Effective Mobility Data Collection

The Do's, Don'ts & Key Takeaways

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Why Mobility Data Matters

Urban transport planning increasingly relies on data to make informed decisions. Mobility data provides critical insights that help cities understand and optimize their transportation systems.

Understand Travel Behavior

Analyze how people move through the city and make transportation choices

Monitor System Performance

Track the efficiency and reliability of transport networks in real-time

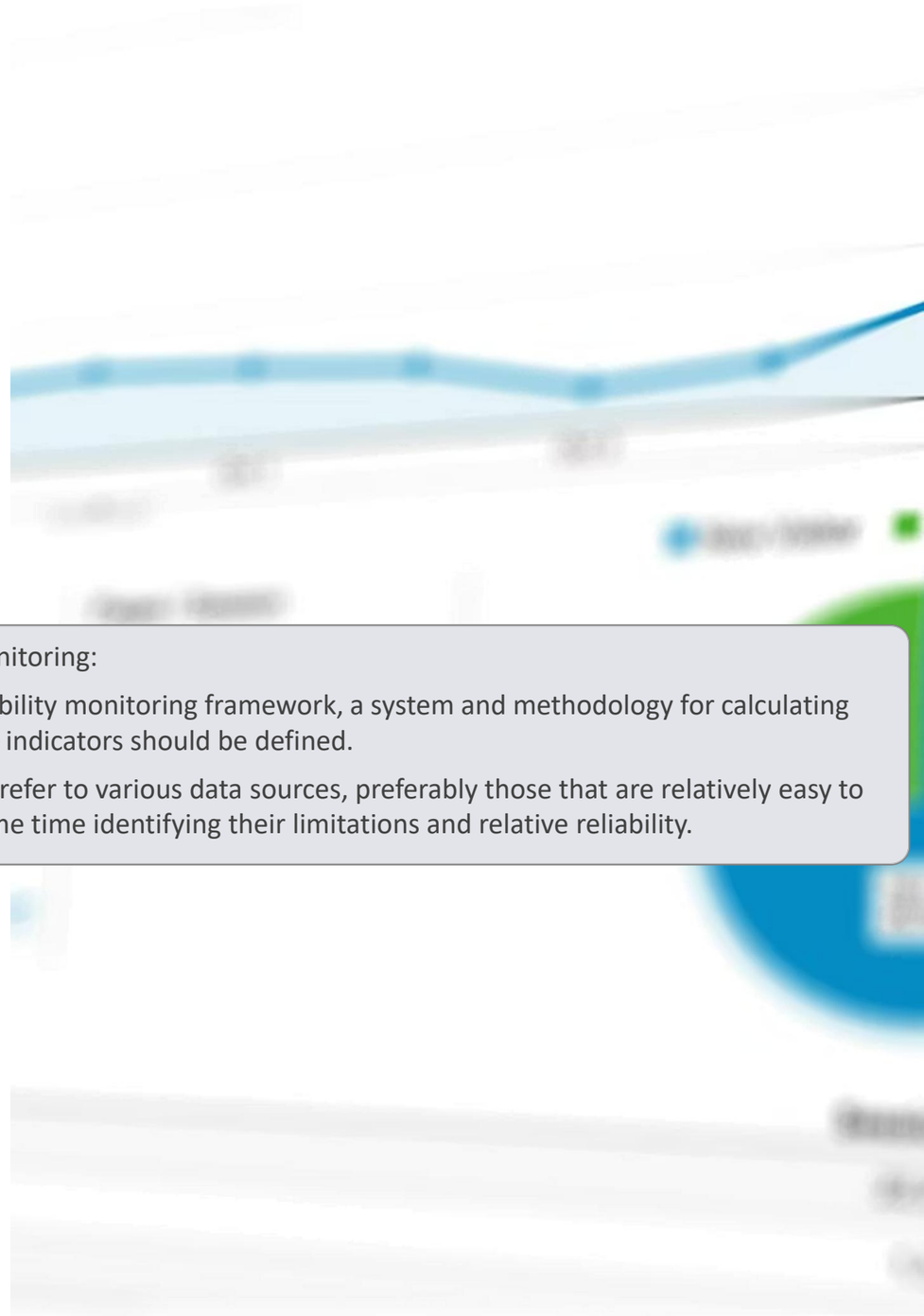
Evaluate Policy Effectiveness

Measure the impact of new initiatives and infrastructure investments

Support Evidence-Based Decisions

Replace assumptions with data-driven insights for better planning outcomes

Poor data collection leads to poor conclusions. Reliable planning requires reliable data and correct interpretation.



In the context of SUMP monitoring:

- When developing a mobility monitoring framework, a system and methodology for calculating individual performance indicators should be defined.
- This methodology may refer to various data sources, preferably those that are relatively easy to obtain, while at the same time identifying their limitations and relative reliability.

The Growing Ecosystem of Mobility Data

Today's mobility analysis can leverage diverse data sources, each offering unique perspectives on urban transportation patterns.

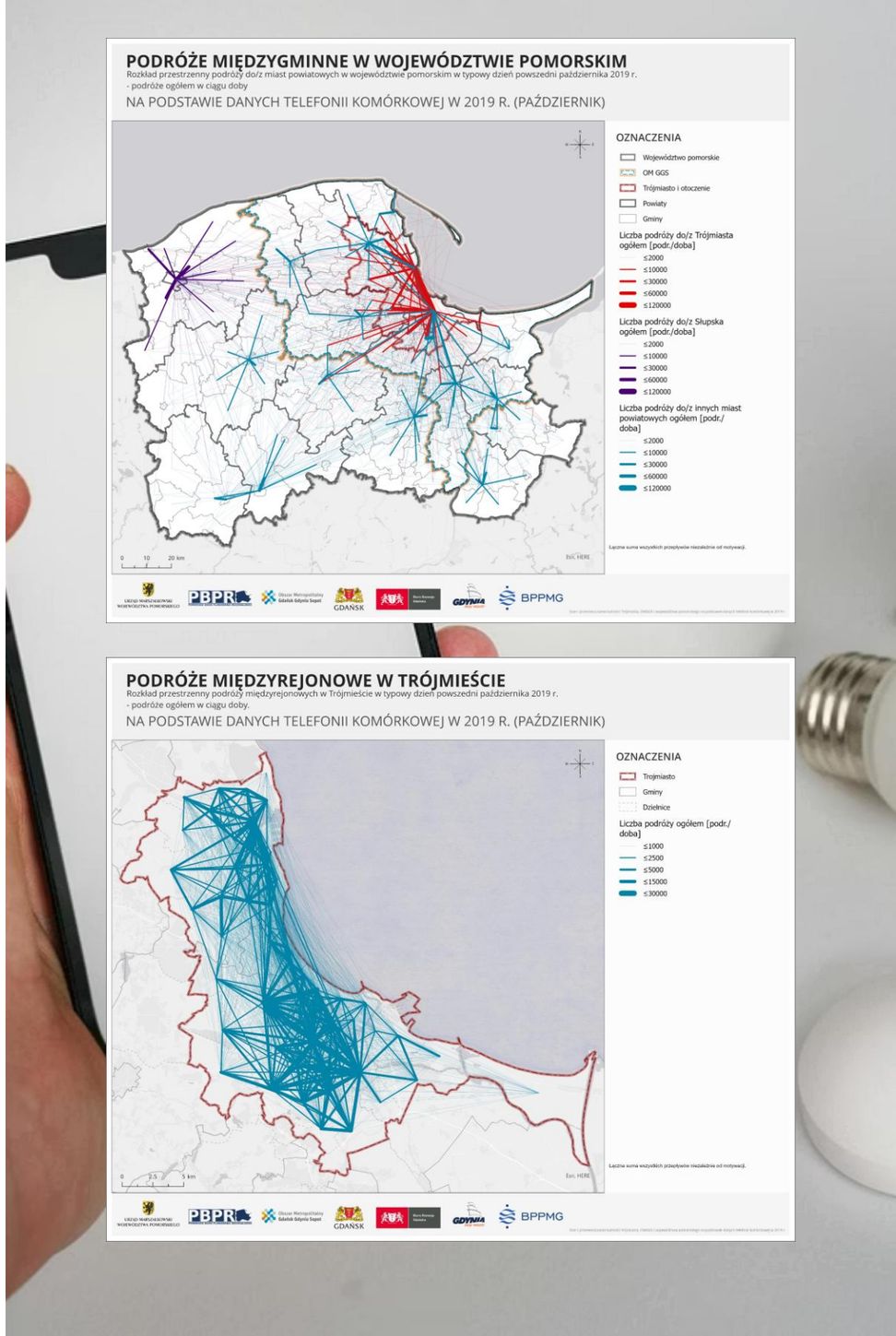
Traditional Data Sources

- *Household travel surveys*
- *Traffic counts*
- *Passenger counts*
- *Statistical data*

Modern Data Sources

- *Mobile phone data*
- *GPS and floating car data*
- *Ticketing systems*
- *ITS sensors*
- *Shared mobility platforms*
- *Bank card data*

> *Each dataset has different strengths and biases. Understanding these characteristics is essential for accurate analysis.*



The Core Challenge

More Data ≠ Better Analysis

Increased availability of mobility data doesn't automatically translate to improved conclusions. Analysts must navigate several challenges.

Incomplete Datasets

Missing segments or time periods that create gaps in understanding

Sampling weaknesses

Non-representative samples that affect results and conclusions

Incorrect Interpretation

Misunderstanding what data actually represents and measures

Inconsistent Methodologies

Different collection methods that make comparison difficult

Lack of Validation

Using unverified data without quality checks or cross-validation

DO: Combine Multiple Data Sources

The most reliable mobility analyses integrate different types of data to create a comprehensive picture of transportation patterns.

Data Source	*What It Tells Us*
Ticketing Systems	*Passenger demand and boarding patterns*
Traffic Counts	*Vehicle volumes and flow rates*
Travel Surveys	*Detailed travel behavior and preferences*
Mobile Phone Data	*Origin-destination flows and trip patterns*

Cross-Validation

Verify findings across multiple sources

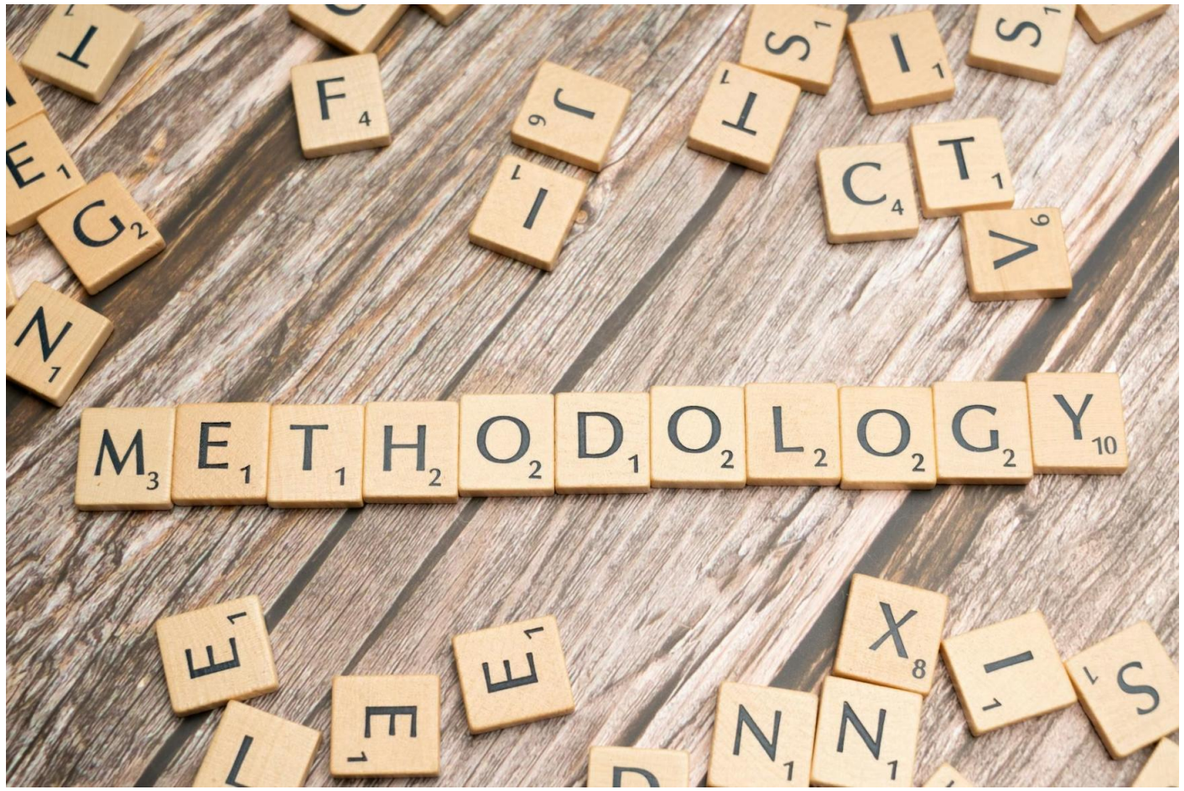
Better Spatial Coverage

Fill gaps in geographic representation

Higher Reliability

Reduce uncertainty through redundancy

DO: Understand Data Collection Methods



Critical Questions

Before using any dataset, analysts must understand fundamental characteristics that affect data quality and interpretation.

- *How the data is collected*
- *Who or what the data represents*
- *How complete the data is over time*
- *How detailed the data is (also spatial delimitation)*
- *Possible biases and limitations*

Example: Mobile phone data provides excellent origin-destination flows but performs poorly for mode choice identification and depends heavily on operator market share.

DO: Validate and Clean the Data

Data must always be verified before analysis. Validation is often more important than the modeling itself.

Data Cleaning

- *Remove outliers*
- *Detect missing values*
- *Identify anomalies*

Validation

- *Compare with historical data*
- *Compare methodology*
- *Check against independent datasets*
- *Verify logical consistency*

DON'T: Confuse Correlation with Causation

A frequent analytical mistake that leads to incorrect policy recommendations and misguided investments.

Example: Public Transport Ridership Increase

- *Service quality improved*
- *Fuel prices increased*
- *Population grew*
- *Road congestion worsened*

> *Observed correlation does not automatically imply causation. Always investigate underlying factors.*

DON'T: Rely on a Single Dataset

Single datasets rarely represent the full transportation picture. Using multiple complementary sources is essential for accurate analysis.

Mobile Phone Data Risk

The operator has varying market shares across different regions, which makes it difficult to extrapolate the sample to the population.

Ticket Data Risk

It is often challenging to convert the number of trips from monthly tickets into the actual number of journeys. / Do we know the trip origin and destination?

Traffic Count Risk

When were the measurements taken? Were they taken on the same day? Were there any disruptions on the network?

One dataset equals partial reality. Good analysis always uses multiple complementary sources.

Key Takeaways

Effective mobility data analysis requires a systematic approach that combines technical rigor with critical thinking.

Combine Multiple Sources

Integrate diverse datasets for comprehensive insights

Understand Collection Methods

Know how data was gathered and its limitations

Validate Carefully

Verify data quality before analysis

Interpret Critically

Question assumptions and avoid bias

Use Models Responsibly

Remember models are simplifications of reality

Final Thought:

The challenge today is not due to a lack of mobility data, but using it responsibly and intelligently. Good planning depends on:

Data Quality + Analytical Competence + Expert Judgment

Data should support decisions — not replace critical thinking.

Examples of data sources

Surveys & Interviews

Traffic Counting Cameras

Bluetooth/WiFi Sensors

Floating Car Data (FCD)

SIM Card Data

Mobile Phone Data

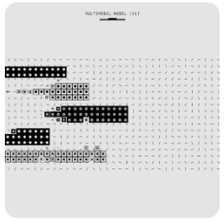
Payment Card Data

Macroscopic Traffic Models

Ticketing Data

Public Transport Vehicles

Drones



Other Sources

Understanding urban mobility relies on integrating data from various innovative sources, each offering unique insights into how people and goods move within a city.

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