Positium Data Mediator: Official Statistics from Mobile Positioning Data

Cases of Estonia, Indonesia and Oman
About Positium

Why
We provide good data and analytics for better decision making, to make a difference to society

What
Methodology and technological platform for processing mobile positioning data for human mobility monitoring, analyses and statistical indicators

How
We are constantly looking for innovation and solutions for common problems and challenges, while always prioritising quality
Positium MPD Projects Globally

[Map showing MPD projects globally with areas marked in blue]

- Home Markets
- Previous Projects
Positium Data Mediator

A platform for processing mobile positioning data (MPD) into statistical indicators

Platform for extracting and processing mobile positioning data into specific applications (population, de facto population, tourism, mobility and commuting, OD-matrices, footfall, heat-maps, event identification, etc.).

Positium Data Mediator:
• Data from one or several mobile network operators
• Central or distributed implementation (NSO or distributed to MNOs)
• Aggregated results extrapolated to general population
• API for data dissemination (SDMX, JSON, XML)
• Visual applications & dashboards
General Data Model for All Domains

- Each subscriber’s data is modelled
- Data model matches official definitions
- Statistical concepts are applied in late data processing
- Allows combining and comparing results for many domains
- Most useful for official statistics
Methodology

The methodology for processing mobile positioning data has been developed with University of Tartu.

- Inbound, outbound and domestic data
- Raw data cleansing, formatting, preparation and QA
- Anchor point model for identification of Country of Residence, Place of Residence, work-time, second home, Usual Environment, and other regular meaningful locations
- Spatial calculations based on adaptive grid
- Continuity data model for most realistic representation of reality model
- Identification of regular and tourism trips (inbound, outbound, domestic)
- Aggregated statistical indicators for hour, peaks, days, weekdays, weekends, months, quarters, years, or custom periods
- Tools for visualisation of data (animations, maps, infographics, applications, dashboards, etc.)
Centralized or Distributed

• Centrally located to NSO or Cloud

• Distributed to MNOs and aggregated data merged centrally
Case: Official Travel Statistics Estonia (2009-...)

Background


Eesti Pank is responsible for external sector statistics

Border-crossing statistics is an important input for the compilation of Estonian monthly/quarterly balance of payments (BoP), where the exports and imports of travel services play a remarkable role

Need for New Data Sources

The rapidly changing external environment forces Eesti Pank to look for new data sources for border-crossing statistics

Growing worldwide travels – challenge for traditional data sources

Estonian membership in the visa-free Schengen Area (no border controls and respective data collection)

Budget cuts in Statistics Estonia in 2009: quarterly Border Surveys and Travel Agent’s statistics were removed from the statistical programme as of 2010
Cooperation model

Official statistics producer

Specifying Needs
MPD collection through mandate of the Statistics Act

Data collection and processing (monthly)
Calculation of time series
Methodological updates
Maintenance of MPD processing system

Data control and validation procedures
Comparison to indirect data sources and logical checks
Estimation of travel exports and imports for BOP (using credit card data)

Dissemination on the web since 2012

Private 3rd Party Processor

Official statistics producer
Result

Client: Central Bank of Estonia
(the official travel statistics provider in Estonia)

- The longest-running official statistics time series based on MPD in the world – since 2008 – 14 years!
- Quality checks done by statisticians at the bank
- Results compared to survey method:

4x faster
200x sample size
12x country-level breakdown
2.5x more cost-efficient
100% less burden on tourists
Case: Cross-Border Tourism Statistics Indonesia (2017-…)

300,000 km² of border area - measuring the previously unmeasured

Ministry of Tourism / BPS Statistics Indonesia used Positium Data Mediator to measure cross-border tourism
Pilot Project until Implementation

**Statistical production process** *GSBPM (General Statistical Business Process Model)*

<table>
<thead>
<tr>
<th><strong>Design</strong></th>
<th><strong>Build</strong></th>
<th><strong>Produce</strong></th>
<th><strong>Analyse</strong></th>
<th><strong>Disseminate</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BPS</strong> – specifying needs of users</td>
<td><strong>Positium</strong> – collection and frame design</td>
<td><strong>Positium</strong> – build collection</td>
<td><strong>Positium</strong> – build processing</td>
<td><strong>BPS with Positium</strong> – analyse and validate outputs</td>
</tr>
<tr>
<td><strong>BPS</strong> – outputs and variables</td>
<td><strong>Telkomsel</strong> – Set up collection</td>
<td><strong>Telkomsel</strong> – run collection</td>
<td><strong>Telkomsel</strong> – produce variables</td>
<td><strong>BPS</strong> – disseminate dashboards, press releases and fulfill user requirements</td>
</tr>
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<td><strong>Positium with BPS</strong> – processing design</td>
<td><strong>BPS</strong> – weight and aggregate</td>
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<td><strong>BPS</strong> - evaluate</td>
</tr>
<tr>
<td></td>
<td><strong>Positium</strong> – QA and metadata tools</td>
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<td></td>
<td><strong>BPS</strong> – output QA</td>
</tr>
</tbody>
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Monthly Production

Statistical production process*  

**Design** | **Build** | **Produce** | **Analyse** | **Disseminate**
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**Telkomsel** – Set up collection

**Telkomsel** – run collection

**Telkomsel** – produce variables

**Positium** – Maintain processing system

**BPS** – weight and aggregate

**BPS with Positium** – analyse and validate processing outputs

**BPS** – disseminate dashboards, press releases and fulfill user requirements

**Positium** – Input QA

**BPS** – output QA

* GSBPM (General Statistical Business Process Model)
Case: Oman National Statistical System (2021)

Mobile positioning data for official statistics for the measurement of tourism, population, and commuting in the Sultanate of Oman

Data from 2 Mobile Network Operators (100%)
Processed using 1 system (Positium Data Mediator) in Government Cloud
Data Flow

PHASE I

- Clean & Data QA
- Request for Corrections
- Raw data
- Raw data Cleaned

PHASE II

- Process data
- Methodology
- Data Model & Results

PHASE III

- Processed Data (Data Model)
- Aggregated Results

Interactive, Applications, Maps, Animations

Pilot Project Final Report
Results based on adaptive grid (grid that adapts to level of activity)

- Home: place of residence
- Secondary home
- Main daytime location
- Other regular locations
Return on Investment

• Faster processing and production of statistical indicators
• No burden on the respondents
• **Supplementary and new indicators, and breakdowns which were previously unavailable**
• Improved temporal and spatial coverage and accuracy of the data
• **Applicability in a wide range of domains**
• **Cost-efficiency compared to the existing methods for same magnitude**