Service quality monitoring vs. infrastructure quality monitoring

Brussel, 14/3/2016

Antonio Carrarini
JASPERS - Vienna Office
PT Infrastructure: expensive, complex, long lasting, public

Source: Berliner Zeitung
Infrastructure quality as a prerequisite for service quality

Operator's own infrastructure

PT Infrastructure

PT Operator

PT Users

Quality of infrastructure
- Reliability
- Availability
- Maintainability
- Safety
- etc.

Quality of service
- Reliability
- Punctuality
- Continuity
- Accessibility
- Affordability
- Cleanliness
- Safety
- etc.

Very different institutional setups for ownership and operation of PT infrastructure exist.

Infrastructure is a public good. Economical and technical optimal use on the long term is to be aimed at.
The mechanism behind infrastructure quality/performance monitoring

- How to define and measure the KPI?
- What are the intervention thresholds?
- Who pays for what? (Measuring is also very expensive!)
- What incentives towards efficiency exist?
Infrastructure monitoring: the fundamental steps

1. Defining, targeting
   - Definition of scope, inventory
   - Definition of goals (technical/political analysis)
   - Definition of criteria and indicators (quantitative/qualitative, possibly referring to established civil engineering standards)
   - Definition of thresholds for interventions and targets

2. Measuring, assessing
   - Definition and implementation of monitoring strategy
   - Development and deployment of data management system
   - Execution of on-field measurement
   - Set-up of models for forecasting (incl. calibration, etc.)
   - Assessment of results and feedback to step 1.

3. Planning, prioritizing
   - Prioritization of maintenance and renewal activities interventions
   - Analysis of constraints and inter-dependencies
   - Scheduling/Budgeting based on urgency and necessity, available resources, capacities, procurement strategy, etc.
   - Seeking of global, long-term optimum (maintenance vs. renewal, quality vs. cost, etc.)

4. Projecting, Executing
   - Preparation and execution of periodic/extraordinary maintenance and renewal interventions
   - Coordination of activities
   - Minimization of impacts on operations and users
   - Ex-post analysis of cost effectiveness (effect on indicators)
Conflicting requirements and expectations on infrastructure monitoring

### Needs of the AUTHORITY
(Accountability)

- Reporting (aggregated indicators, summaries, overviews)
- Data Management (storage, evaluation, representation of data)
- Operation (details, forecasts, interface to transport operations)

### Needs of the OPERATOR
(Efficiency of operation)

- Reporting (aggregated indicators, summaries, overviews)
- Data Management (storage, evaluation, representation of data)
- Operation (details, forecasts, interface to transport operations)

### Authority:
Responsible administrative departments, political decision makers

### Operator:
Responsible operative departments and management

---

Relevance for the Authority

Relevance for the Operator
The two **sides** of infrastructure monitoring: Accounting vs. Engineering

<table>
<thead>
<tr>
<th><strong>Accounting</strong></th>
<th><strong>Engineering</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investment Review</strong></td>
<td>- (Cumulated) expenditure, quantity, frequency of maintenance, …</td>
</tr>
<tr>
<td></td>
<td>- Aging rates, trends of technical indicators, cumulated damages, structural wear and tear, long-term re-investment, …</td>
</tr>
<tr>
<td><strong>Sustainability monitoring</strong></td>
<td>- Availability, reliability, functionality, disruptions, delays, failures, …</td>
</tr>
<tr>
<td></td>
<td>- Age, civil engineering indicators from norms, …</td>
</tr>
<tr>
<td><strong>Service level monitoring</strong></td>
<td><strong>Service level indicators</strong></td>
</tr>
<tr>
<td><strong>Condition monitoring</strong></td>
<td><strong>Structural state indicators</strong></td>
</tr>
</tbody>
</table>

**Input indicators** = spending, quantity, frequency, etc. of maintenance activities  
**Output indicators** = ability of the infrastructure to perform and fulfill its duties
Conclusions

- There exist out-of-the-box infrastructure/asset monitoring systems for some types (subsystems) of PT infrastructure
  - … but they do not suit complex infrastructure or specific set-ups nor do they offer an holistic approach yet.
- There exist good practice for managing the relationship between authority and operator of the infrastructure
  - … but only large efforts by and resources from the involved parties (and external support as needed) can lead to success.

Source: Berliner Morgenpost
For info or further questions on this presentation, please contact:

Antonio Carrarini
Transport specialist
a.carrarini@eib.org

www.jaspersnetwork.org
jaspersnetwork@eib.org
For info or further questions on this workshop and the activities of the JASPERS Networking Platform, please contact:

JASPERS Networking and Competence Centre

jaspersnetwork@eib.org

www.jaspersnetwork.org