Research on the relevance and impact of technical versus non-technical performance monitoring methods

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Plan of presentation

• Main research question on success
• Reasons of the public transport success
• View of systems theory on PT performance monitoring methods
• Public transport quality loop
• Generation Z (e.g. value for money)
• Web 3.0
• Résumé
• Literature
How to explain success or fail?

• What is a good public transport system?
• The hierarchy of indicators in traditional approach
  1. ticket prices
  2. travel time
  3. number of changes
  4. accessibility of seats
  5. safety
  6. access (distance) to stops
Reasons of PT success

• fair and easy to understand fare system
Reasons of PT success

• high quality infrastructure „Le tramway embelli la ville”
Reasons of PT success

- travel speed,
- frequency,
- reliability...

own photo, Dziennik Łódzki, wikicommmons (Radomil)
Reasons of PT success

• culture – the urban style of life
Reasons of PT success

• accessibility for all: spatial, technical, architectonical ...
The reasons for success or failure

**public transport system**

**organisational solutions:**
- frequency (time tables) and reliability
- routes of line
- staff
- dynamic information
- cleanliness

**technical solutions:**
- travel time
- design of rolling stock
- access to PT stops (way to PT stops)
- equipment of PT stops
- ITS...

**economic solutions:**
- fare system
- ticket accessibility
- marketing
- ...

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**environment**

**social conditions:**
- social values (e.g. ecological awarness)
- safety and security
- demography
- the role of ICT
- ...

**physical conditions:**
- urban structure
- road network and priorities (bus lanes)
- competition of cars, bikes, bicycles
- availability of parking spaces
- ...

**economic conditions:**
- oil prices
- paid parking and/or congestion charge
- earnings and its realation to prices
- labor market
- ...

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own compilation
How to monitoring the effects?

Main research question: the effects of actions.

equifinality

cause A

cause B

cause C

outcome 1

multifinality

cause D

outcome 2

outcome 3

outcome 4
Methodological aspects

Main problem of research: the role equifinality and inertia.

Which action (impulse 1, 2 or mixture of both) caused the outcome 1? What role has inertia? What role has environment?
The Public Transport Quality Loop

**performance monitoring in public transport**

- **passengers, citizens**
  - measuring of participation and communication
  - measuring users satisfaction
  - expected quality

- **PT authorities, operators**
  - measuring system performance
  - delivered quality
  - targeted quality

own compilation based on Dhingra 2011
Research on technical performance monitoring methods

The main directions of research:

• big data – inference from an ocean of data (tickets, ITS, passenger counters)
• time geography – potential use of data from mobile phones
Research on technical performance monitoring methods

Important things to do:
- dynamic approach to the competition between modes (caused by infrastructure supply /development, prices of oil, travel time changes etc.)
Research on non-technical performance monitoring methods

Main challenges for researchers:

• not only surveys but also in-depth interviews with specific groups of users (e.g. gender mainstreaming in transport planning in Freiburg)

• creation of wide consensus for the public transport solutions (ex ante surveys on the PT quality, e.g. tram in Brest)

• analysis of the link between culture and mobility – „peak car theory”
Research on non-technical performance monitoring methods

A trend towards "demotorization" is developing mainly among the younger generation in industrial countries

Example: Japan – Ranking of interests of university students [%]

<table>
<thead>
<tr>
<th>Past students (now in 40s, 50s)</th>
<th>Past students (now in 20s, 30s)</th>
<th>Current students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No of interests (avg.):</strong> 5.22</td>
<td><strong>No of interests (avg.):</strong> 7.09</td>
<td><strong>No of interests (avg.):</strong> 8.56</td>
</tr>
<tr>
<td>Rank</td>
<td>Products/Services</td>
<td>N=300</td>
</tr>
<tr>
<td>1</td>
<td>Fashion</td>
<td>35.7</td>
</tr>
<tr>
<td>2</td>
<td>Domestic travel</td>
<td>34.0</td>
</tr>
<tr>
<td>3</td>
<td>Dining out</td>
<td>32.0</td>
</tr>
<tr>
<td>4</td>
<td>Reading</td>
<td>31.7</td>
</tr>
<tr>
<td>5</td>
<td>Music</td>
<td>31.3</td>
</tr>
<tr>
<td>6</td>
<td>Movies</td>
<td>27.7</td>
</tr>
<tr>
<td>7</td>
<td>Cars</td>
<td>27.0</td>
</tr>
<tr>
<td>8</td>
<td>PC</td>
<td>25.7</td>
</tr>
<tr>
<td>9</td>
<td>Foreign travel</td>
<td>23.7</td>
</tr>
<tr>
<td>10</td>
<td>Audio</td>
<td>20.3</td>
</tr>
<tr>
<td>11</td>
<td>Camera</td>
<td>10.7</td>
</tr>
<tr>
<td>12</td>
<td>TV</td>
<td>17.0</td>
</tr>
<tr>
<td>13</td>
<td>Animation, Manga</td>
<td>16.7</td>
</tr>
<tr>
<td>14</td>
<td>Jewelry</td>
<td>15.0</td>
</tr>
<tr>
<td>15</td>
<td>Sports goods</td>
<td>14.0</td>
</tr>
<tr>
<td>16</td>
<td>Cosmetics, Beauty salon</td>
<td>12.3</td>
</tr>
<tr>
<td>17</td>
<td>Watches</td>
<td>11.3</td>
</tr>
<tr>
<td>18</td>
<td>Licenates, Learning</td>
<td>10.3</td>
</tr>
<tr>
<td>19</td>
<td>Portable Music Players</td>
<td>10.0</td>
</tr>
<tr>
<td>20</td>
<td>Motorcycles</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Source: JAMA (Market research of personal vehicles, 2008)

JASPERS Networking Platform: Workshop Public Transport Quality Monitoring | Brussels 14.03.2016 | Michał Beim | Research on the relevance...
Research on non-technical performance monitoring methods
Comparision of performance monitoring methods

Technical
• bigger and bigger data sets
• needs for efficient data mining
• could be open for scientist, NGO’s

Non-technical
• growing importance
• strong correlation with the culture (e.g. urban style of life)
• the most important channel is the consumer services – a need for efficient methods allowing the generalization of knowledge
Generation Z and sharing economy

Post-Millennials:
• shared-use mobility
• Uber as complementary form to public transport
• decreasing car use
• value for money
• interest in open source and collaborative work

credit: puzzлепartner.co and targetmarketingma.com
Social media and Web 3.0 brought:

• quicker and easier way of contact customer - company
• exchange of emotions
• mental maps of PT
Public participation in PT development

• development of the open source tools allows to participate wide range of citizens, academics, students etc. in PT development

• SUMO DLR, AequilibraE, OpenRouting, OSM...
Résumé

• strong local context of analysis
• big data makes easier access to technical methods of performance monitoring methods
• still high importance of personal contact
• generation Z and sharing economy
• growing role of social media (Web 3.0)
• high importance of public dialogue
Literature


• „Uses of Social Media in Public Transportation” TCRP Synthesis 99, 2012

• „State DOT Public Transportation Performance Measures” NCHRP, 2011

Thank you for your attention!

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For info or further questions on this workshop and the activities of the JASPERS Networking Platform, please contact:

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