BENCHMARKING URBAN TRANSPORT - A STRATEGY TO FULFIL COMMUTER ASPIRATION

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What is Benchmarking?

- According to World Bank Report on “Monitoring and Evaluation for Results” Benchmarking has been described as below:

To benchmark is to compare performance against a standard. As part of an effort to improve the effectiveness of Monitoring and Evaluation (M&E) in the policy cycle, benchmarking can be useful in three ways. First, benchmarking can help place an outcome in context. Was the achievement good, bad, or indifferent? Second, benchmarking can help assess the reasonableness of targets that may be set. Third, benchmarking can help identify specific regions or subgroups whose exceptionally good or poor results hint at what factors drive performance.

- Definition clearly highlights that Benchmarking is a tool for Evaluation and Monitoring the Process and Outcomes
What is Benchmarking?

- National Coordinating Centre for Public Engagements, Bristol - Briefing Report, Series 1 titled “Summary: Auditing, Benchmarking and Evaluating Public Engagement” states that for effective evaluation, the flow of enquiry is as below:

- Audit
- Benchmarking
- Evaluation

- This clearly indicate Benchmarking as an Evaluation Tool
Benchmarking UT in India

### Public Transport facilities

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;= 60</td>
<td>&gt;= 0.6</td>
<td>&gt;= 1</td>
<td>&lt;= 4</td>
<td>&lt;= 1.5</td>
<td>75 - 100</td>
</tr>
<tr>
<td>2</td>
<td>40 - 60</td>
<td>0.4 - 0.6</td>
<td>0.7 - 1</td>
<td>4 - 6</td>
<td>1.5 - 2.0</td>
<td>50 - 75</td>
</tr>
<tr>
<td>3</td>
<td>20 - 40</td>
<td>0.2 - 0.4</td>
<td>0.3 - 0.7</td>
<td>6 - 10</td>
<td>2.0 - 2.5</td>
<td>25 - 50</td>
</tr>
<tr>
<td>4</td>
<td>&lt; 20</td>
<td>&lt; 0.2</td>
<td>&lt; 0.3</td>
<td>&gt; 10</td>
<td>&gt; 2.5</td>
<td>&lt;= 25</td>
</tr>
</tbody>
</table>

### Overall Level of Service of Public Transport facilities City wide

Calculated LoS = (LoS₁ + LoS₂ + LoS₃ + LoS₄ + LoS₅ + LoS₆) and identify overall LoS as mentioned below

<table>
<thead>
<tr>
<th>Overall LoS</th>
<th>Calculated LoS</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt; 12</td>
<td>The City has a good public transport system which is wide spread and easily available to the citizens. The system provided is comfortable.</td>
</tr>
<tr>
<td>2</td>
<td>12 - 16</td>
<td>The City has public transport system which may need considerable improvements in terms of supply of buses/ coaches and coverage as many parts of the city are not served by it. The frequency of the services available may need improvements. The system provided is comfortable.</td>
</tr>
<tr>
<td>3</td>
<td>17 - 20</td>
<td>The City has a public transport system which may need considerable improvements in terms of supply of buses / coaches and coverage as most parts of the city are not served by it. The frequency of the services available needs improvements. The system provided is not comfortable as there is considerable over loading.</td>
</tr>
<tr>
<td>4</td>
<td>21-24</td>
<td>The city has very poor/no organized public transport system</td>
</tr>
</tbody>
</table>

Planning Mobility for City's Sustainability
# Literature Study

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Indicators Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Services Benchmarking: Public Transport in San Francisco</td>
<td>Cost effectiveness and efficiency, Service Quality, Maintenance Administration, Productivity (delivered/perceived service quality)</td>
</tr>
</tbody>
</table>
## Literature Study

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<thead>
<tr>
<th>Study Title</th>
<th>Indicators Identified</th>
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<tbody>
<tr>
<td>An analysis of Public Bus Transit Performance in Indiana</td>
<td>User service, Financial performance, Bus productivity, labour productivity</td>
</tr>
<tr>
<td>Bus Transit Service Quality Monitoring in UK: A Methodological Framework</td>
<td>Physical indicators, Operational Indicators</td>
</tr>
<tr>
<td>Evaluating Urban Bus Performances: A Comparative Analysis of Brazilian Methodologies</td>
<td>Fleet Age, Service Depot, Fitness, Timetable, Fleet Size, Ridership, User Complaints, Penalties, Fleet Renewal Policy, Fuel Consumption (operating ratio)</td>
</tr>
<tr>
<td>Public Transport Performance Measurement System for Switzerland</td>
<td>TEMPORAL-On time performance, Headway adherance, Speed etc. SPATIAL-Passenger load, section ridership etc.</td>
</tr>
<tr>
<td>Service Level Benchmarks for Urban Transport, India</td>
<td>Presence of Organized PT System, extent of supply/availability of PT Sytem, Service Coverage, Waiting Time, Level of Comfort, Bus specifications</td>
</tr>
<tr>
<td>Study Title</td>
<td>Indicators Identified</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Quality Factors in Public Transport</td>
<td>Time, Space, Obstructions, Reliability, Availability</td>
</tr>
<tr>
<td>Guide to Sustainable Transportation Performance Measures</td>
<td>Accessibility, Bicycle and Pedestrian mode share, vehicle miles travelled per capita,</td>
</tr>
<tr>
<td></td>
<td>Mixed land use percentage, affordability, PT occupancy, transit productivity</td>
</tr>
<tr>
<td>Transit Performance Measurement</td>
<td>Financial Indicators, Ridership, Routes, Service Quality, Level of Service-Revenue</td>
</tr>
<tr>
<td></td>
<td>Miles, number of complaints, Safety</td>
</tr>
<tr>
<td>Transit System Evaluation Process</td>
<td>Physical parameters, Accessibility, vehicle miles travelled, occupancy, Transit and</td>
</tr>
<tr>
<td></td>
<td>Operational productivity</td>
</tr>
<tr>
<td>A Balanced Approach to Normalizing Bus Operations Data for Performance</td>
<td>Passenger trip length, passenger kilometers, network efficiency, vehicle planning</td>
</tr>
<tr>
<td>Benchmarking</td>
<td>capacity, commercial speed, revenue and vehicle hours</td>
</tr>
</tbody>
</table>
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<tr>
<td>Two Level Evaluation of Public Transport Performances</td>
<td>Macro- Operation time, operating speed Micro- Dwell Time, Intersection delay, speed per segment, running time</td>
</tr>
<tr>
<td>Diagnosing Transportation: Developing Key Performance Indicators to Urban Transportation System</td>
<td>Affordability and Accessibility, Mobility, Operational efficiency, Environmental and Resource conservation, Safety</td>
</tr>
<tr>
<td>A Methodology for Performance Measurement in Public Transport Industry</td>
<td>Cost, Productivity, Resource utilization, Maintenance, Perceived Service Quality, Safety and security</td>
</tr>
<tr>
<td>Public Transport Capacity and Quality: Development of LOS based Evaluation Scheme</td>
<td>Time, Space, Obstructions, Reliability, Availability</td>
</tr>
</tbody>
</table>
Indicators – Physical

- Population of the City
- Fleet Size
- Utilization Ratio of Bus
- Depot and Maintenance Facility
- Average age of the Fleet
- No. of Breakdowns
- Carrying Capacity
- Bus Stops/Total Stops
- Ridership
Indicators - Operational

- Fleet Fuel Efficiency - Mileage (km/litre)
- Operating kilometers per day
- Revenue Miles
- Dead Run / Dry Run
- Duration of operation
- Passenger Kilometers
- Passenger Kilometers per litre
- Speed (Avg and Running)
- Maintenance Cost per Bus per Day
Indicators – Financial

- Operating Cost
- Traffic Revenue
- Operating Ratio and IRR
- Profit/Loss
- Fare Box Revenue as %age of Operating Cost
- Passenger Kilometers (Revenue) also termed as Bus Productivity
- Quantifiable Social Benefits
Indicators - Organizational

- Labour Productivity
- Staff per Bus
- Passenger Kilometers per Employee per day
- Incentives and Penalties
Indicators – Perception

- Passenger Density/Average Occupancy at given time
- Safety
- Cleanliness
- Satisfaction
- Number of Complaints/day
- Accidents/month
- Thefts or Sexual Harassment Cases/Month
- Illumination in Bus and Stops
- Fatalities per 1000 km
- On time Performance (%age)
- Online Tracking, VMS and ITS facility
Indicators - Social

- Provision for Travel Concession for elderly, differently able, Students and poor

- Monthly travel expenditure as %age of Salary

- Transfer of Inflation on Fares

- %age of total Trips on Public Transport
Indicators - Environmental

• Carbon Emissions
• Suspended Particulate Matters (SPM)
• Carbon Credits
• Modal Shift in favor of Public Transit
• Noise Level
• Per capita Energy Consumption
• Emission per km
Understanding of Benchmarking

• Benchmarking is a mean to Evaluate
• The Parameters for Benchmarking are an important factor for effective Benchmarking and Evaluation
• Parameters for Benchmarking Urban Transport can be broadly classified into following categories:
  • Physical
  • Operational
  • Financial
  • Organizational
  • Perception
  • Social
  • Environmental
Questions in Mind

• Is the present Public Transport Service Evaluation Process, based on Service Level Benchmarks (SLBs) in India, reflecting current scenario?

• Do we need to include other Parameters and Indicators for evaluating Public Transport and rationalize the Public Transport Evaluation Mechanism?

• What are the other Parameters and Indicators which should be included in the Evaluation Methodology to make it effective?

• What is the perceived weight allocated by the User to various Parameters and Indicators used for Public Transport Evaluation?
Basic Concept of Evaluation

Inter alia comparison amongst the Sample should be balanced

“Can we evaluate 2\textsuperscript{nd} Std Student on Higher Secondary Scorecard ???”
No !!!
The Research

To understand the Commuters and their Aspirations from Public Transport Services operating in their City, a Study was carried out in various Public Transport Modes operating in Bhopal.
About the Study

The interviews were conducted to understand the Commuter Profile at following Bus Stops

- Board Office Square
- Habibganj Railway Station

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Commuter Interview (in nos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus Rapid Transit (BRT)</td>
<td>38</td>
</tr>
<tr>
<td>City Bus</td>
<td>34</td>
</tr>
<tr>
<td>Mini Bus</td>
<td>36</td>
</tr>
</tbody>
</table>
Glimpse of the Survey
The Service

Mini Bus Service

Standard Bus Service

The BRTS
## The Survey Finding

### Commuters Age Profile

<table>
<thead>
<tr>
<th>Age Group</th>
<th>BRTS</th>
<th>City Bus</th>
<th>Mini Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>10%</td>
<td>5%</td>
<td>20%</td>
</tr>
<tr>
<td>20-35</td>
<td>30%</td>
<td>45%</td>
<td>10%</td>
</tr>
<tr>
<td>36-50</td>
<td>20%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>20%</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>
The Survey Finding

Gender Profile

- BRTS
- City Bus
- Mini Bus

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City Bus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mini Bus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Red: Male
- Pink: Female
The Survey Finding

Commuter Qualification

- BRTS
- City Bus
- Mini Bus

- < 10
- 10th to 12th
- Graduate
- PG and above
The Survey Finding

Commuter Income

- BRTS
- City Bus
- Mini Bus

Percentage:
- < 5000
- 5000-10000
- 10000-20000
- 20000-50000
- > 50000
The Study Finding

The Respondents were also requested to rate the priority of the aforementioned identified attributes on the Scale of 1-10, where 1 is least important and 10 is most important, the analysis of this Response is still in progress.
The Study Findings

• It was quite evident from the Study that:

  – Aspiration of the Commuters from the Public Transport Service is having strong co-relation with the Socio-Economic Characteristic of the Commuter

  – The Benchmarking of the Service Levels offered by Public Transport, shall take into account, the Socio-Economic Character of the City
Research Outcome

Analysis on effectiveness and accuracy of current Benchmarking and Evaluation practice, in India

Set of Parameters and Indicators to evaluate Public Transport Services, with rationale for inclusion.

“A CITY/UA CLASSIFICATION based DYNAMIC SERVICE LEVEL BENCHMARKING METHODOLOGY for INDIAN CITIES”
Thank You !!!