INTEGRATION OF PUBLIC TRANSPORTATION SYSTEMS

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AGENDA

1. Overview

2. MOUD Policies on Public Transportation

3. Public transport scenario of metropolitan cities in India

4. Integration strategies overseas

5. Best Integration Strategy for selected Indian cities
OVERVIEW

- **What?**
  - Operation of public transit modes as one seamless entity.

- **Why?**
  - Meet needs of passenger (comfort, convenience, reduced travel time, costs etc.)
  - Increase patronage of public transport
  - Reduce pollution and congestion levels
  - Provide last mile connectivity

- **How?**
  1. Institutional integration
  2. Operational integration
  3. Physical integration
INSTITUTIONAL INTEGRATION

- Creation of organizational framework for joint planning and operation of transit services.

- Techniques:
  - Tariff Associations
  - Transit Communities
  - Transit Federations
  - Mergers
OPERATIONAL INTEGRATION

- Application of management techniques to optimize allocation of transit resources and coordinate services.

- Techniques:
  - Rationalization of redundant services
  - Matching modes to service requirements
  - Development & Scheduling of feeder route services
  - Unification of fare structure
  - Fare discounts
  - Coordinated public information system
  - Reserved bus lanes and streets
  - Parking controls
PHYSICAL INTEGRATION

Integration of public transport modes with provision of jointly used facilities at intermediate points or at terminals with interchange facilities.

Techniques:
- Intermodal terminals
- Transit Shelters
- Route, schedule and vehicle identification
- Park-and-ride facilities
- Pedestrian facilities
MOUD Policies on Public Transportation

- Optimal modal share for different city sizes
- Capacity of different public transportation modes
- Selection criteria of Mass Rapid Transit modes
## Optimal modal share for different city sizes

<table>
<thead>
<tr>
<th>Population (millions)</th>
<th>Mass Transport</th>
<th>Bicycle</th>
<th>Other modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 0.5</td>
<td>30 – 40</td>
<td>30 – 40</td>
<td>25 – 35</td>
</tr>
<tr>
<td>0.5 – 1.0</td>
<td>40 – 50</td>
<td>25 – 35</td>
<td>20 – 30</td>
</tr>
<tr>
<td>1.0 – 2.0</td>
<td>50 – 60</td>
<td>20 – 30</td>
<td>15 – 25</td>
</tr>
<tr>
<td>2.0 – 5.0</td>
<td>60 – 70</td>
<td>15 – 25</td>
<td>10 – 20</td>
</tr>
<tr>
<td>5.0 +</td>
<td>70 – 85</td>
<td>15 – 20</td>
<td>10 – 15</td>
</tr>
</tbody>
</table>

Source: Traffic and Transportation Policies and Strategies in Urban Areas in India, 1998, MOUD, GOI
## Capacity of different Public Transportation modes

<table>
<thead>
<tr>
<th>Public transport mode</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard size urban bus</td>
<td>32 – 34 seating + standing (AIS 052)</td>
</tr>
<tr>
<td>Mini Urban bus</td>
<td>13 – 22 seating + standing (AIS 052)</td>
</tr>
<tr>
<td>Midi Urban bus</td>
<td>23 – 34 seating + standing (AIS 052)</td>
</tr>
<tr>
<td>Monorail</td>
<td>568 commuter (4 car) &amp; 852 commuter (6 car)</td>
</tr>
<tr>
<td>LRT</td>
<td>200 – 250 passenger per vehicle</td>
</tr>
<tr>
<td>Metro</td>
<td>1200 – 1500 per train trip (4 coach) &amp; 1800 – 2100 per train trip (6 coach)</td>
</tr>
</tbody>
</table>

Source: Urban Bus Specification, MOUD, GOI, Wikipedia, DMRC
# Selection criteria of Mass Rapid Transit modes

<table>
<thead>
<tr>
<th>Mode Choices</th>
<th>PHPDT in 2021</th>
<th>Population (million)</th>
<th>Avg. trip length (kms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro rail</td>
<td>≥ 15,000</td>
<td>≥ 2</td>
<td>&gt; 7 – 8</td>
</tr>
<tr>
<td>LRT</td>
<td>≤ 10,000</td>
<td>&gt; 1</td>
<td>&gt; 7 – 8</td>
</tr>
<tr>
<td>Monorail</td>
<td>≤ 10,000</td>
<td>&gt; 2</td>
<td>5 – 6</td>
</tr>
<tr>
<td>BRT</td>
<td>≥ 4,000 – 20,000</td>
<td>&gt; 1</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>City bus service</td>
<td>&gt; 1 lakh hilly towns</td>
<td>&gt; 2 – 3</td>
<td></td>
</tr>
</tbody>
</table>

# Public Transport Scenario of Metropolitan Cities

<table>
<thead>
<tr>
<th>Feature</th>
<th>Delhi</th>
<th>Mumbai</th>
<th>Chennai</th>
<th>Kolkata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (millions)</td>
<td>16.75</td>
<td>12.47</td>
<td>4.68</td>
<td>4.48</td>
</tr>
<tr>
<td>Major PT modes available</td>
<td>Buses, metro, auto-rickshaws and taxis</td>
<td>Buses, suburban rails, metro, taxis, auto-rickshaws and ferry services</td>
<td>Buses, suburban rails, taxis and auto-rickshaws</td>
<td>Buses, metro, trams, auto-rickshaws and taxis</td>
</tr>
<tr>
<td>PT mode share (%)</td>
<td>43</td>
<td>45</td>
<td>31</td>
<td>54</td>
</tr>
<tr>
<td>Passenger trips/day (lakhs)</td>
<td>1124.9</td>
<td>1124.9</td>
<td>469.8</td>
<td>469.8</td>
</tr>
<tr>
<td>Avg. trip length (km)</td>
<td>10.2</td>
<td>11.9</td>
<td>8.6</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Source: Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, Final report (2008), Wilbur Smith Associates and MOUD
Recommendations for Delhi

As per 12\textsuperscript{th} Five Year Plan:

- Mix of rail and road based system
- Establishment of single authority
- Integration of all public transport modes
- Medium capacity mass transit system for congested areas
- Increase modal split of public transport
- Integrated passenger information system
Recommendations for Mumbai

- **By Dr. S.L. Dhingra:**
  - Integration of Versova-Andheri-Ghatkoper metro and other existing modes
  - Feeder route services
  - Use of battery powered emission free mini buses
  - Bus stops in vicinity of every railway station

- **Vijayshree Pednekar:**
  - Single journey ticket
  - Multimodal passes
  - Fare integration technology
Recommendations for Chennai

- ITDP with Corporation of Chennai (COC):
  - Public cycle sharing system
  - Provision for non-motorized transport policy
  - Improved parking management
Recommendations for Kolkata

Infrastructure Development Finance Company Ltd. and Superior Global Infrastructure Consulting Pvt. Ltd.:

- Increase efficiency of transportation system
- Synchronizing operational timing
- Higher frequency schedule at peak hours
- Allocating movement corridors for each mode according to the traffic volume on different routes
- Unified ticketing system
INTEGRATION STRATEGIES OVERSEAS

- Singapore
- Queensland
- Hong Kong
Singapore

Population: 5.07 mn, PT share: 63%
Queensland

- Population: 1.1 mn, PT share: 26%
- Institutional integration
Hong Kong

- Population: 7.17 mn, PT share: 88%
Best Integration Strategy for selected cities

- Delhi
- Mumbai
- Kolkata
- Chennai
REFERENCES


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17. The Stranded Poor: Recognizing the Importance of Public Transportation for Low-Income Households, Issue Brief (2008), *National Association for State Community Services Programs (NASCSP), Washington D.C.*


THANK YOU