Bus Rapid Transit Systems
The India Experience
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CEPT University

Structure of the presentation
- What is BRTS?
- BRTS
  - Worldwide
  - India
- India initiatives
  - NUTP
  - JnNURM
- India issues
- Lessons for future
What is BRTS?

A flexible, rubber-tired form of rapid transit that combines stations, vehicles, services, running ways, and ITS elements into a fully integrated system with a strong image and identity


An integrated system of features, services, and amenities that improves the speed, reliability, and identity of bus transit

(Bus Rapid Transit Practitioner's Guide by Levinson et al., 2007 - TCRP Report 118)
What is BRTS?

A flexible, high performance rapid transit mode that combines a variety of physical, operating and system elements into a permanently integrated system with a quality image and unique identity

(Levinson et al. 2003)

A high-quality bus-based transit system that delivers fast, comfortable, and cost-effective urban mobility through the provision of segregated right-of-way infrastructure, rapid and frequent operation, and excellence in marketing and customer service

(Bus Rapid Transit Planning Guide by Wright and Hook, 2007)

BRTS features (must have!)

1. Running ways
   - Bus ways or segregated bus lanes
2. Operations plan
   - Flexible routing options
3. Off board ticketing
   - Smart cards
   - Turnstiles, flap gates
4. Modern bus stations
   - Enclosed, safe, comfortable
BRTS features

5. Brand and identity
   • Corporate identity, logo, symbol
   • Marketing

6. ITS applications
   • Passenger information
   • Vehicle tracking

7. Vehicles
   • Modern, clean buses
## BRTS status today

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of cities</th>
<th>%</th>
<th>Passengers per day</th>
<th>%</th>
<th>Total length in km</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>3</td>
<td>1.92</td>
<td>238,000</td>
<td>1</td>
<td>62</td>
<td>1.53</td>
</tr>
<tr>
<td>Asia</td>
<td>30</td>
<td>19.23</td>
<td>6,275,622</td>
<td>24.5</td>
<td>1037</td>
<td>25.69</td>
</tr>
<tr>
<td>Europe</td>
<td>43</td>
<td>27.56</td>
<td>1,656,966</td>
<td>6.46</td>
<td>688</td>
<td>17.04</td>
</tr>
<tr>
<td>Latin America</td>
<td>53</td>
<td>33.97</td>
<td>16,326,783</td>
<td>63.66</td>
<td>1347</td>
<td>33.37</td>
</tr>
<tr>
<td>North America</td>
<td>20</td>
<td>12.82</td>
<td>819,685</td>
<td>3.19</td>
<td>576</td>
<td>14.27</td>
</tr>
<tr>
<td>Oceania</td>
<td>7</td>
<td>4.48</td>
<td>327,074</td>
<td>1.27</td>
<td>326</td>
<td>8.07</td>
</tr>
<tr>
<td>World</td>
<td>156</td>
<td>100</td>
<td>25,644,130</td>
<td>100</td>
<td>4036</td>
<td>100</td>
</tr>
</tbody>
</table>

http://brtdata.org, October 2013
**BRTS evolution**

**Before 1990 (16 cities)**

- Total length: 507 km

**1991 - 2000 (19 cities)**

- Total length: 1025 km

**2001 - 2010 (103 cities)**

- Total length: 3707 km

**Since 2011 (22 cities)**

- Total length: 4119 km

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New Cities

- **2010:** Guangzhou, Hefei, Yeancheng, Zaozhuan – China; Jaipur - India; Bangkok - Thailand; East London Transit – UK; Barranquilla, Bucaramanga – Colombia; Ecatepec - Mexico; Brampton – Canada; …

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Cumulative Number of Cities

**1974/1991**: Curitiba

**1972/2010**: Lima

**2000**: Bogotá (TransMilenio), Colombia

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[http://brtdata.org](http://brtdata.org), October 2013
Where did it begin?

Delhi
Network of 257 km
City wide coverage
Designed as open system (existing routes use segregated corridor, wherever available)
5.5 km operational in 2008
No addition to network since

Where did it begun?

- In 2004, the Gujarat government initiated a feasibility study for BRTS in Ahmedabad
- In 2005, CEPT University’s feasibility study recommended BRTS in Ahmedabad
- In 2005 and 2006, two initiatives by the Central Government gave an impetus to BRTS
  - The Jawaharlal Nehru National Urban Renewal Mission (JnNURM) in 2005
  - The National Urban Transport Policy (NUTP) in 2006
The JnNURM, 2005

- Main focus on efficiency of urban infrastructure and service delivery mechanisms
- Identified requirement of 28 billion USD investment in urban infrastructure in 63 cities
- Urban infrastructure projects include water supply and sanitation, sewerage, solid waste management, road network and urban transport

The NUTP, 2006

**Overarching objective:**

- Safe, reliable, affordable, quick, comfortable, reliable and sustainable access

**Key Objectives**

- To incorporate urban transport as an important parameter in urban planning
- To bring about more equitable allocation of road space with people rather than vehicles as the main focus
- To encourage greater use of public transport and non-motorized modes of transport
### Summary of India BRTS

<table>
<thead>
<tr>
<th>City</th>
<th>Length (km)</th>
<th>Sanction Date</th>
<th>Amount In Rs crore</th>
<th>Progress</th>
<th>Operation al km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indore</td>
<td>11.65</td>
<td>Aug 2006</td>
<td>98.45</td>
<td>complete</td>
<td>11.65</td>
</tr>
<tr>
<td>Bhopal</td>
<td>42.19</td>
<td>Nov 2006</td>
<td>247.12</td>
<td>85%</td>
<td>23</td>
</tr>
<tr>
<td>Pimpri Chinchwad</td>
<td>41.28</td>
<td>Dec 2007, Nov 2008, Nov 2008</td>
<td>738.16</td>
<td>70%</td>
<td>0</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>88.5</td>
<td>Aug 2006, Oct 2006, Aug 2008</td>
<td>981.45</td>
<td>90%</td>
<td>82</td>
</tr>
<tr>
<td>Surat</td>
<td>29.9</td>
<td>Mar 2008</td>
<td>469.02</td>
<td>55%</td>
<td>11</td>
</tr>
</tbody>
</table>
Summary of India BRTS

<table>
<thead>
<tr>
<th>City</th>
<th>Length (km)</th>
<th>Sanction date</th>
<th>Amount in Rs crore</th>
<th>Progress</th>
<th>Operational km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rajkot</td>
<td>10.7</td>
<td>Jul 2007</td>
<td>110</td>
<td>complete</td>
<td>10.7</td>
</tr>
<tr>
<td>Vijaywada</td>
<td>15.18</td>
<td>Mar 2007</td>
<td>151</td>
<td>70%</td>
<td>0</td>
</tr>
<tr>
<td>Vishakhapatnam</td>
<td>45.2</td>
<td>May 2007</td>
<td>452.93</td>
<td>75%</td>
<td>0</td>
</tr>
<tr>
<td>Jaipur</td>
<td>39.45</td>
<td>Jul 2007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delhi*</td>
<td>257</td>
<td>Dec 2007</td>
<td></td>
<td></td>
<td>5.6</td>
</tr>
<tr>
<td>Hubli Dharwad</td>
<td>22.25</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Naya Raipur</td>
<td>42.5</td>
<td></td>
<td>1791.93</td>
<td>NA</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>504.47</td>
<td></td>
<td></td>
<td></td>
<td>157</td>
</tr>
</tbody>
</table>

* Delhi’s network has not been added

BRTS in India

- A total of 504.47 km BRTS network has been sanctioned in India, most of it under JnNURM, since August 2006
- A total of 157 km of BRTS is operational in 2013, half of which is in Ahmedabad
- The first projects to be sanctioned were in Aug 2006 (Indore, Pune and Ahmedabad) and the last in 2013 (Amritsar and Bhubaneswar)
### BRTS in India – Growth in network

![BRTS in India - Growth in network graph](image)

### Ridership in BRTS

<table>
<thead>
<tr>
<th>City</th>
<th>Operations</th>
<th>Population</th>
<th>Km operational</th>
<th>Daily ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad</td>
<td>2009</td>
<td>5,726,000</td>
<td>82</td>
<td>150,000</td>
</tr>
<tr>
<td>Pune</td>
<td>2008</td>
<td>5,010,000</td>
<td>17</td>
<td>96,750</td>
</tr>
<tr>
<td>Bhopal</td>
<td>2013</td>
<td>1,843,000</td>
<td>24</td>
<td>70,000</td>
</tr>
<tr>
<td>New Delhi</td>
<td>2008</td>
<td>17,015,000</td>
<td>5</td>
<td>53,500</td>
</tr>
<tr>
<td>Indore</td>
<td>2013</td>
<td>1</td>
<td>11</td>
<td>22,200</td>
</tr>
<tr>
<td>Rajkot</td>
<td>2009</td>
<td>1</td>
<td>11</td>
<td>7,500</td>
</tr>
<tr>
<td>Jaipur</td>
<td>2010</td>
<td>3,136,000</td>
<td>7</td>
<td>6,622</td>
</tr>
<tr>
<td>Surat</td>
<td>2013</td>
<td>4,500,000</td>
<td>11</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>157</strong></td>
<td><strong>396,572</strong></td>
</tr>
</tbody>
</table>
India BRTS

Issues

What are the issues?

- Except Ahmedabad, no other city has increased network after initial operations
- Even in Ahmedabad, expansion has slowed
- PILs were filed against Delhi, Indore and Ahmedabad systems
  - In Delhi, the High Court (HC) initially allowed cars to use bus lanes and asked CRRI to evaluate situation before and after. Finally, the HC ruled that only buses can be allowed inside
  - In Indore, the HC has allowed cars to use bus lanes, leading to operations, management and safety issues
  - In Ahmedabad, the HC refused to admit the PIL, citing the prerogative of the AMC to take the final decision
Delhi BRTS after cars were allowed inside bus lanes

What are the issues?

- Change in Government has affected some projects
  - The Jaipur BRTS was never expanded after the new government chose to implement a metro

- Delay in implementing projects has led to public resentment
  - Pune and Pimpri Chinchwad have been in execution mode for six years now
  - Vishakhapatnam and Vijaywada have been in execution mode for five years now
What are the issues?

- **Structural**
  - NUTP and JnNURM are central government initiatives
  - Urban transport is a state subject
- **Policy non-integration**
  - Getting people on urban transport is a two fold game – create attractive public transport and give disincentives to private transport
  - There is no attempt to disincentivise private transport. On the contrary, cities are funding road projects through internal budgets
  - A pre-condition to JnNURM funding was that cities create parking policies. No city with BRTS has a parking policy

What are the issues?

- **Political**
  - Very few leaders are ready to weather criticism
  - Rail based systems are considered more likely to please voters
  - Bus priority removes parking spaces
- **Bus image**
  - Deteriorated over last 40 years; very difficult to change
Lessons for future

Comprehensive outlook

• BRTS should be seen as a catalyst to transform urban mobility, not as a stand alone project

• BRTS implementation should be linked to other initiatives to improve urban mobility
  • Completion of DP and TP roads
  • New river bridges, new rail bridges

• New Development Plan should reserve space for BRTS

• If multi-modal, integrations plans should begin with system design
Strong leadership

- Strong political support – at state and local level
  - Policy support
  - Quick release of funds
  - Representation to central government

- Strong administrative support – at state and local level
  - Willingness to innovate
  - Willingness to look at quality over cost
  - Willingness to engage with media
  - Willingness to take risk

Taking ownership

- Local government must own the BRTS
  - Regular representation at central government level
  - New methods of contracting and engaging the private sector
  - Close monitoring of operations and course correction
Using Master Plan...

Innovating...
Phase 1: Status and ongoing work

- **Canal Corridor**
  - BRTS lane
  - Mixed traffic lane
  - Existing Canal

- **Mixed traffic lane**
As a catalyst for urban development
Thank you...

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