Restructuring Auto-rickshaws within a Sustainable Urban Transport System in Indian Cities

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1. Do they promote traffic safety?
2. Are they environmentally friendly?
3. Do they lead to net reduction in vehicle kilometres traveled (VKT)?
4. Do they promote social equity in urban transport?
5. Do they lead to reduced impacts on public spaces (need for less parking)?
Current Indian Urban Transport Context

- Unprecedented growth of private vehicles
- Inadequate / poor quality public transport services to meet rising urban transport demand
- Declining shares of non-motorized transport, particularly cycling
- Increasing usage of Intermediate Public Transport (IPT) modes for long-distance trips

Historical Trends in Total Vehicle Population in India

Source: Society of Indian Automobile Manufacturers (SIAM)
Auto-rickshaws in the Indian Urban Context

Growing Sales

Significant Usage

IPT share among motorized road transport modes

Source: City Traffic & Transportation Plans (CTTPs)
* Mumbai shares include Taxis

Significant Market

Source: Society of Indian Automobile Manufacturers (SIAM)

Auto-Rickshaw Trip Lengths compared to Average Trip Lengths (Indian cities)

Sustainability Aspects of Auto-rickshaws

Objective: Assessment of the relative contribution of motorized modes on pedestrian fatalities relative to their share of VKT

Pedestrians constitute a large share of road fatalities in Indian cities

Source: Transportation Research and Injury Prevention Programme (TRIPP), IIT Delhi, April 2004

Trends in Modal Traffic Fatalities, Mumbai, 2005 to 2009

Source: Mumbai Traffic Police, Road Fatality Data

Contributors to Pedestrian Fatalities, Bangalore, 2007

Source: National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore
IPT stands for Intermediate Public Transport (including auto-rickshaws and taxis)

Figures in brackets represent number of fatalities per 100,000 VKT

Share of VKT
Source: Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008; and Mumbai Traffic Police

Source: Comprehensive Traffic & Transportation Plan for Bangalore, 2007; and NIMHANS

Key Insights
Auto-rickshaws have the lowest pedestrian fatality rate (fatalities per VKT) amongst motorized modes

Characteristics promoting safety: Lower speed, smaller size, easy maneuverability
### PM10 Sources

- Ground level (around high activity areas)
  - Road dust
  - Motorized transport
    - Diesel
    - 2-stroke engines
  - Landfills
- Ground level (around low activity areas)
- Higher level
  - Industries

### State of PM10 Emissions in Indian Cities, 2007

- Critical (> 150% of standard)
- High (between 100-150% of standard)
- Moderate (between 50-100% of standard)
- Low (less than 50% of standard)

Source: Central Pollution Control Board, National Air Quality Monitoring Program (NAMP)

### City Population

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
<th>Number of auto-rickshaws</th>
<th>% 2-stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mumbai</td>
<td>18 million</td>
<td>150,000</td>
<td>50%</td>
</tr>
<tr>
<td>Pune</td>
<td>3.5 million</td>
<td>60,000</td>
<td>90%</td>
</tr>
<tr>
<td>Surat</td>
<td>3.3 million</td>
<td>50,000</td>
<td>90%</td>
</tr>
</tbody>
</table>

Source: Surveys, EMBARQ, 2010
“Driver” based “Vehicle Sharing” systems, like auto-rickshaws, will play a key role in Indian cities in controlling private car ownership.
Social Equity

- Low cost mobility for lower income, elderly and disabled population
- Low cost mobility for school children in the absence of school buses
- Low cost alternative in the case of poor city bus services (Rajkot, Surat) as Shared Fixed-route services
- Commonly used mode for transporting victims from accident sites to hospitals
### Current Situation in the Auto-rickshaw Sector

<table>
<thead>
<tr>
<th>Issue</th>
<th>Specifics</th>
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</thead>
<tbody>
<tr>
<td>Governance</td>
<td>Lack of a multi-modal governing body</td>
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<td></td>
<td>Inadequate involvement of key stakeholders in policy making (city government; manufacturers; unions; citizens; civil society)</td>
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<td>Regulation</td>
<td>Many cities have restricted the nos. of Autos in the city but are unable to restrict the growth of personalized vehicles</td>
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<td>Lack of policies to drive formalization of services (such as fleet companies)</td>
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<td>Unorganized sector</td>
<td>Lack of employment benefits</td>
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<td>Poor inspection/maintenance</td>
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<td>Problems with financing</td>
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<td>Lack of brand image and poor driver behavioral practices</td>
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<tr>
<td>Infrastructure</td>
<td>Lack of provision of adequate stands</td>
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<td>Inadequate servicing centers for 4-stroke engines</td>
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<tr>
<td>Vehicles</td>
<td>Problems with design (comfort, rain)</td>
</tr>
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<td></td>
<td>2-stroke engines still prevalent in many cities</td>
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<tr>
<td>Operational inefficiencies</td>
<td>Significant empty trip making</td>
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</tbody>
</table>
### Initial Successes in Indian Cities

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Where</th>
<th>Benefits</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion to CNG fuel</td>
<td>Mumbai, Delhi, Rajkot, Ahmedabad, Surat, Pune</td>
<td>Reduced operating cost; Reduction in emissions (in 4-strokes)</td>
<td>CNG supply would be challenge when implementing in other cities</td>
</tr>
<tr>
<td>Private entrepreneurship</td>
<td>Pune, Bangalore (pilots)</td>
<td>Increased earnings; employment benefits; brand image</td>
<td>Policy changes to facilitate these services; Attracting investors to scale up</td>
</tr>
<tr>
<td>SIAM - SAFE initiative</td>
<td>National</td>
<td>Driver safety training</td>
<td>Poor on-road enforcement</td>
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<tr>
<td>Advertising</td>
<td>Mumbai</td>
<td>Brand image; value-added services; increased earnings</td>
<td>Policy changes to facilitate this on a larger scale</td>
</tr>
<tr>
<td>Direct fuel injection for 2-stroke engines</td>
<td>Bangalore (pilot)</td>
<td>Improved fuel efficiency; Reduction in PM10 emissions</td>
<td>Costs; Participation from the driver community</td>
</tr>
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</table>
### City Case Study

#### Auto-rickshaw market characteristics

<table>
<thead>
<tr>
<th>City</th>
<th>Pop. (Mi.)</th>
<th>Market Size</th>
<th>Permit Policy</th>
<th>Engine</th>
<th>Fuel</th>
<th>Driver Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delhi</td>
<td>13.5</td>
<td>55,000</td>
<td>Closed</td>
<td>4 stroke (90-95%)</td>
<td>CNG (100%)</td>
<td>Around 60-70% rental – drivers</td>
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<tr>
<td>Mumbai</td>
<td>18</td>
<td>120,000</td>
<td>Closed</td>
<td>2 &amp; 4 stroke (50%)</td>
<td>CNG (100%)</td>
<td>Around 50% rental – drivers</td>
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<tr>
<td>Rajkot</td>
<td>1.5</td>
<td>15,500</td>
<td>Open</td>
<td>2-stroke (80-90%)</td>
<td>95% CNG</td>
<td>Around 75% owner-drivers</td>
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<td>Pune</td>
<td>5.5</td>
<td>60,000</td>
<td>Closed</td>
<td>2-stroke (90-95%)</td>
<td>90% Petrol (10% CNG)</td>
<td>Around 65% renter-drivers</td>
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<td>Surat</td>
<td>3.3</td>
<td>60,000</td>
<td>Open</td>
<td>2-stroke (90-95%)</td>
<td>100% CNG</td>
<td>Around 50% owner-drivers</td>
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<tr>
<td>Jaipur</td>
<td>3.2</td>
<td>18,500</td>
<td>Closed</td>
<td>4-stroke (90%)</td>
<td>90% diesel (10% LPG)</td>
<td>More than 75% renter-drivers</td>
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Source: EMBARQ Survey, August 2010
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<tr>
<th>City</th>
<th>Lack of Governance</th>
<th>PM Emissions</th>
<th>Infrastructure</th>
<th>Unregulated Fixed route</th>
<th>Unorganized Sector (operational inefficiencies; lack of benefits)</th>
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<td>2-stroke</td>
<td>Diesel</td>
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City Case Study

Source: EMBARQ Survey, Rajkot City, August 2010

Vehicle Emissions
- 2-stroke
- Diesel

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Source: EMBARQ Survey, Rajkot City, August 2010
City Case Study

- Poor Infrastructure
- Lack of stands

Source: EMBARQ Survey, Rajkot City, August 2010
City Case Study

Overloading
Restructuring and reform

Where are we now?

How are we going to get there?

Where do we want to be?
Way Forward

Policy & Governance
- Governing body
- Planning & regulation
- Policy / legislation for Auto rickshaw

Inclusive planning as integrated public transport
- Integration with other modes

Enterprise based services
- Managed fleet companies
- Technology-based value added services

Environmental sustainability
- Operational efficiency
- Technology
- Fuel

Infrastructure
- Auto-rickshaw stands
- Inspection, maintenance and servicing facilities
- Control Centers
- Prepaid Booths
Next Steps

- Recognizing the role of Auto rickshaw in SUT
- Engaging stakeholders in reform process
- Identifying and prioritizing the reform areas
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