Session 3

Innovations in Transport Service Provision
Mobility at all scales

Mass Transport
- BRT
- Metro Rail

Public Transport/IPT
- City Bus Service
- ‘Private Public Transport’

Non-Motorized Transport
- Walking
- Public Bicycling Schemes
Innovations in...

- **Formal Public Transport**
  
  *PPP for City Bus Services: Indore*

- **Intermediate Public Transport**
  
  *Improving Autorickshaw Services: Rajkot*

- **Last Mile Connectivity and Neighbourhood Mobility**
  
  *Public Bicycle Sharing Schemes*

- **Private Vehicle Use**
  
  *Car-sharing: A viable solution for Indian Cities?*
Innovations in Formal Public Transport:

PPP for City Bus Services in Indore
Population: 2.29 Million (3.4% Annual Growth)

Expected to grow from 110 sq km (2001) to 365 sq km (2011)

Registered vehicles growing at 10% pa 
(0.55m in 2001 to 1.18m in 2010)

Private vehicles account for 82% of registrations

Accidents increasing at 3.2% pa 
(2617 in 2001 to 3473 in 2010)
Traffic Situation in Indore
Before City Bus: Unorganised Transport in Indore
Issues with existing system

- Lack of regular service (defined stops, fares)
- High competition leading to unsafe practices
- Oversupply on high demand corridors, undersupply on low demand corridors
- Overcrowding
Challenges to setting up PT System

- Lack of financial resources
- Lack of technical capacity
- Lack of manpower
Solution

PPP model for city bus service

Public Agency
- Plans system
- Sets operational details and parameters
- Sets Fares
- Provides Support Infrastructure
- Co-ordinates operations
- Monitors performance

Private Operators
- Bid for permits/Concessions
- Owns and operates fleet under contract with Public Agency
- Upholds service standards
Key Aspects/Decision

- Bus Ownership
  Own all vs. Own some vs. Own none

- Involvement in Operations
  Operate none vs. Operate some

- Infrastructure provision

- Unit of concession
  Individual Routes Vs. Clusters

- Contracting model
  Net Cost vs. Gross Cost

- Use of technology

- Dispute resolution mechanism
**PPP Model of Bus Operations**

**Public partners role:**
- Planning of routes
- Inviting tenders for bus operations
- Providing support infrastructure

**Objective:** Providing affordable & quality public transport

**Private operator responsibilities:**
- Owns, operates and maintains fleet
- Collects fare from passengers
- Pays premium to AICTSL for right to operate on route
RESPONSIBILITY SHARING

**Planning, Management, Control and Monitoring (ICTSL)**
- Fixation of fares/tariff
- Monitoring quality of service
- Setting standards
- Ensuring adherence to Standards
- Ensuring adherence to environmental standards
- Network and route design
- Identification of demand
- Franchising/route allocation
- Planning and provisioning of services
- Contract monitoring

**Infrastructure (ICTSL)**
- Passenger Information System
- Data collection and management.
- Dispute resolution
- Management of common infrastructure
- Public relations
- Security services
- Management of common ticketing facilities
- Management of revenue sharing arrangement between operators

**Vendors**

**Bus Operator**
- Operation (Private)
  - Operators with multiple routes
  - Buses, Employees

**Fare Collection (Private)**
- Equipments (ETM)
- Smart Cards
**Indore Statistics**

- **Number of routes**: 16
- **Average route length**: 18 km
- **Number of bus stops**: 210
- **Fleet Size**: 122 buses
- **Operating frequency**: 8 minutes (min) 26 minutes (max)
- **Avg. daily ridership**: 112,000 pax
- **Avg. daily collection**: Rs. 5,35,000 /day
- **Ridership per bus**: 920 pax/bus
- **Avg. Revenue per day**: Rs. 7,88,000 /day
Safety & Quality has helped attract trips from private travel modes.

- Private Vehicle: 16%
- New Travellers: 20%
- Walk: 4%
- Bicycle: 6%
- IPT: 54%
Success Factor 1: Good System Planning

1. 24 routes have been identified to cover the entire city.
2. Operations started after complete route testing and time scheduling.
3. Route map and buses are colour coded to facilitate easy and convenient excess of passengers.
Success Factor 2: Intensive Performance Monitoring

1. Every bus is fitted with GPS based tracking device with online data transfer facility.
2. Schedule & itinerary adherence.
3. Log of exact kilometer traveled by bus.
4. Punctuality and improvement in driving pattern.
5. Control over unauthorized and unscheduled stoppages.
6. Better KMPL & EPKM.
Success Factor 3:
Good User Information
Success Factor 4: Centralized Management

1. Combined control centre and management offices for operators
   - Constant communication between operator and Public Agency
   - Ease of dispute resolution

2. Detailed specification of responsibilities and service parameters
   - Penalties for poor performance
   - Unified branding for vehicles and staff
   - Training for drivers and conductors
System Expansion & Future

Starting from 37 buses, AICTSL now operates a fleet of 122 buses.

City bus in Indore has a mode-share of 4.4%

The BRT launch will add 50 buses (mode-share > 6%)

However, to sustain the growth, the mode-share of PT should increase to 40% or more.

The CMP for Indore recommends having 750 city buses by 2015
**Challenges**

- CNG fuel prices have increased by 64% in 24 months, thus reducing profitability to operators.
- AICTSL has limited financial resources (premium from operators, advertising) for additional infrastructure.
- Passenger ridership per bus has increased only marginally, not keeping pace with input costs.

Modernising the system by way of better workshop infrastructure, improved information for passengers and customer service is necessary for expanding the system.
Innovations in Intermediate Public Transport:

Reforming Rickshaws in Rajkot
Rajkot – Key City and Transport Statistics

- Population (2011): Around 1.3 million
- Total motor vehicles: Around 0.8 million
- Auto-rickshaws: Around 12,000

Vehicle Registration

Mode Share

- Auto: 8.0%
- Walk: 28.0%
- Cycle: 21.0%
- Others: 5.0%
- Two Wheeler: 38.0%

% VEHICLE REGISTRATIONS
- HGV
- LGV
- BUSES/ MAXI/ PSV/ SCHOOLBUS
- AUTORICKSHAWS
- CAR/ TAXI/ JEEP
- 2-WHEELERS
- OTHER
IPT in Rajkot

Auto-rickshaws  Share-autos
Fleet and Driver Profile

Market Size: 12,000

Engine/fuel profile
- CNG 2-stroke: 74.8%
- Petrol 2-stroke: 23.6%
- Petrol 4-stroke: 1.2%
- CNG 4-stroke: 0.4%

Manufacturers
- Bajaj: 98%
- TVS: 2%

Driver profile
- Owner-driver: 70%
- Renter-driver: 30%
User Characteristics

Age Profile
- <20 years: 25%
- 20-30 years: 45%
- 30-40 years: 20%
- 40-50 years: 8%
- >50 years: 2%

Gender Profile
- Male: 64%
- Female: 36%

Trip Purpose
- Work: 36%
- Shopping: 19%
- Education: 28%
- Recreation: 6%
- Health: 11%

Income Profile
- < 5,000: 5%
- 5,000 - 10,000: 21%
- 10,000 - 20,000: 51%
- 20,000 - 30,000: 16%
- 30,000 - 50,000: 5%
- > 50,000: 2%
Major Issues with Existing System

For Users

- Informal fares
- High rate of refusal
- Poor quality of rickshaws/service
- Poor infrastructure
- High wait times (occasionally)
- Poor road safety
- Poor perception of safety for women
Major Issues with Existing System

For Rickshaw Drivers

- Stiff competition with other drivers
- Stress of haggling with customers
- High cost of maintenance
- Lack of/difficulty acquiring insurance
- Lack of ancillary benefits (pension, health insurance etc)
- Lack of respect for work
Major Issues with Existing System

For City

Road Safety
Poor coverage of service
Air pollution from old rickshaws
Continuous demand to raise fares (from drivers)
Continuous demand to enforce laws (from users)
General concern over lack of adequate collective transport (leading to growth in 2-Wheelers, Cars)
Solution

- Promote creation of fleet auto service
- Mutually beneficial relationship between operator and City
- City provides supporting legislation and infrastructure (Amending motor vehicle act, Providing support infrastructure)
- Operator organises
Type of Fleet Service

Organizational Model
- Non-profit organizational model
- Drivers as members and operating under a brand (such as G-Auto)
- Vehicle ownership with drivers

Costs
- Driver benefits (insurance, uniform)
- Vehicle improvements
- Administrative expenses (staff salaries, travel, telephone, office)

Revenues
- Grants
- Service fees (stands, dial-a-rickshaw)
- Advertising
Key Service Characteristics

- **Dial-a-Rickshaw Service**
  - Call-auto service at centralized number (24-hrs)

- **Fleet Service at key transit hubs**
  - Metered auto-rickshaw service at railway station and ST bus stand
  - Booth facility with receipts

- **Fare system**
  - Meter-based fares based on government regulations

- **Driver characteristics**
  - Licensed and trained drivers, with uniforms

- **Vehicle performance**
  - Vehicles with environmental and safety certifications
Benefits of fleet organization

- Better brand image and public perception
- Elimination of refusals
- Formal meter-based fares
- Dial-a-rickshaw service
- Operational efficiencies – reduction in empty trips
- Reduction in operating and maintenance costs due to fleet management
- Environmental benefits due to operational efficiencies and cleaner vehicles
Future Challenges

 Scaling up: Within Rajkot and to other cities

 Improving marketing and branding

 Public Outreach

 Continuous value add through technology
Innovations in Last Mile Connectivity and Neighbourhood Mobility

Public Bicycle Sharing Schemes
What is bike sharing

- Flexible personal private system
- Dense network of cycles
- Strong identity
- Encourage short trip lengths
- Cycles are not tied up with stand
- Use of IT
Role of Bike Sharing

Adopted from: Quay Communication Inc. 2008. Trans Link Public Bike system Feasibility Study, Vancouver
Evolution of Bike Sharing Program

1965
First Generation
- Free Bike Systems
  - Components: Bicycles

Amsterdam
- White Bikes

Source: Ab Pruis
International Institute of Social History (IISH)

1992-95
Second Generation
- Coin-deposit Systems
  - Components: Bicycles, Docking Stations
  - Characteristics: Distinct Bicycles, Locked bikes, Coin access, Free of charge, Specific stations.

Copenhagen
- Bycyklen (City Bikes)

Source: Jeroen Buis
Interface for Cycling Expertise

1998
Third Generation
- Smart Card Systems
  - Components: Bicycles, Docking Stations
  - Characteristics: Distinct Bicycles, Locked bikes, Smart card access, Free (first 30 mins), Specific stations, Access kiosk

Rennes
- Vélos à la carte

Source: Le Monde à Bicyclette

2005
Third Generation +
- Smart Card Systems
  - Components: Bicycles, Docking Stations
  - Characteristics: Distinct Bicycles, Locked bikes, Smart card access, Free (first 30 mins), Specific stations, Access kiosk, Real time availability, GPS tracking

Lyon
- Vélo’v

Source: Danielle Birck, RFI

Source: Adapted from Dhingra, Chhavi and S. Kodukula, 2010.
Global Trends in Bike Sharing
Bike Sharing Program Size

No of cycles

- Hangzhou PBS
- Paris: Velib
- Barcelona: Bicing
- Kaohsiung: C-Bike
- Berlin: Call-a-Bike
- Lyon: Velo’v
- Montreal: BiXi
- Washington: Capital BikeShare
Ministry of Urban Development (MoUD), Government of India organized the first national consultation meeting in June 2011 and constituted the following subgroups:

- Sub-group 1: National Policy for promotion of Non-Motorized Transport in Indian cities
- Subgroup 2: Toolkit for Public Bicycle Scheme projects
- Subgroup 3: Product design and Specifications for the Public Bike Schemes in India
- Subgroup 4: Financing Public Bicycle Schemes
Sub Groups Recommendations

DRAFT
Toolkit for public cycle sharing systems

Subgroup 3, National Public Bicycle Scheme

Public Private Partnership in Public Bicycle Scheme on Built Operate and Transfer Basis (BOT) format

MODEL CONCESSION AGREEMENT (DRAFT)

Product design and Specifications for the Public Bike Schemes in India
Atcag – Banglaore

- Launched in October 2011
- 3 Stations with 6 docks each
- 2 stations added in 2012 (near Metro stations)
- Limited registration
- Too small to really make any impact
- Scalability
Nama Cycle – Bangalore
## Capital and O&M Cost

<table>
<thead>
<tr>
<th>Details</th>
<th>Lyon</th>
<th>Paris</th>
<th>Washington</th>
<th>Montreal</th>
<th>Hangzhou</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bikes</td>
<td>1,000</td>
<td>20,600</td>
<td>500</td>
<td>2,400</td>
<td>60,000+</td>
</tr>
<tr>
<td>Capital Cost /Bike</td>
<td>$4500</td>
<td>$4400</td>
<td>$3600</td>
<td>$3000</td>
<td>$1300</td>
</tr>
<tr>
<td>Operation Cost /Bike</td>
<td>$1500</td>
<td>$1944</td>
<td>$1600</td>
<td>$1200</td>
<td>$900</td>
</tr>
</tbody>
</table>

### Capital Cost in a Typical PBS System

- Lyon: 70%
- Paris: 17%
- Washington: 6%
- Montreal: 5%
- Hangzhou: 2%

### O&M Cost in a Typical PBS System

- Redistribution: 30%
- Bike Maintenance: 22%
- Station Maintenance: 14%
- Operation setup: 13%
- Communication: 1%
- Administration: 6%
Many systems charge no money for first 30 minutes, in China the system is free for first hour

About 95% of the system usage in China is free
Mysore Bike Sharing Project

- Mysore has been recommended for taking up the Scheme under GEF Grant
- Grant will be utilised for technology, rolling stocks etc
- Infrastructure will be developed by city / state agency
- Operation may be done by private agency
- Technical Studies underway
Model Concession Agreement

Public Private Partnership in

Public Bicycle Scheme

on Operate and Maintain (O&M) Basis

MODEL CONCESSION AGREEMENT

(DRAFT)
Integration with Existing System

**Indore**
- Bicycle mode share – 20%
- 2000 Bicycle Rental + Repair Shops
- Average 60 Bicycles / shop
- Shops in business for 20yrs
- Store Hours - 7 AM to 9 PM
- Bicycles rented to familiar people

**ECONOMICS**

**Costs**
- Bicycle – $70
- Shop Rental – $30
- Repairs/Maintenance – $2
  (Per month per rental bicycle)

**Revenue per bicycle**
- Rent – $5
- Repairs/Maintenance – $1

**Income** – $3.5 per bicycle
Innovations in Private Vehicle Use

Car Sharing: A viable option for Indian cities?
What is Carsharing?

Car-sharing is a service that provides members with access to a fleet of vehicles on an hourly basis. Carsharing offers users access to driving a vehicle without owning it.

Carsharing is different from carpooling. While carpooling involves sharing a ride in a privately-owned vehicle, carsharing involves sharing the collectively-owned vehicles for private use.

Users typically pay hourly rates and a modest membership fees for independent, ubiquitous access to vehicles parked in a network of convenient locations, usually in dense urban environments.

There are currently several common variations of carsharing systems

- Two-way: shared car is picked up from & returned to fixed location.
- One-way: user can return the vehicle to a different designated location
- Open ended: shared car can be returned to any valid parking space
- Peer-to-peer: a special model - car owners rent out their cars to neighbour

Example

Current Carsharing Industry

- **Users**: Approximately 1,247,000 individuals share 32,000 vehicles in 1,100 cities, 26 nations and 5 continents.

- **New key players**: Hertz, Enterprise, Daimler, and BMW have recently invested in launching new carsharing brands. In April 2011, Zipcar launched the industry’s first Initial Public Offering.

- **Predicted growth**: By 2020, global carsharing membership is expected to scale to 20 million.

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## Impacts of Carsharing

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Vehicles Replaced Due to One Car-Sharing Vehicle</th>
<th>Percent of Participants Who Sold Private Vehicle After Joining Carsharing</th>
<th>Percent of Participants Who Postponed Or Avoided Vehicle Purchase Due to Carsharing</th>
<th>Percent Reduction of Vehicle Kilometers Traveled Due to Carsharing</th>
<th>Reduction in Average User’s CO₂ emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>4 to 10</td>
<td>15.6 to 34%</td>
<td>23 to 26.2%</td>
<td>28 to 45%</td>
<td>-</td>
</tr>
<tr>
<td>Europe</td>
<td>6 to 23</td>
<td>11 to 29%</td>
<td>12 to 68%</td>
<td>7.6 to 80% (Avg of 40% across studies)</td>
<td>39 to 54%</td>
</tr>
</tbody>
</table>


Studies also indicate increased use of public transportation, fuel savings and higher degree of environmental awareness among carshare users³.

³ Matsumoto, Naoko. 2005. In APEIS/RISPO Strategic Policy Options (SPOs) Database. IGES(Hayama)
Carsharing in Developing Countries

Current Status

• Asia, Africa and Latin America are home to over 75% of the world’s urban population\(^3\) but account for **only 4.5% of the global carsharing membership** (mostly in Japan and Singapore)\(^4\).

• Existing carsharing systems in China, Brazil and Turkey are **primarily two-way systems**.

• Shared-use vehicles (e.g. informal rideshare, shared taxis, shared rickshaws) are very common in developing countries.

Context

• Rapid urbanization: China and India will add at least **600 million new urban residents by 2030\(^5\)**.

• Rapid motorization: by 2030, light auto sales in China, India, and Brazil are expected to nearly **double those sold in the U.S. and Europe combined\(^6\)**.

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\(^3\) United Nations, Department of Economic and Social Affairs, Population Division: World Urbanization Prospects, the 2009 Revision. New York, 2010

\(^4\) Shaheen and Cohen. 2007


Brazil an early adopter
At least 3 CSOs in operation since 2009
Active in Sao Paolo and Rio de Janeiro
Some innovation: Peer-to-Peer Car Sharing

Mexico City’s carsharing systems are expanding this summer.
Some small operations in Mexico City
Benefit from active local government support, positioning Car Sharing as a sustainable mobility option

Turkey seeing modest growth.
3 CSOs in Istanbul, with a 4th launching soon
But Fleet Sizes are small (10-15)

China is an emerging market.
At least 2 CSOs operating in Beijing
2-3 more in the pipeline
But chauffeur-driven rental market is very mature (10,000+ fleet)

India has no traditional carsharing system currently.
Pilot in 2011 in Gurgaon (‘Rent-a-Reva’ – collaboration between Mahindra and NGO Uthaan)
New service ‘Zoom’ plans to launch in Bangalore with major expansion plans
Opportunities and Challenges

Opportunity

- The proportion of people with driving experience and driving licenses will increase, expanding customer base.
- Carsharing can benefit from the growing desire for personal mobility.
- Resulting congestion and pollution is likely to eventually force cities to implement policies making car ownership less attractive.

Challenge

- People’s desire for car ownership is also a threat for carsharing industry. Access versus Ownership.
- The resulting congestion is also a challenge since reliable travel times are important for carsharing users to adhere to a reservations system.
- Lack of access to online payment systems may require innovation.