Implementing Transit Oriented Development in Indian Cities

Learnings and Challenges

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What Is Transit-Oriented Development?

- Compact, mixed-use development within ten-minute walk of high quality transit (train stations or bus stops with frequent service).

- This creates “urban villages” where commonly-used services (shops, restaurants, schools, parks, etc.) and a significant number of jobs are easily accessible without a car).
Transit-oriented development provides convenient and affordable accessibility to the greatest number of people for the lowest total costs.

This helps create a truly efficient and equitable community.

A developed country is not a place where the poor have cars. It's where the rich use public transport.

- Gustavo Petro, Mayor of Bogota
### TOD Benefits Categories

<table>
<thead>
<tr>
<th>Improved Service</th>
<th>Increased Use of Alt. Modes</th>
<th>Reduced Automobile Travel</th>
<th>More Compact Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Improved walking, cycling and transit service, benefits existing users of these modes</td>
<td>- User cost savings</td>
<td>- Reduced traffic and parking congestion</td>
<td>- Improved accessibility, particularly for non-drivers</td>
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<tr>
<td>- Reduced automobile traffic speeds and volumes improves safety and livability</td>
<td>- User enjoyment</td>
<td>- Road and parking cost savings</td>
<td>- Reduced land consumption, heritage and openspace preservation, and public service cost savings</td>
</tr>
<tr>
<td>- Improved street conditions increases local property values</td>
<td>- Economic development benefits from increased access to education and employment</td>
<td>- Consumer cost savings</td>
<td>- Reduced sprawl costs</td>
</tr>
<tr>
<td></td>
<td>- Increased public fitness and health</td>
<td>- Reduced crash risk to others</td>
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</table>
Affordable-Efficient Modes

Walking, cycling and public transport are affordable and resource efficient, and so tend to be most sustainable.

Sustainability does not eliminate automobile travel but it does require favoring affordable-efficient modes in policy and planning decisions.

Person Capacity per Lane-Equivalent

- Walking: 2,000
- Cycling: 9,000
- Public Transport: 14,000
- Car: 19,000
- Train: 22,000

Number of people crossing a 3.5-meter-wide space in an urban environment during a one-hour period.
Sustainable Transport Hierarchy

1. Walking
2. Cycling
3. Public Transit
4. Service & Freight
5. Automobile Travel
6. Automobile Parking
Features of High Quality Transit

- Grade-separated right-of-way
- Frequent, high-capacity service (less than 10-minute headways).
- High-quality vehicles.
- Pre-paid fare collection.
- Convenient user information
- Comfortable stations.
- Excellent customer service.
Transit Priority

Transit passengers require far less road space than automobile travel. A bus lane that carries 24 buses or more during peak hours carries more people than a general traffic lane.

It is therefore more efficient and fair to give buses priority in traffic.
Transit Station Level-Of-Service

- Clean
- Comfort (seating, temperature, quiet)
- Convenience (real-time user information, easy fare payment)
- Accessible (walkability, bike parking, nearby housing, employment, nearby shops)
- Services (refreshments, periodicals, etc.)
- Security
The BRT Standard, being developed by the Institute for Transportation and Development Policy, is a scoring system that defines world-class bus rapid transit (BRT) systems. It allows transit planners to evaluate BRT system performance and set targets for improvement.
**Complete Streets**

**Complete streets** are designed for all modes and users, including:

- Pedestrians
- Cyclists
- Transit passengers
- Motorists
- Customers and residents
Walking and Cycling Improvements

- Walking and cycling are the most basic, affordable and resource-efficient travel modes. They should receive priority in urban road design.
- More investment in sidewalks, crosswalks, paths and bike lanes.
- More traffic calming.
- Bicycle parking.
- Encouragement, education and enforcement programs.
Smart Growth (Density, Design, Diversity)

- **Compact**, infill development.
- **Mixed** land use.
- Good sidewalk and road connectivity.
- Improved walkability.
- **Urban villages**.
- Transportation diversity.
- Efficient parking management.
- Attractive public realm.
- **Traffic calming** and speed control.
Parking Management

- Regulate and price on-street parking to favor higher value uses.
- As much as possible, charge users directly for parking, rather than indirectly through taxes and rents.
- More flexible parking requirements.
- Share parking spaces rather than having assigned spaces.
- Parking Cash Out (Employees who currently receive free parking are able to choose a cash benefit or transit subsidy instead.)
- Better enforcement.
Institutional Reforms

- Comprehensive, multi-modal transport planning.
- Multi-modal level-of-service analysis
- Lease-cost planning and funding.
- Sustainable transport hierarchy.
- Set performance targets
- Interagency coordination.
- Improve user information.
- Improve enforcement.
- Identify best practices and appropriate innovations from other countries, including Northern Europe, Brazil, Korea and India.
# Multi-Modal Level-Of-Service (LOS)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Level of Service Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>Sidewalk/path quality, street crossing conditions, land use conditions, security, prestige.</td>
</tr>
<tr>
<td>Cycling</td>
<td>Path quality, street riding conditions, parking conditions, security.</td>
</tr>
<tr>
<td>Ridesharing</td>
<td>Ridematching services, chances of finding matches, HOV priority.</td>
</tr>
<tr>
<td>Public transit</td>
<td>Service coverage, frequency, speed (relative to driving), vehicle and waiting area comfort, user information, price, security, prestige.</td>
</tr>
<tr>
<td>Automobile</td>
<td>Speed, congestion delay, roadway conditions, parking convenience, safety.</td>
</tr>
<tr>
<td>Telework</td>
<td>Employer acceptance/support of telecommuting, Internet access.</td>
</tr>
<tr>
<td>Delivery services</td>
<td>Coverage, speed, convenience, affordability.</td>
</tr>
</tbody>
</table>
Transport Demand Management

Provision of efficient modes
- Transit improvements
- Walking & cycling improvements
- Taxi service improvements
- Car & bike sharing
- Rideshare programs
- Campaigns and marketing e.g. events like car-free days etc.

Incentives to reduce car-use
- Congestion pricing
- Distance-based fees/pricing
- Commuter financial incentives
- Balancing parking supply
- Parking pricing
- Parking regulations and enforcement

Land use management
- Smart growth policies (dense, human scale)
- Transit oriented development (incl. land value capture)
- Location-efficient development
- Car-free housing
- Traffic calming
- Priority for human-scale modes
- Telework & flextime

Better street network
- Street design and design standards (e.g. human-scale roads)
- Improving connectivity in cities
- Upgrading critical intersections
- Green waves (also for bicycles)
- Traffic rules and enforcement
- Speed limit
- Removal of barriers
- ITS, traffic and parking management

Incentives for clean vehicles
- Environmental zoning
- Green procurement
- Feebates (Rewards for eff and low-carbon fuel vehicles)
- Phasing out (big) vehicles as salary benefit
- Vehicle scrapping / retrofit schemes
- Inspection & maintenance programmes
Appropriate Housing Options

- Create diverse housing options (various unit sizes, price ranges, styles, etc.) to serve diverse needs (families with children, people with disabilities and low incomes, etc.).
- Provide an appropriate amount of affordable housing.
- Provide appropriate services, including schools.
- Reduced parking requirements and unbundle parking in TODs.
- Reduces property taxes and utility fees for compact development in recognition of the lower costs of providing public services compared with automobile-dependent sprawl.
Supported by Professional Organizations

- Institute of Transportation Engineers
- Planning Institute
- Transport agencies
- World Health Organization
- And much more...
More balanced transport policy is no more “anti-car” than a healthy diet is anti-food. Motorists have every reason to support these reforms:

- Reduced traffic and parking congestion.
- Improved safety.
- Improved travel options.
- Reduced chauffeuring burden.
- Often the quickest and most cost effective way to improve driving conditions.


Footfalls: Obstacle Course To Livable Cities, Centre For Science And Environment (www.indiaenvironmentportal.org.in/content/footfalls-obstacle-course-livable-cities).

Center for Transit-Oriented Development (www.reconnectingamerica.org).


Sustainable Transportation: A Sourcebook for Policy-Makers in Developing Countries (www.sutp.org).

Institute for Transportation and Development Policy (www.itdp.org).


Online TDM Encyclopedia (www.vtpi.org/tdm).
“Toward More Comprehensive and Multi-modal Transport Evaluation”
“Evaluating Public Transportation Benefits and Costs”
“The New Transportation Planning Paradigm”
“Transportation Cost and Benefit Analysis”
“Evaluating Complete Streets”
“Online TDM Encyclopedia”
and more...

www.vtpi.org
Implementing Transit Oriented Development (TOD) in Indian Cities - Learnings and Challenges

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Station Level TOD:
Station Accessibility plans and Development Control regulations Indiranagar, Bangalore;

Area Level TOD:
Safe Access interventions and better connectivity to transit, MIDC Marole, Mumbai;

City Level TOD:
Parking Norms in India’s most transit rich city, Mumbai;
Bangalore has high transit ridership as well as high NMT fatalities

- 52% walk, bicycle and use public transport
- Estimated number of traffic fatalities in 2013 = 737*
- Estimated number of NMT fatalities in 2013 = 401*

* Bangalore Traffic Management Center

MODE SHARE PERCENTAGE

* Bangalore CTTP 2007/2011
Overall project:
The HSR NIP- location
An Accessibility Project for Indiranagar Metro Station

TOWARDS A WALKABLE AND SUSTAINABLE BENGALURU

Guiding Principles

SAP + DCR

Compact Development

• Ensure utilization of incentives
  Avoid overloading of infrastructure
• Extend benefits of incentives to areas with potential for growth
• Meet market demands for residential and commercial development

Street Design and Access

• Improve quality of streets
• Improve quality of public spaces
• Strengthen proposals of the Safe Access Proposals

Area Character

• Protect existing character
• Ensure a mixed income bracket for housing
• Enhance the existing nodes
• Reduce conflicts between auto-oriented and pedestrian-friendly uses and activities
Station Accessibility Plans and Development Control Regulations
(SAP + DCR)

Safe Access Proposals

Development Control Regulations
Proposal: Development Control Regulations

SAP + DCR

Proposed FAR

Urban Design Concept
Overall project:
The HSR NIP - location

The Proposal need to be coordinated between Line Agencies: SAP + DCR
How to ensure Safe Access Proposals are effectively implemented?

- Lack of coordination between agencies;

How to ensure Development Control Guidelines are integrated in Master Planning process?

- No clear mandate for TOD in the present town and country planning act.
Overall project:
The HSR NIP - location

An Accessibility Project for Indiranagar Metro Station

TOWARDS A WALKABLE AND SUSTAINABLE BENGALURU

MIDC Marol records extremely pedestrian and public transit users

- 56% walk, bicycle and use public transport
- Estimated number of pedestrians = 1,05,000*

* Estimated number of pedestrians: 1,05,000
Safe Access Interventions to improve internal connectivity and access to Metro

- Street design of primary roads
- Street design of secondary roads
- Potential plots for multi-use (public open spaces etc)
- Introducing pedestrian networks
- Intersection geometry corrections
- Parking management strategy
- Creating nodes / Place markers
- Street vending strategy
- Signage strategy / guidelines
Overall project: The HSR NIP - location
An Accessibility Project for Indiranagar Metro Station

**Existing Condition**

- Large gap in the divider
- No street markings to guide vehicles and pedestrians
- Unsafe crossing, no pedestrian refuge area
Complete street

Create pedestrian refuge areas
Reduce gap in the divider
Create table top intersection
Safe crossings
Role of Vending in Supporting Walkable Local Areas

- Vendors provide cheap options
- Located within 5 minutes walking distances from anywhere, they facilitate access to food and create a walkable business district
- Land provision for canteens, common cooking, storage, cleaning areas
Multiple institutions inducing a need for equitable participation

- MMIA
- EMB
- ARQ
- MTSU
- MIDC
- MCGM
- TRAFFIC
- POLICE
- BEST
- BEST

Street Design Proposals

Parking Proposal for Depots

DEPARTMENT OF YOUTH COMMERCE AND ENTERPRISE (DYCE)
How do we augment internal capacities within local governments to meet the challenges of –

- Lack in technical capacities?
- Multi-stakeholder participation?
- Multiple agencies and jurisdictions?

How do we ensure that TOD models are equitable and inclusive?

- Integration of informal markets and vendors in public space?
Unreal parking requirements in Mumbai, one of India’s most transit rich cities!

<table>
<thead>
<tr>
<th>CITY</th>
<th>POPULATION</th>
<th>CAR DENSITY/1000 ppl</th>
<th>PARKING SUPPLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONKONG</td>
<td>7.1 million</td>
<td>55</td>
<td>0.24</td>
</tr>
<tr>
<td>SINGAPORE</td>
<td>4.6 million</td>
<td>112</td>
<td>1.30</td>
</tr>
<tr>
<td>SEOUL</td>
<td>19.9 million</td>
<td>227</td>
<td>1.44</td>
</tr>
<tr>
<td>BEIJING</td>
<td>14 million</td>
<td>103</td>
<td>0.52</td>
</tr>
<tr>
<td>GHUANGZHOU</td>
<td>13.2 million</td>
<td>84</td>
<td>0.74</td>
</tr>
<tr>
<td>AHMEDABAD</td>
<td>5.4 million</td>
<td>55</td>
<td>0.24</td>
</tr>
<tr>
<td>MUMBAI</td>
<td>12 million</td>
<td>48</td>
<td>2.17</td>
</tr>
</tbody>
</table>

Parking supply ratios across seven Asian cities; Source: ADB

Even though Mumbai city is extremely transit dependent, has low car ownership and usage, it has excessively high parking norms!

10 million people generate 28.5 million ‘one-way’ trips everyday = 250 million kms

53% of those trips are conducted on foot!

78% of the motorized trips are conducted on public transit!

Only 6% of the motorized trips are conducted using private cars!
Effects of Current Parking Norms (DP 1991) on buildings within TOD zones

Elphinstone Road Railway Station Access
Building 500m from Marine lines station

Photo credit: Lubaina Rangwala, EMBARQ India;
Making stringent off-street parking norms in TOD areas in Mumbai, a reality!

• How does one begin to influence a shift in aspirations for a city moving towards auto-oriented planning?

How do we ensure that TOD models are equitable and inclusive?

• Lack of affordable housing
Challenges in Implementing TODs

Projects and challenges in implementing TODs in Indian cities

- Making stringent off-street parking norms in TOD areas in Mumbai, a reality!
  - *Addressing challenges of aspiration*

- Most often we may have the right infrastructure plans, but we lack institutional capacities!
  - *Steps towards augmenting capacities within local governments*

- Implementation is the key!
  - Coordination between agencies;
  - Mandates is Town Planning Acts;

- How do we ensure that TOD models are equitable and inclusive?
  - *Addressing sticky questions around gentrification and affordability.*

*Safe Access Approach; Image Source: EMBARQ India.*
Thank you