Foundation Course, Lecture-1

SUSTAINABLE URBAN MOBILITY & DEVELOPMENT- AN INTRODUCTION

at
TATA INSTITUTE OF SOCIAL SCIENCES

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EMBARQ India
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EMBARQ’s mission is to catalyze and help implement environmentally and financially sustainable transport solutions to improve quality of life in cities.

Centers work together with local transport authorities to reduce pollution, improve public health, and create safe, accessible and attractive urban public spaces.
SOME (Wow)... TRENDS
3 cities with a population > 10 m and 53 with > 1 m

833 m live in 0.64 m villages
377 m live in ~ 8,000 urban centres

Source: Census of India, 1971-2001
UN, 2007
IIHS analysis, 2009-10
Exponential growth travel demand

Total Urban Travel Demand in India, 2011 - 2031
(Million Trips Daily)

Source: EMBARQ India Analysis
Predicted Vehicle Growth Worldwide


Increase in energy and emissions.

Estimated Growth in Emissions from Urban Transport – 2000 to 2030

+7.05% per year

Source: Schipper et al 2008
How do we view DEMAND & SUPPLY?
Travel is an Induced Demand

- People don’t travel for the sake of travel – it is derived from the need or desire to do something else.
- Travel or trips are associated with economic activity and a sense of societal connect/need.
The transport paradox

“Transport is unique as the only development sector that worsens as incomes rise. While sanitation, health, education and employment tend to improve through economic development, traffic congestion tends to worsen.”

Source: M.Breithaupt, GIZ,
We cannot ‘build’ our way out of congestion!
MOBILITY ISSUES IN THE DEVELOPING WORLD

In the large cities of the developing world, travel times are generally high and increasing, destinations accessible within limited time are decreasing. The average one-way commute in Rio de Janeiro is 90 minutes. In Bogota it is 60 minutes. The average vehicle speed in Manila is 7 miles per hour. The average car in Bangkok is stationary in traffic for the equivalent of 44 days a year.

This is happening because vehicle registrations are growing fast on the basis of increased populations, increased wealth, increased commercial penetration, and probably an increasingly persuasive picture in the developing world of international lifestyle in which a car is an essential element. Accordingly, in much of the developing world the number of motor vehicles is increasing at more than 10 percent a year—the number of vehicles doubling in 7 years. The countries include China (15 percent), Chile, Mexico, Korea, Thailand, Costa Rica, Syria, Taiwan, and many more.

What is the shape of increasing congestion and declining mobility? There are no widespread measures available for comparative purposes because decline in mobility is complicated. Congestion is always localized in time and space. A few things are nonetheless evident.
What are we loosing in this process?
Urbanization S-Curve. Warning!
SOME MORE CONCEPTS
Accessibility vs. Mobility

**Accessibility** refers to number of opportunities also called activity sites within a certain distance or travel time.

**Mobility** refers to the ability to move between different activity sites.
Source: Santhosh Kodukula, GIZ

Lloyd Wright, ADB
Thinking MOBILITY rationally - Corridor Capacity

(People per hour on 3.5 m wide lane in a city - pphpd)

Source: Botma & Papendrecht, TU Delft 1991 and own figures
Evidence from data usually overlooked
Why is the Household an important parameter in travel behaviour?

- Economic Activity relates to the household, household needs and characteristics
  - Income
  - Vehicle Ownership
  - Household size
Choice- what affects it?

- Cost
- Convenience
- Reliability
- Comfort
- Safety
- Security
- Ability to use (access)
The A-S-I approach - A wider policy package

**AVOID**
the distance or number of trips

**SHIFT**
towards lower emission modes of transport

**IMPROVE**
technological and operational efficiency of vehicles

**BENEFITS**
Air quality, health, safety, climate, economy, development, etc.
Making a choice - a simple example

Example: Shopping

- First decision: How far do you have to go?
  - 2 km
  - 10 km

- Second decision: Which mode of transport will you (have to) use?
  - Car
  - Bicycle
  - Bus

- Third decision: Which type of vehicle + use?
  - Smart infrastructure planning: Reduces need for travelling!
  - Encourage use of non-motorized and public transport!
  - Reduce car size and consider using alternative fuels!

Starting point: A household requires a wide range of goods, with varying frequency.
Key Parameters

- Trip Lengths
- Per Capita Trip Rates
- Modal Shares (based on choices)
Useful tools for Planning

- Indicators
- Trends of supply and demand
- Predictions and Perceptions of Future
- Policies & Programs
- Comprehensive Mobility Plans
- ..and a gut feeling of what seems like common sense!
Transport in Cities

INDIA

INDICATORS
High density inside administrative boundary (200+ hab/ha), but declining in most places

Urban India 2011: Evidence
November 22, 2011
Low density sprawl happening in all cities (<40 hab/ha)
Short to medium average trip lengths (2-12 km/trip)

Average Trip Length

kilometers

Chennai
Delhi
Mumbai
Ahmedabad
Bangalore
Pune
Bhopal
Indore
Jaipur
Mysore
Rajkot
Surat

Legend

Metro Cities
Millenium Bloomers
Now Exploding

Based on CMPs 2006-2007
High to very high non-motorised modal share (25-55%)
Low to medium public transport modal share (12-60%)
**PREDICTING THE FUTURE - Scenarios for Fried Eggs**

<table>
<thead>
<tr>
<th></th>
<th><strong>Today</strong></th>
<th><strong>2041 - Automobility</strong></th>
<th><strong>2041 - Sustainable Transport</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (millions)</td>
<td>5.4</td>
<td>13.2</td>
<td>13.2</td>
</tr>
<tr>
<td>Trips (millions/yr)</td>
<td>5.6</td>
<td>39.75</td>
<td>39.75</td>
</tr>
<tr>
<td>Area (Sq. Km.)</td>
<td>1330</td>
<td>6484</td>
<td>3242</td>
</tr>
<tr>
<td>Emissions (million Tons CO2/yr)</td>
<td>0.33</td>
<td>12.32</td>
<td>1.97</td>
</tr>
<tr>
<td>Traffic Fatalities (per yr)</td>
<td>175</td>
<td>5,232</td>
<td>1,225</td>
</tr>
</tbody>
</table>
ROAD & RAIL continue to be the POLICY PARADIGM
Financial Benefit - What can a city get for 1Bn US$?

- 426 kilometres of BRT
- 14 kilometres of elevated rail
- 7 kilometres of underground rail
- 40 kilometres of LRT

Source: GIZ - Actual data from systems built or proposed in Bangkok, Thailand
Bangalore – Transport Financing Plan

PROJECTED TRANSPORT SECTOR ALLOCATIONS

BANGALORE

CTTP October 2007
Chapter 9
Cost Estimate | Pages 20-21
Amount in Crores
POLICIES & PROGRAMS
National Policy and Program driving investments

- Jawaharlal Nehru National Urban Renewal Mission (2005)
  - City Development Plans
  - Comprehensive Mobility Plans
First reform-driven financial stimulus package exclusively targeting urban areas by the central government

Envisaged “mission projects” for 65 select cities

An investment of over INR 1,00,000 crores (20 Bn USD) by centre, state and city govts

Publicly stated aim of the programme: to make cities “investor friendly”; active PPPs
National Urban Transport Policy

- Focus on moving people not vehicles - public transport
- Integrated land use and transport
- Clean fuels and technology
- Capacity building

2006
Policies & Plans for the Future

- National urban transport policy should be the basis
- Cities to develop comprehensive mobility plans (CMP)
- All projects in the city should be a part of CMP
- Dedicated urban transport fund to be created
- Set-up an Unified Authority to plan and oversee all transport project
Study on Assessment of the National Investments in Urban Mobility

- Interviews with 30 people at the national, state, local levels; academia, NGOs, and consultants
- Literature review
  - IIHS Urban India 2011: Evidence
  - K.C. Shivaramakrisna
  - TERI
  - CSE
  - Grant Thornton
  - Association of Municipalities & Development Authorities
  - Parisar Report - Pune
General Observations

- NUTP a very important advancement and paradigm shift – policy and funding for moving people not vehicles
- NUTP and JNNURM created strong learning in planning and implementation
- But states and cities still prefer road widening and road expansion over sustainable transport projects - lack of familiarity, capacity to take on new ideas/projects
- NUTP objectives not being realized on ground
Specific issues

- Failure to mainstream urban planning and link land use and transport, which is the key
- Focus on disbursing money, not delivering quality projects
- No Alternative Analysis, cost overruns, land acquisitions, approvals, etc.
- Incomplete reforms, slow progress in project implementation,
- Poor service delivery, quality and institutional hurdles
- Lack of focus on vulnerable groups, infrastructure resilience and climate adaptation
- Lack of capacity at city level to absorb and implement reforms; resulting in new problem
- Lack of monitoring and evaluation framework (KPIs)
Key suggested improvements in order to make most of the investments

1. Vision to be strengthened around the land use and transport link

2. Improve the process of creating CMPs

3. Do monitoring and evaluation; make funding conditional on performance

4. Build capacity to implement reforms
CMPS
What went wrong?
2011-12
PUNE TRANSPORT SECTOR BUDGET

Break up of Transportation Budget

- MV: 61%
- NMT: 9%
- PT: 18%
- General: 12%
Comprehensive Mobility Plans

An Urban Mobility Plan (UMP) is a people-centered urban development roadmap which defines a long-term vision for mobility in an urban area and outlines strategies to achieve its objectives. It aims to achieve sustainable, inclusive mobility for all people within an urban center, and should therefore emphasize “pedestrian facilities, non-motorized transport measures, and public transport systems, including buses and sustainable mass rapid transit systems” (ADB, 2008, p. 6).
**Comprehensive Mobility Plans**

- Followed from JNNURM
- Positive concept for advancing the transport planning process – move people not vehicles
- Preparation was rushed and funding and capacity was limited – not enough time/resources
- All CMP’s had a framework to fill in
- “More focus on listing out of number of projects rather on holistic approach” M.L. Chotani, Director-cum-member Secretary, Association of Municipalities & Development Authorities, Dec 2010 (IUM)
CMP vs CTTS

- CMP to focus on mobility for people; CTTS focuses on smooth traffic movement
- CMP to address wider range of integrated Land use - Transport issues
- CMP to explore a wider range of policy options; CTTS to give operational level detailing

Source: RITES
How were the CMPs prepared?
## CMP toolkit - a guideline

<table>
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<th>PART ONE</th>
<th>INTRODUCTION, CITY PROFILE, LAND USE AND TRANSPORT SYSTEM RELATED ISSUES</th>
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<tr>
<td>PART TWO</td>
<td>DEVELOPMENT OF URBAN LAND USE AND TRANSPORT STRATEGY VISION, GOALS, FUTURE URBAN GROWTH AND TRANSPORT SCENARIO</td>
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<td>PART THREE</td>
<td>PUBLIC TRANSPORT IMPROVEMENT PLAN, ROAD NETWORK IMPROVEMENT PLAN, NON-MOTORISED TRANSPORT FACILITY IMPROVEMENT PLAN REGULATORY AND INSTITUTIONAL MEASURES, FISCAL AND MOBILITY IMPROVEMENT MEASURES</td>
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<tr>
<td>PART FOUR</td>
<td>IMPLEMENTATION PROGRAMMES, COSTING, PHASING</td>
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Source: M.L. Chotani, AMDA
Issues with CMPs
City (client) Awareness

Existing local government capacity for urban transport planning is still insufficient.

- Insufficient knowledge/awareness about CMP, its Objectives and Goals- consultants define for them
- Absence of experienced planners in City Agencies
- Client refers to CTTS under CMP
- CMP provides policy level interventions but client expects DPR level detailing
- No consensus among stakeholders

Source: RITES
Master Plan

CMP provides a recognized and effective platform for integrating land use and transport planning.

- Master Plan are being prepared on old approach & doesn’t integrate transport with land use
- The concept of TOD is not incorporated/ addressed
- Generally the proposals in CMP regarding change in land use in Master Plan are not welcome

Source: RITES
The challenge of integration

Master Plan

CMP

Budget Allocation
Focus on road development proposals

CMP focuses on movement of people rather than vehicles.

City Agencies lay emphasis on

- Proposals for Flyovers/Elevated Roads
- Junction Improvement Plans
- Proposals for Parking lots (Off street/On street/ Multilevel)
- Proposals for Bypass / Expressways
- Sometimes CMP title sounds like a DPR title
Neglect of NMV facilities

- Generally cities lack NMT infrastructure
- Most of the footpaths are encroached with commercial activities, City Agencies unable to remove encroachments
- Focus of City Agencies is to increase carriage way instead of increasing footpath widths
- Proposals to incorporate NMT lanes as essential element of road design are not favored
Most of the cities lack proper bus system and rely on IPT to serve as public transport for the system.

Buses provided under JNNURM to cities have started the bus system in some cities but the IPT system continue to dominate the public transport scene.

In most of the cities IPT is operating in direct competition to PT.

For city agencies, public transport means METRO/LRT, as a result there is very little effort to improve available bus / IPT systems in the City.

Source: RITES, 2012
Multiplicity

- Of city agencies
- Of consultants—eg. Indore
  - CTTS by CES, Delhi in 2004 (proposed Metro)
  - CDP by Mehta Associates, Indore in 2006 (proposed BRT on lines of CTTS 2004)
  - Master Plan of Indore 2021 recommends CTTS 2004 and BRT Study 2006
  - Ongoing BRT Study by CEPT, Ahmedabad
  - Ongoing Metro Study by DMRC
  - Ongoing CMP Study by RITES Ltd.
  - Ongoing LRT/Tram Study by Korean Consultants
  - Proposal of Elevated Roads/Flyovers

7 out of 9 studies listed have made different proposals for one corridor i.e. AB Road!

Source: RITES, 2012
Implementation

- Lack of clear implementation strategy in many plans
- Lack of a well defined framework of important targets and performance indicators
- Lack of supporting institutional reforms and capacity building
- Lack of recommendations to establish a mechanism for periodic revision and updating Plan
- No proper communication strategy to build public support for projects to be implemented

Source: TERI, 2010
### EVALUATION OF CMPs AS PER TOOLKIT CHECKLIST

<table>
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<tr>
<th>CONTENTS</th>
<th>Bangaluru</th>
<th>Madurai</th>
<th>Thane</th>
<th>Rajkot</th>
<th>Jalpur</th>
<th>Varanasi</th>
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**Legend:**
- **A** – Adequate
- **P** – Partial
- **N** – Negligible

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M.L. Chotani, Director-cum-member Secretary, Association of Municipalities & Development Authorities, Dec 2010 (IUM)
Towards an improved CMP structure..

Recommendations CMP improvements
Our team
... and 2014
Thank you! www.embarqindiahub.org