Transportation Demand Management

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Recap

**Multi-modal Mobility**
- Bus Rapid Transport
- Bus Karo
- Sustainable Transport Operators Industry

**Intermodal Connectivity**
- Feeders: Rickshaw + Public Bicycles
- Fare Integration
- Station Access and Area Design

**Integrating Land use and Transport**
- Street Design and Development Control Regulations
- Land use zoning and Development Control Regulations
- Land use zoning and Strategies and Priorities

**Disincentive to Car Use**
- Parking
- City led Travel Demand management
- Travel Demand management for businesses
City Visioning exercise

I want my city to be a place where....

➢ ......

➢ ......
- A city is a place where people want to be outside
- A place where as the society gets richer, transport improves for everyone
- A city friendly to cars cannot be friendly to people
- A city that is good for children, the elderly, the handicapped, the poor, is good for everybody else 😊
In public space we all meet as equals.
We ensure they thrive...and don’t drive?!

They have no political power...not just yet..
Bottom-line?

We have to decide the kind of city we want, before deciding the kind of transport system we want.
Transportation Demand Management (TDM), also called Travel Demand Management, aims to maximize the efficiency of the urban transport system by discouraging unnecessary private vehicle use and promoting more effective, healthy and environment-friendly modes of transport, in general being public transport and non-motorized transport (GIZ).

TDM is the all-inclusive term given to the variety of measures used to improve the efficiency of the existing transportation system (TRB).

TDM measures could be PULL measures, PUSH measures or a combination of both.
What does managing demand mean?

“Managing” an activity could mean “handling” or “altering” that activity at various stages of its execution.

Managing “travel demand” could therefore mean:

- Altering the need to travel
- Altering the location, route and time of travel
- Altering the price of travel
- Altering the mode
- Altering the road (and other facilities)
- Altering the environment of travel
- Altering the behaviour of the traveler
- Altering the technologies used to travel
The 3 TDM Elements: Example - Shopping

Starting point:
A household requires a wide range of goods, at various times of the day.

First decision:
How far do you have to go?

Second decision:
Which mode of transport will you (have to) use?

Third decision:
Which type of vehicle to use?

Smart Growth and Land Use Management

Improving Mobility Options and Pull people towards public transport and NMT

Using economic instruments to Push people to use cleaner modes

Diagram source: GIZ
Demand and Supply measures

List and distinguish between both (exercise)
The push and pull approach

Measures with push-effects
Area-wide parking management, parking space restrictions in zoning ordinances, car limited zones, permanent or time-of-day car bans, congestion management, speed reductions, road pricing...

Measures with pull-effects
Priority for buses and trams, high service frequency, passenger friendly stops and surroundings, more comfort, park-and-ride, bike-and-ride..., area-wide cycle-networks, attractive pedestrian connections...

Measures with push- and pull-effects
Redistribution of carriageway space to provide cycle lanes, broader sidewalks, planting strips, bus lanes..., redistribution of time-cycles at traffic lights in favour of public transport and non-motorized modes, public-awareness-concepts, citizens’ participation and marketing, enforcement and penalizing...

IMPROVING MOBILITY OPTIONS

“PULL”
Quick overview of measures

Improving

➤ Public transport- quality, priority, image, pricing, safety, security, accessibility..

➤ Walking

➤ Cycling

Introducing

➤ Bike sharing

➤ Ridesharing- carpooling

➤ Carsharing
Public Transport as a ‘Pull’ measure

It’s the reverse case today. People are desperate to leave public transport! Reason??
Quality based performance indicators

- Service km operated/vehicle owned
- Passenger carried/vehicle owned
- Passenger carried/staff member
- Staff/vehicle owned
- % of vehicle fleet operating in peak hr
- Revenue/vehicle owned
- Revenue/vehicle kilometre
- Kilometres operated between breakdowns
- Kilometres/fuel consumed
- Cost/vehicle km
- Fare collection leakage
- Employees’ absenteeism
- Number of accidents per 105 km

Does any of these reflect ‘performance’ as how a public transport user would perceive it?!
Non-motorized transport - Bike sharing

- Flexible personal private system
- Free for first 30 min
- Dense network of cycles
- Strong identity
- Encourage short trip lengths
- Cycles are not tied up with stand
- Use of IT
- Gives people an opportunity to bike again!
Role of Bike Sharing

Adopted from: Quay Communication Inc. 2008. Trans Link Public Bike system Feasibility Study, Vancouver
Global Trends in Bike Sharing
Nama Cycle – Bangalore
USING ECONOMIC INSTRUMENTS

“PUSH”
Quick overview of measures

Instruments could be incentive or disincentive based. Pricing reforms capturing real costs of externality caused (eg. Pollution, health damage, time and fuel wasted in congestion, etc.)

- Tax/charge on vehicle ownership/purchase (registration tax, annual vehicle tax, etc.)
- Tax/charge on vehicle usage (fuel tax, parking fees, tolls, road pricing, cordon pricing, congestion charging)
- Incentives to use public transport and during off-peak hours (subsidies, cash-outs to employees)
- Tax differentiations based on emissions-carbon taxes, emission fees; tax rebates for low emission vehicles and technologies
Vehicle Bans

- Some Chinese cities – e.g. Guangzhou - have banned motorcycles from central area
- Guangzhou started with small central area ban, expanded in 2007 to 35 sq. km. area shown (applies 8:30-17:00)
- Such bans divert trips to other modes, such as bicycle, public transport, and car

**Jogyakarta, Indonesia, bans motorcycles from its extensive cycle path network, but enforcement is non-existent, putting cyclists at risk**

Source: GIZ
Regulatory controls

Prohibition on motor vehicles from being driven into central areas on certain days of the week

“Odd-even” or “Last digit” or other license-plate based schemes attempt to keep each vehicle from being driven 1-2 days a week or certain hours in a day)

• Mexico City
• Bogota
• Sao Paulo
• Santiago
• Manila

Multiple side-effects limit their effectiveness- road mgt, induced traffic, Source: GIZ
Congestion Pricing: A key emerging TDM strategy
Congestion charging

- Different from road pricing and tolling
- Could be done for a cordon area, a corridor or a network
- Objective is to manage traffic and reduce congestion
- Helps raise money for public transport improvements
- Technologies range from basic toll collector systems, to gantry ‘tag and beacon’ systems to plate recognition cameras
- In use: London, Stockholm, Oslo, Singapore, etc.
Singapore in the 70's...before congestion charging

Source: LTA
Singapore today... after 30 years of road pricing and public transport investment
London

- London suffered the worst traffic congestion in the UK and amongst the worst in Europe.
- Drivers in central London spent 50% of their time in queues.
- Every weekday morning, the equivalent of 25 busy motorway lanes of traffic tries to enter central London.
- London lost between £2–4 million every week in terms of lost time caused by congestion.
- Mayor Ken Livingston in Feb 2003 introduced congestion charging in central London between 7 AM and 6 PM.
- Charge has increased from £3- £8 since then.
- Drivers are charged through camera plate recognition after entering the zone.

Within 3 years journey times reduced by 15% and congestion by 26%

Source: GIZ, TDM Document
## Comparing Singapore and London (Source: Santos, 2004)

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Area covered</td>
<td>22 sq. km (1/3rd of GL)</td>
<td>NA</td>
</tr>
<tr>
<td>Recording devices</td>
<td>Cameras, License plates</td>
<td>Gantries, In Vehicle Units</td>
</tr>
<tr>
<td>Exemptions and discounts</td>
<td>2 wheelers, bicycles, emergency vehicles, buses, disabled friendly vehicles, taxis, mini-cabs, alternative fuel vehicles, zone residents</td>
<td>emergency vehicles, police cars</td>
</tr>
<tr>
<td>Managed by</td>
<td>TfL and Capital</td>
<td>LTA</td>
</tr>
<tr>
<td>Capital costs £</td>
<td>200 million</td>
<td>66 million</td>
</tr>
<tr>
<td>Operating costs £</td>
<td>115 million</td>
<td>5.2 million</td>
</tr>
<tr>
<td>Net revenues/yr £</td>
<td>80-100 million</td>
<td>19.8 million</td>
</tr>
<tr>
<td>Reduction in pvt. cars in the zone</td>
<td>33% (daily)</td>
<td>15%</td>
</tr>
<tr>
<td>Increase in avg. speed in the zone</td>
<td>14-21 %</td>
<td>No change</td>
</tr>
</tbody>
</table>
SMART GROWTH & LAND USE MANAGEMENT

PUSH AND PULL
### The symptoms

#### Leading causes of premature death in the world:

<table>
<thead>
<tr>
<th>2004</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ischaemic heart disease</td>
<td>1. Ischaemic heart disease</td>
</tr>
<tr>
<td>2. Cerebrovascular disease</td>
<td>2. Cerebrovascular disease</td>
</tr>
<tr>
<td>3. Lower respiratory infections</td>
<td>3. Pulmonary disease</td>
</tr>
<tr>
<td>4. Pulmonary disease</td>
<td>4. Lower respiratory infections</td>
</tr>
<tr>
<td>5. Diarrhoeal disease</td>
<td>5. <strong>TRAFFIC ACCIDENTS</strong></td>
</tr>
<tr>
<td>7. Tuberculosis</td>
<td>7. Diabetes</td>
</tr>
<tr>
<td>8. Lung cancers</td>
<td>8. Hypertensive heart disease</td>
</tr>
<tr>
<td>9. <strong>TRAFFIC ACCIDENTS</strong></td>
<td>9. Stomach cancer</td>
</tr>
<tr>
<td>10. Low birth weight</td>
<td>19. HIV / AIDS</td>
</tr>
</tbody>
</table>

- **90% of traffic fatalities occur in low and middle-income countries and involve 70% of vulnerable users of the road**
- **In cities, the majority of crashes are concentrated on urban arterials, where BRTs and Busways are usually located**
## The disease: Lack of Transport & Landuse integration in Master Plans

<table>
<thead>
<tr>
<th></th>
<th>Today</th>
<th>Automobility</th>
<th>2041</th>
<th>Sustainable Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (millions)</td>
<td>5.4</td>
<td>13.2</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>
<td>39.75</td>
</tr>
<tr>
<td>Area (Sq. Km.)</td>
<td>1330</td>
<td>6484</td>
<td>3242</td>
<td></td>
</tr>
<tr>
<td>Emissions (million Tons CO2/yr)</td>
<td>0.33</td>
<td>12.32</td>
<td>1.97</td>
<td>1.225</td>
</tr>
<tr>
<td>Traffic Fatalities (per yr)</td>
<td>175</td>
<td>5,232</td>
<td>1,225</td>
<td></td>
</tr>
</tbody>
</table>
Quick overview of measures

- Integration of land use with transport at Master Planning Level
- Local plans to allow for transportation and other street elements
- TOD (feeders are important)
- Density vs. Clustering to reduce number of trips made
- Road space re-allocation
- Parking Management and Controls
- Traffic Calming
- Preferential traffic signalling
- Public awareness campaigns
- Telecommuting, …

Source: GIZ TDM Document
Pedestrian way or Parking zone?

Bangkok / Thailand

Picture: GTZ Photo CD-ROM / Karl Fjellstrom
It is indeed an inverted world...
Our cities need….

Parks……not car parks!

Source: GIZ
Positive impacts of parking policy

- Has an impact on mode share
- Can support local economic development
- Major revenue earner
- Improves road safety
- Influences car ownership

Source: GIZ
Menu of Parking management strategies…

- Shared parking (multiple users and destinations)
- Unbundle Parking (not included in cost of residence)
- Parking Maximums (standards on % age of land available for parking in buildings)
- Remote parking
- Increase capacity of exiting facilities—valet, stacking, etc.
- Parking pricing
- Financing incentives
- Better parking user information system
- Enforcement, management, public participation
- “In-lieu” fees
- Mandatory off-street parking proof to purchase vehicle
- Bicycle Parking
**PARK Smart: New York City’s Peak-Rate Parking Pilot**

**How does the Program Work?**

**Rates:**
- During peak times, rates are 100% to 200% higher than the baseline rates.
- Exact rates and peak hours are established in consultation with merchants, residents, and property owners.

**Branding:**
- Single-space Motor Logo
- Multi-space Motor Logo

**Data Collection:**
- Parking occupancy, parking duration, unique vehicle counts and traffic volumes are measured at three points: Before implementation, one month after program implementation (“Snapshot”) and six months after program implementation.
- Additionally, merchants, parkers and passersby are surveyed on their program experience and behavior.

**Technology:**
- Initial pilots in Greenwich Village and Park Slope utilized existing single-space, coin-only meters.
- Both areas transitioned to multi-space meters which allow for credit/debit card payments.
- Future programs will utilize next-generation multi-space meters.

**Keys to implementing parking pricing in a large, diverse city**
- Implement six-month pilots in distinct neighborhoods.
- Treat each pilot neighborhood as a unique entity.
- Partner with the community on all aspects of the program.
- Monitor the effects – the response will be different in each neighborhood.

**PARK Smart Pilot Neighborhoods**

**Greenwich Village**
- Manhattan [October 2008]
- Pilot Rates: $2.00/hr peak, $1.00/hr base
- One of NYC’s premier cultural, academic and entertainment districts.
- Parking occupancy decreased by six percentage points after implementation.
- Share of vehicles parked for one hour or less increased from 48% to 60%.
- Community supported rate increases to $3.75/hr during the peak and $2.50/hr off peak.

**Upper East Side**
- Manhattan [April 2010]
- Pilot Rates: $3.75/hr peak, $2.50/hr base
- Combines high-end retail on Madison Avenue and ‘Big-Box’ retail on East 86th Street.
- Baseline data analysis currently underway.
- First community report due Fall 2010.

**Park Slope**
- Brooklyn [May 2009]
- Rates: $1.50/hr peak, $0.75/hr base
- Retail corridor in primarily residential neighborhood.
- Average duration decreased by 20% during peak hours.
- Increase in number of unique vehicles observed after implementation.
- Occupancy showed little change due to already saturated levels of demand and few off-street parking options.
- Community supports expansion of the PARK Smart program, doubling the size of the original pilot area.

**Lessons Learned**

- Pricing is an effective strategy in addressing demand for parking, but the actual response to pricing varies based on:
  - Levels of demand.
  - Supply and cost of off-street parking.
  - Land use and neighborhood character.
- Community partners are critical to the success of PARK Smart as:
  - Advocates for their constituency.
  - Conduits for neighborhood concerns.
  - Disseminators of the results of data collection.
- Parking pricing cannot be a stand alone strategy. A neighborhood’s parking needs include:
  - Commercial deliveries.
  - Residential parking.
  - Metered parking time limits.
  - Metered hours in operation.
- Meter technology can limit the range of pricing options.
- Program evaluation requires flexible and robust data collection – and extensive QA/QC protocols.
Car Free Days

Changing cultural & institutional perceptions
...and meet the Peatónito, the masked Mexican defender of pedestrians!

Changing cultural & institutional perceptions (cont’d)....

➤ His mission is to protect the pedestrian’s much-assaulted right of way on the streets of Mexico City, where on average one pedestrian is killed by a motor vehicle every day and countless others are injured.

➤ His mask is black and white, the colors of a crosswalk.

➤ ..and in Bogota they have clowns instead of Traffic Police to “embarrass” motorists for causing inconvenience to pedestrians.

Source: ?
Concluding points

- TDM programs can work well only if there are alternatives to commute (therefore, PULL strategies should be in place before PUSH).
- The public and political acceptability of many TDM programs is a challenge usually. Public education and communication of these lessons to all stakeholders is essential.
- Focus more on the ‘incentives’ rather than the ‘disincentives’. Eg. Infosys case in Bangalore.