Speed, distance and social space: What do we make of our cities?

Dinesh Mohan
Urban transport – changing concerns

- <1990: Speed
- 1990s-: Pollution
- 2000s-: Road Safety (concern but unscientific in most countries)
- Late 2000s-: Lip service to climate change
Poor have to increase energy consumption

Rich and middle class must reduce energy consumption

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28 November 2011
All natural systems, including humans being, grow to maturity and then stop growth

*Current economic philosophies violate this fundamental principle*

All have negative feedback systems to maintain homeostasis

*Most transportation policies have positive feedback systems embedded in them*
City density – traditional understanding

Car use and density redone

Car use and density redone

Density, cities > 10 million

- Income
- Density

- Density / high rise may not be a major concern for us

IIT Delhi
Probability of pedestrian fatality by impact speed

Impact speed km/h

Percent

Yes

No
Miles travelled by car & motorcycle and average male BMI (USA)

Source: Ian Roberts, 2011
Vehicle ownership in countries with per capita incomes US$ 1,500-8,000

India 2030

<table>
<thead>
<tr>
<th>Country</th>
<th>Cars/100</th>
<th>MTW/100</th>
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<tbody>
<tr>
<td>France</td>
<td>50</td>
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<td>USA</td>
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Growth in automobile ownership being encouraged by national and international corporate/government policies as signs of robust dynamic economies: +ve feedback

IIT Delhi 28 November 2011
Life cycle emissions – rail modes

Life cycle emissions – road modes

- Sedan: 232
- SUV: 275
- Pickup: 327

Operations ~75%  
Infrastructure ~25%

Bus (Off-Peak)  
Bus (Peak)  
Bus 40 passengers

Underground or elevated system
Estimates CO2 emissions per passenger in Delhi

Focus on local emissions by electric systems gives +ve feedback for promoting grade separated systems

Calculation
- Passengers carried per day (metro system and per bus)
- Energy consumed (Total electricity bill for Metro and diesel consumed per bus)
- CO2 emitted per MVAH at the powerhouse, well-to-wheel CO2 for diesel
- Fly ash emitted by metro system not included
ISSUES

- Even cities in high income countries have not been able to solve the problems that all of us have to deal with in the near future

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Modernisation of public transport systems are very visible and profitable for manufacturers, preferred politically over sidewalks and bicycle facilities.
FRIENDS & URBAN TRANSPORT

Light traffic
2,000 v/day
3.0 friends
5.3 acquaintances

Moderate
8,000 v/day
1.3 friends
4.1 acquaintances

Heavy traffic
16,000 v/day
0.9 friends
3.1 acquaintances

Source: Dr. Carlos Dora
ISSUES

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More vehicles → Wider roads
20th CENTURY SOLUTIONS

- One way streets?
  Increase CO2 and fuel consumption ~ 30%

  "One-way streets reflect the dominance of the car and the failed go-faster policies of the traffic engineers. As we begin to realise that walking and cycling should be the dominant forms of transport, the one-way street should be consigned to the dustbin of history."
  Peter Murray, Head of the New London Architecture Centre,

- High speed system public transport?
  "will further encourage sprawl and greater energy consumption, and hence, Public Transit (PT), even if the commercial speed is rather low, is probably the only way to improve urban accessibility and urban attractiveness in a sustainable way"


IIT Delhi 2009
Long distance high speed commuting

- In the case of New York City, more than one-third of the gains in reducing car-related emissions that are associated with central city residents are offset by higher emissions from public transit.

- In New York, central city residents emit more than 5600 lb of carbon dioxide less than suburbanites.

- In bigger cities, suburbanites are more likely to drive longer distances relative to central city residents.

Public transport fare systems

- Flat fare systems promote longer commutes
- Monthly/season tickets encourage extra long distance travel
- Both discriminate against lower income groups in need of single or infrequent trips

Rewards those who travel more
Future

Balancing of management efficiency and negative feedback mechanisms