Travel behavior of low-income residents:

Studying two contrasting locations in the city of Chennai, India

Sumeeta Srinivasan
Peter Rogers

TRB Annual Meet, Washington D.C.
January 2003

Environmental Systems, DEAS
Harvard University, Cambridge MA 02138

Outline of Paper

1. **Introduction**
   - Travel behavior and accessibility
   - Motorization in India
2. **The context of Chennai**
3. **The survey**
   - Data
4. **Results**
   - General, Mode choice, trip frequency
   - Models of Mode choice, trip frequency
5. **Implications for planning**

Introduction

- Relationship between accessibility and travel behavior debated in North America and Europe. Very little research in India and other developing countries
- The poor in urban India depend heavily on non-motorized transportation and often live on peripheral settlements
- The challenge to planners in India is that accessibility needs vary greatly – therefore effective strategies for meeting needs also vary greatly

Introduction

- Accessibility is also related to motorization in India - the private automobile or two-wheeler is becoming the most popular mode of transport
- The automobile sector is seen as a major focus of industrial development
- Policies do not distinguish between targeting vehicle ownership and use

Context of Chennai (Madras)

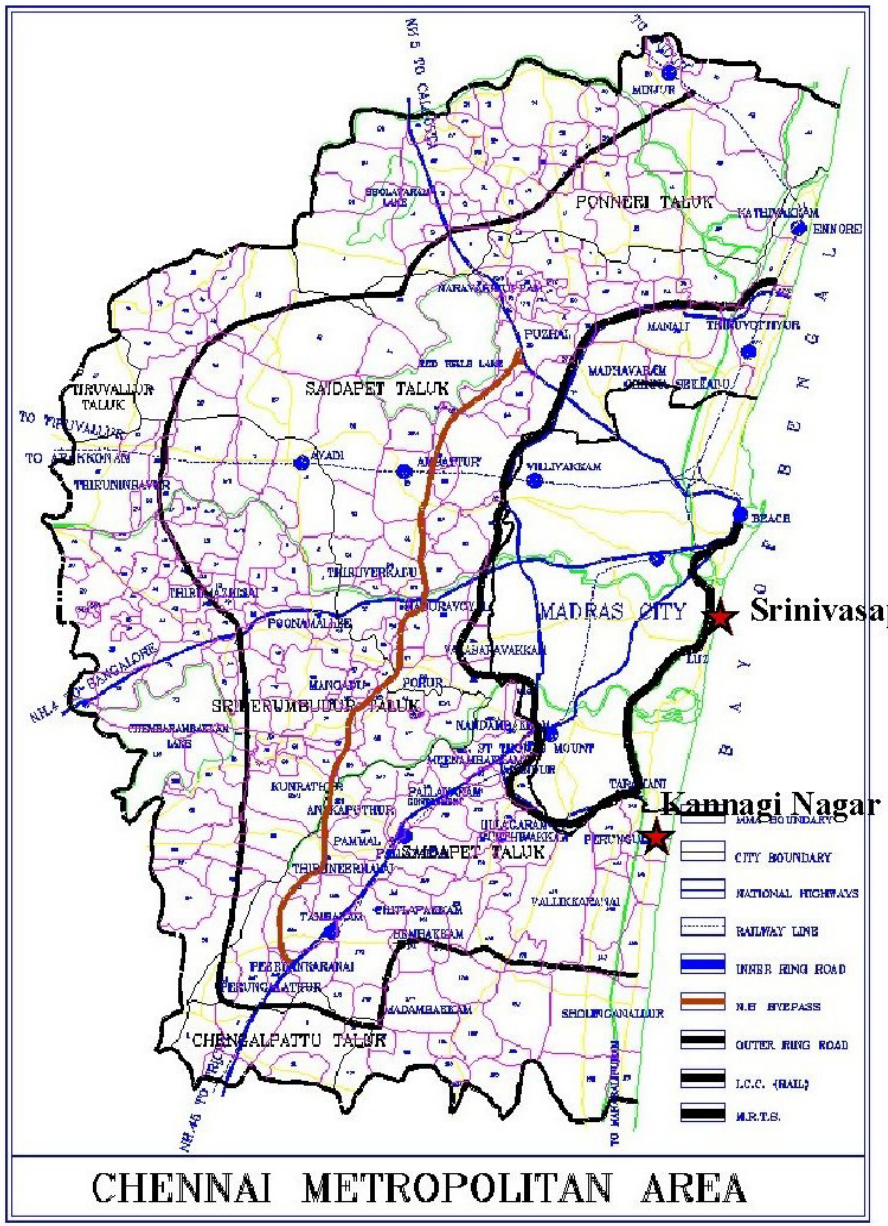
- Chennai is a city of 4.2 million (Census of India, 2001) in Tamil Nadu
- The metropolitan area spread over 1000 sq km with total estimated population 6 million
- An estimated 1 million people live in shanty towns (or “slums”)
- Rapid growth in vehicle population (17% annual growth rate since 1996 and 4.6 million private vehicles in 2001)

Location of Chennai in India

The Survey - data

- In our study, data for 70 households were collected for one day
  - 35 living in Srinivasapuram (close to CBD)
  - 35 households living in Kannagi Nagar (far from CBD)
- Both settlements have residents with similar income levels The State Housing Board has provided the housing and infrastructure in both locations
- In the 70 households surveyed 145 adults (over the age of 16) made 427 trips that took about 29 minutes and traveled about 5 km

Location of study areas with respect to the city of Chennai



Results - General

- Srinivasapuram (the centrally located settlement - SP) is slightly wealthier than that in Kannagi Nagar (KN)
- Household size, number of workers, percentage of females and average age are similar
- Residents depend on non-motorized transport and transit for work and non-work activity
- Very few trip-chains

Srinivasa puram (SP)

View of SP

Road into SP

Kannagi Nagar (KN)

Access to KN

View of KN

Results – Travel time and costs

- Residents in KN spend more time and money commuting to work
- The out-of-pocket daily costs of travel are higher for men in KN (Rs 35 as compared to Rs 9 in SP)
- In SP the average and median distance traveled 2.7 km (15 min) and 0.4 km (10 min) vs. KN 11 km (50 min) and 6 km (45 min)

Results – Mode choice

- In SP the major mode was walk or bicycles (60% of persons; 69% of trips) versus in KN which had bus users (persons 65% and trips 50%)
- In SP men have equal shares of walk and transit (walk by 40% of men and 35% of trips) versus KN bus predominant mode for men (74% of the trips and 82% of the men)
- 81% of all trips on private vehicles in SP

Results – Trip frequency

- In KN 37% of households made 5 (or more) trips versus 91% of households in SP had 5 (or more) trips
- 24% of the women in SP made 2 (or fewer) trips versus 56% of the women in KN
- Average trip frequency of men in SP was 1.2 women in SP averaged 2.2 versus women in KN 1.1 (the same as the men)
- Persons with jobs in both locations had a higher trip frequency

Models: Mode choice, trip frequency

- Models of qualitative choice were used to model
  - Multinomial logit mode choice between walk/bike, bus and personal vehicle
  - Binary choice of trip frequency (higher or lower than average trip frequency of sample)
- Independent variables included socioeconomic descriptors of households, individuals and of the modes (in terms of cost and time

Model results – Mode choice

- Time significant and negative indicating people tended to choose the mode that took the least time
- Women (with jobs and without) significantly more likely to us NMT/bus than men
- All persons with jobs less likely to use NMT than those without
- Location was significant indicating people in SP more likely to use NMT than KN

Model results – Trip frequency

- Persons and households with relatively high income (over Rs 1500/ month) make fewer than average trips
- Women are more likely to make more than average number of trips
- Location is significant at person and household level model – those living in SP likely to make more than average number of trips

Implications of results

- Location significant in affecting travel behavior, even for low-income residents of Chennai
- It appears to affect all aspects of travel behavior: time spent, cost, frequency and mode choice for the trip
- It does not seem to affect attitudes towards transportation (mainly because the poor quality of services is of concern to all households)

Planning for Chennai

- In future low-income residents in Chennai are more likely to live in locations like KN than locations like SP
- Increases in commuting distances will result in high infrastructure costs borne mostly by the state (and indirectly the residents of the city)
- Improving supply of transit and facilitate use of NMT is one answer
- Improving mix of employment, services and housing should also be addressed

Future research directions

- This study uses a relatively small sample limited to two locations in the city
- An expanded survey over several locations could better estimate the impact of other land use and accessibility characteristics on travel behavior

(To be done over this summer over 75 locations in Chennai in locations where the poor live)

Thank You