INEQUALITY IN TRANSPORT ACCESSIBILITY
Sao Paulo, Istanbul and Mumbai

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London School of Economics and Political Science

SAO PAULO
19.2m Metropolitan Population
$ 12,021 Economic Output [GDP per capita]
0.61 Income Inequality [Gini Index]

ISTANBUL
12.7m Metropolitan Population
$ 12,856 Economic Output [GDP per capita]
0.43 Income Inequality [Gini Index]

MUMBAI
19.3m Metropolitan Population
$ 1,871 Economic Output [GDP per capita]
0.35 Income Inequality [Gini Index]

RESIDENTIAL DENSITY

MUMBAI METRO REGION - DENSITY
19.3m Metropolitan Population
25,316 Avg. Density vertical area
of 10km (pers./sqkm)
121,312 Max. Density pers./sqkm
LONDON METRO REGION - DENSITY

19.0m
Metro Population
8,326
Max. density central area
17,324
Avg. density central area

RAIL TRANSPORT INFRASTRUCTURE

São Paulo
Istanbul
Mumbai
London

MODAL SPLIT

São Paulo
Mumbai
London
Istanbul
URBAN AGE SURVEY BY LSE CITIES

- Household Surveys: across metropolitan region commissioned by LSE Cities and conducted by IPOS MORI covering key urban policy areas

<table>
<thead>
<tr>
<th>city</th>
<th>year</th>
<th>sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sao Paulo</td>
<td>2008</td>
<td>1,000</td>
</tr>
<tr>
<td>Istanbul</td>
<td>2009</td>
<td>1,013</td>
</tr>
<tr>
<td>Mumbai</td>
<td>2010</td>
<td>1,001</td>
</tr>
</tbody>
</table>

- Transport Section of the surveys included mobility patterns and various attitudes towards transport policy. Of particular relevance to this study were:

<table>
<thead>
<tr>
<th>Main daily trip information</th>
<th>General information</th>
</tr>
</thead>
<tbody>
<tr>
<td>trip duration</td>
<td>access to car</td>
</tr>
<tr>
<td>modal shares</td>
<td>travel time to various services</td>
</tr>
</tbody>
</table>

METHODOLOGY AND STRUCTURE

Research Question
To which extent are disadvantaged groups in the three cities also exposed to lower accessibility levels?

Approach
Exploration of accessibility and mobility patterns in relation to

- socio-economic status
- tenure type
- employment status
- gender
- location-related

Structure
1. Socio-economic status and location
2. Socio-economic status and accessibility
3. Location, density and accessibility
4. Conclusions
SOCIOECONOMIC STATUS AND LOCATION

SAO PAULO: DISTRIBUTION OF LEAST EDUCATED

SAO PAULO: UNEMPLOYMENT LEVELS

unemployment is more severe in remote areas, high concentration of unemployed people

SAO PAULO: PERCENTAGE OF FORMAL JOBS

EDUCATION LEVEL AND DISTANCE TO CITY CENTRE

EDUCATION LEVEL AND DISTANCE TO RAPID TRANSIT NETWORK

Source: IBGE 2000 and A. Gomide 2008
SOCIOECONOMIC STATUS AND ACCESSIBILITY

DIMENSION OF ACCESSIBILITY
1. Cost
2. Time
3. Reliability
4. Service frequency
5. Physical comfort
6. Safety
7. Security
8. Convenience

EDUCATION LEVEL AND ACCESS TO SERVICES

EDUCATION LEVEL AND TRIP DURATION
Work Trips

EDUCATION LEVEL AND TRIP DURATION
Non-Work Trips

EDUCATION LEVEL AND MODAL SHARE
Work Trips
EDUCATION LEVEL AND MODAL SHARE

Non-Work Trips

EDUCATION LEVEL AND ACCESS TO CAR

SAO PAULO: PUBLIC TRANSPORT ACCESSIBILITY PROBLEMS

Problems in using public transport for accessing jobs: families who earn less than 3 minimum wages a month Sao Paulo Metropolitan Region (July 2003).

<table>
<thead>
<tr>
<th>Problems</th>
<th>SPMR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paying the fare</td>
<td>52</td>
</tr>
<tr>
<td>Long wait (low frequency)</td>
<td>36</td>
</tr>
<tr>
<td>Distant bus stops</td>
<td>27</td>
</tr>
<tr>
<td>No transportation available</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Itrans, 2004 and A. Gomide 2008

MUMBAI – PERCENTAGE OF SLUMS

LOCATION, DENSITY AND ACCESSIBILITY
DISTANCE FROM CITY CENTRE AND TRIP DURATION

- Work Trips

- Non-Work Trips

INTRA-URBAN VARIATIONS OF MOBILITY: NEIGHBOURHOODS

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>Central-urban</th>
<th>Intermediate</th>
<th>Highly residential</th>
<th>Dense-volatility</th>
<th>Periphery</th>
</tr>
</thead>
<tbody>
<tr>
<td>São Paulo</td>
<td>13,001 ppl/km</td>
<td>10,490 ppl/km</td>
<td>18,971 ppl/km</td>
<td>9,533 ppl/km</td>
<td>753 ppl/km</td>
</tr>
<tr>
<td>Istanbul</td>
<td>42,396 ppl/km</td>
<td>14,717 ppl/km</td>
<td>26,394 ppl/km</td>
<td>8,698 ppl/km</td>
<td>4,191 ppl/km</td>
</tr>
<tr>
<td>Mumbai</td>
<td>56,463 ppl/km</td>
<td>36,807 ppl/km</td>
<td>49,019 ppl/km</td>
<td>14,559 ppl/km</td>
<td>46,188 ppl/km</td>
</tr>
</tbody>
</table>

TRAVEL TIME OF NON-WORK TRIPS ACROSS NEIGHBOURHOODS

CONCLUSION