Multimodal accessibility and commuting to campus: the case of the University of Lisbon

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12th International Symposium on Urban Planning and Environment
1th UPE Lusophone Symposium
Built Environment and Travel

MOBILITY MANAGEMENT
- Parking availability
- Parking cost
- PT Supply
- (etc.)

BUILT ENVIRONMENT
- Density
  - Intensity
- Diversity
  - Land use mix
- Design
  - Street Connectivity
  - Routes
- Safety
- Aesthetics
- Topography
- Active Travel

ACCESSIBILITY
- Origins
- Destinations
- Routes
- Several modes

TRAVEL
- Travel mode
- Travel time
- Travel distance
- Travel frequency

DEMOGRAPHICS
- Age
- Gender
- Income (..)

Psycho-social
- Attitudes
The University of Lisbon
Locations – 7 campuses

Public Transport
- Train
- Metro

University Locations
- Cidade Universitária
- Polo da Ajuda
- Faculdade de Belas-Artes (FBA)
- Faculdade de Motricidade Humana (FMH)
- Instituto Superior Técnico (IST)
- Instituto Superior de Agronomia (ISA)
- Instituto Superior de Economia e Gestão (ISEG)
The University of Lisbon Locations – 7 campuses
The University of Lisbon Travel Survey

Initial sample: 2037
Georeferenced: 1963

90.6% travel 3 or more times per week

>> Final sample: 1767 individuals

1390 Students
100 PhD / Researchers
156 Professors
121 Staff
Travel patterns

Mean = 42.5 min
StDev = 31.43 min

Mean = 2.34
StDev = 1.38

Travel Mode

Walk 17%
Bicycle 6%
Car passenger 1%
Car driver 1%
Motorcycle 2%
Taxi 26%
PT + other motorized 47%
PT + bicycle 1%

Travel Time

Number of Travel Steps

Travel Distance

66%
37%
18%
# Travel patterns

## Alternative travel mode

### Travel Mode * Alternative Travel Mode Crosstabulation

<table>
<thead>
<tr>
<th>Travel Mode</th>
<th>Alternative Travel Mode</th>
<th>None</th>
<th>Walk</th>
<th>Bicycle</th>
<th>Public Transport</th>
<th>Car passenger</th>
<th>Car driver</th>
<th>Motorcycle</th>
<th>Taxi</th>
<th>Total</th>
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<td>3.0%</td>
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<td>1.3%</td>
<td>100.0%</td>
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</tbody>
</table>

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**no alternative mode for:**

- 59.4% Walkers
- 60.1% PT users
- 57.3% Car drivers

**PT is alternative mode for:**

- 75.9% car passengers
- 35.4% Car drivers
1) What’s the impact of the employment status?
TRAVEL TIME

Employment Status

Mean
42.5 min

Student
45.3 min

Professor
26.2 min

PhD / Researcher
34.2 min

Staff
38.9 min
TRAVEL MODE

Employment Status

- **Student**
  - 18% Walk
  - 54% PT

- **PhD / Researcher**
  - 16% Walk
  - 41% PT
  - 31% Car driver

- **Professor**
  - 9% Walk
  - 81.4% Car driver

- **Staff**
  - 10% Walk
  - 34% PT
  - 46% Car driver
TRAVEL DISTANCE
Employment Status

Student
18% up to 4 km
36% up to 7 km

PhD / Researcher
23% up to 4 km
54% up to 7 km

Professor
20% up to 4 km
44% up to 7 km

Staff
9% up to 4 km
30% up to 7 km
2) What’s the impact of the location of the campus?
TRAVEL TIME
Campus ULisboa

Cidade Universitária
ISEG
FMH

Polo Ajuda
IST
ISA*
FBA*

Mean
42.5 min

Smaller Travel Time:
IST (Center, Good PT accessibility)
FMH (Periphery, Bad PT accessibility)

>> Smaller travel distance?
>> Mode change to reduce time?

* Only students
TRAVEL DISTANCE
Campus ULisboa

18% up to 4 km
37% up to 7 km

Smaller Travel Distance:
IST (Center, Good PT accessibility)

Reduced number of walking distance residents:
Polo da Ajuda (Periphery, Bad PT accessibility)

>> Mode change to reduce time?
Location of residential place
Kernel density
Location of residential place
Kernel density
By different campuses

* Only students
TRAVEL MODE
Campus ULisboa

Travel Mode
- 17% Walk
- 47% Bicycle
- 26% Car passenger
- 2% Car driver
- 6% Motorcycle
- 1% Taxi
- 1% PT + other motorized
- 0% PT + bicycle

More car drivers: Polo da Ajuda + FMH
More walkers: IST + ISEG
More PT users: FBA

* Only students
3) What explains the commuting pattern?

Logistic model (No-car commuting = 1)
### Independent Variables (30)

<table>
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<tr>
<th>BUILT ENVIRONMENT @ HOME (6)</th>
<th>BUILT ENVIRONMENT @ CAMPUS (6)</th>
<th>SOcio-Economic (9)</th>
<th>Accessibility @ Home (4)</th>
<th>Accessibility @ Campus (4)</th>
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<tbody>
<tr>
<td>Density:</td>
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<td>Employment status</td>
<td>Distance to closest stop</td>
<td>Distance to closest stop</td>
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<td>Number of buildings</td>
<td>Number of buildings</td>
<td>Age</td>
<td>Has PT stop 400</td>
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<td>Number of dwellings</td>
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<td>Has PT stop &lt; 800 m (01)</td>
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<td>Number of POIs</td>
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<td>Pedestrian shed ratio</td>
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</table>

FCA 500 meters network
## Logistic model (no-car commuting)

Nagelkerke $R^2 = .451$

PAC = 81.9% (% accuracy)

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Conclusions

• Major differences found between employment status BUT ALSO between campus location (and associated BE and Accessibility)

• Socio-economic very determinant

• However, BE of destination has important as BE of home

• Transport-Land Use integration must consider both origins and destinations

• Different destinations require different measures

> One size does NOT fit all!