Beyond Mobility - Understanding and comparing urban accessibility in European Cities

Guy Hitchcock, Knowledge Leader
Study on improving the understanding of urban accessibility and road congestion in Europe

- Client: DG MOVE
- 2 year study – completed and due to be published soon

“The general objective of this EU study is to improve understanding of urban accessibility and road congestion, and support a debate on understanding and improving urban accessibility in order to improve the functioning of urban areas and make the transport system more “resource efficient”
Study on improving the understanding of urban accessibility and road congestion in Europe

Qualitative analysis

Task 1: Provide a state-of-the-art report on assessing urban accessibility

Task 2: Estimate European urban road congestion costs

Task 3: Derive average efficiency of urban passenger transport

Task 4: Provide best practice examples

Task 5: Provide policy proposals

Quantitative assessment

Task 1: stakeholder outreach
- Interviews
- Surveys
- Workshop
Defining accessibility

‘The average opportunity which the residents of the area possess to take part in a particular activity or set of activities’ (Wachs & Kumaga, 1973)

‘The opportunity which an individual or type of person at a given location possesses to take part in a particular activity or set of activities’ (Hansen, 1959)

‘The extent to which the land use-transport system enables (groups of) individuals or goods to reach activities or destinations by means of a (combination of) transport mode(s)’ (Geurs & van Eck, 2001)

‘The consumer surplus, or net benefit, that people achieve from using the transport and land use system’ (Leonardi, 1978)

‘The number and diversity of places that can be reached within a given travel time and/or cost’ (Bertolini, Le Clercq, & Kapoen, 2005)

‘The ease in meeting one’s needs in locations distributed over space for a subject located in a given area’ (Cascetta, Carteni, & Montanino, 2013)

Property of an individual’s surroundings (e.g. the transport-land use system) or particular places: “[Accessibility is] the extent to which the land use-transport system enables (groups of) individuals or goods to reach activities or destinations by means of a (combination of) transport mode(s).” (Geurs & van Eck, 2001)

As property of an individual: “Accessibility is a measure of the ease of an individual to pursue an activity of a desired type, at a desired location, by a desired mode, and at a desired time” (Bhat, et al., 2000)
Defining accessibility

- Accessibility differs from mobility:

**Mobility**

*Movement of people and goods*

**Accessibility**

*Consideration of opportunities enabled by mobility*

- A working definition of accessibility is:

  “….the *ease of reaching* goods, services, activities and destinations in urban areas. It includes factors such as mobility options, travel information, transport network connectivity, land use patterns and cost for both passengers and freight.”

Diagram: Link between individuals and desired opportunities/destinations
The four dimensions of accessibility

**Land use**
Where activities are

**Transport**
How to get to activities

**Individual**
Needs, capabilities and perceptions

**Temporal**
When are opportunities available and what time to people have to access them
Measuring Accessibility - Metrics

**Location-based**
How easily can people get to a location?

**Infrastructure-based**
How good is the transport system?

**Person-based**
How many opportunities can a person or group of people access?

**Utility-based**
What is the utility derived from a certain level of accessibility?
## Coverage of dimensions of accessibility by type of accessibility measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>Component</th>
<th>Transport component</th>
<th>Land-use component</th>
<th>Temporal component</th>
<th>Individual component</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure-based measures</strong></td>
<td>Travelling speed; vehicle-hours lost in congestion</td>
<td></td>
<td></td>
<td>Peak-hour period; 24-h period</td>
<td></td>
</tr>
<tr>
<td><strong>Location-based measures</strong></td>
<td>Travel time and or costs between locations of activities</td>
<td>Amount and spatial distribution of the demand for and/or supply of opportunities</td>
<td></td>
<td>Travel time and costs may differ, e.g. between hours of the day, between days of the week, or seasons</td>
<td>Only personal location</td>
</tr>
<tr>
<td><strong>Person-based measures</strong></td>
<td>Travel time between locations of activities</td>
<td>Amount and spatial distribution of supplied opportunities</td>
<td></td>
<td>Temporal constraints for activities and time available for activities</td>
<td>Accessibility is analysed at individual level</td>
</tr>
<tr>
<td><strong>Utility-based measures</strong></td>
<td>Travel costs between locations of activities</td>
<td>Amount and spatial distribution of supplied opportunities</td>
<td></td>
<td>Travel time and costs may differ, e.g. between hours of the day, between days of the week, or seasons</td>
<td>Utility is derived at the individual or homogeneous population group level</td>
</tr>
</tbody>
</table>
Location-based
✓ Reasonable easy to collect data
✓ Easy to understand
✗ Limited details of personal dimension

Infrastructure-based
✓ Simple to measure
✓ Easy to collect data
✗ Ignores land use
✗ Limited personal dimension

Person-based
✓ Accounts for personal dimension
✗ Requires lots of local data collection

Utility-based
✓ Accounts for all aspects
✗ Complex to calculate difficult to understand
Accessibility indicators for comparing European Cities

• Trade-off between accuracy and ease of implementation/interpretation

**Accuracy**
Required if comparisons between cities and over time are to be informative

**Ease of implementation/interpretation**
Important if indicators are going to have an influential effect on policy makers
May rule out utility-based statistics

European-level accessibility indicators

• Location-based most likely candidate
• Simple travel distances/times to opportunities
• Supported by use of types of indicators in comparative accessibility studies
• EPSON TRACC, UK Department for Transport Accessibility Statistics.
Barriers to improving accessibility

Lack of:

1. Common definition of accessibility
2. Comparable and consistent monitoring data
3. Understanding of measures to improve accessibility
4. Interpreting accessibility as a main goal
5. Understanding of congestion costs
6. Financial resources
7. Consideration of accessibility in other policy areas
### Actions at the EU Level

<table>
<thead>
<tr>
<th>Recommendations / policy actions</th>
<th>Common definition of accessibility</th>
<th>Comparable / consistent data</th>
<th>Understanding of accessibility measures</th>
<th>Interpreting accessibility as main goal of policies</th>
<th>Understanding costs and links to accessibility</th>
<th>Consideration of accessibility in wider policy</th>
<th>Financial resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a common understanding and definition of accessibility and its relationships with congestion</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Develop a set of comparable indicators</td>
<td></td>
<td>✓</td>
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<tr>
<td>Promote consistent and comparable data collection to compute indicators</td>
<td></td>
<td>✓</td>
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<td>Include accessibility improvements as an explicit goal in policy assessment within urban transport policy but also outside transport policy highlighting how accessibility can be promoted by non-transport policy</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Support knowledge sharing and best practice between EU cities building on existing urban mobility programmes</td>
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<td>✓</td>
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<td>Contribute to provide cities with the financial resources to implement policies to improve accessibility</td>
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<td>✓</td>
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Key conclusions

• Accessibility is very complex
  – There are a wide range of definitions
  – It is more than just mobility as it considers the opportunities enabled by mobility
  – It has four key dimensions: Transport, Land-use, Personal, Temporal
  – There are a wide range of potential measurement metrics

• Improving accessibility rather than just mobility is likely to generate greater benefits for cities as we are looking to improve opportunities for our citizens

• To support improving urban accessibility we recommend
  – A greater focus on accessibility rather than just mobility
  – Providing a common definition of accessibility that can be used by all cities
  – Defining a common measurement metric and support related data collection
  – Sharing best practice between cities

• Build support for accessibility into the existing SUMP processes and support systems
Thank you for your attention

Guy Hitchcock

+44 (0)1235 753327
guy.hitchcock@ricardo.com