Integrating transport and urban planning

Why necessary? Why complex? How to cope?

Amsterdam, for example
Why necessary?
A mobile society, borderless cities
A mobile society: dispersed activity places, held together by mobility (Kattenbroek, NL)
A mobile society: multi-sited production processes, held together by mobility (Philips in NWE) (Boelens)
Cities: from self-contained and compact to borderless and networked
Then: self-contained, compact cities (Amsterdam, 1538)
Now: borderless, networked cities (Amsterdam, 2012)
Why complex?
A core dilemma
We depend on mobility …
... but mobility is not sustainable

**Measures to be increased**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to means of personal mobility</td>
<td>+</td>
</tr>
<tr>
<td>Equity in access</td>
<td>-</td>
</tr>
<tr>
<td>Appropriate mobility infrastructure</td>
<td>-</td>
</tr>
<tr>
<td>Inexpensive freight transportation</td>
<td>+</td>
</tr>
</tbody>
</table>

**Measures to be reduced**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion</td>
<td>-</td>
</tr>
<tr>
<td>“Conventional” emissions</td>
<td>+</td>
</tr>
<tr>
<td>Greenhouse gas emissions</td>
<td>-</td>
</tr>
<tr>
<td>Transportation noise</td>
<td>+</td>
</tr>
<tr>
<td>Other environmental impacts</td>
<td>-</td>
</tr>
<tr>
<td>Disruption of communities</td>
<td>-</td>
</tr>
<tr>
<td>Transportation-related accidents</td>
<td>+</td>
</tr>
<tr>
<td>Transportations’ demand for nonrenewable energy</td>
<td>=</td>
</tr>
<tr>
<td>Transportation-related solid waste</td>
<td>+</td>
</tr>
</tbody>
</table>

**Key:**
- Dark grey: the particular measure is at an unacceptable and/or dangerous level
- Medium grey: the level is of concern and needs improvement
- Light grey: the level is acceptable or shows signs of becoming so
- +: indicates that the situation appears to be moving in the desired direction
- -: suggests that the situation appears to be deteriorating
- =: no clear direction is apparent
- ?: available information is not enough to make a judgment
• Dilemma: dependency vs. sustainability
  – No more ‘predict and provide’
  – No more ‘predict and prevent’
How to cope?
Finding a balance
Balance

• “For mobility to be sustainable, it must improve accessibility while avoiding disruptions in societal, environmental, and economic well-being that more than offset the benefits of the accessibility improvements” (WBCSD)
Balance

• “For mobility to be sustainable, it must improve accessibility while avoiding disruptions in societal, environmental, and economic well-being that more than offset the benefits of the accessibility improvements” (WBCSD)
Accessibility

• In the large majority of cases people travel in order to get access to something or somebody, not just for the sake of it
  – Accessibility is the goal, mobility is a means

• What matters is:
  – What can be accessed (which jobs, shops, friends, etc.) = places of activity
  – How it can be accessed (how fast, cheap, etc.) = travel conditions
“improve accessibility”

• Increase the amount and diversity of places of activity (e.g. workplaces) within an acceptable travel time/cost/etc. …
  \rightarrow Land use density and functional mix (proximity)
  \rightarrow Transport speed and network form (mobility and connectivity)
“avoid disruptions”

• … with no more use of resources (e.g. energy) than what is sustainable
  ← Share of resource-efficient transportation means
  ← Average distance traveled
Without travel

Walking, biking

By PT

By car

Transport policy

Activity coupling

Land use policy

ICT infrastructure

Facilitate (infrastructure)

Increase speed, flexibility

Selective use (pricing)

Multifunctional homes/workplaces

Diverse neighborhood/city

Concentration around stations

Balanced region

Solution space (‘mobility environments’)
Amsterdam, for example
# World cities: modal split, emissions, income (1995)

<table>
<thead>
<tr>
<th>Region</th>
<th>Car (% all trips)</th>
<th>Public transport (% all trips)</th>
<th>Biking and walking (% all trips)</th>
<th>Per capita transport emissions (kg/p)</th>
<th>Per capita transport CO₂ emissions (kg/p)</th>
<th>Per capita metropolitan income (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American</td>
<td>88.5</td>
<td>3.4</td>
<td>8.1</td>
<td>265</td>
<td>4.405</td>
<td>31.386</td>
</tr>
<tr>
<td>Rich Asian</td>
<td>41.6</td>
<td>29.9</td>
<td>28.5</td>
<td>37</td>
<td>825</td>
<td>31.579</td>
</tr>
<tr>
<td>Western European</td>
<td>49.7</td>
<td>19.0</td>
<td>31.3</td>
<td>98</td>
<td>1.269</td>
<td>32.077</td>
</tr>
<tr>
<td>Amsterdam</td>
<td>31.3</td>
<td>17.2</td>
<td>51.4</td>
<td>38</td>
<td>1.035</td>
<td>28.322</td>
</tr>
</tbody>
</table>

(Kenworthy & Laube)
Amsterdam: modal split 1986-2008

(O+S Amsterdam)
Biking and walking environments?
Historic city: ‘within the motorway ring’
Modal split by area
(dRO Amsterdam, MON)
Accessibility by bike (people and jobs within 30 minute travel)
Solution space ('mobility environments')

- **Transport policy**
  - Facilitate (infrastructure)
  - Increase speed, flexibility
  - Selective use (pricing)

- **Activity coupling**
  - Without travel
  - Walking, biking
  - By PT
  - By car

- **Land use policy**
  - Multifunctional homes/workplaces
  - Diverse neighborhood/city
  - Concentration around stations
  - Balanced region

ICT infrastructure

Solution space ('mobility environments')
Policy change: from facilitating the car and pursuing functional separation (up to the ‘70s) …
... to constraining car use, facilitating alternative modes, and preserving the functional mix (since the ‘70s)
Public transport environments?
Railway station areas along the ring line
Modal split workers ring line corridor (home to work trips)

Bike 9%
PT 51%
Car 40%

(dIVV Amsterdam)
Accessibility by public transport (people and jobs within 30 minute travel)

(dIVV Amsterdam)
Solution space (‘mobility environments’)
Developments in the railway network

- **Built-up area, 1967**
- **Built-up area, 1967-2001**
- **Railways, 1967**
- **Railways, 1967-2001**
- **Motorways, 1967**
- **Motorways, 1967-2001**
- **Centre, 1967**
- **Centre, 1967-2001**

Legend:
- Built-up area
- Railways
- Motorways
- Centre

Scale: 5 km
Developments in the railway network

- **Built-up area, 1967**
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- **Centre, 1967-2001**

Legend:
- Solid blue lines: Railways, 1967
- Dashed blue lines: Railways, 1967-2001
- Solid gray lines: Motorways, 1967
- Dashed gray lines: Motorways, 1967-2001
- Hatched area: Built-up area, 1967
- Solid black stars: Centre, 1967
- Solid black stars: Centre, 1967-2001

5 km scale
Developments in urban centres

- Built-up area, 1967
- Built-up area, 1967-2001
- Railways, 1967
- Railways, 1967-2001
- Motorways, 1967
- Motorways, 1967-2001
- Centre, 1967
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Legend:
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- Railways, 1967-2001
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- Motorways, 1967-2001
- Centre, 1967
- Centre, 1967-2001

Map showing developments in urban centres with various symbols indicating built-up areas, railways, motorways, and urban centres for the years 1967 and 1967-2001.
Developments in urban centres
The corresponding urban form
Accessibility by car (people and jobs within 30 minute travel)

(dIVV Amsterdam)
What about other cities?
Solution space (‘mobility environments’)
The corresponding urban form

- Urban reach, high intensity
- Regional reach, high intensity
- Regional reach, low intensity (car)
- Local reach (walk, cycle)
- Interregional reach, high intensity

Origins (homes)
Destinations (workplaces, other facilities)

Urban PT
Regional PT
Interregional PT
Motorway
Let’s discuss!