Impacts of long-term commitments on daily choices

KW Axhausen, S Beige, M Bernard and S Schönfelder

IVT
ETH
Zürich

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Longterm commitments

Core of current mobility choices:

- Home location, but constrained through family and partnership commitments
- Work location
- Car ownership
- Season ticket ownership

define

- „Personal world“ (over time)
- Current marginal cost of travel
Personal world

Activity repertoire: Known activities (what, what for, with whom, what minimum or maximum duration, how expensive)

Mental map: Known locations (where, which activity, generalised costs of travel by time-of-day and day-of-week, temporal availability)

Expectation space: Generalisations, rules derived from the mental maps and activity repertoire for known and yet unknown locations
Two sides of the expectation space

- Influences current behaviour by providing assumptions for not yet visited parts of the environment
- Influences investment choices by defining expectation of how the world will be in the future

Examples:

- Learning to cycle
- Acquiring a driving licence, even if the time gap between the licence and the first car has become shorter.
- Purchase of housing
Early commitments: Licence holding in Switzerland
Current commitments

• Mobility tools and home/work location

• Activity space, i.e. the set of locations personally known to a traveller. Does this define the choice set of the traveller?

   Activity space is the observable aspect of the mental map or activity repertoire
Mean personal car availability

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Age of Cohort in Survey Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-79</td>
<td>10</td>
</tr>
<tr>
<td>1980-89</td>
<td>20</td>
</tr>
<tr>
<td>1990-99</td>
<td>30</td>
</tr>
<tr>
<td>2000-09</td>
<td>40</td>
</tr>
<tr>
<td>2010-19</td>
<td>50</td>
</tr>
</tbody>
</table>

**Availability** = 100 * Number of cars/Number of licences, if the person owns a licence; otherwise availability = zero

Male - Solid Line
Female - Dashed Line

Current commitments: Car availability in Switzerland
Current commitments: Car availability in Switzerland

- Share of persons over 18 [%]
- Household vehicles/Household licence

Graph showing the share of persons over 18 [%] for different categories of household vehicles and household licence availability in Switzerland.
Current commitments: Season/discount tickets in CH
Current commitments: Behavioural impacts

![Graph showing mean number of daily trips by age group and commitment status.](image-url)
Current commitments: Behavioural impacts

![Graph showing relationship between public transport trips/day and trips with motorized vehicles/day. The graph includes data from Mikrozensus Schweiz 1984, 1989, 1994, and 2000. The categories are vehicle and season ticket, no vehicle, but season ticket, vehicle, but no season ticket, and neither.]
Activity space: Issues

• What are the expectations of drivers beyond their current activity space?

• How do these expectations influence the response to ITS, in particular information services?

• Does the activity space bind travellers to the known routes and locations?
Activity spaces: New measures of size (1)

Confidence ellipse
Smallest possible area of a defined share of visited locations
Measure: Area
Dispersion

Kernel densities
Density surface based on frequency and proximity
Measure: Area / “Volume”
Local clusters / sub-centres
Activity spaces: New measures of size (2)

“Minimum spanning tree” (network)
Smallest geometry based on all O-D pairs
Measure: Length of tree/network
Perception of space and networks
Mobidrive: Number of trips in the study area
Mobidrive activity spaces: Confidence ellipse

Anzahl

Grösse der 95% Konfindenzellipse [km]
Mobidrive activity spaces: Tree (only Karlsruhe)
### Mobidrive activity spaces: Areas with positive densities

<table>
<thead>
<tr>
<th>Anzahl</th>
<th>Besuchte Flächen [500*500 m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>60</td>
<td>140</td>
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<tr>
<td>80</td>
<td>180</td>
</tr>
<tr>
<td>100</td>
<td>220</td>
</tr>
<tr>
<td>120</td>
<td>260</td>
</tr>
</tbody>
</table>
New locations in a 6-week travel diary

„location“ = detailed purpose * street address
New locations in a 12-week leisure diary

"location" = detailed leisure purpose * zip code
Conclusions

ITS systems guide, control and influence through real-time information, regulation and pricing

The information impacts are limited through:

- Understanding travellers have of the world (partially measured as activity spaces)
- Long-term commitments to locations and contacts (social networks)

Their information impacts are enhanced through:

- Variety seeking of the traveller
- Unreliability of the transport systems
Appendix: Data sources
Swiss National Travel Surveys

Brief description:
- Large scale random sampling surveys of the whole country
- 1984 and 1989 conducted as postal self-completion travel diary surveys (trip-based forms)
- 1994 and 2000 CATI stage-based diary
- One day plus some long-distance travel

For details see:
12-week leisure survey

Brief description:

- Combined time use (all purposes) and activity-survey (out-of-home leisure only)
- Twelve (six) one-week diaries in Zürich (Berlin)
- 70 respondents with a 150 sFr incentive payment (about 10% recruiting rate from a random telephone sample) (hardly any drop-out after the start of the diary)

For details see (in German):

http://www.ivt.baug.ethz.ch/vrp/ab123.pdf
http://www.ivt.baug.ethz.ch/vrp/ab121.pdf
Mobidrive (6-week travel diary)

Brief description:

- 6-week travel diary in Karlsruhe and Halle
- Spring and fall 1999
- 360 persons in 160 households receiving small incentives (100-200 DM/household) (20% of eligible households recruited)
- 95% of trips in the study area geocoded

For details see:

http://www.ivt.baug.ethz.ch/vrp/ab140.pdf