Preferred citation style

Activity spaces, social networks and mobility biographies

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Plan

• Remind us of the changes in the amount of travel
• Remind us of what we currently ignore
• Suggest a possible set of mechanisms
• Discuss the measurement of activity space
• Discuss the integration of social network questions into travel surveys
• Integrate social networks and biographies into the explanatory scheme
• Remind us of what needs to be done
Trends: Road travel time scaled Switzerland (1950 & 2000)

Carosio, Dolci und Scherer, 2005
Trends: Real revenues per mile (USA since 1880)
Trends: Quality controlled prices of the mean new Swiss car
Trends: Real price of telecommunication

Adapted from FCC (2001)

US International and interstate average revenue per minute
Response: Annual vmt increase since 1960

Source: Schäfer
Response: Increasing trip length (Germany since 1976)
Response: Swiss Suburbanisation since 1970

Adapted from Botte, 2003
### Response: Kilometers travelled by purpose [%]

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<tr>
<td>Leisure</td>
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<td>38.3</td>
<td>33.7</td>
<td>32.2</td>
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<td>Work/school</td>
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<td>29.7</td>
<td>32.0</td>
<td>31.3</td>
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<td>Shopping/private business</td>
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<td>27.6</td>
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<td>Accompanying</td>
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<td>4.5</td>
<td>7.6</td>
<td>8.5</td>
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<td>Other</td>
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<td>7.1</td>
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</table>
What do we, what don’t we account for?

- Generalised costs of travel
- Sociodemographics
- Attitude and values
- Life style
- Biography
- Social networks
The „network actor“ in a dynamic social context
The social content of travel (2003 Thurgau)

- Short vacation
- Excursion: nature
- Excursion: culture
- Meeting friends
- Further education (leisure)
- Garden/ cottage
- Voluntary work
- Disco, pub, restaurant, cinema
- Meeting relatives/family
- Window shopping
- Pick up/drop off/attendance
- Group/club meeting
- Family duty
- Cemetery
- Active sports
- Education
- Long-term shopping
- Walk or stroll
- Daily shopping
- Private business
- Private business (doctor,...)
- Work

Mean

- Household members travelling along
- Other persons travelling along
- Dog travelling along
Spatial and social density

Dense/tight

Dense/loose

Sparse/tight

Sparse/loose
Example of an activity location distribution (1)

Women, 24
Full-time
Single
216 trips / 6 weeks
Example of an activity location distribution (2)

Man, 50
Full-time
1 child
120 trips / 6 weeks
How to measure the activity space

Parametric:
  • 95% confidence ellipse

Semiparametric:
  • Kernel density estimator
  • Inclusion geometries
  • Shortest path networks

Non-parametric
  • Observed path geometries
Measurement approaches: Confidence ellipse
Measurement approaches: Kernel densities
Measurement approaches: Inclusion geometries

Find:

$$\min A_i(\beta_{i1} \ldots \beta_{in})$$

s.t.

Area $A_i$ covering $p\%$ of all observed points

with:

- $i$ : Type of geometry (Ellipse, bean, Cassini ...)
- $p$ : Predetermined share, e.g. 95%
Measurement approaches: Inclusion geometries

- Ellipse
- Superellipse 1
- Superellipse 2
- Bean
- Cassini

Vaze, Schönfelder and Axhausen, 2005
Measurement approaches: Shortest path network
Activity space size variation: 95% CE* (Mobidrive)

* Local trips only
Activity space size variation: Kernel densities* (Mobidrive)

* “Visited area”, grid cells with positive Kernel densities value [500*500m]
Activity space size variation: Shortest path network

* Observed O-D-relations, Mobidrive, Karlsruhe subsample
Survey development: Objects of interest (cross section)

- Name, type and membership of the networks (groups)
- Name and type of the contacts (strength of the link)

- Home location of the contacts
- Places, dates and duration of meetings with the networks (or subsets)
  - Role, cost and cost allocation of the meeting
  - Cost, cost allocation and duration of associated trip

- Channel, dates, size of other interactions with the contacts
  - Cost of interaction and its allocation
  - Location of the persons during the interaction
Survey development: Objects of interest (panel/retrospective)

- Mobility biography:
  - Home locations
  - Work/school locations
  - Mobility tools (car, season tickets, cycles, licences)
  - Income
  - Household structure

- All of the cross-sectional items across time
Survey development: Sources

- Memory:
  - Interviews
  - Paper/web-based self-administered questionnaires

- Records:
  - Diaries and agendas
  - Personal phone books/email lists
  - Email and letters (collections)
  - Phone bills / Income tax returns / credit card bills
  - Photo albums / personal web pages
  - Minutes and yearbooks
  - Databases, such as www.google.scholar.com

- [Observation]
Example: Contact frequency – emails to kwa (Outlook)
Example: long-distance travel (kwa) (agenda/tax returns)
Survey development: Current possibilities

In the short term:

- Mixture of qualitative and quantitative analyses
- Face-to-face structured interviews (supplemented by written questionnaires)
- Quota-based samples

In the medium term:

- Paper-based questionnaires with personal interaction
- Representative samples
Survey development: Future possibilities

Longer-term diaries:

- Social content of activities
- Including name generators
- Including a life-course element

Traces of 3. Generation and other communication services:

- Automated screening of electronic records
- „Buddy“-services
- Merger with geocoding (GSM or GPS)
Current work

(BMW) ifmo:
• 30 interviewees in Berlin and Zürich
• Quota-guided recruitment
• 2.5h duration
• £ 50 incentive

Dft Horizons (with Urry and Larsen, Lancaster):
• 24 interviewees drawn from three growing industries in the North-West of England
• 2h duration plus written elements
• £ 50 incentive
Example of a social network geography

Female, 28, 4 moves,
More examples
Distribution of the social network geographies (95% CE)

Both samples
Distribution of the interpersonal distances (Horizon)
Channels of communication by distance (Horizon)

- Face-to-Face
- Phone
- Email
- SMS

Number of contacts per year vs. Median of the quintiles of the distance distribution [km]
Channels of communication by distance (Horizon)

- Face-to-Face
- Phone
- Email
- SMS

Graph showing the market share of how to cultivate social contacts by distance. The x-axis represents the median of the quintiles of the distance distribution in kilometers, while the y-axis shows the market share in percentage. The graph indicates the dominance of different communication channels at varying distance intervals.
Biography of a female personal trainer, mid-30ies
Biography of a male architect, early-30ies
Activity spaces and network geographies: A hypothesis

Specialisation

Migration

Wages

Activities

Tours

Fleet comfort

Energy costs

Housing consumption

vtts et al.

k

Energy costs

Elasticity > 0

Elasticity < 0

Professional and personal activity space

Network geography

Number of networks

Network overlap

Local anomie
Willingness to pay for reduction of free-flow travel time
Willingness to pay for reduction of congested travel time
Size of goods markets and productivity: A hypothesis

Economies of scale
Economies of scope

GDP

Activity
Fleet comfort
slots
vtt's et al.

Tours
t/pkm

Market size

Energy costs

Slots: possibilities to move goods or people
For a given infrastructure and commercial and private fleet

+ Elasticity > 0
- Elasticity < 0
What remains, needs to be done?

- Prove the mechanisms stipulated
- Provide the data on a representative scale
- Develop stable survey methods
- Think through the policy implications
Appendix
Size of goods markets and productivity: A hypothesis

Economies of scale
Economies of scope

Innovation

Capital/Wages

Prices

Monopolies

Transport system and demand

Market size

Energy costs

Elastizität > 0  k: Generalisierte Kosten
Elastizität < 0  Kosten
Generalised costs of contact and social networks

- Elasticity > 0
- Elasticity < 0

Message costs

- Number of contacts and networks

- Left skew of intensity distribution

- Network overlap

- Network geography

- Migration

- Professional activity space

- Local anomie

- Supervision gradient

- Personal activity space


