Social network geographies: Expected dynamics and empirical results

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A shrinking world

Coach and sailing boat until 1840

Steam ship and locomotive, 1840 - 1930

Propeller aircraft, 1930-1950

Jets, from 1950

Dicken, 1998
In-commuter sheds of the ten largest Swiss towns
Worldwide flows: 2005 Share of world’s migrants
Activity spaces inc. network geographies: A hypothesis

Elasticity > 0
Elasticity < 0

k: personal short term generalised costs of travel
Travel and social networks

Maintenance of the networks requires:

• Face to face interaction
• Balanced by other forms of interaction

• Travel ~ Physical spread of the contacts

• Trade-off between loosing contacts and “social” capital and investing in new contacts closer to home
Hypotheses

Message costs → Number of networks → Left skew of intensity distribution

k → Migration → Network geography → Personal activity space

Professional activity space → Local anomie

Elasticity > 0
Elasticity < 0
First set of research issues

Benchmarking the current state:

- Numbers of contacts
- Distance distributions
- Geographies
- Frequency and mode of contact
- Productivity
- Levels of local anomie
- Levels of local trust
- Level of place attachment
Number of contacts reported

Number of contacts named

Percent

Number of contacts named
Distances between home locations
Example of a social network geography
Size of network geometries

95%-confidence ellipse of the social network geography
Ratio of contacts to population

Ratios at 1km: 39; 2km: 9; 3km: 5
Interactions by mode and distance between homes

- Face-to-face visits/year
- Phone calls/year
- Email messages/year
- SMS messages/year

Great circle distance (km) vs. Interaction Frequency
Second set of research issues

- Reconstruction of historical/prior activity spaces
- Taste differences in network form and geography
- Social/cultural preferences for network form and geography
- Stability of the geographies under pressure
- Elasticities to policy (or environmental) change
- Time until trend change
Policy questions

• Is „happiness“ still growing?

• How large are the social externalities?

• How stable is the overall system under pressure?

• How can public policy support a possible need to reconstruct the networks?
The hypotheses summarized

- **Wages**
  - Fleet comfort
  - Housing consumption
  - vtt: et al.

- **Activities**
  - Specialisation
  - Tours

- **Energy costs**

- **k**
  - Migration
  - Activity space
  - Network geography

- **Network overlap**

- **Local anomie**

+ Elasticity > 0
- Elasticity < 0
For more information see

www.ivt.ethz.ch


Definition of a social network

The topology of a social network describes

- Which person/firm (node) is linked to which other persons/firms
- By contacts (links) of a certain quality (impedance or cost)

Closeness ~ 1/Impedance
Social networks: Hypotheses

[1] The size of the social network geography is inversely proportional to the generalised costs of travel and communication

[2] The number of contacts individuals maintain is inversely proportional to the generalised costs of travel and communication

[3] The probability of being linked to a member of one’s network through multiple networks increases with the spatial density of one’s contacts

[4] The distribution of effort on non-household members will become more left skewed as the spatial social network tightness decreases

[5] The knowledge about the contacts of contacts in a social network is proportional to the generalised costs of travel and communication
[6] The activity space of an individual is proportional to its social network geography

[7a] The size of the local activity space of an individual stabilises after an initial exploration.

[7b] The size of the total activity space will grow in line with the growth of social network geographies.

[8] The reliance on commercial or publicly funded personal services increases proportionally with the geography of social networks.

[9] The welfare of the individuals should increase inversely proportional to the generalised costs of travel.