

The geography of networks: methodological remarks on social network theory

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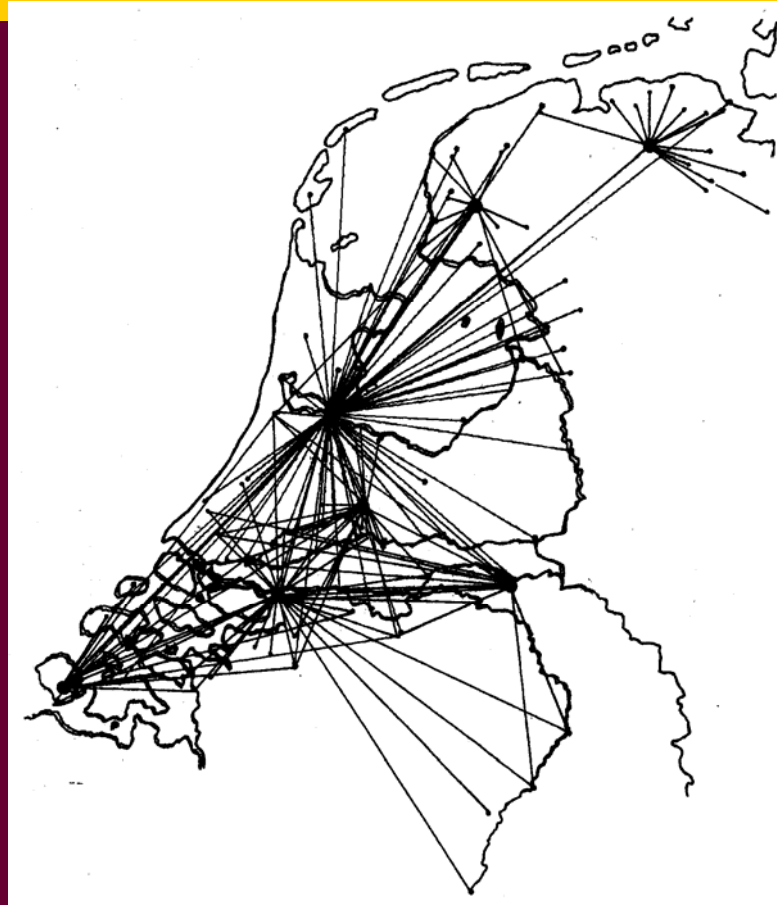
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Why study the geography of networks?

- Castells' (1996) thesis: “space of flows” more important than the “space of places”
- Innovation studies (clusters, innovative milieu, triple helix, innovation systems, “Mode 2” knowledge production, epistemic communities)

Horse drawn boat transport network (year: 1700)





What explains network structure? (1)

- Static methodology 1: proximity
 - Gravity equation by Tinbergen extended by other forms of proximity
 - $s_{ij} = f(\text{mass}_i, \text{mass}_j, \text{geoprox.}, \text{instprox}, \text{cognprox}, \text{orgprox})$
 - Examples
 - Key refs: Gertler 1995 EG, Boschma 2005 RS

What explains network structure? (2)

- Static methodology 2: knowledge spillovers
 - Using patent citations
 - Probability of actor i citing actor j is determined mainly by social distance (i.e. shortest path length in the collaboration network)
 - Accounting for social distance renders geographical proximity irrelevant
 - Key references: Breschi/Lissoni 2003 CESPRI WP, Singh 2005 MS)

What explains network structure? (3)

- Dynamic: Evolutionary modelling
 - Growing networks expanding node by node
 - Central hubs emerge from a path dependent process with early mover advantages
 - Preferential attachment: evolutionary algorithm to replicate observed network distribution by means of simulation
 - Key reference: Barabasi/Albert 1999 Nature

Does network position matter?

- Yes, it does !
- See Uzzi 1997 ASR and Guilianani 2006 PEEG WP on clustrs
- See Micro data: interviews at the firm level
- Interesting link to the weak ties (creativity) vs. strong ties (social capital) debate (Burt vs. Coleman; Putman versus Florida)

Promises and challenges

- Methodological advances in sociology, mathematics, physics, biology
- Data
 - Many datasets available
 - Relatively easy to collect own data
- Multilevel analysis straightforward
- But challenge: endogeneity problems!

Proposition

- We need a wake-up call because network theory will become the new paradigm in the social sciences!

Further reading

- Barabasi, A.-L. (2002) *Linked. The New Science of Networks* (New York: Perseus)
- Boschma, Ron A., Frenken, Koen (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography, *Journal of Economic Geography*, 6(3): 273-302.
- Breschi, S., Lissoni, F. (2003) Mobility and social networks: Localised knowledge spillovers revisited. *CESPRI Working Paper 142*, www.cespri.it.
- Giuliani, Elisa (2005) The structure of cluster knowledge networks: Uneven and selective, not pervasive and collective. *DRUID Working Paper 2005-11*, <http://www.druid.dk>
- Giuliani, Elisa (2006), Networks and heterogeneous performance of cluster firms, *Papers in Evolutionary Economic Geography* #06.02, <http://econ.geog.uu.nl/peeg/peeg.html>
- Jaffe, A.B., M. Trajtenberg & R. Henderson (1993), Geographic localization of knowledge spillovers as evidenced by patent citations. *Quarterly Journal of Economics* 108 (3): 577-598.