PhD course
Social Network Analysis in R
By Tom Broekel
Kassel: 1. -5. February 2021

Course description

Notions such as "*it is a small world*" emphasize that individuals do not operate in isolation but are deeply embedded into relational structures. Consequently, if one seeks to understand social and economic processes and developments, it is imperative to consider (social) relations and to be able to apply a relational perspective.

The course "Social Network Analysis in R" introduces students to this relational perspective, which implies reassessing core issues in economics and business administration. The course delivers conceptual and application-oriented insights with a focus on the empirical work with different tools of social network analysis. Such include the measurement of node and link centralities, the description of network structures, and dynamic network analysis. The course thereby deals with the following questions:

- What is the network paradigm and how can it contribute to the understanding of social and economic processes and developments?
- What are different approaches to describe and analyze the structures of networks as well as the positions of actors and links therein?
- How can the development of networks be analyzed, and fundamental drivers be identified?

Prerequisite knowledge

The course is aimed at students with a background in economics, sociology, human geography or related fields (master's degree). Solid expertise in bivariate and multivariate statistics is recommended. While prior experience with programming will be helpful, the course is suitable for students with no such experience as well.

Structure of course

This course consists of pre-recorded and live lectures that are combined with computer exercises. During the first 2 days, students learn basic programming skills in R. Subsequently, three days are dedicated to network analysis techniques implemented in the *igraph*, *statnet*, and *tidygraph* packages.

Proposed time schedule (subject to change)

Time	Monday	Tuesday	Wednesday	Thursday	Friday
09:00 - 10:30	Introduction to R (Live lecture)	Introduction to R (Live Q&A)	The network paradigm (Live lecture)	Visualizing networks (Self-study, recorded material)	Dynamic network analysis (Self-study, recorded material)
11:00 - 12:30	Introduction to R (Self-study, recorded material)	Basic programming in R (Self-study, recorded material)	The network paradigm (Live lecture or self-study, recorded material)	Visualizing networks (Live Q&A)	Dynamic network analysis (Live Q&A)
13:30 - 14:30	Introduction to R (Self-study, recorded material)	Basic programming in R (Self-study, pre-recorded)	Working with network data in R (self-study, recorded material)	Analyzing nodes and links (Self-study, recorded material)	Dynamic network analysis (Self-study, recorded material)
15:00 - 16:00	Introduction to R (Live Q&A)	Visualizations in R (Live Q&A)	Working with network data in R (Live Q&A)	Analyzing nodes and links (Live Q&A)	Dynamic network analysis and Introduction to project (Live lecture & Q&A)
16:30 - 17:30	Introduction to R (Self-study, recorded material)	Visualizations in R (Self-study, recorded material)		Analyzing nodes and links (Self-study, recorded material)	

Completion of course and grade

To complete the course, attendance in at least 80 % of all live sessions is compulsory. Moreover, the individual project report has to be completed and handed-in before February 19, 2021. The project report includes a literature-based theoretical discussion and a self-conducted empirical network analysis. The word-limit for the report is 3,000 words. It will be graded **pass/fail**. Additional instructions will be given during the course.

Lecturer

Tom Broekel is Professor in Regional Innovation at the University of Stavanger Business School. He has obtained a PhD in Economics from the Friedrich- Schiller-University of Jena and a Habilitation in Economic Geography from the Leibniz University of Hannover. He has been working at multiple organizations including the Max-Planck-Institute of Economics in Jena and the universities in Utrecht and Hannover. Currently, he is also affiliated to the Center of Regional and Innovation Economics of the University of Bremen.

His research focuses on the geography of innovation, the analysis of knowledge networks and R&D policies as well as on renewable energies and regional news. In addition to multiple book chapters and a textbook, Tom Broekel has published more than 40 articles in international peer-reviewed journals.

His teaching includes courses in Economic Geography, Advanced Data Analysis with R, Social Network Analysis, and the Geography of Innovation.