Knowledge, Innovation and Networks in Today’s Economy

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Lecturer
Robin Cowan is Professor of Economics and Maastricht University, and Professor of Management at the University of Strasbourg. His interests lie largely in the area of the economics of networks. More specifically he is interested in (social) networks as the infrastructure over which knowledge flows, affecting both creation and diffusion of knowledge. He has done considerable theoretical work on knowledge creation and diffusion as well as strategic alliance formation, using simulation techniques. In addition he is involved in a large empirical and theoretical project on academic science in middle income countries, with a focus on South Africa.

Please briefly introduce yourself

Course objectives

For 60 years we have known that innovation, broadly defined, is the main driver of economic growth and development. Innovation can be seen as the act of creating and employing new knowledge or using existing knowledge in a new way. Thus a fundamental issue in understanding how economies grow, develop, evolve, lies in understanding the creation and use of knowledge. These issues have captured attention in many places and at many levels. Academics have changed their views in recent decades about how knowledge, and thus innovation, functions as an economic good. This is seen in studies of technological choice, technology diffusion, intellectual property rights, communities of practice, open innovation and many others. Firms are struggling to compete in a fast-moving, global economy and attempt to do so with innovation. But at the same time the nature of the firm has changed, as innovating often demands access to knowledge or technology not mastered or owned by a single firm: firms attempt to create or cope with “distributed innovation”. Policy makers fear what will happen if their “local” (often meaning “European”) firms become less competitive as globalization continues to march on, and firms in other parts of the world develop new technologies, products or processes, as competitive firms are seen as central to increasing social welfare. But for firms to innovate they must have access to knowledge, skills, technology and so on. This has brought policy makers to view innovation in terms of an “innovation system” in which different parts of the system act and interact, jointly producing changes in knowledge, technology, hopefully competitiveness, and thus welfare.

Against this backdrop, this course uses social network analysis as a tool for examining these issues. We are concerned both with how networks form, and how they perform. The course will introduce students to recent changes in our understanding of the role of knowledge and how it functions in the modern economy. Using this as a base, our interest will be largely in how network analysis is useful in understanding innovation and knowledge creation and diffusion. As such we see (social) networks as
the infrastructure over which knowledge flows. We seek to understand how different actors in an innovation system interact, and how those interactions can be analyzed with network tools and concepts. We begin with a general introduction to social network analysis, laying out the basic concepts. The bulk of the course uses these concepts to look at various issues of innovation and development in today’s economy. We look at different network structures and how they might be good or bad for encouraging innovation; we look at models of network formation, starting with the basic building block of links between pairs of actors. The course presents both theoretical and empirical results. Finally, in the last sessions we will examine a variety of empirical applications of network analysis relevant to today’s economy and society. Which types of applications precisely will be determined by the interests of the students in the class.

Course content
The course will cover several topics:
Knowledge in economics and in the economy
An overview of social networks
Small worlds and scale free networks (or why (some) physicists are as not smart as they think they are)
Centrality, performance and social capital
Network architecture and aggregate performance
Network Formation
Empirical applications in economics and sociology (topics will be tailored to the interests of the students)

Prerequisites
Acquaintance with micro-economics, and a facility with quantitative techniques broadly defined are both highly desirable. Some acquaintance with econometrics would also be useful.

Instructional methods
The course will largely be lectures, though designed to include considerable student participation through questions and discussion.

Reading list

Knowledge in economics and in the economy


Supplementary material at http://www.nd.edu/~networks/productspace/index.htm
An overview of social networks


Small worlds and scale free networks (or why (some) physicists are as not smart as they think they are)


Centrality, performance and social capital


Network architecture and aggregate performance


Network Formation


Empirical applications in economics and sociology. The topics here have a bias towards development. This will be expanded before the course begins in order to tailor topics covered to the interests of the students.


**A Few Papers on Data and Methodology:**


**Relevant software**

UCINET
igraph (for R, C, or python)
Gephi
Wikipedia has an extensive list

**Time schedule**
6 hours of teaching per day (an hour lasts 45 minutes).

*Example:*
Lecture from 08.30 to 10.00; break from 10.00 to 10.15, and another lecture 10.15-11.45.
Lunch break: 12.00-13.00.
Afternoon: Lecture from 13.00 to 14.30.

Assessment
Final grades will be based on a written, closed book exam (50%), class participation (15%), and class presentations (35%).