4th EDEN Doctoral Seminar on
Social Network Analysis (SNA): Theory and Methods

to be organised by the Grenoble Ecole de Management, LINC Lab, in collaboration with the European Institute for Advanced Studies in Management – EIASM, Brussels, and to be hosted by the Gyzi Cultural Centre, Fira, Santorini, Greece, June 10 – 14, 2013

Faculty

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Soong Moon Kang, UC London, Dept. of Management Science & Innovation, UK

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Nina Payen, EIASM, Brussels, Belgium

Dimitris Assimakopoulos, Grenoble Ecole de Management

Aims and Objectives

In the last few decades network organisations and social network theory and methods have risen as a key field for research in Management and Business Studies (e.g., Brass[1] et al 2004) including several disciplines, such as HRM and innovation management. This 4th EDEN seminar is going to introduce Social Network Analysis (SNA) theory, methods and techniques for doctoral students who aim collecting, analysing and visualising network data for their research in diverse organisational settings and application areas. SNA and visualisation software such as Ucinet[2] and Netdraw[3] is going to be deployed throughout the seminar. Examples from several research projects in doctoral and post-doctoral levels from both sides of the Atlantic are going to illustrate many of the qualitative and quantitative issues related to network theory and SNA of relational data at community, inter-organisational and inter-personal levels of analysis. Particular attention is going to be paid in the dynamic analysis of longitudinal data in the last one and a half days of the

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[1] Brass, D. J., Galaskiewicz, J., Greve, H. R., Wenpin T., 2004, Taking Stock of Networks and Organizations: a Multilevel Perspective, *Academy of Management Journal*, *47(6),* 795-817.

[2] Borgatti, S.P., Everett, M.G. and Freeman, L.C., 2002, *Ucinet 6.0 for Windows: Software for Social Network Analysis*, Harvard, MA., Analytic Technologies, see http://www.analytictech.com/ucinet/ucinet.htm

[3] Borgatti, S.P., 2002, *NetDraw: Graph Visualization Software*, Harvard, MA., Analytic Technologies.

seminar using the Stata[4] software. In addition students are going to be allocated time in each and every day of the seminar for reflecting on what they will have learned the previous day and also presenting their own ongoing doctoral projects for getting advice and feedback from faculty and other participants during and after the seminar, see final draft schedule in Appendix. The primary aim here it is to create an intimate environment conducive for learning at the Cultural Centre / Museum of Megaro Gyzi at the scenic capital of Fira, at the island of Santorini (Greece), for about 20 doctoral students and 4 faculty from top EU/US Business Schools to share best practices and learning in the state of the art in SNA across boundaries in Europe and beyond.

Outline of the Seminar

Our seminar is going to combine lectures covering a broad range of issues, in depth tutorial discussions, and hands on training for SNA and dynamic analysis. **Four modules** are planned to be delivered as they are outlined below, including several required or/and recommended readings, that the students should ideally review and prepare before the seminar so that they accrue maximum value from it. A supporting web-site hosted by the EIASM it is going to provide access to some of these readings and related resources. Students are also required to bring along their personal computers and download before the seminar the Ucinet/Netdraw/ Pajek **software** from http://www.analytictech.com/ucinet/ucinet.htm http://pajek.imfm.si/

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Module 1: An Introduction to SNA theory and methods
Dimitris Assimakopoulos dimitris.assimakopoulos@grenoble-em.com

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Overview and Objectives
The main objective of this first module is to introduce you to the field of SNA research methods, with particular reference to the emergence of new technological communities and analysis of new 'distributed' product development teams. We will also discuss the rationale for SNA in module 1, how to collect and organise network data, plus the main theoretical concepts of centrality at node level and cohesion at the network level. We will also illustrate these concepts and methods through examples stemming from half a dozen research projects carried out with various collaborators in the EU and US over the past decade or so.

Session 1.   **Monday, June 10, 2013, 9:30-10:30**
                  Introduction to SNA (part I)
                  why SNA? Network data collection

Session 2.   **Monday, June 10, 2013, 11:00-12:30**
                  Introduction to SNA (part II)
                  Centrality and Cohesion in Networks

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[4] See the Stata Starter Kit, put together by UCLA's Academic Technology Services group at
http://www.ats.ucla.edu/stat/stata/sk/

Subsequently, the module 2 shifts the emphasis on network theory, rather than methods, see below. The module 3 will cover more advanced SNA topics and also introduce some of the issues related to the dynamic analysis of network data which is specifically the main topic of the final module 4.

Required texts
You may find helpful to start with the online book: *Introduction to Social Network Methods* written by Hanneman and Riddle (2005) see http://faculty.ucr.edu/~hanneman/nettext/

And also the key textbook in SNA:
Wasserman Stan, and Faust Kathreen, (1994) *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Recommended texts
Linton C. Freeman. 2004. *The Development of Social Network Analysis: A Study in the Sociology of Science*. Empirical Press.

R. L. Breiger. 2004. The Analysis of Social Networks, pp. 505-26, in *Handbook of Data Analysis*, edited by Melissa Hardy and Alan Bryman, London: Sage.

Scott, John. 2000. *Social Network Analysis: A Handbook*. London: Sage.

Borgatti, S. P. and Foster, P. C*., 2003, The Network Paradigm in Organizational Research: A Review and Typology, *Journal of Management*, vol. 29, no. 6, pp. 991-1013.

de Nooy, W., Mrvar, A., Batagelj, V., 2005, *Exploratory social network analysis with Pajek,* Cambridge: Cambridge University Press.

Rob Cross and Andrew Parker, 2004, *'The Hidden Power of Social Networks: Understanding How Work Really Gets Done in Organizations', Boston: Harvard University Business School Press.*

Assimakopoulos D, 2007, *'Technological Communities and Networks: Triggers and Drivers for Innovation',* London: Routledge.

Assimakopoulos D, Carayannis E. and Dossani, R. (Eds.), 2011, *'Knowledge Perspectives of New Product Development: a Comparative Approach'*, New York: Springer.

Assimakopoulos D, Everton S, and Kiyoteru T, 2003, The Semiconductor Community in Silicon Valley, *International Journal of Technology Management,* 25(1/2), 181-199.

Schweer, M., Assimakopoulos D, Cross, R., and Thomas, R. J, 2012, Building a Well-Networked Organization, *Sloan Management Review*, 53(2), 35-42.

Yan J and Assimakopoulos D, 2009, The Small World and Scale Free Structure of an Internet Technological Community, *International Journal of Information Technology and Management,* 8(1), 33-49.

Doak, S. and Assimakopoulos, D., 2007, How Forensic Scientists Learn to Investigate Cases in Practice, *R&D Management*, 37(2), 113-122.

Module 2
Social networks: ties or structure?
Marco Tortoriello
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Overview & objectives
The objective of this module is to use the content of the papers assigned to explore and discuss current debates in social network research as applied to organizations. We will examine primarily theoretical issues and focus on their relationships with the methods and measures used to critically evaluate past work in the area as well as to pinpoint future directions and fruitful new line of inquiry in the area of social networks and knowledge management/innovation
.
The substance of the module, in seminar format, is based on a close reading of primary works from leading researchers in each area. These works are not so much an exhaustive literature review as they are an opportunity for exploring the genre of social network theory and its application to organizational research.

You are expected to read the assigned papers thoroughly and to come prepared to contribute to class discussion. You contribute to class discussion in three ways. First, you are expected to identify and to be able to discuss the key issues in each reading. Second, once basic issues are defined you are expected to critically evaluate the work under discussion (e.g. Why was this paper published? Why is this relevant?) and propose/suggest extensions or improvements. Third and perhaps most importantly, you will constructively evaluate the positions taken by your classmates. Throughout, I encourage you to contribute to class discussion with clarifying questions and critical evaluations of the theoretical arguments and empirical evidence considered.

Required Readings
Krackhardt, D. 1992. The strength of strong ties: the importance of philos in organization. N. Nohria, R.G. Eccles, eds. *Networks and organizations*. Harvard Business School Press, Boston.

Granovetter, M.S. 1973. The strength of weak ties. *American Journal of Sociology* **78**(6) 1360-1380.

Hansen, M. 1999. The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits. *Adm. Sci. Q.* **44** 82-111.

Perry-Smith, J.E. 2006. Social yet creative: the role of social relationships in facilitating individual creativity. *Acad. Manage. J.* **49** 85-101.

Reagans, R., B. McEvily. 2003. Network structure and knowledge transfer: The effects of cohesion and range. *Adm. Sci. Q.* **48**(2) 240-267

Burt, R.S. 2004. Structural holes and good ideas. *American Journal of Sociology* **110** 349-399.

Bechky, B.A. 2003. Sharing meaning across occupational communities: the transformation of knowledge on a production floor. *Organ Sci.* **14** 312-330.

Tortoriello, M. & Krackhardt, D. 2010. Activating cross-boundary knowledge: Simmelian ties and the generation of innovation. *Academy of Management Journal*, **53**(1) 167-181.

Tortoriello, M., Reagans, R., & B. McEvily. 2011. Bridging the knowledge gap, *Organization Science* (Published online before print August 24, 2011, doi:10.1287/orsc.1110.0688)

Recommended Readings

Burt, R.S. 1992. *Structural Holes: the social structure of competition*. Harvard University Press, Cambridge, MA. (Chapter 1 & 2)

Coleman, J.S. 1988. Social capital in the creation of human capital. *American Journal of Sociology* **94** 95-120.

Reagans and McEvily, 2008. Contradictory or compatible? Reconsidering the trade off between brokerage and closure on knowledge sharing. In J.A.C. Baum and T.J. Rowley (Eds.), *Advances in Strategic Management*: Vol(25).

Module 3
Advanced Topics in Social Network Analysis
Soong Moon Kang
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Social network analysis focuses on the relationships between actors who are interdependent, and on social structure that emerges from regularities in this interdependence. The main objective of this module is to introduce you to several advanced topics in the field of SNA.

Module 3 Schedule

Session 13. **Wednesday, June 12, 2013, 14:00-15:30**
Different types of networks: 2-Mode networks, multiplex, etc
Recommended Reading:
Wasserman and Faust, Chapter 8
Breiger, Ronald. 1974. The duality of persons and groups. *Social Forces*. 53:191-190.

Session 14. **Wednesday, June 12, 2013, 16:00-17:30**
Structural Equivalence and Blockmodeling
Recommended Reading: Wasserman and Faust, Chapter 9 and 10

Brokerage and Structural Holes
Recommended Reading:
Burt, Ronald S. 1992. *Structural Holes: The Social Structure of Competition*. Harvard University Press.
Gould, Roger V., and Roberto M. Fernandez. 1989. Structures of mediation: A formal approach to brokerage in transaction networks. *Sociological Methodology*. 19: 89-126.

Cliques and Small Worlds
Recommended Reading:
Wasserman and Faust, Chapter 7
Watts, Duncan J. 1999. Networks, dynamics, and the small-world phenomenon. *American Journal of Sociology* 105: 493–527

Session 16. **Thursday, June 13, 2013, 9:15-10:45**
Structural Balance and Transitivity
Recommended Reading:
Wasserman and Faust, Chapter 6

Session 17.   **Thursday, June 13, 2013, 11:00-12:30**
                   Network Dynamics
                   Recommended Reading:
                   Doreian, Patrick. 2002. Event sequences as generators of social network evolution. *Social Networks.* 24: 93–119.
                   Kang, Soong Moon. 2007. Equicentrality and network centralization: A micro–macro linkage. *Social Networks.* 29: 585-601.

Module 4: Event History Analysis

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Overview and Objectives

The main objective of this module is to introduce you to the various concepts and models available for studying change in variables of qualitative nature. This methodology is called *Event History Analysis* (henceforth, EHA), a term that refers to the group of techniques used to study events.

Event history analysis is used to study longitudinal data when the social process to study is the occurrence of an event. An "event" is a change from one state to another; and states are best represented by a categorical variable. Thus, such an event is measured using a categorical dependent variable. EHA has also been called *survival analysis* because biologists and epidemiologists were the first to use and develop this methodology in order to study the survival of organisms after certain treatments. EHA analyzes longitudinal data available for a sample of individual cases or units during a period of time when a series of events may occur. EHA allows the researcher to examine the determinants or factors behind the occurrence of any type of social event over time and can consequently help answer questions that previously could not be answered using the classic linear regression or the logit/probit models.

This module is structured as follows: First, I cover the two main models for modeling binary outcomes, the **logit and probit models** (Session 1). Then, I introduce the unique language used in the discussion of events and the **EHA methodology** available to analyze events over time (Session 2). Next, I review several of the most commonly used EHA techniques, in detail, with some examples (Session 3). In doing so, I provide a few examples of how to use the covered methodologies in research papers and reports.

Class Format and Requirements

The structure of the module (roughly) involves combining lectures on the principles associated with logit/probit models as well as event history analysis followed by the application of these models. We will pursue two types of applications:

- We will discuss articles that use the particular methods in question, with an eye toward assessing whether the data and methods are appropriate for the research question.

- I will show you how to work with data to estimate models (in Stata) and write up an interpretation of the results. In order to get started with the Stata Program, you can access the Stata Starter Kit, put together by UCLA's Academic Technology Services group at http://www.ats.ucla.edu/stat/stata/sk/

Required Readings

Castilla, Emilio J. 2007. *Dynamic Analysis in the Social Sciences.* Oxford, UK: Elsevier and Academic Press.[5] (There should be ample time to order this through Amazon, etc.)

Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables.* Thousand Oaks, CA: Sage.

Module Schedule

Sessions 18 & 19.   Thursday, June 13, 2013: 14h00-17h30

Part I.   Models for Binary Outcomes
    Long, J. Scott. 1997. Chapter 3: "Binary Outcomes: The Linear Probability, Probit, and Logit Models" and Chapter 4: "Hypothesis Testing and Goodness of Fit"

    Petersen, Trond. 1985. "A Comment on Presenting Results from Logit and Probit Models." *American Sociological Review* 50: 130-131.

Part II.   Applications: Models for Binary Outcomes
    Burt, Ronald S. 2003. "Structural Holes and Good Ideas" *American Journal of Sociology* 110 (2): 349-399.

Sessions 21 & 22.   Friday, June 14, 2013: 8h45-12h00

Part I.   Introduction to the Basic Concepts of Event History Analysis
    Castilla, Emilio J. 2007. Chapter 1: "Longitudinal Data" Pp. 1-42 and Chapter 4. "Designing a Study with Longitudinal Data." Pp. 241-84.

    Castilla, Emilio J. 2007. Chapter 3: "Event History Analysis." Only Sections 1-5: Pp. 135-69.

    Stata Corporation. 2005. *Stata 9.0: Survival Analysis and Epidemiological Tables* (Manual). Entry covering -stset-.

Part II.   Descriptive Statistics for Event History Data
    Castilla, Emilio J. 2007. Section 6: "Exploratory Analysis of Events" in Chapter 3: "Event History Analysis." Pp. 170-90.

Sessions 23 & 24.   Friday, June 14, 2013: 13h00-16h15

Part I.   Multivariate Models for the Analysis of Events
    Castilla, Emilio J. 2007. Section 7. "Multivariate Analysis of Events" in Chapter 3. "Event History Analysis." Also Sections 8-10. Pp. 191-240.

Part II.   Applications: Event History Analysis
    Castilla, Emilio J. 2005. "Social Networks and Employee Performance in a Call Center." *American Journal of Sociology* 110 (5): 1243-83.

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[5] The book is available in amazon.com at http://www.amazon.com/Dynamic-Analysis-Social-Sciences-Castilla/dp/0120884852 and also at the Stata bookstore: http://www.stta.com/bookstore/daitss.html.

Appendix: Schedule of the 3rd EDEN Seminar on SNA, June 10 – 14, 2013

Monday, June 10th	Tuesday, June 11th	Wednesday, June 12th	Thursday, June 13th	Friday, June 14th
9h30-10h30 Session 1 *Introduction to SNA (part 1): main concepts and methods for visualisation of graphs and analysis of key metrics at node and network levels* Dimitris Assimakopoulos **10h30-11h00** *Coffee break* **11h00-12h30 Session 2** *Introduction to SNA (part 2): main concepts and methods for visualisation of graphs and analysis of key metrics at node and network levels* Dimitris Assimakopoulos	**8h30-09h15** *What have we learned yesterday* **9h15-10h45 Session 6** *The role of social networks in the generation of innovation: Focussing on structure* Marco Tortoriello **10h45-11h00** *Coffee break* **11h00-12h30 Session 7** *The role of social networks in the generation of innovation: Focussing on structure* Marco Tortoriello	**8h30-09h15** *What have we learned yesterday* **9h15-10h45 Session 11** *Research proposals Students' presentation* Dimitris Assimakopoulos **10h45-11h00** *Coffee break* **11h00-12h30 Session 12** *Research proposals Students' presentation* Dimitris Assimakopoulos	**8h30-09h15** *What have we learned yesterday* **9h15-10h45 Session 16** *Structural Balance and Transitivity* Soong Moon Kang **10h45-11h00** *Coffee break* **11h00-12h30 Session 17** *Network Dynamics and Advanced Topics on Network Measures: Clustering, Assortative Mixing, etc.* Soong Moon Kang	**8h00-08h45** *What have we learned yesterday* **8h45-10h15 Session 21** *Introduction to Event History Analysis* Emilio Castilla **10h15-10h30** *Coffee break* **10h30-12h00 Session 22** *Descriptive Statistics for Event History Data* Emilio Castilla
12h30-14h00 Lunch	*12h30-14h00 Lunch*	*12h30-14h00 Lunch*	*12h30-14h00 Lunch*	*12h00-13h00 Lunch*
14h00-15h30 Session 3 *The role of social networks in the generation of innovation: Focussing on ties* Marco Tortoriello **15h30-16h00** *Coffee break* **16h00-17h30 Session 4** *The role of social networks in the generation of innovation: Focussing on ties* Marco Tortoriello **17h30 -18h30 Session 5** Students' presentation Marco Tortoriello Dimitris Assimakopoulos	**14h00 - 15h30 Session 8** *The case of a large new product development team in a multi-site & multi-functional business unit* Marco Tortoriello Dimitris Assimakopoulos **15h30-16h00** *Coffee break* **16h00-17h30 Session 9** *The case of a large new product development team in a multi-site & multi-functional business unit* Marco Tortoriello Dimitris Assimakopoulos **17h30 -18h30 Session 10** Students' presentation Marco Tortoriello Dimitris Assimakopoulos	**14h00-15h30 Session 13** *Different types of networks: Bipartite, Multiplex, etc.* Soong Moon Kang **15h30-16h00** *Coffee break* **16h00-17h30 Session 14** *Brokerage, Cliques Small worlds, etc.* Soong Moon Kang **17h30 -18h30 Session 15** *Research proposals* Students' presentation Soong Moon Kang Dimitris Assimakopoulos	**14h00-15h30 Session 18** *Models for Binary Outcomes* Emilio Castilla **15h30-16h00** *Coffee break* **16h00-17h30 Session 19** *Applications: Models for Binary Outcomes* Emilio Castilla **17h30 -18h30 Session 20** *Research proposals* Students' presentation Emilio Castilla Dimitris Assimakopoulos	**13h00-14h30 Session 23** *Multivariate Models for the Analysis of Events* Emilio Castilla **14h30-14h45** *Coffee break* **14h45-16h15 Session 24** *Applications: Event History Analysis* Emilio Castilla *16h30* **Departure**