Management Science II, Summer Term 2020
ESMT Learning Center (Main Building), Schlossplatz 1
Thursdays 9:00am to 12:00noon (please see separate schedule for further details)

Part 1: Networks and organizations I

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Part 2: Innovation, intellectual property rights and the market for technology

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Part 3: Networks and organizations II

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Course overview

This course is composed of three parts. The first part of the course introduces social network analysis in Organizations. We will look at what makes network analysis special in conceptual and methodological terms before touching on two key topics in the literature: the role of individuals in networks and the dynamics of networks. This first part will equip you with the knowledge that you need to embark in more advanced topics in network analysis.

The second part of the course explores empirical applications of network-analytic methods to a wide array of agents—professional auto racers, gangsters, college fraternity members, and words in semantic networks. In addition to our empirical emphasis, we'll consider a game-theoretic network formation model designed to better understand the performance-related consequences of peer monitoring within the firm. Our final session will then draw on lessons regarding argumentation and evidence emerging from earlier sessions.

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The third part of the course focuses on the economics of innovation and dives into studies of "Innovation, Intellectual Property Rights and the Market for Technology". The sessions touch upon important topics related to intellectual property rights (in particular patent rights) and how they affect innovative activity. Moreover, we discover how information published in patents can be used as a method to trace knowledge flows over time and geographies – a technique which has been used to address a wide range of questions in Management and Economics.

Course format

We will meet once a week for three hours. In each meeting, you are expected to have prepared the assigned readings for each session. While reading the papers it may be useful to first identify the research question, major concepts used to formulate the research problem, the methodology used, key findings and its major shortcomings or weaknesses. You should then be able to suggest research ideas on how to address the weak or problematic aspects of the article.

Selected readings are available at: https://cloud.esmt.org/s/WAgKiKaNsgqKoYN

Each participant will be assigned to present at least one paper in class during the course depending on the number of participants. The student assigned the paper being discussed is not only expected to introduce the paper but also to lead the class discussion. The presentation assignments will be communicated after the first session.

Prerequisites

Participants should be familiar with basic microeconomic tools as well as have a basic understanding of multivariate regression analysis.

Course evaluation

Performance evaluation will be based on three building blocks:

Class participation (20%) The course will be highly interactive and you are expected to advance discussions in the class-room by your participation. Note that the evaluation of your class participation will be based on quality not quantity.

Paper presentations (30%) You are expected to present at least one paper during the course (see above).

Term paper/referee report (50%) Grading of the written contribution is based on one individual assignment for which each student is expected to write one referee report on a recent research paper. The instructors will provide a list of research papers on the topics of each part of the course from which students could choose one paper to prepare a referee report. The list of research papers will be provided during the course. Alternatively, students can opt to write a term paper in the form of a research proposal. **Referee reports and research proposals are due by September 15, 2020.**

Part 1: Networks and organizations I
Core concepts and methods to understand networks in organizations

Eric Quintane

Course Sessions

Session 1
Thursday, April 23, 2020
9:00–12:00

Session topic	**Key ideas in organizational network analysis**
	Departing from other perspectives, SNA assumes that actors (e.g., individuals, groups, organizations) influence each other through their relations and that these relations drive many social processes and organizational outcomes. As such, by examining the structure of relations among actors, network approaches seek to explain variations in behaviors and outcomes at different levels of analysis. This session provides an overview of the key ideas, debates and issues in organizational network analysis.

Required Readings:	Kilduff, M., and D. J. Brass. (2010). Organizational Social Network Research: Core Ideas and Key Debates. Academy of Management Annals. 4:317 - 357. Borgatti, S. P., A. Mehra, D. J. Brass, and G. Labianca. 2009. Network Analysis in the Social Sciences. Science, 323: 892–895.
Optional Readings:	Borgatti et al., Chapter 1: Introduction, Chapter 2: Mathematical foundations, Chapter 6: Visualizations Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. American Journal of Sociology, 91(3), 481–510. Jackson, M. O., Rogers, B. W., & Zenou, Y. (2017). The Economic Consequences of Social Network Structure. Journal of Economic Literature, 55(1), 49–55.

Session 2
Thursday, April 30, 2020
9:00–12:00

Session topic	**Network data, methods and dependence assumptions**
	The beauty of network analysis lies in its underlying mathematical nature. Building on matrix algebra and graph theory, network measures have been developed to represent precisely the patterns of social relations that surround actors. However, network data

	requires specific tools and methods for its collection and analysis. Also, because network analysis is based on the assumption that observations are dependent, standard statistical analysis methods are in most cases inappropriate.
Required Readings:	Schorch, S. and Quintane, E. 2018. Social Network Analysis. In Edlund, J. E & Nichols, A. L. Eds. Advanced Research Methods for the Social Sciences. Cambridge University Press. Robins, G., Pattison, P., Kalish, Y., & Lusher, D. 2007. An introduction to exponential random graph (p*) models for social networks. Social Networks, 29(2), 173–191.
Optional Readings:	Marsden, P. V. 1990. Network Data and Measurement. Annual Review of Sociology 16: 435-463. Robins, G. 2015. Doing Social Network Research: Network-based Research Design for social Scientists. Sage. Chapter 7 pp. 149-160. Borgatti et al., Chapter 3: Research design, Chapter 4: Data collection

Session 3
Thursday, May 7, 2020
9:00–12:00

Session topic	**Individuals and networks** Individuals and networks have a complex relationship. The mathematical and sociological roots of social network analysis have led the field to focus on the structure of relationships that surround an individual. For a long time, research has been built on the assumption that the network position in which individuals find themselves drive their thoughts and behavior, regardless of the individual occupying this position. But to what extent is this true? We will start by discussing one of the most established positions in social network analysis and articulate its structural dimension. Then we look at the individual within the position and examine how individual characteristics affect the relationship between structure and outcomes.
Required Readings:	Granovetter, M. S. 1973. The Strength of Weak Ties. American Journal of Sociology 78: 1360-1380. Fang, R., Landis, B., Zhang, Z., Anderson, M. H., Shaw, J. D., & Kilduff, M. (2015). Integrating personality and social networks: A meta-analysis of personality, network position, and work outcomes in organizations. Organization Science, 26(4), 1243–1260.

| Optional Readings: | Burt, R. S. (2004). Structural Holes and Good Ideas. American Journal of Sociology, 110(2), 349–399.
Sasovova, Z., Mehra, A., Borgatti, S. P., & Schippers, M. C. (2010). Network churn: The effects of self-monitoring personality on brokerage dynamics. Administrative Science Quarterly, 55(4), 639–670.
Burt, R. S., Kilduff, M., & Tasselli, S. (2013). Social Network Analysis: Foundations and Frontiers on Advantage. Annual Review of Psychology, 64, 527–547.
Burt, R. S. (2019). Structural holes capstone, cautions, and enthusiasms. 1–45.
Borgatti et al., Chapter 10: Centrality |

Session 4
Thursday, May 14, 2020
9:00–12:00

Session topic	**Dynamics of networks** This session looks deeper into the dynamics of networks. There is still not much research that examines how networks evolve over time, i.e., when new ties form and existing ones dissolve. We will discuss the assigned literature and review the different explanations for tie formation and persistence as well as reflect on the way in which time can be embedded in network theory and methods.

Required Readings:	Quintane, E., & Carnabuci, G. (2016). How do brokers broker? Tertius gaudens, tertius iungens, and the temporality of structural holes. Organization Science, 27(6), 1343–1360. Rivera, M. T., S. B. Soderstrom, & B. Uzzi 2010. "Dynamics of Dyads in Social Networks: Assortative, Relational, and Proximity Mechanisms." Annual Review of Sociology, 36: 91–115.
Optional Readings:	Falzon, L., Quintane, E., Dunn, J., & Robins, G. (2018). Embedding time in positions: Temporal measures of centrality for social network analysis. Social Networks, 54, 168–178. Kitts, J. A., Lomi, A., Mascia, D., Pallotti, F., & Quintane, E. (2017). Investigating the temporal dynamics of interorganizational exchange: Patient transfers among Italian hospitals. American Journal of Sociology, 123(3), 850–910.

Part 2: Innovation, intellectual property rights and the market for technology

Stefan Wagner

Course Sessions

Session 5
Thursday, May 28, 2020
9:00–12:00

Session topic	**A primer on intellectual property rights**
	During this session we will introduce a set of legal tools establishing incentives to innovate as they allow capturing the value of innovations by excluding third parties from using them: copyrights, trademarks, trade secrets and patents. The first part of the session helps to understand the power and limitations of these tools. During the second part, we will focus on the protection of technical know-how using patent rights. This includes a discussion of empirical papers analyzing the effect of patent rights on innovative activities.

Required Readings:	Arrow, K. (1962): Economic welfare and the allocation of resources for invention. In R. Nelson (Ed): The Rate and Direction of Inventive Activity, 1962, Princeton University Press, Princeton.
	Budish, E., Roin, B. and Williams, H. (2015): Do fixed patent terms distort innovation? Evidence from cancer clinical trials. American Economic Revue, Vol. 105 (7), 2044-2085.
	Moser, P. (2005): How Do Patent Laws Influence Innovation? Evidence from Nineteenth Century World's Fairs. *American Economic Review*, 95(4): 1214–36.
Optional Readings:	Cohen, W., R. Nelson, and J. Walsh (2000). Protecting their intellectual assets: Appropriability conditions and why US manufacturing firms patent (or not). NBER Working Paper, no. 7552. Cambridge, MA.
	Landes, W. M. and Posner, R. A. (1987): Trademark law: an economic perspective. Journal of Law and Economics 30(2): 265-309.
	Scotchmer, S. (2004) – 3rd Chapter: A primer for nonlawyers on intellectual property.

Session 6
Thursday, June 4, 2020
9:00–12:00

Session topic	**Patent thickets, patent trolls and other frictions in the market for technology – is the patent system broken?** Most patent offices have seen an explosion of patent filings over the last two decades. We will discuss what is behind this surge in patent filing rates and analyze resulting problems for innovating firms – most notably the emergence of hold-up situations in complex high-technology industries (mobile phones).

Required Readings:	Cockburn, I. and MacGarvie, M. (2011): Entry and Patenting in the Software Industry. Management Science 57(5): 915-933. Hall, B. and Ziedonis, R. (2001): The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry 1976-1995. RAND Journal of Economics 32(1), 101-128. Harhoff, D., von Graevenitz, G. and Wagner, S. (2016): Conflict resolution, public goods and patent thickets. Management Science, Vol. 62(3): 704–721.
Optional Readings:	Bessen, J./ Meurer, M. (2009): Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk. Princeton University Press. Kortum, S. and Lerner, J. (1998): What is behind the Recent Surge in Patenting? Research Policy 28(1), 1–22. Scotchmer, S. (2004): 7th Chapter: Litigation and Enforcement. Shapiro, C. (2001): Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting. In: Innovation Policy and the Economy, Vol. 1, 119-150, M.I.T. Press, Cambridge MA. Von Graenitz, G. and Wagner, S. and Harhoff, D. (2011): How to Measure Patent Thickets – A Novel Approach. Economics Letters 111(1), 6-9.

Additional Multimedia to watch/listen to before or after the session (**highly recommended!**):

Patent Absurdity: how software patents broke the system (Video, 30 mins), available at http://patentabsurdity.com/

When Patents Attack (Audio report, 60 mins), available at http://www.thisamericanlife.org/radio-archives/episode/441/when-patents-attack

Session 7
Thursday, June 11, 2020
9:00–12:00

Session topic	**Measuring knowledge flows using patent data** Despite the existence of IP regimes excludability of third parties from ideas usually is incomplete and knowledge flows between firms. In this session we will review empirical studies that focus on the measurement of knowledge flows and the underlying mechanisms.
Required Readings:	Correida, R. and Rosenkopf, L. (2010): Should Auld Acquaintance be Forgot? The Reverse Transfer of Knowledge through Mobility Ties. Strategic Management Journal 31, 159-181. Jaffe, A. and Trajtenberg, M. and Henderson, R. (1993): Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations. The Quarterly Journal of Economics 108(3), 577-598. Singh, J. (2005): Collaborative Networks as Determinants of Knowledge Diffusion Patterns. Management Science 51(5), 756-770.
Optional Readings:	Almeida, P. and Kogut, B. (1999): The Localization of Knowledge and the Mobility of Engineers in Regional Networks. Management Science 45(7), 905–917. Michel, J. and Bettels, M. (2001): Patent citation analysis – A closer look at the basic input data from patent search reports. Scientometrics 51(1), 185-201. Wagner, S., Hoisl, K. and Thoma, G. (2013): Overcoming localization of knowledge: The role of professional service firms. Forthcoming in: Strategic Management Journal, available at http://dx.doi.org/10.1002/smj.2174

Session 8
Thursday, June 18, 2020
9:00–12:00

Session topic	**An introduction to available data-sources – an empirical perspective on the patent system**

Having spent discussed important (micro)economic tools for the analysis of IP related questions we now turn our attention to empirical work. In this session we will discuss the content and the availability of patent data.

The second part of the session that will be devoted to hands-on STATA exercises. First, I will introduce the concept of survival models that are usually not covered in standard econometrics courses. Seconc, we take the models to data and replicate the findings of Harhoff/Wagner (2009).

Required Readings:	Harhoff, D. and Wagner, S. (2009): The Duration of Patent Examination. Management Science 55(12), 1969-1984.
	Kiefer, N. (1988): Economic Duration Data and Hazard Functions, Journal of Economic Literature, Vol. 26(2), 646-679.
	Stephen Jenkins provides excellent free material on survival analysis covering both theoretical treatment as well as its implementation in STATA. If you are interested in this topic your recommended to have a look at https://www.iser.essex.ac.uk/resources/survival-analysis-with-stata.
Optional Readings:	Griliches, Z. (1990): Patent Statistics as Economic Indicators: A survey. Journal of Economic Literature 28(4), 1661-1707.
	Hall, B. and Jaffe, A. and Trajtenberg, M. (2001): The NBER Patent Citation Data File: Lessons, Insights and Methodological Tools. NBER Working Paper 8498, NBER, Cambridge MA.

Part 3: Networks and organizations II
Further topics in network analysis, including semantic networks,
strategic network formation, and Bonacich centrality

Matt Bothner

Course Sessions

Session 9
Thursday, June 25, 2020
9:00–12:00

Session topic	**Strategic Network Formation and Performance Feedback Theory**

At the core of the network-analytic perspective is a portrayal of human beings as "molecular," not "atomistic." We'll start this session with a working paper that examines the performance-related consequences of employees in a firm becoming less atomistic—that is, more conscious of the performance of their colleagues. We'll address the question: does employees' effort rise or fall as they more deeply engage in social comparisons? And if this is context-dependent, what are the important contextual modifiers? We'll then consider how to reposition this paper as a contribution to a vibrant literature that runs parallel to the networks literature: performance feedback theory. In preparing for session 9, please develop answers to these questions:

(1) Suppose you were reviewing "What raises the social multiplier?" (e.g., for *Management Science*). What would you write to the editor in your referee report?

How might this paper most effectively contribute to the literature on performance feedback theory, as depicted in the other assigned readings? (In our class discussion, we will refer to the behavioral theory of the firm and performance feedback theory almost interchangeably).

Readings:

Marquart, Ingo, Nghi Truong, Richard Haynes, and Matthew S. Bothner. 2019. "What raises the social multiplier? Embedding versus decoupling as formal design choices." *Working Paper*.

Askin, Noah, and Matthew S. Bothner. 2016. "Status-aspirational pricing: The "Chivas Regal" strategy in US higher education, 2006–2012." *Administrative Science Quarterly*. (please read the **first 5 pages**; the rest is optional).

Gavetti, Giovanni, Henrich R. Greve, Daniel A. Levinthal, and William Ocasio. 2012. "The behavioral theory of the firm: Assessment and prospects." *The Academy of Management Annals*. (please read selectively to answer question (2))

Greve, Henrich R., and Daphne Teh. 2018. "Goal selection internally and externally: A behavioral theory of institutionalization." *International Journal of Management Reviews*. (again selectively, to answer (2))

Session 10
Thursday, July 2, 2020
9:00–12:00

Session topic	**Guest instructor: Chengwei Liu** **A random school of thought in organization science** Chance models—mechanisms that explain empirical regularities through unsystematic variance—have a long tradition in the sciences but are marginalized in the organization scholarship. During this session, we will have an overview of how this school of thought provides alternative explanations for organizational and management phenomena as well as their behavioral implications, such as how people systematically mistake luck for skill when evaluating successes and leaders.

Readings:	Liu, Chengwei. "The Variance of Variance: A Tribute to and Extension of James G. March's Chance Models." Forthcoming at Research in the Sociology of Organizations. Liu, Chengwei and Denrell, Jerker. "Should We Attribute Exceptional Success to Skill or to Luck? Empirical Evidence from Entertainment, Innovation, Auto Racing, and Firm Performance." Working paper.

Session 11
Thursday, July 9, 2020
9:00–12:00

Session topic	**Crowding—in Tournaments and in Semantic Networks** You face competitive crowding in a dynamic tournament—for instance, in a professional auto racing season—if your lower-ranked rivals are poised to surpass you or if you're poised to surpass those currently ranked ahead of you. Crowding doesn't just happen in vertical networks, however. It's also visible in semantic networks. Suppose, for instance, you're an economist studying leadership, arguing from a policy perspective that the key job of the leader is to signal consistency to his or her followers. Suppose further that a different "camp" is arguing that the key responsibility of the leader is instead to be flexible—and that this camp is gaining ground over you in the relevant journals. Your normative vision of leadership is crowded by another's. In this session, we'll refer to the concept of crowding in the study of two empirical subjects: the antecedents of risk-taking behavior in tournaments and the time-varying meaning(s) of leadership. Our data will range from competitive proximities among professional athletes to semantic networks generated through an AI-based language model.

Readings: to be distributed electronically

Session 12
Thursday, July 16, 2020
9:00–12:00

Session topic	Instructor: Stefan Wagner
	Topic:
	Session summary:

Readings: Materials to be distributed