

Graduate Seminar on
Complex Networks and Enterprises

Georgia Institute of Technology
ISyE / MGT / CS 8803
Fall 2008

Monday, 3:05pm – 5:55 pm
Tennenbaum Institute, Technology Square, 760 Spring Street NW, Rm 129

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Course URL: <http://www.ti.gatech.edu/basole/seminar/networks/>

Course Overview

This seminar is designed as an introduction to complex networks in organizational contexts, building on seminal readings from multi-disciplinary (e.g. management, engineering, computer science, and policy) perspectives. The objective of this seminar is to familiarize students with the theory, research and methodological issues connected with network analysis in the organizational sciences. The seminar will explore “networks” in topical areas such as innovation, knowledge/collaboration, new product/service development, supply chains, business ecosystems, and entrepreneurship, investigate the role of information and communication technologies (ICT) in complex networks, and examine examples from a diverse set of industries (e.g. high-tech, manufacturing, telecommunications, health and life sciences, etc.). Upon completion of the seminar, students should have a good grasp of complex network concepts and methods, and be able to use them to conduct research. An emphasis is placed on applying complex network thinking in the development of each student's own individual research interests. The seminar will include guest lectures by leading faculty and practitioners.

Course Format

This course is organized as a research seminar. This means that you are primarily responsible for discussing the readings. You are expected to do all of the readings for each session and to be prepared to discuss and comment on the readings. The underlying notion of the class is interaction, not passivity. Consequently, class participation will be considered significantly in grading.

The course focuses on management, engineering, and computer science perspectives of network analysis. The goal is to provide students an appreciation for network and complex systems thinking in the organizational and management science. Readings will consist of a range of theoretical, empirical, case study, and practitioner articles. An EndNote reference library of all required and suggested readings can be downloaded from the course webpage. Throughout the semester, we will have several guest speakers who will provide practical relevance and provide their views on network-related topics.

It should be noted that this is not a network methods course (although some of the basic methods and tools will be discussed) and so no hands-on empirical analyses will be conducted. However, we will look at a variety of scholarly papers that will expose us to some of the methodological issues that arise.

Course Requirements

The course is designed for doctoral students from all backgrounds and advanced graduate and MBA students interested in studying networks and enterprises. Students should have some familiarity with basic statistics and data analysis techniques. Specific course requirements include:

- Read all class materials, attend and participate in class discussions.
- Lead at least one of the class discussion sessions; sign up in advance.
- Write a research paper on a topic related to the class and present it in class during the final session.

Readings and Conversation Starters

Be prepared to summarize the main points of each reading and discuss the following questions:

- What is the research question of this article? What is the main contribution?
- What were the most important insights you obtained from the reading?
- What do you know now that you didn't know before?
- What do you now think about differently?
- What are the strengths and weaknesses of each article?
- What didn't you understand?
- What type of data and research method was used?
- How do the articles relate to each other and to others read in previous weeks?

For each session's reading, you should prepare a "conversation starter" with a set of "bullets" (maximum one-page) highlighting interesting, intriguing, or perhaps confusing aspects of the assigned reading. We will use these pages to drive the discussion in each class meeting. Conversation starters are due each week Sunday before the session by 9pm and should be submitted by email to the instructor.

Discussion Leadership

Each student will take on the task of leading/moderating one session during the semester. Depending on class enrollment, multiple students may moderate one session. I will pass a signup sheet around the first week of class. The moderation entails coming up with thought provoking discussion questions and leading the discussion of the articles, and assist in selecting additional papers (where necessary). The discussion should integrate the insights from different readings and place them in the context of research in the field. Discussion questions should help integrate across the readings, rather than discuss them one by one. The moderator(s) need to submit a plan of the session moderation to the instructor three days (Friday) prior to the session.

Research Paper

The final research paper should involve the exploration of a "network" issue of interest to the student's research. The domain may include (i) a network analysis of a particular enterprise, industry, or ecosystem, (ii) a critical literature review of some specific aspect of organizational network research, or (iii) a theory development paper, proposing a new theoretical direction and specifying a research agenda for complex networks and enterprises. Written topic proposals (one page or less) must be submitted for approval by the instructor no later than September 29.

Students should discuss the motivation, provide a relevant literature review, theoretical underpinnings (not restricted to the topics covered in the course), and research propositions. A plan for conducting the research and research materials as well as potential results and contributions should also be discussed. With additional work after this semester, it is expected that the paper would be of quality accepted in leading conferences in your research field. To ensure that everyone is making good progress in selecting a topic for their research proposal, a one page overview and a one to two page outline of the proposal are due on October 20. Be prepared to provide a 3-5 minute presentation to the class.

In addition you will be required to do a conference-length presentation (~20-30 minutes) to the class at the end of the term on December 1. Based on the comments and feedback you receive, the final research paper is due December 8. Note that you are required to prepare and submit a paper to a conference or journal, but whether the paper is accepted will have no bearing on the evaluation.

Attendance

Since this seminar convenes only once a week, attendance at all class meetings is mandatory. Please do not plan to be absent. I expect you to arrive on time and to be prepared to discuss the session's readings. This is not a lecture course, but an active learning opportunity built around assigned readings, exercises, and intense engagement in research.

Grading

- Conversation Starters, Class Preparation and Participation (25%)
- Discussion Leadership (25%)
- Research Paper (50%)

Georgia Tech Honor Code

Each student must read and abide by the Georgia Tech Academic Honor Code (www.honor.gatech.edu).

Schedule

Session	Date	Topic	Assignment Due
1	Aug. 18	Introduction and Overview	
2	Aug. 25	Network Theories, Models and Properties	
3	Sept. 1	<i>Official School Holiday</i>	
4	Sept. 8	Analysis and Visualization of Complex Networks <u>Guest Speaker:</u> Dr. John Stasko, College of Computing, Georgia Tech	
5	Sept. 15	Value Creation in Networks	
6	Sept. 22	The Role of Information Technology <u>Guest Speaker:</u> Dr. Detmar Straub, CIS Department, Georgia State Univ.	
7	Sept. 29	Knowledge and Collaboration Networks <u>Guest Speaker:</u> Verna Allee, CEO, Value Networks LLC (Oct. 6, 2008)	Research Paper Proposal
8	Oct. 6	Innovation Networks I <u>Focus:</u> Entrepreneurship, Regional/National Systems, Venture Capital	
9	Oct. 13	<i>No Class</i>	
10	Oct. 20	Innovation Networks II <u>Focus:</u> R&D, Open Innovation, New Product/Service Development <u>Guest Speaker:</u> Dr. Raul Chao, Darden School of Business, UVirginia	Research Paper Progress Overview
11	Oct. 27	Networks in Government, Policy and Public Management <u>Focus:</u> Healthcare <u>Guest Speaker:</u> Dr. Bill Rouse, Tennenbaum Institute, Georgia Tech	
12	Nov. 3	Networks in Operations Management <u>Focus:</u> Supply Chains and Manufacturing (Aerospace, Automotive) <u>Guest Speaker:</u> Dr. Soumen Ghosh, College of Management, Georgia Tech	
13	Nov. 10	Leadership, Culture, Trust, and Governance of Networks <u>Guest Speaker:</u> Dr. Daniel Bello, Marketing/International Business, GSU	
14	Nov. 17	Change, Evolution, and Transformation of Networks	
15	Nov. 24	<i>No Class</i>	
16	Dec. 1	Final Research Paper Presentation and Concluding Overview	Final Presentation / Research Paper (Dec. 8)

Assigned Reading List

August 18 | Session 1 | Introduction and Overview

Required Readings

1. D.J. Brass, J. Galaskiewicz, H.R. Greve, and T. Wenpin, "Taking Stock of Networks and Organizations: A Multi-Level Perspective," *Academy of Management Journal* **47**, No. 6, 795-817 (2004).
2. A. Kambil, "Purposeful Abstraction: Thoughts on Creating Business Network Models," *Journal of Business Strategy* **29**, No. 1, 52-54 (2008).
3. J.E. Post, L.E. Preston, and S. Sachs, "Managing the Extended Enterprise: The New Stakeholder View," *California Management Review* **45**, No. 1, 6-28 (2002).
4. K.G. Provan, A. Fish, and J. Sydow, "Interorganizational Networks at the Network Level: A Review of the Empirical Literature on Whole Networks," *Journal of Management* **33**, No. 3, 479-516 (2007).
5. W.B. Rouse, "Complex Engineered, Organizational and Natural Systems," *Systems Engineering* **10**, No. 3, 260-271 (2007).
6. L. Rosenkopf and M.A. Schilling, "Comparing alliance network structure across industries: observations and explanations," *Strategic Entrepreneurship Journal* **1**, No. 3-4, 191-209 (2008).

Suggested Readings

1. A.L. Barabasi, *Linked: The New Science of Networks*, Perseus Publishing, New York (2002).
2. D. Batten, J. Casti, and R. Thord, Editors, *Networks in Action: Communication, Economics and Human Knowledge*, Springer-Verlag: Berlin (1995).
3. R.E. Miles and C.C. Snow, "Organizations: New Concepts for New Forms," *California Management Review* **28**, No. 3, 62-73 (1986).
4. S. Nambisan and M. Sawhney, *The Global Brain: Your Roadmap for Innovating Faster and Smarter in a Networked World*, Wharton School Publishing, Philadelphia (2007).

August 25 | Session 2 | Network Theories, Models and Properties

Required Readings

1. S.P. Borgatti and P.C. Foster, "The Network Paradigm in Organizational Research: A Review and Typology," *Journal of Management* **29**, No. 6, 991-1013 (2003).
2. R.S. Burt, "Models of Network Structure," *Annual Review of Sociology* **6**, No. 1, 79-141 (1980).
3. M.S. Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* **78**, No. 6, 1360-1380 (1973).
4. R. Gulati and M. Garguilo, "Where do interorganizational networks come from?," *American Journal of Sociology* **104**, No. 5, 1439-1493 (1999).
5. G.R. Salancik, "Wanted: A Good Network Theory of Organization," *Administrative Science Quarterly* **40**, 345-349 (1995).

Suggested Readings

1. R.S. Achrol, "Changes in the Theory of Interorganizational Relations in Marketing: Toward a Network Paradigm," *Journal of the Academy of Marketing Science* **25**, No. 1, 56-71 (1997).
2. D.J. Brass, "Being in the Right Place: A Structural Analysis of Individual Influence in an Organization," *Administrative Science Quarterly* **29**, No. 4, 518-539 (1984).
3. J.P. Cannon and W.D. Perreault, "Buyer-Seller Relationships in Business Markets," *Journal of Marketing Research* **36**, No. 4, 439-460 (1999).

4. R. Gulati, N. Nohria, and A. Zaheer, "Strategic Networks," *Strategic Management Journal* **21**, No. 3, 203-215 (2000).
5. J. Hagedoorn, "Understanding the Cross-Level Embeddedness of Interfirm Partnership Formation," *Academy of Management Review* **31**, No. 3, 670-680 (2006).
6. C. Jones, W.S. Hesterly, and S.P. Borgatti, "A General Theory of Network Governance: Exchange Conditions and Social Mechanisms," *Academy of Management Review* **22**, No. 4, 911-945 (1997).
7. B.R. Koka and J.E. Prescott, "Designing alliance networks: the influence of network position, environmental change, and strategy on firm performance," *Strategic Management Journal* **29**, No. 6, 639-661 (2008).
8. D. Lavie, "The Competitive Advantage of Interconnected Firms: An Extension of the Resource-Based View," *Academy of Management Review* **31**, No. 3, 638-658 (2006).
9. D. Lazer and A. Friedman, "The Network Structure of Exploration and Exploitation," *Administrative Science Quarterly* **52**, No. 4, 667-694 (2007).
10. C. Oliver, "Determinants of Interorganizational Relationships: Integration and Future Directions," *Academy of Management Review* **15**, No. 2, 241-265 (1990).
11. J. Travers and S. Milgram, "An Experimental Study of the Small World Problem," *Sociometry* **32**, No. 4, 425-443 (1969).
12. B. Uzzi, "Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness," *Administrative Science Quarterly* **42**, No. 1, 35-67 (1997).

September 1 | Session 3 | No Class

September 8 | Session 4 | Analysis and Visualization of Complex Networks

Required Readings

1. V. Batagelj and A. Mrvar, "Pajek: A Program for Large Network Analysis," *Connections* **21**, No. 2, 47-57 (1998).
2. S. Bender-deMoll and D.A. McFarland, "The Art and Science of Dynamic Network Visualization," *Journal of Social Structure* **7**, No. 2, 1-47 (2006).
3. N.S. Contractor, S. Wasserman, and K. Faust, "Testing Multi-Theoretical, Multi-Level Hypotheses about Organizational Networks: An Analytic Framework and Empirical Example," *Academy of Management Review* **31**, No. 3, 681-703 (2006).
4. C.J. Fombrun, "Strategies for Network Research in Organizations," *Academy of Management Review* **7**, No. 2, 280-291 (1982).
5. P.V. Marsden, "Network Data and Measurement," *Annual Review of Sociology* **16**, No. 1, 435-463 (1990).

Suggested Readings

1. S.P. Borgatti, "A Quorum of Graph Theoretic Concepts," *Connections* **17**, No. 1, 47-49 (1994).
2. S.P. Borgatti and J.-L. Molina, "Toward Ethical Guidelines for Network Research in Organizations," *Social Networks* **27**, No. 2, 107-117 (2005).
3. K. Cook, R. Earnshaw, and J. Stasko, "Discovering the Unexpected," *IEEE Computer Graphics and Applications* **27**, No. 5, 14-19 (2007).
4. W. de Nooy, A. Mrvar, and V. Batagelj, *Exploratory Social Network Analysis with Pajek*, Cambridge University Press, Cambridge (2005).
5. R.A. Hannemann and M. Riddle. *Introduction to Social Network Methods*. 2008 [cited August 10, 2008]; Available from: University of California, Riverside.

6. F. Harary, "Graph Theoretic Methods in the Management Sciences," *Management Science* **5**, No. 4, 387-403 (1959).
7. C. Johnson, R. Moorhead, T. Munzner, H. Pfister, P. Rheingans, and T.S. Yoo, *NIH/NSF Visualization Research Challenges*, IEEE (2006).
8. G.L. Lohse, K. Biolsi, N. Walker, and H.H. Rueter, "A Classification of Visual Representations," *Communications of the ACM* **37**, No. 12, 36-49 (1994).
9. N.H. Lurie and C.H. Mason, "Visual Representation: Implications for Decision Making," *Journal of Marketing* **71**, No. 1, 160-177 (2007).
10. C. McGrath, D. Krackhardt, and J. Blythe, "Visualizing Complexity in Networks: Seeing Both the Forest and the Trees," *Connections* **25**, No. 1, 37-47 (2003).
11. J. Moody, D. McFarland, and S. Bender-DeMoll, "Dynamic Network Visualization," *American Journal of Sociology* **110**, 1206-1241 (2005).
12. J. Pfeffer, "A Note on Social Networks and Network Structure," *Stanford Graduate School of Business Case OB-66*, (2008).
13. J.P. Scott, *Social Network Analysis: A Handbook*, Sage Publications, London (2000).
14. B. Shneiderman and A. Aris, "Network Visualization by Semantic Substrates," *IEEE Transactions on Visualization and Computer Graphics* **12**, No. 5, 733-740 (2006).
15. R.J. Thomas and S.R. Maloney, *Visualizing Organizations*, Accenture (2006).
16. S. Wasserman and K. Faust, *Social Network Analysis: Methods and Applications*, Cambridge University Press, Cambridge (1994).

September 15 | Session 5 | Value Creation in Networks

Required Readings

1. V. Allee, "Reconfiguring the Value Network," *Journal of Business Strategy* **21**, No. 4, 36 (2000).
2. R.C. Basole and W.B. Rouse, "Complexity of service value networks: Conceptualization and empirical investigation," *IBM Systems Journal* **47**, No. 1, 53-70 (2008).
3. J.K. Frels, T. Shervani, and R.K. Srivastava, "The Integrated Networks Model: Explaining Resource Allocations in Network markets," *Journal of Marketing* **67**, No. 1, 29-45 (2003).
4. M. Iansiti and R. Levien, "Strategy as Ecology," *Harvard Business Review* **82**, No. 3, 68-78 (2004).
5. K. Möller and A. Rajala, "Rise of Strategic Nets - New Modes of Value Creation," *Industrial Marketing Management* **36**, No. 7, 895-908 (2007).
6. W. Tsai and S. Ghoshal, "Social Capital and Value Creation: The Role of Intrafirm Networks," *Academy of Management Journal* **41**, No. 4, 464-476 (1998).

Suggested Readings

1. D. Bovet and J. Martha, *Value Nets: Breaking the Supply Chain to Unlock Hidden Profits*, John Wiley and Sons, New York (2000).
2. P.A. Cartwright, "Only Converge: Networks and Connectivity in the Information Economy," *Business Strategy Review* **13**, No. 2, 59-64 (2002).
3. N.S. Caswell, C. Nikolaou, J. Sairamesh, M. Bitsaki, G.D. Koutras, and G. Iacovidis, "Estimating value in service systems: A case study of a repair service system," *IBM Systems Journal* **47**, No. 1, 87-100 (2008).
4. J. Dedrick, K.L. Kraemer, and G. Linden, "Capturing Value in a Global Innovation Network: A Comparison of Radical and Incremental Innovation," *PCIC Sloan*, 1-34 (2007).
5. D.S. Evans and R. Schmalensee, *Catalyst Code: The Strategies Behind the World's Most Dynamic Companies*, Harvard Business School Press, Boston (2007).

6. M. Iansiti and R. Levien, *The Keystone Advantage: What New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Harvard Business School Press, Boston (2004).
7. B. Iyer, C.-H. Lee, and N. Venkatraman, "Managing in a "Small World Ecosystem": Lessons from the Software Sector," *California Management Review* **48**, No. 3, 28-47 (2006).
8. S. Nambisan and M. Sawhney, *The Global Brain: Your Roadmap for Innovating Faster and Smarter in a Networked World*, Wharton School Publishing, Philadelphia (2007).
9. C. Parolini, *The Value Net: A Tool for Competitive Strategy*, John Wiley, Chichester (1999).
10. J.B. Smith and M. Colgate, "Customer Value Creation: A Practical Framework," *Journal of Marketing Theory and Practice* **15**, No. 1, 7-23 (2007).

September 22 | Session 6 | The Role of Information Technology

Required Readings

1. A. Barlow and F. Li, "Online Value Network Linkages: Integration, Information Sharing and Flexibility," *Electronic Commerce Research and Applications* **4**, No. 2, 100-112 (2005).
2. T.H. Davenport, "Putting the Enterprise into the Enterprise System," *Harvard Business Review* **76**, No. 4, 121-131 (1998).
3. S.L. Jarvenpaa and B. Ives, "The Global Network Organization of the Future: Information Management Opportunities and Challenges," *Journal of Management Information Systems* **10**, No. 4, 25-57 (1994).
4. A. Sahaym, H.K. Steensma, and M.A. Schilling, "The Influence of Information Technology on the Use of Loosely Coupled Organizational Forms: An Industry-Level Analysis," *Organization Science* **18**, No. 5, 865-880 (2007).
5. D. Straub, A. Rai, and R. Klein, "Measuring Firm Performance at the Network Level: A Nomology of the Business Impact of Digital Supply Networks," *Journal of Management Information Systems* **21**, No. 1, 83-114 (2004).

Suggested Readings

1. T. Dewett and G.R. Jones, "The Role of Information Technology in the Organization: A Review, Model, and Assessment," *Journal of Management* **27**, No. 3, 313-346 (2001).
2. J. Fulk and G. DeSanctis, "Electronic Communication and Changing Organizational Forms," *Organization Science* **6**, No. 4, 337-349 (1995).
3. A. Kambil and J.E. Short, "Electronic Integration and Business Network Redesign: A Roles-Linkage Perspective," *Journal of Management Information Systems* **10**, No. 4, 59-83 (1994).
4. R.A. Nolan, "The Ten Components of a Strategic i-Net," *Harvard Business Case 9-301-154*, 1-4 (2001).
5. R.A. Nolan, "Cisco Systems Architecture: ERP and Web-enabled IT," *Harvard Business Case 9-301-099*, 1-23 (2005).
6. N. Saraf, C.S. Langdon, and S. Gosain, "IS Application Capabilities and Relational Value in Interfirm Partnerships," *Information Systems Research* **18**, No. 3, 320-339 (2007).
7. P. Vervest, K. Preiss, E.v. Heck, and L.-F. Pau, "The Emergence of Smart Business Networks," *Journal of Information Technology* **19**, No. 4, 228-233 (2004).
8. J. Wareham, L. Mathiassen, A. Rai, D. Straub, and R. Klein, "The Business Value of Digital Supply Networks: A Program of Research on the Impacts of Globalization," *Journal of International Management* **11**, No. 2, 201-227 (2005).

September 29 | Session 7 | Knowledge Networks

Required Readings

1. J.H. Dyer and K. Nobeoka, "Creating and Managing a High-Performance Knowledge-Sharing Network: The Toyota Case," *Strategic Management Journal* **21**, No. 3, 345-367 (2000).
2. A. MacCormack, "Siemens ShareNet: Building a Knowledge Network," *Harvard Business Case 9-603-036*, 1-27 (2002).
3. A. Nerkar and S. Paruchuri, "Evolution of R&D Capabilities: The Role of Knowledge Networks Within a Firm," *Management Science* **51**, No. 5, 771-785 (2005).
4. J. Owen-Smith and W.W. Powell, "Knowledge Networks as Channels and Conduits: The Effects of Spillovers in the Boston Biotechnology Community," *Organization Science* **15**, No. 1, 5-21 (2004).
5. R. Reagans and B. McEvily, "Network Structure and Knowledge Transfer: The Effects of Cohesion and Range," *Administrative Science Quarterly* **48**, No. 2, 240-267 (2003).

Suggested Readings

1. J. Allen, A.D. James, and P. Gamlen, "Formal versus Informal Knowledge Networks in R&D: A Case Study using Social Network Analysis," *R&D Management* **37**, No. 3, 179-196 (2007).
2. G.G. Bell and A. Zaheer, "Geography, Networks, and Knowledge Flow," *Organization Science* **18**, No. 6, 955-972 (2007).
3. T. Boone and R. Ganeshan, "Knowledge acquisition and transfer among engineers: effects of network structure," *Managerial and Decision Economics* **29**, No. 5, 459-468 (2008).
4. J.N. Cummings, "Work Groups, Structural Diversity, and Knowledge Sharing in a Global Organization," *Management Science* **50**, No. 3, 352-364 (2004).
5. P. Gloor, *Swarm Creativity - Competitive Advantage Through Collaborative Innovation Networks*, Oxford University Press, New York (2006).
6. M.T. Hansen, "The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits," *Administrative Science Quarterly* **44**, No. 1, 82-111 (1999).
7. M.T. Hansen, "Knowledge Networks: Explaining Effective Knowledge Sharing in Multiunit Companies," *Organization Science* **13**, No. 3, 232-248 (2002).
8. W.W. Powell, "Learning From Collaboration: Knowledge and Networks in the Biotechnology and Pharmaceutical Industries," *California Management Review* **40**, No. 3, 228-240 (1998).
9. R. Ramlogan, A. Mina, G. Tampubolon, and J.S. Metcalfe, "Networks of Knowledge: The Distributed Nature of Medical Innovation," *Scientometrics* **70**, No. 2, 459-489 (2007).
10. J. Singh, "Collaborative Networks as Determinants of Knowledge Diffusion Patterns," *Management Science* **51**, No. 5, 756-770 (2005).
11. W. Tsai, "Knowledge Transfer in Intraorganizational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance," *Academy of Management Journal* **44**, No. 5, 996-1004 (2001).

October 6 | Session 8 | Innovation Networks I

Required Readings

1. G. Ahuja, "Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study," *Administrative Science Quarterly* **45**, No. 3, 425-455 (2000).
2. L. Fleming, C. King Iii, and A.I. Juda, "Small Worlds and Regional Innovation," *Organization Science* **18**, No. 6, 938-954 (2007).
3. J. Owen-Smith, M. Riccaboni, F. Pammolli, and W.W. Powell, "A Comparison of U.S. and European University-Industry Relations in the Life Sciences," *Management Science* **48**, No. 1, 24-43 (2002).

4. P. Rizova, "Are you Networked for Successful Innovation?," *MIT Sloan Management Review* **47**, No. 3, 49-55 (2006).
5. M.A. Schilling and C.C. Phelps, "Interfirm Collaboration Networks: The Impact of Large-Scale Network Structure on Firm Innovation," *Management Science* **53**, No. 7, 1113-1126 (2007).

Suggested Readings

1. J. Birkinshaw, J. Bessant, and R. Delbridge, "Finding, Forming, and Performing: Creating Networks for Discontinuous Innovation," *California Management Review* **49**, No. 3, 67-84 (2007).
2. B. Chakravorti, "The New Rules for Bringing Innovations to Market," *Harvard Business Review* **82**, No. 3, 58-67 (2004).
3. R. Cowan, N. Jonard, and J.-B. Zimmermann, "Bilateral Collaboration and the Emergence of Innovation Networks," *Management Science* **53**, No. 7, 1051-1067 (2007).
4. M. Ferrary, "The Gift Exchange in the Social Networks of Silicon Valley," *California Management Review* **45**, No. 4, 120-138 (2003).
5. K. Frenken, "A Complexity Approach to Innovation Networks. The Case of the Aircraft Industry (1909-1997)," *Research Policy* **29**, No. 2, 257-272 (2000).
6. M.T. Hansen and J. Birkinshaw, "The Innovation Value Chain," *Harvard Business Review* **85**, No. 6, 121-130 (2007).
7. A.B. Hargadon, "Firms As Knowledge Brokers: Lessons in Pursuing Continuous Innovation," *California Management Review* **40**, No. 3, 209-227 (1998).
8. H. Hoang and B. Antoncic, "Network-based research in entrepreneurship: A critical review," *Journal of Business Venturing* **18**, No. 2, 165-187 (2003).
9. B. Iyer and T.H. Davenport, "Reverse Engineering Google's Innovation Machine," *Harvard Business Review* **86**, No. 4, 58-68 (2008).
10. N. Nicolaou and S. Birley, "Social Networks in Organizational Emergence: The University Spinout Phenomenon," *Management Science* **49**, No. 12, 1702-1725 (2003).
11. W.W. Powell, J. Owen-Smith, and J.A. Colyvas, "Innovation and Emulation: Lessons from American Universities in Selling Private Rights to Public Knowledge," *Minerva* **45**, No. 2, 121-142 (2007).
12. A. Saxenian, "Regional Networks and the Resurgence of Silicon Valley," *California Management Review* **33**, No. 1, 89-112 (1990).
13. O. Sorenson, "Social networks and industrial geography," *Journal of Evolutionary Economics* **13**, No. 5, 513-527 (2003).
14. J.G. Wissema and L. Euser, "Successful Innovation Through Inter-Company Networks," *Long Range Planning* **24**, No. 6, 33-39 (1991).

October 13 | Session 9 | No Class

October 20 | Session 10 | Innovation Networks II

Required Readings

1. H.W. Chesbrough and M.M. Appleyard, "Open Innovation and Strategy," *California Management Review* **50**, No. 1, 57-76 (2007).
2. C. Dhanaraj and A. Parkhe, "Orchestrating Innovation Networks," *Academy of Management Review* **31**, No. 3, 659-669 (2006).
3. A. Hargadon and R.I. Sutton, "Technology Brokering and Innovation in a Product Development Firm," *Administrative Science Quarterly* **42**, No. 4, 716-749 (1997).

4. S.J. Harryson, "From experience How Canon and Sony drive product innovation through networking and application-focused R&D," *Journal of Product Innovation Management* **14**, No. 4, 288-295 (1997).
5. L. Huston and N. Sakkab, "Connect and Develop: Inside Procter & Gamble's New Model for Innovation," *Harvard Business Review* **84**, No. 3, 58-66 (2006).
6. M.P. Knudsen, "The Relative Importance of Interfirm Relationships and Knowledge Transfer for New Product Development Success," *Journal of Product Innovation Management* **24**, No. 2, 117-138 (2007).
7. W.W. Powell, K.W. Koput, and L. Smith-Doerr, "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology," *Administrative Science Quarterly* **41**, No. 1, 116-145 (1996).
8. P.-H. Soh and E.B. Roberts, "Technology Alliances and Networks: An External Link to Research Capability," *IEEE Transactions on Engineering Management* **52**, No. 4, 419-428 (2005).

Suggested Readings

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October 27 | Session 11 | Networks in Government, Policy, and Public Management

Required Readings

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8. V. Krebs, "Mapping Networks of Terrorist Cells," *Connections* **24**, No. 3, 43-52 (2002).
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10. S. Nambisan, *Transforming Government Through Collaborative Innovation*, IBM Center for Innovation, New York (2008).
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November 3 | Session 12 | Networks in Operations Management

Required Readings

1. C. Buhman, S. Kekre, and J. Singhal, "Interdisciplinary and Interorganizational Research: Establishing the Science of Enterprise Networks," *Production & Operations Management* **14**, No. 4, 493-513 (2005).
2. J.H. Dyer and N.W. Hatch, "Using Supplier Networks to Learn Faster," *MIT Sloan Management Review* **45**, No. 3, 57-63 (2004).
3. K. Johansen, M. Comstock, and M. Winroth, "Coordination in collaborative manufacturing mega-networks: A case study," *Journal of Engineering & Technology Management* **22**, No. 3, 226-244 (2005).
4. A. Lomi and P. Pattison, "Manufacturing Relations: An Empirical Study of the Organization of Production Across Multiple Networks," *Organization Science* **17**, No. 3, 313-332 (2006).
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November 10 | Session 13 | Leadership, Culture, Trust, and Governance of Networks

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7. H. Ibarra and M. Hunter, "How Leaders Create and Use Networks," *Harvard Business Review* **85**, No. 1, 40-47 (2007).
8. M. Johnson-Cramer, S. Parise, and R. Cross, "Managing Change through Networks and Values," *California Management Review* **49**, No. 3, 85-109 (2007).
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5. R. Gulati and M. Garguilo, *Where do interorganizational networks come from?*, in *American Journal of Sociology*. 1999. p. 1439-1493.

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8. M. McGuire, "Managing Networks: Propositions on What Managers Do and Why They Do It," *Public Administration Review* **62**, No. 5, 599-609 (2002).
9. K. Möller and S. Svahn, "Managing Strategic Nets: A Capability Perspective," *Marketing Theory* **3**, No. 2, 209-234 (2003).
10. T. Ritter, I.F. Wilkinson, and W.J. Johnston, "Managing in complex business networks," *Industrial Marketing Management* **33**, No. 3, 175-183 (2004).

November 17 | Session 14 | Change, Evolution, and Transformation of Networks

Required Readings

1. S. Casper, "How Do Technology Clusters Emerge and Become Sustainable?: Social Network Formation and Inter-Firm Mobility within the San Diego Biotechnology Cluster," *Research Policy* **36**, No. 4, 438-455 (2007).
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4. B.R. Koka, R. Madhavan, and J.E. Prescott, "The Evolution of Interfirm Networks: Environmental Effects on Patterns of Network Change," *Academy of Management Review* **31**, No. 3, 721-737 (2006).
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7. W.B. Rouse, Editor, *Enterprise Transformation: Understanding and Enabling Fundamental Change*, John Wiley and Sons: Hoboken (2006).
8. T.J. Rowley, "Moving Beyond Dyadic Ties: A Network Theory of Stakeholder Influences," *Academy of Management Review* **22**, No. 4, 887-910 (1997).
9. N. Venkatraman and C.-H. Lee, "Preferential Linkage and Network Evolution: A Conceptual Model and Empirical Test in the U.S. Video Game Sector," *Academy of Management Journal* **47**, No. 6, 876-892 (2004).

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1. R.E. Miles and C.C. Snow, "Causes of Failure in Network Organizations," *California Management Review* **34**, No. 4, 53-72 (1992).
2. W.W. Powell, D.R. White, K.W. Koput, and J. Owen-Smith, "Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences," *American Journal of Sociology* **110**, No. 4, 1132-1205 (2005).
3. T.E. Stuart, "Network Positions and Propensities to Collaborate: An Investigation of Strategic Alliance Formation in a High-technology Industry," *Administrative Science Quarterly* **43**, No. 3, 668-698 (1998).
4. S. Ulset, "The Rise and Fall of Global Network Alliances," *Industrial and Corporate Change* **17**, No. 2, 267-300 (2008).

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November 24 | Session 15 | No Class

December 1 | Session 16 | Concluding Overview