MGMT 935

Network Theory and Applications (Ph.D. Seminar)

Spring 2015, Quarter 3

Lori Rosenkopf
rosenkopf@wharton.upenn.edu
8-6723

Class meets W 10:30-1:30, 2034 SH-DH
Office hours by appointment (G95 JMHH)
Canvas class page

This course explores network models and their applications to organizational phenomena. By examining the structure of relations among actors, network approaches seek to explain variations in beliefs, behaviors, and outcomes. The beauty of network analysis is its underlying mathematical nature – network ideas and measures, in some cases, apply equally well at micro and macro levels of analysis. Therefore, we read and discuss articles both at the micro level (where the network actors are individuals within organizations) and at the macro level (where the network actors are organizations within larger communities) that utilize antecedents or consequences of network constructs such as small worlds, cohesion, structural equivalence, centrality, and autonomy.

We begin by examining the classic problem of contagion of information and behaviors across networks, and follow by considering the various underlying models of network structure that might underlie contagion and other processes. The next two sessions address a variety of mechanisms by which an actor's position in a network affects its behavior or performance. Then, the following two sessions address antecedents of network ties via the topics of network evolution and network activation. We close with a "grab bag" session of articles chosen to match class interests. Each week, four articles are listed as the key readings we will discuss in detail during the class session; you need only focus on these articles. Numerous related articles are listed as "recommended" for additional reading, but I do not expect you to prepare them for class. Please feel free to post pdfs of recommended or other related articles onto the Canvas page for our class.

Evaluation is based on three components: reaction papers, empirical analyses, and class participation. For five of the sessions (excluding the final grab bag session), you are expected to write a reaction paper on an article you select from the required readings assigned for that day (maximum 750 words). A strong reaction paper will avoid wasting the word quota on summarizing the article; instead, focus on what the paper evokes for you in terms of unanswered questions, perceived flaws, and comparisons to other work with which you are familiar. Hard copies of these reaction papers must be handed in at the beginning of the class; choose the five sessions you prefer. At one of sessions 2 through 6, you will work in a pair to lead the class discussion for one article for which you are each also writing a reaction paper (sign up on Canvas; only one pair for any paper). There is one empirical assignment which requires analysis using a network software package and data of your choice. Detailed instructions for this empirical assignment are posted on Canvas. As in any seminar, consistent attendance and high-quality participation will help your grade.

Session 1 CONTAGION
(January 21)

- To underpin our discussion on the evolution of contagion studies, in reading these four articles, focus your attention on the mechanisms by which contagion is purported to occur and the wide variety of empirical approaches used to discern these mechanisms.

Coleman, J., E. Katz, and H. Menzel (1957). "The Diffusion of an Innovation Among Physicians." Sociometry: 253-270.

Burt, R. S. (1987). "Social Contagion and Innovation: Cohesion versus Structural Equivalence." American Journal of Sociology **92**: 1287-1335.

Davis, G. and H. Greve (1997). "Corporate Elite Networks and Governance Changes in the 1980s." American Journal of Sociology **103**(1): 1-37.

Aral, S. and D. Walker (2011). "Creating Social Contagion through Viral Product Design: A Randomized Trial of Peer Influence in Networks." Management Science **57**: 1623-1639.

Recommended:

Granovetter, M. (1985). "Economic Action and Social Structure: The Problem of Embeddedness." American Journal of Sociology **91**: 481-510.

Krackhardt, D. and L. Porter (1985). "When Friends Leave: A Structural Analysis of the Relationship between Turnover and Stayers' Attitudes." Administrative Science Quarterly **30**: 242-261.

Galaskiewicz, J. and R. S. Burt (1991). "Interorganization Contagion in Corporate Philanthropy." Administrative Science Quarterly **36**(1): 88-105.

Strang, D. and N. Tuma (1993). "Spatial and Temporal Heterogeneity in Diffusion." American Journal of Sociology **103**(3): 614-639.

Wasserman, S. and K. Faust (1994). Social Network Analysis: Methods and Applications. New York, Cambridge University Press. (Chapters 1-3)

Salancik, G. R. (1995). "Wanted: A Good Network Theory of Organization." Administrative Science Quarterly **40**: 345-349.

Westphal, J., R. Gulati, and S. Shortell (1997). "Customization or Conformity: An Institutional and Network Perspective on the Content and Consequences of TQM Adoption." Administrative Science Quarterly **42**(2): 366-394.

Abrahamson, E. and L. Rosenkopf (1997). "Social Network Effects on the Extent of Innovation Diffusion: A Computer Simulation." Organizational Science **8**(3): 289-309.

Shah, P. (1998). "Who are Employees' Social Referents? Using a Network Perspective to Determine Referent Others." Academy of Management Journal **41**(3): 249-268.

Iyengar, R., C. Van den Bulte, and T. Valente (2011). Opinion Leadership and Social Contagion in New Product Diffusion, Marketing Science **30:**195-212.

Session 2 NETWORK STRUCTURE, EVOLUTION AND PERFORMANCE (January 28)

- Read the first two articles to explore two very different models of network structure. With these in mind, examine the two subsequent articles to consider how researchers can analyze the learning and problem-solving consequences of varying network structures.

Watts, D. (1999). "Networks, Dynamics and the Small-World Phenomenon." American Journal of Sociology **105**:493-527.

Barabasi, A., R. Albert and H. Jeong (1999). "Mean-Field Theory of Scale-Free Random Networks." Physica A **272**:173-187.

Schilling, M. and C. Fang (2014). "When Hubs Forget, Lie, and Play Favorites: Interpersonal Network Structure, Information Distortion, and Organizational Learning." Strategic Management Journal **35**:974-994.

Shore, J., Bernstein, E., and D. Lazer (2014). "Facts and Figuring: An Experimental Investigation of Network Structure and Performance in Information and Solution Spaces." Working Paper, HBS.

Recommended:

Travers, J. and S. Milgram (1969). "An Experimental Study of the Small World Problem." Sociometry **32**: 425-443.

White, H., Boorman, S. and R. Breiger (1976). "Social Structure from Multiple Networks. I. Blockmodels of Roles and Positions." American Journal of Sociology **81**:730-780.

Nohria, N. and C. Garcia-Pont (1991). "Global Strategic Linkages and Industry Structure." Strategic Management Journal **12**(special issue):105-124.

Baker, W. and R. Faulkner (1993). "The Social Organization of Conspiracy: Illegal Networks in the Heavy Electrical Equipment Industry." American Sociological Review **58**: 837-860.

Kogut, B., and G. Walker (2001). "The Small World of Germany and the Durability of National Networks." American Sociological Review **66**:317-355.

Davis, G., M. Yoo, and W. Baker (2003). "The Small World of the American Corporate Elite, 1982-2001." Strategic Organization **1**:301-326.

Uzzi, B. and J. Spiro (2005). "Collaboration and Creativity: The Small World Problem." American Journal of Sociology **111**: 447-504.

Rosenkopf, L. and M. Schilling (2007). "Comparing Alliance Network Structure Across Industries: Observations and Explanations," Strategic Entrepreneurship Journal, 1:191-209.

Lazer, D. and A. Friedman (2007). "The Network Structure of Exploration and Exploitation." Administrative Science Quarterly **52**:667-694.

Centola, D. and M. Macy (2007). "Complex Contagions and the Weakness of Long Ties." American Journal of Sociology **113**:702-734

Cowan, R. and N. Jonard (2009). "Knowledge Portfolios and the Organization of Innovation Networks." Academy of Management Review **34**:320-342.

Baum, J., Cowan, C. and N. Jonard (2010). "Network-Independent Partner Selection and the Evolution of Innovation Networks," Management Science **56**:2094-2110.

Ghosh, A. and L. Rosenkopf (2012). "Small worlds in macro-organizational behavior research: Challenges and opportunities." Working paper.

Session 3 NETWORKS AS KNOWLEDGE CONDUITS (February 4)

Burt, R. S. (1997). "The Contingent Value of Social Capital." Administrative Science Quarterly **42**:339-365.

Ahuja, G. (2000). "Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study." Administrative Science Quarterly **45**:425-455.

Reagans, R. and W. McEvily (2003). "Network Structure and Knowledge Transfer: The Effects of Cohesion and Range." Administrative Science Quarterly **48:**240-267.

Schilling, M. and C. Phelps (2007). "Interfirm Collaboration Networks: The Impact of Large Scale Network Structure on Firm Innovation," Management Science **53**:1113–1127.

Recommended:

Freeman, L. (1979). "Centrality in Social Networks: Conceptual Clarification." Social Networks **1**:215-239.

Coleman, J. S. (1988). "Social Capital in the Creation of Human Capital." American Journal of Sociology **94**:S95-S120.

Powell, W., K. Koput, et al. (1996). "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology." Administrative Science Quarterly **41**:116-145.

Podolny, J. and J. Baron (1997). "Resources and Relationships: Social Networks and Mobility in the Workplace." American Sociological Review **62**:73-693.

Podolny, J. (2001). "Networks as the Pipes and Prisms of the Market." American Journal of Sociology **107**:33-60.

Sorenson, O. and T. Stuart (2001). "Syndication Networks and the Spatial Distribution of Venture Capital Investments." American Journal of Sociology **106:**1546-86.

Rosenkopf, L. and P. Almeida (2003). "Overcoming Local Search through Alliances and Mobility." Management Science **49**:751-766.

Castilla, E. (2005). "Social Networks and Employee Performance in a CallCenter." American Journal of Sociology **110**:1243-83.

Aral, S. & Van Alstyne, M. 2011. "The Diversity-Bandwidth Tradeoff." American Journal of Sociology, **117**(1); July: 90-171.

Ranganathan, R. and L. Rosenkopf (2014). "Do ties really bind? The effect of knowledge and commercialization networks on opposition to standards." Academy of Management Journal **57**:515-540.

Session 4 NETWORKS AS INDICATORS OF STATUS/POWER (February 11)

Cook, K. and R. Emerson (1978). "Power, Equity and Commitment in Exchange Networks." American Sociological Review **43**:721-739.

Krackhardt, D. (1990). "Assessing the Political Landscape: Structure, Cognition, and Power in Organizations." Administrative Science Quarterly **35**:342-369.

Podolny, J. M. (1993). "A Status-based Model of Market Competition." American Journal of Sociology **98**:829-872.

Stuart, T., H. Hoang, and R. Hybels (1999). "Interorganizational Endorsements and the Performance of Entrepreneurial Ventures." Administrative Science Quarterly **44:**315-349.

Recommended:

Bonacich, P. (1987). "Power and Centrality: A Family of Measures." American Journal of Sociology **92**:1170-82.

Burkhardt, M. and D. Brass (1990). "Changing Patterns or Patterns of Change: The Effects of a Change in Technology on Social Network Structure and Power." Administrative Science Quarterly **35:**104-127.

Ibarra, H. (1993). "Network Centrality, Power, and Innovation Involvement: Determinants of Technical and Administrative Roles." Academy of Management Journal **36**:471-501.

Uzzi, B. (1996). "The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect." American Sociological Review **61**:674-698.

Podolny, J. and D. Phillips (1996). "The Dynamics of Organization Status," Industrial and Corporate Change **5**: 453-371.

Smith, E., Bothner, M, and Y. Kim (2012). "How Does Status Affect Performance? Status as an Asset versus Status as a Liability in PGA and NASCAR." Organization Science, **23**:416-433.

Session 5 NETWORK EVOLUTION / TIE ANTECEDENTS (February 18)

Gulati, R. and M. Gargiulo (1999). "Where do Interorganizational Networks Come From?" American Journal of Sociology **104**: 1439-1493.

Moody, J. (2001). "Race, School Integration, and Friendship Segregation in America." American Journal of Sociology **107**(3): 679-716.

Reagans, R. (2005). "Preferences, Identity and Competition: Predicting Tie Strength from Demographic Data." Management Science **51**:1374-1383.

Kleinbaum, A. (2012). "Organizational Misfits and the Origins of Brokerage in Intrafirm Networks." Administrative Science Quarterly **57**: 407-452.

Recommended:

Walker, G., B. Kogut, and W. Shan (1997). "Social Capital, Structural Holes and the Formation of an Industry Network." Organization Science **8**(2): 109-125.

Chung, S., H. Singh and K. Lee (2000). "Complementarity, Status Similarity and Social Capital as Drivers of Alliance Formation." Strategic Management Journal **21**: 1-22.

Hinds, P., K. Carley, D. Krackhardt and D. Wholey (2000). "Choosing Work Group Members: Balancing Similarity, Competence and Familiarity." Organizational Behavior and Human Decision Processes **81**: 226-251.

Rosenkopf, L., Metiu, A. and V. George (2001). "From the Bottom Up: Technical Committee Activity and Alliance Formation." Administrative Science Quarterly **46**: 748-772.

Mollica, K., B. Gray and L. Trevino (2003). "Racial Homophily and its Persistence in Newcomers' Social Networks," Organization Science **14**: 123-136.

Baum, J., A. Shipilov and T. Rowley (2003). "Where Do Small Worlds Come From?" Industrial and Corporate Change **12**:697-725.

Klein, K., B. Lim, J. Saltz and D. Mayer (2004). "How Do They Get There: An Examination of the Antecedents of Network Centrality in Team Networks." Academy of Management Journal **47**: 952-963.

Powell, W., D. White, K. Koput and J. Owen-Smith (2005). "Network Dynamics and Field

Evolution: The Growth of Interorganizational Collaboration in the Life Sciences." American Journal of Sociology **110**:1132-1205.

Rosenkopf, L. and G. Padula (2008). "Investigating the microstructure of network evolution: Alliance formation in the mobile communications industry," Organization Science, **19**:669-687.

Ahuja, G., F. Polidoro and W. Mitchell (2009). "Structural Homophily or Social Asymmetry? The Formation of Alliances by Poorly-Embedded Firms," Strategic Management Journal **30**:941-958.

Gulati, R., Sytch, M., and A. Tatarynowicz (2012). "The Rise and Fall of Small Worlds: Exploring the Dynamics of Social Structure." Organization Science **23**:449-471.

M. Schulte, M., Cohen, A. and K. Klein (2012). "The Coevolution of Network Ties and Perceptions of Team Psychological Safety." Organization Science **23**:564-581.

Session 6 NETWORK ACTIVATION
(February 25)

Casciaro, T. and M. Lobo (2008). "When Competence Is Irrelevant: The Role of Interpersonal Affect in Task-Related Ties." Administrative Science Quarterly **53:**655-684.

Singh, J., Hansen, M. and J. Podolny (2010). "The World Is Not Small for Everyone: Inequity in Searching for Knowledge in Organizations." Management Science **56**:1415-1438.

Smith, E., Menon, T. and L. Thompson (2012). "Status Differences in the Cognitive Activation of Social Networks." Organization Science **23**:67-82.

Srivastava, S. (2012). "Organizational Restructuring and Social Capital Activation." Working paper. (UPDATE)

Recommended:

Granovetter, M. (1973). "The Strength of Weak Ties." American Journal of Sociology **78**:1360-1380.

Fernandez, R., E. Castilla and P. Moore. (2000). "Social Capital at Work: Networks and Employment at a Phone Center." American Journal of Sociology **105**:1288-1356.

Yakubovich, V. (2005). "Weak Ties, Information and Influence: How Workers Find Jobs in a Local Russian Labor Market." American Sociological Review **70**:408-21.

Session 7 GRAB BAG, ARTICLES TBD
(March 4)