

Networks, Network Analysis & Business Relevance

Setting Expectations for SMM638

SMM638 Network Analytics

2025-10-06

What Are Networks?

Networks are structures of interconnected entities

- Entities are interconnected via specific **relationships**
- **Examples of relationships** are:
 - Resource flow (e.g., economic exchange)
 - Information exchange (e.g., electronic communication)
 - Physical connection (e.g., London tube)
 - Membership (e.g., student-program affiliation)

Note

Networks and graphs are interrelated yet distinct concepts: graphs are mathematical constructs, while networks regard concrete relationships between entities that can be represented using graphs

What to Expect: Network Analysis

Network Analysis Tools	Real-world Examples
Visualize complex relationship patterns	Associations between subreddits on Reddit
Identify influential nodes and key positions	Opinion leaders in organizations and platforms

Network Analysis Tools	Real-world Examples
Detect network sub-components and communities	Communication silos in teams
Understand information flows and diffusion	Impact of Tube station closures on connectivity
Explain properties of complex systems quantitatively	Distribution of popularity in cultural markets

Network Analysis Skills

Key skills you'll develop:

- Network data collection, wrangling, and structuring
 - Computing various network indicators
 - Statistical analysis of network data
 - Creating meaningful network visualizations
 - Translating insights into business strategy
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Networks in Markets

Information Flow

- Product reviews and recommendations spread through networks¹
- Market intelligence travels via professional connections
- Innovation diffuses along network pathways



¹Oestreicher-Singer, Gal, and Arun Sundararajan. *Recommendation networks and the long tail of electronic commerce*. MIS Quarterly (2012): 65-83.

Networks in Markets

Trust and Transaction Costs

- Trust networks reduce monitoring costs and increase task focus²
- Established relationships lower search costs for new business partners
- Repeat interactions enable efficient exchange and coordination among parties



Networks in Markets

Platform Economy's Network Structure

- Platform economics is predicated around the value of connections³
- Network effects drive scaling (how to leverage networks to get attention?)
- An ecosystem's advantage relies on networks (e.g., Android is more than an operating system, it's a complex network of firms, developers, and customers)

²Uzzi, B., & Dunlap, S. (2005). *How to build your network*. Harvard Business Review, 83(12), 53.

³Belleflamme, P., & Peitz, M. (2021). *The economics of platforms*. Cambridge University Press.

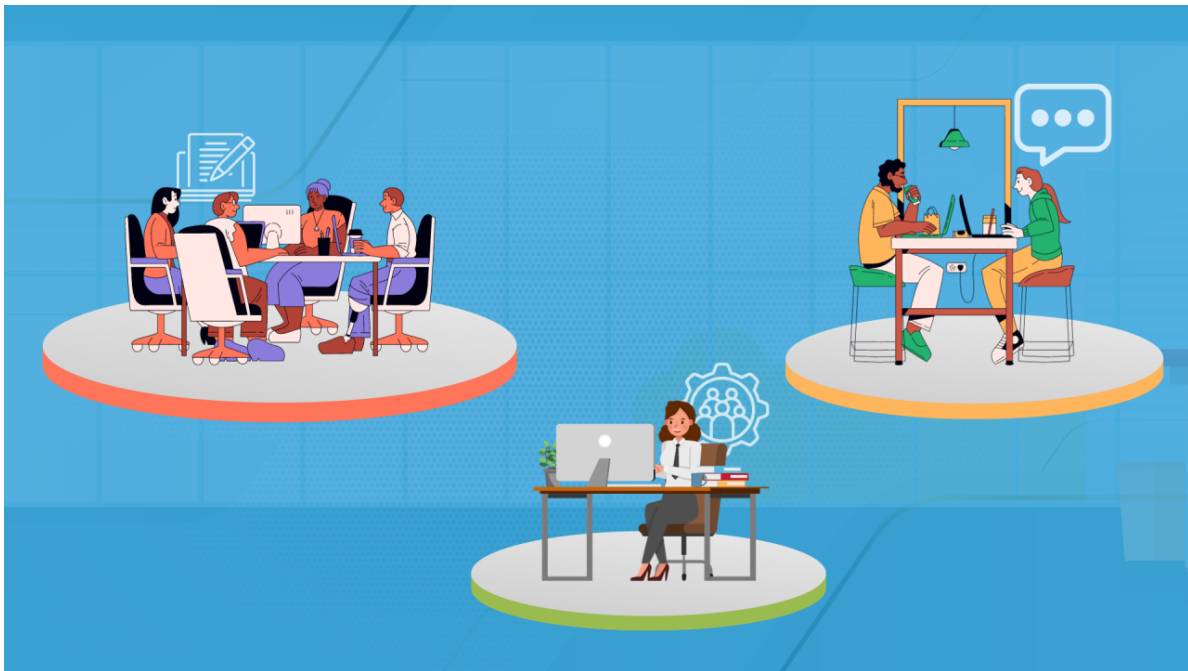


Networks in Organizations

Knowledge Resides in Networks

Organizational Network Analysis allows analysts to understand:

- Knowledge locus and knowledge sharing
- Innovation through diverse connections
- Problem-solving via boundary-spanning ties



Networks in Organizations

Teams Function through Networks

- Collaboration patterns affect performance⁴
- Informal advice networks complement formal structure⁵
- Communication efficiency depends on network position



Networks in Organizations

Networks Enable Strategy

- Sparsely connected networks offer value creation opportunities⁶
- Those who connect otherwise disconnected groups have information advantages⁷
- Central nodes have influence and power⁸

⁴Gratton, L., & Erickson, T. J. (2007). *Eight ways to build collaborative teams*. Harvard Business Review, 85(11), 100.

⁵Cross, R., Ehrlich, K., Dawson, R., & Helerich, J. (2008). *Managing collaboration: Improving team effectiveness through a network perspective*. California Management Review, 50(4), 74-98.

⁶Burt, R. S. (2005). *Brokerage and closure: An introduction to social capital*. Oxford University Press, USA.

⁷Burt, R. S. (2004). *Structural holes and good ideas*. American Journal of Sociology, 110(2), 349-399.

⁸Battilana, J., & Casciaro, T. (2013). The network secrets of great change agents. *Harvard Business Review*, 91(7), 62-68.



PENGUIN CLASSICS

NICCOLÒ MACHIAVELLI

The Prince

A new translation by TIM PARKS

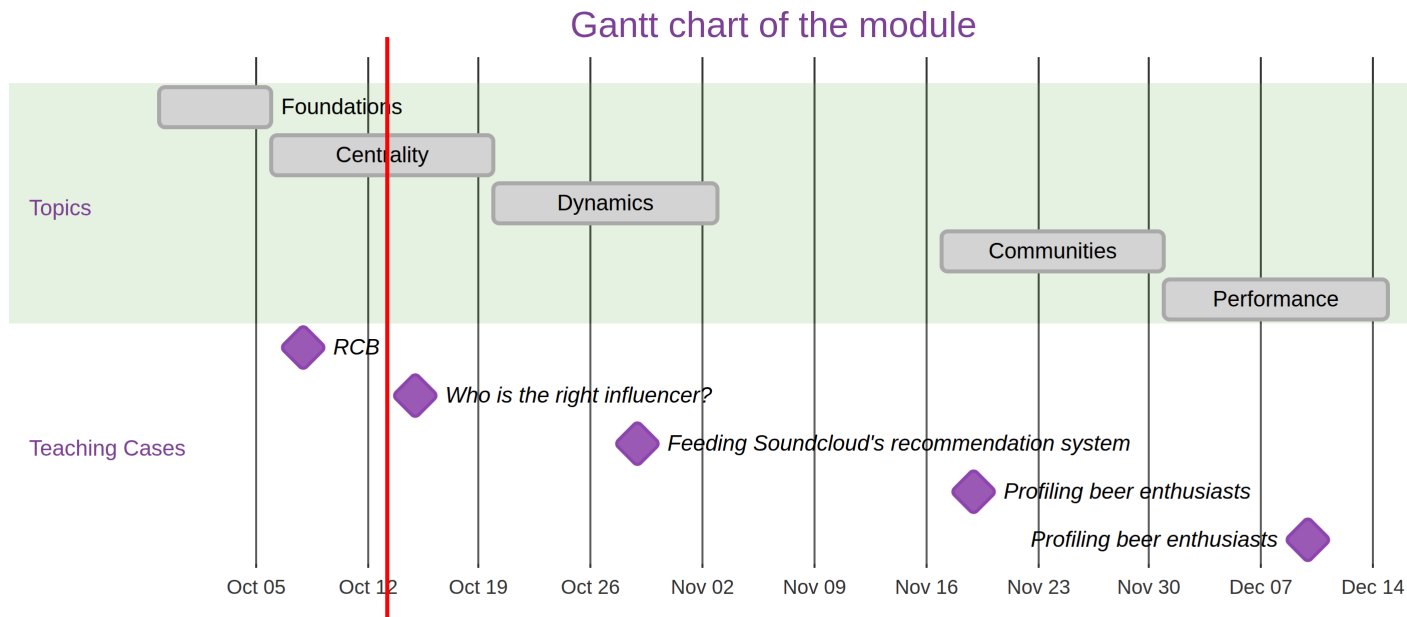
Your Learning Journey

Timeline

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  Centrality :active, topic2, 2025-10-06, 14d
  Dynamics   :topic3, 2025-10-20, 14d
  Communities:topic4, 2025-11-17, 14d
  Performance:topic5, 2025-12-01, 14d

  section Teaching Cases
  RCB: crit, milestone, case0, 2025-10-08, 0d
  Who is the right influencer?:crit, milestone, case1, 2025-10-15, 0d
  Feeding Soundcloud's recommendation system:crit, milestone, case2, 2025-10-29, 0d
  Profiling beer enthusiasts:crit, milestone, case3, 2025-11-19, 0d
  Profiling beer enthusiasts:crit, milestone, case4, 2025-12-10, 0d
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Practical Focus

- Real business cases (e.g., RCB fraud detection, marketing through Twitch)
- Hands-on coding in R and Python
- Actionable insights for business decision-making