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)

i 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
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

Networks in Markets

Information Flow

- Product reviews and recommendations spread through networks[1]
- Market intelligence travels via professional connections
- Innovation diffuses along network pathways

[1] Oestreicher-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 focus[2]
- Established relationships lower search costs for new business partners
- Repeat interactions enable efficient exchange and coordination among parties

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

Networks in Markets

Platform Economy's Network Structure

- Platform economics is predicated around the value of connections[3]
- 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)

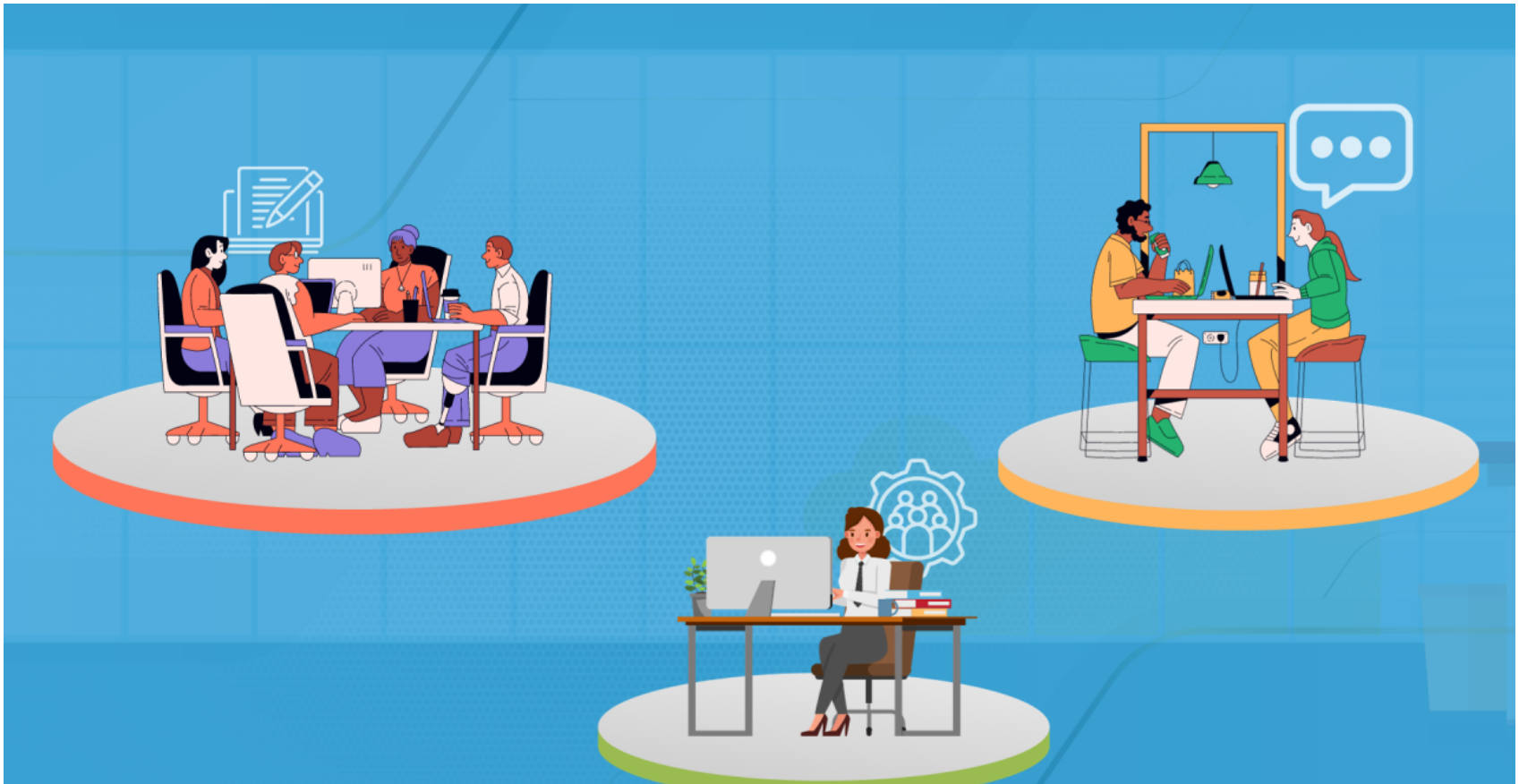
[3] Belleflamme, P., & Peitz, M. (2021). *The economics of platforms*. Cambridge University Press.

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 performance[4]
- Informal advice networks complement formal structure[5]
- Communication efficiency depends on network position

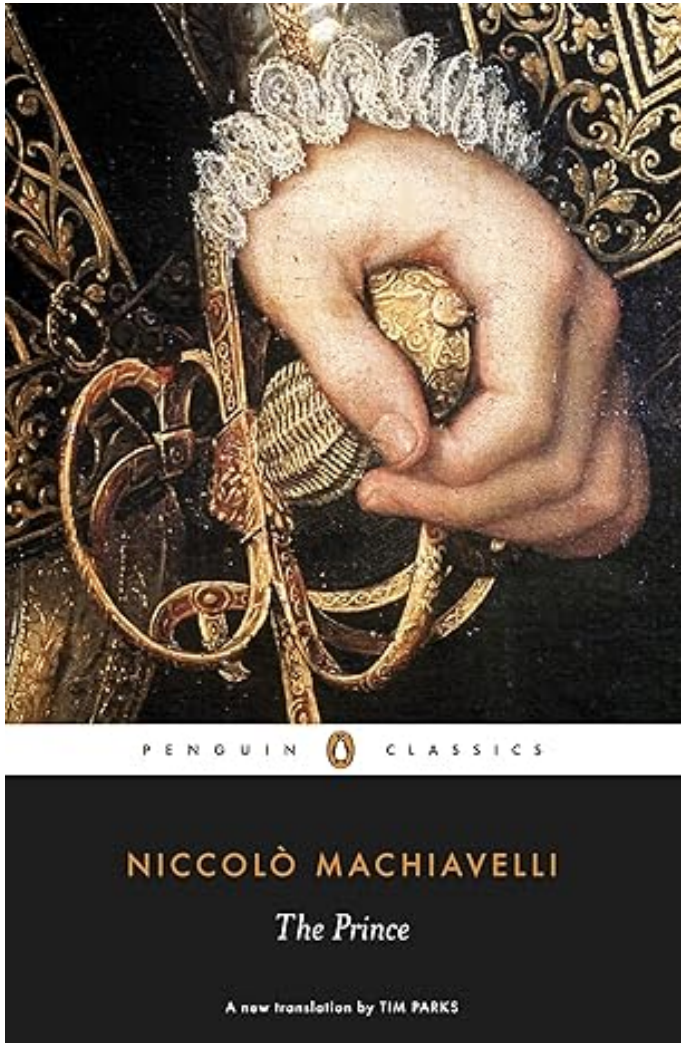
[4] Gratton, L., & Erickson, T. J. (2007). *Eight ways to build collaborative teams*. Harvard Business Review, 85(11), 100.

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

Networks in Organizations

Networks Enable Strategy

- Sparsely connected networks offer value creation opportunities[6]
- Those who connect otherwise disconnected groups have information advantages[7]
- Central nodes have influence and power[8]



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

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

[8] Battilana, J., & Casciaro, T. (2013). The network secrets of great change

Your Learning Journey

Timeline

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    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, 20
    Feeding Soundcloud's recommendation system:crit, milest
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