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# Methodological Issues in Innovation Diffusion Research

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# Editorial Perspectives on Diffusion Research

- We have come a long way in understanding IT adoption and diffusion *but...*
    - ❑ *Research is focused on few themes and there is a need to broaden the scope*
    - ❑ *Not much diffusion but more of technology acceptance and adoption, some assimilation/implementation research*
    - ❑ *Continues to be primary empirical, largely self reported survey based data.*
    - ❑ *Structural model (PLS, AMOS) have become more or less the norm*
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# Potential opportunities

- Diffusion models
    - Very limited published work in IS that does diffusion modeling
      - Individuals/consumers
      - Firms
  - Social network perspective on diffusion
    - Some research focused on technology acceptance
    - Need for using SNA to address other firm level and individual level diffusion issues
  - Simulation as a methodology for diffusion research
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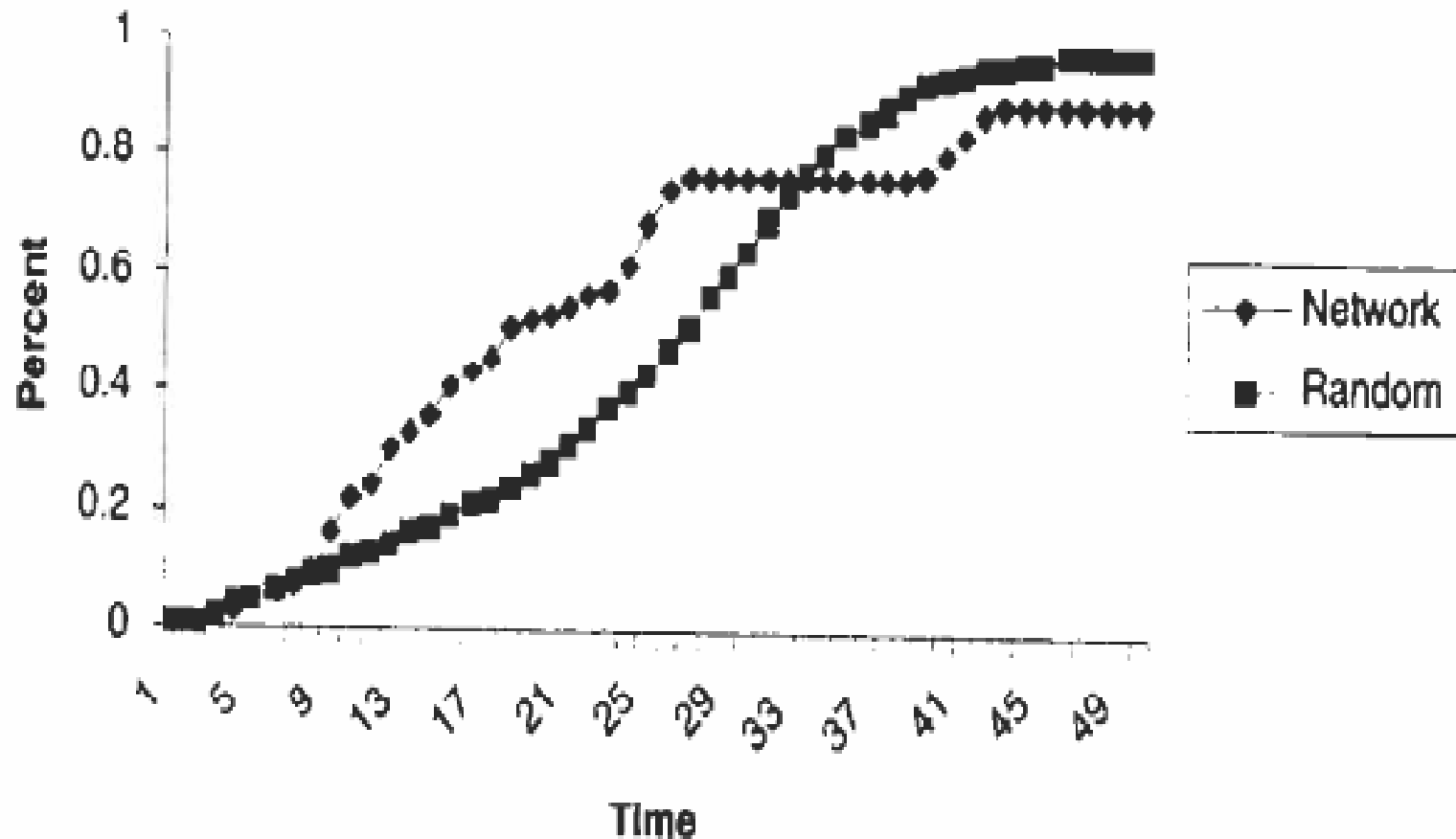
# Innovation Diffusion Models

- Macro diffusion models
    - Internal influence, external influence and mixed influence models [Bass, (1969), Mahajan & Peterson (1985)]
  - Bandwagon Theories
    - Increasing return theories (Profitability bandwagon pressures)
    - Learning theories (Informational bandwagon pressures)
    - Fad theories (Social bandwagon pressures)
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# Why a Social Network Perspective

- Complements other theoretical perspectives
  - DOI theory assumes perfect social mixing
  - Bandwagon theories assume that all potential adopters experience the same bandwagon pressures at a time period
    - Social network structure could influence the strength of the bandwagon pressure felt by a potential adopter.
- Allows for a micro examination of how diffusion occurs

# Diffusion Pattern in Random versus Moderately Dense Network

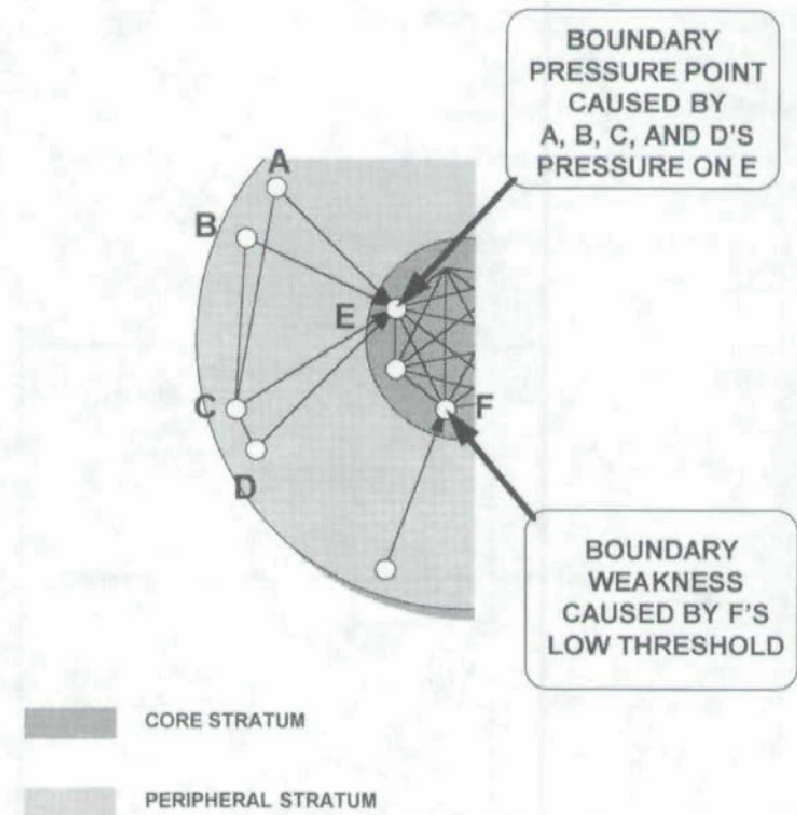


# Network Topologies and Innovation Diffusion

- How does network topologies influence the diffusion process
    - Small world networks/ scale free networks
    - Core- periphery structure
    - Pressure points and weakness points in the networks and their location
  - How does network structure influence the diffusion process
    - Dense versus sparse networks
    - Structural holes
    - Tie diversity, tie strength
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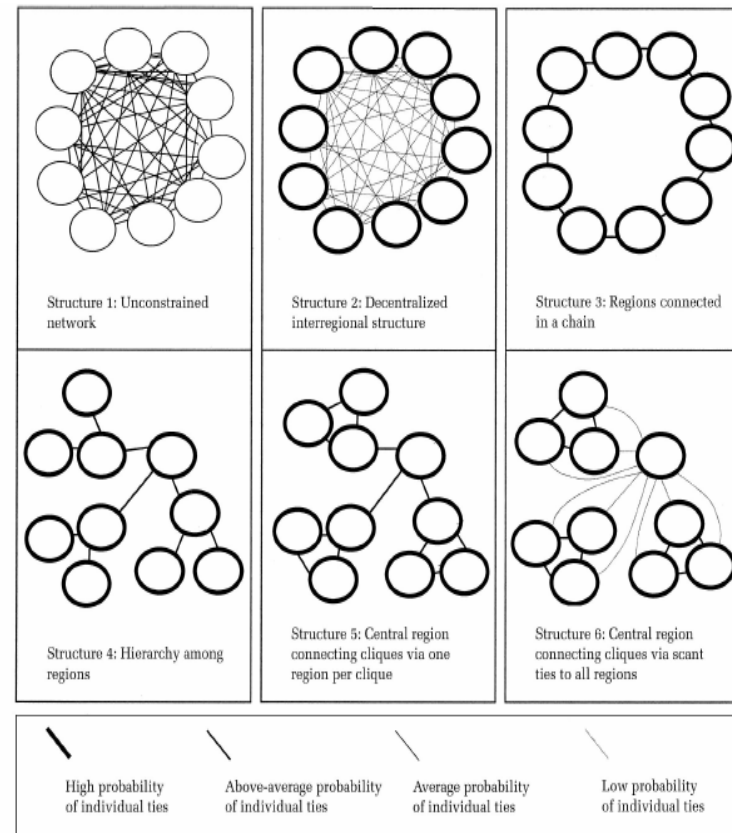
# Network Topologies and Diffusion

- How does network topologies influence innovation diffusion?
  - Network density → Bandwagon adopters
  - Pressure points → Bandwagon adopters
  - Weakness points → Bandwagon adopters
  - Pressure and weakness points will have greater effect on diffusion in lower density networks



# Network Structures and Diffusion

- How do innovations diffuse across differently structured regional networks of firms?
- How does variation in the partnering tendencies of firms influence diffusion?
- How do innovation characteristics such as benefit observability influence diffusion



# Why simulation?

- Is a very common methodology in SNA and diffusion research
    - Abrahamson and Rosenkopf, 1997, Deroian 2002, Gibbons 2004, Valenti, 2005, Zhong & Ozdmir, 2010
  - Data availability is an issue
    - Network structure data can be easily obtained in some contexts, but actor behaviors are difficult to measure
    - Long time horizon needed to observe the diffusion process
    - Comparing different network structures requires tapping into comparable multiple social systems.
  - Data availability a bigger problem for firm level studies than for individual level studies
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# Why Simulation

- Useful methodology to answer some potentially interesting questions
    - Do opinion leaders matter more than susceptible members in the diffusion process
      - Does this vary for different types of innovations
      - Does this vary across different stages in the diffusion process
    - How do negative externalities such as over exposure influence the diffusion process?
      - How does this vary for different types of innovations
      - Do some network structures mitigate the effects of such externalities
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# Summary

- Many opportunities for extending the boundaries of diffusion research in IS
    - How do innovations diffuse through online social networks?
      - Within organizations and across organizations
    - How do inter-firm networks influence innovation adoption
    - How do the structure of inter-firm networks explain the adoption and acceptance of radical innovations
      - Do radical innovations happen in the periphery and trickle up?
  - Simulation is a potential methodology that is under used in IS research
    - Has been widely used in engineering and physical sciences
    - Gaining acceptance in management research
    - Especially useful for explorative work
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