Modeling dynamic network evolution in the context of strategic change

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Research question

- network evolution has been understood from the perspective of individual preferences and action
- how does organizational strategic change shape individual discretionary choice and the evolution of the interpersonal network?

Main argument

- previous research: Δ G = f (homophily, propinquity, agency) + ε
- contribution: Δ G = f (homophily, propinquity, agency, formal) + ε

Research approach - simulation

- ideal approach impractical - performance data for a number of firms implementing a strategic change
- simulation approach - exogenous stimuli for multiple agents across multiple levels

Genetic algorithm

1. generate an “ideal” network (n x n)
2. generate an organization (n x n) with m strategies about the unknown “ideal” network
3. calculate a composite organizational strategy as the “desired” network
4. generate n individuals with p beliefs about their optimal interdependencies
5. calculate a composite belief for each individual
6. form the “actual” network using two-sided matching on the composite beliefs
7. calculate the fitness of the organization’s “desired” network, and the “actual” network using Hamming distance from the “ideal”
8. calculate the fitness of, and rank the organization’s strategies and each individual’s beliefs
9. select two parents from the organization’s strategies, and from each individual’s beliefs
10. perform cross-over and mutation of the parents
11. replace parents with mutated offspring
12. reproduce the “desired” and “actual” networks and return to #7

Figure 1: Evolution of the “actual” network relative to management’s “desired” network and the environment’s preference

“Desired” (t=0)

“Actual” (t=0)

“Desired” (t=157)

“Actual” (t=157)

“Desired” (t=388)

“Actual” (t=388)

Figure 2: Two-sided matching with the “actual” network

Key findings

- individuals and the organization learn
  - individuals
  - organization matters for network evolution
  - learn more quickly than management
  - show heterogeneity
  - organization
  - learns based upon behavior of individuals
  - strategy evolves in implementation
- simulation
  - random assignment reduces endogeneity at the expense of generalizability
  - parameters require validation

Future projects

- brokers as chameleons: how brokers affect two-sided matching
- first-in gets the most out: the timing of network entrepreneurial opportunities
- the power of 3: an NK-landscape model of network evolution (job-market paper)
- informality rising: organizational strategy, identity, and networks (dissertation chapter)

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Further information

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I will be on the job market in 2014/15