Organizational Learning in Interpersonal Networks: Models and Some Preliminary Thoughts on Experiments

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Agenda

• 1. March 1991

• 2. Quick review of some of my work on Organizational Learning in Interpersonal Networks
  – Marriage between ‘Network Science’ and March 1991

• 3. Some very preliminary thoughts on experiments
March (1991)

• **Exploitation:**
  
  – Learn fast $\rightarrow$ higher efficiency
  
  – But leads to premature convergence on a homogeneous set of ideas

  – *lower overall performance*

• **Exploration:**
  
  • Learn slow $\rightarrow$ lower efficiency
  
  • Allows the organization to preserve more diversity of individual ideas

  • *higher overall performance*
Tradeoff between diffusion and performance

• Individuals that rapidly identify and adopt higher performing ideas from others learn efficiently

• However, too rapid diffusion of higher performing beliefs through a population eliminates variety

• → lower organizational performance in the long run (March, 1991).
Indirect Learning

Organizational Code
Learning – from whom?
Direct, interpersonal Learning

Organizational Code
Interaction Pattern matters
How does network structure matter for learning and performance?

• Available evidence on the association between structural configurations and organizational learning is still limited
  – Argote, McEvily and Reagans, 2003; Reagans and McEvily, 2003
Some preliminary ‘answers’:

• 1. How much cross-group linkage is good and why?
  – Fang, Lee and Schilling, OS, 2010

• 2. How much ‘hubbiness’ is good and why?
  – Schilling and Fang, SMJ, online

• 3. Which growth logics is best and why?
  – Links, distance, performance, beliefs
  – Fang, 2014.
1. Are cross-group linkings good?

Fang, Lee and Schilling, OS, 2010

a) Nearly-isolated subgroup structure

b) Semi-isolated subgroup structure with randomly rewired links

c) Random network: Network structure without subgroup identity
1. Are cross-group linkings good?

Fang, Lee and Schilling, OS, 2010

- Tradeoff between diffusion of good ideas and depletion of variety
- A small number of cross-group links yields the highest performance
2. Are hubs good and why?

Schilling and Fang, Strategic Management Journal, 2013
2. Networks with Varying Degree of Hubbiness

Moderately hubby networks perform the best
3. Which growth logics is best and why?

• Networks evolve following distinctive growth logics
  • Preferential attachment (Barabasi and Albert, 1999)
    – Existing number of links – *The rich gets richer*
    – Distance – homophily *Birds of a feather flock together*
    – Performance – *Learn from the elite*
  • Uniform – *Random*
Consistent findings: Inverted U

Performance

Organizational Structure

α = 0  α = 1  α = 2  α = 3  α = 4  α = 5
What does this degree of ‘connections’ capture?

• Opportunity to exchange ideas and learn

• As a result, individual performance improves

• Yet, the aggregate mixture of ideas evolves
  – Deviant/inferior performing ones are eliminated
Importance of diversity in complex problems

- Imagine two individuals:
  - A: everything but the last two digits correct (8)
  - B: nothing but the last two digits correct (2)

- Q: Whose beliefs will be copied and ‘spread’ to the population?
- Knowledge about the last two digits ‘LOST’ as a result of learning
Next step?

• Is this mechanism at work in real life settings?

• Do networks of real individuals behave in a way as predicted by the models?

• Model + Experiments could potentially yield powerful insights
Contributions from Cognitive Science

- Researchers from cognitive science have made some earlier forays, among them Thomas Wisdom, Winter Mason, Duncan Watts etc.

- However, their work are less satisfying from our point of view because:
  - Not motivated by a desire to test model mechanism
  - The set up does not correspond with the model perfectly
Correspondence between model and experiment

**Networks**
- Varying characteristics: cross group links, hubbiness or logics

**Payoffs**
- Needs a problem with some degree of complexity:

**Learning**
- Model: learning from superior others
- Experiment: Strategies to be inferred from subject behavior
Wisdom and Goldstone, 2011

Fig. 1. Examples of randomly generated goal pictures in the experimental task.
Subjects can see (and copy) their neighbors...
Subjects to be arranged in …

i) Very hubby; \( \alpha = 0 \)

ii) Moderately hubby; \( \alpha = 2 \)

iii) Democratic; \( \alpha = 5 \)
Q: Do we observe this diffusion vs performance tradeoff?

- We don’t know yet! Stay tuned...

- Very preliminary, comments welcome.
Thank you