Innovation diffusion as a coevolutionary process: adaptive emulation among firms and consultants

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Faddish cycles in management

- Rapid rise and fall in the popularity of a management technique
- A transitory collective belief that a certain technique is at the forefront of rational management progress
- Explanations are offered by Barley and Kunda, Abrahamson, Strang and Macy, and others…
TQM’s discourse cycle

FIGURE 1
TQM Discourse

- All publications
- Specialized publications
- Nonspecialized publications

Number of Articles in ABI/Inform

Year:
- 1988
- 1989
- 1990
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002

450
400
350
300
250
200
150
100
50
0
Adaptive Emulation
(Strang and Macy 2001)

• Firms are seeded with an innovation
• In each period, they examine their performance (which may be affected by the innovation)
• If their performance is poor, the firm is likely to abandon its innovation and select a new one
• Abandoners either adopt the innovation of their most successful peer, or draw randomly from the pool of possible innovations
Key factor in adaptive emulation: innovation effectiveness (contra DiMaggio & Powell 1983)

• When innovations are all worthless, no innovation becomes popular
• When innovations have a small impact on performance, faddish cycles arise
• When innovations have a large impact, one innovation becomes stably dominant
What about management consultants?
Abrahamson (1996): Fashion Setters

FIGURE 4
The Management-Fashion-Setting Process
Management Fashion Market

Launching of Management Fashions by Management Fashion Setters
Processing and dissemination of management rhetorics championing selected techniques

Sensing of Management Fashion Demand by Management Fashion Setters
Creation and selection of management techniques to launch into fashion

Sociopsychological and Technoeconomic Forces
Ernst & Kieser (2001): Demand for Consultants

Figure 3.1 A model for the explanation of the consulting explosion
David & Strang (2006): Coevolving Streams in Management Fashion

<table>
<thead>
<tr>
<th>Period</th>
<th>Discourse</th>
<th>Organizational Adopters</th>
<th>Consulting Firms</th>
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<tbody>
<tr>
<td>Preboom, 1982–83</td>
<td>Little media attention</td>
<td>Few adopters</td>
<td>Small consulting pool</td>
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<td></td>
<td>Direct contacts within an incipient network of adopters and suppliers</td>
<td>Prominent firms where technical fit is good</td>
<td>Quality specialists and gurus</td>
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<td>Customized programs</td>
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<tr>
<td>Boom, 1989–93</td>
<td>High and rising volume of generalized discourse, aimed at general managers</td>
<td>High levels of program adoption and usage</td>
<td>Large consulting pool</td>
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<td></td>
<td>Loose usage with vague prescriptions</td>
<td>Widely distributed across the business community</td>
<td>Many generalists and firms lacking expertise</td>
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<tr>
<td></td>
<td>Exaggerated claims and success stories</td>
<td>Ceremonial and conforming programs</td>
<td></td>
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<tr>
<td>Bust, 1994–present</td>
<td>Low and falling volume of generalized discourse</td>
<td>Moderate levels of program adoption and usage</td>
<td>Medium-sized consulting pool</td>
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<td></td>
<td>Continuing technical discussion within practitioner and academic community</td>
<td>Case study evidence of program maturation</td>
<td>Specialists with quality expertise</td>
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<td>Attacks on excesses of the boom combined with focus on better implementation</td>
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Adding consultants to adaptive emulation

- Consultants can influence the diffusion of management techniques in two ways
  - As advertisers/persuaders
  - As program implementers

- Consultants also adopt & abandon management techniques, forming a dynamic supply side that interacts with firm-level demand
Update a Firm

- At iteration $i$, each firm compares its outcome to $(\text{ASPIRATION\_LEVEL} \times \text{MAX\_Outcome})$, if the former is less than the latter:
  - With a probability equal to $\text{MIMIC\_PROBABILITY}$, it follows the imitation rule and adopts the proper innovation
  - Otherwise, it randomly picks an innovation from those offered by consultants
  - The firm finds and employs a consultant that offers this new innovation
At iteration i, each consultant compares its outcome to (ASPIRATION_LEVEL * Outcome of the most successful consultant), if the former is less than the latter:
  – With a probability equal to MIMIC_PROBABILITY, it follows the imitation rule and adopts the proper innovation
  – Otherwise, it picks an innovation randomly
• The consultant’s experience with its innovation is incremented by a unit
Firm Outcomes

\[ O_{ft} = \alpha V_i^\beta Q_c^\gamma E_{cit}^\zeta + (1 - \alpha) \varepsilon_{ft} \]

- \( O_{ft} \): Outcome of firm f at time t
- \( V_i \): Performance value of innovation i
- \( Q_c \): Quality of consultant c
- \( E_{ct} \): Experience of consultant c with innovation i at time t
- \( \varepsilon_{ft} \): Luck (noise) for firm f at time t
Consultant Outcomes

\[ P_{ct} = \alpha \cdot \frac{\sum_{f \in F} z_{fct}}{|F|} + (1 - \alpha) \cdot \varepsilon_{ct} \]

- \( z_{ft} = \begin{cases} 
1 & \text{if firm } f \text{ is working with consultant } c \text{ at time } t \\
0 & \text{otherwise} 
\end{cases} \)
- \( F \): Set of all firms
- \( |F| \): Total number of firms (cardinality of \( F \))
- \( \varepsilon_{ct} \): Luck (noise) for consultant \( c \) at time \( t \)
- \( \alpha, (1 - \alpha) \): Relative weights of predictable factors and luck (noise)
Alternative Imitation Rules

• Firm adopts ...
  – The innovation used by the most successful firm
  – The most popular innovation among firms
  – The most popular innovation among consultants

• Consultant adopts ...
  – The innovation used by the most successful consultant
  – The most popular innovation among firms
  – The most popular innovation among consultants
Popularity of Leading Innovations

Average values for trials over noise 0..100

Firm aspiration = 80, Mimic = 80
Turnover in Leading Innovations

Average values for trials over noise 0..100

Firm aspiration = 80, Mimic = 80
Performance

Average values for trials over noise 0..100

Firm aspiration = 80, Mimic = 80

- Innovation merit
- Consultant quality
- Consultant experience
- Innovation merit..consultants advertise

Performance values over noise range 0 to 100.
Some regularities (1)

• If effectiveness lies in consultants rather than innovations, previously stable worlds become faddish

  – Why? Unlike innovations, consultants form a moving target

  – Why? Unlike innovations, consultants require a learning curve
Some regularities (2)

• Consultants are more volatile than firms

  – Why? They differentiate based on market share rather compete on efficiency
  – As a result, scenarios where consultants persuade firms to pursue innovations are more faddish than scenarios where they affect firms via implementation
Next steps

• Tweak ... Functional form of abandonment decision, innovate/imitate decision, firm/consultant match, ??
• Modify ... Process by which consultants persuade firms to pursue new innovations, ??
• Learn from ... Full-fledged models of predator/prey interactions, ??