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Coevolution in Management Fashion: An Agent-Based Model of Consultant-Driven Innovation¹

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The rise of management consultancy has been accompanied by increasingly marked faddish cycles in management techniques, but the mechanisms that underlie this relationship are not well understood. The authors develop a simple agent-based framework that models innovation adoption and abandonment on both the supply and demand sides. In opposition to conceptions of consultants as rhetorical wizards who engineer waves of management fashion, firms and consultants are treated as boundedly rational actors who chase the secrets of success by mimicking their highest-performing peers. Computational experiments demonstrate that consultant-driven versions of this dynamic in which the outcomes of firms are strongly conditioned by their choice of consultant are robustly faddish. The invasion of boom markets by low-quality consultants undercuts popular innovations while simultaneously restarting the fashion cycle by prompting the flight of high-quality consultants into less densely occupied niches. Computational experiments also indicate conditions involving consultant mobility, aspiration levels, mimic probabilities, and client-provider matching that attenuate faddishness.

The contemporary organizational world is marked by the wavelike rise and fall of management techniques. As Lynne Zucker commented presciently in

¹ Previous versions of this research were presented at the annual meetings of the Academy of Management, European Group for Organizational Studies, and Innovation in

the late 1980s, “Few innovations are widely adopted, by organizations or elsewhere, with most looking more like the sociological characterization of ‘fads’ than social change” (1988, p. 26). Recent scholarship has devoted much attention to modeling these faddish cycles of adoption and abandonment. Theoretical models of the processes that can generate wavelike diffusion include herding (Banerjee 1992), bandwagoning under uncertainty (Abrahamson and Rosenkopf 1993), and adaptive emulation (Strang and Macy 2001). Empirical studies of management fads range from network models of adoption (Westphal, Gulati, and Shortell 1997) to analysis of the ebb and flow of managerial discourse (Abrahamson and Eisenman 2008).

Supply-side actors—whom we call “consultants” as shorthand though they may include gurus, academics, and advisers of various kinds insofar as they work with demand-side adopters—play a crucial role in constructing, promoting, and implementing management techniques. No history of quality circles, for example, would be complete without Wayne Rieker, Don Dewar, and Jeff Beardsley, who observed Japanese quality control circles in situ, developed the first American-style circle program at Lockheed Aerospace, founded the International Association of Quality Circles, and then took their acts on the road as independent consultants. No account of best-practice benchmarking would be complete without Robert C. Camp, the logistics expert at Xerox who conducted the company’s first external study visit and played the lead role in disseminating benchmarking within Xerox and later as author and founder of a consulting firm.

While empirical research is beginning to bring the activities of the world’s “idea merchants” into focus (e.g., Clark 1995; Jackson 2001; Kieser 2002; Heu-sinkveld and Benders 2005; Perkmann and Spicer 2008), the role of actors who construct and implement novel techniques—the suppliers of management fashion—remains undertheorized. Formal models of innovation adoption and abandonment generally suppose that techniques sell themselves and that firms talk only to each other. Demand for a better mousetrap is explicitly represented while supply is left implicit.

This article seeks to redress the imbalance by bringing the supply side of organizational innovation into the equation. The model of adoption and abandonment investigated here centers on the interaction between two populations: consultants that develop and implement novel practices and firms that adopt these practices. Building on Strang and Macy’s (2001) adaptive

Professional Service Firms, Oxford University, and at Harvard University, New York University, and the University of Chicago. The authors thank Matt Bothner, Ron Burt, Daniel Della Posta, Paul Ingram, Natalia Levina, Patrick Park, Felix Reed-Tsochas, Andrew Sturdy, Elizabeth Yoon, Ezra Zuckerman, and the *AJS* reviewers for their helpful comments. Robert David acknowledges generous funding from the Cleghorn Faculty Scholar Award, which he holds. Direct correspondence to David Strang, Department of Sociology, Cornell University, Ithaca, New York 14853. E-mail: ds20@cornell.edu

emulation framework, we treat both firms and consultants as chasing the secrets of success by mimicking their highest-performing peers. The fates of the two sets of actors are fundamentally intertwined, however, since firms rely on consultants to realize the benefits of novel techniques while consultants rely on firms for their bread and butter. Computational experiments assess the implications of coevolutionary adaptive emulation for the two interdependent populations.

From a substantive perspective, we address prevailing conceptions of the relationship between consultants and management fashion.² As detailed in the next section, much analysis suggests that consultants utilize their interstitial position and superior rhetorical gifts to foist questionable new techniques on anxiety-prone managers. While some elements of this argument are persuasive, the notion that naïve managers are simply manipulated by savvy consultants is problematic. We start instead from the assumption that both consultants and managers are cognitively constrained actors who operate in a highly competitive, causally ambiguous world. Notions of consulting wizardry, managerial gullibility, and worthless innovations prove unnecessary for the emergence of faddish cycles and, in the case of the latter, make such cycles less rather than more likely.

REVIEW OF PREVAILING ARGUMENTS: THE CRITICAL PERSPECTIVE ON MANAGEMENT FASHION

Management consultants occupy a central role in the contemporary world of organizations. Major initiatives in business, governmental, and nonprofit sectors alike are made with their assistance (David 2012). Wood's (2002) extensive survey found that 70% of firms used consultants when embarking on organizational change projects. These results are echoed by Buono (2001, p. vii), who notes that consultants have become "increasingly visible in most, if not all, organizational initiatives." As Sahlin-Andersson and Engwall (2002, p. 18) observe, consultants have "come to orchestrate the field of management" by packaging ideas "in a way that makes disseminating them to the larger publics possible."

The prominence of the consulting industry is of recent vintage. *Business Week* estimated that there was one consultant for every 100 managers in

² A note on language: Abrahamson (1996) defines "managerial fashion" as "rapid, bell-shaped swings in the popularity of management techniques . . . the product of a management-fashion setting process involving particular management fashion setters—organizations and individuals who dedicate themselves to producing and disseminating management knowledge" (p. 256). Our usage is related but distinct: we approach management fashion (or, synonymously, fads, faddish cycles) as rapid, bell-like swings that may be generated by a variety of processes. Computational experiments below treat consultant behavior as a variable whose impact on patterns of adoption/abandonment is of interest.

1965; by 1995, the ratio had reached one in 13 (McKenna 2006, p. 8). Ruef (2002) noted that the percentage of master of business administration graduates who join consultancies rose from a trickle in the 1950s to 20%–40% for elite business schools in the 1990s. The share of global gross domestic product ascribed to management consulting increased from less than 0.01% in 1970 to 0.15% in 1997 (May 1997 issue of *Consultants News*). U.S. Census Bureau data suggest linear expansion in consultancies over the last three decades (see fig. 1).

The growth of the consulting industry has been accompanied by prominent swings in management fashion, where named innovations gain widespread but temporary popularity. Carson et al. (2000) found a fourfold increase from the 1950s to the 1990s in the speed at which discussions of an innovation rise to a peak as well as a negative correlation between the length of the cycle and the year when it began. Paradigmatic management fashions such as quality circles, total quality management (TQM), and business process reengineering hail from the 1980s and later, while earlier decades were marked by slower, more segmental shifts in organizational techniques. The shift in collective dynamics has reshaped academic theorizing, which focused on institutionalization and homogeneity in the 1970s and early 1980s (Meyer and Rowan 1977; DiMaggio and Powell 1983) but by the 1990s emphasized the fragility of managerial rhetorics and practices (Barley and Kunda 1992; Abrahamson 1996).

The literature suggests a variety of mechanisms that link fashion cycles to the expansion of the consulting industry. Thematic connections are so

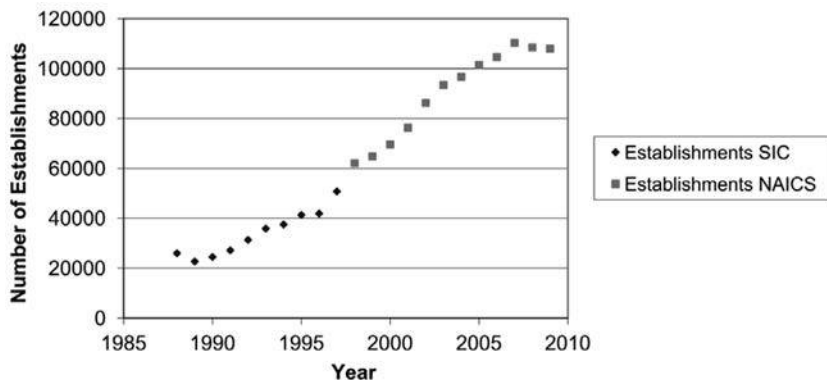


FIG. 1.—Growth in the management consulting industry (data from County Business Patterns, U.S. Census). A discontinuity between 1997 and 1998 results from a change in census codes. Values prior to 1998 (Standard Industrial Classification [SIC] coding system) are not perfectly comparable to those from 1998 onward (North American Industry Classification System [NAICS] coding) because of a widening of the management consulting category.

strong, in fact, that Abrahamson's (1996) seminal analysis defines management fashion as a supply-side-driven process. Without seeking to be exhaustive, we review a variety of these arguments to discern their general character. A top-level division separates the two subprocesses that combine to generate faddish cycles: inflationary effects that promote the widespread adoption of management techniques and deflationary effects that lead popular practices to lose their hold on the business community.

In terms of inflationary effects, first, consultants help to unleash cycles of management fashion by authoring some of the practices that gain popularity, thereby increasing the density and competitiveness of the market for organizational innovation. An early example is the Project Evaluation and Review Technique developed by Booz, Allen & Hamilton in the 1950s and disseminated to its defense industry clients. Portfolio Planning and the Growth-Share Matrix were the brainchildren of Bruce Henderson, who left A. D. Little to found the Boston Consulting Group in 1963. The Balanced Scorecard, a widely used management tool in the late 1990s and 2000s, was developed by Robert Kaplan and David Norton of Nolan, Norton & Company.

Second, consultants (re)package practices invented elsewhere to facilitate their widespread dissemination. Suddaby and Greenwood (2001) see the key activity of consultants as that of commodifying managerial knowledge: turning local, contextual responses to specific problems into generalized recipes that can be communicated and implemented across settings. Rovik (2002) finds that managerial innovations diffuse when made into a user-friendly product that is readily installed in organizations. Benders and van Veen (2001) and Heusinkveld (2014) argue that consultants devise innovations that possess interpretative viability: sufficient ambiguity and range of meaning that multiple audiences can be attracted to them for different reasons.

Third, consultants focus attention on practices whose "time has come." Their interstitial position gives supply-side actors access to the concerns of a diverse array of managers and professionals, providing insight into the approaches that are likely to be well received. Abrahamson (1996, p. 264) argues that "fashion setters sense incipient preferences guiding fashion demand" and "select those techniques that they believe will satiate this demand." In this way, consultants ease "underlying anxieties" of managers and provide a "comforting sense of order and identity and/or control" (Sturdy 2004, p. 157). In the 1980s, for example, consultants promoted Japanese management practices that spoke to widespread concerns over American industrial decline.

Finally, consultants increase the market for management innovation through their powers of persuasion. Clark (1995) developed a dramaturgical perspective on consultant-client interaction that focuses on the rhe-

torical generation of perceived threat while Kieser (2002, p. 174) notes that “in their presentation of management concepts, consultants not only provoke fear, they raise hopes.” Abrahamson (1996) argues that business discourse is framed by norms of rationality and progress that allow supply-side actors to present novel management techniques as akin to scientific breakthroughs.

If consultants popularize management innovations, how do they contribute to their downfall as well? First, the cultural labor that fosters fashion booms also facilitates fashion busts. By stressing general mechanisms and universal applicability, consultants sacrifice key contextual elements and encourage usage in inappropriate settings. Jackson (2001, p. 16) argues that popular innovations often generate a backlash because supply-siders oversimplify complex realities, resulting in a “gap between promise and practice.” Techniques designed to appeal to multiple audiences may engender confusion and conflict when put into practice (Benders and van Veen 2001). Strang (2010) finds that consulting interventions at a global bank that minimized the cost of adoption via standardized scripts, staff rather than line responsibility, and social movement-like tactics were readily abandoned when leadership changed hands.

A second mechanism is rooted in supply-side demographics. When an organizational practice’s popularity booms, a feeding frenzy emerges among managers eager to jump on the bandwagon. Irrational exuberance on the demand side precipitates an inflow of consultants into the area, including many that lack relevant skills. While many supply-side actors thereby grab a share of the market opportunity, firms are likely to experience implementation problems. David and Strang (2006) demonstrate this effect for TQM, which at the height of its popularity was a magnet for generalist consultants with little expertise in manufacturing or quality control.

Finally, consulting rhetoric and dramaturgy emphasizing novelty, norms of progress, and intensifying competition imply that the perceived value of innovations dissipates with increased usage. One might expect that popularity would promote institutionalization by confirming the utility of an innovation and reducing its cost. But if the adoption of innovations is interpreted as a means of displaying cutting-edge leadership, popularity prompts first-movers to look for new ways to distinguish themselves. Managers come to believe that they need consultants to stay ahead of the pack, resulting in an addiction in which “consultants have made [managers] marionettes on the strings of their fashions” (Kieser 2002, p. 176).

Kieser alludes here to a central implication of the argument we have sketched: consultants benefit from the instability of management fashion. Booms raise the perceived stakes for fashion consumers and thus the price of innovation, while busts restart the market. A world riven by faddish cycles of adoption and abandonment by firms is a world where consultants

charge a steep price for their services. The institutionalization of a dominant design, by contrast, would reduce returns to supply-side providers, since the need for consulting assistance diminishes as managers gain familiarity with a once-novel technique. The benefits of faddishness to supply-side actors are so apparent that some warn darkly of the consultant's quasi-magical powers. Williams (2004, p. 769), among others, denounces management consultants "as 'evil Svengalis' who bring forth contagious concepts that serve nobody except themselves."

The flip side of consulting wizardry is the notion that managers are incompetent stewards of their firm's interests. If consultants are hypnotists, managers are presumably their dupes. Scholars ascribe managerial suggestibility to status anxiety, fragmented work routines, and a cultivated interest in symbolic performance (Huczynski 1993; Kieser 1997, 2002; Clark and Salaman 1998). While commentators vary in the degree of foolishness they assign to the demand side, most view consultants as active sense givers and managers as their more passive audience (though see Sturdy [2011]). This is visible in accounts of the fashion upside, when consultants sell managers innovations they did not know they wanted, and on the downside, when postboom managers clamor for more.

Consulting wizardry and managerial incompetence are often joined to a third key idea: the notion that popular management techniques have zero or near-zero utility. Popular innovations are often described as "old wine in new bottles," dressing up timeless verities in provocative new language, or as mere common sense (Jackson 2001). Close analysis of consulting rhetoric emphasizes limitations on the practical value of consulting services (Kieser 1997; Benders and van Veen 2001; Suddaby and Greenwood 2001).

The triple pillars of consulting wizardry, managerial gullibility, and worthless innovations combine to form a cogent "critical perspective" (Clark and Fincham 2002). When a popular management technique falls out of favor, the dominant interpretation is that it must have lacked value in the first place. The spread of ineffective techniques is in turn traced to the self-interested agency of the most obvious beneficiary, the consultant. And if consultants are able to realize their interests without providing useful services, how can their clients be anything other than feckless?

While the critical perspective is provocative and in many ways compelling, it is also theoretically problematic. The weakest link is managerial gullibility. It is unclear a priori why managers would be easily and repeatedly fooled. As powerful, well-rewarded actors, managers (a term we use generically for organizational decision makers) are the winners in an elaborate selection process. The skill set of those who run organizations differs from that of those who proffer advice, generating the potential for mutually beneficial gains from trade, but it would be odd for the cognitive balance to be so lopsided.

The critical perspective also runs afoul of the collective action problem. While the consulting industry as a whole might benefit if popular management techniques proved to be short-lived, individual consultants linked to a declining technique typically lose market share in the fashion bust. As a result, carriers of a popular practice are not motivated to build in obsolescence, which might benefit their peers but harm their own life chances. They seek instead to make their services effective and long lasting, which should help them retain clients and expand their market share.

One could rescue the critical perspective by viewing managers as the consultant's coconspirators. Perhaps managers perceive the limitations of popular innovations readily enough but have nothing to gain by pointing out that the emperor has no clothes. This is one reading of Staw and Epstein (2000), who found that corporate adoption of TQM was associated with increased corporate reputation and chief executive officer compensation but not better organizational performance. The difficulty with this interpretation is that it simply shifts the location of the problem. If the manager is a con artist allied with the consultant, someone else must take his or her place as the resource-rich mark. Since corporate reputations reflect the assessments of industry insiders and CEO pay is set by boards of directors, appeals to demand-side knavery imply that the managers who adopt these practices are duping their peers. It is not plausible that those who run large organizations would be individually cynical but collectively credulous.

The model of innovation adoption and abandonment developed here thus starts not from the critical perspective but from the notions of bounded rationality and social mimicry (Cyert and March 1963; DiMaggio and Powell 1983). Consultants and managers/firms are treated as self-interested agents who lack true knowledge of causal relationships. All actors draw on observed outcomes to mimic behaviors associated with success, acting reasonably though not necessarily insightfully. Collective outcomes arise from the mutual responsiveness of members of each group to their own outcomes, the outcomes experienced by peers, and the choices of their exchange partners.

Investigation of this model can be understood as a "what if" experiment. Do consultants amplify fashion cycles in worlds where they are no more far-seeing or persuasive than managers? As an exercise in computational simulation, this article does not seek to measure the empirical capabilities of consultants and managers. Instead, we examine the dynamics produced by boundedly rational vicarious learning on both the demand side and the supply side.

COMPUTATIONAL MODEL

Computational simulation investigates postulated causal processes via the analysis of "virtual experiments" (Carley 2001). This involves the transla-

tion of a formal model into a computer program that is run repeatedly under varying conditions (e.g., alternative assumptions, different parameter values) to identify resulting outcomes (Davis, Eisenhardt, and Bingham 2007, p. 481). Computational simulation offers a “third way” of doing science (along with theoretical deduction and empirical research), one particularly suited to cases in which simple mechanisms interact in complex ways (Axelrod 1997; Harrison et al. 2007).

The basic structure of two-population adaptive emulation formulated here (and implemented as a stand-alone Java program) is as follows. In each round, (1) consultants have a current innovation they supply; (2) firms have a current innovation they demand; (3) firms and consultants are matched; (4) each consultant receives a return based on demand for its services; (5) each firm receives an outcome based on its performance; (6) consultants decide (in light of their returns) whether to continue to offer their current innovation versus abandon it for an alternative and, if so, which one; and (7) firms decide (in light of their outcomes) whether to continue to utilize their current innovation versus abandon it for an alternative and, if so, which one. Neither firms nor consultants know the stochastic rules that govern the system they operate within. Instead, they follow the apparent lessons of the past. All actors are *adaptive* in the sense that they tend to maintain their current behavior (i.e., their choice of innovation) when they experience good results and change that behavior when they experience poor results. They are *emulative* in that new strategies are directed toward the replication of successes elsewhere. Firms imitate the highest-performing firm; consultants imitate the most-sought-after consultant.

Firms

The performance outcome of a firm i in period t is driven by the merit of the firm's chosen innovation (V_j), the quality of the consultant implementing the innovation (Q_c), and random noise:

$$O_{it} = \alpha V_j + \beta Q_c + (1 - \alpha - \beta)\varepsilon_{it}.$$

The parameters (α , β) lie on the unit interval, with $0 \leq \alpha + \beta \leq 1$. Variation over their range allows us to investigate how innovation trajectories are influenced by heterogeneity across innovations and consultants. If $\alpha = 0$, the identity of the chosen innovation has no impact on the firm's outcomes; if $\alpha = 1$, the firm's outcomes are determined completely by the innovation it selects. If $\beta = 0$, the contracted-with consultant does not affect the firm's outcomes; if $\beta = 1$, the firm's outcomes are determined completely by the identity of its consultant. We thus refer to α as the parameter for innova-

tion merit and β as the parameter for consultant quality. The term ε_{it} summarizes all sources of firm performance (market conditions, various sources of firm-specific advantage, etc.) other than those due to the firm's choice of innovation and consultant.³

A firm's decision to abandon its current innovation rests on a comparison of its realized outcomes with its aspiration level. Aspirations play a central role in behavioral theories of decision making by providing the actor with a subjective reference point that distinguishes success from failure (March and Simon 1958). Firms with elevated aspirations code a wide range of outcomes as failures and are thus relatively likely to change their innovation even if they have done well; firms with modest aspirations view a wide range of outcomes as successful and are thus more likely to maintain their current practice even if they have done poorly.

To model aspirations we employ Greve's (1998) framework for the analysis of adaptive change (see Bendor et al. [2011] for extensive analysis of this class of models). The firm's perception of the dividing line between success and failure has two components: inward-looking attention to its own prior achievements (which defines the firm's "historical aspiration," or A_H) and outward-looking attention to the contemporaneous achievements of peers (which defines its "social aspiration," or A_S). Firms thus consider whether their performance today is better or worse than their prior performance and whether their performance today is better or worse than the contemporaneous outcomes of peers:

$$A(i, t) = \gamma_f A_H(i, t) + (1 - \gamma_f) A_S(i, t),$$

where

$$A_H(i, t) = (1 - \zeta_f) A_H(i, t - 1) + \zeta_f O_{it-1},$$

and

$$A_S(i, t) = 1/(n - 1) \sum_{s \neq i} O_{st}.$$

Thus γ_f describes the balance between inward- versus outward-looking sources of the firm's aspiration. If $\gamma_f = 1$, outcomes are gauged solely in

³ Values of V_j and Q_c are drawn prior to each simulation from truncated normal distributions with mean = 0.5 and SD = 0.28 (i.e., we draw from a normal distribution with mean = 0.5 and SD = 1 but accept only values that lie within the unit interval) while values of ε_{it} are drawn from a truncated normal distribution for each firm in each round. As a robustness check, we alternatively drew values from uniform distributions, with no change in the qualitative pattern of results reported below.

terms of improvement over the past; if $\gamma_f = 0$, they are based on comparisons to the average peer. The term ζ_f captures the speed with which historical aspirations are updated. If the updating rate is one, a firm's historical aspiration equals its performance in the immediately prior round (O_{it-1}); for values less than one, historical aspirations are a weighted average of past performance over all rounds, with weights declining geometrically with temporal distance.

The probability of abandonment (again, following Greve [1998]) is modeled as a logistic function of the difference between the firm's outcome and its aspiration:

$$\Pr(D_{it}) = 1/(1 + \exp\{a_f + b_f[O_{it} - A(i, t)]\}).$$

Responsiveness to the gap between performance and aspiration is determined by b_f , while a_f gives the firm's abandonment probability when performance equals aspirations. Large positive values of b_f imply a rapid rise in the probability of abandonment (toward one) when outcomes lag aspirations and a correspondingly rapid drop (toward zero) when outcomes exceed aspirations. At the other extreme, $b_f = 0$ implies that the firm is indifferent to its performance; all outcomes lead to the same abandonment probability (we do not allow $b_f < 0$, which would imply that firms become more likely to abandon innovations when performance exceeds aspirations). Larger positive values of a_f correspond to lower probabilities of abandonment and thus inertia while smaller (including negative) values of a_f imply greater volatility.

If a firm abandons its current innovation, it mimics apparent best practice with probability p_mimic_f or adopts a new innovation drawn randomly from the pool of innovations currently offered by consultants with probability $1 - p_mimic_f$.⁴ Mimetic adopters define best practice as the innovation associated with the highest performance outcome in the just-completed round—equivalently, the innovation employed by the most successful of the firm's rivals and provided by the most effective (as far as firms are concerned) consultant. Prior research provides empirical support for this decision rule. Burns (1992) showed that the business press broadcasts success stories to the virtual exclusion of tales of failure. Strang (2010) found that managers tasked to develop innovative strategies focused on specific outcomes experienced by peers rather than aggregate comparisons and were more attentive to successes than to failures.

⁴Firms cannot immediately readopt an abandoned innovation; the pool of innovations that firms select from randomly does not include the firm's current innovation, and firms abandoning current best practice are obliged to draw randomly from the pool. They can return to a previously used practice at a later date, in keeping with documented serial adoption in the corporate world (Cole 1999).

Consultants

Consultants follow a parallel logic. Like firms, they receive a performance outcome in every period (termed a “return” to distinguish it from the firm’s “outcome”), abandon innovations via comparison of this return to historically and socially defined aspirations, and emulate observed success stories. Decision parameters are set separately from those of firms, allowing us to explore worlds where consultants are volatile and firms inert, where firms herd but consultants experiment, and so forth.

Consulting returns are shaped by the demand for their services. This resolves into two distinct, albeit linked, quantities: the number of firms that contract with the given consultant in the period and the balance of supply and demand surrounding the consultant’s offered innovation within the system as a whole. The former term captures the number of revenue sources available to a service provider, while the latter term reflects the terms of trade: if many firms desire the innovation and there are few alternative suppliers, the consultant should obtain a higher fee. Take F_{jt} as the number of firms pursuing innovation j , S_{jt} the number of consultants offering innovation j , and M_{ct} the number of clients served by consultant c . The consultant’s return in round t is then

$$R_{ct} = \eta M_{ct} (F_{jt} / S_{jt}),$$

where η is a constant that tunes the level of consulting returns. Consultant returns range from zero (if the consultant has no clients) to a possible maximum of η multiplied by the number of firms squared (if one consultant monopolizes the sole innovation that all firms demand). Consultants offering the same innovation are thus postulated to be in an equally strong market position, but they each receive a different total return depending on how many clients they acquire. For example, if an innovation is offered by two consultants and demanded by 10 firms, one consultant might serve seven (gaining a return of $\eta \times 7 \times 10/2$) and the other three (gaining a return of $\eta \times 3 \times 10/2$).

When a firm adopts a new innovation, it selects among the consultants offering that technique on an outcome-proportional basis. Let $\bar{O}_j(k)$ equal the average outcome realized by the previous clients of consultant k implementing innovation j over some temporal window (generally set to three periods). Then the probability that a firm will select consultant k (from the pool of consultants offering the desired innovation) is

$$\Pr(H_j = k) = [\bar{O}_j(k) + c] / \left\{ \sum_s [\bar{O}_j(s) + c] \right\},$$

where the numerator represents k 's track record and the denominator represents the track record of all consultants currently offering innovation j .⁵ The constant term c ensures that all consultants in the pool—including new entrants and others that have not yet obtained any clients—have a non-zero probability of being selected. (We set c to 0.025 in the experiments below; robustness tests showed little sensitivity to values of c and the size of the temporal window.) Client-provider matches are maintained until either the firm or the consultant decides to make a change. If the firm abandons the innovation, the consultant loses a client. If the consultant leaves the market, its prior clients reselect from the remaining providers on the same outcome-proportional basis that newcomers use. Firms are obliged to select a new innovation if no consultants remain in the market.⁶

The structure of adoption/abandonment decisions made by consultants mirrors that of firms. Current innovations are abandoned because of failure to obtain a satisfactory return relative to a weighted combination of the consultant's own past track record and the contemporary achievements of others. Consultants that elect to offer a new innovation emulate their most successful peer (consultant, not firm) with probability p_{mimic_c} or adopt a new innovation drawn randomly from the pool of possible innovations with probability $1 - p_{\text{mimic}_c}$. Unlike firms, however, consultants who "experiment" (draw randomly from the pool) select from the full range of possible innovations, regardless of whether these are currently utilized by firms or not.

COMPUTATIONAL EXPERIMENTS

Illustrative Dynamics of a Coevolving System

We begin by inspecting one realization of the two-population version of adaptive emulation defined above. This provides an opportunity to see the formal-

⁵ The firm's selection of a consultant is based on favorable prior outcomes rather than price competition; all consultants charge "what the market will bear" given supply and demand. This reflects our understanding that firms focus on the potential for upside gains rather than treating innovation as a commodity in which marginal cost plays a key role. On the supply side, Fuller (1999, p. 74) notes that "consultants will rarely discuss fees in initial meetings with clients . . . consultants are not hagglers."

⁶ We should stress the key assumption that firms first select the (highest-scoring) innovation and then contract with a consultant offering that innovation. A different decision rule would be for mimetic adopters to select the (highest-scoring) consultant, which would implement that innovation (or conceivably direct the firm to another practice). This alternative approach is inconsistent with the observed success stories that lie at the heart of our model. While some consultants do indeed gain elite status, business discourse centers on named innovations rather than named providers (Abrahamson 1996; Strang and Macy 2001), and case histories of adoption indicate that firms choose a strategic innovation and then locate a consultant rather than the reverse (O'Shea and Madigan 1997, chap. 6; Strang 2010, chap. 8).

ism in action, gain a sense of the characteristic trajectories it induces, and build intuition about the interplay between innovation supply and demand. Much experience with these models tells us that the results displayed here are characteristic given the parameter settings.

We simulate 100 firms and 100 consultants who select from a menu of 100 possible innovations over a 300-period history. Parameters are set to values that combine the multiple drivers of behavior, which are isolated in the next section to test their impact. The outcomes experienced by firms are determined by an equal measure of innovation merit, consultant quality, and luck ($\alpha = .33$, $\beta = .33$). Historical and social aspirations also have equal weight ($\gamma_f = \gamma_c = 0.5$), with past performance expeditiously updated ($\zeta_f = \zeta_c = 0.8$). Firms and consultants are responsive to the gap between outcomes and aspirations ($b_f = b_c = 10$) and are moderately volatile, with about 12% ready to abandon their current innovation when results equal aspirations ($a_f = a_c = 2$, $\eta = 1,000$). Given the decision to make a change, members of both populations emulate their most successful peers with $p_mimic_f = p_mimic_c = 0.8$.

Figure 2 portrays a single trial based on these parameter settings, with the x -axis indicating the period (from one to 300). We track the rise and fall of “leading innovations”—the most popular innovation in each round—as a measure of dynamic central tendency. Usage of the most popular innovation among firms is charted in the top panel, and usage of the leading innovation among consultants (which is not necessarily the leading innovation of firms) is charted in the bottom panel. Vertical lines within the graphs indicate changes in the identity of these popular practices; the index of each new leading innovation is shown next to each vertical line, with an arrow pointing to the round when that innovation becomes more popular than any other.⁷

Looking first at the collective dynamics of firms, we see rapid convergence toward specific practices. A first distinctly popular innovation (#54) is adopted by about 50% of firms, though its fame lasts only some 15 periods. Two rather long-lasting popular practices emerge later in this simulated history, one of which (innovation #53) holds the interest of between 40% and 75% of firms for an extended period, and a second even more durable innovation (#18) that at its peak is demanded by almost 80% of all firms. Intervening and subsequent interregnums involve a medley of more

⁷This is akin to showing the profile of an iceberg above the waterline. Leading innovations begin to build up adherents before they appear in the graph (but since some other innovation has more, we do not see them) and likewise retain some adherents after they fall out of view. Mini cascades also occur, where innovations experience upswings and downswings without ever becoming the most widely adopted innovation at any given time.

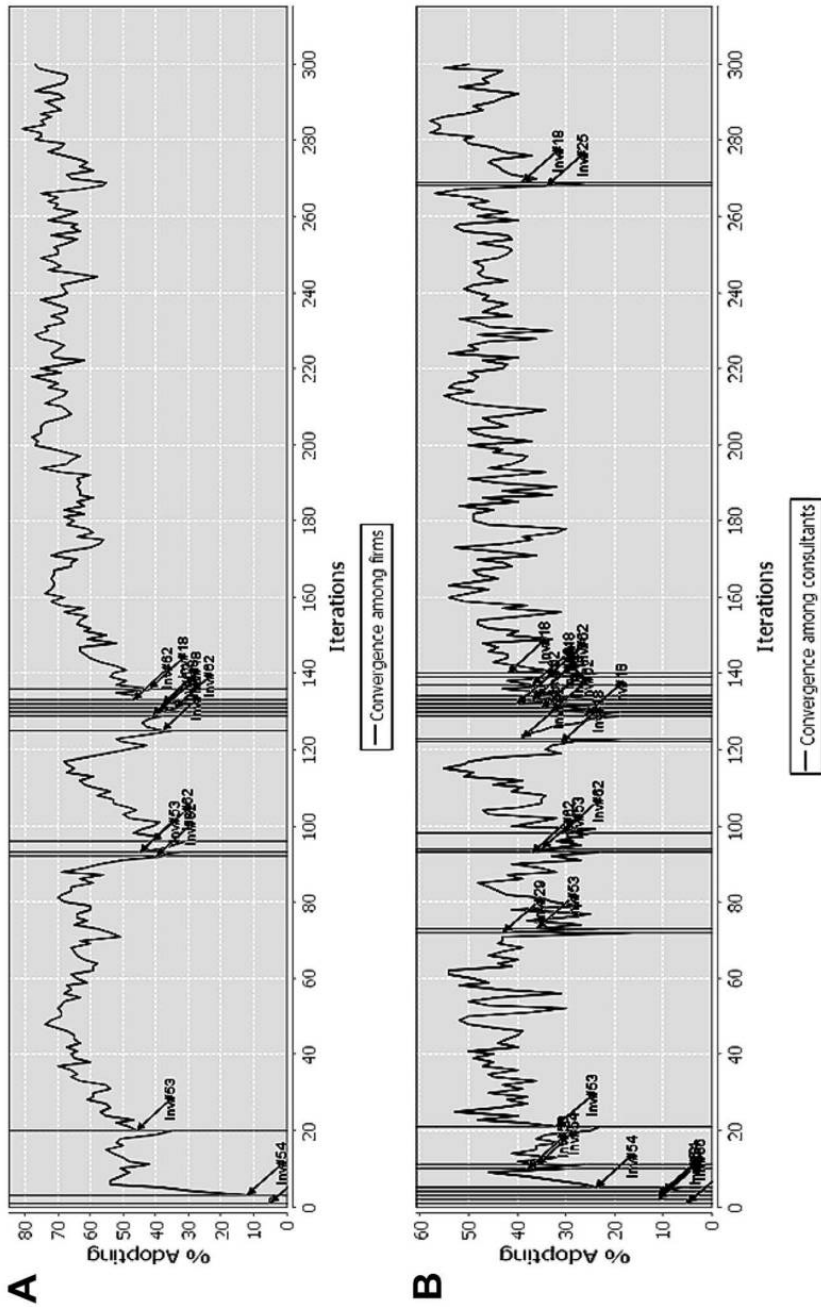


FIG. 2.—Single realization of a firm–consultant innovation system

abrupt boom-bust cycles, with a number of leading innovations that retain prominence for 10 or fewer time points.

Consultants show a similar dynamical pattern, converging on a specific practice and then moving away as rival innovations emerge and win success. Indeed, their collective trajectory over the course of the run is strikingly parallel to that of firms. Both populations move toward the same dominant practices for most of the two long-lasting cycles. Although neither firms nor consultants respond directly to each other's choices, the two series are synchronized by the fact that consulting performance depends on client demand. Consultants move toward the most underserved innovation in the system—the innovation that has most recently provided supernormal returns for a lucky provider. This is not necessarily the innovation for which aggregate demand is highest since the most popular practice among firms may be overserved while rising markets are neglected. Net of random fluctuation and path dependency within individual histories, however, the end result is congruence in the distribution of firms and consultants across innovations.

The system's adoption-abandonment dynamics are asymmetric, with consultants more responsive to the distribution of innovation choices among firms than vice versa. Firms are influenced by the collective locational choices of consultants, which define the pool of adoptable practices, some of which are made especially attractive by their association with high-quality consultants. But these are indirect mechanisms with subtle effects relative to the consulting imperative to invade client-rich markets. While not easily detected in the graph (because consultants are quick on their feet), the tendency is for large-scale swings on the supply side to follow demand-side movements.

The example history alerts us to two characteristic differences in the dynamics of demand- and supply-side movement. First, consultants have a weaker tendency toward convergence than firms do: the percentage of consultants pursuing a given leading innovation is almost always smaller than the corresponding percentage of firms. Second, consultants are more temporally variable in their adoption patterns. The lower panel is more spiky or jagged in appearance than the upper panel.

Lesser convergence and greater temporal volatility reflect the implicit benefits to differentiation among consultants. If the number of providers offering an innovation equals or exceeds the number of firms demanding the innovation, none of the consultants is well positioned to garner strong returns. A smaller group of consultants serving a proportionately large pool of firms can and will often do better. Firms, by contrast, are not overtly penalized by crowding, although the social component of their aspirations leads them to be dissatisfied in a market in which others do, on average, as well as they do. In addition, while some firms will leave such markets be-

cause of their unsatisfied aspirations to do better than “the herd,” this outflow is counterbalanced by entry of firms drawn into the market by success stories.

Competitive differentiation on the supply side thus tends to keep the overall level of convergence among consultants proportional to but below that of firms and means that the appeal of leading innovations is frequently undercut by supply/demand imbalances in less well-subscribed domains. Precisely because consultants are so responsive to market openings, they constantly charge off in search of “the next big thing,” pursuing signals that may never register within the more placid population of firms.

The Impact of Consultants on Faddish Dynamics

Having gained insight into the basic functioning of two-population adaptive emulation, we vary the impact of consultants on firms to understand how they affect patterns of adoption and abandonment. Do consultants play a stabilizing role, increasing the chances that firms will converge on common practices and maintain them over time? Or do they make collective trajectories more faddish, stimulating first booms and then busts? To find out, we contrast versions of coevolutionary adaptive emulation that are “consultant driven” in the sense that consultants powerfully influence outcomes with scenarios in which consultants are less consequential.

In prior work with single-population adaptive emulation, Strang and Macy (2001) and Strang and Still (2004) showed that innovation merit, the extent to which variation across innovations drives performance outcomes, is a central factor in differentiating collective dynamics. Outcome patterns can be usefully partitioned into three qualitative regimes—turbulence, fads, and institutionalization—and two transitions, from turbulence to fads and from fads to institutionalization. With α (the parameter for innovation merit) near zero, almost worthless innovations characteristically generate a turbulent regime of incessant change. Because success stories occur at random, no innovation can remain popular for long. As α rises toward some threshold level, however, the froth of turbulence consolidates to form faddish waves. Innovations with sufficient merit are able to garner substantial popularity, but the relationship between merit and firm performance is not strong enough for these innovations to retain a leading position indefinitely. Further increases in α generate lengthening waves of increasing amplitude, until a second qualitative transition occurs. Above some value of α , we see an institutionalized pattern in which a highly effective practice, once popular, has an extremely low probability of losing its hold on the simulated population. Visible waves are replaced by stable dominance in which one innovation—not necessarily the most meritorious but always near the top—gains a virtually unchallengeable position.

The same sequence is replicated here, beginning with a world of pure noise and ending with one driven solely by innovation merit. We then contrast these results—and this is the critical novelty—with a parallel sequence of analyses that locate the nonrandom element in the choice of consultant. In a world where 75% of outcomes are random noise, does it matter whether the systematic signal is located in innovation merit ($\alpha = .25$, $\beta = 0$) or consultant quality ($\alpha = 0$, $\beta = .25$)? Does a world where corporate outcomes are determined solely by differences among consultants ($\alpha = 0$, $\beta = 1$) differ from one where they are determined by differences among innovations ($\alpha = 1$, $\beta = 0$)?

Model results are summarized in terms of simple statistics based on the now-familiar notion of a leading innovation. *Popularity* gives the percentage of firms utilizing the leading innovation; this is just the average height of graphs like the ones shown in figure 2. *Turnover* counts the total number of leading innovations that arise over the trial. A faddish pattern is signaled by the combination of high popularity and high turnover, while low popularity–high turnover indicates a turbulent world where firms seldom converge, high popularity–low turnover an institutionalized world where bandwagons gain a near-permanent hold on the population, and low popularity–low turnover a sleepy world of great inertia.⁸

The two experimental series below show how collective trajectories vary as random noise is leavened by increasingly strong effects of either innovation merit or consultant quality. We report just the adoption/abandonment choices of firms; the movements of consultants are not shown, though they influence and are influenced by the firm behavior that we chart. Figure 3 gives the popularity of leading innovations, while figure 4 gives the rate of turnover in leading innovations. With the exception of the factors that we vary systematically (α and β), parameters are set to the values given in the model illustrated in figure 2.

Figure 3 shows that convergence on popular innovations tends to rise with both innovation merit (dashed line) and consultant quality (solid line). Average utilization of the most popular innovation is relatively low at the extreme left of the graph, which represents a world of pure noise. In the absence of both innovation merit and consultant quality, bandwagons are typically limited since the success stories of the recent past are seldom duplicated. As the impact of luck diminishes and the signal/noise ratio increases (i.e., moving to the right of the graph), bandwagons grow in duration as well as scale. Efforts to replicate success become more long-

⁸The parameter space explored in this section generates the first three patterns (fads, turbulence, and institutionalization) but not the fourth, which is produced if actors have very low aspirations; so they seldom try new innovations, instead “making do” with historically set idiosyncratic traditions. Inertial worlds are considered below in the subsection on parameter variation.

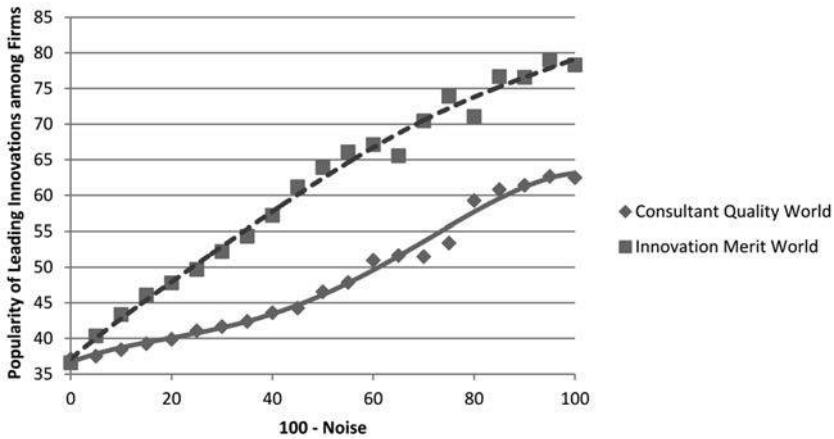


FIG. 3.—Popularity of leading innovations among firms (average values for trials across levels of noise).

lived when apparent best practice is underpinned by innovation merit or consultant quality.

Figure 4 presents the other side of the coin—the rate at which popular innovations rise and fall. The left side of the graph indicates that the tenures of leading innovations are short-lived when outcomes are based solely on random noise. In a typical simulation of this type, a population of 100 firms flocks to some 120 leading innovations over the course of 300 rounds, with each popular practice receiving a scant few moments of fame before collapsing. As the signal/noise ratio increases, turbulence is

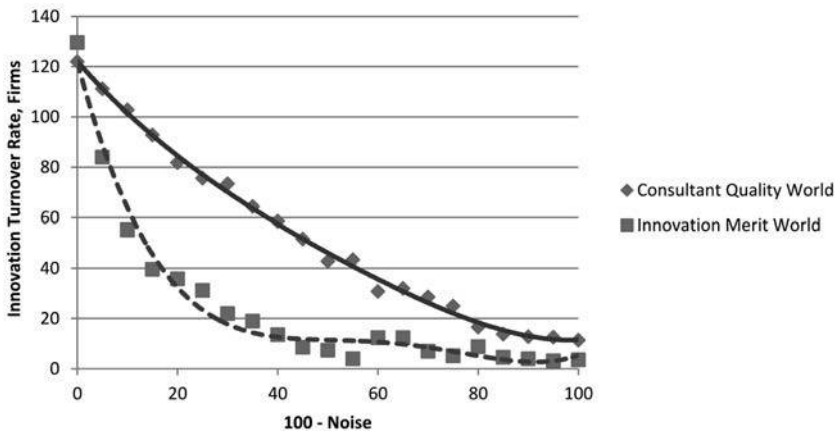


FIG. 4.—Turnover in leading innovations among firms (average values for trials across levels of noise).

replaced by boom-bust swings whose periodicity lengthens. At the extreme right of the graph, where outcomes are determined entirely by the choice of innovation (innovation merit) or consultant (consultant quality), “swings of fashion” occur so glacially that simulation histories reflect convergence on and retention of a single dominant innovation.

A key result here deserves emphasis: a noisy world of “worthless innovations” is not characteristically a faddish world. While cycles of popularity are often taken as a priori evidence that innovations have zero or near-zero value, the computational model simulated here implies that faddishness arises where innovations have some—not too much, but not too little—effectiveness. Worlds made up of worthless innovations are not faddish because success stories cluster too little to allow bandwagons to grow; worlds of highly effective innovations are not faddish because success stories cluster too much to allow bandwagons to collapse. Within the framework of adaptive emulation, rapid bell-like swings are the signature trajectory of innovations or consultants that possess modest value, not zero value.

Both innovation merit and consultant quality are thus stabilizing factors when contrasted to random noise. As the weight given to either quantity increases, bandwagons grow as turbulence morphs into faddish cycles and lengthen as faddish cycles give way to stable convergence. Firms gravitate to innovations that have superior merit in the first series of experiments and to innovations that are served by the best consultants in the second. The signal provided by these relatively stable influences serves to extend the wild swings in adoption and abandonment we see in purely random worlds.

As figures 3 and 4 make clear, however, the worlds generated by innovation merit and consulting quality do not stabilize at the same rate or to the same extent. Where noise is replaced by innovation merit, popularity rises quickly and turnover declines even more dramatically. Where noise is replaced by consultant quality, by contrast, the growth of popularity is slow and the decline in turnover halting. The disparity between the two curves is especially large for medium and high levels of noise, which represent the enormous variety of factors at play in firm performance. Rates of turnover are more rapid in a world driven by 40% noise and 60% consultant quality than one driven by 80% noise and just 20% innovation merit. Differences in turnover lessen only when noise falls implausibly toward zero.

Another way to summarize these results is with reference to the turbulent, faddish, and institutionalized regimes described above. For simplicity, let us demarcate these regimes in terms of turnover in leading innovations, describing a world as turbulent if turnover occurs in more than 30% of rounds, faddish if turnover is in the 15%–30% range, and institutional-

ized if turnover occurs in less than 15% of rounds. By these cut points, worlds based on innovation merit transition to faddishness early (at around $\alpha = 0.04$) while worlds based on consulting quality do so much later (at about $\beta = 0.17$). Worlds driven by innovation merit become institutionalized at around $\alpha = 0.15$, just when ones driven by consulting quality are starting to become faddish, while the latter become institutionalized only when consulting quality makes up more than 50% of outcomes ($\beta = 0.52$). The faddish region is thus substantially larger when corporate outcomes are shaped by consulting quality rather than innovation merit.

To understand why consultant-driven innovation tends to generate faddish trajectories, consider a stylized but characteristic boom and bust cycle. It begins when a few firms happen upon an innovation discovered by one or a few consultants. If these consultants are sufficiently high in quality (relative to other consultants offering other innovations) and the firms are reasonably lucky, the innovation is well positioned to become the site of a string of dramatic success stories. Other firms—particularly those suffering from poor luck or the ministrations of ineffective consultants—imitate their top-performing peers and flock to the innovation. These migrating firms tend to benefit from the move since they are now working with the high-quality consultants that were the source of performance gains for others. The innovation's popularity among firms grows, and this increases the chance that top performers will continue to be located among its followers.

As firms bandwagon, consultants that supply the now wildly popular innovation earn supernormal returns. They garner many more clients than rival consultants offering lower-profile innovations do, and the favorable balance of supply and demand means that they can charge more per contract. They thus emerge as the top performers among consultants, impressing their peers with the rewards that flow from providing a red-hot innovation. The resulting success stories spark supply-side bandwagoning as relatively dissatisfied consultants enter the market in search of a piece of the action.

As additional consultants flow into the popular innovation, however, the average quality of providers tends to diminish. This occurs in part because many supply-side "fashion surfers" lack the capacity to provide excellent service—one reason they failed to sustain client relationships elsewhere. Reduction in average quality also occurs via exit, since the influx of hungry providers hastens the departure of consultants who see their previous monopoly becoming a competitive market and their high-priced innovation a commodity. The high-quality consultants who pioneered the rising innovation are particularly likely to exit in the face of this competition since their aspirations skyrocket during the period when firms jumped on the bandwagon but fellow consultants had not yet begun to respond.

As lower-quality consultants enter and higher-quality consultants exit, clients begin to feel the effects. The average firm experiences reduced outcomes that increase its probability of abandoning the practice. And at the collective level, even more devastatingly, success stories among firms come to describe rival innovations staffed by small cadres of high-quality consultants. As firms and then consultants exit in droves, the sequence begins all over again.

The faddishness of consultant-driven innovation is thus rooted in quality differentials among mobile providers. Low- and average-quality consultants flood into lucrative markets and make them less appealing to the high-quality consultants that created those markets in the first place. A corresponding dynamic is absent when value is located in innovations. Unlike consultants, unsuccessful and ineffective innovations are not agents motivated to invade the markets built by their peers. If consultants were similarly immobile, a supply-side feeding frenzy would not follow a boom market. And if consultants were all of the same quality, the feeding frenzy that did occur would not reduce demand-side outcomes and induce market collapse.⁹

The pattern of weaker consultants chasing their better-endowed peers from fad to fad does not eliminate the favorable return on consultant quality. High-quality consultants gain a larger share of the market than low-quality consultants do. Where 50% of the variation in outcomes is determined by noise and the rest by differences across providers, for example, consultants whose quality is above the 90th percentile attract 26% of total client contracts, with the highest-quality consultant serving 10 times as many clients as the median consultant. Supply-side concentration is inversely related to the amount of noise in the system, since noisy outcomes tend to reduce the impact of consultants and thus the choices that firms make. As the signal provided by consulting quality rises to 100% while noise falls to zero, the top 10% of consultants attract 46% of total client contracts over 300 rounds, with the top consultant serving more than 32 times as many clients as the median consultant.

High-quality consultants also move less frequently than low-quality consultants. They are better positioned to retain clients even if the innovations where they locate do not garner major success stories and retain a

⁹Price competition would reinforce the faddishness of consultant-driven innovation. Consider that consultants who experience the most demand (characteristically high-quality market pioneers) would charge a higher price for their services while market entrants tend to offer low fees to undercut established providers. If firms were sensitive to these price differentials, they would be more prone to hire newly entering consultants, which would hasten the outflow of high-quality pioneers and amplify fashion cycles.

higher percentage of clients in rising markets as well. It takes time for the entry-exit dynamics described above to play out, and during this time, high-quality consultants are likely to be located within a growing market while lower-quality providers flit from opportunity to opportunity. With noise set to 50%, the number of innovations provided by consultants (or, equivalently, the number of innovations they abandon) is correlated $-.36$ with consultant quality.

Demand- and Supply-Side Interactions in a Real-World Management Fashion: Business Process Reengineering

It is informative to compare the model trajectories described above to an empirical case. We review the market dynamics of business process reengineering (BPR, or “reengineering”), the most fashionable managerial innovation of the 1990s.

By the late 1980s, the emergence of distributed computing and the widespread availability of accessible software had made possible new methods of information storage, retrieval, and sharing. While corporate leaders lacked insight into this emerging technology, those at the interface between computer science and management were well positioned to recognize the opportunities afforded by information technology (IT). The most prominent such figure was Michael Hammer, who lectured in Massachusetts Institute of Technology’s Computer Science Department and Sloan School of Management. After management consultancy was added to his several hats in 1987, Hammer’s 1990 *Harvard Business Review* article (“Reengineering Work: Don’t Automate, Obliterate”) introduced the concept of BPR to the management community. Thomas Davenport and James Short, authors of BPR’s other foundational piece (“The New Industrial Engineering: Information Technology and Business Process Redesign,” 1990), were similarly in the right place at the right time. Davenport was a partner at Ernst & Young’s Center for Information Technology and Strategy who had consulted at McKinsey and taught at the Harvard Business School,¹⁰ and Short was a research associate at the Center for Information Systems Research at the Sloan School and a lecturer at Boston University.

Success stories were key evidence for both Hammer (1990) and Davenport and Short (1990). Hammer’s article drew especially on Ford, whose invoiceless processing system led to 75% downsizing in accounts payable. Hammer also cited the experience of Mutual Benefit & Life, whose case management system cut application processing times from five to 25 days

¹⁰Davenport received a sociology Ph.D. from Harvard, where as the first author’s sophomore tutor he graciously accepted a research paper on the sociological implications of punk rock.

to two to five days. Davenport and Short reported on 19 firms including IBM, Digital Equipment, Du Pont, and (like Hammer) Ford and Mutual Benefit & Life while offering a detailed account of process redesign at Rank Xerox U.K. This too was a success story, credited with a reduction of delivery times from 33 to six days coupled with a cut in head count.

Supply-side advocacy amplified as BPR began to catch on. Business press articles with “reengineering” in the title increased from four in 1990 to 17 in 1991, 34 in 1992, and 139 in 1993, and a review of this corpus reveals overwhelmingly favorable accounts that aggressively touted BPR (Jung 2006). In 1993, Hammer teamed with James Champy to pen *Reengineering the Corporation: A Manifesto for Business Revolution*, the best seller that vaulted BPR to superstar status. The authors explained that their approach would upend Taylorist architectures based on functional specialization and contended that its immediate adoption was vital for corporate survival. Hammer and Champy rehearsed the now-tired histories of Ford and Mutual Benefit & Life while also presenting new exemplars such as Taco Bell and Bell Atlantic.

BPR became the hot business innovation of the 1990s, a testament to the bold claims, success stories, and good historical timing that marked the advocacy of Hammer, Davenport, and others. In 1993, when the first corporate survey of adoption was conducted, 57% of Fortune 1,000 firms with a TQM program were pursuing BPR initiatives (Lawler, Mohrman, and Ledford 1995). The wave continued to crest; two years later, the same authors reported that 81% of Fortune 1,000 companies were now utilizing BPR, with an average employee involvement rate of 38% (Lawler, Mohrman, and Ledford 1998; see also Jackson 2001, p. 73).

A small cadre of consultants reaped the rewards of reengineering initiatives during the fashion upswing. In 1990 and 1991, the field was monopolized by IT specialists like CSC Index, a division of the database applications giant Computer Services Corporation headed by Champy, and by elite consultancies like Ernst & Young that were linked to early developments at MIT and Harvard. Hammer & Company was more concerned with executive education than program implementation, although its Phoenix Program served a blue-chip consortium of 27 “leading-edge firms committed to the process revolution” (Jackson 2001, p. 76). These sorts of elite consultancies aside, few providers appear to have offered BPR services before 1992 (Jung 2006, pp. 107–8). As a result, first-movers reaped enormous rewards. CSC Index entered the decade as a \$30 million business; in 1995 it was a \$220 million business with 400 consultants worldwide (Yurko 1995).

The larger consulting community, however, soon took notice of the boom market. In 1994, Kinni reported that the “blizzard of interest” in BPR among corporations was a boon to the consulting industry as “re-engineering ‘experts’ rushed into the marketplace” (p. 11). Mintz (1994,

p. 42) contended that windfalls were enjoyed by all consultants “who [could] plausibly claim expertise in the realm of [BPR].” The consulting pool exploded: Kennedy’s *Directory of Management Consultants* listed 456 consultancies that numbered BPR as one of their service offerings in 1995, and by 1996 BPR was a \$51 billion industry (Jarrar and Aspinwall 1999). While all market signals were positive, however, only 39% of reengineering providers possessed an IT background, and many were young firms located in regions with few competitors (Jung 2006).

Reengineering’s next chapter was one of decline on both the demand and supply sides, though the falloff was so abrupt that we cannot identify their relative timing. On the demand side, Bain’s survey of management tools shows a reduction of nearly 50% in corporate usage from 1995 to 2000. Business discourse fell even more sharply: the number of BPR-titled articles dropped by more than half from 1995 to 1996 (Jung 2006). One industry journal linked reengineering’s declining credibility to the feeding frenzy: “[BPR] made a lot of sense. But then came the book, the buzzword fad, the hordes of consultants—and the trouble” (Mariotti 1996, p. 20).

Elite consultants were quick to leap off the bandwagon. At the peak of the fashion cycle, the *Economist* noted, “As re-engineering reaches maturity, rival consultants are trying to come up with the next money-spinning idea” (1995, p. 63). A managing partner at Andersen Consulting commented, “Re-engineering has been a very valuable concept, but the easy pickings are gone” (White 1996, p. A1). While middle-of-the-road consultants remained willing to provide BPR services (listings in Kennedy’s *Directory of Management Consultants* dropped just 13% from 1995 to 1999), the gurus and market leaders that had made BPR famous diversified into other interventions. CSC Index shifted to an emphasis on “organizational agility”; Booz, Allen & Hamilton developed “value engineering” focused on revenue and growth rather than cost-cutting; Champy blended reengineering, strategy, and culture change; and Hammer went “beyond reengineering” to address “the human dimensions” of management.

One innovation does not test a model. And many key pieces of BPR’s history are unavailable: we are unaware of systematic data on program outcomes at the level of the individual firm and cannot determine from the historical record whether demand-side exits preceded, followed, or were simultaneous with the departure of elite consultants. We are struck, however, by the parallels between reengineering and the trajectories generated by coevolutionary adaptive emulation. These include (1) the jump-starting of interest by a handful of elite consultancies, (2) the key role of publicly visible success stories, (3) rapid growth in corporate demand, (4) extraordinary profits earned by a small number of supply-side pioneers, (5) the rush of consultants of all types into the market, and (6) substantial decline in

corporate demand accompanied by attempts by pioneering consultants to differentiate their product or exit the market.

Variation in Faddishness: Model-Based Insights

We have focused thus far on the characteristic impact of consultants on faddish cycles. But computational simulation can do more than indicate main effects; it also permits exploration of variability. We explore the impact of several parameters on rates of turnover in leading innovations with an eye to specifying qualitative relationships of interest.

Since we are primarily concerned with the impact of consulting behavior on faddishness, we examine a noisy world where consultant quality plays a significant role. We set $O_{it} = .05V_j + .15Q_c + .8\varepsilon_{it}$ while sequentially varying parameters of interest (nonmanipulated terms take on the same values as in the previous section). A series of analyses across levels of noise were also conducted; these are not reported because of space constraints but confirm the directional effects reported below.

Consultant volatility.—Since supply-side faddishness is rooted in the mobility of consultants, the rate at which providers change innovations is a potential brake on the system. If consultants are so inertial that even consistent failure is unlikely to prompt a decision to try something different, they become fixed quantities akin to innovations. In the model, consulting volatility can be tuned via the parameters that translate consulting returns into abandonment probabilities. We focus here on a_c , which sets the level of consultant inertia: low values imply frequent movement of consultants across innovations while high values indicate supply-side sluggishness. (Variation in b_c affects sensitivity to good vs. bad outcomes but not intrinsic restlessness.)

Figure 5 shows that rates of turnover in leading innovations decrease as consultant inertia rises. In worlds where providers are highly volatile (large negative values of a_c), boom markets are rapidly invaded and even the most successful consultants are prone to try something new. When consultants are slow to move (large positive values of a_c), by contrast, markets stabilize and leading innovations retain their popularity longer. Consultants that are both inert and high quality are reluctant to abandon boom markets, which are more slowly invaded by competitors in any case.

But this benefit comes at a cost. Recall that consultants affect firms not only by implementing desired innovations but by making those practices available in the first place. If consultants are slow to abandon their current practices for new ones, the pool of innovations that firms sample from is smaller. This is a version of the trade-off between exploration and exploitation (March 1991), one whose terms are governed by the balance between

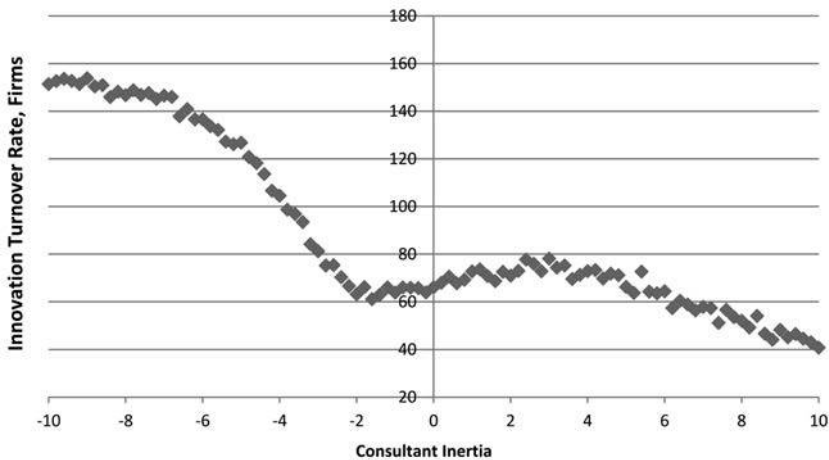


FIG. 5.—Consultant volatility and innovation turnover (average values for trials across levels of a_c).

innovation merit and consultant quality. If novel practices differ greatly in intrinsic merit while consulting quality varies little (high α , low β), it is more critical for consultants to discover the diamonds in the rough. Consultants in such a world play a more important role as “prospectors” in identifying valuable innovations than as “developers” who turn the raw material into a beneficial service. If innovations differ little in intrinsic merit while consultants differ substantially in quality (low α , high β), on the other hand, the exploratory activity of consultants yields limited dividends while consulting volatility is costly because it promotes the outflow of high-quality consultants from popular practices.

Historical versus social aspirations.—While parameter shifts that render consultants immobile are blunt instruments, a sharper tool is provided by manipulating parameters that determine which consultants move. Recall that supply-side abandonment decisions result from a mix of inward-looking versus outward-looking comparisons: the relevant parameter is γ_c , which ranges from zero (purely social aspirations) to one (purely historical aspirations). If γ_c is high, consultants that have recently done well are likely to abandon their current innovation when they confront a minor downturn while those that operate in a stable, albeit meager, market share are likely to stay put. If γ_c is low, on the other hand, consultants in small markets are likely to try their fortunes elsewhere while those in strong but declining markets tend to persevere.

Figure 6 shows that faddishness is promoted where a consultant’s aspirations are dominated by its history (γ_c closer to one) and diminished when social comparisons play a larger role (γ_c closer to zero). Key to this result is the behavior of pioneering supply-siders who are responsible for

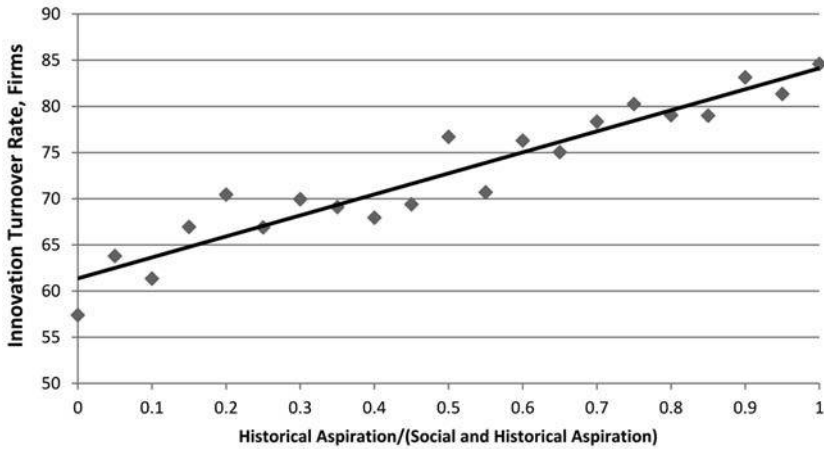


FIG. 6.—Consultant aspirations and innovation turnover (average values for trials across levels of γ_c).

the growth of leading innovations. These consultants experience supernormal returns in the ramp-up phase and weaker, albeit above-average, returns once other consultants flood the market. If their aspirations are dominated by their own historical experience (Am I doing better today than yesterday?), pioneers are quick to leave when other providers crash the party; they insist, as it were, on continuing to earn extraordinary returns and act as though they can readily repeat their earlier feats elsewhere. If aspirations are dominated by social comparison (Am I doing better than my peers?), by contrast, pioneers remain with the popular innovation longer since they serve large numbers of first-mover clients as well as a diminishing percentage of latecomers. Their “commitment” to the innovation increases average corporate outcomes and improves the chances that community-wide success stories will continue to be generated, which retards the exit of firms while maintaining the inward flow. Where consultants are guided by social aspirations, bandwagons are thus more extensive and more durable; where consultants are guided by historical aspirations, bandwagons are smaller and shorter-lived.

Mimic probabilities.—A third behavioral factor of interest is the propensity of actors to emulate their top-performing peers. If p_{mimic} is close to one, the great majority of dissatisfied consultants flock to the most recent success story; if it lies close to zero, most draw randomly from the pool of possible innovations. As in the above discussion of consulting volatility versus inertia, we once again have an opposition reminiscent of March’s (1991) analysis of exploration versus exploitation. Random selection from the innovation pool is a form of exploration while mimetic adoption is a

type of exploitation (based on the reproduction of success via vicarious learning).

Figure 7 shows that faddish dynamics diminish when consultants are less imitative (i.e., small p_mimic_c). As we have seen, it is supply-side mimicry that prompts the inflow of consultants into popular innovations, with substantial costs for the pioneers who jump-started the wave and subsequently for firms. High levels of p_mimic_c accelerate these invasive movements, while low levels lead them to occur glacially. Note that collective dynamics are stable over most of the parameter's range. Only when mimicry is quite low ($< 20\%$) does faddishness markedly decline.

Firms also benefit in a second way when p_mimic_c is small. As shown above, low rates of mimicry imply high collective levels of exploration. When consultants randomly draw from the innovation pool, they sometimes uncover previously unknown innovations, a feat that mimics never accomplish. This exploratory behavior in turn makes a more diverse set of innovations accessible to firms, a service that is most valuable at higher levels of the parameter for innovation merit. As α increases, the chance that an explorer will uncover a diamond in the rough grows, and average corporate outcomes rise accordingly.

It is of interest that exploration/exploitation works in the opposite direction where firms are concerned. While mimicry by consultants tends to undercut bandwagons, mimicry of superior performance on the demand

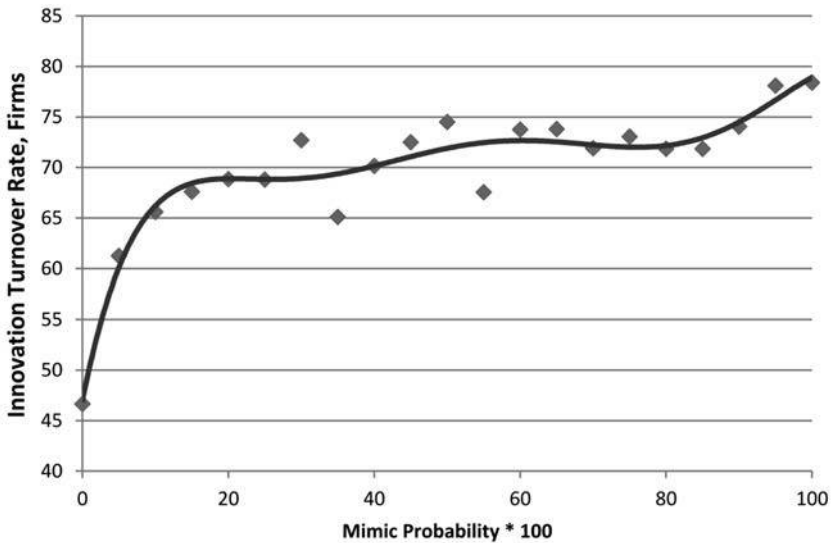


FIG. 7.—Consultant mimicry and innovation turnover (average values across levels of p_mimic_c).

side makes bandwagons last longer. Firms that explore virgin territory rather than emulate their peers fail to coalesce around success stories, generating an innovation landscape in which no one innovation is popular. And since bandwagons generally arise around high-performing innovations or high-quality consultants, demand-side outcomes generally improve as p_{mimic_f} increases.

Matching firms and consultants.—In the computational experiments conducted above, firms select consultants on the basis of their clients' average outcomes. This seems reasonable given the firm's strong incentive to hire high-quality consultants, a drive that is presumably dampened but not extinguished by the consultant's interest in protecting client confidentiality. To evaluate model robustness, we consider two more extreme matching rules: one more discerning, the other less discerning. In the more discerning formulation, the attractiveness of consultants is proportional to their true quality, as if firms peeked at our Java code before deciding which consultant to partner with. In the less discerning rule, firms and consultants are randomly matched, as though demand-side actors were unable to make any outcome-based distinctions between providers.

Figure 8 shows the consequences of these matching rules alongside the outcome-proportional rule we have used so far. To clarify the implications for model robustness, we chart turnover across noise for each rule under two conditions: a world where outcomes are driven by consultant quality and a world where outcomes are driven by innovation merit. This reproduces the structure of the comparison in figure 4, allowing us to see how faddish cycles are influenced by the way consultants and firms are matched.

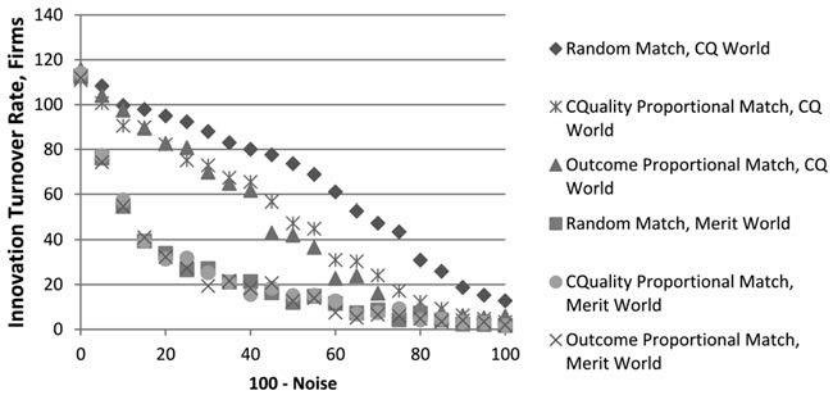


FIG. 8.—Matching rules and innovation turnover (average values across noise for different matching rules and outcome regimes).

Figure 8 shows that differences in matching rules are overshadowed by the contrast between consultant- and merit-driven innovation. The upper three curves characterize consultant-driven innovation under random, outcome-proportional, and quality-proportional matching, while the three lower-lying curves result from worlds where innovations rather than consultants matter. Among the consultant-driven worlds, random matching produces the highest levels of turnover while matchings based on true quality and outcomes are virtually indistinguishable. But all three lead to greater faddishness than in worlds that are merit driven. The gap is largest under noisy conditions (the left of the graph) and falls only when corporate outcomes are virtually determined by choice of innovation and consultant.¹¹

This robustness flows from the basic dynamic that we have stressed throughout: lower-quality consultants invade boom markets and spur the exit of both firms and high-quality pioneers. When firms are indiscriminating (the random match condition), booms are especially fragile, since market pioneers have no special advantage over new entrants in acquiring additional clients. When firms are more discriminating, booms are less fragile and effective market invasion occurs more slowly; but it ultimately occurs nevertheless. Since the boom market remains a magnet for dissatisfied providers under all matching conditions, the pressure of new entrants simply builds to a higher level before it prompts an outflow of pioneers.

The contrast between consultant- and merit-driven innovation thus obtains unless either (a) consultants fail to move toward burgeoning market opportunities or (b) entrants are unable to gain market share. These are extreme cases but telling ones. Two parameterizations leading to supply-side immobility were noted above: where aspiration levels are so low as to fix consultants to their original innovation or where consultants are so non-mimetic that almost all explore the innovation space rather than converging on popular innovations. Inability of supply-side entrants to gain market share would arise if all mimetic adopters contracted with the same high-scoring consultant, treating the provider rather than the innovation as the

¹¹ Two additional specification analyses were conducted that we describe briefly. In the first, client/provider matches could be revised without the firm or consultant leaving the innovation, which increases faddishness by making the market position of pioneers highly variable and thus a source of dissatisfaction and exit. In the second, consultant quality was treated as a variable that rises with innovation experience. Following the learning curve literature (Argote and Epple 1990), we assume $dq/dt = k(L_i - q)$, which implies that $q_{it} = L_i - (L_i - q_{i0})\exp(-k \times t_i)$, where q_{i0} is a consultant's initial quality, q_{it} its quality with an innovation after t_i rounds, L_i its maximum potential quality, and k the learning rate. Overall levels of faddishness were not much affected by variation across k . Late adopters eventually catch up (on average) with early movers since all learners approach an asymptotic level of quality, keeping the overall level of intra-consulting competition rather stable.

success story. In this scenario, mimetic and nonmimetic movers have equally low probabilities of gaining clients, and burgeoning markets are not undercut by supply-side mobility.

Consequences for consultants.—We have focused above on the way model parameters influence the collective trajectories and outcomes of firms. What about the flip side? How do the parameter shifts described above affect consultants?

The answer is remarkably consistent across the model variations considered here. To the extent that a behavioral shift reduces faddishness, it generally increases the market share of high-quality consultants. If consultants experiment rather than mimic, for example, there is a wider distribution of providers across innovations and consequently more opportunity for firms to contract with high-quality consultants without run-of-the-mill providers spoiling the party. Similarly, the ability of firms to better discriminate between high- and low-quality consultants leads to a higher proportion of clients for the consulting elite. We tracked one-, two-, four-, and eight-consultant concentration ratios across conditions and found that these rise with immobility, the weight of social versus historical aspirations, rates of experimentation versus mimicry, and matching rules that improve the ability of firms to distinguish higher- versus lower-quality consultants. The net rewards to consultants do not change much in these conditions, but the tendency for a few providers to enjoy the lion's share of the market is enhanced.

Supply-side market concentration appears potentially problematic, though computational analysis of the likely consequences would require further elaboration of the agent-based model. From the firm's perspective, consultants that gain large numbers of clients may not be able to serve them effectively, particularly if demand rises too rapidly for the provider to expand its capacity. From the perspective of consultants, those who find themselves frozen out of red-hot markets are not likely to passively accept their fate. They are motivated to take countermeasures: low-quality/unsuccessful consultants may refine their capacity to sense incipient shifts in market demand, focus their efforts on exploitation to the exclusion of experimentation, and duplicate the visible characteristics of high-quality consultants. The three-way Red Queen's race between high-quality consultants hungry to preserve returns commensurate with their capacities, low-quality consultants hungry for market share, and firms hungry for superior performance seems unlikely to settle down into a stable scenario in which a few consultants reap all the rewards.¹²

¹²The empirical level of market concentration in management consulting is modest, with four- and eight-firm concentration ratios equaling 11% and 15%, respectively, based on revenue data for NAICS code 541611 (administrative management and general man-

DISCUSSION

This article adds to the already large literature on boundedly rational models of innovation/diffusion. The Carnegie school (March and Simon 1958; Cyert and March 1963) developed a broad critique of choice-theoretic formulations that posit maximization of utility across alternatives, noting their heroic assumptions about knowledge and calculating capacity. They contended that managers who are “intendedly rational, but boundedly so” could more plausibly employ simple rules that are consistent with cognitive constraints. The Carnegie school’s powerful insight provides the basis of formal models of information cascades, where actors base decisions on signals provided by the behavior of others (Banerjee 1992; Bikchandani, Hirshleifer, and Welch 1992), and vicarious learning, where actors base decisions on outcomes elsewhere (Haunschild and Miner 1997; Strang and Macy 2001).

Working within the vicarious learning tradition, this article explicitly models innovation supply as well as innovation demand. Despite the burgeoning role of consultants, advisers, and experts across many domains, we are unaware of formal models of innovation/diffusion that represent both sides to the exchange as active agents.¹³ In the version of adaptive emulation formulated here, members of the two populations follow exemplars of their own species: consultants mimic the most successful consultant while firms mimic the most successful firm. Resource dependencies lead the choices of demand- and supply-side actors to influence each other and thus coevolve.

We have focused on the implications of this coevolutionary framework for faddish cycles—a commonly observed phenomenon in the management world, but one in which the role of consultants is not well theorized. Much research develops a critical perspective on consultancy, contending that supply-side providers foist empty practices on their gullible demand-side counterparts. The image of consultants as rhetorically skilled charlatans and managers as their dupes has some warrant in empirical observation but is conceptually problematic as an explanation of managerial fashion. If man-

agement consulting services) from the U.S. Census Bureau (2007). This undercuts the plausibility of model parameterizations that sharply limit supply-side competition and thereby faddishness, since the demand for consulting would then be monopolized by a few providers. If we set noise to 0.5, e.g., simulations in which all mimetic adopters converge on the single most successful consultant lead a single provider to garner more than 60% of all contracts, a *de facto* monopoly that is out of line with the distribution of consultants across clients that we see in the corporate world.

¹³White’s (2002) model of production markets also posits variable-quality suppliers who monitor their peers rather than their exchange partners. But White’s interest centers on the construction of a stable role structure in which players of differential quality occupy distinct niches rather than (as here) the ebb and flow of popular practices.

agers running billion-dollar businesses are disabled by anxiety and lacking in causal insight, why aren't they replaced by million-dollar consultants who would do a better job?

The model presented here offers an alternative explanatory framework. Competitive dynamics among consultants of variable quality generate instability even though both demand- and supply-side actors face equivalent cognitive constraints. The key driver is not the service provider's wizardry but her mobility. Innovations that attract supernormal demand attract a feeding frenzy of increasingly mediocre consultants, a form of market invasion that generates a management version of Gresham's law. Bad consultants drive out good; those who built the boom market react to the feeding frenzy by differentiating their product in hopes of locating a new niche. Consultant-driven innovation is robustly faddish because it combines a mechanism that makes popularity go up (local concentrations of high-quality consultants seeking to differentiate their product from that of their rivals) with a mechanism that makes popularity go down (inflows of low-quality consultants hungry for a share of the boom market and intent on eradicating the distinction between themselves and the pioneers). A real-world exemplar of managerial fashion, business process reengineering, suggests the plausibility of these dynamics while reminding us of the complexity of real-world fashion cycles (David and Strang [2006] demonstrate a similar dynamic for total quality management).

Computational experiments provide further insight by identifying parameter shifts that influence the level of faddishness. We see less faddish behavior when consultants are more inertial, when their aspirations center on social comparisons rather than historical ones, when they are less imitative and more exploratory, and when firms are better able to discern underlying differentials in consultant quality. While collective trajectories are influenced by these parameter shifts, the model is robust in the sense that worlds where consultants are central to outcomes are always more faddish than ones driven by innovation merit. Parameter shifts affect the speed with which boom markets are invaded but do not eliminate the mechanism traced here; competitive pressure builds until it hastens the exit of market pioneers.

We should note that shifts in behavioral parameters are not well viewed as straightforward "technical fixes," since they come at the cost of heightened market concentration and an accelerating struggle between higher- and lower-quality providers. Real-world strategies to reduce faddishness often have a political character, relying on collective or authoritative action to shape individual choice. For example, invasion of boom markets by inexperienced and underresourced consultants can be restricted by credentialing schemes that demand evidence of the new entrant's expertise.

Underlying quality can be made more visible to buyers by publishing the provider's qualifications or track record.¹⁴ Even the propensity to utilize socially rather than historically defined aspirations is influenced by factors such as the dissemination of industrywide performance data.

Given the sizable distributional benefits at stake, real-world actors maneuver to construct advantageous institutional rules and norms. While some such battles lead supply-side actors to join forces against outsiders such as consumers or the state, in other cases the interests of high- and low-quality supply-siders come into conflict. In our model, for example, lower-quality consultants have an interest in opposing rigorous certification schemes and the publication of performance data. Higher-quality consultants (who are not always the most successful consultants) should favor these practices.

While we have focused on the dramatic case of management consulting, the coevolutionary framework presented here may prove useful in the analysis of a variety of domains. Service providers—conceptualized by Meyer and Jepperson (2000) as rationalized “others”—are on the rise. They play key roles in domains such as politics and schooling as well as individual-level behavioral change. For example, the contemporary educational landscape is characterized by a large and growing population of experts who advocate reform and assist teachers and schools in adopting new practices, as well as an even more rapidly growing consulting sector that provides services to students and their families (tutoring, college preparation, and assistance in composing the “perfect” personal statement). The field is also rife with the rise and fall of pedagogical, curricular, and administrative innovations (the new math, reform mathematics, common core, the testing movement, assessment, phonics, whole language, flexible scheduling, and the like). The model developed here has potential application to these and other settings, insofar as they satisfy the general preconditions for adaptive emulation (performance orientation, causal ambiguity, and publicly available success stories) plus differentiation and mobility on the supply side.

To sum up, the central finding of this study is that supply-side actors can foster faddishness even when both they and their clients are boundedly rational agents who emulate their most successful peers. Our claim is not

¹⁴ There has been a longstanding debate among consultants and those who study them regarding such schemes—a debate that often turns on the status of management consulting as a profession. An early critic observed that management consulting is “an amorphous umbrella that anybody can get under, with no price of admission” such as licensing, certification, or professional requirements (Higdon 1969, pp. 28, 32–33). Recent contributions to this discussion note the low membership in credentialing associations, absence of specific educational requirements, lack of occupational closure, and unclear standards against which to judge consulting performance (Kubr 2002, pp. 131–32; Kirkpatrick, Muzio, and Ackroyd 2012).

that notions of consulting wizardry and managerial gullibility are logically unsound but that they are optional rather than required elements of a supply-side account of management fashion. The market-seeking mobility of providers who vary in intrinsic quality provides a well-defined mechanism that robustly generates booms and busts in the adoption and abandonment of innovations.

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