



Does ambiguity promote imitation, or hinder it? an empirical study of benchmarking teams

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Abstract

Attractive theoretical arguments can be made that causal ambiguity promotes imitation and that it hinders imitation, but the relationship is seldom investigated empirically. We study 21 benchmarking teams whose projects led them to confront different levels of ambiguity. While all teams sought to learn from external firms, those facing the greatest ambiguity reported lower levels of inter-organizational influence and were less likely to reference visited companies when making recommendations to senior management. Rather than mimicking other firms, teams working in opaque domains turned to academics and consultants. These results resonate with resource and evolutionary theories of the firm, which explain why inter-organizational imitation is difficult, and with varieties of institutional analysis that emphasize interpretive processes grounded in theoretical models.

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Arguments about the diffusion of innovations, especially in organizational studies, often begin with the limits on cognition. A few examples:

‘Communication with one’s contacts helps resolve the ambiguity surrounding the value of an innovation’. (Davis, 1991: 593–594)

‘According to organizational theory, ambiguity is the main factor moderating the impact of the number of adopters on the strength of bandwagon pressures’. (Abrahamson and Rosenkopf, 1993: 494)

‘Mimetic adoption of newly innovated market positions may be the heuristic that allows managers to act in the face of uncertainty’. (Greve, 1996: 32)

‘When faced with uncertainty, organizations economize on search costs (Cyert and March, 1963) and imitate the actions of other organizations’. (Westphal, Gulati and Shortell, 1997: 369–3670)

This framing powerfully resonates with assumptions of organizational rationality (Mizruchi and Fein, 1999). For many, imitation raises the spectre of undirected or mindless action. An appeal to ambiguity resolves the tension,

revealing mimicry to be an effective strategy when calculation of an optimal strategy is not feasible.

Evolutionary and resource-based theories of the firm make the opposite argument, however. Consider:

‘Ambiguity as to what factors are responsible for superior (or inferior) performance acts as a powerful block on both imitation and factor mobility’. (Lippman and Rumelt, 1982: 420)

‘Valuable and rare organizational cultures may be very difficult, if not impossible, to imitate. First, it may not be possible for individuals observing a culture (let alone those experiencing a culture) to describe what about a particular organization’s culture adds value’. (Barney, 1986: 661)

‘The more easily a capability can be communicated and understood, the shorter the time to transfer or imitation’. (Zander and Kogut, 1995: 80)

As is often the case with seemingly self-evident propositions, little evidence links ambiguity and imitation. Diffusion analysts routinely make claims about ambiguity but do not test them. Quite remarkably, Everett Rogers’ (1995)

compendium of six decades of diffusion research across ten disciplines reports no relevant findings.

Some recent work begins to redress the imbalance between theory and evidence. Haunschild (1993) shows that variation in estimates of target value strengthens the relationship between the acquisition bids of a firm and those of its board interlocks, and Haunschild and Miner (1997) find similar effects on the choice of an investment adviser. By contrast, Ventrakamen *et al.* (1994) discover that multi-divisional structures appear to have spread less contagiously than joint ventures, and argue this is due to the M-form's greater complexity and causal ambiguity.

However, none of these studies make the case for a strong relationship. The organizational decisions that Haunschild (1993) and Haunschild and Miner (1997) study are not innovative. Ventrakamen *et al.*'s (1994) two-innovation study does not measure the ambiguity of either joint ventures or the M-form, and cannot control for alternative explanations. And in the best test we are aware of, Zander and Kogut (1995) find no effect of codification or teachability on the diffusion of 35 technological innovations. They argue that the pace of inter-organizational imitation is governed, not by characteristics of innovations, but by strategic behavior like the successful defense of proprietary knowledge.

While Zander and Kogut may be right, it seems premature to abandon the search. Because almost all diffusion research examines the spread of a single practice, we know much about the individual and organizational correlates of adoption, and have some insight into the social networks involved. But the paucity of multi-innovation studies means that we know little about why different innovations spread in different ways (Strang and Soule, 1998). A more comparative agenda is needed to develop the empirical evidence and theoretical sensibilities that would provide convincing answers to questions like 'does ambiguity promote or hinder imitation'?

This paper seeks to make initial progress by examining how one firm approached a variety of managerial and business innovations. The comparison is across 21 benchmarking teams formed at a multinational bank, called here Global Financial. Teams worked within areas as disparate as the Internet, Data Warehousing, and Work/Life Balance. We use archival, interview, and survey data to characterize the extent to which teams built their proposals for corporate innovation on the practices of external firms, and relate these differences to variations in perceived causal ambiguity.

This research strategy also reflects our concern with a growing imbalance in the innovation/diffusion literature. The rigor and sophistication of quantitative analyses of organizational diffusion has increased substantially in recent years. But muscular development on the methodological front has not generally been paralleled with commensurate advances in theoretical understanding, especially where foundational ideas are involved. Reports from the field may help to correct this imbalance.

Theory

We begin by clarifying our usage, since both 'imitation' and 'ambiguity' can sustain multiple meanings. We use 'imitation' in a generic sense to indicate that an organization is

positively influenced by what others do. Influence may involve a wide variety of cognitive and social processes like unconscious priming, slavish mimicry, group conformity, mindful translation, vicarious learning, and many more. This paper does not seek to systematically isolate these motives and mechanisms, and indeed works largely with omnibus measures of influence. We do mobilize quantitative measures of the structure of reference groups and vicarious learning, however, and seek to develop insight into the way managers introduced external exemplars into policy debates.

'Ambiguity' refers here to a (perceived) lack of understanding of means-ends relationships. This follows March and Olsen's (1976: 12) usage, which terms ambiguity as a fundamental opacity in decision-making. But while March and Olsen speak of the ambiguity of future preferences, cause-effect relationships, history, and attention, our concern is with knowledge of causes and effects. This knowledge is fundamental to organizational decision-making, while revolves significantly (though not wholly) around the likely consequences of various alternatives. Ambiguity is particularly salient when organizations seek to innovate, since past experience provides little guidance.

Causal ambiguity is related to but distinct from the concept of (perceived) environmental uncertainty, which is generally described in terms like complexity, volatility, entropy, and randomness (see Milliken (1987) for a careful review).¹ An earlier tradition of organizational research (March and Simon, 1958; Thompson, 1967) focused on adaptive strategies for coping with unpredictable task inputs and market conditions - such as delegating authority, investing in broadly skilled employees, hedging bets, buffering the technical core, and the like. While arguably central to organizational strategy and structure, these ideas bear little connection to imitation *per se*. And although environmental uncertainty may have important effects on innovation diffusion, we regard these as largely separable from the issues discussed in this paper.

The primary argument linking ambiguity to imitation is an economic analysis inspired by the notion of bounded rationality. Abrahamson and Rosenkopf (1993) refer to this as an 'efficient choice' perspective, an apt description: when knowledge of means-ends relationships is limited, imitation is argued to provide a feasible and effective decision strategy.

To rehearse the argument, it is useful to go back to classical models of choice, which involve four components:

1. Knowledge of alternative actions;
2. Knowledge of the consequences of alternative actions;
3. A consistent preference ordering among consequences;
4. A decision rule.

Causal ambiguity throws this machinery out of order. What if lack of knowledge about actions and their consequences makes the necessary calculations unfeasible? DiMaggio and Powell (1983) put it beautifully, building their influential analysis of mimetic isomorphism on classical lines:

'When organizational technologies are poorly understood (March and Olsen, 1976), when goals are ambiguous, or when the environment creates symbolic uncertainty,



organizations may model themselves on other organizations. The advantages of mimetic behavior in the economy of human action are considerable; when an organization faces a problem with ambiguous causes or unclear solutions, problematic search may yield a viable solution at little expense (Cyert and March 1963).¹

Work on 'information cascades' (Banerjee, 1992; Bikhchandani *et al.*, 1992) develop a parallel logic. Decision-makers consult not only their personal knowledge but also the choices of others, which reveals their (equally uninformed, on average) knowledge. Cascades begin when inferences based on the actions of others dominate any possible contribution from one's own signal. A lack of causal insight leads herd dynamics to emerge quickly, since weak private signals are easily overwhelmed.

Sociologists introduce a different calculus. The problem is not only to make an intrinsically effective choice; it is also to make one that will appear intelligible and legitimate. What others do is thus of central importance, because they define lines of action that can be understood and valued. Social psychological versions see this process as grounded in status anxiety and group conformity (Kerckhoff and Back, 1968). Structural versions emphasize the instrumental advantages of strategic compliance (Meyer and Rowan, 1977; Pfeffer and Salancik, 1978).

While the sociological argument is not about efficient choice, it asserts the same conclusion. Assume that organizations face both sets of demands: their resources and life chances depend on success in the market and on satisfying a logic of appropriateness. Ambiguity tilts this balance towards the social (Pfeffer *et al.*, 1976; Haunschild and Miner, 1997). When insight into (instrumental) consequences is lacking, social considerations become more prominent.²

As an aside, we note that the above arguments can be recast as making an existential claim. Not 'more ambiguity, more imitation,' but instead 'no ambiguity, no imitation.' This latter statement seems plausible but vacuous. All decision situations involve some ambiguity, just as all decision-makers are fallible. We thus interpret ideas about the difficulty of calculation and social pressures as generating the stronger, falsifiable claim:

H1: As causal ambiguity increases, organizations are more strongly influenced by what other organizations do.

While the above arguments focus on limited cognitive capacity and consequent failures of rational calculation, they treat imitation as simple and straightforward. However, ambiguities that impede calculation pose potential problems for mimetic behavior as well.

Lippman and Rumelt (1982) problematize vicarious learning with their concept of 'uncertain imitability.' Causal ambiguity obscures the sources of superior performance. How can decision-makers know what to copy if cause-effect relations are not understood? Their insight builds one pillar of a resource-based theory of competitive advantage.³

Even when the practices that generate superior performance are identified, they may not be easily transferred from one organization to another. The meaning and functioning of an organizational practice is generally embedded in its context, and is intertwined with local

values, understandings, skills, and a supporting network of other practices. The extraction of a practice from one location and its re-implantation in another is thus problematic. For example, Lillrank (1995) describes innovation diffusion as a three step process whereby (1) a concrete practice is represented by an abstract blueprint; (2) the blueprint is communicated to a potential adopter unfamiliar with the original; and (3) the adopter builds a concrete practice by following the blueprint. Each step is fraught with error, all the more so when cause-effect relationships are not well understood.

For us, the muddled American response to Japanese success in the 1970s and 1980s provides the best illustration (see Cole, 1989, 1999; Strang and Kim, 2004). It was obvious that American managers should learn from Japan, but what they should learn was not clear. Should American executives develop a Zen-like appreciation of subtlety and contradiction? Create business groups like the *keiretsu*? Should managers and production workers sing company songs together in the morning? (All of these ideas, and others even more bizarre, were seriously proposed.) And while the practices that American firms did fasten upon – quality circles and total quality management – were better conceived, much of their substance was lost in translation.

Strang and Meyer (1993) look on the bright side. They contend that diffusion accelerates where domains are 'theorized': where models of actors and their behavior are developed, and where functional or causal relations are (or at least are believed to be) understood. Only when ambiguity is tamed can generalized innovations be devised and disseminated. By contrast, untheorized domains lack a language to describe the connection between one organization's solutions and another's problems, and a theory to make this language compelling.

H2: As causal ambiguity increases, organizations are less influenced by what other organizations do.

How then can organizations act in the face of irreducible ambiguity? One strategy is to imitate selectively by focusing on strong ties. Frequent, intense, and long-lasting contact may mitigate much of what is difficult about imitation. Inter-organizational imitation begins to look more like intra-organizational practice transfer (Szulanski, 1996), and effective communication can take place although causal relationships remain obscure.

Much organizational research suggests the disambiguating quality of strong ties. Hansen (1999) finds that product development is speeded by strong ties when knowledge is complex and uncoded. Mizruchi and Stearns (2001) show that bankers rely on strong ties when deals are uncertain. Analyses of joint ventures and strategic alliances, which involve the institutionalization of strong ties, point to the transfer of tacit knowledge as a primary benefit (Khanna *et al.*, 1998). In fact, Kogut and Zander (1992) view the firm as a type of community that can effectively share knowhow, even without a formal language to express it.

H3: As causal ambiguity increases, organizations are more influenced by organizations they are strongly tied to.

An alternative strategy is to develop a language, or better, make contact with those who already possess one. This idea is part of DiMaggio and Powell's (1983) notion of normative isomorphism, though their emphasis is on the unintended consequences of professional authority and mobility rather than the constructive roles played by professionals. Our analysis is closer to Meyer and Rowan (1977), who argue that professionals provide recipes for rationalizing the organization, and Strang and Meyer (1993), who see theorists and the languages they develop as fundamental to diffusion. Once an area is cognitively settled, the behavior of peers may provide more immediate models – professionals, consultants, and especially academic theorists often have trouble keeping up with events. However, in cognitively unsettled, ambiguous domains, decision-makers may seek expert advice.

Some empirical support is provided by the critical role often played by professionals in the early stages of innovation diffusion. For example, Edelman (1992) argues that lawyers fashioned organizational responses to affirmative action laws. Dobbin *et al.* (1993) find that human resource professionals and lawyers jointly constructed the arrangements underpinning internal labor markets.

H4: As causal ambiguity increases, organizations are more influenced by experts.

While we have stressed oppositions across theoretical perspectives, these competing accounts have much in common. In particular, they agree with the central social scientific claim that actors resolve ambiguity by looking to social cues (Festinger, 1954). Jumping on bandwagons, taking the perspective of the other, and attending to experts are all social strategies for dealing with ambiguity. The debate is over which social cues organizations rely upon in different circumstances, not between social vs asocial behavior.

Research design

The standard diffusion study, which traces the spread of a single innovation across a population, is a blunt instrument for studying the relationship between imitation and ambiguity. It contrasts organizations that face the same decision, but either make different choices or make the same choice at different times. Ambiguity generally becomes a constant that affects all cases in the same way.

Conventional 'pattern finding' studies also rely on indirect evidence, inferring imitation if the hazard of adoption is statistically related to prior adoptions by network partners. However, model misspecification can inflate the apparent impact of prior adoptions and underestimate the extent to which organizations are responding in the same way to a changing environment (Greve *et al.*, 1995). While carefully specified models are adequate for most purposes, this level of indirection is undesirable when the existence rather than the structure of inter-organizational imitation is at issue.

We seek to gain leverage by shifting the vantage point. Rather than studying the spread of a single innovation across many firms, we examine how a single firm approached many innovations. And rather than inferring

imitation from adoption schedules, we develop direct measures of influence.⁴

To do so, we study 21 benchmarking teams formed at 'Global Financial,' a multinational bank. Teams worked on distinct innovation domains, which led them to confront different degrees of causal ambiguity (or at least so they told us). And while all teams had access to comparable mixes of information, some were heavily influenced by the models provided by other organizations, while for others this was a lesser consideration. We use archival data and survey self-reports to describe the impact of external models on benchmarking proposals, and relate these to variations in perceived causal ambiguity.

Of course, mimicry is fundamental to benchmarking, both procedurally through visits to external firms and normatively through the framing of the exercise as a search for 'best practice' (Camp, 1989). It is thus no surprise that every team shows clear evidence of inter-organizational influence. But the focus here is on variation across the 21 groups, not on central tendencies within Global Financial's program. The peculiar structure of benchmarking as an institutionalized form of imitation thus poses no threat to internal validity. We return to the limits imposed by our research setting in the discussion section.

The benchmarking process

Global Financial began 'Team Challenge', the benchmarking program examined here, in 1996. Teams examined broad issues facing the company – 'the things that keep the CEO up at night', according to one manager. Over a two and a half year period, 21 teams were formed to study 13 different issues.

Team Challenge was organized within the executive development arm of Human Resources. It had the twin aims of providing strategic input to the bank and furthering the career development of the managers who were enlisted as benchmarkers. From 12 to 20 managers were selected to work on each 'challenge.' Participants were high performers with bright prospects in the company. Diversity across business units, nationality, and gender was sought. In general, team members did not possess special expertise in the area of the challenge.

In most cases, two teams of about seven members each were formed to address each issue, though one challenge was organized into three teams and the six topics making up the first wave of Team Challenge were pursued by single teams. Teams working on the same topic visited many of the same companies and reviewed much of the same material, but conducted separate planning sessions and developed independent reports and recommendations.

All teams met at a site away from their regular workplace to be briefed by the bank's CFO and other senior executives. The first several days were devoted to team-building and familiarization with the problem area. Managers were provided with briefing books that surveyed professional and academic literatures on their topic. External consultants and academic researchers made presentations to the teams.

Managers then spent 2 weeks visiting external firms and conducting internal interviews. Teams then re-assembled to collectively formulate policy recommendations that they

presented to the firm's top management team. Reports discussed the strategic importance of the issue, identified an overall strategy, and made concrete implementation proposals. After the team's meeting with top management, individual participants were occasionally asked to head up or be involved in implementation, but most returned to their regular duties.

While not all benchmarking recommendations were viewed favorably by the top management team, we should note that most were accepted. Programs developing from Team Challenge were central to many of Global Financial's corporate initiatives during the late 1990s. The total quality challenge led to a global quality initiative; the high performance and work/life balance challenges led to programmatic efforts to address strains within the bank's intensely competitive culture; the Internet challenge set directions for the bank's Web offerings; and the sales challenge promoted a shift towards cross-selling financial products.

It should also be emphasized, however, that the efforts of benchmarking teams constituted no more than the first (or second) step in an arduous 'innovation journey.' Some recommendations were rejected out of hand, generally because key executives thought they were bad ideas. And even recommendations that were enthusiastically greeted by top management evolved in unanticipated ways over time, not infrequently to the benchmarker's chagrin. As other (and more organizationally powerful) actors got involved, they put their own stamp on the bank's strategy. And as plans turned into programs, the boldness of benchmarking visions often dissipated as they were made more consistent with the organization's *status quo*. The present study should thus not be mistaken for a full-fledged analysis of organizational change.⁵ It is instead a theoretically driven inquiry into how groups of managers devised strategies for corporate innovation.

Data and measures

We develop an archival measure of mimetic influence through examination of team reports. Reports to senior management included references to benchmarked companies, both to document the sources of team proposals and to provide evidence that advocated practices were successfully in use elsewhere. *Report mentions* count the number of times each visited company was referenced in connection to concrete practices.

After conducting 10 phone interviews with team members to learn about the benchmarking process, we surveyed all members of Global Financial's benchmarking teams. Surveys were returned by 94 of 156 team participants (144 still with the bank at the time of the survey), a response rate of 61%.⁶

Surveys asked managers about the role of *visits to external companies* and *the literature and consultants*. Respondents scored their influence on four dimensions ('helped team conceptualize issues,' 'affected recommendations,' 'helped make the case for team recommendations,' and 'affected your views'). Responses were strongly associated within sources of information ($\alpha = 0.93$ for visits and 0.85 for literature and consultants) so we form scales averaging responses across the items.⁷

Table 1 Influences on benchmarking teams

	Mean	% very or extremely influential
<i>Sources of information</i>		
Literature and consultants	3.20	25
<i>Observed outcomes</i>		
Specific examples of success	4.06	82
Specific examples of failure	3.63	67
Comparative data	3.10	31
<i>Reference groups</i>		
Many firms	2.95	27
Prestigious firms	3.82	70
Competitors	2.96	36
Customers & partners	3.21	42

Data drawn from surveys of managers who participated on benchmarking teams ($N = 94$ usable responses).

Questions took the form 'How influential were the following ... for your team's evaluation of possible approaches to your < benchmarking topic >?'

All responses were given on a 1–5 scale, where 1 = 'no influence' and 5 = 'extremely influential'.

Additional questions sought to gauge attention to outcomes and reference groups. To inquire into efforts at learning from outcomes, we asked team members about the influence of *specific examples of success elsewhere*, *specific examples of failure elsewhere*, and *comparable data across firms*. To probe attention to reference groups, we asked about the influence of *the business community as a whole*, *prestigious firms*, *competitors*, and *customers or business partners*.

Table 1 summarizes the importance of each of these considerations. Team recommendations liberally referenced visited firms; the average company was mentioned twice, and the average report included 21 mentions. Managers also reported that external visits had a strong impact, while indicating a weaker overall role for consultants and the literature. As one manager put it in an interview, 'I'm sure one of our guys read the whole thing [the briefing book], but it wasn't me.'

Managers also reported that they were more influenced by concrete examples of success and failure than by comparative data, a preference that helps generate faddish cycles (Strang and Macy, 2001; Strang and Still, 2004). Prestigious companies form the single most important reference group. Benchmarkers also reported that they were strongly oriented towards the bank's business partners and customers, though not to its competitors in financial services or to the business community as a whole. These latter accounts were offered with some force; in interviews, we were told that as an industry leader Global Financial had little to learn from its competitors, and that 'following the herd' was counterproductive.⁸

The ambiguity of innovation domains is measured via the perceptions of benchmarking managers. Managers agreed or disagreed (on a 6-point scale) with the following statements:



'... is an area where cause and effect is well understood'
 'Effective approaches to ... are easily understood and communicated'
 'Effective approaches to ... have been systematically studied and developed'
 'Effective approaches to ... are generally agreed upon within the business community'

where '...' named the subject of their Team Challenge. While the items tap different aspects of the ambiguity surrounding a benchmarking area, they are strongly related. We reverse code all four items and take their mean ($\alpha = 0.69$).⁹

Methods

Our concern is with variation across teams, rather than variation across team members. We thus asked benchmarkers about collective properties ('how was the team's thinking influenced by ...') and conduct ANOVA tests of the feasibility of aggregating their responses to form team-level indicators.

Survey measures of ambiguity vary more between challenges than within them. Ranked in ascending order, they are: Total Quality (least ambiguous), Sales, Treasury Organization, Derivatives Strategy, Training & Development, Foreign Exchange Strategy, Work/Life Balance, Quality Culture, High Performance Work Organization, Customer Service, Data Warehousing, Organization of the Corporate Center, and the Internet (most ambiguous).

Teammates also tended to agree about how they had arrived at collective decisions, though perceptions of the impact of the business community as a whole and of competitors vary more within teams than across them. (Archival counts of report mentions are by definition team-level measures.) We confine statistical analysis to indicators that can be aggregated to the team level, and discuss outliers but not systematic patterns where this is not the case.¹⁰

Since measures characterize teams, we work with 21 cases. As Charles Ragin (1987) points out, this is an awkward N : too small for multivariate statistical analysis and too large for close examination of individual cases. Our strategy is to search for robust low-order relationships, since we cannot control for multiple factors simultaneously. We first examine bivariate relationships between ambiguity and influences on benchmarking, inspecting product-moment correlations and comparisons of means. Simple correlations then become partial correlations in a series of analyses that control for additional innovation characteristics. Finally, we consider four benchmarking challenges in more detail.

Results

Table 2 indicates that ambiguity bears a largely negative relationship to imitation of visited firms. Teams facing greater ambiguity were less likely to refer to visited firms in making policy recommendations to top management. The differential is about 60% (2.48/1.56) per benchmarked firm. These cumulate to a difference of almost 300% when we

Table 2 Relationship between causal ambiguity and features of the cognitive structure of benchmarking

	<i>All teams</i>	<i>Low ambiguity</i>	<i>High ambiguity</i>	<i>F</i>	<i>Correlation with causal ambiguity</i>
<i>Team recommendations</i>					
Mentions of visited companies	2.05	2.48	1.56	4.96**	-0.33***
<i>Sources of information</i>					
Benchmarking visits	3.92	3.94	3.90	0.03	-0.22
Literature and consultants	3.19	2.93	3.42	8.70***	0.46***
<i>Types of evidence</i>					
Specific successes	4.06	4.00	4.12	0.45	0.01
Specific failures	3.63	3.80	3.48	2.04	-0.30
Comparative data	3.10	3.16	3.04	0.49	-0.17
<i>Reference groups</i>					
Prestigious companies	3.82	3.74	3.88	0.61	-0.12
Customers & business partners	3.21	3.28	3.14	0.42	-0.15
No. of Teams	21	11	10		

* $P < 0.1$; ** $P < 0.05$; *** $P < 0.01$.

Mentions of visited companies' counts references in benchmarking reports that link external companies to organizational practices recommended by the team. Other row variables refer to the self-reported influence on benchmarking teams of various sources of information, observed outcomes, and reference groups.

Causal ambiguity is based on the self-reports of participants on benchmarking teams to a 4-item scale. Sample item: '... is an area where cause and effect are well understood' (reverse coded).

Columns report average responses across all teams; average responses for teams that reported higher than average ambiguity; for teams that reported lower than average ambiguity; an F -test comparing responses across the two groupings; and the Pearson's correlation between the row variable and the level of causal ambiguity reported by the team.

$N = 21$ benchmarking teams (individual survey responses are averaged to form team-specific scores).



consider total references to visited companies in each report, since teams facing more ambiguity referenced fewer companies as well as referred to each one less often, on average. Teams facing higher than average ambiguity contained an average of 10 mentions of external firms, while those below the mean offered an average of 27.7 mentions.

Managerial reports of the influence of benchmarked firms are negatively related to ambiguity as well, though the differential is smaller and not statistically significant. This may point to a lesser resolving power of self-reports. It might also indicate that external visits affected all teams strongly, but that this influence is further from 'simple copying' (as reflected by report mentions) in ambiguous domains.

Ambiguity bears no strong relationship to the types of firms that benchmarking managers attended to. In all innovation domains, benchmarking managers were most strongly influenced by prestigious firms and by success stories. There is some suggestion that attention to 'failure stories' declines with ambiguity, but this tendency is modest and not statistically significant across 21 teams.

Most important, we see no sign that teams dealt with a lack of means-ends knowledge by focusing attention on business partners and customers. Perhaps strong ties could have helped resolve the ambiguity of questions like how Global Financial could become a 'high performance work organization.' But benchmarkers did not avail themselves of this strategy. Indeed, the average influence of business partners and customers was slightly smaller for teams facing high levels of ambiguity, though the relationship is not statistically significant.

Rather than focusing on distinctive reference groups, teams confronted with high levels of causal ambiguity turned to the experts. Members of six of ten teams facing low ambiguity rated the literature and consultants as less than 'somewhat influential' (the midpoint on the scale), while no team facing high ambiguity did so. The strong positive correlation ($r = 0.46$) indicates that this difference holds with most force at the extremes of the distribution. The Internet and the Corporate Center scored the influence of the 'literature and consultants' highest, and these were also the challenges rated as most uncertain; the lowest ratings come from the Derivatives, Sales, and Training and Development challenges, all of which were well below the mean on ambiguity.

Statistical controls

The bivariate relationships shown above might be the spurious product of other innovation characteristics linked to both imitation and ambiguity. We thus probe the robustness of the relationships shown in Table 2 by controlling for seven factors relevant to innovation diffusion. While broad ranging, this analysis is of course not comprehensive – it should be trivially easy to 'explain away' statistical associations based on 21 cases (though we have not accomplished this feat).

The candidate factors examined here are:

- technical (vs administrative) innovation
- product (vs process) innovation,
- the strength of the bank's track record in the innovation area,

- the strategic importance of the innovation area, as perceived by Globalbankers
- the complexity of the innovation area
- average team member experience in the innovation area
- the reluctance by external firms to share information about the innovation area.

Some of these characteristics are plausibly related to both imitation and ambiguity. For example, a poor track record might make imitation a good 'catch up' strategy while also leading managers to perceive the area as one where causal relationships are not well understood. In other cases, there is a natural hypothesis about imitation (for example, that it should decrease when firms refuse to share information) but no obvious link to ambiguity.

The first three columns of Table 3 give partial correlations between ambiguity and influences on benchmarking teams, controlling for the row variable.¹¹ The pattern is a simple one. Net of each measured characteristic, ambiguity is associated with stronger influence by experts and fewer mentions of visited firms in team proposals. The only shift in coefficients reinforces bivariate results: controlling for prior success in the innovation area, the perceived impact of visited companies declines with ambiguity.

Table 3 also indicates that three innovation characteristics are linked to self-reports of attention to visited firms. Consistent with the notion of problem-driven search, managers indicated a greater role for imitation where Global Financial had been less successful. There is also more attention to visited companies in domains perceived as less strategically important. Interviews with benchmarking managers lead us to interpret this as indexing the rhetorical value of external exemplars – the experiences and successes of other firms, particularly prestigious firms, provided useful counters to audience skepticism. Finally, visited firms were less influential where issue domains were seen as highly complex, a result that parallels our main findings concerning causal ambiguity.

Four cases

Finally, we look in greater detail at benchmarking teams operating in four innovation domains. These vary in levels of perceived causal ambiguity, and also in their perceived strategic importance – a significant differentiating factor in its own right, and one that helps separate the wheat from the chaff.¹² The four Team Challenges reviewed here are the Internet (ambiguous and important), Sales (unambiguous and important), Total Quality (unambiguous and unimportant), and Work/Life Balance (ambiguous and unimportant).¹³ Figure 1 provides a summary of major influences on each challenge.

The novelty of e-commerce in the late 1990s makes the Internet challenge central to the comparisons developed here. Benchmarkers sought to determine an effective strategy in a context where the direction of commercial uses, customer preferences, the bank's capabilities, technological developments, and competitor strategies were unclear, and where there was great confusion about the type of market that the Web represented. Benchmarkers were thus unsure about what strategy to pursue, and indeed in knowing on what basis to choose between strategies.

Table 3 Partial correlation analysis of the relationship between causal ambiguity and features of the cognitive structure of benchmarking, net of selected innovation characteristics

	Correlation with ambiguity, net of row variable			Correlation with row variable, net of ambiguity		
	Mentions	Visits	Experts	Mentions	Visits	Experts
Technical (vs administrative) innovation	-0.56**	-0.30	0.46**	-0.12	-0.30	0.11
Product (vs process) innovation	-0.58**	-0.18	0.45**	0.10	-0.25	0.05
Bank has strong track record in the innovation area	-0.56**	-0.45**	0.42*	-0.06	-0.68***	-0.35
Globalbankers view area as strategically important	-0.57**	-0.25	0.45**	0.16	-0.60***	-0.11
Innovation area is complex	-0.61**	-0.12	0.49**	0.34	-0.52**	-0.13
Average team member experience in innovation area	-0.60**	-0.19	0.47**	-0.02	-0.02	-0.20
External firms are reluctant to share area-specific information	-0.51*	-0.27	0.45**	0.24	-0.19	-0.07
No variable controlled	-0.57**	-0.19	0.45*			

* $P < 0.1$; ** $P < 0.05$; *** $P < 0.01$.

'Mentions' counts references in benchmarking reports that link external companies to organizational practices recommended by the team; 'visits' equals average reported influence of visits to external companies; 'experts' equals average reported influence of the literature and consultants.

Causal ambiguity is based on the self-reports of participants on benchmarking teams to a 4-item scale. Sample item: '... is an area where cause and effect are well understood' (reverse coded).

Technical vs administrative innovation and product vs process innovation are binary indicators assigned by the authors. All other measures are derived from the self-reports of participants on benchmarking teams to questions about the content and organizational context of their team project.

$N = 21$ benchmarking teams (individual survey responses are averaged to form team-specific scores).

	Low Perceived Strategic Importance	High Perceived Strategic Importance
Low Perceived Ambiguity	<p>Total Quality</p> <p>Close attention to prestigious companies, customers, and the business community as a whole.</p> <p>Little attention to the literature and consultants.</p>	<p>Sales</p> <p>Close attention to prestigious companies, competitors, and customers.</p> <p>Little attention to the literature and consultants.</p>
	<p>Work/Life Balance</p> <p>Little attention to visited companies.</p> <p>Close attention to the academic literature.</p> <p>Close attention to employee concerns at Global Financial.</p>	<p>Internet</p> <p>Little attention to visited companies overall, but relatively close attention to competitors.</p> <p>Close attention to the consulting literature.</p>

Figure 1 Summary of key influences on benchmarking teams operating in four innovation domains.

Global Financial's Internet strategy, we should note, was also seen as having great strategic importance. A number of Globalbankers told us that the most serious challenges they foresaw came not from other established money centers, but from new providers born on the Web. But the unfamiliarity and pace of change of the Internet made it difficult to plot a course for Global Financial (as the investing public also discovered, to its dismay).¹⁴

Teams benchmarking the Internet tended not to imitate specific firms. Managers rated the influence of the companies they visited as rather limited, and hardly referred to these firms in developing proposals for Global

Financial. In fact, while teams in other challenges typically saw the companies they visited as possible exemplars, managers on the Internet Challenge often treated them as technical advisers.

Development of an Internet strategy also drew heavily on business consultants and other experts. Twenty-four such individuals and firms were contacted, perhaps the most of any challenge. Teams found Hagel and Armstrong's *net.gain* useful as a source of step-by-step prescriptions for capturing value from an uncertain market. Benchmarkers concluded that the Internet presented a 'completely different economic model' and that 'The new business environment...requires us to change our mindset from 'own' to 'influence'.'

Finally, to the extent that Internet teams were influenced by external firms, they emphasized a distinctive reference group: other firms in the financial services industry. While competitors generally played a minor role in Global Financial's benchmarking efforts, the Internet teams form the exception to this rule. Other banks were often visited, and both content analysis of team recommendations and survey responses indicate that these visits were influential.

Why would competitors be important for the Internet Challenge but not elsewhere? The reason may be that the Web was the one innovation domain that was simultaneously *ambiguous*, *uncertain*, and *risky*. The pace and unpredictability of its evolution was great, and Global Financial was vulnerable. As Burt (1987) argues, fear of losing one's position trigger intense monitoring of rivals.

The Sales teams worked on another salient business opportunity – how to integrate Global Financial's marketing efforts and aggressively cross-sell its products. However in Sales, unlike the Internet, means-ends relationships



appeared well understood. As a team participant we interviewed told us,

'We found out early on, there's no treasure here. There's no gold. And you want to find gold. There's things you can do that are time honored; that's about all you can do.'

This lack of ambiguity did not prevent managers on the Sales Challenge from learning from the practices of external companies. Sales teams rated the impact of visited firms more highly than did the managers on any other challenge, and were above the mean in their attention to three reference groups: prestigious companies, business partners and customers, and competitors. Asked about external visits, one manager responded

'I think that they were very influential and relevant. [We learned that] there has to be a sales culture. There has to be a process – in terms of measures, goals, constant feedback, a link between performance and compensation, integrity, controls, and delivery of data to the sales process'.

Sales teams returned with clear recommendations that Global Financial establish management systems patterned on those working effectively elsewhere.

Total Quality provides a second innovation area that was seen as relatively unambiguous, though here Globalbankers were skeptical about the bottomline benefits. Interestingly, both perceptions contradict much discussion in the academic and practitioner literatures, which stress the difficulty of implementing TQM and its potential performance advantages. Globalbankers saw total quality as a systematically developed technology, but one with a limited upside.

Like Sales teams, Total Quality teams sought to learn from exemplars. They attended particularly closely to prestigious companies, both ones celebrated for their quality programs as well as firms with high standing in the business community overall. Benchmarkers returned to Global Financial with concrete stories about how and why TQM worked. For example, one participant reported:

'For me, I was especially interested in [], because it was in services. They provided a great example of a root cause analysis, in tracking down plumbing problems. It was a very practical, understandable example'.

The impact of these visits was so strong that benchmarkers were described to us as becoming proponents of the companies they had visited.

By contrast, Total Quality teams evidenced relative inattention to experts. This is remarkable when we recall that modern quality methods are largely defined around prominent figures like Joseph Juran, W. Edwards Deming, and Kaoru Ishikawa. We think that by the late 1990s the ideas of the 'quality gurus' had been broadly absorbed within the business community (also see Cole, 1999). Concrete programs, especially in prestigious firms, provided tangible and up-to-date models for action within a well-defined domain.

Finally, teams working on Work/Life Balance faced a double whammy: irreducible ambiguity and limited strate-

gic importance. The problem was not novelty (as with the Internet) but the messiness of behavioral engineering. While the bank possessed exemplary formal programs, changing informal norms was difficult. A good manager's instincts could not be legislated for the bank as a whole.

Managers benchmarking Work/Life Balance found external visits provocative but of limited value. The commitment that some corporations made to their employees was visible and attractive. However, the achievements of firms like Patagonia and Levi Strauss seemed bound up in unique and inimitable corporate cultures. As one manager told us, 'You were able to get a picture of what a good organization looked like, but not how to get there'.

Work/Life Balance teams found they needed to go outside 'best practice' for ideas and information that could structure their proposals. They paid close attention to researchers who were building the business case. One manager described the contribution from academics in much stronger terms than we were accustomed to hear:

'I think they gave us the ammunition to use. They gave us the background, some of the academic proof we needed. And some of our thoughts formed around that material. We visited []. She's the one who advocates using a model of offsetting costs. You actually figure out if you improve on work-family balance, what does it cost'.

Beyond attention to the experts, however, the key strategy that emerged within Team Challenge was to investigate the realities of work/life concerns at Global Financial. Teams expanded upon the usual internal interviews with corporate leaders to conduct an on-line survey and organize focus groups in Hong Kong, Bangkok, and Belgium. In short, managers acted more like researchers than like benchmarkers! And these efforts bore fruit. After their presentation, the CEO informed team members that they had identified 'important new facts' about the extent of work/life concerns throughout the organization, and had successfully made the case that balance was an issue not only in the United States but around the world.

Overall, examination of four specific challenges reinforces the claim that ambiguity hinders mimesis. Managers benchmarking ambiguous domains like the Internet and work/life turned to the experts, who provided road maps for an Internet strategy and an accounting scheme for the financial benefits of work/life balance. Managers also acted as researchers, investigating technologies for using the Web and discovering how Globalbankers felt about the balance in their own lives. However, the behaviors exhibited by external firms gave them little material to work with.

Teams benchmarking Sales and Total Quality, by contrast, did not feel compelled to cool their heels outside professors' offices or conduct their own investigations. They saw the domains they benchmarked as relatively settled, and found that exemplary companies provided concrete lessons that they could use. While none of these teams slavishly 'copied' anyone, strategies for cross-selling and TQM were built on observation of leading companies in ways that Internet and work/life strategies were not.

This section's attention to differences in perceived business importance also provides some insight into benchmarking's more strategic dimensions. The skepticism with which Globalbankers greeted TQM helps us understand why benchmarkers stressed the achievements of highly prestigious companies. And Globalbanker appreciation of the Web's transformatory potential helps explain why Internet teams kept one eye on competitors. Differences in perceived strategic importance, and perhaps in perceived environmental uncertainty, seem particularly relevant to the identification of reference groups.

Discussion

Ambiguity about the relationship between means and ends is a core theme in organizational studies. In the literature on innovation diffusion, theories of efficient choice argue that a lack of causal insight prevents boundedly rational managers from calculating optimal strategies, and makes them more likely to mimic others as an inexpensive alternative. Much sociological analysis agrees, treating ambiguity as a license to introduce social processes like emulation and conformity.

Innovation proposals at a global bank tell a different story. Managers facing great ambiguity were less likely to refer to the firms they had visited in making policy recommendations, and reported a lesser impact of visited companies. And while teams developed reference groups that reflected the competitive or rhetorical challenges they faced, there is no general relationship between ambiguity and the kinds of firms that Globalbankers attended to. Instead, the main effect of ambiguity was to increase attention to consultants, professionals, and academics.

These findings resonate with evolutionary theories of the firm and with much institutional analysis. These perspectives may seem strange bedfellows, since theories of the firm emphasize obstacles to homogenization while institutional accounts argue that isomorphism is all around us. But they converge on a view of imitation as an interpretive process grounded in generalized models. And their division of theoretical labor makes for complementarity: theorists of the firm help us understand why imitation is difficult, and institutionalists help us understand how the difficulties are overcome.

In this study, at least, 'what other firms do' played an organic and interpretively complex role in organizational cognition. Indeed, we found mechanical notions of 'blind mimicry' untenable after interviewing benchmarkers, who skillfully made use of both visited firms and experts to develop and legitimize corporate policies. It is precisely because managers approached imitation as part and parcel of organizational problem-solving, rather than as clueless simians, that ambiguity limited rather than expanded the influence of external models.

Limitations and future directions

This paper's results refer to 21 benchmarking teams in one company. From a statistical perspective this is a small *N* with unknown sampling properties, and replication with stronger controls is desirable. Rather than dwell on design limitations, however, we want to focus on substantive issues.

First, are this paper's findings a simple product of our research site? Global Financial is an elite firm and acknowledged leader in financial services. A less well-established bank might have visited more competitors; a firm reeling from failure might have been less willing to experiment; a captive producer might have focused attention on key exchange partners. This study is a comparative analysis of innovation efforts across issue domains, but also a case study of a multinational bank.

The benchmarking context might also condition the way inter-organizational influence enters into corporate innovation. Team Challenge provided cultural and material resources that shaped the way benchmarkers went about their work. In terms of the theoretical issues examined in this paper, the main such effect was probably to restrict attempts at pursuing a 'strong tie' strategy for resolving ambiguity. Executives have resources for pursuing this strategy, like formalizing partnerships and joint ventures, that are not available to benchmarkers.

These limitations are best addressed by studying innovation across various decision-makers and organizational contexts. How do senior executives versus general managers vs specialists approach inter-organizational learning? How does explicit planning differ from that of seat-of-the-pants decision-making? How does an organization's structural position and identity shape its stance towards imitation?

A second sort of limitation, more self-imposed, involves the conceptual framework applied in this paper. We have focused, rather single mindedly, on the relationship between causal ambiguity and the imitative content of benchmarking proposals. In doing so, little attention has been paid to other characteristics of innovations and to a wider range of managerial motives. While we have not wanted to prematurely complicate matters, some concluding mention of some of the issues this paper has overlooked seems appropriate.

When managers make innovation decisions, they are confronted by many cognitive challenges beyond the one stressed here. In some situations, the problem is not an absence of means-ends knowledge, but a plethora of disparate logics that must be simultaneously entertained. As March and Olsen suggest, preferences and history can be just as ambiguous as cause-effect relationships. For Podolny (2005: 227-232), the distinction between egocentric uncertainty (uncertainty about production functions, which is roughly equivalent to our causal ambiguity) and altercentric uncertainty (uncertainty about prices) is central. And there is also environmental uncertainty and downside risk, which have been flagged here but not seriously addressed.

This paper has also defocused the strategic side of corporate innovation. Exemplars and experts are resources that can be deployed to embellish the advocate's status, mobilize supporters, and quiet opponents (Callon, 1986). This was certainly true for the benchmarkers we study, who had little organizational power but considerable cultural standing as managers disinterestedly in search of best practice. Benchmarkers may also anticipate what external models will most appeal to their audience, and structure their presentations around that material.¹⁵ In short, accounts of corporate innovation that center on politics, especially symbolic politics, are highly plausible.

For us, much of the interest in ‘innovation diffusion’ stems from the multiplicity of logics involved – the way it can be addressed as a problem in cultural sociology, social physics, organizational politics, and even rational choice. Unfortunately, our language often reflects this embarrassment of riches poorly. ‘Diffusion’ is burdened by connotations of particle movement from high to low concentrations, particularly for those who remember their physics. ‘Imitation’ also has overly mechanistic overtones – ones that we have sought to elude, probably unsuccessfully, in this paper. Much work, particularly in the institutional tradition, seeks to develop better language and better theories of the way ideas travel, and in doing so domesticate actors and are domesticated by them (see, for example, Lillrank, 1995; Czarniawska and Joerges, 1995; Czarniawska and Sevón, 1996; Westphal *et al.*, 1997; Kjaer and Pedersen, 2001; Strang and Kim, 2005). It is as a party to this effort that we hope this paper can be translated.

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Notes

- 1 It is possible to treat causal ambiguity and environmental uncertainty more synonymously, and indeed some formal definitions create confusion by appearing to do so (Knight, 1921; Milliken, 1987: 134). But while heroic attempts have been made to unify the two empirically (for a great example, see Leblebici and Salancik, 1981), we find them unpersuasive.
- 2 Economic and sociological accounts differ more substantially over who or what will be imitated. Economic accounts suggest that organizations should imitate successful practices or, if the specific causes of performance cannot be discerned, successful firms. Sociological accounts, by contrast, imply the imitation of prestigious firms, whose standing confers legitimacy on their epigones.
- 3 Lippman and Rumelt can be read as linking ambiguity to the likelihood of unsuccessful imitation, rather than the infrequency of mimetic behavior. But recall that the efficient choice argument is also a statement about outcomes. If success is irrelevant, managers can as readily miscalculate their strategy, copy another firm, toss a coin, or consult an astrologer.
- 4 While organizational researchers do not often adopt a ‘process tracing’ approach to study innovation diffusion, work in other fields provides good models. See for example Bennett’s (1991) analysis of the way British and Canadian policymakers interpreted and were influenced by the American Freedom of Information Act.
- 5 One of the programs that began as a benchmarking proposal, Global Financial’s corporate quality initiative, is studied in some detail in Strang (2003) and Strang and Jung (2005).
- 6 A comparison of background characteristics of survey respondents and non-respondents showed no significant differences. 19% of respondents were women, compared to 18% women in benchmarking teams overall. 68% of respondents were located in the US (*versus* 70% overall). Further background data was available for US-based participants. US-based respondents and team members had been at Global Financial for 10 years; the average salary was \$163,655 for respondents, \$163,101 for all members of benchmarking teams.
- 7 We also asked managers about the internal interviews they conducted at Global Financial. We neither anticipate nor find a relationship between ambiguity and the influence of internal interviews.
- 8 Benchmarkers may have underestimated the influence of competitors and general trends in the business community, since these reference groups were generally incompatible with Global Financial’s status as an elite organization. But while some reporting bias is possible here, we do not think it is likely to be large. The benchmarker’s conception of their firm’s elite status – and the consequent indignity of mimicking rival banks or popular trends – was shared held by the bank’s executives as well, and these combined to limit the extent to which Team Challenge was organized around intra-industry comparisons or following the herd.
- 9 We also examined alternative scales that include three of each of the four items, and found no qualitative shifts in the relationships presented below.
- 10 An alternative approach, which has some theoretical appeal, would be to aggregate survey responses to the level of the benchmarking challenge. We analyze relationships at the level of teams instead, because these form real ‘collective actors’ and because permitting variation across teams and within issues provides a stronger test. We note that all variables that aggregate at the team level also aggregate to the issue level, and that analyses of variation across issues reproduce the qualitative relationships reported below.
- 11 We look at three indicators that are central to theoretical arguments and to the results of bivariate analyses: self-reports of the impact of visited firms, self-reports of the impact of the literature and consultants, and mentions of visited companies in team reports. Owing to this study’s small *N*, we introduce each candidate factor in a separate, three-variable analysis rather than controlling for all seven simultaneously.
- 12 Perceived Strategic Importance is measured via benchmarker agreement/disagreement with the statement: ‘... is an area that Globalbankers regard as critical to Global Financial’s success.’ These perceptions are highly correlated with the bank’s track record in the innovation area (Globalbankers were less skeptical when the firm’s track record was more excellent), the other variable we would make central to models of corporate innovation. Strang and Still, (2004). examine the benchmarking projects studied here to test and improve arguments about innovation diffusion proposed by Strang and Macy (2001).
- 13 The Work/Life Balance parallels the other explicitly ‘corporate cultural’ challenges (Quality Culture and High Performance Work Organization): all have similar ambiguity scores that lie above the mean, none were seen as critical to the bank’s success, and none were seen as areas where the bank had a strong track record. We focus on Work/Life Balance because interviews with participants provide us with a fuller picture.
- 14 The Internet challenge thus combines great causal ambiguity, environmental uncertainty, and strategic importance – a managerial perfect storm!
- 15 We hasten to add that strategic behavior does not vitiate this paper’s empirical analysis – it may shape the choice of external models, but not the overall force of imitation.

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