

On the Origin of Strategy: Action and Cognition over Time*

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On the Origin of Strategy: Action and Cognition over Time

Abstract: We develop a perspective on how managers search for a strategy. In the spirit of Cyert and March (1963), we aim for a perspective that reflects the reality of managerial behavior; that respects both the reasoning power of managers and the bounds on their rationality; and that permits organizations to change, but within realistic limits. Our perspective employs the variable *time* to frame the question of strategy's origins in a distinctive way. Over time, the cognitive and physical elements that make up a strategy become less plastic, while mechanisms to search rationally for a strategy become more available. This generates a fundamental tension in the origin of strategy: managers struggle to understand their environment well enough to search rationally for an effective strategy before their firms lose the plasticity necessary to exploit that understanding. A focus on time allows us to synthesize and extend the evolutionary and positioning models of strategic search. Toward this end, we couple induction and deduction. The inductive part of the paper uses detailed observation of the search for a strategy at one firm in order to identify constructs that play a crucial role in strategic search. The deductive part steps beyond our focal firm and uses these constructs to derive theoretical propositions about the typical path of strategic search and the mortality associated with different approaches to search.

Where does a firm's strategy come from? Though seemingly fundamental to the study of organizations, this question has received less attention than it merits. Extant work on it includes a few detailed case studies (e.g., Bower, 1970; Burgelman, 1991; Siggelkow, 2002), even fewer large-sample analyses (Bhide, 2000), and important theoretical work (e.g., Bower, 1970; Mintzberg, 1987; Stinchcombe, 1965). Yet the strategy field remains distant from a clear understanding of how initial conditions, foresight, experience, competitive feedback, and other forces combine to shape the origins of strategies.

This gap derives in part from strategy's dual nature. First, strategy exists in the minds of managers – in their theories about the world and their company's place in it (Porac *et al.*, 1989; Huff and Jenkins, 2002). Second, strategy is embodied. It is reified in a firm's activities (Porter, 1985), rules (March *et al.*, 2000), and routines (Nelson and Winter, 1982). Understanding the origins of strategy therefore requires a grasp of how both its aspects – the mental and the physical – jointly come into being. That is, it requires the characterization of a two-part search process. One part occurs in the world of cognition and comprises the mental processes that mold particular theories about the firm and its environment. The other part unfolds in the world of action and consists of mechanisms that shape what a company actually does. These two aspects of strategic search are intimately related, and in subtle ways (Gavetti and Levinthal, 2000). Characterizing the two aspects and the relations between them is such a steep challenge that it is not surprising significant lacunae remain.

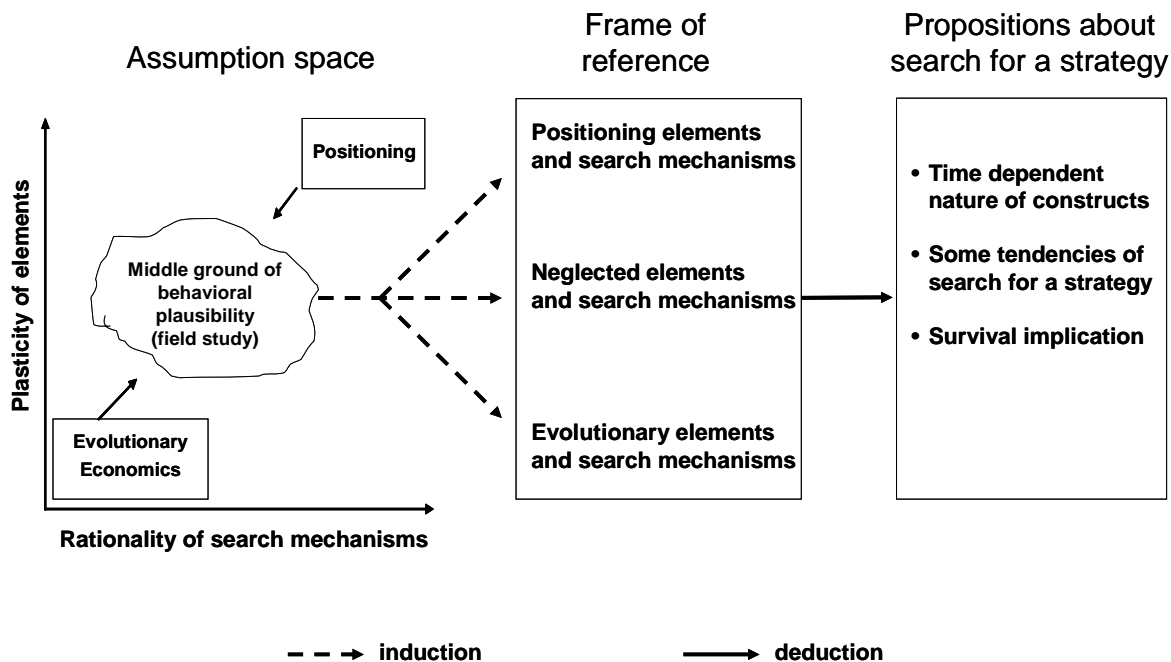
This paper aims to help fill those lacunae in a way that has deep roots in the Carnegie tradition of organization research (Simon, 1957a; March and Simon, 1958; Cyert and March, 1963). First, we try to characterize the process of searching for a strategy in a manner that is plausible in light of how managers and firms truly behave. Our desire for behavioral plausibility finds its origins in Cyert and March's (1963: 3) call for an “[e]mpirically relevant, process-oriented, general theory of economic decision making by a business firm.” Second, we follow Cyert and March (1963: 3) in coupling “detailed observation of the ways in which business organizations make decisions” with “a commitment to theoretical generality.” This coupling implies that our paper has an inductive part (§2-5) and a deductive part (§6). The inductive part uses detailed observation of the search for a strategy at one firm in order to identify often-overlooked constructs that can play a crucial role in strategic search. The deductive part steps beyond our focal firm and asks what those constructs imply, in theoretical generality, about how strategic search unfolds.

The inductive portion of the paper begins with the recognition that any model of search must specify two types of constructs: the *elements* that are to be searched and the *mechanisms* by which elements are searched. Therefore, we aim for behavioral plausibility along two dimensions relevant to elements and mechanisms: plasticity and rationality. We seek a description of search in which firms are realistically plastic – able to change elements of their strategies, but only within limits. At the same time, we aim for a description that allows managers to employ rational search mechanisms, but respects the bounds on their rationality. To identify relevant elements and search mechanisms, we focus on two well-known models of strategic search (§2). Through their conceptual lenses (Allison, 1971), we examine the search for a strategy at our focal firm (§3). The two models make opposite and extreme assumptions about plasticity and rationality. Consequently, they focus on different constructs (i.e., different elements and search mechanisms) as they characterize strategic search. At the firm we study, constructs from both of these models are important to the search for a strategy. However, certain pivotal aspects of the firm’s strategic history are hard to explain without additional constructs that the models overlook (§4). Given that the models make extreme and not-so-plausible assumptions about plasticity and rationality, it is not surprising that they downplay key elements and mechanisms. The “neglected constructs,” combined with the validated constructs of the well-known models, yield a frame of reference for understanding the search for a strategy (§5). In short, our fieldwork highlights by induction a set of elements and search mechanisms that two prominent models of strategic search overlook.

Using this frame of reference, the deductive portion of the paper moves beyond the case to derive general theoretical propositions about strategic search (§6). *Time* plays a central role in our deductive effort. Specifically, we argue both that the plasticity of elements will vary systematically as an organization ages and that the rationality of available search mechanisms will vary systematically as an industry ages. This argument implies that the constraints on search for a strategy – what a firm can change and how intelligently it can make these changes – depend on time. The ensuing propositions exploit this insight to identify general tendencies of strategic search and their implications for firm survival. The propositions highlight, for instance, a race between plasticity and rationality: a management team often struggles to develop wisdom about its environment and to deploy rational search mechanisms before it loses the plasticity necessary to adjust elements and exploit its wisdom. (See Figure 1 for a roadmap.)

The two well-known models of search that we use come from the positioning school (Porter, 1980, 1985, 1996; Ghemawat, 1991; Brandenburger and Stuart, 1996) and from evolutionary economics (Nelson and Winter, 1982; Winter, 1987, 2000). They differ dramatically in their assumptions about plasticity and rationality. (See the assumption space on the left of Figure 1.) The positioning model portrays strategic search as cerebral and top-down; the core search mechanism is deductive application of economic logic to a firm's activities – the central elements that are searched. It assumes firms are highly plastic, conforming readily to the shape desired by the management team. The evolutionary model posits that managers are intendedly but boundedly rational (Simon, 1957a: xxiv). Because individuals can consciously process a limited amount of information, much behavior in organizations is based on semi-automatic rules and routines (Nelson and Winter, 1982). The core search mechanism is local search: actors seek solutions that entail incremental change to existing routines – the key elements searched – often through trial and error (Cyert and March, 1963) and with limited deliberation. Managers rely on local search because they are cognitively limited and know their firms are not fully plastic.

Figure 1: Coupling of Induction and Deduction



We focus on the positioning and evolutionary perspectives because they are in a process of convergence that is promising yet incomplete. Scholars from both schools of thought have studied the evolution of strategy recently, and as they have done so, the two schools – one with a sophisticated view of strategy at a point in time and the other with a well-developed model of change over time – have found fruitful common ground. Recent work has tried to couple the cross-sectional strength of the positioning school with the longitudinal power of evolutionary economics by relaxing the schools' extreme assumptions about rationality and plasticity (e.g., Ghemawat and Levinthal, 2000; Gavetti, *et al.*, 2005). Positioning scholars have come to see strategies as embodied in complex webs of interdependent activities (Porter, 1996; Ghemawat and Rivkin, 1999; Siggelkow, 2001, 2002). Such intertwined systems are implastic and difficult for managers to comprehend fully. Evolutionary scholars, on the other hand, have increasingly wrestled with the role of cognition in strategy making (Gavetti and Levinthal, 2000; Nelson, 2002), thus departing from a passive view of individual rationality and implicitly challenging the notion that organizations are largely inert.

The convergence promises to deliver a synthesis that is very much in the spirit of Cyert and March (1963): a behavioral theory of the origins of strategy in which rationality and plasticity are present but bounded. Our perception is that Cyert and March (1963, see especially Chapter 2) lay near the middle ground of the assumption space in Figure 1, but their most direct descendants, Nelson and Winter, pushed the field toward an overly routinized, non-cognitive, implastic view of organizations. A synthesis that melds Nelson and Winter with the overly rational and plastic positioning perspective may restore balance, returning the field to the middle ground. The synthesis requires empirical grounding beyond a handful of prior efforts (e.g., Siggelkow, 2001, 2001; Tripsas and Gavetti, 2000), and we aim to help provide such grounding.

A behavioral theory that melds the positioning and evolutionary perspectives might also bridge a vexing divide between the two broad *classes* of models that have dominated prior literature on strategic search: the content-oriented rational-choice class and the process-centered learning class. The positioning school is closely related to neoclassical economics, Andrews' (1971) design thinking, and Ansoff's (1965) planning school, which share a confidence in the cognitive power of managers and the plasticity of firms. On the other hand, the evolutionary perspective is often classified alongside a number of influential views of search that emphasize learning within bounds on rationality and

plasticity: Weick's (1979) work on thinking and acting in organizations, Quinn's (1980) emphasis on logical incrementalism, Mintzberg's (1987, 1990) advocacy of emergent strategy, the resource allocation process research of Bower (1970) and Burgelman (1983, 1991), Ocasio's (1997) work on managerial attention, and Eisenhardt's work (1989b) on decision-making in high-velocity environments.¹ Within these two classes, we choose to focus on the positioning and evolutionary perspectives in part because they present stripped-down models of search that lay bare assumptions about plasticity and rationality, with little attention to organizational structure. We prefer to study the cognitive and behavioral aspects of strategic search in pure form before we consider the structural considerations that other perspectives describe. Other perspectives may be more behaviorally plausible than these two are, but some focus on features that divert attention from the cognition of individual managers, which we wish to examine in detail.

Not only do we rely on two models that pay little attention to structure, but we also focus on a young organization – a startup firm – in which structure's impact is arguably minimal. We use the evolutionary and positioning models to examine the search for a strategy at Lycos, an Internet portal. Based on archival sources and interviews, we trace the origins and evolution of Lycos' strategy from the firm's earliest days to when it clearly has a distinctive strategy. The examination encompasses the elements and the mechanisms of the firm's strategic history; the interplay between elements and mechanisms; and the way such interplay changed as the company and its industry developed.

1. RESEARCH METHODOLOGY

As described above, this paper induces a frame of reference (Popper, 1959) for studying the search for a strategy that reflects plausible assumptions about plasticity and rationality. It then uses the frame deductively to develop propositions about how strategic search typically unfolds. A theory's assumptions determine the variables and processes it focuses on when it explains or predicts a given phenomenon. Theories with different assumptions often focus on different variables and processes and thus reach different explanations and predictions. Increased plausibility typically requires the consideration of variables and processes that stripped-down theories neglect. There has been a long epistemological debate on the costs and benefits of descriptive realism among theories (Hausman,

¹ Pioneers of these views often emphasize their close affiliation with the others. For instance, Mintzberg and Lampel (1999) highlight the family resemblance among work by Bower, Burgelman, Cyert, March, Quinn, Weick, and Mintzberg himself. In introducing their work, Brown and Eisenhardt (1998: 7, fn. 4) note: "Our thinking builds on the work on emergent strategy of a number of colleagues, including Joseph Bower, Robert Burgelman, Henry Mintzberg, James Brian Quinn, and Karl Weick."

1984). Skeptics of realism emphasize that behavioral plausibility adds complexity to a theory, which may undermine its analytical relevance (Friedman, 1953). We take a different stance, following Cyert and March's (1963: 2) dictum to "link models of the firm as closely as possible to empirical observations," provided that the model is kept "within the confines of theoretical manageability."

For the phenomenon that interests us, the search for a strategy, we use the concept of search to identify ex-ante what categories of constructs will comprise a frame of reference. The first category will be the elements over which search occurs, that is, the elements that together constitute a strategy. The second category will be search mechanisms: ways in which a firm with one array of elements moves to a different array. We aim to populate our frame of reference with elements and search mechanisms that reflect realistic assumptions.

To do so, we used a longitudinal case-study design (Yin, 1984; Eisenhardt, 1989a) and took a grounded approach (Glaser and Strauss, 1967). In principle, this approach requires researchers "at first, literally to ignore the literature of theory and fact on the area under study" (Glaser and Strauss, 1967: 37). Because it is difficult to enter the field with no preconceptions, we distinguish notions with which we entered the field from concepts that we truly induced. The reader can then be an informed skeptic. She can separate reported features that should be believed because they were seen from those that might have been seen because they were believed. To enable this, we lay out the key steps in our research process, under headings that follow Eisenhardt's (1989a) recommendations for building theory from case-study research.

Getting started. We began with a research question: where do strategies come from? We also began with preconceptions: strategies are manifested in both cognition and action; the positioning and evolutionary perspectives together might shed new light on the core question; elements identified by the two perspectives, which we discuss below, affect strategic search; and elements in the world of cognition interact with elements in the world of action. We recorded these preconceptions in a document that is available from the authors. As Eisenhardt (1989a) recommends, we identified constructs at this stage and did not articulate hypotheses, in order to maintain theoretical flexibility. The original document missed constructs and relations that are pivotal in the frame of reference described below. Specifically (using terms developed below), it did not distinguish search elements from mechanisms, missed

important search mechanisms such as case-based reasoning, did not mention managerial values, understated sensors' role, and did not anticipate our arguments below concerning the time-dependent nature of strategic search.

Selecting the case. We identified industries that might be good sites and asked colleagues who reviewed our initial document for input. As noted above, we focused on startup firms and found the Internet portal industry to be an attractive setting in which to study the origin of strategies. With the advent of the World Wide Web in the early 1990s, a set of firms raced to establish themselves as entry points to the Web for users. Distinct strategies emerged quickly, and shakeout was rapid. Contenders included green-field startups, ventures by established companies, and acquisitions of startups by established firms. The variety of strategies pursued made the industry appealing from our perspective, as did the documentation of portals' maneuvers by the press and financial analysts. Furthermore, the industry was young, and the major decision makers remained accessible. We focused on Lycos because its corporate headquarters was close to our offices, making frequent interviews of employees possible.

Crafting instruments and entering the field. In collecting data, we generally followed the advice of Mintzberg (1979), Yin (1984), Miles and Huberman (1984), and Eisenhardt (1989a). We triangulated from multiple data collection methods, combined qualitative and quantitative methods, and employed multiple investigators. Our understanding of Lycos' search for a strategy came first from semistructured interviews with virtually all critical decision makers, 11 in total. All interview invitations were accepted, and the interviewees answered all of our questions. At the time of the research, five interviewees had left Lycos. Each interview lasted one to two hours, and we conducted some follow-up interviews to clarify issues. We started each interview by describing our research purpose, exploring the interviewee's background, and asking the interviewee to recount how Lycos' strategy developed. Most were eager to tell their stories and needed little prompting. Both researchers attended all interviews or, in two instances, reviewed interview audiotapes. Researchers reviewed and compared notes soon after each interview. We circulated a case study write-up (Eisenhardt, 1989a: 540) to the interviewees, who could then edit it. We also benefited from a company history written by Lycos' long-time CEO (Davis, 2001) and an unpublished memoir commissioned by the chairman of a key acquisition target (Sabot, 2000).

Interviews were conducted primarily in 2001, while the events of interest transpired between 1995 and 1999. The passage of time between events and interviews made forgetfulness and retrospective bias (Golden, 1992)

possible. We guarded against these problems in three ways. First, we questioned multiple individuals on overlapping topics. The consensus on all factual matters was strong. Second, we interviewed several decision makers at rival portals, who corroborated the events reported here. Third, we exhaustively reviewed documents written during the study period and challenged interviewees on the small handful of oral assertions that conflicted with the written record. Documents included hundreds of SEC filings, company press releases, and reports by analysts and journalists.

Analyzing data. We did the bulk of our analysis after we conducted most of the interviews. Our primary analytical technique was to examine Lycos' strategic search through our two models. We believed that both models rely on less-than-plausible assumptions, so we expected to see discrepancies between the phenomenon and how each model characterized it. In particular, we expected the case to highlight elements and search mechanisms that neither model focuses on. These neglected constructs guided us toward our frame of reference. The frame eventually comprised the elements and search mechanisms that were (a) associated with the models and prevalent in the case history or (b) neglected by both models but crucial to Lycos' strategic history.

This endeavor required us to track Lycos' actions as well as managers' thoughts about the world and their place in it. Tracking actions was straightforward; tracking thoughts was not. Detecting cognitive elements from interviews alone is problematic because of retrospective bias and because such elements may reflect mental structures inaccessible to actors (Thagard, 1996). Some techniques for measuring cognitive constructs involve content or textual analysis (Huff, 1990; Carley, 1997). We used frequency counts of words compared across firms and across time to supplement our interviews and to help us detect the focus of managerial attention (Simon, 1994).

Shaping hypotheses, enfolding literature, and reaching closure. Through our analysis of Lycos, we identified relevant constructs. We then used those constructs to develop general propositions on strategic search (Strauss and Corbin, 1994). Here, we moved from an inductive to a deductive posture. Research on Lycos inspired some of the hypotheses, but we tried to move beyond the field context in our theory-building efforts by relying on literature outside the positioning and evolutionary schools.

2. CHARACTERIZATION OF THE MODELS OF SEARCH

For us, a strategy is a management team's way of seeing its place in its environment as well as the firm's way of interacting with the environment. This definition includes both mental and physical aspects, thoughts and action. Evolutionary economics and the positioning school provide different accounts of how strategies come to be, and thus different models of strategic search. Below, we identify the elements and search mechanisms that dominate each model. We do not describe these rich perspectives in full, but instead emphasize how each perspective would depict the search for a strategy. Indeed, for reasons described earlier, we tend toward caricaturing these perspectives.

Evolutionary search for a strategy. Evolutionary economics emphasizes boundedly rational managers and limited organizational plasticity to describe how a particular search mechanism, local search, operates on specific elements, routines (Nelson and Winter, 1982). Evolutionary theorists have devoted much attention to firms' embodied routines, and they are skeptical about the power of deliberate cognitive efforts to affect firms' behavior (Cohen *et al.*, 1996). Cognitive heuristics may set the broad contours of high-level decisions and guide search, but such heuristics do not necessarily originate in a fully conscious or deliberate way (Nelson and Winter, 1982; Nelson, 1994).² The impact of cognition on behavior is assumed to be especially limited in established firms, where the weight of "state variables" or "stocks" holds the company in place (Winter, 1987). Some of these stocks are tangible or intangible assets or liabilities, such as factories, patents, or relationships. A more important class of stocks is a company's routines, or elaborate and semi-automatic chunks of repeated activities that help firms deliver goods and services reliably and efficiently (Nelson and Winter, 1982). Routines economize on managerial rationality by enabling complex coordination with little reflection and deliberation. However, they are difficult to change because they involve intertwined activities by many actors, are taken for granted, and entail organizational truces (Nelson and Winter, 1982). Routines are a central element of a firm in the world of action (Dosi *et al.*, 2000), and accordingly play an important role in our exploration of Lycos.

Evolutionary theorists believe the key search mechanism underlying the dynamics of routines is local search. Firms initiate search in response to specific problems or opportunities and consider but few potential alternatives.

² For an evolutionary theorist, heuristics can be defined as "concepts and dispositions that provide orientation and a common structure for a range of similar problem-solving efforts, but supply few, if any, of the details of individual solutions" (Winter in Cohen *et al.*, 1996).

Those considered involve incremental change, are readily available, and are in tune with the firm's focal heuristics; they are evaluated more by trial than by forethought, and the selected alternative is satisfactory but not necessarily optimal (Simon, 1957a; Cyert and March, 1963; Nelson and Winter, 1982). Evolutionary theorists are relatively silent on the origins and dynamics of heuristics. Nelson (1994: 259) argues that heuristics are so bound to individuals that their change may require a change in management, and Nelson and Winter (1982: 133) mention briefly that professional background may shape a manager's heuristics. Otherwise, their origins are left unexplained.

Positioning search for a strategy. The positioning school starts with a profound appreciation of the power of managerial cognition and a faith in firms' plasticity. With respect to the elements of search, the school has come to emphasize that strategy is rooted in a firm's concrete activities (Porter, 1985). Thus strategy resides largely in the world of action, not just in the world of cognition, and activities are the core elements to be searched. Strategy formulation is complete not when a management team has pinpointed its broad goals and intended type of competitive advantage, but when it has nailed down the target scope of its advantage and specific activities throughout the value chain (Porter, 1985). Importantly, positioning scholars see strategy in terms of what makes a firm different from its rivals. A firm with a successful strategy engages in different activities than its competitors; it does not simply attempt to perform the same activities better (Porter, 1996; Ghemawat and Rivkin, 1999). Recently, this school has emphasized the connections that span activities and make strategies into bundles of reinforcing choices (Porter, 1996; Rivkin, 2000; Porter and Siggelkow, 2002). Such interactions arise when the configuration of one activity influences the costs and buyer value generated by another.

The search mechanism by which such bundles come to be – or at least should come to be – is usually portrayed as one in which highly rational managers survey an environment and deductively apply economic logic to their observations. This effort produces a recommended set of activities that a highly plastic organization adopts. Local and distant alternatives may be considered, and cognition precedes action. The school has produced relatively little research on how integrated sets of activities emerge. An exception is Siggelkow (2002), who tracks the linked activities of the mutual fund company Vanguard over time and identifies patterns in how these activities and linkages evolved. He focuses on the emergence of Vanguard's strategy in the world of action, however, and pays limited attention to the search for an accompanying managerial mindset.

In sum, the evolutionary and positioning perspectives focus attention on different elements: routines, heuristics, and stocks versus distinctive, interactive activities. They also emphasize different search mechanisms: local search versus deductive logic. We now use these contrasting models to view Lycos' strategic history.

3. ONE HISTORY THROUGH TWO LENSES

By March 1999, Lycos had a distinctive strategy among Internet portals. Senior managers saw the company as a network of related, linked web sites, not as a monolithic entity like Yahoo! or AOL. Each member of the Lycos Network maintained its own brand and purpose: flagship Lycos for Web navigation and news, Tripod for user homepages, Quote.com for financial information, etc. Hyperlinks connected these sites and shuttled users among them. The connections increased the number of Lycos Network pages viewed and expanded advertising, the primary source of revenue. A consistent set of marketing, business development, engineering, financial, and human resource activities supported Lycos' approach. Among portals, Boston-based Lycos was especially focused on cost containment, foregoing the free-spending ways of its Silicon Valley rivals. The company's strategy appeared to be successful. In March 1999, the portion of Internet users viewing Lycos pages – a metric known as “reach” – surpassed 51% and eclipsed archrival Yahoo! for the first time. Lycos' market value stood at \$3.6 billion. For the fiscal year ending in July 1999, Lycos had revenues of \$135.5 million and a small pro-forma profit.

How did Lycos come to have this strategy? The search for a strategy at Lycos can readily be broken into two phases, the first of which conforms well to the evolutionary caricature of search and the second to the positioning image. First, however, we set the stage by briefly describing the context in which Lycos operated.

Development of the Internet portal industry. Between 1991 and 1994, the World Wide Web emerged and grew quickly. Both capitalizing on and catalyzing this growth was a small group of web sites that, starting in 1994, began to catalog individual sites on the Web. These sites fell into two categories (Giroto and Rivkin, 1999). Some, such as Yahoo!, used human beings to categorize web destinations. Others, including Lycos, compiled keywords from web pages into databases that users could query. These “search engines” typically used software called “spider technology,” which continuously crept through the Web to capture, store, and index the latest site information. Early contenders included Architext (later Excite), Galaxy, Global Network Navigator, Infoseek, Lycos, Magellan,

OpenText, Time Warner's Pathfinder venture, and Yahoo!. Initially it was unclear how navigational sites would generate revenue. Infoseek charged 10¢ per search. Magellan considered a subscription fee. Lycos licensed its search technology to corporate customers. By 1996, attention focused on advertising revenue.

In early 1997, Yahoo! and Excite began to add content such as news headlines, sport scores, stock prices, etc., to their sites rapidly. Other companies soon did the same. By early 1998, these sites had added features such as email boxes and the technology for users to create personal homepages or to personalize their interfaces with the site. Chat rooms and online gaming brought users together in a community. Increasingly, industry executives and observers referred to the sites as "portals." This proliferation of new services offered by portals and their increased use (collectively, portals accounted for 15% of all pages viewed on the Web in 1998 but garnered 52% of all web-based advertising) triggered entry. America Online, a closed provider of online services since 1985, launched an open portal on the Web in 1996. Microsoft did likewise with its Microsoft Network (MSN) Internet service. Disney took a 43% stake in Infoseek in 1998 and later purchased it outright, while NBC purchased a stake in the portal Snap. AOL bought the portal NetCenter in 1998, Internet service provider @Home acquired Excite in 1999, and the Spanish telecommunications concern Terra purchased Lycos in 2000. By 2001, at the end of a shakeout, the portals that continued to attract large audiences were AOL, Yahoo!, MSN, and Terra Lycos. It is against this backdrop of entry, uncertainty, rapid change, clarifying economics, and consolidation that Lycos' managers struggled to secure the firm's success.

An evolutionary perspective on Lycos' strategic history. Evolutionary economics' imagery of lightly-guided local search matches much of Lycos' earliest days. In 1994, Michael Mauldin, a computer science professor at Carnegie Mellon University, developed an Internet search technology he called Lycos. Research interests, not commercial intent, motivated Mauldin's work. In 1995, the Massachusetts-based Internet investment group CMGI licensed the technology from Carnegie Mellon to form a company. Looking for a CEO, Dan Nova and David Wetherell, partners in CMGI, reached out via their personal networks – in Nova's words, "without an executive search firm or any very systematic effort." Nova called, among a few others, his friend Bob Davis and asked him if he knew any likely candidates. Nova knew Davis as a capable, driven individual and thought that someday he might invest in a Davis-led venture, but he also knew that Davis was completely unfamiliar with the Internet. Davis

nominated himself for the job at Lycos and was hired only after he lobbied intensely for the role. Thus Davis arrived at his position largely as the result of local search and happenstance.

Davis quickly hired several managers, including Ted Philip, who arrived from Disney in December 1995 and became Davis's right-hand man as the chief financial officer. Lycos lacked answers to questions that were key for a CFO, such as who its customers were and what they would pay for. "We didn't have a model to follow," Philip recalled. "There was no such thing as advertising on the Internet at that time." Lacking a model, the company did what an evolutionary theorist might expect: it focused on its sole tangible stock, its search technology, and searched in the "vicinity" of this technology by trying out various sources of revenue that were based on it. "We had no business plan," Philip recalled. "All we had was a piece of technology." The emphasis on technology, coupled with Davis's background as a minicomputer salesman, led Lycos to focus on generating revenue by licensing its search technology to corporations for their internal use. The focus on technology was also consistent with the development of a key heuristic: do what it takes to demonstrate effective search. Lycos' goal became "to be a 'go to and go through' site," Philip explained. "Success was measured by how quickly we got rid of you," that is, how quickly the search engine located the information you wanted and sent you to a destination on the Web. Reflecting this heuristic, Lycos launched its public search engine in 1995 to demonstrate the superiority of its search capabilities, hoping that a successful public site would convince corporate customers to license technology from Lycos rather than from competitors. The site quickly gained popularity among web users, Lycos began to sell ads on the site, and advertising soon became the company's dominant source of revenue. Hence the product that would eventually become Lycos' flagship, its public search engine, was launched largely as a marketing tool.

This early period saw the gradual development of routinized activity. Company veterans describe Lycos' earliest days as fairly chaotic and ad hoc, with individuals shifting among tasks as needed. A marketing manager, for instance, would informally pick up public-relations tasks as they arose. Between 1995 and 1997, more-structured routines developed. Systems came together, for example, to sort PR tasks to the right individual: Bob Davis handled investor relations, another person tackled technical requests, another managed partnerships, etc. Similarly, well-defined functional roles appeared: product managers served individual corporate licensees; software developers, mostly Carnegie-Mellon students, devoted themselves to creating the very best spider technology; and network

engineers handled the physical operations of server computers.

Overall, Lycos' early days conform fairly well to the evolutionary picture of search. Idiosyncratic opportunities and stocks such as its initial technology sparked local, less-than-exhaustive search for more effective ways to do business, which gradually became routinized. The development of focal heuristics guided such search efforts.

A positioning perspective on Lycos' strategic history. Explicit competitive positioning came to the fore only in mid-1997. Davis reports, "we looked around and were not overly thrilled with the competitive landscape." Yahoo! had launched an effective branding campaign focused on "near-surfers," people about to use the Web for the first time. Its hip and funny "Do You Yahoo!?" ads contrasted sharply with conservative Lycos', in which a Sherpa personified a reliable guide. Yahoo!'s "reach," the monthly portion of web users visiting its site, had grown to 50%, while Lycos' stood in the mid-teens; Yahoo! displayed 65 million web pages to users each day while Lycos showed only 10 million. Lycos' relatively small size hurt the firm as Yahoo! and Excite raced to add new content and features with large fixed development costs. Lycos' challenge was "keeping up with the Joneses," recalled Sangam Pant, head of engineering. "You go for parity [with competitors' features] and differentiate as you can." Lycos' size disadvantage was compounded because the average user spent less time and viewed fewer pages on its site than on, say, AOL. This was especially damaging because advertising had emerged as the dominant source of revenue in the industry.

As a positioning scholar would expect, managers' descriptions of this period reflect an intense focus on competitors and the economic threats they posed: increasing economies of scale due to escalating features and marketing, switching costs if Yahoo! captured the near-surfers, first-mover advantages, etc. The team's response was self-conscious and analytical: at a mid-1997 Board of Directors offsite, the board members acknowledged the rising economies of scale in their business and resolved to "get big fast," largely by buying undervalued acquisition targets and web sites that built on themselves with little marketing expense. Homepage sites that gave users software tools and server space to build their own web pages attracted particular attention. Within this category, Lycos searched broadly (Davis, 2001: 63) before acquiring Tripod for roughly \$60 million on the last day of 1997.

This acquisition entailed a strategic decision that Davis and Philip identify as perhaps *the* pivotal choice in Lycos' history: how completely to integrate Tripod into Lycos' existing operations and brand. Options included complete

operational integration and the re-branding of Tripod as Lycos Communities; wholesale independence for Tripod; and a hybrid that integrated some functions and left others separate. Heated meetings ensued as Lycos managers and their Tripod counterparts made integration plans. Particularly controversial was the fate of Tripod's brand. Two co-founders of Tripod who were now Lycos employees argued that the Tripod brand was meaningful to users and should be maintained. Lycos' VP of marketing countered that small Lycos could not afford the marketing expense associated with multiple brands. After much debate, the management team decided to keep the Tripod brand and integrate Tripod selectively. Tripod users would not know the property was owned by Lycos unless they looked carefully. Moreover, software development, product management, and editorial activities were kept largely separate while Tripod and Lycos shared finance, business development, sales, and engineering functions. Sites would be linked to one another, but the look and feel of each would be distinctive. Lycos repeated this decision to maintain multiple brands during the subsequent years as it acquired other sites such as Guestworld, WhoWhere?, Internet Music Distribution, etc. in rapid succession.

Executives tell different, but not mutually exclusive, stories of how Lycos decided to preserve the Tripod brand. One is consistent with the positioning view. Lycos managers report that they wanted to do something distinctive in their industry. Indeed the multibrand approach, dubbed the "Lycos Network," departed significantly from rivals' practices. Yahoo!, for instance, devoted itself to developing a unified brand; its web properties were linked and unified vigilantly by a single Yahoo! look and feel. In explaining the multibrand approach, Philip recalled, "Yahoo! had a fairly sizeable lead.... We said, 'We can fight them at their own game [of developing a single, unified brand], but we'll lose. We'll wind up a strong #2. Or we can change the rules'" by taking a multibrand approach. In this rendition, it was a self-conscious search based on the economic logic of differentiation that shaped Lycos' choice. (We will return later to another story of how Lycos chose to keep multiple brands.)

Consistent with the positioning view, Lycos' multibrand position became embodied in an interwoven set of distinctive activities throughout the firm's value chain. Tactics in business development, database management, and international expansion illustrate the points of distinction and the interactions across activities. Lycos, Yahoo!, and other portals struck numerous deals with third parties – for instance, with the Associated Press (AP) to supply news content. The portals differed substantially in how they carried out the deals. With Yahoo!, the AP would feed its

content onto Yahoo!'s servers. When a Yahoo! user viewed a news item, the page would come from Yahoo!, in a format consistent with the rest of Yahoo!'s pages. From Lycos, the AP would receive a header, footer, and left navigation bar. When a Lycos user viewed a news item, the page would come from the AP server. The header, footer, and navigation bar would be consistent across Lycos sites, and the ad would come from Lycos' ad server, but the content would be formatted as the AP wished. This reduced consistency, limited links across Lycos pages, and gave Lycos less control over its content. Yet, it lowered Lycos' editorial expenses, gave it flexibility in striking co-branding deals, and made use of partners' servers. Its international ventures also demonstrated its willingness to sacrifice control and consistency for the sake of flexibility, low cost, and leverage from others. While Yahoo! built its own organizations around the world, Lycos entered foreign markets largely through joint ventures. In sum, Lycos Network's position was embodied in a host of distinctive activity choices with clear interactions among them.

Lycos' history during this time approximates a positioning account, but also contains elements consistent with an evolutionary search process. For instance, Lycos executives note that during this period they developed a set of routines – indeed an organizational capability – to acquire other web-based ventures. There emerged routines around CFO Ted Philip for spotting, screening, pursuing, and integrating acquisition targets quickly. These routines appear to have come from experience and local search, not from a foresighted process.

With its acquisitions, Lycos rapidly increased its reach, which grew to exceed that of Yahoo! for a single month, March 1999. Still, the management team felt vulnerable on two fronts – vulnerabilities they expressed in positioning-school terms. First, “the big boys were coming in,” recalled Philip. Major companies such as Disney, NBC, and Microsoft had started or purchased their own portals. Second, analyses showed that advertising revenue alone would not support more than a few portals. These forces prompted a heightened interest in e-commerce revenues at Lycos, at other portals, and among financial analysts tracking the portals. The firm flirted with a fundamental shift toward e-commerce in 1999, but was unable to complete a critical merger with USA Networks that would have enabled the move. Accordingly, Lycos remained focused on its advertising-oriented strategy until it announced in May 2000 that it would be acquired by Terra, the largest Spanish Internet service provider.

4. NEGLECTED CONSTRUCTS

Evolutionary theory and the positioning school each provide powerful models for interpreting Lycos' search for a strategy. In Lycos' earliest days, we observe elements such as routines, heuristics, and a role for stocks as well as a reliance on local search mechanisms – much as an evolutionary scholar would expect. Later, we observe constructs consistent with the positioning view: distinctive activities with interactions and the use of deductive logic with an emphasis on competitors. Yet the evolutionary and positioning constructs, separately or jointly, cannot explain fully three crucial aspects of Lycos' strategic history:

1. why Lycos found itself relatively small in 1997, needing to “get big fast.”
2. how Lycos' management team awoke to the need to “get big fast.”
3. why, when integrating Tripod, Lycos' managers opted for a multibrand approach.

Accounting for these aspects of the phenomenon brings to the fore constructs that the evolutionary and positioning perspectives have largely neglected. Among elements, we highlight the role of cognitive representations, personal values, and information sensors. Among search mechanisms, we emphasize the role of case-based reasoning.

LYCOS' RELATIVE SIZE, COGNITIVE REPRESENTATIONS, AND PERSONAL VALUES

A central fact of Lycos' history is that, by 1997, the company was relatively small in an industry with growing benefits of scale. An evolutionary scholar might attribute the firm's small size to the happenstance of local search guided by heuristics. A positioning scholar might point to Yahoo!'s first-mover advantage or a deliberate choice by Lycos to remain small. Neither would adequately capture the set of central cognitive elements that were actually in play at Lycos. Indeed, as noted in §2, the evolutionary and positioning perspectives have focused on physically embodied elements of strategy such as routines or activities. Aside from the evolutionary focus on cognitive heuristics, the elements of strategy that reside in managers' minds remain sparsely charted territory for these schools – discussed but not well mapped. Evidence from Lycos points to the relevance of heuristics, but it also points to two types of cognitive elements that shaped the firm's heuristics and caused it to have far fewer page-views than its leading rivals had.

Representations. First, the evidence reveals the pivotal role of the management team’s basic conceptions of the world and of Lycos’ place in it. These conceptions are what cognitive scientists call *representations*: mental models or cognitive frameworks underlying an actor’s thought processes (Simon, 1955; Thagard, 1996).³ Representations are the most fundamental lenses through which managers view their world. Our finding that representations were central to Lycos’ search for a strategy is strongly consistent with other studies that identify representations as a critical determinant of managerial choice (Tversky and Kahneman, 1986; Huff, 1990; Fiol and Huff, 1992; Walsh, 1995), focus of attention (Simon, 1991; Ocasio, 1997), and interpretation (Weick, 1995). In Lycos’ case, management’s early representations were crucial in leading it to remain relatively small.

As early as 1995 (the management team reports in interviews), Lycos’ top team adopted a distinctive representation: managers saw the firm as “a technology company” while their counterparts at Yahoo! saw Yahoo! as “a media company.” Lycos’ emphasis on technology had pervasive effects. Lycos’ adoption of a technology representation affected its size via several routes. First, and perhaps most importantly, it guided the development of the focal heuristic we mentioned above – do whatever it takes to demonstrate effective search. This, in turn, was pivotal to channeling Lycos’ search efforts towards technological solutions that quickly “got rid” of surfers before they viewed many Lycos pages. Second, it shaped the choice of competitive focus. As Philip noted, small Infoseek was “the one to worry about” because “they had the technology.” Yahoo!’s human-crafted directory was less worrisome despite its reach because its approach “would never scale” as the size of the World Wide Web exploded. Finally, the technology representation influenced hiring practices: Lycos hired the best software engineers it could find while Yahoo! pursued library scientists and marketers. The more effective were Lycos’ engineers, the faster did surfers leave its site – and the wider did the page-view gap versus Yahoo! become.

Contrasting representations show up in company self-descriptions. Early Lycos press releases described the company as “the newly formed corporation based upon technology developed at Carnegie Mellon” or the purveyor of “the most relevant and comprehensive search and guide products on the Internet” based on “patent-pending

³ Cognitive psychology conceptualizes cognition in terms of “representational structures in the mind and computational algorithms that operate on those structures” (Thagard, 1996: p. 10). Given bounded rationality, thinking is often premised on cognitive representations of reality (Simon, 1955), which simplify the decision problem in the mind of the agent (Johnson-Laird, 1983; Weick, 1990) and help her cope with her limited processing capacity (Halford *et al.*, 1993).

technology.”⁴ In sharp contrast, Yahoo!’s early press releases spoke of “a global family of Yahoo! branded media properties,” and its co-founder declared from mid-1995 “[w]e knew that we weren’t going to be a technology company” (Goldstein, 1997).

Comparing Lycos’ early SEC filings with Yahoo!’s confirms Lycos’ relative emphasis on technology. Senior executives wrote these filings or closely supervised them. Therefore, they closely reflected the strategic thinking at the firm. As one Lycos executive put it, “We dreamt up the strategy as we wrote it down.” To make use of this, we examined the 1996 10Ks of Lycos and Yahoo!, focused on each company’s description of its business and industry, and counted the frequency with which each word appears. We filtered out words with little semantic value (e.g., articles, conjunctions) and, to analyze a manageable number of words, considered words with a frequency higher than 0.3% of the total number of words processed for either company. Results are shown in Table 1, in which words are ordered on the basis of a ratio: frequency in Lycos’ documents / frequency in Yahoo!’s documents. Words on the top left are distinctively used by Lycos, and those on the bottom right by Yahoo!. *Technology, license, software,* and *product* are particularly relevant for Lycos, while *media* and *property* (media-industry slang for “product”) are distinctive to Yahoo!. The difference reflects an early, enduring divide in the industry between those who saw the business as a technology industry and those who viewed it through a media lens. Scale matters much more in a media industry than it does in a technology licensing business, and accordingly, Yahoo! sought to become large much earlier and more aggressively than did Lycos.

NC1: It is difficult to account for Lycos’ relatively small size in 1997, a key aspect of its strategic history, without appreciating management’s representations, a construct that receives limited attention from the evolutionary and positioning perspectives.

Personal values. Also shaping Lycos’ relative size was a second mental element largely ignored by our focal perspectives: the set of *personal values* brought to the company by Bob Davis.⁵ By values, we mean “conceptions of

⁴ Lycos press releases from July 24, 1995 and February 6, 1996.

⁵ Nelson and Winter (1982: 133) and Nelson (1994: 259) briefly suggest a role for personal and professional backgrounds in strategic search. Porter (1980) recommends an extensive examination of managerial goals and values in the context of competitor analysis, and the traditional Harvard Business Policy school of thought from which the positioning school descends suggests a thorough review of one’s own values as part of the strategy-making process (Andrews, 1971). The polar positioning view of the search for a strategy, however, focuses on deductive logic and not on the role of values. Our claim is not that the evolutionary and positioning perspectives on search miss the role of values altogether, but that they allocate too little attention to values.

the desirable which influence the selection from available modes, means and ends of action” (Kluckhohn, 1951: 395). Individuals use their personal values, explicitly or not, to justify their actions (Spates, 1983) and to decide what issues are important (Keeley, 1983). Consequently, personal values have been argued to influence strategic choice in important ways (Guth and Tagiuri, 1965: 123), and our observations at Lycos are consistent with this claim.

Raised in working-class Dorchester, Massachusetts, and having paid his own way through college with a variety of odd jobs, Davis developed an abiding belief in the virtues of hard work and frugality. Davis’s 11 years at Wang Laboratories, where he had to lay off nearly 200 people (Davis, 2001:10), only reinforced this belief. Under Davis, frugality pervaded Lycos, with Philip proudly describing the early team as “the cheapest b*****ds you ever met.” Along with frugality came a “need for earnings” that Davis described as “part of our psyche” and that contrasted with the inattention to earnings paid by many Internet companies of the day.

The values of frugality and fiscal responsibility gave rise to particular heuristics. In the domain of human resources, the values guided Lycos to a “no-nonsense-this-is-business” heuristic. “People don’t bring their pets to work or play foosball in the cafeteria here,” Philip remarked, contrasting Lycos to its Silicon Valley rivals. In web site design, the values promoted conservative rules of thumb. In the words of Lycos’ marketing vice president, “We aren’t your quirky little VW Beetle, nor are we your luxury high-end sports car. We are a friendly family sedan that’s safe, consistent, reliable, predictable, and used by the masses.”⁶ Perhaps most importantly, the personal values spawned heuristics about growth, leading the company to expand more cautiously than its rivals in its early days. “Part of the industry was willing to pursue growth at all costs,” Davis reflected. “We thought there would be a day of reckoning.” In preparing for that day, Lycos took actions that led it to be relatively small. In sum:

NC2: It is also difficult to account for Lycos’ relatively small size in 1997 without appreciating management’s personal values, another construct that receives limited attention from the evolutionary and positioning perspectives.

LYCOS’ AWAKENING, INFORMATION SENSORS, AND INTERPRETED EXPERIENCE

In 1997, Lycos’ managers and directors came to believe that the company needed to “get big fast.” Section 3 describes a Board meeting that conforms well to the positioning perspective, with an analytical focus on deduction

⁶ Quoted in Davis (2001: 90). Note that this statement contains a representation (seeing the portal industry through the lens of the auto industry) and a heuristic (like a family sedan, Lycos should be safe, consistent, etc.).

from economic principles. The meeting, however, was the culmination of a gradual process of discovery – a process that reveals an additional neglected construct and a relationship among constructs.

The process of discovery appears to have had three steps. The first was the crucial experiment of selling advertising on Lycos' public search engine. CFO Ted Philip reports that the move was a “no-brainer” in light of the strong personal value the team placed on short-term profitability: advertising entailed very little extra expense, so “the revenue would drop straight to that precious bottom line.” The success of the advertising experiment led the management team to begin to represent the firm as a “techno-media company” rather than a simple technology company. Second, following its IPO in April 1996, Lycos increasingly focused its attention on the concerns of Wall Street. Managers paid more heed to metrics that Wall Street valued: reach became more important and short-term earnings less so. Attention also shifted from technology-focused companies like Infoseek to firms like Yahoo! that were competing for Wall Street's affections. Yahoo! portrayed itself as a media company, not as a technology company, and that choice was well received by Wall Street. This led to the recognition, acknowledged at the 1997 Board meeting, that Lycos should be a full-fledged media company, not a technology or techno-media company. Third, and in line with the positioning perspective, was a realization that media industries typically display significant benefits of scale. These steps, together, led naturally to an imperative to “get big fast.”

Lycos' shift toward a media representation is evidenced in its public documents. Table 2 repeats Table 1's analysis, but with 1999 10Ks instead of 1996 filings. Lycos' documents are no longer so distinguished by terms such as *technology* and *license*. Words such as *traffic*, *competition*, and *growth* take their place. Similarly, Lycos altered its self-description in press releases from “the second most visited hub on the Internet” in late 1998 to “a leading Web media company and owner of the Lycos Network” in early 1999. (In contrast, in its press releases, Yahoo! had identified its media aspirations as early as April 1996.)

In Lycos' awakening, we see two general aspects of the search for a strategy.

Information sensors. First, Lycos' increasing focus on Wall Street illustrates that strategy resides in part in managers' choices about what to pay attention to. Following Winter (1978), we label this the choice of information sensors. Sensors are elements of a firm's strategy that help managers cope with the feedback the environment provides. If representations and personal values simplify a complex world and focus managerial attention (Ocasio,

1997), then they must be embodied in choices about what concrete channels of information to activate (Arrow, 1974; Daft and Weick, 1984; Henderson and Clark, 1990). We see sensors as physical elements of a firm's strategy that evolutionary and positioning perspectives have neglected.

Information sensors are crucial because a firm's environment often provides far more data than management can process. At Lycos, for example, consider the searches requested by users. Internet portals have unusually good information about what customers want: users type in search requests that reveal what they hope to find. Yet Lycos did not use this information for years, and the product manager who began to use it in late 1997 faced skepticism within the company. This example illustrates the weight of information a management team faces. In Lycos' case, the weight was so heavy that relevant and readily available information was not processed for years.

We emphasize that the data gathered through sensors are meaningful only after they are interpreted through lenses such as representations and values. Indeed, data may have entirely different meanings when seen through different lenses. For instance, most portals monitored how many pages a typical user viewed during a visit to their sites, and Lycos was typically lower on this metric than some rivals. For early Lycos, the "technology firm," few pages per visit signified success: users were having an easy time "going to and going through" Lycos' web site, reflecting the superiority of its search technology. In contrast, for later Lycos, the "media firm," the same information signified failure: it indicated that Lycos had little opportunity to sell advertising.

NC3: *To understand Lycos' awakening in 1997, one must acknowledge a neglected element of its strategy: the sensors that were channeling information selectively to the management team.*

Interpreted experience. Both evolutionary and positioning perspectives emphasize how mental elements and search mechanisms shape physical actions. Take, for instance, the positioning model in which deduction molds a firm's activities. Yet in Lycos' awakening, we see the reverse process: how feedback from physical action in the marketplace can mold mental elements (Barr *et al.*, 1992; Weick, 1995; Noda and Bower, 1996; Porac *et al.*, 2003). The success of advertising, for instance, shifted management's representation from "technology" to "techno-media." This feedback process is akin to Weick's (1995) notion of sensemaking.

NC4: *To understand Lycos' awakening in 1997, one must move beyond the evolutionary and positioning perspectives and recognize that feedback from physical actions can shape the mental elements of a strategy, such as managers' representations, over time.*

LYCOS' MULTIBRAND CHOICE AND CASE-BASED REASONING

Having awoken to the need to get big fast as a media company, and having acquired Tripod, Lycos' managers made a crucial decision to maintain multiple brands rather than become a monolithic entity such as Yahoo!. As noted above, Lycos' managers can provide a positioning-style logic for the choice. Even more commonly in interviews, however, managers offered a second version of how Lycos decided to retain multiple brands. As Davis tells the story, the acquisition came after Lycos' managers acknowledged that Lycos was a media company. While closing the Tripod deal, Lycos reviewed the growth strategies of traditional media companies such as Time Warner, and, in Davis' words, concluded that "any media company of reasonable scale operates across multiple brands" (e.g., Time Warner maintained *Time*, *Sports Illustrated*, *People*, and so forth). By analogy, Lycos chose to maintain multiple brands as it grew. Hence analogical reasoning, based on the media-company representation, played a pivotal role in the multibrand decision.

Our focal perspectives do not encompass analogical reasoning as a mechanism for strategic search. Evolutionary theorists emphasize local search as a dominant search mechanism, while positioning scholars highlight deductive reasoning. In Lycos' search for a strategy, we see two deviations from either perspective.

First, *both* local search *and* deductive reasoning seem central to Lycos' history, with neither dominant over the firm's life. For instance, we see Lycos' early focus on a licensing model as resulting from local search in the vicinity of Lycos' sole asset, its technology, and close to the experience of a minicomputer salesman.⁷ Deductive logic also plays a significant role in Lycos' history. In choosing to get big fast, for example, Lycos' board focused on the implications of the economies of scale in what it increasingly saw as a media industry. Contrary to our focal perspectives, Lycos' strategic history gives us little reason to focus exclusively on either local search or deduction.

⁷ In Lycos' early history, we also see a search mechanism that is a close relative of local search: experimentation. Experimentation typically involves multiple efforts with little attempt to anticipate consequences, followed by selection after consequences are realized. The experiment of advertising on the Lycos public search site, for example, proved pivotal in the company's strategic history.

Second, we see search mechanisms at work in Lycos' history that neither perspective emphasizes, mechanisms such as analogical reasoning. These mechanisms involve case-based reasoning (Gilboa and Schmeidler, 2001), in which the management team consciously tries to apply the lessons of past experience from their own or other organizations to present problems. If vicarious, the experience may be in the firm's own industry or in some other setting that the team deems to be similar in its essentials. Crucially, the experience is transferred not via some summary, deductive principle, but by the application of a concrete case. The media analogy that underpinned the multibrand decision exemplifies this class of search mechanism. We saw other examples of this class, for instance, when Lycos imitated its rivals' features in order to "keep up with the Joneses" or acknowledged the wisdom of Yahoo!'s media representation. Case-based search, whether through analogical reasoning or imitation, falls between action-led local search and cognition-led deduction.

NC5: The multibrand decision illustrates the use of case-based reasoning, a search mechanism neglected by the evolutionary and positioning perspectives. More broadly, we observe multiple search mechanisms – local search, deductive logic, and case-based reasoning – at work at Lycos, with no single mechanism dominant over the firm's entire life.

5. TOWARD A FRAME OF REFERENCE

Our field data highlight several constructs that are critical to explaining important aspects of strategic search at Lycos yet receive little attention from the evolutionary and positioning perspectives. A model of strategic search that aims for behavioral plausibility should encompass these neglected constructs, along with traditional elements and search mechanisms of the two perspectives that are validated by the field study.

A hierarchy of mental and physical elements. We conceive of strategies as systems of interdependent elements. Following Winter (in Cohen *et al.*, 1996), we "split" elements into hierarchical categories (Figure 2). At the top of the hierarchy are elements residing entirely in managers' minds: representations, personal values, and heuristics. At the bottom are elements that physically embody a firm's strategy such as interdependent activities that directly incur costs and generate buyer value (Porter, 1996) as well as activities that allow a firm to sense the world. The lower layer also includes assets and liabilities – the stocks or state variables of evolutionary theory – ranging

from a firm's productive equipment and reputation to its knowledge, skill, or capability, a large component of which is embodied in organizational routines.

The most novel aspect of this hierarchy is its division of mental elements into representations, values, and heuristics. These three are alike in important ways. All three exist in the world of cognition yet guide physical action. All three help managers cope with a reality whose complexity outstrips their processing power. They do so by simplifying the space of possibilities in which the manager or team searches. For instance, at Lycos they ruled out regions of the space ("we will not consider profligate possibilities"), focused attention on a subset of choice dimensions ("it's the technology that really matters"), or suppressed interactions across functional domains ("keep R&D physically separate from marketing"). In such ways, these mental elements assist the search mechanisms we discuss below, acting as central initial conditions early in a company's life (Stinchcombe, 1965; Baron, Hannan, and Burton, 1999).

Representations, values, and heuristics also differ from each other. In Lycos' case, personal values and initial representations appear to have been adopted with little intentionality, but heuristics involved much reflection, at least when initially adopted. They also differ in their prescriptive specificity and scope, with representations and values giving high-level and broad guidance to action and heuristics providing more fine-tuned and narrower direction.

The neglected constructs suggest linkages that connect different elements over time. Representations and personal values influence a manager's choice of heuristics, which then affect activities. Activities generate levels or patterns of performance that are detected selectively through sensors. Once interpreted through the lens of representations or personal values, this feedback from the world of action can alter elements in the world of cognition. In addition, activities are linked vertically to stocks. Stocks typically build up as a result of activities that are undertaken, thus contributing to the effectiveness of activities and, importantly, constraining a firm's choice set at any given point in time.

Search mechanisms. The hierarchy arrays the elements that our study identified as critical in strategic search at Lycos. Search mechanisms underlie the dynamics of such elements. Lycos' history illustrates several classes of search mechanisms: local search (including experimentation), deductive reasoning, and case-based reasoning (including analogy and imitation). Future studies may well identify additional search mechanisms. Each search

mechanism receives guidance from the representations and values of the management team, which themselves can be shaped by feedback from action.

6. THEORETICAL IMPLICATIONS

The frame of reference moves us toward a model of search for a strategy, and it does so under the premise of behavioral plausibility. Behavioral plausibility, however, comes at the cost of increased complexity. This cost is worth paying if the extra complexity allows us to identify valuable propositions about the search for strategy that would be hard to identify otherwise. In this section, we step beyond Lycos, shift to deduction, and aim to build a sequence of such propositions. Although we ground our propositions in prior research, the picture we paint remains speculative, calling for theoretical refinement and empirical validation. Our propositions return us to the two dimensions underlying our approach: plasticity and rationality. We posit that each dimension depends on time and that grasping the origin of strategy hinges on understanding such dependencies.

Prior research, particularly in organizational ecology, has shown that organizations become less plastic as they age (Stinchcombe, 1965; Hannan and Freeman, 1977; Baron *et al.*, 1999). In terms of our framework, this implies that the physical and mental elements of a firm's strategy become more rigid as the firm ages. The nature of a firm's search mechanisms also depend on time, in a way we flesh out in propositions A1-A4. We bring together the time dependencies of elements and the time dependencies of search mechanisms to derive implications for strategic search in propositions B1-B3.

A. Rationality, search mechanisms, and environmental maturity. Lycos' history suggests that search mechanisms may take multiple forms and that no single mechanism need be dominant throughout an organization's history. Lycos' history was first dominated by local search, followed by a shift to case-based reasoning and, later, deductive logic. We see this shift as a trend toward a logic of consequences (March, 1994), in which alternatives are interpreted based on their expected outcomes and selected based on the match between expectations and preferences. Because they involve increased application of reasoning before action is taken, we will refer to search mechanisms

that rely more on a logic of consequences as “more rational” (Simon, 1997).⁸ Is the trend toward more-rational, less-experiential search mechanisms at Lycos purely accidental, or does it reflect deeper properties of search?

Consistent with work on cognition (Thagard, 1996) and decision theory (Gilboa and Schmeidler, 2001), we argue that the availability of search mechanisms depends on the nature, particularly the ambiguity, of the information environment in which an organization operates. In turn, this environment can be related to the maturity or age of the industry in which the organization competes. Industry maturation is typically conceived of as a complex process unfolding along both economic-technical and socio-institutional dimensions (Aldrich and Fiol, 1994). As an industry matures, knowledge about what works and what does not work accumulates, and central technological and competitive uncertainties get resolved (Klepper and Graddy, 1990). At the same time, industry maturation entails the creation and diffusion of norms, frames, expectations, and associated organizational practices and forms that conform to them (Scott, 1995). Together, these processes bring order and stability. Thus, we posit that, as an industry matures, the ambiguity of its informational environment decreases. We can conceive of information ambiguity in terms of two dimensions: the definability of possible states of the world (e.g., concrete manifestations of the problem) and the definability of priors over such states (e.g., the likelihood that a given scenario manifests itself in a specific way and leads to a certain outcome). As states and priors become definable, we move from “structural ignorance” (Gilboa and Schmeidler, 2001), which corresponds to infant industries or industries that have just experienced a major punctuation, to situations characterized by much lower informational ambiguity, which correspond to more mature industries. We posit that this movement affects the availability of search mechanisms.⁹

PROPOSITION A1: Early in an industry’s history or just after a major shock, local search may be the only effective mode of search that is available. In situations of full structural ignorance, not only are paths of cause and effect largely unclear, but, more fundamentally, decision makers cannot collect the information required to construct realistic scenarios, let alone develop priors on them. In these situations, the decision problem is fully amorphous

⁸ In common usage, “more rational” is sometimes equated with “better chosen.” On the contrary, we do not mean to imply that more-rational search mechanisms are always a better choice for a firm. It may be quite wise to rely on less rational, more experiential mechanisms. Our conception of rationality is fully consistent with standard treatments in the Carnegie tradition of organizational research. For instance, Simon (1955, 1997) explicitly lays out a notion of rationality along the lines of the agent’s ability to generate choice alternatives (which stems from her knowledge of the world and ability to define possible states of the world) and to select among them (which stems from her knowledge of accurate probability distributions of outcomes for each alternative).

⁹ Factors other than maturity surely affect the ambiguity present in an industry. A new industry that closely resembles a preexisting one or that employs well understood technology may be analyzable even in its infancy, for instance. For parsimony, we set these factors aside in this paper.

(Gilboa and Schmeidler, 2001) or unanalyzable (Daft and Weick, 1984). In addition, the uncertainty in such settings makes it difficult for firms to identify other firms as winners and imitate them. Thus, a less-than-exhaustive, local consideration of alternatives might be the only approach available to an intendedly rational manager.

PROPOSITION A2: As an industry matures, it passes through a stage at which search based on case-based forms of reasoning becomes available. These are intermediate situations in which the decision problem, while still being amorphous to some degree, contains informational cues that allow decision makers to spot similarities with past situations (Gentner *et al.*, 2001). These cues enable managers to form the similarity mappings that underlie reasoning by analogy (Gick and Holyoak, 1983). Furthermore, early winners begin to emerge that provide targets for imitation, and collective representations are formed that legitimize some targets more than others; in the portal industry, for example, Yahoo! emerges as a leader worthy of emulation, and Yahoo!'s media representation becomes accepted in the wider community of companies, financiers, and analysts.

PROPOSITION A3: As an industry matures further, the availability of search based on deductive logic increases relative to the availability of other modes of search. We refer here to mature industries, in which relative order and stability have been established thanks to the economic-technical and socio-institutional forces mentioned above. In such contexts, states of the world and priors over them can be defined more accurately (Daft and Weick, 1984; Gilboa and Schmeidler, 2001). Thus, search based on deductive logic is psychologically plausible and effective: intendedly rational decision makers can approach a given problem on the basis of, say, general economic principles. They can, for instance, examine economies of scale and switching costs in a new media business and draw conclusions about the appropriate strategy for their firm from first principles.

PROPOSITION A4: As a firm's (or its top management team's) experience within a given industry increases, so does its ability to employ more-rational search mechanisms. While industry maturation makes more-rational search mechanisms available to firms in general, some firms within an industry may have better access to those mechanisms than do others. At any point in the history of an industry, firms or top management teams with greater seniority within an industry or in similar contexts will likely have better access to rational search mechanisms. We do not deny the importance of population-level learning (Miner and Haunschild, 1995): as an industry matures, the stock of knowledge that is available to all firms increases. We simply argue that individual experience plays an important

role and can create variation across firms. Likewise, prior experience in similar contexts might improve the repertoire of “source problems” from which managers can draw analogies (Gavetti *et al.*, 2005).

B. Time dependencies combined. So far, we have argued that the constraints on *what* a firm can change in its strategy (elements) and *how intelligently* it can make those changes (search mechanisms) vary over time, with the age of the firm and the age of the industry in which it operates. As a result, the search for a strategy will tend to manifest itself differently for firms in different quadrants of Figure 3. We now illustrate some such tendencies and their implications. We pay special attention to three types of firms in Figure 3 that usually require intense strategy-making efforts: a young company in a new industry; a mature company right after a major punctuation in its industry; and a young company in a mature industry. For each type of firm, we first articulate the central tendency of strategic search as a function of the time dependencies. We then derive survival implications: for each type of firm that we consider, what kind of search behavior improves the odds of survival?

PROPOSITION B1.a: Young firms in new industries will tend to display highly plastic elements and low use of rationality. Over time, these firms will tend to shift to lower plasticity and greater use of rationality.

PROPOSITION B1.b: Among these firms, (i) those that are fortunate enough to begin with an effective set of elements and (ii) those that gain access to rational search mechanisms before their mental and physical elements ossify will have lower mortality rates than will firms that meet neither of these conditions. The assumption space on the left side of Figure 1 can be used to depict the trajectory of a firm. We argue that, for a young firm operating in a new industry, a typical trajectory is from the upper left to the lower right, with elements becoming less plastic and with more rational search mechanisms becoming available.

This trajectory sets up an interesting tension. Consider a firm like Lycos that is founded in the early days of its industry. Early on, the firm is plastic in its body. For instance, interwoven sets of activities, routines, or capabilities have not yet emerged (Nelson and Winter, 1982), and the firm has rarely made sticky commitments to stake out favorable competitive positions (Ghemawat, 1991). To a certain degree, the firm is also flexible in its mental elements: at least the cognition of the top management team has not yet been embodied in activities, routines, and structures. The highly ambiguous information environment, however, prevents the firm from exploiting its underlying plasticity. It is only later that more rational search mechanisms become available, with case-based

reasoning typically preceding deduction (A1-A3), and that the organization's accumulation of experience allows their effective use (A4). By that time, however, the organization may have stiffened so much that it cannot capitalize on its increased intelligence. The firm may master more rational forms of search too late to use them.

In light of this tension, we see three possible outcomes for a young firm in a new industry. First, the firm may be fortunate enough to begin its search for a strategy in a locale auspicious enough that local search can guide it to a winning combination of activities (Levinthal, 1997). Such a firm succeeds even if its elements ossify before it can deploy more rational search mechanisms. Among portals, we see Yahoo! as a firm that followed this path to survival. The company's early adoption of a media representation allowed it to thrive without the kind of repositioning that Lycos required.

A second path to survival, exemplified by Lycos, is to exploit more rational search mechanisms as they become available – and to act on the resulting insight before losing plasticity. This path, from upper left to upper right then down in Figure 1, is tricky not only because of the tension described above, but also because it requires a firm to modify its search mechanisms. Both theory and evidence suggest that such adjustments are not straightforward: it is extremely challenging to change how decisions are made and how tasks get organized, particularly when they have become routinized (Hannan and Freeman, 1977; 1984; Amburgey *et al.*, 1993; Baron *et al.*, 1996; Baron *et al.*, 1999).

Finally, firms with unlucky starting points that leap late toward more rational search mechanisms, after elements have ossified, will have more difficulty surviving, particularly in a tight selection environment. In the portal industry, Infoseek and Excite might exemplify this path – from upper left to lower left with a poor starting point...and eventually to exit. Each firm started with a technology representation that resembled Lycos', but each persisted in acting on that representation long after Lycos' managers shifted their mindsets and actions toward a media model. Their late conversions to media – Infoseek with its purchase by Disney, and Excite with its adoption of a model based on cable television – did little to alter what the firms actually did. At least in this single setting, the evidence is consistent with our proposition that young firms in new industries get lucky, get cognitive, or get dead.¹⁰ A profound mystery, which we purposely do not tackle in this paper, is what permitted Lycos to maintain its mental and physical

¹⁰ We are grateful to Rebecca Henderson for this vivid summary of the proposition.

plasticity longer than its rivals did.¹¹

PROPOSITION B2.a: Established firms entering new industries or facing industry punctuations will tend to display implastic elements and the routinized use of deductive search mechanisms.

PROPOSITION B2.b: Among these firms, those that (i) preserve more plasticity than others in their elements and (ii) persist less than others in deductive reasoning and adopt less rational search mechanisms will have lower mortality rates.

Over time, firms that don't "get dead" tend to gravitate toward implasticity and the routinized use of deductive logic in strategic decision-making (March, 1994). As an industry matures, not only is deductive logic more available, but normative pressures also arise that induce industry participants to use deductive logic to justify their actions (DiMaggio and Powell, 1983). Increasingly formal governance (due to, say, an IPO) may make it more important to account for and justify firm actions (Hannan and Freeman, 1984), and an increase in the number of people to whom management must communicate the rationale for its actions may make it attractive for managers to rely on widely known principles (such as general economic principles). In this context, a major shift in the environment, a punctuation event (Tushman and Romanelli, 1990), may threaten an established firm in three ways.

First, it might change the configuration of physical elements necessary for success. Established firms would then suffer because of implasticity in the world of action. Prior literature has labeled this type of change "competence-destroying," acting largely on elements in the domain of action (Abernathy and Clark, 1985; Tushman and Anderson, 1986). Second, a punctuation event may require radical changes in an organization's mental elements. That is, the change might be cognitively disruptive so that previously effective representations or values steer a firm toward ineffective action (Tripsas and Gavetti, 2000).

A third possibility, not emphasized in prior literature, is that punctuation events may upset cause-and-effect relations in an industry and restore the "structural ignorance" that is typical of young industries, thereby resetting the

¹¹ Proposition B1.b assumes that some sets of elements are inherently more or less effective than others are. This assumption runs somewhat contrary to recent literature that, in the wake of structuration theory (Giddens, 1984), emphasizes how organizations can act to shape their environments (e.g., Leblebici *et al.*, 1991; Aldrich and Fiol, 1994); in this literature, a strategy is not inherently effective but becomes effective as the venture deploying it gains cognitive and sociopolitical legitimacy. This perspective surely has validity. In the portal industry, for example, Yahoo!'s strategy became more effective as its media representation gained acceptance among Wall Street analysts, venture capitalists, and advertisers. At the same time, one can argue that the strategy was also inherently effective because it embedded a good solution to the structural constraints of the industry in which it was developed, and that external parties recognized that the solution was good. As we discuss below, future work should consider how firms can mold the evolution of their environments and how that evolution shapes the availability of search mechanisms. Such work would generate additional insights into the origins of strategy, particularly for firms in nascent industries.

clock with respect to search mechanisms. As a result, the wisdom accumulated in the old environment (A4) might not transfer fully to the new one. Moreover, perhaps more importantly, in a newly ambiguous information environment, local search may become relatively effective once again, as it was in the industry's youth (A1). Yet, as explained above, in an established firm deductive search typically becomes institutionalized and routinized, with the development of structures and administrative mechanisms that support it (Bower, 1970; Burgelman, 1991; Simon, 1957b). Consequently, established firms may very well persist in deductive search at the expense of local search even in a setting where that search mechanism is no longer the most effective. Survival then hinges on a leftward movement in Figure 1, toward more-experiential search mechanisms.

One can use similar logic to examine the prospects of an established firm not after a punctuation, but in an altogether new industry. In the portal industry, for instance, Time-Warner's Pathfinder venture suffered in part because its parent inappropriately imposed the representations of its magazine division on the Internet start-up and insisted on well-deduced plans before deduction was available. Far more successful was Microsoft's MSN venture, which shifted representations readily and reinvented itself several times before discovering an effective strategy.

PROPOSITION B3.a. Young firms entering mature industries will tend to display high plasticity and good access to rational search mechanisms.

PROPOSITION B3.b. Among these firms, those that adopt rational search mechanisms more than others will have lower mortality rates. An entrant's advantages are, however, balanced against other benefits that incumbent firms enjoy.

Late entrants to an industry might be located in an especially favorable part of the assumption space in Figure 1: the upper right corner. Hence, they are more likely to have access to and use more rational search mechanisms to spot winning strategies than are early entrants, and they retain the plasticity to deploy such strategies. This is especially true when firsthand experience is not necessary to gain access to rational search mechanisms (cf. A4). In the portal industry, one might argue that Google has attempted such a maneuver, committing itself to actions only at the end of the period covered by this paper. (Google was incorporated in September, 1998, more than three years after Lycos.) This approach fails, however, if firms that entered earlier and "got lucky or got cognitive" have preemptively occupied the attractive positions in the industry. Presumably, it is the potential for such an early-mover

advantage that tempts a firm to take early action and begin to give up its plasticity.

The central implication of Propositions B1-3 is that virtually any mixture of plasticity and rationality is plausible under some combination of organizational age and industry maturity. We return to this observation as we conclude.

7. CONCLUSION

The genesis and dynamics of business strategies remain a profound puzzle. Strategy exists in the cognition of managers but also is reified in what companies do. Characterizing its origin requires a grasp of how both aspects of strategy jointly come into being. We have attempted to offer a behaviorally plausible account of this two-part search process. The model we derive specifies two types of constructs: elements over which search occurs, and search mechanisms that operate on those elements. Our sensitivity to behavioral plausibility, therefore, operates along the dimensions of plasticity and rationality. Through field-based induction, we identify elements and search mechanisms that, although central to the search for a strategy at Lycos, are neglected by the two perspectives that we chose as initial guides. Based on this emerging characterization of what elements and mechanisms correspond to the “middle ground of behavioral plausibility,” we deduce theoretical propositions about strategic search. Our propositions center on the argument that both the plasticity of elements and the rationality of mechanisms vary over time, with plasticity depending largely on the age of the firm and rationality depending largely on the maturity of its industry. Though simple, this argument has deep implications for our understanding of the origin of strategy.

The argument implies a distinctive way of framing the question of strategy’s origins, one that takes *time* as a central primitive. The claim that rationality and plasticity are time dependent implies that the constraints on strategic search – *what* can be changed and *how intelligently* it can be changed – shift over time. Thus, we expect the nature of strategic search to change as a firm and its industry age, with different elements in flux and different search mechanisms at work at any given point in time. Our initial analyses of some portions of this space (propositions B1-3) illustrate such differences and their implications for survival. The analysis also highlights a tension between rationality and plasticity: by the time a firm can shift to more-rational, less-experiential search mechanisms, it may lack the plasticity necessary to harvest the fruits of its rationality.

Seeing the origin of strategy through a time-dependent lens sharpens our view of the path toward an evolutionary-positioning synthesis. Our analysis leads us to realize that the location of the “middle ground of behavioral

plausibility” depends on time: what is behaviorally plausible at one point in time might not be plausible at another. A young firm in a mature industry might combine the high plasticity and rationality of the polar positioning perspective, while an old firm that engrained local search during its youth may display the implasticity and reliance on experience of the extreme evolutionary perspective. Our model identifies conditions under which the polar perspectives are plausible in their pure forms, and it suggests how the search for a strategy unfolds when those conditions do not hold. In this sense, the model contributes to a genuine synthesis of the two perspectives.

An implication of our framing is that research on the origin of strategy must deal more fully with time dependency. Much prior work in this domain is certainly sympathetic to the notion that the nature of strategic search is time dependent (Bower, 1970; Mintzberg, 1971; Ghemawat, 1991; Burgelman, 1991; Noda and Bower, 1996; Siggelkow, 2002). However, with isolated exceptions (Eisenhardt, 1989b; Haveman *et al.*, 2001), the variable “time” has typically not been given the primitive status that we advocate. Here we offer the beginning of a truly diachronic approach to the question of how strategy originates, one that specifies a theoretical architecture by linking time directly to assumptions about rationality and plasticity. Clearly, this paper is only an opening step on a long journey. The journey must address a number of fundamental gaps. For instance, although the relationship between plasticity and organizational age has already been explored in some depth, particularly by organizational ecologists (e.g., Carroll and Barnett, 2004, and contents therein), evidence that maps rationality to industry maturity is much weaker. Even less is known about the interplay between these two dependencies.

We recognize the limitations of building theory on the basis of one case: there is little reason to believe that a single history will reveal all of the relevant constructs. More efforts to build grounded theory are clearly in order. We are in the midst of expanding our focus from Lycos alone to the full set of Internet portals, including survivors, exiters, and potential entrants who opted not to enter. We hope this expansion will allow us to extend our model to consider the construction of collective cognitive models (Porac *et al.*, 1995). Indeed, by prioritizing organizational-level processes, we have underplayed the role of cognition at the field level. Although our emphasis on cognition at the organizational level generated distinctive insights into how strategic search typically unfolds, and what this means for survival, such insights should be augmented by studying the interplay between organizational and field-level cognitive processes. More specifically, we have conceived of search behavior as organizational action

constrained by the maturation of both an organization and its environment. The environment changes, but it is assumed to change in a way that is largely exogenous to the organization. We believe that relaxing this assumption would generate additional insights into how strategies originate and evolve over time. Further, our perspective underplays the role of social influence on search behavior (DiMaggio and Powell, 1983). Legitimation pressures affect search processes in important ways (Cialdini, 1993; Rao *et al.*, 2001) yet are missing from our current list of search mechanisms. This issue suggests that the “technical” environment – our current focus – and the broader institutional context should be considered jointly.

Finally, a challenge for future research is to extend our conceptual apparatus to address more explicitly the role of organizational structure, thereby linking it to the work of Bower, Burgelman, and their students on the strategy-making process (e.g., Bower, 1970; Burgelman, 2002; Christensen and Bower, 1996; Noda and Bower, 1996; Gilbert, 2001). This prior work focuses on strategic decision-making in large, hierarchical organizations and, in particular, on the role of structural and strategic context in that process. In contrast, we have examined an entrepreneurial venture in its early days, before it developed formal procedures for allocating resources and making strategic choices. The contrast was intentional. We believed that it would be sufficiently challenging to track the evolution of cognition-led and action-led search processes in a relatively simple organization without the complications that come with hierarchy. Consequently, the constructs in our frame of reference do not incorporate the role of organizational structure. If successful, simple and young organizations grow, develop internal structure, and adopt more formal means of making decisions. Structure, processes, and politics begin to matter in ways that our frame of reference does not capture.

Despite its limitations, or perhaps because of them, the theoretical architecture we propose may suggest something new about how strategies originate. The world of action, the world of cognition, and their interplay are sensitive to time, and our models need to incorporate this sensitivity. In such considerations may lie the roots of an integrated view of the search for a strategy – a synthesis of the evolutionary and positioning perspectives and perhaps, in time, other points of view.

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TABLE 1: TEXT ANALYSIS OF 1996 10K'S

Word	Frequency (% of all words)		Lycos / Yahoo! ratio	Word	Frequency (% of all words)		Lycos / Yahoo! ratio
	Lycos	Yahoo!			Lycos	Yahoo!	
Catalog	1.4	0.0	Inf.	Assurance	0.5	0.5	1.00
Technology	1.0	0.0	Inf.	Future	0.6	0.6	1.00
License	0.8	0.0	Inf.	Provide	0.7	0.7	1.00
Index	0.7	0.0	Inf.	Content	0.6	0.7	0.86
Resource	0.6	0.0	Inf.	Business	0.8	1.0	0.80
Offering	0.4	0.0	Inf.	Revenue	0.7	0.9	0.78
Reviews	0.4	0.0	Inf.	Advertising	1.9	2.5	0.76
Software	0.4	0.0	Inf.	Finance	0.6	0.8	0.75
Product	3.2	1.1	2.91	Operation	1.0	1.4	0.71
Directory	0.8	0.3	2.67	Result	0.9	1.5	0.60
Information	1.3	0.7	1.86	Agreement	0.3	0.6	0.50
Internet	2.8	1.6	1.75	Development	0.7	1.4	0.50
Web	2.7	1.6	1.69	Sale	0.3	0.6	0.50
Service	3.0	1.9	1.58	Failure	0.0	0.4	0.00
Site	1.5	1.0	1.50	Stock	0.0	0.5	0.00
Growth	0.4	0.3	1.33	Brand	0.0	0.6	0.00
Search	0.8	0.6	1.33	Listing	0.0	0.6	0.00
Traffic	0.4	0.3	1.33	Guide	0.0	0.7	0.00
User	1.6	1.2	1.33	Media	0.0	1.2	0.00
Competition	0.9	0.7	1.29	Properties	0.0	2.0	0.00
Market	1.1	0.9	1.22				

TABLE 2: TEXT ANALYSIS OF 1999 10K'S

Word	Frequency (% of all words)		Lycos / Yahoo! ratio	Word	Frequency (% of all words)		Lycos / Yahoo! ratio
	Lycos	Yahoo			Lycos	Yahoo	
Search	0.8	0.0	Inf.	Future	0.6	0.5	1.20
Traffic	0.5	0.0	Inf.	Develop	0.8	0.7	1.14
Competition	0.4	0.0	Inf.	Service	3.5	3.3	1.06
Growth	0.4	0.0	Inf.	Business	1.2	1.2	1.00
Netscape	0.4	0.0	Inf.	Technology	0.5	0.5	1.00
Strategy	0.4	0.0	Inf.	Users	1.2	1.5	0.80
Product	2.8	0.6	4.67	Acquisition	0.3	0.4	0.75
Advertising	1.8	0.6	3.00	Distribution	0.3	0.4	0.75
Commerce	1.1	0.5	2.20	Market	0.6	0.8	0.75
Site	1.5	0.7	2.14	Parties	0.3	0.4	0.75
Internet	2.0	1.0	2.00	User	0.4	0.6	0.67
Number	0.6	0.3	2.00	Revenue	0.5	0.8	0.63
Operation	1.4	0.8	1.75	Information	0.4	0.8	0.50
Ability	0.5	0.3	1.67	Media	0.3	0.7	0.43
Relationships	0.5	0.3	1.67	Provide	0.4	1.2	0.33
Finance	0.9	0.6	1.50	Content	0.4	1.3	0.31
Sale	0.4	0.3	1.33	Audio	0.0	0.4	0.00
Result	1.3	1.0	1.30	Communicat'n	0.0	0.4	0.00
Brand	0.5	0.4	1.25	Access	0.0	0.7	0.00
Effect	0.5	0.4	1.25	Stock	0.0	0.8	0.00
New	0.5	0.4	1.25	Properties	0.0	1.6	0.00
Web	1.5	1.2	1.25				

FIGURE 2: TOWARD A FRAME OF REFERENCE

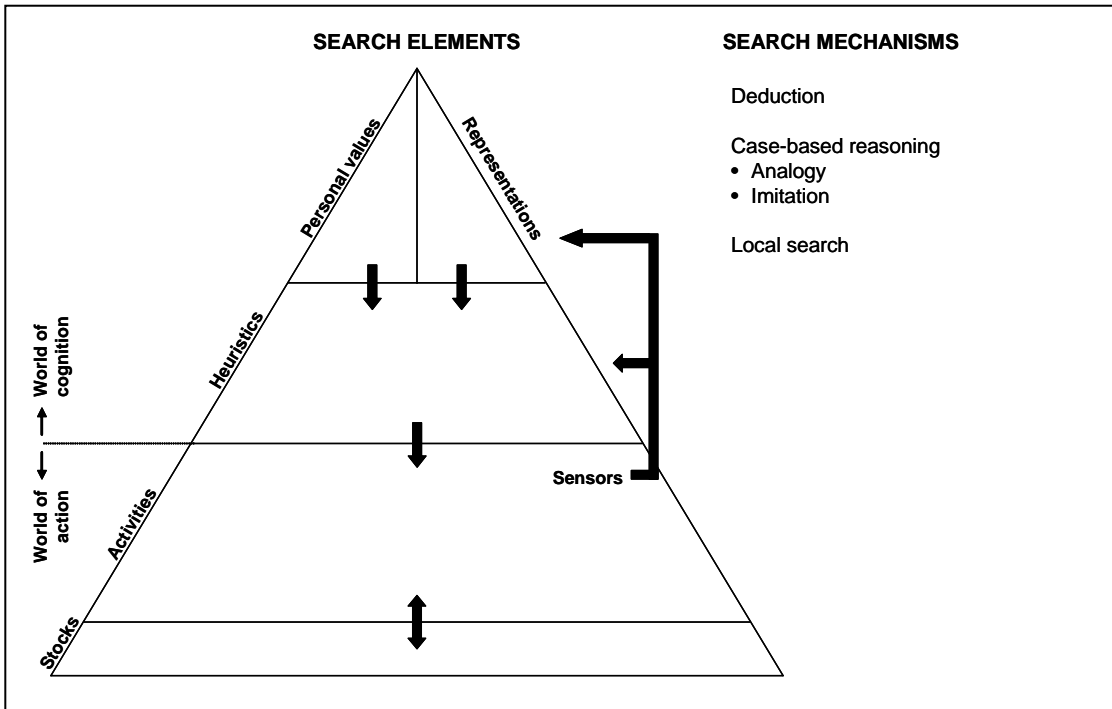


FIGURE 3: IMPLICATIONS OF TIME DEPENDENCIES

	Young firm	Established firm
New industry or industry after punctuation	<p>B1.a: Highly plastic elements and low use of rationality, shifting over time toward lower plasticity and greater use of rationality.</p> <p>B1.b: Lower mortality among (i) those fortunate to begin with an effective set of elements and (ii) those that gain access to rational search mechanisms before elements ossify.</p>	<p>B2.a: Implastic elements and routinized use of deductive search mechanisms.</p> <p>B2.b: Lower mortality among those that (i) preserve more plasticity in elements and (ii) persist less in deductive reasoning.</p>
Mature industry	<p>B3.a. High plasticity and good access to rational search mechanisms.</p> <p>B3.b. Lower mortality among those that adopt rational search mechanisms. Advantages balanced, however, against other benefits of incumbent firms.</p>	