

Evolution toward Fit

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This paper uses a longitudinal case study of the mutual fund provider, The Vanguard Group, to understand the developmental processes that lead to organizational configurations and fit. A new method for determining an organization's core elements is developed, and four processes are identified that describe the creation and subsequent elaboration of these core elements: thickening (reinforcement of an existing core element by new elaborating elements), patching (creation of a new core element and its reinforcement by new elaborating elements), coasting (no further elaboration of a new core element in a given period), and trimming (deletion of a core element and its elaborating elements). The four processes are used to describe organizations' development paths toward configurations and their transitions between configurations, including two new ideal types, termed thin-to-thick and patch-by-patch, as well as two known paths between configurations, the punctuated equilibrium path and reorientation through linear progression.●

Scholars in a variety of literatures have conceptualized firms as systems of highly interdependent elements (e.g., Miller, 1981; Milgrom and Roberts, 1990; Porter, 1996; Levinthal, 1997; Whittington et al., 1999). In these analyses, organizational elements such as firms' activities, policies, structural elements, and resources are seen to form complex systems, or configurations. Although scholars have established a long time ago that consistency, or internal fit, among an organization's elements is positively correlated with performance (e.g., Khandwalla, 1973; Drazin and Van de Ven, 1985), research about how organizations evolve toward such configurations of tightly reinforcing elements is much less developed (Miller, 1996). Moreover, no adequate vocabulary exists that would allow a consistent description of organizations' developmental paths toward configurations—a vocabulary that would be helpful in developing further theory that links organizational development and organizational performance.

In describing organizations, many scholars have argued that some organizational elements are more central or core to an organization than other, more peripheral elements (Hannan and Freeman, 1984; Singh, House, and Tucker, 1986). For instance, Hannan and Freeman (1984: 156) identified as "core aspects of organization" the organization's stated goals, its forms of authority, its core technology, and its marketing strategy. While the distinction between core and non-core elements has become common in the organizational literature, little progress has been made to date in distinguishing them systematically. As a result, Hannan, Burton, and Baron (1996: 507), summarizing the research efforts concerning organizational core elements, concluded, "Although there seems to be a general agreement that some organizational features fall nearer the core than others, we see no consensus on exactly what constitutes the core."

To better understand the nature of core elements and the underlying developmental processes that lead to configurations, I engaged in an inductive study of the developmental path of The Vanguard Group, the second-largest mutual fund provider in the U.S. Through an iterative process, involving

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the data of the case, existing literature, and broader conceptual reasoning about organizational evolution, I identified four developmental processes that were intimately related to the creation and further elaboration of organizational elements that had core characteristics. To define these developmental processes more tightly, a characterization of organizational core elements was required that allowed a systematic identification of such elements. As a result, the inductive study of the developmental processes went hand-in-hand with creating a methodology that allowed the identification of an organization's core elements at various points in the organization's history. To identify core elements, the notion of interactions among the elements of an organizational system played a key role.

ORGANIZATIONAL CORE ELEMENTS AND ORGANIZATIONAL SYSTEMS

In previous work, core elements of organizations have been identified by declaring *ex ante* a number of critical activity domains and then selecting variables that represent these domains. For instance, Miller and Friesen (1982), in their study on quantum changes, measured structural variables falling into three categories: uncertainty reduction (e.g., use of formal rules), differentiation (e.g., decentralization), and integration (e.g., use of coordinative committees). In a similar vein, Romanelli and Tushman (1994: 1147), in testing the punctuated equilibrium model, argued that organizational culture, strategy, structure, power distributions, and control systems are "important to organizational survival and central to organizational activities" and thus form core activity domains. Changes in these activity domains were measured by introductions of new product lines (strategy change), by general reorganizations of the firm (structural change), and by turnover of senior executives (power distribution change). Due to data limitations, they dropped the culture and control systems domains from their analysis.

The advantage of an *ex ante* specification of core elements is that changes in these elements can be measured consistently across firms. The disadvantage of this approach is that it assumes that the same elements are equally central or core in all firms. Empirical evidence suggests, however, that the same elements are not equally central in all firms. For instance, Singh, House, and Tucker (1986) argued that chief executive change is a peripheral change in their sample of voluntary social service organizations, while Romanelli and Tushman (1994) coded such a change as a core change for their sample of minicomputer producers. The *ex ante* specification approach also implies that the number of core elements is constant across different firms and constant over time for any given firm. Rather than specifying core elements (or domains from which core elements are selected) *ex ante*, it may be preferable to identify core elements more directly.

Even though the organizational literature contains no agreement as to what particular elements should be included in an organization's core, consensus exists as to the properties of an organizational core element. In particular, an element is said to belong to the core if it has one of the following two

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features: (1) a high interdependency with other current organizational elements and (2) a large influence on future organizational elements. As to the first property, Hannan, Burton, and Baron (1996: 506) noted: "A feature forms part of the organizational 'core' if changing it requires adjustments in most other features of the enterprise. A feature lies at the periphery if it can be changed without imposing changes on other features. . . . Coreness means connectedness, elements in the core are linked in complicated webs of relations with each other and with peripheral elements." Thus, an element is core if it interacts with many of the organization's other elements. The second property of a core element is its profound effect on future organizational elements. Studying core elements of employment relations, the sum of which the authors call an "organizational blueprint," Baron, Hannan, and Burton (1999: 531) noted, "once formulated and articulated, a founder's organizational blueprint likely 'locks in' the adoption of particular structures; it also 'locks in' certain premises that guide decision-making." Thus, an element is a core element if it affects or interacts with many future elements. Taking both features of core elements into account, I define an organizational core element as an element that interacts with many other current or future organizational elements.

This definition implies that the number and identity of organizational core elements might not be constant over time. Over any period of time, a firm might add a new core element, delete a core element, or replace a core element with a new one. Besides changing core elements (typically a rare event), an organization is engaged in supporting or elaborating its core elements. For instance, as will be described in more detail later, one of Vanguard's core elements was a policy to engage in candid communication with its clients. Other organizational activities that elaborated this core element included clearly written annual reports, letters to shareholders warning them that high performance of certain funds was unlikely to continue, and "Plain Talk" brochures that explained fundamental issues of investing. Each core element of an organization is thus supported over time by a series of elaborating elements, which are defined as organizational elements that reinforce existing core elements.

The definitions of core and elaborating elements use the terms interaction and reinforcement, which deserve further explanation. I use a definition of interaction that has been used in the literature on complex interdependent systems (e.g., Rivkin, 2000). Two elements are said to interact if the value of one element depends on the presence of the other element. In particular, two elements are said to reinforce each other if the value of each element is increased by the presence of the other element, that is, if the two elements are complementary to each other (Milgrom and Roberts, 1990). Examples of reinforcement can be found, for instance, in Raff's (2000) description of the bookstore chain Borders. Given Borders' focus on having a wide assortment of books available in each store, investments in software that allowed tracking of inventory and enabled better sales forecasts became more valuable. Conversely, given a sophisticated

inventory and procurement system, an increase in book selection within stores was made economically more feasible. Both elements reinforced each other. Analogously, in the context of manufacturing, flexible manufacturing systems and wide product variety are complementary elements, reinforcing each other: the wider the product variety, the more valuable are investments in increasing the flexibility of the manufacturing system; and conversely, the more flexible the manufacturing system, the greater the benefit (i.e., the lower the cost) of increasing product variety (Jaikumar, 1986; Milgrom and Roberts, 1990).

Interactions can exist both between and among elaborating and core elements. An elaborating element usually reinforces at least one core element, and each core element interacts with many elaborating elements. An elaborating element may interact with more than one core element and with other elaborating elements as well. Not every elaborating element has to interact directly with a core element. An element may elaborate a core element indirectly via another elaborating element that directly interacts with the respective core element. Finally, core elements themselves may interact with each other. A firm with many organizational elements that reinforce each other is said to have a high degree of internal fit (Siggelkow, 2001). This notion of fit is consistent with Miller's (1996: 511) suggestion that "the fit among the elements of an organization may be evidenced by the degree to which strategy, structure and systems complement one another."

Not all organizational elements interact with each other. If the value of an element is independent of the presence of another element, both elements are said to be independent from each other. Moreover, a firm may adopt elements that are inconsistent. For instance, in the early 1980s, many U.S. firms did not pair their investments in flexible manufacturing systems with a change in product variety or increased training for their employees but continued with high-volume production of a few parts produced by employees with relatively low levels of skill (Jaikumar, 1986). The combination of these choices created a misfit between manufacturing and product strategy, leading to a decline in performance as compared with using conventional technology (Jaikumar, 1986).

At any point in time, one can thus describe a firm as an organizational system composed of various types of elements (core elements, elaborating elements, independent elements, and inconsistent elements) and the interactions among these elements.¹ This conceptualization of an organizational system has a close parallel in Porter's (1996) notion of an activity system and in Miller and Friesen's (1984) notion of a configuration. The concept of an organizational system is broader, however, than the notion of a configuration. The term configuration usually implies that the core elements are reinforcing, such that the overall system is in a state of coherence or consistency. For instance, Miller and Friesen (1984: 21) noted, "Configuration, in essence, means harmony." In contrast, an organizational system may well consist of core elements that are not reinforcing. A possible definition of configuration is thus an organizational system with no incon-

¹ Formal representations of such organizational systems have been studied by Gavetti and Levinthal (2000), Ghemawat and Levinthal (2000), Rivkin (2000), and Rivkin and Siggelkow (2002).

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sistent core elements and a number of reinforcing core elements.

The existing literature thus provides a number of concepts that allow one to describe an organization at a point in time: at the detailed level of the organization's core elements, its elaborating elements, and the interactions among these elements or, at a higher level, by matching the organization's configuration to one of the configurational ideal types proposed by various researchers (e.g., Burns and Stalker, 1961; Miles and Snow, 1978; Mintzberg, 1979). How an organization evolves over time toward such a full-fledged configuration and how to describe such development appear to be open questions, however. It was to answer such questions that I undertook the inductive study of The Vanguard Group.

METHODS

Research Setting

Studying the underlying processes of organizational development required a research setting that allowed an analysis of an organizational system, comprising elements and interactions, at various points in time. The Vanguard Group had several features that made it suitable for this purpose. First, Vanguard was founded in 1974, providing more than 20 years of data, while members of the firm could be interviewed, including the founder, who had experienced the entire history of the firm. Second, and more important, founder John Bogle, who played a pivotal role in the development of Vanguard, had been a prolific writer, penning dozens of speeches and memos throughout his career, even before becoming the leader of Vanguard. These documents provided an excellent opportunity to gain insights into the contemporaneous thinking of Bogle at various points in Vanguard's history. Moreover, these documents served as a check to retrospective sense-making and potentially biased memories of interviewees (Golden, 1992). Third, due to its unique organizational structure (explained below), Vanguard enjoyed extensive press coverage, generating a large amount of secondary data that were helpful in identifying Vanguard's organizational system throughout its history.

Data Collection

To map out Vanguard's organizational systems, I used a longitudinal case-study design (Eisenhardt, 1989). The research was carried out in three stages. In the first stage, I primarily relied on secondary sources and several company documents to develop a chronology of Vanguard's organizational elements from its inception to the beginning of 1997. I further started to identify interactions among elements and to create maps displaying the elements and interactions. In the second stage, I engaged in a series of interviews with members of Vanguard's management team to amend the maps. I discussed both the elements contained in the maps and the interactions among them. The third stage involved in-depth interviews with John Bogle and an analysis of the memorandums and speeches he prepared throughout his career, leading to further refinement of the maps. While these three stages broadly describe the research process, the overall cre-

ation of the maps depicting the organizational systems was much more iterative. Whenever I gathered new information either through interviews or archival material, I triangulated (Miles and Huberman, 1984: 234) the information through interviews with different members of the organization or through other archival material before refining the maps.

Stage 1: Analysis of archival data. An extensive search on Lexis-Nexis for articles written about Vanguard in trade journals and magazines yielded approximately 500 articles that were used to identify the elements of Vanguard's organizational systems over time. A biography of Bogle (Slater, 1997) and company documents provided further information. To systematize the analysis, I found it helpful to lay out the elements of a typical value chain (Porter, 1985) of a mutual fund provider (detailed below). The different stages of the value chain provided helpful categories for grouping elements and to ensure that elements from all stages of the value chain were included for analyses at different points in time.

After the organizational elements for a particular year had been recorded, I identified interactions among the elements using the logic outlined in the previous section. For each two elements A and B, I assessed whether the value of element A was dependent on element B and, in particular, was strengthened by element B, or not. A common thought experiment was, if Vanguard did not engage in element B, would the value of element A be affected and, in particular, decrease? A similar approach for establishing the complementarities among the set of activities the Lincoln Electric Company engaged in can be found in Milgrom and Roberts (1995). Identifying elements and interactions was only preliminary, serving as a starting point for the subsequent interviews. Putting elements and interactions together, I created maps of Vanguard's organizational systems for its founding year, 1974, for 1977, when Vanguard internalized its distribution, for 1981, when Vanguard started internal asset management of several funds, and for 1997, the end of the study.

Stage 2: Interview data. Over the period 1996–97, I conducted 11 personal interviews with members of Vanguard's senior management team and several junior managers. Management team members interviewed included the current chief executive officer (CEO), chief financial officer, senior vice president for information technology, general counsel, principal responsible for institutional client services, and director of portfolio review. The interviewees' tenure at Vanguard ranged from three years to over 20 years. The interviews lasted between one and two hours and usually consisted of three parts. In the first part, managers were asked to outline key developments in Vanguard's evolution. A typical question asked in this part was, "Over your tenure at Vanguard, what have been some important initiatives and changes that Vanguard has engaged in?"

In the second part, we discussed the preliminary maps I had constructed from the archival data and previous interviews. With managers with a long tenure at Vanguard, I discussed all maps. With managers who had joined Vanguard only a few years earlier, I discussed the maps of the most recent years.

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The main goal of this second step was to verify the elements that I had identified up to that point and to discuss the interactions that I had sketched out. I explained to the managers the definition of interaction (i.e., what the lines in the maps represented) and talked through several examples in the maps, usually using a variant of the thought experiment described above. After studying the maps, interviewees pointed out further interactions among elements or questioned the existence of interactions I had indicated. I tried to confirm or disconfirm each interaction with at least two different managers. Interviewees also suggested that I outline an organizational system for 1991, a time at which Vanguard had increased its efforts to gain business in the retirement market.

Each interview typically ended by asking the manager some specific questions concerning his or her department, for example, to provide more information on Vanguard's strategy with respect to information systems or details on institutional services. Several shorter follow-up interviews were conducted on the telephone to clarify inconsistencies or questions that arose during the subsequent analysis. Overall, while the interviews were important in verifying the elements and interactions, the original archival analysis proved to be fairly accurate. Only about 10 percent of the elements and interactions were changed through this interview process.

Stage 3: Interviews with Bogle and further analysis of archival data. After the interviews with members of Vanguard's management team, I conducted two extensive, several-hour interviews with John Bogle. These interviews differed from the interviews with the other Vanguard managers in that Bogle had received, prior to the interviews, a written chronology on Vanguard's history that I had compiled and the maps depicting the individual elements and interactions. After the first interview, I gained access to a large number of additional documents, in particular, an 89-page study John Bogle had prepared at the inception of Vanguard, in which he outlined "The Future Structure" of Vanguard (Bogle, 1974) and a series of 37 speeches that Bogle delivered over the last 30 years in front of various audiences (e.g., to Vanguard's employees, fund analysts, and industry associations). After I had analyzed and incorporated these new sources into the analysis, I conducted a second interview with Bogle, who again provided extensive comments on the chronology and the maps provided to him prior to the interview. Interviews were not recorded, but I made extensive notes during and after the interviews.

The overall research process was highly iterative (Miles and Huberman, 1984). I started with the question, "How do organizations evolve toward highly complex systems of interdependent elements?" and "How can we describe these developmental paths?" for which the literature did not appear to provide satisfying answers. I then engaged in collecting data, attempting to outline the evolutionary path of an organization. While the type of data collected was guided by the broad framework of treating firms as systems of interdependent elements—leading to an emphasis on gathering data at the level of individual organizational elements and on their

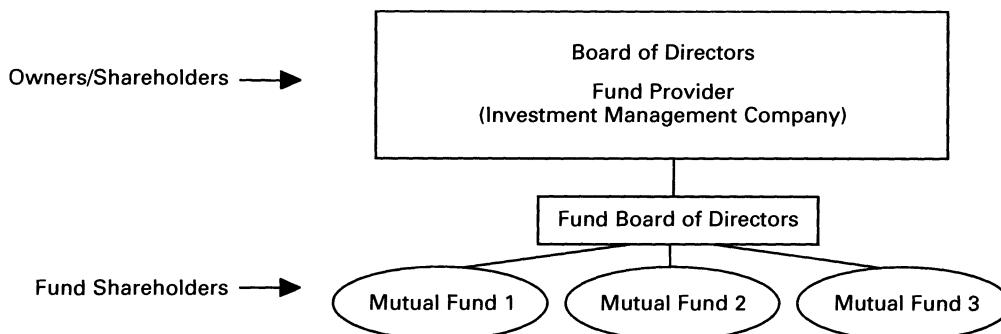
interactions—the data collection was not influenced by an a priori theory of developmental processes. Through the analysis of the data, I started to recognize patterns in the overall developmental path of the organization under study. I then referred back to the literature to seek concepts that might help to explain these patterns. By going back and forth between the data and the literature, a reiterative process that included responding to the creative challenges raised by the reviewers, I identified four lower-level processes of organizational development: thickening, patching, coasting, and trimming. Since the underlying developmental processes are intimately tied to the concept of an organizational core element, I developed an operationalization of the definition of an organizational core element that would allow me to systematically identify Vanguard's core elements within its organizational system at various points in time.

VANGUARD'S ORGANIZATIONAL SYSTEMS AND CORE ELEMENTS

To understand the elements of Vanguard's organizational systems, a brief account of the typical organizational structure and the typical value chain of a mutual fund provider is necessary. Each mutual fund (e.g., Vanguard's Index 500 Fund) consists of a board of directors and the capital paid in by fund shareholders. Most commonly, all mutual funds offered by a fund provider have the same directors on their boards, creating one fund board of directors, as shown in figure 1. Formally, the fund board of directors hires an investment management company to operate the fund. In practice, however, the investment management company (alternatively called the fund provider) decides to create a new fund, assigns a fund manager to operate the fund, and then appoints a board of directors to monitor the handling of the fund's assets. The investment management company itself is usually a publicly or privately held firm, which also has a board of directors. In the unique case of Vanguard, however, the fund shareholders are also the owners of the investment management company. In the following, I will refer to this organizational arrangement as Vanguard's "mutual structure."

To offer funds, a fund provider has to engage in a series of other activities besides asset management. Its value chain includes account management activities, such as record-keeping services for fund shareholders and distribution of div-

Figure 1. Typical organization of mutual fund providers.



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idends; selling and marketing activities, such as distribution of fund shares to individual or institutional customers; and information and customer service activities, such as providing customers with information about investment choices and after-sale services. Not all of these activities have to be conducted by the fund provider itself. For instance, some fund providers out-source the account management and distribution activities. Human resource practices concerning activities that remain in-house have to be stipulated as well. Lastly, all activity and resource decisions by the fund provider are made in the context of the fund provider's organizational structure and the product portfolio that the fund provider offers. I used these different activity categories to systematically catalogue Vanguard's activities at various points in time and to color-code elements in the maps depicting Vanguard's organizational systems. More detail on the individual elements contained in these systems is provided below. While space constraints do not permit a detailed discussion of all interactions, I can provide the flavor of the underlying reasoning by focusing on some of the key interactions within Vanguard's system in 1997.

Vanguard's low-cost strategy reinforced its focus on conservatively managed funds, such as index funds. Since index funds of different fund providers hold the same securities, the performance differences between index funds are entirely driven by differences in cost. Similarly, for funds with low volatility and relatively low returns (e.g., conservative bond funds and money market funds), cost differences create noticeable performance differences. The same cost advantage is much more difficult for investors to discern in the more volatile, actively managed stock funds. Vanguard's cost advantage translated directly into an ability to offer more attractive funds, in particular, within the types of funds it focused on. In other words, the value of Vanguard's low-cost strategy was positively affected by its product choices, while, conversely, the value of its product choices was positively affected by its low-cost strategy.

The performance advantage of Vanguard's funds was pronounced when viewed over the long run. For instance, in *Barron's* 1996 ratings of five-year and ten-year performances of mutual fund families, Vanguard was ranked number one (Savitz, 1997). Vanguard's overall focus on long-term performance, including various provisions that made short-term trading difficult, and its candid communication efforts with investors, which included a series of educational efforts to stress the importance of long-term investing, made the long-term performance advantage of its funds visible to customers. Customers, thus sensitized to the higher long-term performance of Vanguard's funds, invested more of their assets with Vanguard: over the period 1980–1996, Vanguard's assets grew at a compounded annual rate of 31.4 percent, while the mutual fund industry as a whole recorded an annual growth rate of 22.6 percent. This enormous growth in assets, in funds that were easily scaled up, allowed Vanguard to lower its costs further. Vanguard's focus on long-term performance and its efforts to educate customers thus reinforced its low-cost strategy.

Identification of Core Elements

From Vanguard's organizational systems, I identified Vanguard's core elements by operationalizing Hannan, Burton, and Baron's (1996: 506) notion that "coreness means connectedness" and that "elements in the core are linked in complicated webs of relations with each other and with peripheral elements." Following the suggestion of Ghemawat and Levinthal (2000), I treated organizational systems as networks consisting of nodes (organizational elements) and connecting edges (interactions). Given the definition of core elements as elements that interact with many current or future organizational elements, two types of core elements needed to be identified. First, elements that affect many other contemporaneous organizational elements, i.e., those elements that are central nodes in the organizational system at a given time t , are current core elements. Second, elements that are not central at time t yet become central at a future time are emerging core elements. To identify emerging core elements, a retrospective analysis was thus necessary as well.

I proceeded in two steps. I first identified the most central elements in Vanguard's organizational system in 1997, the last year for which I collected data. While Vanguard's set of core elements in 1997 might include unidentified emerging core elements, this set of central elements is a good approximation of the set of Vanguard's core elements, without speculating about future developments. I then traced the identified core elements back in time to assess when Vanguard adopted these core elements. In the second step, I analyzed Vanguard's organizational system at various points in time to assess whether other core elements existed that did not survive until 1997.

If coreness is to represent connectedness, a suitable centrality measure needs to capture how many other elements any given element affects. Freeman's (1979) degree centrality, which measures the number of directly affected elements, is one suitable centrality measure. The first column of table 1 shows the 15 elements that have the highest degree centrality in Vanguard's organizational system in 1997.² But elements may have more far-reaching ramifications than just direct interactions. If element A affects element B, which in turn affects element C, then A is also affecting element C. I computed a second-order degree centrality by also counting the number of elements that any given element affects indirectly via one other element. The second column in table 1 contains the results with a weighting scheme that equalizes the total effect of direct and second-order interactions. On average each element in Vanguard's 1997 system affected 3.0 other elements directly (average degree centrality) and 14.2 elements indirectly via one other element. If d is the Freeman degree centrality of element A and m is the number of indirect elements A affects, the second-order degree centrality of A is computed as $d + \alpha * m$. I chose $\alpha = 3.0/14.1 = 0.21$, so that the first and second term in the calculation of second-order degree centrality are equal on average, but the identification of core elements is robust to a wide range of α (details available from the author).

²

For the purpose of computing centrality measures, I ignored misfits between elements, since network theoretic measures are not geared toward taking such negative interactions into account. Since relatively few misfits occur in Vanguard's organizational systems, this simplification should not affect the identification of the appropriate core elements.

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Table 1

Centrality Measures of the Fifteen Most Central Elements in Vanguard's Organizational System in 1997*

Rank		Centrality Measure					
		Degree	Second-order degree	Information centrality	Betweenness		
1	<i>Low cost</i>	17	<i>Low cost</i>	22.29	<i>Low cost</i>	1.21	<i>Low cost</i>
2	<i>High-quality service</i>	11	<i>Focus on conservative funds</i>	15.51	<i>Focus on conservative funds</i>	1.08	<i>Candid communication</i>
3	<i>Focus on conservative funds</i>	10	<i>Focus on long-term performance</i>	14.29	<i>Focus on long-term performance</i>	1.08	<i>High-quality service</i>
4	<i>Focus on long-term performance</i>	9	<i>Direct distribution</i>	13.72	<i>Direct distribution</i>	1.06	<i>Focus on conservative funds</i>
5	<i>Direct distribution</i>	8	<i>High-quality service</i>	13.12	<i>Mutual structure</i>	1.05	<i>Focus on long-term performance</i>
6	<i>Mutual structure</i>	6	<i>Mutual structure</i>	12.99	<i>High-quality service</i>	1.04	<i>Direct distribution</i>
7	<i>Candid communication</i>	6	<i>Candid communication</i>	12.14	<i>Candid communication</i>	0.99	<i>Mutual structure</i>
8	Investor education	5	No-load distribution	8.08	Investor education	0.92	Reduced fees for outside managers
9	Internal management of funds	4	Reduced fees for outside managers	7.60	Internal management of funds	0.92	Bogle's openness
10	Reduced fees for outside managers	4	Investor education	7.54	No-load distribution	0.88	Moderate wages
11	High esprit de corps	4	Swiss Army	7.08	Limited research	0.85	High esprit de corps
12	Little advertising	3	Toll-free service	7.08	Moderate wages	0.85	Swiss Army
13	Bogle's openness	3	Client services for retirement sponsors	7.08	Reduced fees for outside managers	0.84	Toll-free service
14	Limited research	3	Moderate wages	7.02	High esprit de corps	0.84	Client services for retirement sponsors
15	Moderate wages	3	Servicing of defined benefit plans	6.66	Web University	0.80	Investor education

*Core elements are in italics.

Other centrality measures are suitable as well. Stephenson and Zelen's (1989) information centrality and Freeman's (1977) betweenness centrality take even more far-reaching interactions into account than the second-order degree measure. Stephenson and Zelen's measure accounts for how frequently a given element lies on all interaction chains between any pair of other elements, while Freeman's measure restricts itself to direct interaction chains, i.e., geodesics. Since no strong theoretical reason exists to confine the analysis to geodesics, Stephenson and Zelen's measure might be preferable. Given its widespread use (Wasserman and Faust, 1994), however, I included the betweenness measure in table 1 as well. All four centrality measures point to the same seven elements as the most central: low cost, high-quality service, a focus on conservatively managed funds, candid communication, direct distribution, mutual organizational structure, and a focus on long-term performance. This agreement, which stops after the first seven elements, in addition to a distinct break in the distribution of the second-order degree and betweenness measures after the seventh ele-

ment, makes the seventh element a natural breaking point for distinguishing between core and elaborating elements.

In the second step, I analyzed Vanguard's organizational system for each year for which I had constructed a map. The results of these analyses are shown in table 2, in which the

Table 2

Centrality Measures of the Ten Most Central Elements in Vanguard's Organizational System in 1974, 1977, and 1978*

Centrality Measure						
Rank		Degree	Second-order degree		Information centrality	
1974						
1	<i>Low cost</i>	7	<i>Low cost</i>	10.56	<i>Low cost</i>	1.05
2	<i>Focus on conservative funds</i>	5	<i>Focus on conservative funds</i>	9.00	<i>Mutual structure</i>	0.95
3	<i>Mutual structure</i>	4	<i>Mutual structure</i>	8.89	<i>Focus on conservative funds</i>	0.93
4	<i>Candid communication</i>	4	<i>Focus on long-term performance</i>	7.89	<i>Focus on long-term performance</i>	0.89
5	<i>Focus on long-term performance</i>	3	<i>Candid communication</i>	5.78	<i>Candid communication</i>	0.88
6	Administrative functions in-house	2	Moderate wages	5.11	Moderate wages	0.70
7	Bogle's openness	2	Reduced fees for outside managers	4.67	Reduced fees for outside managers	0.70
8	Missionary zeal	2	Bogle's openness	3.78	Administrative functions in-house	0.68
9	Moderate wages	2	Small investment in IT	3.67	Bogle's openness	0.65
10	Reduced fees for outside managers	2	No perks for management	3.67	High esprit de corps	0.60
1977						
1	<i>Low cost</i>	11	<i>Low cost</i>	15.29	<i>Low cost</i>	1.23
2	<i>Focus on conservative funds</i>	8	<i>Focus on conservative funds</i>	12.29	<i>Mutual structure</i>	1.10
3	<i>Mutual structure</i>	6	<i>Mutual structure</i>	11.51	<i>Focus on conservative funds</i>	1.10
4	<i>Candid communication</i>	5	<i>Direct distribution</i>	10.51	<i>Direct distribution</i>	1.05
5	<i>Direct distribution</i>	5	<i>Focus on long-term performance</i>	8.21	<i>Candid communication</i>	0.99
6	<i>Focus on long-term performance</i>	3	<i>Candid communication</i>	7.45	<i>Focus on long-term performance</i>	0.95
7	Outside investment management companies	3	Little advertising	7.29	Little advertising	0.89
8	Reduced fees for outside managers	3	Reduced fees for outside managers	6.06	Outside investment management companies	0.88
9	Little advertising	3	No-load distribution	5.68	Reduced fees for outside managers	0.86
10	Bogle's openness	3	Moderate wages	5.37	Bogle's openness	0.80
1978						
1	<i>Low cost</i>	11	<i>Low cost</i>	15.69	<i>Low cost</i>	1.05
2	<i>Focus on conservative funds</i>	8	<i>Focus on cons. funds</i>	12.69	<i>Mutual structure</i>	0.96
3	<i>Mutual structure</i>	6	<i>Mutual structure</i>	11.94	<i>Focus on conservative funds</i>	0.95
4	<i>Candid communication</i>	6	<i>Direct distribution</i>	10.63	<i>Candid communication</i>	0.95
5	<i>High-quality service</i>	5	<i>Candid communication</i>	9.75	<i>Focus on long-term performance</i>	0.91
6	<i>Direct distribution</i>	5	<i>Focus on long-term performance</i>	9.63	<i>Direct distribution</i>	0.91
7	<i>Focus on long-term performance</i>	4	Little advertising	7.69	Little advertising	0.81
8	Outside investment management companies	3	<i>High-quality service</i>	6.56	Outside investment management companies	0.78
9	Reduced fees for outside managers	3	Reduced fees for outside managers	6.13	Reduced fees for outside managers	0.76
10	Little advertising	3	No-load distribution	5.75	Bogle's openness	0.75

*Core elements are in italics.

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ten most central elements for the respective year are listed, using degree, second-order degree, and information centrality scores to rank the elements. The analyses reveal that Vanguard did not drop any of its core elements throughout its history. More discussion of these results, especially for 1978, are provided below. Lastly, I conducted similar analyses for 1981 and 1991 to check whether other core elements existed, which was not the case (results available from the author).

DEVELOPMENTAL PROCESSES

The Founding of Vanguard

The circumstances leading to Vanguard's founding are related to the history of another mutual fund provider, the Wellington Management Company (WMC). Founded by Walter L. Morgan in 1928, WMC had offered the fourth open-ended mutual fund in the U.S., a fund later known as the Wellington Fund. This fund, based in Philadelphia, was the first balanced fund, carrying up to 60 percent high-quality government and corporate bonds. In contrast, all other mutual funds at the time held only stocks. In 1951, Morgan hired John Bogle, later Vanguard's CEO, who had impressed Morgan with his undergraduate thesis on the nascent mutual fund industry. In June 1966, WMC merged with Thorndike, Doran, Paine & Lewis (TDP&L), a Boston-based investment management company. By 1970, Bogle had succeeded Morgan as president of WMC and as chairman of the funds. Three years later, a declining equity market, which prompted many shareholders to withdraw their investments, reduced WMC's assets under management by a third. Tensions grew between the partners in Boston and Philadelphia, culminating on January 23, 1974 in Bogle's being fired by the board of WMC, which was controlled by the Boston partners. The day after Bogle was fired, the fund board of directors met and decided that Bogle should retain his position as chairman of the fund board and conduct a "Future Structure Study" of the Wellington Funds. In March 1974, in his report to the fund board of directors, Bogle discussed three increasingly radical options for the future relationship between WMC and the funds (Bogle, 1974): option 1: WMC would continue to provide investment management and distribution services, but the funds would take over administrative services; option 2: WMC would continue to provide investment management but, in addition to administrative services, the funds would take over distribution; and option 3: the funds would purchase WMC and thereby take over investment management, underwriting, and administrative services.

In June 1974, the fund board decided to adopt option 1: the funds were to take over and be responsible for all tasks involving legal compliance, financial accounting, shareholder records, share transfers, filing tax reports, and balancing and auditing the books. While the funds performed the fund accounting themselves (e.g., computing fund prices), most activities tied to shareholder accounting (e.g., processing of new deposits) remained initially out-sourced to a third-party provider. WMC continued to provide investment management and distribution services. In August 1974, the fund

board ruled that the funds would not use the Wellington name any longer (except for the Wellington Fund), since the funds were now distinct from the Wellington Management Company. Bogle decided to name the fund complex "Vanguard," after the HMS *Vanguard*, Lord Nelson's flagship in the victory over the French fleet at the Battle of the Nile in 1798. In September 1974, The Vanguard Group was incorporated, with the Vanguard name serving as the new collective identifier for the funds. Vanguard was owned by the shareholders of its 11 funds and provided the administrative services to them at cost.

Figure 2 depicts Vanguard's organizational system by the end of 1974. As shown in table 2, five of the eventual seven core elements were present. As described above, Vanguard had adopted its mutual structure by making the fund shareholders the owners of the fund provider. Second, Vanguard started on its strategy to reduce its costs wherever possible. A focus on low cost had already been prominent in Bogle's thinking in his honors thesis, in which he concluded that "there is some indication that the cost of management [in the mutual fund industry] is too high" (Bogle, 1951: 18) and that the industry's "future growth can be maximized by concentration on a reduction of sales loads and management fees" (Bogle, 1951: 122). Similarly, for each of the three options that he had proposed to the fund board in his "Future Structure Study," the emphasis of his analysis was on the potential cost savings that the increased independence from WMC would afford. Bogle estimated annual cost savings from \$1 million for option 1 to up to \$3 million for option 3 (Bogle, 1974). Now that the fund board had agreed to option 1, Vanguard was able to reduce the management fees it paid to WMC from \$7.4 to \$6.4 million. This reduction in fees included not only the shifted costs of the administrative services but also WMC's 40 percent mark-up (Bogle, 1975).

Vanguard's third core element, candid communication with its investors, was initiated by Bogle's starting to write nearly all the annual reports for the mutual funds, a practice he continued until he retired in 1999. Bogle pursued an additional goal with the annual reports. As he announced at the time, "The shareholder will receive Fund reports that will 'tell it as it is,' with candor and fairness. If results are good, we will say so; and if they are not, we will be equally candid. In short, our reports will be written from the perspective of the shareholder" (Bogle, 1975). In contrast, shareholder reports of most other funds were described by an industry observer as "a sparse listings of holdings prefaced by a ghostwritten letter from the fund president. . . . Among major fund-company executives, Bogle was the first to sweat out the details. Bogle's letters have consistently been candid . . . and clearly written" (Sanders, 1996).

In these early years, spurred by the need to explain the rationale of the very uncommon organizational structure (only one other fund provider had a similar structure and would later revert to the traditional one), Bogle also started his very open and ample communication with the press. He frequently talked about his philosophy of what made for sound mutual funds—in his view, funds that were inexpensive to run and

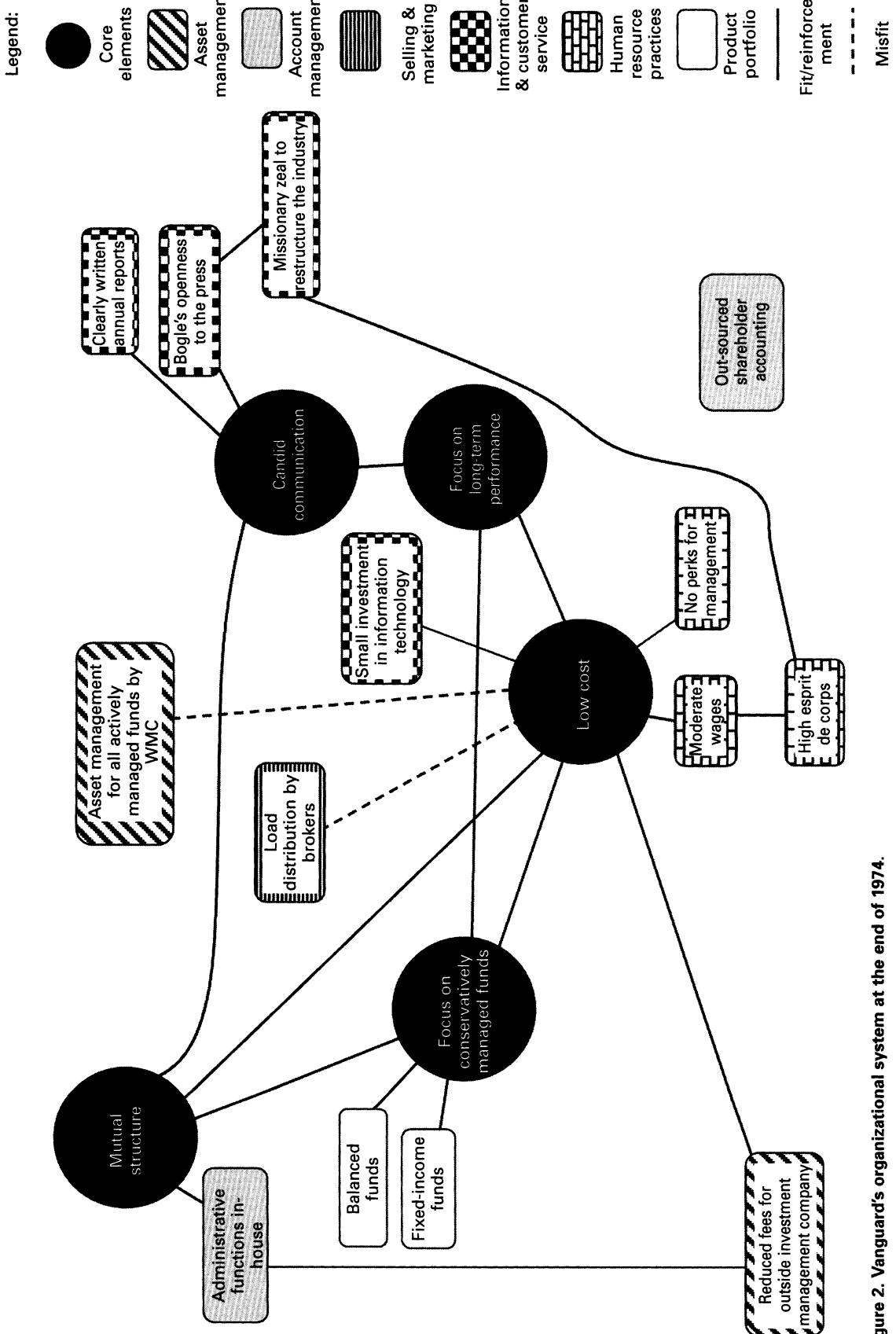


Figure 2. Vanguard's organizational system at the end of 1974.

that focused on long-term performance—as well as his view of the organizational form mutual fund providers should adopt. Only a few months after Vanguard was founded, Bogle started to discuss implications for the industry, suggesting in a speech at the FBA-CCH Conference on Mutual Funds and Investment Management that other fund groups “might want to consider some form of internal management,” a decision to which fund groups would be led by “an enlightened sense of self-interest about the optimal structure for the conduct of a fund group’s activities” (Bogle, 1975). Bogle’s missionary zeal to restructure the industry so that fund shareholders’ interests would become paramount created a climate at Vanguard in which many employees felt that they were actively involved in pursuing a noble goal. The resulting high esprit de corps enabled Vanguard to compensate its employees with more than just a monetary reward and helped to keep wage costs down (Hallowell, 1997).

The other two core elements, the focus on conservatively managed funds and the focus on long-term performance, Vanguard inherited from WMC. WMC had created a series of funds that were conservatively managed and that benefited shareholders who invested for the long term. Although Vanguard inherited these core elements, they were also consistent with Bogle’s investment philosophy of low risk and long-term investing (Slater, 1997).

Patching

An organization adopts many new elements over the course of its history. New elements might reinforce existing core elements, they might be independent, they might create misfits with existing elements, or they might constitute new core elements. I term the process of adopting a new core element, and its subsequent reinforcement, “patching.” Since a central element interacts with many other elements, graphically, a new central element gives rise to a new patch in the map of an organizational system. Two types of new core elements exist: immediate core elements and emerging core elements. A new element that is at once central within the organizational system, interacting directly and indirectly with a large number of the existing organizational elements, is an immediate core element. A new element that is originally not a central element but, over time, becomes central through further elaboration is an emerging core element.

An interesting parallel exists between the patching process described here and the patching process described by Eisenhardt and Brown (1999). For Eisenhardt and Brown, “Patching is the strategic process by which corporate executives routinely remap businesses to changing market opportunities. It can take the form of adding, splitting, transferring, exiting, or combining chunks of businesses” (pp. 73–74). In both cases, patching refers to the association of a number of interdependent elements to a higher-level construct, in this case, to a core element, or, in Eisenhardt and Brown’s case, to a business unit. But my use of the term patching is more restrictive. Patching refers here only to the adoption of new sets of elements that are highly interdependent with each other, creating a patch, and that contain elements that are

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highly interdependent with other elements of the firm and are therefore central. The patching process described by Eisenhardt and Brown also contains the notion of decomposing a given set of elements into smaller subsets to better exploit business opportunities, a process related to the patching procedure for solving highly interdependent decision problems, as described by Kauffman (1995).

Two patching events are evident in Vanguard's evolution. The first patching event took place in 1977, when Vanguard adopted a direct distribution system. This new element was immediately a central element in its organizational system as shown on the left side of figure 3 and in the middle panel of table 2. The second patching process commenced in 1978, when Vanguard started to create a new focus on high-quality service. This element became a central element only over time. I describe each patching event in turn.

In February 1977, the fund board accepted Bogle's proposals to take the distribution function in-house and to market its funds as no-loads, eliminating the sales load, which had been on the order of 8 percent. In other words, the fund board agreed to option 2, which Bogle had suggested in 1974. The decision to take distribution in-house had wide-ranging ramifications on many existing elements of Vanguard, and it immediately became a central element in its organizational system: direct distribution allowed Vanguard to abolish sales fees, which strengthened its focus on low cost. Moreover, having distribution in-house allowed Vanguard to negotiate contract terms with investment management companies at arm's length, in particular, with WMC. Before, the threat to switch the investment management function to another firm had been fairly empty, since the investment management company controlled the distribution of fund shares. In September 1977, Vanguard used its newly gained freedom to hire Citibank to run its new Warwick Municipal Bond Fund. This was the first time that WMC did not manage a fund for The Vanguard Group. Because Vanguard had taken over the distribution function and had more of an arm's length relationship with WMC, it was also able to cut management fees paid to WMC by \$2.9 million, or 39 percent (Slater, 1997: 105). Thus, the interplay between its mutual structure, which allowed arm's-length negotiations with investment managers, and its direct distribution system, which provided it with independence from investment managers' distribution capabilities, allowed Vanguard to strengthen its focus on low cost.

Beginning in 1978, Vanguard started to create a new patch of activities around a focus of high-quality service, as shown on the lower right in figure 4. The first step to improve service markedly was Vanguard's decision to partially in-source its individual shareholder accounting system in 1978. In-sourced tasks included dealing with deposit checks, creating customer accounts, sending out balance statements, handling share exchanges, and answering fund shareholders' questions. Previously, a third-party supplier, DST Service Bureau, had handled these tasks, but Vanguard felt that DST provided poor quality (personal communication with Robert DiStefano, January 24, 1997). In-sourcing the individual shareholder accounting system was a natural starting point for a focus on

Legend:

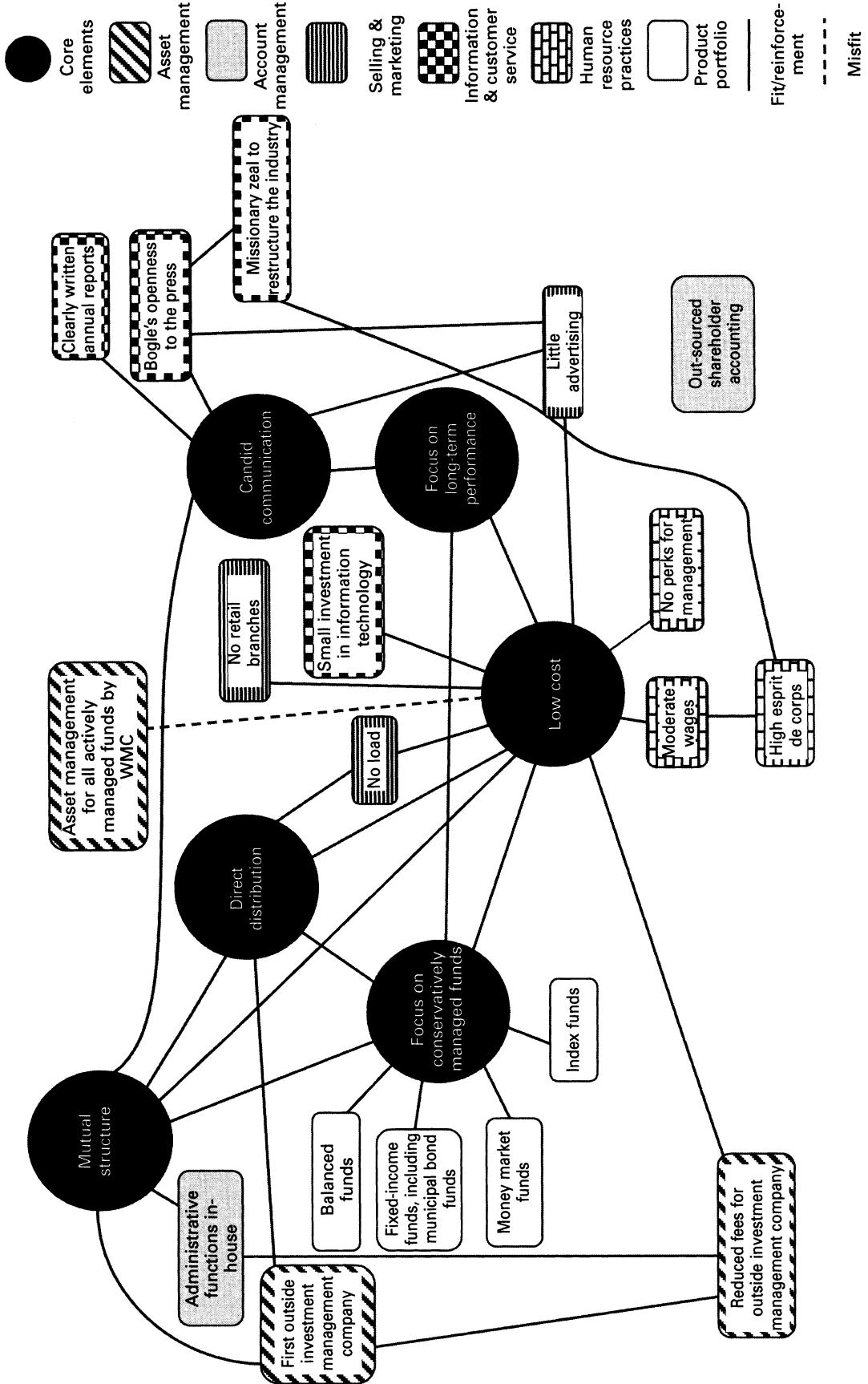


Figure 3. Vanguard's organizational system at the end of 1977.

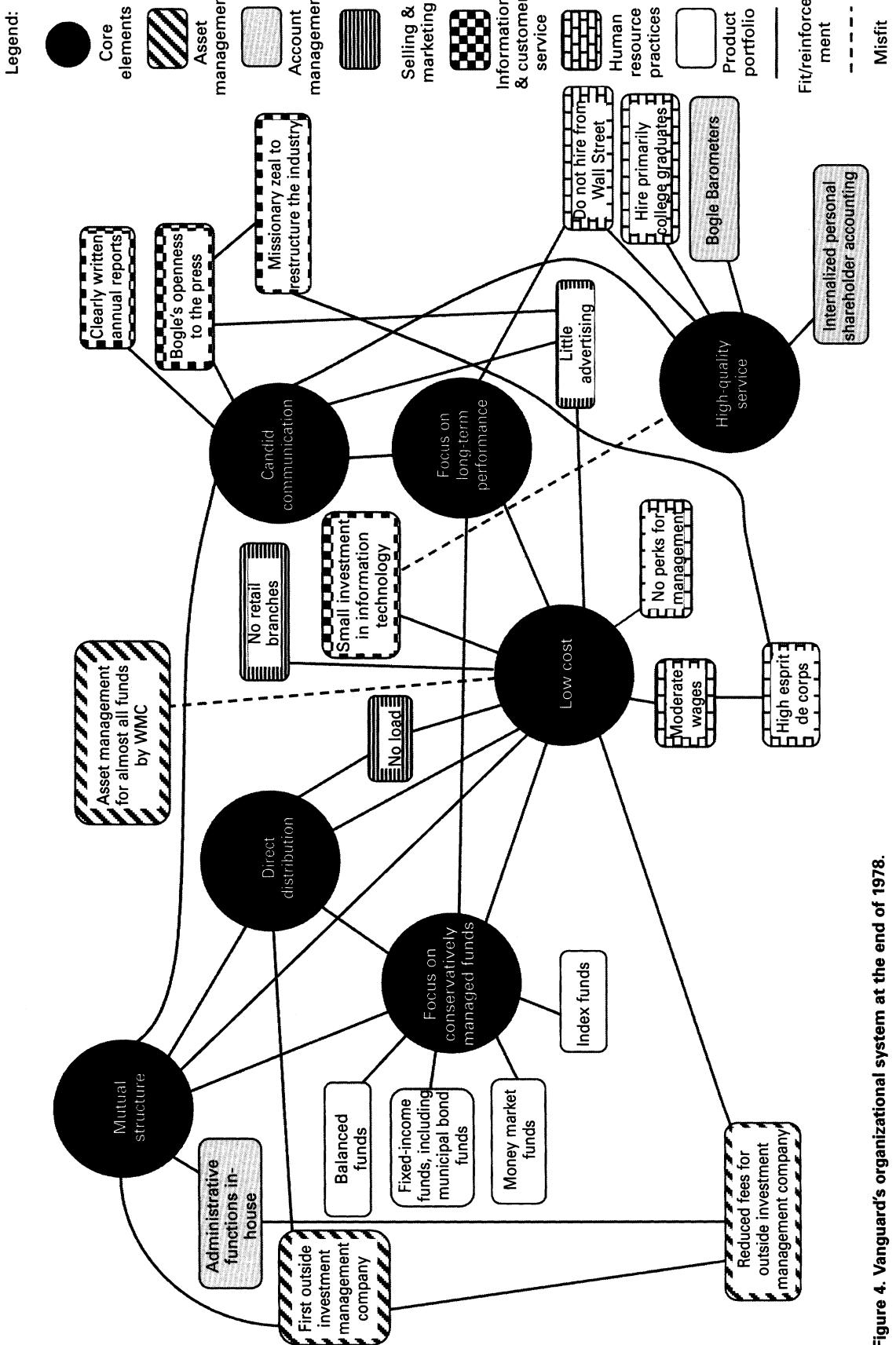


Figure 4. Vanguard's organizational system at the end of 1978.

quality service. As a direct distributor, Vanguard had only a few personal contacts with its customers, since it did not use brokers or a branch network. As a result, most customer contacts arose when customers inquired about their accounts. When customers had previously called for an account question and did not receive good service from DST, it was Vanguard that received the blame. By in-sourcing these services, Vanguard regained control over the interface with its clients.

A series of other choices further elaborated and strengthened Vanguard's new core element. For instance, Bogle started to distribute throughout the organization monthly "Bogle Barometers," which indicated the number of shareholder complaint letters he had received that month and which listed the kinds of problems customers were complaining about. In the area of human resources, Vanguard adopted a series of particular hiring practices that helped to improve quality. Vanguard hired primarily college graduates and rarely hired applicants from Wall Street, as their trading mentality usually made them a poor fit in Vanguard's culture, which was based on fostering long-term investing. Similarly, Vanguard rarely hired fresh M.B.A.s, since they tended not to stay long. While its focus on high quality was supported from the start with these new elaborating elements—giving this element a relatively high degree measure—the focus on high quality did not immediately affect many of the existing elements of Vanguard's organizational system. This weak interdependence can be seen in the centrality measures that take more far-reaching interactions into account. Thus, while focus on high quality is the fifth-highest-ranked element using the degree measure, as can be seen in the bottom panel of table 2 above, it is only ranked eighth by the second-order degree measure and fails to make it into the top most central elements, using Stephenson and Zelen's (1989) centrality measure.

Over time, however, the focus on high quality became increasingly reinforced by additional elaborating elements and emerged as a core element in Vanguard's organizational system. For instance, in 1984, Vanguard inaugurated its Award for Excellence Program. This quarterly award was given to employees, especially those working in the lower ranks of the organization, who had excelled in their performance. Top management treated these ceremonies very seriously and almost always attended the award presentations. Other elements that elaborated Vanguard's focus on high quality included extensive training for Vanguard's telephone operators, mostly college graduates, and a Vanguard Quality Program initiated in 1990. Under this initiative, project improvement teams were formed to tackle particular quality issues and recommend solutions. Finally, to gain complete control over the customer interface, Vanguard completed its in-sourcing of the individual shareholder accounting system in 1991. Analyzing Vanguard's organizational system in 1991 reveals that the focus on high quality is among the most central elements by all centrality measures (analysis available from the author), a conclusion that continues to hold for 1997, as was shown in table 1. Overall, Vanguard's efforts to

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elaborate its new core element bore fruit. In 1990, *Financial World* magazine conducted a customer satisfaction survey on mutual fund providers; Vanguard was voted number one. In all subsequent surveys (1991–1995), Vanguard won top honors again.

Thickening and Coasting

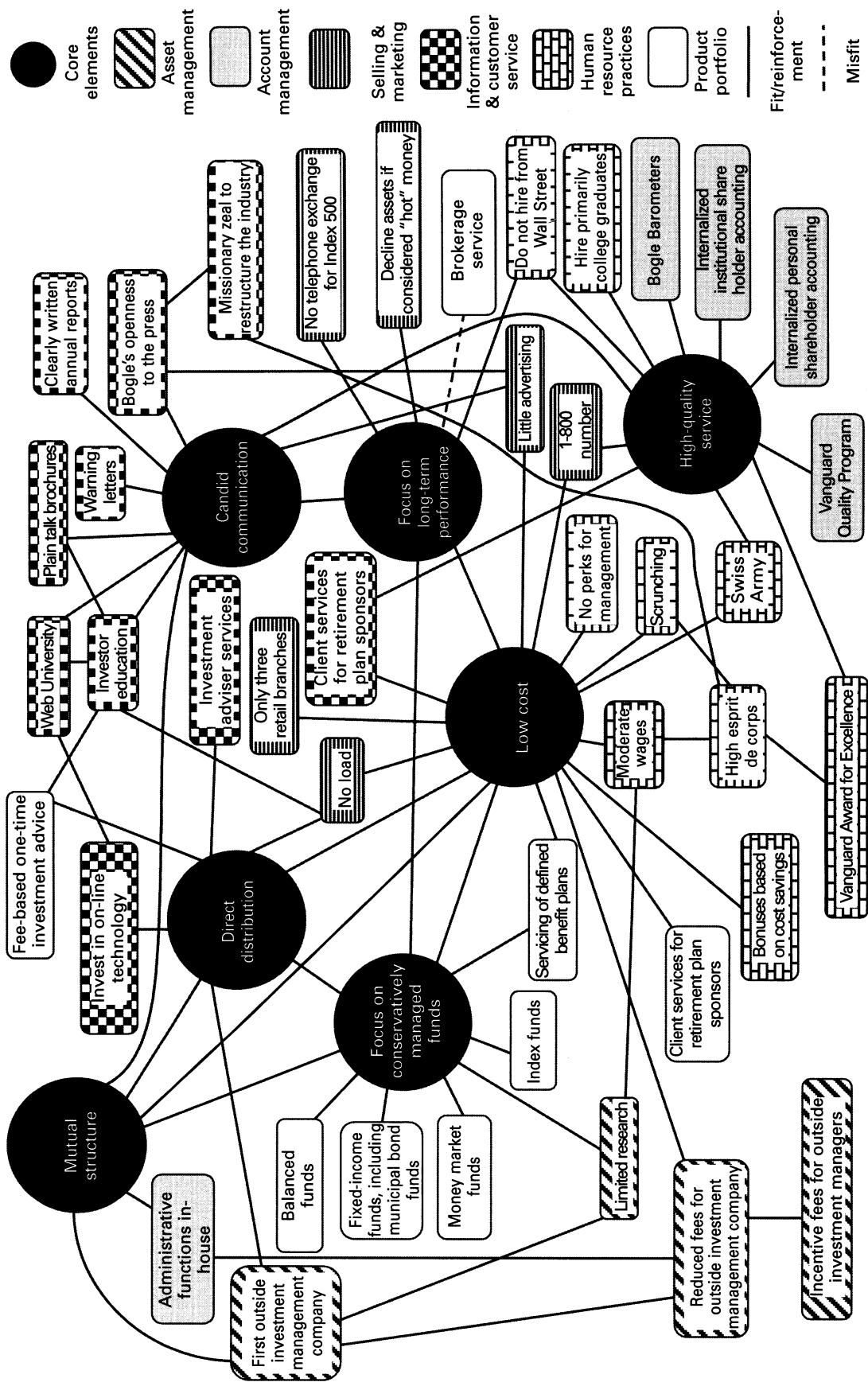
While an organization may adopt new elements that are, or become, very central within its overall system, most new elements are not new core elements but reinforce existing core elements. I term the process of reinforcing an existing core element with subsequent elaborating elements "thickening," because it leads to an increasingly thick network of interactions involving the respective core element. Thickening is thus a process at the level of a given core element. Over any period of time, any given core element might become further reinforced through the addition of elaborating elements. If a core element is not reinforced over a given period of time, the organization is said to be "coasting" with respect to this core element. The process of thickening can also involve the replacement of former elaborating elements with new ones. Technological advance, for instance, may allow elaboration of a certain core element in a new manner, thereby making older elaborating elements obsolete. Thickening occurred around Vanguard's core elements of focusing on conservatively managed funds, low cost, communication, and focus on long-term performance, as can be seen in figure 5, which shows Vanguard's organizational system at the beginning of 1997.

Thickening around conservatively managed funds. Immediately after its founding, Vanguard elaborated its core element of focusing on conservatively managed funds, while it coasted with respect to its other core elements. In 1975, Vanguard offered its first money market fund. In August 1976, Vanguard introduced the industry's first market index fund, an idea Bogle had first expressed in the "Future Structure Study" two years earlier. The fund, which tried to mirror the performance of the S&P 500 index, was initially not well received and had a difficult time finding investors. Critics chided the fund as pandering to mediocrity, or even as "un-American," since the aspiration to achieve more than the average was seen as part of the American heritage. Bogle believed, however, that over the long run, a broad index fund would outperform most actively managed equity funds, largely because of its much lower operating and transaction costs (Bogle, 1977).

Vanguard continued to elaborate its product focus on conservatively managed funds by starting to offer municipal bond funds in 1977. Paralleling the skepticism that any firm could outpace the stock market for a long period of time—which had led Vanguard to offer an equity index fund—Bogle harbored doubts that any firm could consistently forecast changes in interest rates (Bogle, 1999). Consequently, Vanguard did not follow other fund providers in forming a managed municipal bond fund, in which managers tried to capitalize on their predictions of interest rates by shifting the average maturity length of the securities held in the fund.

Figure 5. Vanguard's organizational system at the beginning of 1997.

Legend:



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Rather, Vanguard created the first municipal bond funds that focused on particular maturities: one fund holding solely long-term municipal bonds, a second only short-term, and a third only intermediate-term securities. This investment strategy of defined asset classes provided investors with a clear picture of what types of securities the fund would hold and, hence, what type of risk and relative performance to expect.

Thickening around low cost. After 1977, Vanguard strengthened its focus on low cost through a series of decisions. For instance, Vanguard decided against operating branch offices. Since the decision to take distribution in-house had been driven mainly by cost considerations, engaging in costly distribution using a branch network would have been counterproductive. Vanguard also did not engage in much advertising. Bogle believed that advertising did not provide value to existing shareholders, who shouldered the costs. Bogle's openness to discussing Vanguard, which was the focus of frequent business reports because of its unique organizational structure, served in part as a substitute for advertising. Over time, Vanguard actually decreased its advertising as a percentage of assets by increasing its advertising expenses only slightly to about \$8 million. In comparison, Fidelity was reported to spend on the order of \$100 million annually on advertising. In similar cost-conscious fashion, Vanguard did not engage in large capital expenditures. At the time, being a leader in computer and information technology was considered unnecessary, given Vanguard's product offering and low-cost strategy.

In 1981, the Vanguard board permitted the firm to take over asset management for the municipal bond funds from Citibank and for the money market funds from WMC. The two fund portfolios amounted to \$1.5 billion, roughly one-third of the company's total assets at the time. These funds shared important characteristics that made them good targets for internalization of the asset management function. First, the funds had large economies of scale, which were only partially passed on by asset management firms, so substantial cost savings were possible. Second, managing these funds required no particular industry or research experience and no relationships with industry analysts. Thus, in-sourcing asset management for these funds was not very difficult or costly.

To strengthen employees' incentives to reduce costs, Vanguard initiated a "partnership plan" for its employees in 1984. Incentive pay was coupled to the "cost saved" (the difference between its expense ratio and the average industry expense ratio) and the performance of its funds relative to peer funds. The incentive component represented about 10–15 percent of total compensation for new employees but could rise up to 30 percent for longer-term employees.

Besides monetary incentives, Bogle had created a climate at Vanguard in which many employees believed they were pursuing an honorable goal of putting fund shareholders' interests first. To convey his ideals and to create a high esprit de corps, Bogle started in the early 1980s to address Vanguard's employees at every billion-dollar milestone of assets under

management. Almost without fail, he repeated in these speeches his vision of a low-cost mutual fund provider whose highest obligation was the fiduciary duty it owed to its fund shareholders. As Bogle put it, the reasons for these speeches were "to celebrate, to communicate, and to inculcate" (Bogle, 1986). Vanguard benefited from the high morale of its "crew" to offer high-quality service to its clients while keeping costs low. For instance, to guard against under-staffing in its telephone operations in times of sharp market declines, Vanguard did not increase its regular phone personnel but cross-trained its existing employees. Under the name of "Swiss Army," each employee, from clerical workers to the CEO, had to perform several hours of phone service every month to stay in practice. In times of high demand, these employees could be drafted to take client calls. Thanks to its Swiss Army operation, Vanguard was able to handle the October 1987 stock market crash without a glitch in its operations.

Similarly, Vanguard solved its frequent office space constraints, due to its rapid growth, by simply halving its managers' offices ("scrunching"), rather than by renting expensive temporary office space. Such measures were feasible in a company whose culture demanded that everyone, from the lowest ranks to the top of the organization, kept low costs in mind. Top management, with its high visibility, played an especially important role. In that vein, it was not surprising that Vanguard's management did not fly first class, did not have perks such as dedicated parking spots, and did not have a privileged dining area, eating instead in the company cafeteria, the "galley."

Its greatest cost savings, however, came in the area of asset management. First, Vanguard's costs decreased because of scale effects. For instance, its 20 index funds, with \$56 billion of assets as of end 1996, were completely managed by only five managers. Second, due to its arm's-length negotiating power, Vanguard was also able to press its 18 different outside investment advisers to pass along scale effects as well. Its average fee paid to external investment advisers for equity funds fell to 0.15 percent, compared with an industry average of 0.75 percent for similar funds. Vanguard, in contrast to most other fund providers, had also incorporated performance-based incentive provisions in 24 of its 38 contracts with outside advisers.

Overall, the effects of Vanguard's mutual structure and low-cost approach were visible in its funds' expense ratios, which express the fees paid by the funds as a percentage of assets. In 1975, Vanguard's average expense ratio was at parity with that of other major fund complexes at 0.68 percent and below the industry's average of 1.08 percent. By 1995, Vanguard's average expense ratio had dropped to 0.31 percent, while major fund complexes were charging, on average, 0.96 percent, and the industry, 1.11 percent.

Thickening around candid communication. To strengthen its core element of candid communication, Vanguard not only continued to send out clearly written annual reports but also created a quarterly newsletter, "In the Vanguard," in which

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investment relevant topics were discussed. In addition to these newsletters, on several occasions, Vanguard contacted investors who held shares of funds that had performed exceedingly well, warning them that their fund's performance was unlikely to continue to be this outstanding. For instance, in 1991, Bogle wrote in a letter to shareholders of Vanguard's Health Care industry fund: "It is highly unlikely that such [high] absolute returns—or even the Portfolio's relative performance advantage—will be matched in the future."

To educate its investors, in particular about the benefits of long-term investing, Vanguard started issuing a series of "Plain Talk" brochures, which explained in simple terms the risks of investing. As new technology became available, Vanguard further elaborated its efforts to educate its investors. Vanguard was the first 401(k) vendor to establish a presence on America Online (since January 1995) and later on the World Wide Web (Rohrer, 1995). The main functions of its extensive Web site (at the time) were education and service rather than marketing and sales. In 1996, Vanguard created on its Web site a free "University," comprising ten courses, from "What Is a Mutual Fund?" to "Retirement Investing: Allocating Your Retirement Assets."

Thickening around long-term performance. In addition to educating its investors concerning the benefits of long-term investing, Vanguard engaged in a number of activities that strengthened its focus on this core element. For instance, it did not offer telephone redemptions for its popular Index 500 Fund and limited substantial "round trips" (selling and purchasing back into the fund) to no more than twice a year. Through these rules, Vanguard tried to avoid customers who did not want to invest for the long run. Similarly, with respect to institutional investors, Vanguard made a name for itself by not accepting assets that it expected to remain in its funds for only a short time. George U. Sauter, head of Vanguard's equity index funds, estimated that 5 percent of all big deposits were declined, because the cost of buying and selling large blocks of securities would be mainly borne by existing shareholders and not by the shareholder who made the transaction (Easton, 1996).

Misfits

At times, Vanguard experienced misfits within its organizational system. Misfits arose from two sources. First, in some cases, a new core element created misfits with existing elements. For instance, Vanguard's initial (inherited) choices of asset management performed solely by WMC and of load distribution through brokers were inconsistent with Vanguard's low-cost core element. Similarly, as Vanguard adopted high-quality service as a new core element, its existing small investments in information technology became inconsistent. Since Bogle held a strong belief about keeping investment costs down, Vanguard resolved this misfit only slowly. While Vanguard was one of the first adopters of 1-800 phone numbers, Bogle still asserted in 1985 that "we're not going to be a technology leader. It's too expensive" (Heins, 1985: 221). Only after an intense off-site strategy meeting in June 1992 was Bogle willing to "slaughter Vanguard's sacred

cow" of not investing heavily in information technology (Slater, 1997: 194) and to use information technology to improve its communication with clients.

The second way in which misfits were created was through new product introductions that had attributes that made them inconsistent with Vanguard's existing organizational system. For example, in 1983, Vanguard started to offer its clients brokerage services. The main function of this extension was to accommodate clients who wanted to trade part of their portfolios themselves. This service created a misfit with Vanguard's core element of focusing on long-term performance, since with brokerage, money was earned on transaction volume. In the 1980s, Vanguard entered another business that did not fit well into its organizational system. Following the example of several competitors, in a style that Vanguard's current CEO John Brennan called "a worst case of emulation," Vanguard offered real-estate funds patterned after limited partnerships (personal communication with John Brennan, February 5, 1997). These investment vehicles were very costly to operate, contradicting Vanguard's core element of low cost. Moreover, their fee structure was akin to load-funds, creating an inconsistency with Vanguard's no-load distribution. After a year and a half, Vanguard's management realized that this product was inconsistent with the existing structure at Vanguard and decided to exit the business.

DISCUSSION

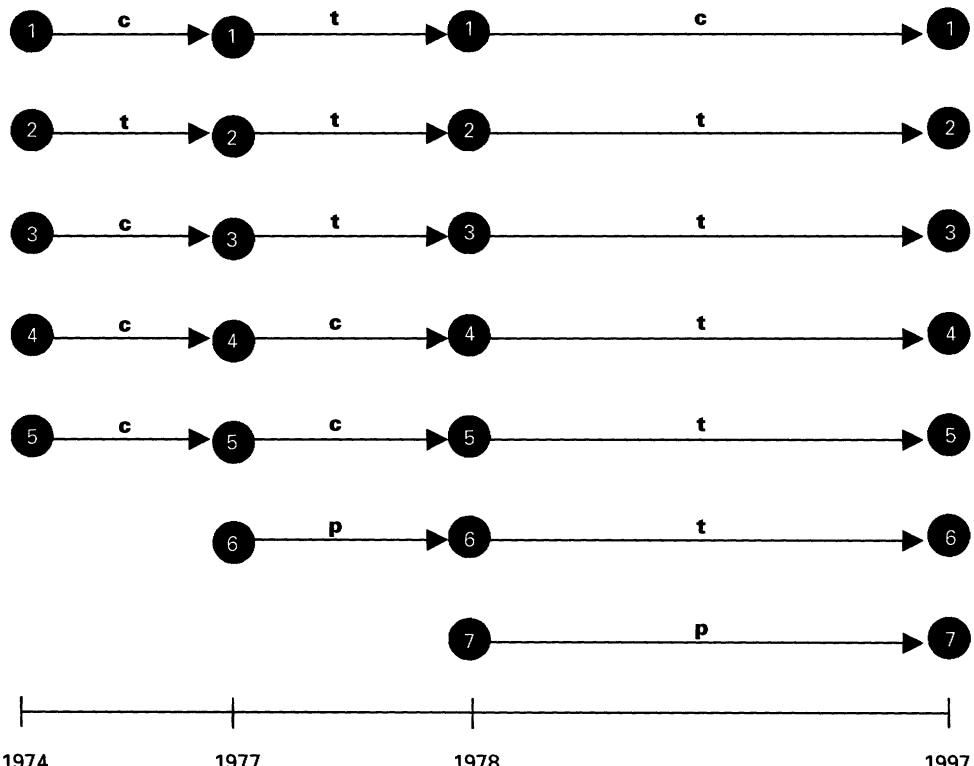
The study of Vanguard's developmental path highlighted three processes: patching, thickening, and coasting. One further developmental process that relates to a core element is the process of "trimming": the deletion of an existing core element and most of its associated elaborating elements. Partly due to the fact that Vanguard never experienced a large number of misfits caused by one of its core elements, it never eliminated one of its core elements. Thus, the process of trimming could not be observed at Vanguard. A recently published study on Liz Claiborne, a leading U.S. manufacturer of women's apparel, however, provides an account of such a process (Siggelkow, 2001). Responding to new competitors, changed requirements by distributors, and technological advances in supply-chain management, Liz Claiborne replaced one of its existing core elements concerning the organization of its production system with a new core element. Indicative of a trimming process, the old core element of not offering production to order was eliminated in concert with a change in a large number of elements that supported this core element. Together with the adoption of the new core element of partially producing to order, Liz Claiborne changed the location of a number of its suppliers from the Far East to the Western Hemisphere, focused on suppliers that had the financial resources to invest in new information and production technology, reduced the number of its design cycles, and modified its distribution schedule. Liz Claiborne thus engaged in a trimming process coupled with a patching process.

The concepts of thickening, patching, coasting, and trimming allow us to describe the developmental path of an organiza-

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tion consistently. In particular, the addition, deletion, and replacement of core elements create natural periods within a firm's organizational history. Within each of these periods the organization can engage in three processes with respect to each existing core element (thickening, coasting, or trimming) and one process with respect to new core elements (patching). Figure 6 traces Vanguard's evolution in terms of its core

Figure 6. Stylized evolution of Vanguard's organizational system.



Legend: ● = core element; t = thickening; p = patching; c = coasting

Core element 1 = mutual structure; core element 2 = focus on conservatively managed funds; core element 3 = low cost; core element 4 = candid communication; core element 5 = focus on long-term performance; core element 6 = direct distribution; core element 7 = high-quality service.

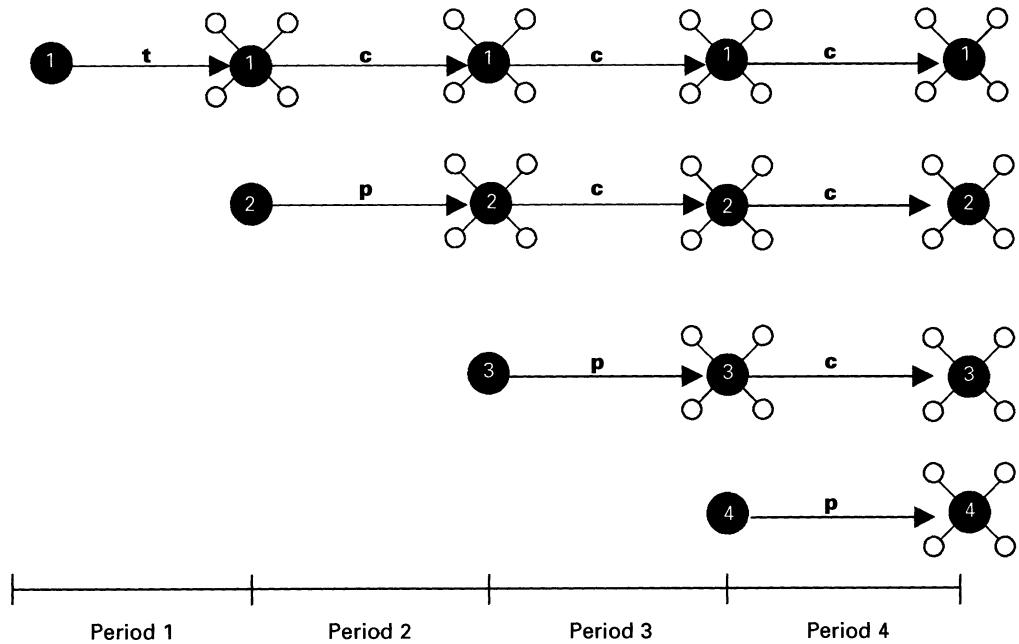
elements. Its developmental path can be compactly described as follows. At its founding in 1974, five of its eventual seven core elements were created: mutual organizational structure, focus on conservatively managed funds, low cost, candid communication, and focus on long-term performance. Over the period 1974–77, Vanguard elaborated its focus on conservatively managed funds, while coasting with respect to its other core elements.³ In 1977, Vanguard patched onto its organizational system a new core element, direct distribution. Over the period 1977–78, Vanguard thickened its system around its core elements of mutual structure, focus on conservatively managed funds, and low cost. In 1978, Vanguard created another core element, a focus on high-quality service, which it subsequently elaborated. From 1978 to 1997, Vanguard did not create any other new core elements but continued to thicken its system around its existing core elements.

³ For the first period of an organization's history an ambiguity exists whether to call the process of elaboration patching, since all core choices that are created are new, or thickening, since after the birth event all core choices exist. To maintain consistency with the thin-to-thick pattern described below, I opted to call this first period process thickening.

The four developmental processes, together with the concepts of core and elaborating elements, form a grammar (Pentland and Rueter, 1994) that can be used to provide consistent descriptions of the developmental paths of different organizations. Moreover, the vocabulary allows the characterization of a number of ideal types that can serve as a starting point for a classification scheme for observed paths of organizational development. I describe below two such ideal paths toward a single configuration, called "patch-by-patch" and "thin-to-thick."

Figure 7 illustrates an organization that develops purely by patching, except in the first period when, by definition, it

Figure 7. Patch-by-patch development.



Legend: ● = core element; ○ = elaborating element; t = thickening; p = patching; c = coasting

thickens its first core element. Over its history, the organization creates a number of core elements. After creating a new core element, the organization devotes itself entirely to further elaborating this core element. After a new core element is created, the organization coasts with respect to previously created core elements. Brown and Eisenhardt (1997) reported an empirical observation resembling this pattern. In their study of firms in the computer industry from 1993 to 1995, they described how one firm, Cruising, had transformed itself from a poor performer to a good performer:

[Cruising's managers] began by focusing on current projects and getting rid of their lock-step and bureaucratic processes, increasing communication, and adding project-level responsibilities. With that accomplished, they concentrated on developing their sense of the future through tactics such as futurists and alliances with leading-edge technology providers. Lastly, they turned to the transition between current and future projects, ultimately settling on a 4/8 quarter rhythm and a marketing-led transition. . . . Cruising managers did not instantly create their organization but, rather, "grew" it

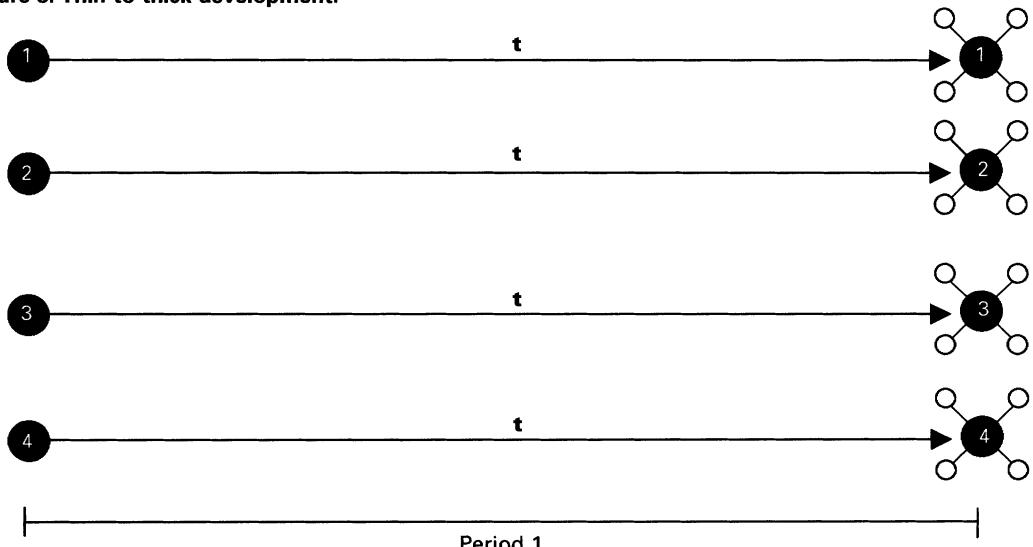
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over a period of several years. They developed and stabilized some pieces of the process, and then moved on to the next. (pp. 30–31)

A second ideal type of organizational development I term thin-to-thick. Figure 8 displays this pattern. Here, the organization is founded with a number of core elements that it continues to elaborate over time. No new core elements are added later. The organization thus engages only in a thickening process of its core elements. Its overall system starts out thin and thickens over time with elaborating elements. While core elements stay constant, individual elaborating elements might still change over time. The thin-to-thick pattern is characterized by important early decisions about core elements that consequently guide the developmental pattern of the firm. In the terminology of Mintzberg and Waters (1985), this developmental pattern can be described as a mixture of an “entrepreneurial” and an “umbrella” strategy. Early in the organization’s history, its founders express their vision for the organization by making several key strategic and structural decisions that subsequently serve as general guidelines for behavior throughout the organization.

Given that the patch-by-patch and thin-to-thick patterns are ideal types, not many organizations are expected to follow either pure path, but organizations may follow paths that more closely resemble one type or the other. The critical differentiator between the patterns is the temporal sequence of the creation and elaboration of core elements. Organizations that create most of their core elements simultaneously and then continue to elaborate these elements simultaneously would display a developmental pattern that is closer to the thin-to-thick pattern. Organizations that create most of their core elements sequentially and elaborate these core elements sequentially would follow a path resembling more the patch-by-patch pattern. For instance, Vanguard’s development was much closer to a thin-to-thick development than a patch-by-patch development: Vanguard established and elaborated

Figure 8. Thin-to-thick development.



Legend: ● = core element; ○ = elaborating element; t = thickening

most of its core elements simultaneously rather than sequentially. As a result, for most of its history, Vanguard was engaged in the process of thickening its system around existing core elements.

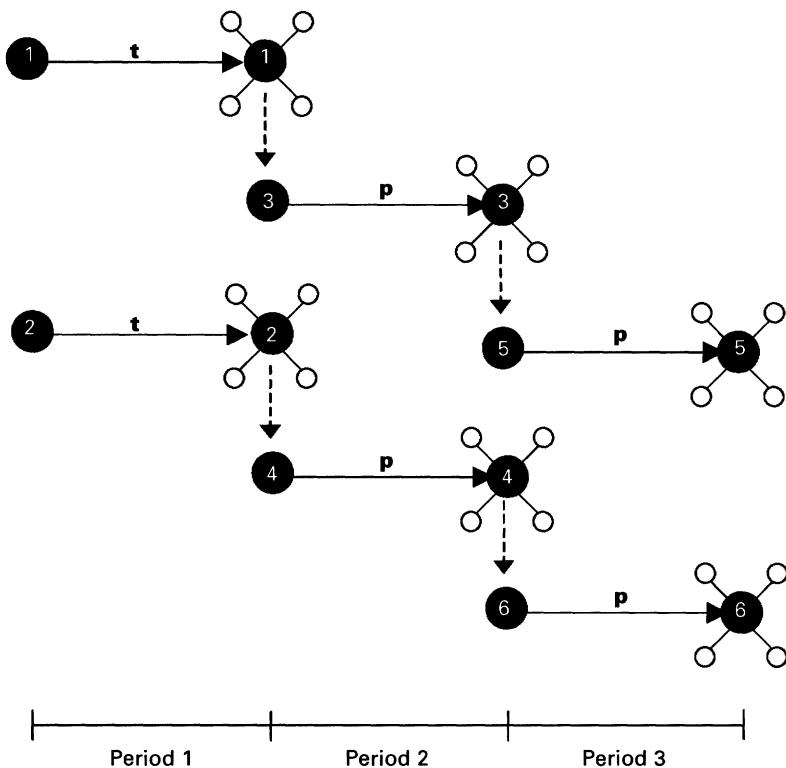
As long as the core elements within an organizational system remain consistent with each other, both patch-by-patch and thin-to-thick developments can lead to configurations with increasingly tighter interactions, i.e., high internal fit. At some point, however, firms may need to move from one set of consistent core elements, or one configuration, to another set of consistent core elements. For instance, while the internal fit of a configuration may still be intact, the external fit—the appropriateness of the configuration as a whole—may have declined, making a reconfiguration necessary (Siggelkow, 2001). Several transition paths from one configuration to another have been described in the literature (e.g., Greenwood and Hinings, 1988). The constructs of thickening, coasting, trimming, and patching allow us to describe these transition paths as well. To illustrate, I focus on two transition paths that have received considerable attention in the literature, the punctuated equilibrium model and a reorientation through linear progression.

A punctuated equilibrium pattern of organizational development (or a quantum-change model) has been described by various organizational scholars (e.g., Miller and Friesen, 1982; Tushman and Romanelli, 1985; Gersick, 1991). An organization that follows this developmental pattern experiences “convergent periods . . . relatively long time spans of incremental change and adaptation which elaborate structures, systems, controls and resources toward increased coalignment” (Tushman and Romanelli, 1985: 173). Very infrequently, organizations experience “reorientations [that] are defined by simultaneous and discontinuous shifts in strategy . . . the distribution of power, the firm’s core structure, and the nature and pervasiveness of control systems . . . [or] re-creations that are reorientations which also involve a discontinuous shift in the firm’s core values and beliefs” (Tushman and Romanelli, 1985: 179). The history of an organization is thus punctuated by “reorientations and/or re-creations [that] define the end of one convergent period and usher in the next” (Tushman and Romanelli, 1985: 179).

Translated into the terminology of this paper, a punctuated equilibrium path of development can be described as a sequence of periods in which existing core elements are elaborated, interspersed with brief moments in which all (or almost all) core elements are changed. Figure 9 illustrates the pure form of this developmental path. Dividing an organization’s history into periods based on changes in core elements yields the same periods as Tushman and Romanelli’s demarcation of convergent periods. At the end of each such defined period, the organization replaces all (or almost all) of its core elements and creates an entire new set of core elements. These new core elements are then elaborated over the next period, after which the firm again replaces its set of core elements. Since an organization that follows such a path always creates its set of core elements simultaneously and then continues to elaborate them simultaneously, one could

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Figure 9. Punctuated equilibrium development.



Legend: ● = core element; ○ = elaborating element; **t** = thickening; **p** = patching

describe the development of such an organization as a sequence of thin-to-thick developments: at each recreation point a complete set of core elements is created; over the convergent period, these core elements are elaborated, yet no new core elements are added; at the end of the convergent period, all core elements are replaced by new core elements; and so on.

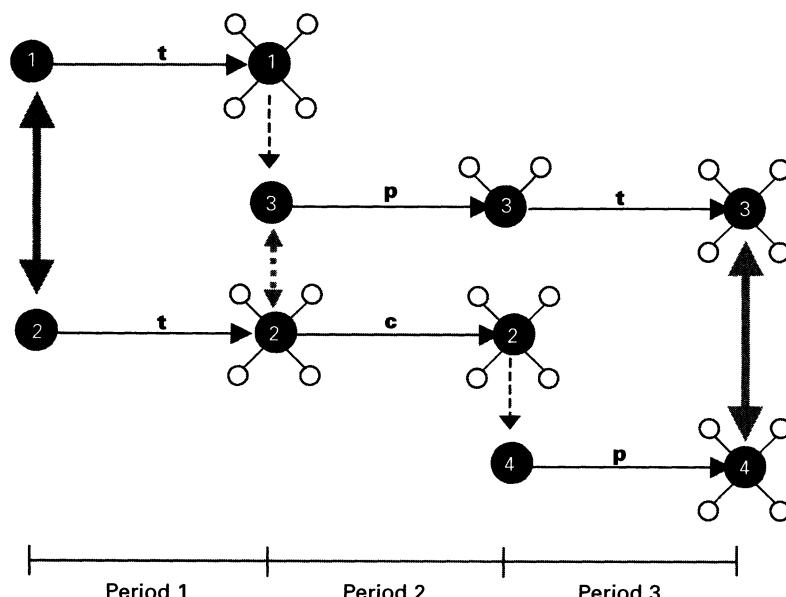
In figures 7–9, interactions between elaborating elements and core elements were stylized with thin lines connecting them, but core elements can interact and reinforce each other as well. Moreover, these interactions can help explain the dynamics behind a developmental trajectory. If core elements reinforce each other, further elaboration of these core elements is likely, since a new elaborating element for one core element not only increases the value of that core element but also (indirectly) increases the value of other core elements. Further elaboration of core elements that reinforce each other is thus particularly valuable. The stronger the interactions, the more the value of elaborating elements is affected and the higher the incentive to adopt new elements consistent with the existing core elements. A positive feedback loop can arise: core elements that reinforce each other are likely to be further elaborated, which in turn increases the positive interaction between them, leading to further elaboration, and so forth. The static interactions create dynamic feedback effects: configurations develop a self-sustaining

momentum (Miller and Friesen, 1980). In contrast, if core elements are inconsistent with each other, strong internal misfits can arise, because two clusters of elements (the sets of elaborating elements associated with each core element) work at odds with each other.

Additional types of transition from one configuration to another configuration (i.e., from one set of reinforcing core elements to another set of reinforcing core elements) have been described by Greenwood and Hinings (1988). Figure 10 illustrates, for instance, a reorientation called "linear progression." In this case, an organization transitions from one configuration (or archetype in Greenwood and Hinings' terminology), consisting of core elements 1 and 2 through a "schizoid" phase, in which core elements of both configurations are present, to another configuration consisting of core elements 3 and 4. In period 1, the gray double-headed arrow between core elements 1 and 2 is used to denote that these elements are reinforcing, thus forming a configuration. Over period 1, the organization elaborates both core elements. At the beginning of period 2, the organization replaces core element 1 with core element 3. But core elements 2 and 3 are not well aligned, denoted by a dashed, double-headed arrow between the core elements. Over period 2, the new core element 3 is elaborated. At the beginning of period 3, core element 2 is replaced with core element 4, and the organization reaches a new configuration consisting of the mutually reinforcing core elements 3 and 4.

By relying on interactions to identify core elements, this paper thus provides a bridge between research that has characterized firms as configurations or systems of interdependent elements (e.g., Porter, 1996; Gavetti and Levinthal,

Figure 10. A linear progression development.



Legend: ● = core element; ○ = elaborating element; t = thickening; p = patching; c = coasting

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2000; Rivkin, 2000) and work that has described firms using the imagery of core and periphery (e.g., Hannan and Freeman, 1984; Singh, House, and Tucker, 1986). The four constructs of thickening, patching, coasting, and trimming, which are based on the creation and elaboration of core elements, can thus serve as building blocks to describe various paths of organizational development. Developments that can be described include both paths toward more elaborated configurations and transitions from one configuration to another configuration.

FUTURE RESEARCH DIRECTIONS

The constructs of thickening, patching, coasting, and trimming open two lines of inquiry for future research. First, what causes these processes to take place? An interesting observation from the Vanguard case is that Vanguard adopted all of its core elements within four years of its founding. Such a finding reveals the limitations of a single case study. A more broadly designed study is necessary to address the question of why firms add (or do not add) new core elements in their evolution toward a configuration. One possible factor is the volatility of the environment. Future research could tackle the question of whether environments that are stable are more amenable to the simultaneous creation of entire sets of core elements, and thus would give rise to patterns closer to thin-to-thick, than turbulent environments. In contrast, environments that are characterized by turbulence might require more frequent patching and the full attention of management to the elaboration of one core element at a time, as described by Brown and Eisenhardt (1997) for the U.S. computer industry.

Similarly, the question of when and how firms modify their core elements cannot be addressed with the present study. Besides trimming, a counterpart to the thickening process is conceivable: a gradual process of literally de-centralizing a core element by abandoning its associated elaborating elements. Although such a “thinning” process did not occur at Vanguard, and while the literature on punctuated equilibrium would suggest that when firms change their core elements, the process is quick and wide-encompassing, future research is required to investigate whether and when such a process might take place.⁴

The second broad line of inquiry could investigate the organizational consequences of having followed one developmental pattern rather than a different one. For instance, what is the relationship between a firm’s prior developmental path and its ability to respond to environmental change? Are firms that have followed a patch-by-patch pattern able to react more quickly than firms whose development is closer to a thin-to-thick pattern? Similarly, successful transitions from one configuration to another may well be different depending on the previous developmental pattern of an organization. The framing of organizational development as it relates to the sequence of creating and elaborating core elements—the sequence of the processes of thickening and patching—thus raises an interesting set of new research questions. By having identified a set of developmental processes and a

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I am grateful to my reviewers for having pointed out this possibility.

method for identifying organizational core elements, I hope to have laid a foundation on which future research efforts can be built that will further increase our understanding of organizational evolution toward fit, and, in the process, the origins of misfit.

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