Emerging Structural Patterns within Multinational Corporations: Toward Process-Based Structures
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EMERGING STRUCTURAL PATTERNS WITHIN MULTINATIONAL CORPORATIONS:
TOWARD PROCESS-BASED STRUCTURES

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This study investigated the nature and extent of organizational change in the context of globalization through a longitudinal matched-pair analysis of two leading pharmaceutical companies. The structures of common processes in each firm were empirically characterized over time. Findings suggest that MNCs respond to complex global competitive environments by increasing internal structural complexity, a systematically differentiated structural response to relevant process subenvironments. Though supporting the existence of characteristics associated with projected MNC models, the study showed systematic variations in these characteristics across internal structures.

Research on the organization of multinational corporations (MNCs) has projected the emergence of complex internally differentiated structures (Bartlett & Ghoshal, 1989, 1990; Ghoshal & Bartlett, 1993; Hedlund, 1986, 1993, 1994; Nohria & Ghoshal, 1997; Prahalad & Doz, 1987, 1993). Characteristics of these structures include a global dispersion of operations, interdependence and tight coupling of subunits, and an emphasis on cross-unit learning and structural flexibility (see Westney and Ghoshal [1993] for a review and discussion). The need for such internal structural differentiation results from MNCs’ operations’ typically spanning multiple subenvironments (including geographic markets, product lines, and functions), each exerting competitive pressures and emphasizing different strategic objectives (Bartlett & Ghoshal, 1989; Doz & Prahalad, 1993).

The emergence of internally differentiated MNC structures is also associated with a shift in the strategic focus of operations to outside a company’s home market. Early research on MNCs emphasized the process of building and controlling international operations to exploit existing firm-specific advantages (products, know-how) outside a company’s home market (e.g., Hymer, 1960; Vernon, 1966). Beginning in the 1980s, research has emphasized the emergent strategic opportunities associated with managing an established network of dispersed worldwide operations (Dunning, 1981; Ghoshal, 1987; Kogut, 1984, 1989).

Despite the recognized need for increasing internal differentiation, there has been limited comprehensive empirical research investigating structural patterns within an MNC’s diverse operations. Instead, most empirical research has focused on a single dimension of such operations, such as structural variations across geographic units (Birkinshaw & Morrison, 1995; Gupta & Govindarajan, 1991; Kim & Mauborgne, 1991, 1993; Nohria & Ghoshal, 1989, 1997; Rosenzweig & Singh, 1991; Vernon, 1979); functions (e.g., Kogut, 1984; Porter, 1985); or products. These studies have confirmed the basic characteristics of projected MNC organizational models and have provided important insights into emerging structures. However, they are limited in that structural variations have been projected to vary simultaneously across the multiple dimensions of an MNC’s operations (Bartlett, 1986; Ghoshal & Bartlett, 1993; Prahalad, 1976). A comprehensive investigation of emerging patterns of internal differentiation across diverse MNC operations can advance this research stream.

Investigating emerging MNC structural patterns is important for several reasons. First, the growth of internal organizational complexity has been at the heart of international management research with the goal of understanding how MNCs function globally. However, the extent to which MNCs are actually moving toward “ideal-type” projected models has been a topic of debate (e.g., Ghoshal & Westney, 1993). Comprehensive and longitudinal empirical analysis of the changes actually occurring within firms can help address this debate. Sec-
THEORETICAL BACKGROUND

The primary theoretical background for this study is research on MNC structures, defined here as organizational mechanisms used to control and coordinate worldwide operations. Though early international management research focused primarily on formal reporting structures, there has been increasing attention to other variables, including the formalization and standardization of procedures and systems and the growing use of informal coordination mechanisms (see Martinez and Jarillo [1989] for a review). This research has assumed a broad perspective on an MNC’s organizational structure to enable investigation of changes in the mix of potential mechanisms available to MNC management. This broad perspective is directly in line with that emphasized by researchers developing projected MNC organizational models (Bartlett & Ghoshal, 1989, 1990; Hedlund, 1986, 1993; Prahalad & Doz, 1987, 1993). In this article, traditional MNC structures represent those generally identified and observed in international management research prior to 1980.

Views of Firm-Specific Advantage

Building international operations: Leveraging firm-specific advantage. Prior to the 1980s, most research on MNCs was based on economic and competitive models developed by Hymer (1960), Vernon (1966), and others, suggesting that firms operated across national markets to exploit firm-specific advantages for which there were imperfect markets (Buckley & Casson, 1976; Dunning, 1977; Caves, 1982). There was an emphasis on research on the foreign direct investment process as firms built international operations. A parallel research stream focused on the process of building and controlling national subsidiaries as MNCs expanded their worldwide operations (Prahalad & Doz, 1987; Stopford & Wells, 1972). This early research conceptualized structures in terms of area, product, or functional divisions or “matrix structures.”

An important implication of this research was that the selection of structures occurred at the firm level, and most international management research used the firm as the unit of analysis and investigated aggregate differences across firms. By focusing on a parent company’s control of worldwide operations, researchers found a number of factors influencing the firm’s selection of a structure, including the extent and nature of its worldwide operations (Kindleberger, 1969; Stopford & Wells, 1972; Vernon, 1979), its national origin (Franko, 1976; Hedlund, 1981; Negandhi & Baliga, 1981;
Yoshino, 1976), its information-processing capability (Egelhoff, 1982), and the mind-set of its senior managers (Perlmutter, 1969).

Managing global networks: Creating firm-specific advantages. As MNCs expanded globally, subsequent international management research recognized a growing array of potential, emergent advantages associated with the management of multinational networks of operations (Dunning, 1981; Kogut, 1984, 1993). The “combinative capacity” (Kogut & Zander, 1992) of such networks enhances an MNC’s ability to generate additional strategic advantages by combining distributed knowledge, resources, and capabilities. Emergent potential advantages include expanding efficiency and scale, accessing specialized and location-embedded resources, enhancing innovation through operations across markets, and creating operational flexibility with which to respond to factors outside a firm’s control (such as changes in exchange rates and differences in growth rates).

In line with this emergent strategic perspective, MNC organizational research has emphasized the need to differentiate the structures of subunits within firms. Numerous studies have depicted MNCs as having internally differentiated operations that operate in an integrated fashion to promote and leverage interdependencies among subunits (Bartlett & Ghoshal, 1989; Ghoshal & Westney, 1993; Nohria & Ghoshal, 1997; Prahalad & Doz, 1987). Overall, this perspective suggests that the benefits of a multinational network result from not only the strength of dispersed units, but also the nature and management of linkages among them.

The emergence of internal structural variations within MNCs has been widely accepted, becoming an important foundation for international management research. Assorted studies have identified patterns of internal structural variations along several dimensions of MNC operations, including geography, functions, and products, among others. Structural variations across geographic units reflect different cultural and economic environments (Hofstede, 1980; Rosenzweig & Singh, 1991; Vernon, 1979), resulting in differences in strategic roles and organizational structures (Bartlett & Ghoshal, 1989; Doz, 1976; Gupta & Govindarajan, 1991; Hedlund, 1986; PoynTER & Rugman, 1982). Functional structural variations reflect differences in strategic objectives, with common patterns involving centralized upstream operations (such as research and development and manufacturing), to take advantage of economies of scale and scope, and decentralized downstream operations (like marketing and sales), to respond to differences in national market requirements (Kogut, 1984; Porter, 1986).

Bartlett (1986), among others, emphasized that pressures for structural differentiation simultaneously occur across businesses, products, functions, tasks, and geographic markets, demonstrating the influence of the multiple subenvironments within which MNCs operate. However, one outstanding limitation of this previous research is a lack of comprehensive investigation of emerging structural patterns within firms across their diverse operations. Instead, most research has defined and characterized new MNC organizational models, including the transnational model (Bartlett & Ghoshal, 1989) and heterarchy (Hedlund, 1984; see also Perlmutter [1969] and Prahalad and Doz [1987]). Westney and Ghoshal (1993) summarized the set of organizational characteristics common to these models as including a global dispersion of operations, interdependence and tight coupling of subunits, and an emphasis on cross-unit learning and structural flexibility. However, research on how these characteristics evolve within MNCs across the multiple dimensions of their operations has been limited.

Research Issues

In further advancing research on multinational organizations, this study investigated the extent and nature of structural change actually occurring within the diverse operations of two leading pharmaceutical firms. Regarding the extent of structural change, I addressed the debate within international management research as to whether MNCs are actually moving toward projected MNC models. According to Ghoshal and Westney, “The extent to which MNCs are in fact moving toward this ‘ideal type’ is currently being debated in the field of international management” (1993: 5). An important aspect of this study was to investigate the extent of structural change actually occurring within firms and to contrast observed structures and emerging characteristics with those found in projected MNC organizational models.

Regarding the nature of structural change, research has projected a growing differentiation in the internal structures of MNCs, representing a move away from making structuring decisions at the firm level. Although many studies have identified patterns of internal structural differentiation, most projected MNC organizational models are characterized in terms of average firm-level characteristics. To advance this research, it is important to move beyond projections of average firm-level characteristics and patterns of variation along sin-
ingle structural dimensions to a more comprehensive understanding of the emerging patterns of structural variations within firms. To the extent that MNCs are becoming internally diverse, one important issue for researchers is to systematically explore emerging structural patterns within and across these organizations. This issue involves exploring how observed structural patterns reveal differences in characteristics usually associated with projected ideal MNC models. Overall, this study represents an initial comprehensive empirical investigation of the extent and nature of structural changes actually occurring within MNCs.

**RESEARCH DESIGN AND METHODS**

**Research Sites**

This study exploring changing structures of Eli Lilly (Lilly) and Hoffmann LaRoche (Roche) during a 15-year period (1980–94) emanated from a prior case study of the globalization process at Lilly (Malnight, 1995). That study’s results suggested important variations in the timing, sequencing, and objectives of organizational adjustments within and across individual functions over time. This study extends the prior research in a number of important regards. First, it focuses on the extent and nature of structural change over the range of the firms’ operations, as opposed to investigating the characteristics of the change processes. Second, it develops empirical characteristics of observed structures to enable comprehensive analysis of their variation within and between the two firms. Third, while maintaining its comprehensive depth, the study extends my 1995 analysis to include an additional firm originating from a vastly different traditional structure, but one subject to similar environmental pressures and opportunities during the period of analysis. The inclusion of the additional firm enabled both within-firm and across-firm comparisons of observed emerging structures.

The selection of Lilly and Roche offered several advantages. First, both firms were industry leaders with long histories of significant international operations, though both had operated globally through vastly different structures. Lilly, founded in 1876 in the United States, had units “outside the United States” (“OUS,” in the company’s terminology); these operations focused on local sales, with conservative and centralized management of affiliates. Roche, founded in 1896 in Switzerland, had long been organized around a corporate headquarters and local operating companies, with the head of each operating company reporting directly to the company chairman and exercising extensive authority over local operations. Overall, Lilly was a classic model of an ethnocentric organization, and Roche was a classic polycentric organization (Perlmutter, 1969).

During the period covered by this research, the pharmaceutical industry underwent dramatic change. The cost (unadjusted) of developing a new drug increased to an estimated $359 million in 1993, from about $76 million in the mid 1970s. The time required to obtain regulatory approval for a new product increased to 10–12 years in the late 1980s, from about 60 days in the 1960s (Pharmaceutical Manufacturers Association [PMA], 1993). Spiraling health care costs led to an increasing emphasis on cost containment, as demonstrated by the growing use of price controls, restrictive reimbursement schemes, and managed health care programs. Finally, competition from generic drugs and similar follow-on products intensified. These trends created pressures on pharmaceutical firms to innovate in developing a continual flow of new products, to speed the development and launch of new products, to improve the cost efficiency of all operations, and to be aggressive in selling products to major world markets. These challenges and opportunities directly affected how pharmaceutical firms operated globally. Operating within this environment, between 1980 and 1994 both Lilly and Roche fundamentally altered their organizations, introducing a complex mix of structures throughout their operations.

**Process-Based Analysis**

One challenge in researching emerging MNC structures involves selecting the unit of analysis (e.g., Westney, 1993). This research focused on the structuring of discrete processes within firms, building on an approach used in organizational theory (e.g., Lawrence & Lorsch, 1967) and in management accounting (e.g., Atkinson, Banker, Kaplan, & Young, 1995; Hansen & Mowen, 1995).

Applying this concept to the study of MNCs involves distinguishing common operations or tasks in the overall industry value chain that are meaningful in terms of the mix of goals or objectives and the nature of the work performed. The processes of interest thus were either individual functions or combinations of functions and were performed by both vertically integrated and specialized firms. For example, drug discovery (creating new compounds) is undertaken not only by integrated pharmaceutical firms, but also by specialized firms (such as biotechnology firms) and by research institutes and universities. Processes also involve geographically dispersed operations and affect
FIGURE 1
Pharmaceutical Industry Process Definitions

![Diagram of pharmaceutical industry process definitions]

Three processes were distinguished within overall drug discovery: the initial discovery of a compound, its development into an initial product, and the subsequent development of product extensions. Two processes were distinguished for regulatory approval: obtaining initial regulatory approval and supporting local marketing (clinically). Three processes were distinguished for production: bulk chemical production, bulk formulation production, and fill-and-finish processes. Finally, three processes were distinguished for marketing and sales: developing product- or customer-oriented marketing programs and product sales in major national markets and minor markets.

multiple products. Hence, analysis of structural patterns across processes reveals how multiple dimensions of a firm’s organization are structured. It also represents a managerial approach to investigating potential structural variations both within and across firms.

Focusing on the structuring of processes provides a potentially important lens for investigating patterns of emerging internal structural complexity. For example, in the pharmaceutical industry, the overall environmental pressures mandated innovation, speed, flexibility, efficiency, and global reach. However, the mix of these pressures varied across the internal operations of pharmaceutical companies. Important organizational challenges facing vertically integrated pharmaceutical companies involved how to draw on shared and globally disbursed operations to respond to the varying pressures on their internal operations. Focusing on process-level organizations thus enabled identification of patterns of structural variations in how firms employ common functional, geographic, and product resources to respond to conflicting strategic pressures.

The processes studied here were identified through discussions with executives at the two firms, with selection based on the criteria described above. Figure 1 outlines the 11 processes examined in this study.

Organizational Data

Organizational data were collected through intensive field studies employing both multiple semi-structured interviews and extensive use of archival documents, which were important, given that I sought retrospective data on each firm’s structures in 1980 and 1985. Interviews lasting about 90 minutes were conducted with more than 125 people at Lilly and more than 75 at Roche. Detailed notes were taken, but interviews were not recorded. Interviews at Lilly were conducted in 1989 and 1990, with subsequent interviews in 1993 and 1994, and interviews at Roche were conducted in 1993 and 1994. The president of each company and multiple executives from each function were interviewed, as were staff from multiple geographic affiliates. The sequential nature of the overall study prevented simultaneous data collection at the two firms. Data included both the qualitative, to identify overall organizational changes, and the quantitative, to empirically depict the structures of process-level units within each firm. I selected organizational variables for the study to enable developing a comprehensive picture of each structure. Thus, the variables employed included those found in prior research on MNCs’ structures to reveal important structural variations (see Martinez and Jarillo [1989] for a discussion and review). These variables included resource configuration (that is, location of facilities), the orientation of reporting relationships (by product or by function, for instance), the allocation of decision-making authority, operating standards and procedures, planning and information systems, culture, and integration mechanisms based on coalitions (such as task forces or committees). The Appendix contains a more complete definition of variables. Subsequently made distinctions within dimensions revealed differences in issues addressed and time frame. Overall, these data provided a detailed characterization of indi-

1 For example, distinctions within the resource configuration dimension were based on the locations of strategic and nonstrategic resources, in line with Bartlett and Ghoshal (1989). Further, distinctions within decision authority and standards and procedures were based on strategic, operational, and tactical levels, in line with Lorange et al. (1986).
individual process structures at each point in time examined.

Given this study’s focus on movement toward globally oriented structures, variable coding built on the evolutionary perspective emphasized in international management research on the movement toward such structures (e.g., Kindleberger, 1969; Perlmutter, 1969; Vernon, 1979). According to this perspective, MNCs evolve from being domestically oriented (to increase export sales) to being nationally oriented (to protect established export markets) to being regionally or globally oriented (to leverage dispersed operations globally). In line with this perspective, coding of individual variables was based on ordinal scales. Low values indicated characteristics typically associated with an MNC whose primary operations were located within its domestic market, and higher values indicated an increasingly national (that is, host market) orientation and subsequent movement toward a regional and then a global orientation. This coding directly reflects observed MNC evolutionary models developed by Perlmutter (1969), Vernon (1979), and Bartlett and Ghoshal (1989).

The interview notes and archival documents were coded to generate organizational data. Two exercises verified coding accuracy. For data on Lilly, where extensive case write-ups were prepared, two additional coders were given the variable definitions, coding schemes, and case write-ups; they generated secondary codes for 45 percent of the 1980 and 1994 observations. (Although, with a research team, I authored the cases, company officials extensively reviewed and modified them to ensure accuracy.) The secondary coded values exactly matched the researcher’s for 67 percent of observations (being plus or minus one in 89 percent of observations). At Roche, where case write-ups were not prepared, data for 1980 (which demonstrated the structure long in place at the company) and 1994 were coded by two company executives, both of whom had at least 15 years’ experience with Roche. The executives were given the process and variable definitions and coding schemes; they generated secondary sources for 50 percent of the 1980 and the 1994 observations. Their coded values exactly matched the researcher’s for 77 percent of common observations (coding was within plus or minus one in 97 percent of common observations).

Data Analysis

Overall empirical data were collected on 88 process-level observations, representing 11 processes at two firms over four time periods. I analyzed structural changes following the suggestions of Miller and Friesen (1984), first measuring the similarity or dissimilarity of each observed process structure to all other observations, then identifying clusters of similar structures, and finally identifying and interpreting patterns of structural variation over firms, processes, and time. Structural similarity and dissimilarity were measured by Euclidean distances, defined as: $d_{ij} = \sqrt{\sum (x_{ik} - x_{jk})^2}$, where $d_{ij}$ is the distance between observations $i$ and $j$ and $x_{ik}$ is the value for the $k$th organizational variable for the $i$th case. Multidimensional scaling (MDS; Kruskal & Wish, 1978) was used to analyze the resulting 88 by 88 distance matrix. MDS enabled the replacement of the 19 ordinal variables with a smaller set of dimensions that maintained interval metric properties, thus reducing the dimensionality of observed variations while retaining ordinal properties of similarities or dissimilarities across organizational variables. MDS analysis was performed with the STATISTICA (StatSoft, 1995) computer program. Selection of the number of dimensions for MDS analysis followed the Kruskal and Wish (1978) approach of plotting stress values against different numbers of dimensions. The number of dimensions is found by identifying where there is a smooth decrease in stress values. By that standard, this analysis is based on two dimensions. Subsequent clustering of observations within the MDS scatter diagrams was done by K-means cluster analysis. Determination of the number of clusters of observed structures involved an interactive process, in which I referred back to detailed field and coded organizational data to evaluate the significance of each additional cluster in identifying distinct structures.

EMPIRICAL CHARACTERIZATIONS OF STRUCTURAL CHANGES

Observed Structural Changes

In this analysis, I investigated structural changes occurring within Lilly and Roche by identifying patterns of similarity and dissimilarity occurring in observed process-level structures over time. Figure 2 presents the MDS scatter diagram plotting the 88

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2 The exception to this coding pattern was in reporting relationships, where coding characterized reporting relationships along various dimensions of operations.

3 Stress values were 11.5 at one dimension, 2.5 at two dimensions, 1.1 at three dimensions, and 1.0 at four dimensions.
process-level observations (two firms, 11 processes, and four time periods) based on the similarity and dissimilarity of observed process structures. The figure also indicates the results of cluster analysis of these observations, distinguishing groupings of similar structures. Eight structural clusters were distinguished, Table 1 provides data on the statistical significance of the clustering. (Detailed characteristics of each observed cluster will be addressed later in this article.)

One observation on structural changes was that variation in the internal structures of the two firms grew. Table 2 reports the number of processes at each firm observed in each cluster between 1980 and 1994. The findings suggest a high degree of initial structural similarity within both firms. In 1980, all processes at Lilly were observed to be in a single cluster (cluster 1), whereas at Roche, processes fell into two clusters (clusters 2 and 5). There was no overlap in observed structures across the firms. This high degree of initial structural consistency within firms is in line with research suggesting that traditional structural decisions were made at the firm level. Because the research sites were selected because they had different traditional structures, the difference in their initial structures was expected.

The findings also suggest that substantial change occurred during the study period, with variations occurring in the nature and extent of change across processes and firms. There were gradually increasing variations in structures within the firms. At both firms, early changes were limited in their impact on their organizations. At Lilly, processes were observed in two clusters in 1985 and in three in 1990, before the firm introduced a mix of structures that fell into four new clusters in 1994. At Roche, there was little change in clusters in 1985 or 1990. However, between 1990 and 1994, Roche introduced a fundamental new structure, and the observed processes falling into five clusters.

### From Firm- toward Process-Based Structures

Given this growing internal variation, analysis was then focused on identifying emerging structural patterns. Findings suggested a growing convergence or similarity in the structure of common processes in both firms. Table 3 outlines information on observed structures across common processes in 1980 and 1994. In 1980, no common processes were observed in the same structure. In 1994, 5 of the 11 processes were observed in the same structure. A further indication of the growing similarity or convergence of common process structures is based on contrasting changes in the observed distances in the MDS plots between common process structures in 1980 and 1994. Table 4 provides data on observed distances in common processes in 1980 and 1994. In 10 of the 11 processes, there was a decrease in observed distances, further supporting the observed growing similarity within common processes. There was, however, substantial variation in the extent of convergence, with reductions in observed distances ranging from 17 to 76 percent of observed 1980 distances. In this regard, the data suggest significant variations in the

### Table 1

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<th>Between Sum of Squares</th>
<th>df</th>
<th>Within Sum of Squares</th>
<th>df</th>
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* a Test statistics were obtained by analysis of variance.

### Table 2

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<td>Discover compounds</td>
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<td>Develop products</td>
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<td>Develop marketing programs</td>
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<td>Sell products, minor markets</td>
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</tbody>
</table>

* Number indicates cluster. Arrow indicates processes observed in same cluster.
extent of convergence across processes. An important issue for later consideration is the cause of these observed variations.

**OBSERVED PROCESS STRUCTURES**

Empirical analysis of structural changes suggests both growing divergence, or variation, in the firms’ internal structures and convergence, or similarity, in their structures of common processes. Proceeding from this analysis, this section presents a description of sample processes observed in each cluster to enable contrasting observed structural patterns and characteristics to those found in projected MNC models.

Figure 3 presents the data from the original MDS scatter diagram indicating dimensions of variation across observed structural clusters, and Table 5 summarizes the structures in each cluster. An observation’s position along the horizontal axis was correlated directly with the average (unweighted) coded value across all organizational variables. Because this coding was based on ordinal scales on which higher values indicated a higher degree of globalism, an observation’s position along this axis reveals variations in geographic orientation. Figure 3 also identifies bands of observations grouped by variations in operating orientation (for instance, functional or product structures). In this regard, observed structural variations simultaneously occurred in geographic and operating orientations.

Most of the clusters observed here correspond to structures identified in prior international management research. For example, the domestic functional structure is similar to Perlmutter’s ethnocentric (1969) and Bartlett and Ghoshal’s international models (1989), and the global product- or process-oriented structure is similar to Perlmutter’s geocentric (1969) and Bartlett and Ghoshal’s transnational models (1989). In addition to the previously identified structures, two of the observed transitional structures were associated with gradual increase in the resources and responsibilities existing outside a firm’s domestic market. These structures were in line with evolutionary patterns suggested by Bartlett and Ghoshal (1986), Malnight (1995, 1996), Perlmutter (1969), Vernon (1979), and others.

The following subsections provide descriptive examples of process structures in each cluster in 1994, developed from both the empirical and the qualitative data collected in this study.

### Global Product/Process Structures

Prior to 1994, no process at either firm was observed in this structure. However, in 1994, seven processes (32 percent of 1994 observations) at the two firms were organized around globally oriented product/process structures. They included both firms’ compound discovery and initial regulatory approval processes, as well as Lilly’s product development and extensions and marketing processes. Examples providing insights into the characteristics of these structures include the compound discovery and initial regulatory approval processes.

Lilly and Roche had traditionally organized compound discovery around scientific disciplines like chemistry, biology, and pharmacology, with individuals (Roche) or disease-focused committees (Lilly) acting as coordinators for individual research initiatives. Both structures emphasized technical excellence and autonomy, giving scientists extensive freedom in conducting research. At

### Table 4

<table>
<thead>
<tr>
<th>Process</th>
<th>1980 Distance</th>
<th>1994 Distance</th>
<th>Distance Change, 1980-94</th>
<th>Percent Change from 1980 Distance</th>
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<tr>
<td>Discover compounds</td>
<td>7.21</td>
<td>2.83</td>
<td>4.38</td>
<td>61%</td>
</tr>
<tr>
<td>Develop products</td>
<td>7.07</td>
<td>3.16</td>
<td>3.91</td>
<td>55</td>
</tr>
<tr>
<td>Develop product extensions</td>
<td>7.00</td>
<td>5.10</td>
<td>1.90</td>
<td>27</td>
</tr>
<tr>
<td>Obtain initial regulatory approval</td>
<td>6.56</td>
<td>2.00</td>
<td>4.56</td>
<td>70</td>
</tr>
<tr>
<td>Clinically support local marketing</td>
<td>4.47</td>
<td>2.83</td>
<td>1.64</td>
<td>37</td>
</tr>
<tr>
<td>Produce bulk chemicals</td>
<td>5.92</td>
<td>1.41</td>
<td>4.52</td>
<td>76</td>
</tr>
<tr>
<td>Produce formulation</td>
<td>3.61</td>
<td>1.73</td>
<td>1.87</td>
<td>52</td>
</tr>
<tr>
<td>Produce final products</td>
<td>2.65</td>
<td>3.74</td>
<td>-1.10</td>
<td>-42</td>
</tr>
<tr>
<td>Develop marketing programs</td>
<td>4.36</td>
<td>3.61</td>
<td>0.75</td>
<td>17</td>
</tr>
<tr>
<td>Sell products, major markets</td>
<td>3.61</td>
<td>2.24</td>
<td>1.37</td>
<td>38</td>
</tr>
<tr>
<td>Sell products, minor markets</td>
<td>4.24</td>
<td>2.65</td>
<td>1.59</td>
<td>38</td>
</tr>
</tbody>
</table>
FIGURE 3
Variation across Structural Clusters
TABLE 5
Organizational Characteristics of Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Structure</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Domestic functional</td>
<td>Resources are concentrated primarily within the home country or aligned with domestic needs. Strategic decision-making authority and standards and procedures are tightly centralized, with some decentralization of tactical and operating authority and standards. Planning and information systems are tightly centralized, as is the firm culture and senior management.</td>
</tr>
<tr>
<td>2</td>
<td>Transitional A</td>
<td>Resources are increasingly dispersed but remain oriented to home market requirements. Strategic decision authority and standards and procedures are highly centralized and oriented toward the home market, with increasing decentralization of tactical and operating authority. The configuration is associated with growing informal cross-border communications, including the use of informal or supplemental planning units, task forces, operating committees, and senior management committees.</td>
</tr>
<tr>
<td>3</td>
<td>National functional</td>
<td>Resources, decision authority (strategic, tactical, and operating), and standards and procedures (strategic, tactical, and operating) are localized and oriented to national market requirements, as are planning and information systems.</td>
</tr>
<tr>
<td>4</td>
<td>Transitional B</td>
<td>Resources and tactical operating authority and standards are localized, but there is increasing global centralization of strategic decisions and standards, as well as of planning and information systems. There is also extensive and formal use of task forces and committees to communicate across national operations.</td>
</tr>
<tr>
<td>5</td>
<td>Regional functional</td>
<td>Strategic resources are increasingly centralized within regions, although nonstrategic (supporting) resources remain decentralized and nationally focused. Strategic and tactical decision authority and standards and procedures are increasingly centralized regionally, although operating authority and standards remain decentralized within national affiliates. Planning and information systems are centralized regionally. There is limited use of task forces, operating committees, and other informal integrating mechanisms.</td>
</tr>
<tr>
<td>6</td>
<td>Regional product</td>
<td>Resources (both strategic and nonstrategic) are decentralized within national operations. Strategic decision-making authority and standards and procedures are centralized regionally, whereas both tactical and operating authority and standards are decentralized within national operations. Planning and information systems are increasingly centralized regionally. There is extensive and formal use of task forces and operating committees to coordinate national affiliates, but firm culture and senior executives remain largely locally decentralized.</td>
</tr>
<tr>
<td>7</td>
<td>Global functional</td>
<td>Resources are centralized (but dispersed) globally, as are strategic, tactical, and operating decision authority and standards and procedures. Planning and information systems are also globally centralized, as is the firm culture and senior executives. There is extensive use of formalized task forces, junior committees, and senior management committees to supplement communication and coordination of worldwide operations.</td>
</tr>
<tr>
<td>8</td>
<td>Global product/process</td>
<td>Strategic resources are decentralized, whereas supporting resources are centralized regionally. There are strong product/process-oriented units (primary) as well as functional units (secondary). Strategic decision-making authority and standards and procedures are centralized globally; tactical authority and standards are centralized regionally; and operating authority and standards are decentralized locally. Planning and information systems are centralized and oriented globally. There is extensive and formal use of task forces and operating committees to supplement communication and coordination of worldwide operations. Both firm culture and the selection of senior executives reflect a global orientation.</td>
</tr>
</tbody>
</table>

Lilly, research processes were concentrated at a single location, whereas at Roche, laboratories were duplicated in various independent and often competing research centers. Beginning in the early 1990s, both firms introduced new structures around therapeutic areas, with representatives from across scientific disciplines focusing on the discovery of new compounds within areas. Lilly continued to concentrate its discovery operations primarily in the United States, but Roche allocated global responsibility for therapeutic areas across its four research centers. Despite the differences between Lilly and Roche in the location of laboratories, both managed their compound discovery operations with a global focus. Both firms focused on discovering products with global market potential, as opposed to products targeting individual markets. Both also drew on global resources, hiring scientists of various backgrounds to work at laboratories and forming research associations with outside institutions such as biotechnology firms and universities.

At each firm, executives responsible for global therapeutic areas managed discovery operations, reporting to a cross-functional senior management committee, called the Global Plans Approval Committee (GPAC) at Lilly and the Research and Development Board (RDB) at Roche. These senior com-
mittees focused on allocating resources, prioritizing and monitoring the progress of each unit, and resolving conflicts. For example, a Lilly executive described the role of the GPAC as “evaluating and consolidating research plans from across all therapeutic areas, managing discovery resources, and ensuring alignment with overall corporate priorities.” Similarly, a Roche executive described the RDB’s role as deciding which compounds would proceed for further development, as well as reviewing overall research progress within each area. At each firm, responsibility for therapeutic areas was centralized, but every unit was expected to access and exploit knowledge and resources dispersed within the firm’s organization and at other external organizations and research institutions. A Roche executive described how the focus of the organization was to “use knowledge resources and technology from around the world” to enhance the discovery process. Characteristics of these structures thus involved a centralization of reporting around product units, a dispersion of resources (both within and outside the firms), and the establishment of centralized systems and procedures for resource allocation, monitoring project progress, and conflict resolution.

For initial regulatory approval, both firms had traditionally been structured around functions, with clinical units designing and managing the clinical trials necessary for regulatory approval and scientific testing undertaken by independent science-based functions such as toxicology and pharmacokinetics. By 1994, both had introduced structures built around cross-functional teams dedicated to development, regulatory approval, and launches of individual compounds. An important component of these structures involved the establishment of formal drug development and planning systems within which all compound-focused teams operated. At Roche, the formalized system, referred to as the International Drug Development System (IDDS), charged the compound-focused teams with devising a single global development plan that would meet worldwide regulatory requirements, thus enabling the rapid and global launch of new products. At both firms, common global development plans were implemented through clinical trials conducted by dispersed national affiliates and regional preclinical development operations. Both firms established common worldwide technical standards and protocols for all clinical trials and created systems allowing centralized management to reimburse expenses, thereby enabling the teams to allocate work and in turn reimburse associated expenses through in-house contracts.

Characteristics of these structures thus involved a centralization of decision-making authority within compound-focused (product-focused) teams, accompanied by a centralization of planning and control systems (like Roche’s IDDS) to enable the teams to access resources dispersed within the company over functional and geographic units. These structures represented efforts to allow the compound-focused teams to allocate development tasks globally on the basis of local expertise and resources and to simultaneously centralize controls over the actual development process. The formal systems included detailed project reviews of team development plans and monitoring of progress on these plans by senior management at key decision points throughout the development and regulatory approval process. As a result, clinical operation tasks were distributed globally, but coordinated and aligned globally for the approval of individual compounds. Interdependence and exchanges across dispersed tasks was managed by centralized global development planning systems and common standards and procedures.

Global Functional Structures

Prior to 1994, no processes were observed in this structure. However, in 1994, both firms’ bulk manufacturing processes (representing 9 percent of 1994 observations) were managed within global functional structures. Executives described how bulk manufacturing had traditionally focused on maximizing tax advantages and ensuring product availability and quality, but by the late 1980s bulk manufacturing strategies were affected by a conflicting set of pressures, which varied across a product’s life cycle.

Prior to a firm’s receiving regulatory approval for a new product, material supply requirements were highly uncertain, thus limiting the firm’s ability to make fixed commitments for production facilities. However, immediately after approval, product availability became key, and less attention was paid to production costs. As a result, both firms responded with initial material supply strategies based on centralized “flexible launch facilities,” or facilities able to produce a wide variety of products. Following product launch, and as supply requirements became defined, facility investment and production costs became important strategic pressures for moving bulk production to dedicated facilities. Given rising facility and technology costs, both firms were moving toward centralized global supply facilities for bulk materials. As products moved farther along their product life cycles, both firms actively considered outsourcing production of selected products to further curtail production costs and minimize investments.
In line with these challenges, both firms had moved toward centralized functional structures reporting to senior management committees—the Manufacturing Strategy Committee (MSC) at Lilly and the Pharmaceutical Technology Board (PTB) at Roche. The role of Lilly’s MSC was described as taking leadership in establishing global manufacturing policies, including setting the overall direction for worldwide manufacturing (for instance, making decisions regarding plant capacities and locations, and make-or-buy decisions). At Roche, the PTB was charged with coordinating manufacturing operations in areas such as sourcing strategies, technical standards, and capacity planning, as well as with resolving geographically based disputes. Both firms increasingly operated global bulk production facilities designed to meet worldwide requirements, and operating standards gradually became based on the most stringent global requirements. Overall, characteristics of this structure included centralized facilities operating within common standards and procedures to meet worldwide requirements, supervised and managed by centralized functional management. Centralization of facilities based on both product technologies and regional markets. Roche executives explained that the structure supported a large number of other processes. For example, one Roche preclinical executive outlined links with other processes including compound discovery (for defining physical characteristics of compounds), production (for ensuring clinical equivalency and manufacturability), regulatory approval (for supplying dosages for testing), and product marketing (for evaluating product image alternatives, such as tablet size and color). For these other processes, the preclinical functions were expected to provide high-quality, time-based support, often by means of adapting other scientific approaches to similar problems used in worldwide operations. Given these dispersed operations’ focus on regional requirements, there were few exchanges among or coordination across them.

Facilities for both firms’ final manufacturing processes were in dispersed national markets and were focused on meeting national or regional material supply requirements and reporting to national management. Although remaining generally autonomous, these national facilities increasingly operated within common global standards and procedures, and their national staffs joined worldwide manufacturing meetings. One manufacturing executive characterized the structure as follows: “Over the last three years, we have delegated more autonomy to local sites, but within the framework of a coordinated business map. From headquarters, we provide long-term goals and the tools necessary to achieve them. We then provide our local facilities the challenge of running their processes and meeting our objectives.” At Lilly, common global policies and procedures were outlined in a worldwide manufacturing policy book, whereas at Roche, units such as quality control and assurance, which set operating standards and managed technical compliance, provided common policies and procedures.

Regional or National Product or Functional Structures

Other processes at Lilly and Roche were structured with a regional or national orientation, being organized around either products or functions. In 1994, five regional product structures (23 percent of 1994 observations), five regional functional structures (23 percent of 1994 observations), and three national functional structures (14 percent of 1994 observations) were observed in the two firms. Two types of regional or national structures were observed, one supporting multiple global product or process units in meeting local requirements and a second focusing on the delivery of final products to markets. An example of a support process is Roche’s product development process; examples of delivery processes included both firms’ final manufacturing processes.

Roche’s initial product development process, involving preclinical development, continued throughout the study period to be managed within a regional functional structure, with facilities performing similar functions duplicated in major regional markets. Roche executives explained that the structure supported a large number of other processes. For example, one Roche preclinical executive outlined links with other processes including:

**EMERGING MNC STRUCTURAL PATTERNS**

**Structural Patterns within MNCs**

Major variations in the internal process-level structures of both Lilly and Roche were observed in 1994. Figure 4 portrays the structural patterns observed within the firms, distinguishing among core, support, and delivery processes. Whereas core processes represent the primary stages along the industry value chain for discovering, developing, and manufacturing products, support processes consist of tasks or activities undertaken on behalf of multiple core processes to meet regional or national requirements, and delivery processes focus on the supply of final products to diverse national markets. A further distinction of the core processes was that significant independent competitors focusing primarily on each process existed. Core processes...
included compound discovery, initial regulatory approval, bulk chemical manufacturing, and product marketing. Support processes included product development and marketing support provided by clinical development. Delivery processes included later-stage manufacturing and sales.
By 1994 Lilly and Roche had introduced common structures for three of the core processes, compound discovery, initial regulatory approval, and bulk chemical production, while maintaining some differences in the fourth (product marketing). A look back at the data in Table 4 shows a generally high degree of structural convergence across the firms for these core processes, yielding an average 56 percent reduction in Euclidean distances across firms between 1980 and 1994, compared with 40 percent for supporting processes and 21 percent for delivery processes. These core processes also moved toward globally oriented structures (for seven of the eight processes observed in 1994). However, important structural variations remained in these core process structures beyond geographic orientation. Although compound discovery, initial regulatory approval, and bulk chemical production were all organized globally, they were structured around different operating orientations: discovery processes around global product units, initial regulatory approval around global process-oriented structures, bulk manufacturing around global functional structures, and bulk formulation around regional functional structures. For product marketing, Lilly had a global product structure, and Roche had a regional one.

For support and delivery processes, Lilly and Roche maintained a broad mix of observed structures in 1994, in terms of both geographic and operating orientation. Where structural change was observed in the support and delivery processes, there was convergence. For example, both firms introduced regional product structures for marketing support (support) and regional functional structures for bulk formulation production (delivery). For other support and delivery processes, however, Roche did not alter its overall structure during the period of the study, but Lilly made substantial changes in all of these processes.

Overall, these patterns of internal structural variation suggest the emergence of common, core, globally oriented processes, supported by global (Lilly) or regional (Roche) support processes, finally delivering products through either regionally (Lilly) or nationally oriented (Roche) processes. Within processes, variations were also observed in the operation of those with similar geographic foci. These findings suggest important and systematic patterns of structural variation within the two firms. Rather than moving to a single organizational model, structural evolution at Lilly and Roche revealed growing variation across processes within firms, with growing similarity in structures across firms within processes.

**Variations in the Extent of Structural Convergence**

In addressing the sources of internal structural differentiation, management at the two firms described similar patterns of pressures and opportunities facing pharmaceutical companies. These pressures and opportunities varied in their impacts on processes and thus influenced the types of global networks desired for the processes. Given the similarities in the process structures observed in the two firms, a further issue for preliminary discussion involves potential causes of observed differences in the extent of convergence in process structures. As described earlier, in 1980 no processes were observed to be in the same structure in both firms, in line with research suggesting that firm-level factors, such as national origin, influence structuring decisions. However, 5 of the 11 processes were similarly structured by 1994, and the extent of process-level structural convergence varied dramatically.

Study findings suggest two potential explanations for the variations in observed process-level structural convergence. First, there was a higher degree of structural convergence in core processes than in support or delivery processes. Management at both firms emphasized that these processes were subject to the strongest competitive pressures and that pressures on the supporting and delivery processes were weaker. A second potential explanation involves observations on the timing of adjustments within the firms. In general, the processes with the highest levels of convergence were those that had also undergone structural change over the longest periods of time. This observation suggests that the longer the periods of structural change, the higher the potential for structural convergence. This perspective would suggest a gradual decrease in the influence of administrative heritage (Bartlett & Ghoshal, 1989) through the process of structural change. As institutional influence on structures decreased, structural convergence suggested the potential for growing isomorphism over time, an increase potentially associated with companies' mimicking structural solutions in the process of searching for new organizational responses to growing environmental pressures. There were numerous examples of similar organizational units being introduced under different names. As noted above, a senior management committee overseeing manufacturing was called the Manufacturing Strategy Committee at Lilly and the Pharmaceutical Technology Board at Roche. For discovering new compounds, Lilly established a Global Plans Approval Committee; a similar committee at Roche.
was the Research and Development Board. Members of management at each company associated structural changes with responding to environmental pressures, but they were also highly familiar with changes underway at other industry leaders.

Patterns in MNC Structural Characteristics

Earlier it was described how organizational research on MNCs has emphasized the emergence of network structures, with strategic advantage associated with their “combinative capacity” reflecting both the strength of individual operating units and the links among them. Although supporting the emergence of networks within the firms in the study, my findings also suggest important differences in how commonly projected network characteristics are reflected across process-level network structures. Table 6 portrays three types of global networks observed in the two firms that varied in the projected firm-level structural characteristics of global dispersion of operations, cross-unit interdependence, and structural flexibility.

The global product structure observed in the process of discovering compounds reflected a knowledge-sharing network focused on accessing and leveraging dispersed expertise to enhance innovation, while simultaneously leveraging scale in growing technology investments and supporting services to effectively exploit this expertise. As portrayed in Table 6, the characteristics of these networks varied dramatically from those observed in the initial regulatory approval process, which reflected a data-sharing network. Focused on generating and sharing data, this network’s characteristics enhanced speed and flexibility by aligning and integrating globally dispersed and duplicated operations. The structural characteristics of both of these networks differed from those of facility-sharing networks like the one observed for bulk chemical production, where the focus was on leveraging scale in specialized global facilities to meet common worldwide requirements.

Variations in process-level structural characteristics highlight the limitations of average firm-level characteristics as a lens for investigating emerging MNC structures. Although all the characteristics associated within ideal MNC models were observed here, there were systematic differences within each characteristic and in their mix across

<table>
<thead>
<tr>
<th>Projected MNC Structural Characteristic</th>
<th>Knowledge-Sharing Networks</th>
<th>Data-Sharing Networks</th>
<th>Facility-Sharing Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample observed process</td>
<td>Compound discovery (global product structure)</td>
<td>Initial regulatory approval (global process structure)</td>
<td>Bulk chemical production (global functional structure)</td>
</tr>
<tr>
<td>Global dispersion of operations</td>
<td>Dispersed global product area (for instance, application) responsibility for process output</td>
<td>Dispersed global product-specific responsibility for process output</td>
<td>Single unit with global process responsibility for all operations</td>
</tr>
<tr>
<td></td>
<td>Dispersed and specialized operational facilities</td>
<td>Dispersed and duplicated operations for undertaking common activities within markets</td>
<td>Dispersed and specialized facilities with global product type (for instance, technology) responsibility</td>
</tr>
<tr>
<td>Cross-unit interdependence</td>
<td>Exchanges of know-how and expertise</td>
<td>Exchanges of data and know-how for individual products</td>
<td>Primary flows of intermediate products to global markets</td>
</tr>
<tr>
<td></td>
<td>Global sharing of technology “tools” across units</td>
<td>Operations aligned through common operating standards and procedures to ensure global process consistency</td>
<td>Operational planning integrated through technical and operating standards focused on worldwide requirements</td>
</tr>
<tr>
<td></td>
<td>Operations coordinated within overall corporate research strategy</td>
<td>Focus on identifying and sharing information and expertise for individual compounds</td>
<td>Primary flexibility within global functional unit</td>
</tr>
<tr>
<td>Structural flexibility</td>
<td>Primary operational and budget flexibility within global product-area units</td>
<td>Focus on identifying and sharing innovations arising globally and across centers</td>
<td>Sharing of “best practices” for common tasks across facilities</td>
</tr>
<tr>
<td></td>
<td>Focus on identifying and sharing innovations arising globally and across centers</td>
<td>Internal “contracting” system for cost transfers</td>
<td>Internal contracting through transfer price systems</td>
</tr>
<tr>
<td></td>
<td>Internal “contracting” system for cost transfers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
process-level structures. The complexity of firm-level structural challenges called for internally developing and integrating multiple types of networks, drawing on common resources and operations across functional, geographic, and product dimensions of its operations, rather than for implementing a single network structure. These findings support the need, identified by Scott (1987) and others, to investigate the complexities of organizational subsystems as opposed to averaging characteristics over a firm’s subunits. Referring to the classic strategy-structure paradigm (e.g., Chandler, 1962), these findings suggest that emerging patterns of structural differentiation across processes were influenced by both variations in the mix of environmental pressures and the growing complexity in the nature of these pressures.

The complexity of observed internal MNC structures highlights the need for international management research to move the organizational debate beyond the traditional opposition of global integration (centralization) and local responsiveness (decentralization). In the context of developing and integrating complex internal network structures, structuring decisions involved employing various combinations of centralization and decentralization in structural characteristics within process structures to pursue multiple and often conflicting strategic objectives. Discussions with executives at the firms in this study provide some insights into the importance of this change. Although they focused on exploiting existing firm capabilities by operating across markets (in the early periods of this study), there was a specific emphasis on having a “global” strategy in line with the classic global integration-local responsiveness debate. However, as the firms evolved toward managing established global networks, executives emphasized how operating globally could enhance their firm’s overall ability to pursue strategic objectives at the process and firm levels through the introduction and management of internally differentiated structures.

**DISCUSSION**

Focusing on the extent and nature of structural change at two leading multinational corporations, in this study I observed both increasing divergence in internal firm structures and convergence in common process structures across firms, even firms with significant differences in their traditional structures. I identified significant variations in the extent of convergence across processes, with higher degrees of convergence in core processes, as opposed to support or delivery processes, as well as over time. Although supporting the findings of prior research on emerging MNC structures, including the existence of projected network structural characteristics, the study showed the emergence of multiple types of networks within the firms. Some internal networks focused on global knowledge sharing, but others focused on global data sharing, and others on global facility sharing. Each type of network pursued a different mix of strategic objectives and was associated with different mixes of structural characteristics, yet the networks also drew on common resources and operations dispersed within a firm. Rather than emphasizing firm-level structures or organizational models, the study suggests that there may be particular structures appropriate to specific processes across firms within a given industry.

Given the observed systematic structural variations, the findings provide mixed support for the movement toward ideal proposed MNC models. Rather, the findings suggest important potential refinements to research on MNC structures. Rather than selecting a single structure, MNCs respond to increasingly complex pressures and opportunities from operating globally through increasing internal structural complexity, systematically differentiating their structures to respond to the relevant subenvironments for individual processes. The organizational challenge facing managers at MNCs is not the introduction of a set of firm-level characteristics but, rather, the development and integration of multiple types of internal networks sharing common and globally dispersed resources. This internal differentiation is evidenced by variation in both the geographic and operating orientations of individual process structures within the firms. Reflecting back to the nature of pressures and opportunities associated with operating globally, these systematically differentiated structures enabled the two firms in the study to simultaneously pursue conflicting strategic objectives and respond to complex variations in pressures and opportunities.

**Implications for Research on Diversified Organizations**

Going beyond international management research, these findings have broader theoretical implications for general research on organizational change, particularly for the longstanding debate on the relationship of environmental or contextual change with firm structural change. Much research has highlighted the importance of alignment, or fit, between a firm’s structure and its environment, (e.g., Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Woodward, 1965). A general proposition of this research is that organizations that achieve fit
with their environment are more effective (Chandler, 1962; Lawrence & Lorsch, 1967). However, other research has emphasized the importance of internal alignment and continuity, highlighting the importance of exploiting prior success to increase organizational efficiency and reduce uncertainty (March & Simon, 1958; Nelson & Winter, 1982). As a result, organizations have been characterized as facing a dual challenge, the need to both explore new possibilities and exploit old certainties (e.g., March, 1991; Schumpeter, 1934). The issue of managing these competing risks is particularly important in dynamic environments calling for rapid and fundamental structural change involving the movement toward previously unknown organizational models.

The findings of this study provide one preliminary view of this process of firm-level exploration and exploitation. The study did not show complete structural convergence across firms, as would be expected if environmental or contextual factors drove structuring decisions. Neither did it demonstrate that internal or institutional factors drove structuring decisions within the firms. Rather, I observed both growing convergence across firms, with variations in the extent of such convergence, as well as divergence in structures within firms, although there remained some institutional influences as well. Figure 5 is an overall portrayal of the multiple and competing influences of internal structuring decisions suggested by this research.

In terms of growing divergence in the internal structures of firms and convergence in structures across firms, these findings highlight the importance of variations in industry- and process-level subenvironments. The need for internal structural divergence is directly associated with firms simultaneously pursuing multiple and potentially conflicting strategic objectives. Growing variations in strategic opportunities associated with industry subenvironments and the impact of these opportunities on firm-level performance drive the need for

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5 The simultaneous pressures for effectiveness and efficiency reflect two competing risks (e.g., Hannan & Freeman, 1989). If a firm does not maintain strategies that are effective in an environment, it risks competitive failure. However, altering firm structures and practices poses a risk of change process failure and an associated loss of efficiency from organizational disruption (Hannan & Freeman, 1984; Singh, House, & Tucker, 1986; Winter, 1994).
internal differentiation. However, the findings also suggest at least three factors mitigating the extent of internal structural divergence. A first factor is variation in the importance of process environments for firm-level performance within an industry. I observed higher convergence in core processes than in support or delivery processes. Where process-level strategic pressures are not high, or where these pressures have a significant impact on firm-level performance, institutional influences on structuring decisions impact the extent of structural change. The second factor, time, reflects the overall degree of institutional or firm-level influence on internal structuring. In general, this study suggests higher structural convergence across firms over time as they break down traditional embedded structures and routines. Whether it was associated with change process learning and path dependence (Levinthal, 1991) or with focusing change on managing the simultaneous need for exploration and efficiency, acceleration in the change process was seen at both firms. In the early stages of the process, institutional factors continued to have a larger impact on structuring decisions. Later in the process, the influence of environmental pressures grew. This observation could be directly associated with developing dynamic capabilities reflecting the need for firms to renew, augment, and adapt core competencies when operating in dynamic environments (Grant, 1996; Leonard-Barton, 1992). The third factor is the extent of internal sharing of resources across multiple processes. For support processes, which typically shared resources, there was less observed structural convergence across firms; significant differences in the two companies’ support process structures at the end of this study. Overall, these findings suggest that the pressures for internal structural divergence are affected by the growing complexity of industry subenvironments and importance of associated strategic objectives, offset by the relative importance of such environments for firm-level performance, the time needed to break down institutional influences, and the extent of internal resource sharing.

Limitations and Areas for Further Research

Although limited in generalizability, owing to its focus on two firms within a single industry, this study represents a comprehensive approach to research on structural change within MNCs. The findings identify systematic structural patterns within and across processes in these companies and go beyond the firm-level characteristics highlighted in prior studies, reflecting differences in the nature and extent of structural change across processes. There are a number of potential extensions to this study. One important extension would involve increasing the number of firms involved and including additional industries. A further extension would be further investigating factors influencing structural variations within and across firms, an extension that would require including both vertically integrated (performing multiple processes) and specialized (performing single processes) firms. If projections of structural convergence across common processes are correct, similar convergence should be observed across vertically integrated and specialized firms.

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APPENDIX

Organizational Variables and Coding

Building on prior research on MNCs, I distinguished seven dimensions of MNC operations and 19 variables describing processes for coordinating and controlling worldwide operations. The first dimension was a firm’s resource configuration, or the location of its resources and operations, highlighted by several prior studies (e.g., Bartlett & Ghoshal, 1989; Hedlund, 1986; Kogut, 1984; Porter, 1986). Following Bartlett and Ghoshal, I distinguished between the structuring of primary strategic resources and that of supporting resources. The second dimension was organizational orientation, or the grouping of activities (e.g., Simon, 1976) within distinctive units, a focus of a long stream of research on MNCs (e.g., Davidson & Haspeslagh, 1982; Stopford & Wells, 1972). Specifically, data concerned the existence and roles of organizational units representing functional, product, and other elements (such as customers) of a firm’s operations. Prior research suggests that organizational units can have multiple roles and that MNCs are moving toward having multiple units simultaneously involved in single aspects of operations.

The third dimension was the locus of decision-making authority (e.g., Lawrence & Lorsch, 1967; Simon, 1976) as an important component of an MNC’s formal control mechanisms (e.g., Brooke & Remmers, 1970). I characterized the location and orientation of authority for primary or core strategic decision making (representing long-term strategic directions for each process), short-term or tactical strategic decision making, and operating or implementing decision making. The fourth dimension, standards and procedures, was in line with research emphasizing standardized routines, procedures, or rules as important organizational variables (e.g., Lawrence & Lorsch, 1967; Nelson & Winter, 1982; Thompson, 1967). In literature on MNCs, such an emphasis has been associated with discussions on the extent of formalization.

Specific variables addressed primary or core strategic policies and standards (such as core product policies and investment policies), short-term or tactical strategic policies and standards, and operating policies and standards. The fifth organizational dimension was planning and information systems (Galbraith & Kazanjian, 1986; March & Simon, 1958; Thompson, 1967). Variables captured formal, informal, and supplemental planning systems, which have been highlighted in literature on organizational change as important mechanisms in generating strategic alternatives to an existing organizational focus.

The sixth and seventh dimensions described two less formal organizational mechanisms: lateral, or coalition-based, integration mechanisms and firm culture. Regarding coalition-based integrating mechanisms, much research on MNCs has emphasized the role of supplemental communication mechanisms, including task forces, meetings, and committees crossing organizational lines, a topic also addressed by Lawrence and Lorsch (1967), Galbraith and Kazanjian (1986), and others. The research demonstrated the presence and status of three such mechanisms: temporary coalitions like task forces and meetings, regular and ongoing coalitions, and senior management cross-functional committees overseeing processes. Finally, several researchers have emphasized firm culture (Baliga & Jaeger, 1984; Johnson & Ouchi, 1974) as a control mechanism. Specific cultural control mechanisms include the use of expatriates, frequent visits, management transfer policies, and a strong socialization process, as well as a company’s style, ways of doing business, and values (e.g., Mintzberg, 1983; Selznick, 1957; Simon, 1976). The study incorporated two variables on cultural controls, reflecting both the general mind-set of management and the national origin of the senior managers overseeing a process.

These organizational variables and coding procedures are outlined in Table A.
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Variable</th>
<th>Definition</th>
<th>Value</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource configuration</td>
<td>Strategic resources</td>
<td>Location of strategic resources for performing a process. Strategic resources are those that primarily influence the outcome of the process.</td>
<td>1</td>
<td>Resources exclusively concentrated within a firm’s domestic market and oriented toward domestic market requirements.</td>
</tr>
<tr>
<td></td>
<td>Nonstrategic resources</td>
<td>Location of nonstrategic resources for performing a process. Nonstrategic resources support a process but do not significantly and directly influence its outcome.</td>
<td>2</td>
<td>Resources primarily concentrated within a firm’s domestic market, with overseas resources oriented toward domestic market requirements.</td>
</tr>
<tr>
<td>Organizational orientation</td>
<td>Function-oriented units</td>
<td>Nature of function-based organizational units for performing process.</td>
<td>3</td>
<td>Resources decentralized within local markets and oriented toward local market requirements.</td>
</tr>
<tr>
<td></td>
<td>Product-oriented units</td>
<td>Nature of product-based organizational units for performing process.</td>
<td>4</td>
<td>Resources dispersed, centralized by region, and oriented toward regional requirements.</td>
</tr>
<tr>
<td></td>
<td>Other units</td>
<td>Nature of other organizational units for performing process that are based on another element of an organization’s operations.</td>
<td>5</td>
<td>Resources dispersed, centralized globally, and oriented toward global market requirements.</td>
</tr>
<tr>
<td>Decision-making authority</td>
<td>Core strategic decision-making authority</td>
<td>Location and orientation of decision authority for core process strategies. Core strategies reflect primary policies and typically affect what processes will be performed three to five years forward.</td>
<td>0</td>
<td>No organizational units with the specified orientation.</td>
</tr>
<tr>
<td></td>
<td>Tactical strategic decision-making authority</td>
<td>Location and orientation of decision authority for tactical process strategies. Tactical strategies reflect short-term policies and typically affect what processes will be performed one to three years forward.</td>
<td>1</td>
<td>Centralized at exclusively domestic focused headquarters. Decisions typically reflect domestic market factors.</td>
</tr>
<tr>
<td></td>
<td>Operating decision-making authority</td>
<td>Location and orientation of decision authority for implementing strategies within defined guidelines. Tactical strategies reflect how processes are performed.</td>
<td>2</td>
<td>Decentralized at geographically focused affiliates. Decisions typically reflect local market factors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Centralized at regionally focused headquarters. Decisions typically reflect regional market factors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Centralized at globally focused headquarters. Decisions typically reflect global market factors.</td>
</tr>
<tr>
<td>Standards and procedures</td>
<td>Strategic policies and standards</td>
<td>Orientation of standardized routines, procedures, and rules that affect core strategic decisions.</td>
<td>1</td>
<td>Centralized and primarily reflecting firm domestic market factors.</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Tactical policies and standards</td>
<td>Orientation of standardized routines, procedures, and rules that affect tactical strategic decisions.</td>
<td>2</td>
<td>Decentralized and reflecting local market factors.</td>
</tr>
<tr>
<td></td>
<td>Operating policies and standards</td>
<td>Orientation of standardized routines, procedures, and rules that affect operating decisions.</td>
<td>3</td>
<td>Centralized and reflecting regional market factors.</td>
</tr>
<tr>
<td></td>
<td>Planning and information systems</td>
<td>Formal planning systems</td>
<td>Orientation of primary systems used to plan, guide, and measure processes.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Supplemental planning systems</td>
<td>Presence and orientation of supplemental systems to plan, guide, or measure procedures.</td>
<td>1</td>
<td>Centralized and primarily reflecting firm domestic market factors.</td>
</tr>
<tr>
<td></td>
<td>Information systems</td>
<td>Orientation of primary systems used to measure and evaluate processes.</td>
<td>2</td>
<td>Decentralized and reflecting local market factors.</td>
</tr>
<tr>
<td>Coalition-based integration mechanisms</td>
<td>Temporary coalitions</td>
<td>Presence and nature of temporary task forces and meetings among organization members from different units.</td>
<td>3</td>
<td>Centralized and reflecting regional market factors.</td>
</tr>
<tr>
<td></td>
<td>Regular coalitions</td>
<td>Presence and nature of regular meetings and other forums among organization members from different units.</td>
<td>4</td>
<td>Centralized and reflecting global market factors.</td>
</tr>
<tr>
<td></td>
<td>Senior executive committees</td>
<td>Presence of senior executive committees to oversee and manage a process.</td>
<td>0</td>
<td>Mechanisms not extensively used for specified process.</td>
</tr>
<tr>
<td>Firm culture</td>
<td>Mind-set</td>
<td>General company style, ways of doing things, values, and common practices.</td>
<td>1</td>
<td>Primarily reflecting firm domestic practices and style.</td>
</tr>
<tr>
<td></td>
<td>Senior executives</td>
<td>National origin of senior executives overseeing specified process.</td>
<td>2</td>
<td>Significant variations in style and practices across local markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Significant variations in style and practices across local markets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Centralized and reflecting common practices and styles incorporating worldwide practices and styles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Home-country executives hold all senior posts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Locally based executives hold key local posts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Regionally based executives hold local posts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Executives based worldwide hold key senior positions.</td>
</tr>
</tbody>
</table>

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