chapter six

Fundamentals of Organization Structure

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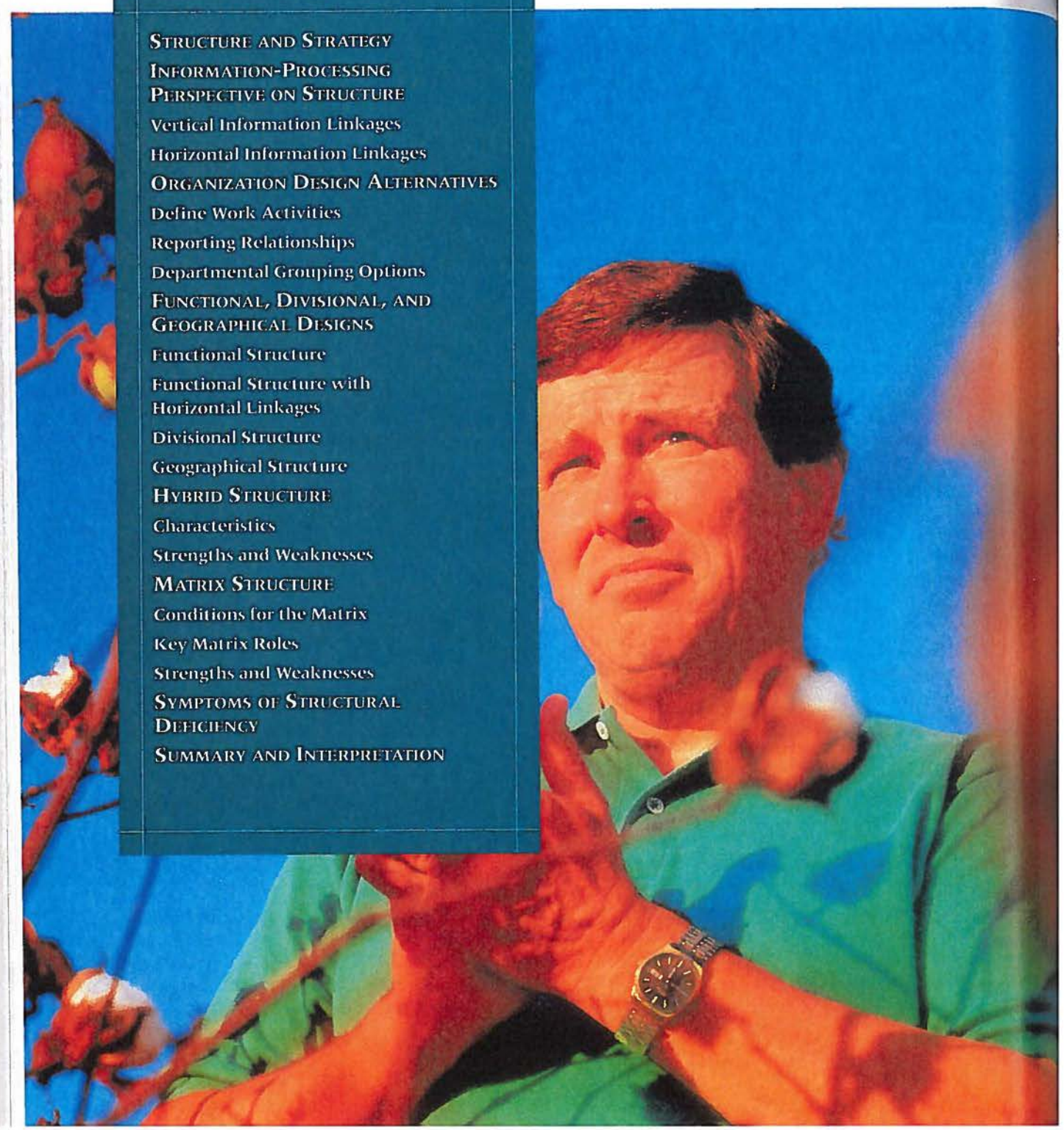


A look inside

Zeneca Agricultural Products

Top executives of the North American agrochemicals business of Britain's Imperial Chemical Industries met to consider the company's future. Profits were lousy and inventories were out of control. Matching a competitor's price cut had just cost $25 million. Things couldn't get any worse—but then, they did. Executives learned that the company would be part of a huge deconglomeration, when ICI spun off its pharmaceutical, agrochemical, and specialty chemical lines. They knew that, unless things turned around fast, their business might not survive the whirlwind.

Bob Woods presided over a traditional functional organization where managers were fiercely loyal to their own departments. Coordination between functional departments had to be improved, but Woods knew an immediate full-scale reorganization would arouse opposition and take time and money Zeneca didn't have. Everyone, however, agreed that the cash problem had to be solved, and that's where Woods found his opening. He first reached below the department heads, creating cross-functional teams of midlevel managers charged with getting working capital under control. Those teams later became the model for a larger transformation, as Zeneca Ag examined every business process—from product development to order fulfillment—and reorganized into teams designed to serve specific customers, for example, corn and soybean farmers. Again, Woods created teams from the middle, who soon became heroes in the organization as profits and customer satisfaction increased. Although some top managers squawked, most supported the improved departmental cooperation and eventually wanted to join the teams.

Horizontal teams have helped turn things around at Zeneca. The company entered 1995 with profits up 68 percent, head count down just 10 percent, and a leadership team poised for rapid response to further environmental changes.[1]

While Zeneca Ag retains elements of a functional structure, emphasis is on horizontal coordination to promote better and faster communication within the company and with customers.

Nearly every firm undergoes reorganization at some point, and today, many companies are almost continuously changing and reorganizing to meet new challenges. Structural changes are needed as the environment, technology, size or competitive strategy changes. The challenge for managers is to understand how to design organization structure to achieve their company's goals.

Purpose of This Chapter

The general concept of organization structure has been discussed in previous chapters. Structure includes such things as the number of departments in an organization, the span of control, and the extent to which the organization is formalized or centralized. The purpose of this chapter is to bring together these ideas to show how to design structure as it appears on the organization chart.

The material on structure is presented in the following sequence. First, structure is defined. Second, an information-processing perspective on structure explains how vertical and horizontal linkages are designed to provide needed information capacity. Third, basic organization design options are presented. Fourth, strategies for grouping organizational activities into functional, divisional, hybrid, or matrix structures are discussed. By the end of this chapter, you will understand how organization structure can help companies like Zeneca achieve their goals.

Structure and Strategy

Organization **structure** is reflected in the organization chart. The organization chart is the visible representation for a whole set of underlying activities and processes in an organization. The three key components in the definition of organization structure are:

1. Organization structure designates formal reporting relationships, including the number of levels in the hierarchy and the span of control of managers and supervisors.
2. Organization structure identifies the grouping together of individuals into departments and of departments into the total organization.
3. Organization structure includes the design of systems to ensure effective communication, coordination, and integration of effort across departments.[2]

These three elements of structure pertain to both vertical and horizontal aspects of organizing. For example, the first two elements are the structural *framework*, which is the vertical hierarchy drawn on the organization chart.[3] The third element pertains to the pattern of *interactions* among organizational employees. An ideal structure encourages employees to provide horizontal information and coordination where and when it is needed.

Exhibit 6.1 illustrates that structural design is influenced by the environment, goals, technology, and size. Each of these key contextual variables was discussed at length in previous chapters. Recall that an environment can be stable or unstable; management's goals and strategies may stress internal efficiency or adaptation to external markets; production technologies can be routine or nonroutine; and an organization's size may be large or small. Each variable influences the correct structural design. Moreover, environment, technology, goals, and size may also influence one another, as illustrated by the connecting lines among these contextual variables in Exhibit 6.1. Human processes (such as leadership and culture) within the organization also influence structure as indicated in the center of Exhibit 6.1. These processes will be discussed in later chapters.

Of these contextual variables, the connection between competitive strategy and structure is of particular interest and has been widely studied. Structure typically reflects organizational strategy, and a change in product or market strategy frequently leads to a change in structure.[4] Once a company formulates a strategy by which it plans to achieve an advantage in the marketplace, leaders design or redesign the structure to coordinate organizational activities to best achieve that advantage. For example, an organization that adopts a strategy to produce a single or only a few products or services for a limited market generally operates

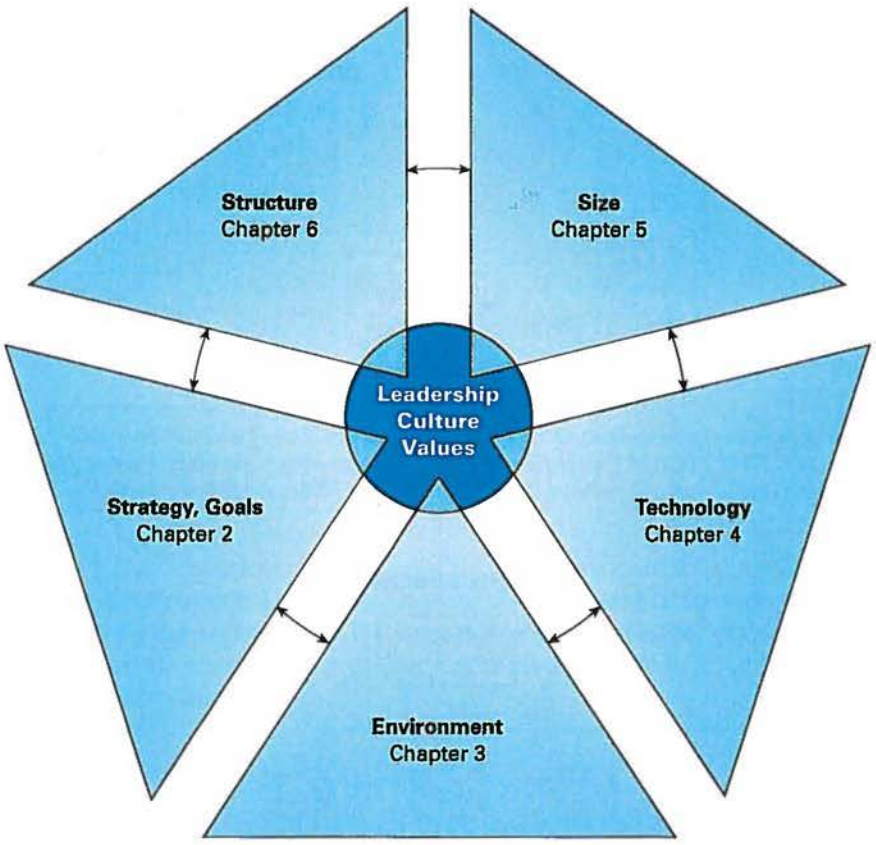


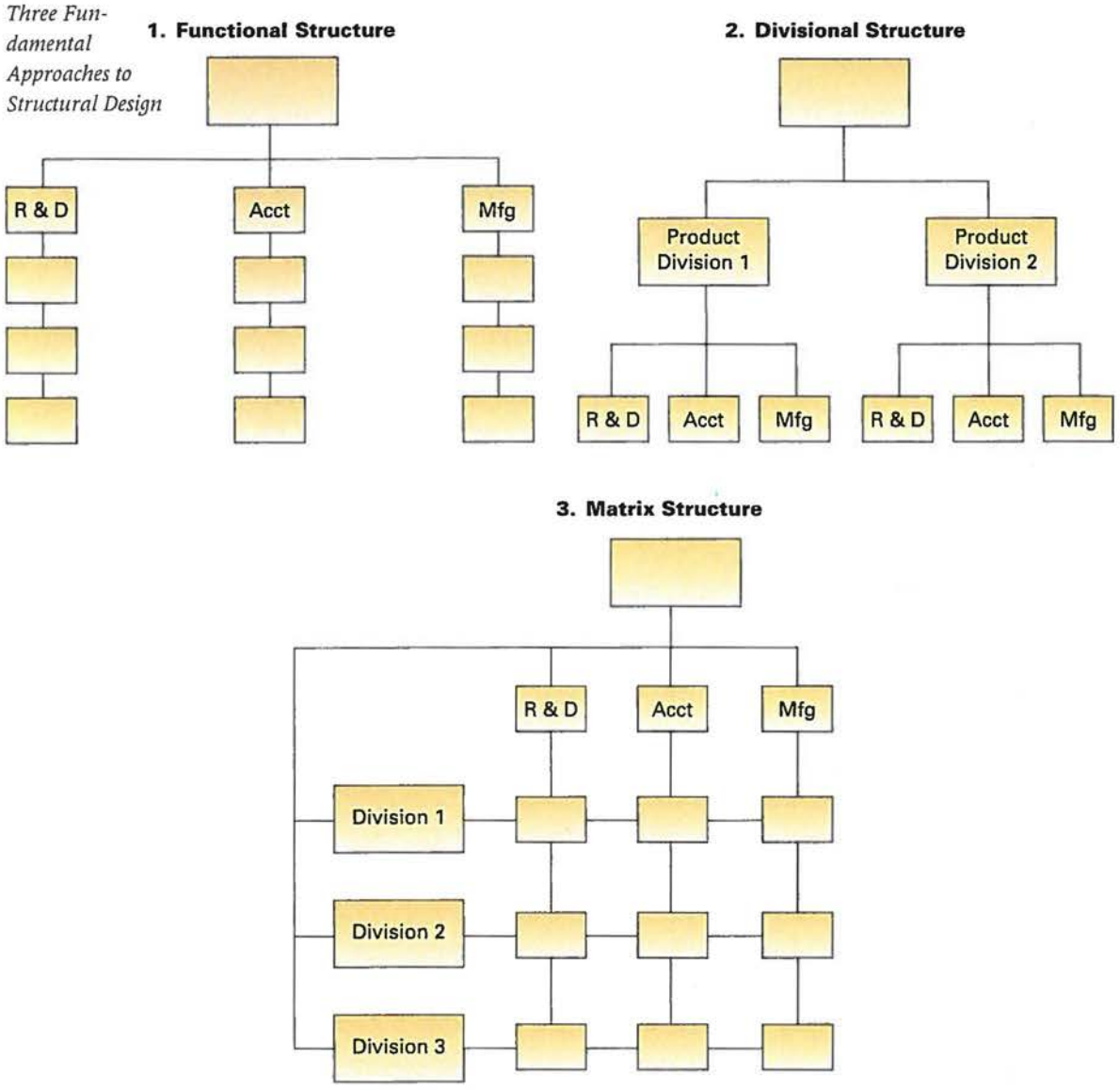
Exhibit 6.1
Organization Contextual Variables That Influence Structure

Source: Adapted from Jay R. Galbraith, *Competing with Flexible Lateral Organizations*, 2nd ed. (Reading, Mass.: Addison-Wesley, 1994), ch.1; Jay R. Galbraith, *Organization Design* (Reading, Mass.: Addison-Wesley, 1977), ch. 1.

well with a centralized, functional structure. Organizational goals stress internal efficiency and technical quality. Apple Computer in the 1980s provides an example: the company essentially produced a single product, the Macintosh, that was sold to a single type of customer, computer dealers.[5]

Often, a company's strategy will evolve to the greater complexity of producing multiple products or services and expanding to new markets. When organizations diversify, structure may evolve into a decentralized, divisional form to promote flexibility and speed decision making. Goals stress adaptation to the ex

Exhibit 6.2
Three Fundamental Approaches to Structural Design



Information-Processing Perspective on Structure

The concepts in previous chapters—technology, goals, environment, size—impose different information-processing requirements on organizations. A nonroutine technology or an uncertain environment, for example, requires employees to process more information to understand and respond to unexpected events. Reciprocal interdependence between departments requires substantially more communication and coordination than is needed for pooled interdependence. Thus, the organization must be designed to encourage information flow in both vertical and horizontal directions necessary to achieve the organization's

Exhibit 6.3 *Information-Processing Approach to Structural Design*

Source: Based on Richard L. Daft and Robert H. Lengel, "Organizational Information Requirements, Media Richness and Structural Design," *Management Science* 32 (1986): 554–71; and David Nadler and Michael Tushman, *Strategic Organization Design* (Glenview, Ill.: Scott Foresman, 1988).

overall task.[6] Exhibit 6.3 illustrates how structure should fit the information requirements of the organization. If it does not, people will either have too little information or will spend time processing information not vital to their tasks, thus reducing effectiveness.[7]

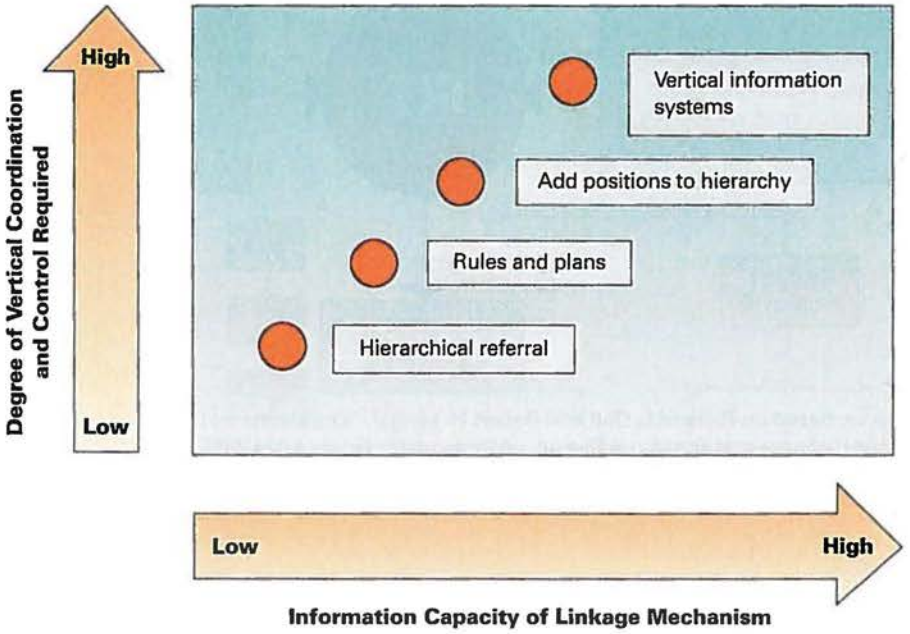
Vertical Information Linkages

Organization design should facilitate the communication among employees and departments that is necessary to accomplish the organization's overall task. *Linkage* is defined as the extent of communication and coordination among organizational elements. **Vertical linkages** are used to coordinate activities between the top and bottom of an organization. Employees at lower levels should carry out activities consistent with top-level goals, and top executives must be informed of activities and accomplishments at the lower levels. Organizations may use any of a variety of structural devices to achieve vertical linkage, including hierarchical referral, rules and procedures, plans and schedules, positions or levels added to the hierarchy, and formal management information systems.[8]

Hierarchical Referral. The first vertical device is the hierarchy, or chain of command, which is illustrated by the vertical lines in Exhibit 6.2. If a problem arises that employees don't know how to solve, it can be referred up to the next level in the hierarchy. When the problem is solved, the answer is passed back down to lower levels. The lines of the organization chart act as communication channels.

Rules and Plans. The next linkage device is the use of rules and plans. To the extent that problems and decisions are repetitious, a rule or procedure can be established so employees know how to respond without communicating directly with their manager. Rules provide a standard information source enabling employees to be coordinated without actually communicating about every job. A plan also provides standing information for employees. The most widely used plan is the budget. With carefully designed budget plans, employees at lower levels can be left on their own to perform activities within their resource allotment.

Exhibit 6.4
Ladder of Mechanisms for Vertical Linkage and Control



Add Positions to Hierarchy. When many problems occur, planning and hierarchical referral may overload managers. In growing or changing organizations, additional vertical linkages may be required. One technique is to add positions to the vertical hierarchy. In some cases, an assistant will be assigned to help an overloaded manager. In other cases, positions in the direct line of authority may be added. Such positions reduce the span of control and allow closer communication and control.

Vertical Information Systems. Vertical information systems are another strategy for increasing vertical information capacity. **Vertical information systems** include the periodic reports, written information, and computer-based communications distributed to managers. Information systems make communication up and down the hierarchy more efficient. For example, Chairman Bill Gates of Microsoft communicates regularly with employees through his company's electronic mail system. He responds to a dozen individual messages each day. At Xerox, some forty thousand customers are polled each month, and this data is aggregated, summarized, and transferred up the hierarchy to managers.

Summary. Structural mechanisms that can be used to achieve vertical linkage and coordination are summarized in Exhibit 6.4. These structural mechanisms represent alternatives managers can use in designing an organization. Depending upon the amount of coordination needed in the organization, several of the linkage mechanisms in Exhibit 6.4 may be used.

Horizontal Information Linkages

Horizontal communication overcomes barriers between departments and provides opportunities for coordination among employees to achieve unity of

effort and organizational objectives. **Horizontal linkage** refers to the amount of communication and coordination horizontally across organizational departments. Its importance was discovered by Lee Iacocca when he took over Chrysler Corporation.

> What I found at Chrysler were thirty-five vice presidents, each with his own turf. . . . I couldn't believe, for example, that the guy running engineering departments wasn't in constant touch with his counterpart in manufacturing. But that's how it was. Everybody worked independently. I took one look at that system and I almost threw up. That's when I knew I was in really deep trouble.
> . . . Nobody at Chrysler seemed to understand that interaction among the different functions in a company is absolutely critical. People in engineering and manufacturing almost have to be sleeping together. These guys weren't even flirting![9]

Today, horizontal communication has evolved to a high level at Chrysler and has had a significant positive impact. Chrysler puts everyone who's working on a specific vehicle project—designers, engineers, and manufacturers, along with representatives from marketing, finance, purchasing, and even outside suppliers—together on a single floor. The team concept has significantly improved horizontal coordination to help Chrysler become the world's most successful automaker.[10]

The need for horizontal coordination increases as the amount of uncertainty increases, such as when the environment is changing, the technology is nonroutine and interdependent, and goals stress innovation and flexibility. Horizontal linkage mechanisms often are not drawn on the organization chart, but nevertheless are part of organization structure. The following devices are structural alternatives that can improve horizontal coordination and information flow.[11] Each device enables people to exchange information.

Information Systems. A significant method of providing horizontal linkage in today's organizations is the use of cross-functional information systems. Computerized information systems can enable managers or front-line workers throughout the organization to routinely exchange information about problems, opportunities, activities, or decisions. Bow Valley Energy, a $264 million exploration and production company, redesigned its computer information system to improve cross-functional information flow among its geologists, geophysicists, production engineers, and contract managers worldwide.[12]

Direct Contact. A somewhat higher level of horizontal linkage is direct contact between managers or employees affected by a problem. To revive customer loyalty by improving service and quality, CEO Louis Morris began encouraging communication across department lines at Simplicity Pattern Company, so that creative design managers were talking with managers in sales and financing.[13] One way to promote direct contact is to create a special **liaison role**. A liaison person is located in one department but has the responsibility for communicating and achieving coordination with another department. Liaison roles often exist between engineering and manufacturing departments because engineering has to develop and test products to fit the limitations of manufacturing facilities.

Task Forces. Direct contact and liaison roles usually link only two departments. When linkage involves several departments, a more complex device such as a task force is required. A **task force** is a temporary committee composed of representatives from each department affected by a problem.[14] Each member represents the interest of a department and can carry information from the meeting back to that department.

Task forces are an effective horizontal linkage device for temporary issues. They solve problems by direct horizontal coordination and reduce the information load on the vertical hierarchy. Typically, they are disbanded after their tasks are accomplished.

Xerox used a task force of twenty hand-picked members to develop its application for the Malcolm Baldrige National Quality Award. Book publishers coordinate the editing, production, advertising, and distribution of a special book with a temporary task force.

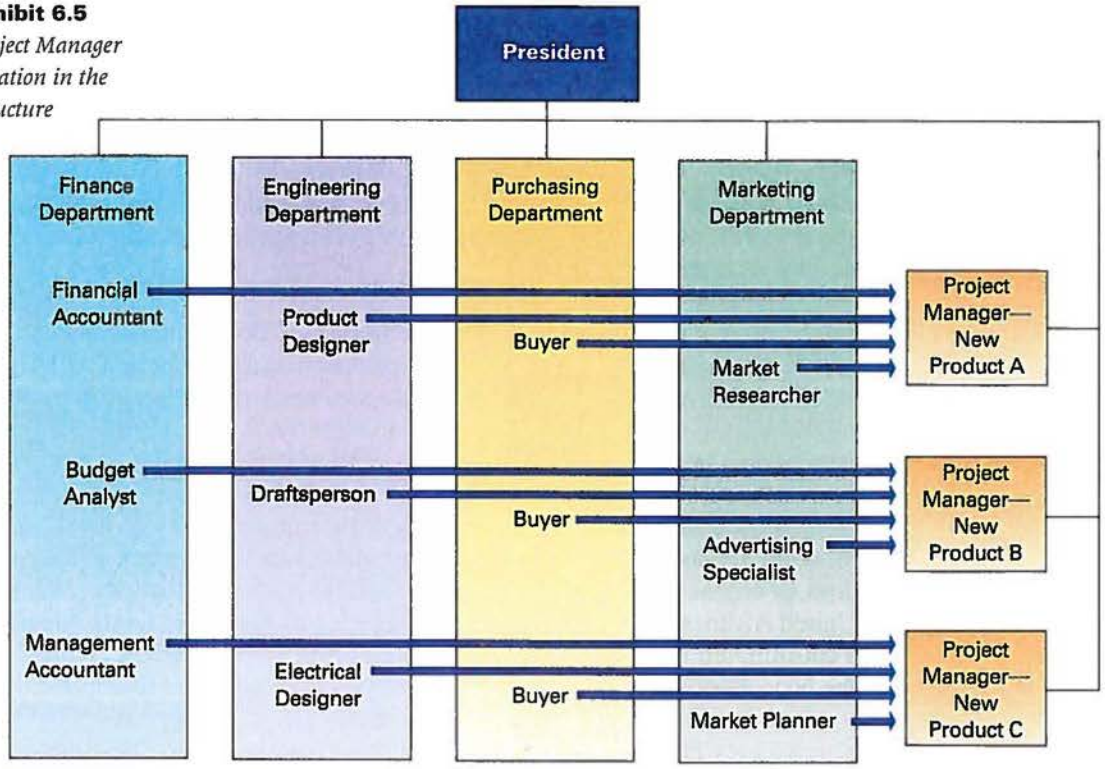
Full-time Integrator. A stronger horizontal linkage device is to create a full-time position or department solely for the purpose of coordination. A full-time **integrator** frequently has a title, such as product manager, project manager, program manager, or brand manager. Unlike the liaison person described earlier, the integrator does not report to one of the functional departments being coordinated. He or she is located outside the departments and has the responsibility for coordinating several departments.

The brand manager for Planters Peanuts, for example, coordinates the sales, distribution, and advertising for that product. Gillette Company created product line managers for multinational coordination. A product line manager coordinates marketing and sales strategies for Trac II across fifteen countries, achieving savings by using similar advertising and marketing techniques in each country. As part of its recent restructuring, General Motors is setting up brand managers who will be responsible for marketing and sales strategies for each of GM's new models.[15]

The integrator can also be responsible for an innovation or change project, such as developing the design, financing, and marketing of a new product. An organization chart that illustrates the location of project managers for new product development is shown in Exhibit 6.5. The project managers are drawn to the side to indicate their separation from other departments. The arrows indicate project members assigned to the new product development. New Product A, for example, has a financial accountant assigned to keep track of costs and budgets. The engineering member provides design advice, and purchasing and manufacturing members represent their areas. The project manager is responsible for the entire project. He or she sees that the new product is completed on time, is introduced to the market, and achieves other project goals. The horizontal lines in Exhibit 6.5 indicate that project managers do not have formal authority over team members with respect to giving pay raises, hiring, or firing. Formal authority rests with the managers of the functional departments, who have formal authority over subordinates.

Integrators need excellent people skills. Integrators in most companies have a lot of responsibility but little authority. The integrator has to use expertise and persuasion to achieve coordination. He or she spans the boundary between departments and must be able to get people together, maintain their trust, confront problems, and resolve conflicts and disputes in the interest of the organization.[16] The integrator must be forceful in order to achieve co-

Exhibit 6.5
Project Manager Location in the Structure



ordination, but must stop short of alienating people in the line departments. Some organizations, such as General Mills, have several integrators working simultaneously.

General Mills

In Practice 6.1

"When General Mills completed a ten-story tower at its suburban Minneapolis headquarters last summer, the company discovered that not all the telephones could be installed at once. 'Hook up the product managers' first,' the senior executive ordered. 'The business can't run without them.' "[17]

General Mills assigns a product manager to each of the more than twenty-five products in its line, including Cheerios, Wheaties, Bisquick, Softasilk Cake Mix, Stir-n-Frost Icing, Hamburger Helper, and Gold Medal Flour. Brand managers are also assigned to develop new products, name them, and test them in the marketplace.

Product managers at General Mills act as if they are running their own businesses. They set marketing goals and plot strategies to achieve those goals. They are responsible for product success, but they have no authority. Product management is management by persuasion. A good product manager is vibrant, challenging, and a little abrasive. He or she has to be to get things done without the aid of formal authority.

If the product manager for Cocoa Puffs needs special support from the sales force and additional output from the plant for a big advertising campaign, she has to sell the idea to people who report to managers in charge of sales and manufacturing. Product managers work laterally across the organization rather than within the vertical structure. When the product manager for Crispy Wheats 'n Raisins decides the product needs different packaging, a new recipe, a more focused commercial, or new ingredients, he must convince the departments to

pay attention to his brand. The product manager can also expect to work with the procurement department, a controller, and the research lab at some point during the year.[18]

The product managers at General Mills are full-time integrators. They coordinate marketing, manufacturing, purchasing, research, and other functions relevant to their product lines. They provide horizontal linkages by persuading diverse departments to focus on the needs of their products. General Mills has been very profitable in a highly competitive industry, and one reason is the role played by product managers.

Teams. Project teams tend to be the strongest horizontal linkage mechanism. **Teams** are permanent task forces and are often used in conjunction with a full-time integrator. When activities between departments require strong coordination over a long period of time, a cross-functional team is often the solution. Special project teams may be used when organizations have a large-scale project, a major innovation, or a new product line, such as Chrysler's Neon.

Boeing used around 250 teams to design and manufacture the new 777 aircraft. Some teams were created around sections of the plane, such as the wing, cockpit, or engines, while others were developed to serve specific customers, such as United Airlines or British Airways. Boeing's teams had to be tightly integrated and coordinated to accomplish this massive project. Even the U.S. Department of the Navy has discovered the power of cross-functional teams to improve horizontal coordination and increase productivity.[19]

The Rodney Hunt Company develops, manufactures, and markets heavy industrial equipment and uses teams to coordinate each product line across the manufacturing, engineering, and marketing departments. These teams are illustrated by the dashed lines and shaded areas in Exhibit 6.6. Members from each team meet the first thing each day as needed to resolve problems concerning customer needs, backlogs, engineering changes, scheduling conflicts, and any other problem with the product line.

A more intense use of teams was adopted by Hewlett-Packard's Terminals Division when the division found itself unable to compete in the fast-changing electronics industry. Permanent teams were combined with other linkage mechanisms to achieve remarkable coordination.

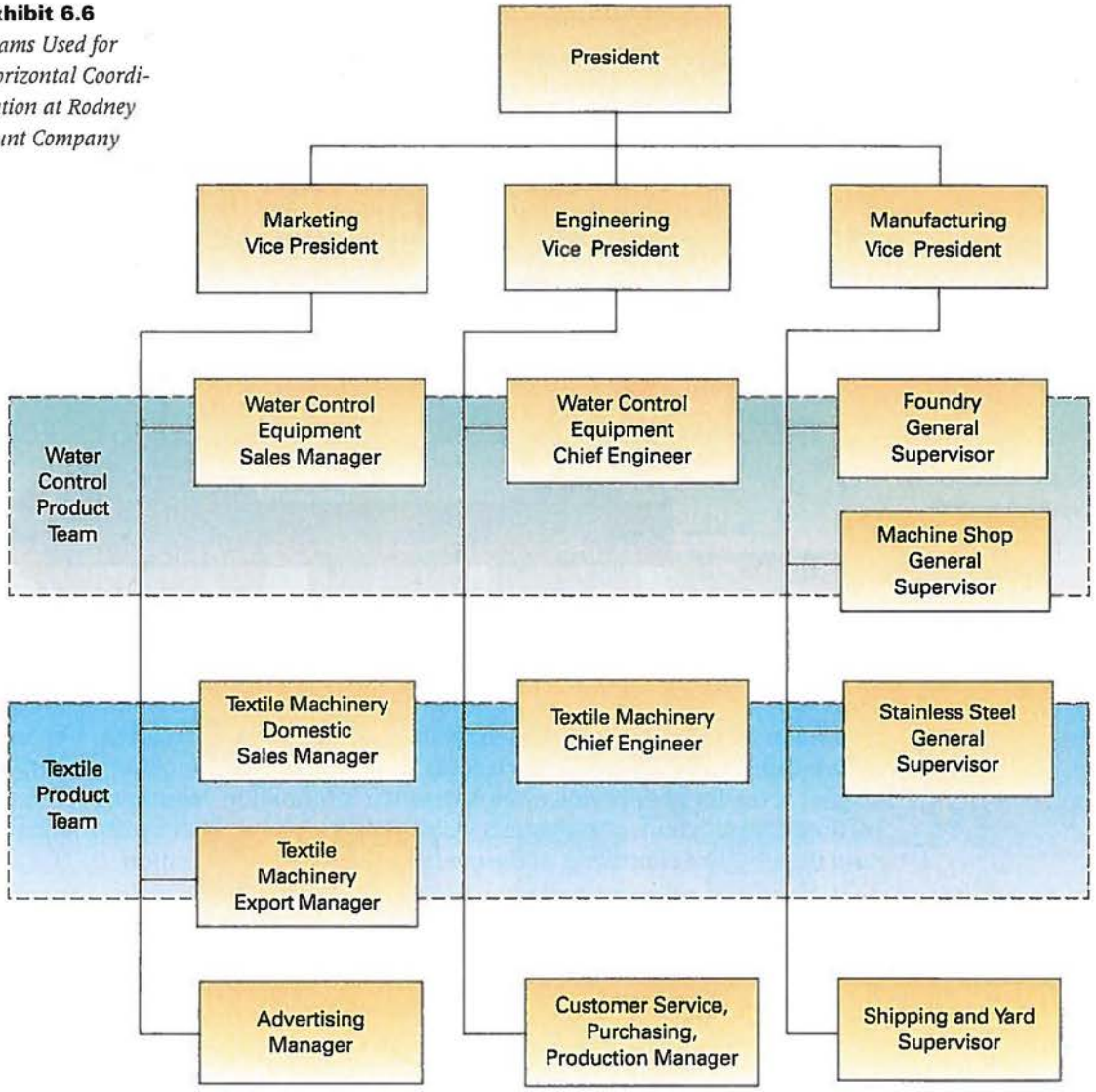
In Practice 6.2

Hewlett-Packard Terminals Division

The Terminals Division was created in 1983 to design and produce terminals for Hewlett-Packard systems, low-end personal computers, and video display systems. Although its terminals were ranked high in quality, they were quite expensive, and the division began rapidly losing market share to low-cost producers by 1985. Rather than sourcing terminals from the Far East, managers decided to radically alter the way the division did business to become a world-class, low-cost manufacturer and serve new customers on a global scale.

Close coordination and communication among all functions was needed to achieve the goal of becoming the highest quality, lowest cost producer, and even greater coordination was required to reduce the design and manufacturing time for development of a new global product. Cross-functional teams provided the solution. A cross-functional program team was created to serve as the integrating mechanism for a number of other teams, including a hardware design team, a software development team, and a team for the localization of hardware and software to meet various requirements in different countries. The hardware team was further subdivided into manufacturing teams around several assembly

Exhibit 6.6
Teams Used for Horizontal Coordination at Rodney Hunt Company

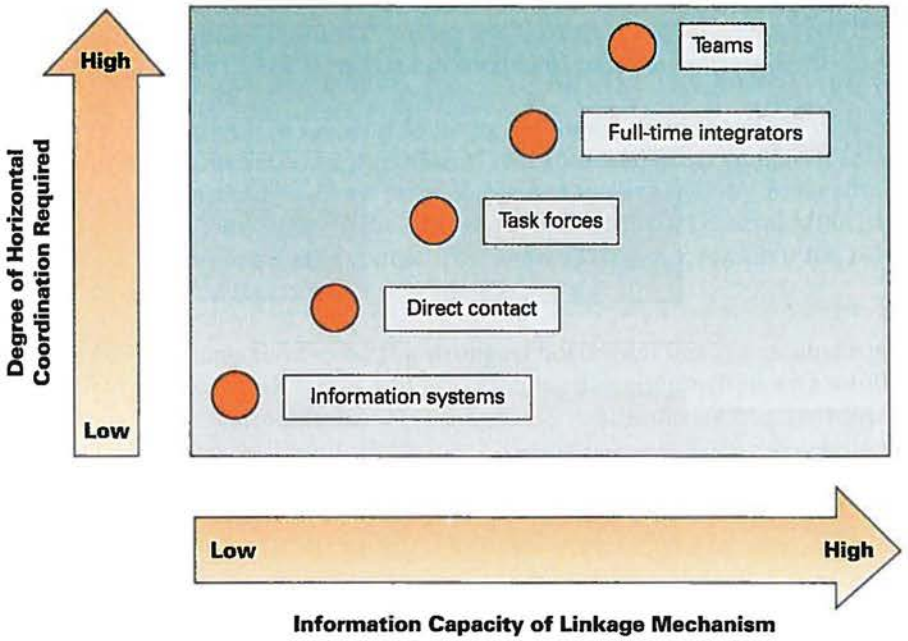


processes. In addition, there was a team for each major component that was to be purchased and a negotiating team to negotiate contracts for components to be shared across the division. Team members were carefully selected based on the goal of integrating products across functions, products across geographies, and components across products.

The program team responsible for coordinating all other teams was led by a program manager, who served as a full-time integrator and was chosen for his leadership abilities and his good relationships with all functional departments. Sharing leadership responsibilities with the program manager were two "architects," generalists who knew a great deal about hardware, software, and systems integration. Several engineers also served as liaisons between the hardware and software teams and between the localization teams and the design teams.

This complex, multidimensional team structure served its purpose. The division achieved the development of a new global product, dramatically reduced the cost of design and manufacture, and compressed development time to only eighteen months. The success of the effort led to refinements of the process to be used in developing future Hewlett-Packard products.[20]

Exhibit 6.7
Ladder of Mechanisms for Horizontal Linkage and Coordination



Summary. The mechanisms for achieving horizontal linkages in organizations are summarized in Exhibit 6.7. These devices represent alternatives that managers can select to achieve horizontal coordination in any organization. The higher level devices provide more horizontal information capacity. If communication is insufficient, departments will find themselves out of synchronization, and they will not contribute to the overall goals of the organization.

Organization Design Alternatives

The overall design of organization structure indicates three things—needed work activities, reporting relationships, and departmental groupings.

Define Work Activities

Departments are created to perform tasks considered strategically important to the company. For example, when moving huge quantities of supplies in the Persian Gulf, the U.S. Army's logistics commander created a squad of fifteen soldiers called Ghostbusters who were charged with getting out among the troops, identifying logistics problems, and seeing that the problems got fixed. The fiberglass group at Manville set a priority on growth and, hence, created a department that was simply called Growth Department. Defining a specific department is a way to accomplish tasks deemed valuable by the organization to accomplish its goals.

Reporting Relationships

Reporting relationships, often called the chain of command, are represented by vertical lines on an organization chart. The chain of command should be an unbroken line of authority that links all persons in an organization and shows who reports to whom. In a large organization like Standard Oil Company, one hun-

dred or more charts are required to identify reporting relationships among thousands of employees. The definition of departments and the drawing of reporting relationships defines how employees are to be grouped into departments.

Departmental Grouping Options

Options for departmental grouping, including functional grouping, divisional grouping, geographic grouping, and multifocused grouping, are illustrated in Exhibit 6.8. **Departmental grouping** has impact on employees because they share a common supervisor and common resources, are jointly responsible for performance, and tend to identify and collaborate with one another.[21] For example, at

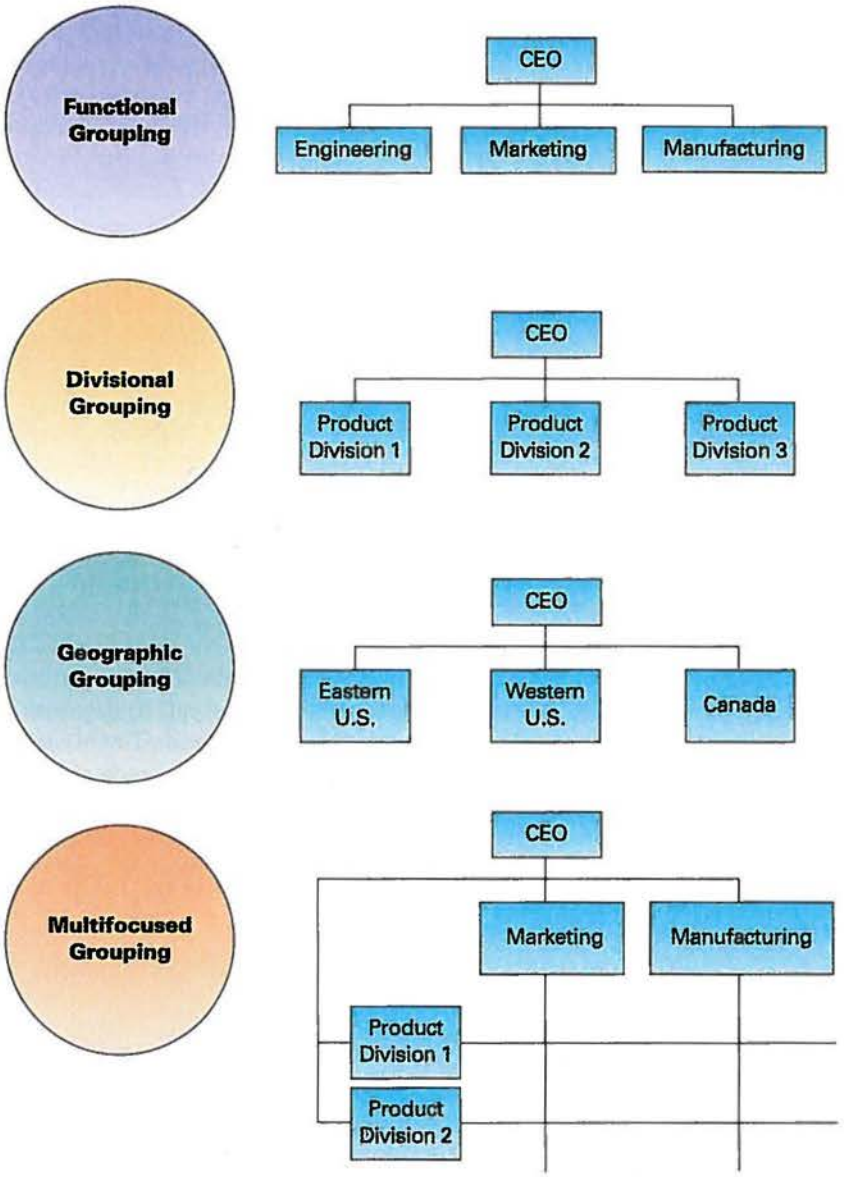


Exhibit 6.8
Structural Design Options for Grouping Employees into Departments

Source: Adapted from David Nadler and Michael Tushman, *Strategic Organization Design* (Glenview, Ill.: Scott Foresman, 1988), 68.

Albany Ladder Company, the credit manager was shifted from the finance department to the marketing department. By being grouped with marketing, the credit manager started working with sales people to increase sales, thus becoming more liberal with credit than when he was located in the finance department.

Functional grouping places employees together who perform similar functions or work processes or who bring similar knowledge and skills to bear. For example, all marketing people would work together under the same supervisor, as would manufacturing and engineering people. All people associated with the assembly process for generators would be grouped together in one department. All chemists may be grouped in a department different from biologists because they represent different disciplines.

Divisional Grouping means people are organized according to what the organization produces. All people required to produce toothpaste—including the marketing, manufacturing, and salespeople—are grouped together under one executive. In huge corporations such as PepsiCo, the product lines may represent independent businesses, such as Taco Bell, Frito Lay, and Pepsi Cola.

Geographic grouping means resources are organized to serve customers or clients in a particular geographical area. For example, all the activities required to serve the eastern United States or Canada or Latin America might be grouped together. This grouping focuses employees on meeting the specific needs of customers in a particular country or region.

Multifocused grouping means an organization embraces two structural grouping alternatives simultaneously. These structural forms are often called matrix or hybrid and will be discussed in more detail later in this chapter. An organization may need to group by function and product division simultaneously or perhaps by product division and geography.

The organizational forms described in Exhibit 6.8 provide the overall options within which the organization chart is drawn and the detailed structure is designed. Each structural design alternative has significant strengths and weaknesses, to which we now turn.

Functional, Divisional, and Geographical Designs

Functional grouping and divisional grouping are the two most common approaches to structural design.

Functional Structure

In a **functional structure**, activities are grouped together by common function from the bottom to the top of the organization. All engineers are located in the engineering department, and the vice president of engineering is responsible for all engineering activities. The same is true in marketing, research and development, and manufacturing. An example of the functional organization structure is shown in part 1 of Exhibit 6.2 earlier in this chapter.

Exhibit 6.9 summarizes the organizational characteristics typically associated with the functional structure. This structure is most effective when the environment is stable and the technology is relatively routine with low interdependence across functional departments. Organizational goals pertain to internal efficiency and technical specialization. Size is small to medium. Each of these characteristics is associated with a low need for horizontal coordination. The stable environment, rou-

Context
Structure: Functional Environment: Low uncertainty, stable Technology: Routine, low interdependence Size: Small to medium Strategy, goals: Internal efficiency, technical quality
Internal Systems
Operative goals: Functional goal emphasis Planning and budgeting: Cost basis—budget, statistical reports Formal authority: Functional managers
Strengths
1. Allows economies of scale within functional departments 2. Enables in-depth skill development 3. Enables organization to accomplish functional goals 4. Is best in small to medium-sized organizations 5. Is best with only one or a few products
Weaknesses
1. Slow response time to environmental changes 2. May cause decisions to pile on top, hierarchy overload 3. Leads to poor horizontal coordination among departments 4. Results in less innovation 5. Involves restricted view of organizational goals

Exhibit 6.9
Summary of Functional Organization Characteristics

Source: Adapted from Robert Duncan, "What Is the Right Organization Structure? Decision Tree Analysis Provides the Answer," *Organizational Dynamics* (Winter 1979): 429.

tine technology, internal efficiency, and small size mean the organization can be controlled and coordinated primarily through the vertical hierarchy. Within the organization, employees are committed to achieving the operative goals of their respective functional departments. Planning and budgeting is by function and reflects the cost of resources used in each department. Formal authority and influence within the organization rests with upper managers in the functional departments.

One strength of the functional structure is that it promotes economy of scale within functions. Economy of scale means all employees are located in the same place and can share facilities. Producing all products in a single plant, for example, enables the plant to acquire the latest machinery. Constructing only one facility instead of separate facilities for each product line reduces duplication and waste. The functional structure also promotes in-depth skill development of employees. Employees are exposed to a range of functional activities within their own department. The functional form of structure is best for small to medium-sized organizations when only one or a few products are produced.[22]

The main weakness of the functional structure is a slow response to environmental changes that require coordination across departments. If the environment is changing or the technology is nonroutine and interdependent, the vertical hierarchy becomes overloaded. Decisions pile up, and top managers do not respond fast enough. Other disadvantages of the functional structure are that innovation is slow because of poor coordination, and each employee has a restricted view of overall goals.

Consider how the functional structure provides the coordination Blue Bell Creameries needs.

In Practice 6.3

Blue Bell Creameries, Inc.

Within seconds, the old-timer on the radio had taken listeners out of their bumper-to-bumper Houston world and placed them gently in Brenham, Texas, with its rolling hills and country air, in the era when the town got its first traffic light.

"You know," he said, "that's how Blue Bell Ice Cream is. Old-fashioned, uncomplicated, homemade good." He paused. "It's all made in that little creamery in Brenham."

That little creamery isn't little anymore, but the desire for first-quality homemade ice cream is stronger than when Blue Bell started in 1907. Today, Blue Bell has more than eight hundred employees and will sell over $160 million in ice cream. The company has an unbelievable 60 percent share of the ice cream market in Houston, Dallas, and San Antonio—Texas's three largest cities.

The company cannot meet the demand for Blue Bell Ice Cream. It doesn't even try. Top managers recently decided to expand slowly into Louisiana and Oklahoma. Management refuses to compromise quality by expanding into regions that cannot be adequately serviced or by growing so fast that it can't adequately train employees in the art of making ice cream.

Blue Bell's major departments are sales, quality control, production, maintenance, and distribution. There is also an accounting department and a small research and development group. Product changes are infrequent because the orientation is toward tried-and-true products. The environment is stable. The customer base is well established. The only change has been the increase in demand for Blue Bell Ice Cream.

Blue Bell's quality control department tests all incoming ingredients and ensures that only the best products go into its ice cream. Quality control also tests outgoing ice cream products. After years of experience, quality inspectors can taste the slightest deviation from expected quality. It's no wonder Blue Bell has successfully maintained the image of a small-town creamery making homemade ice cream.[23]

The functional structure is just right for Blue Bell Creameries. The organization has chosen to stay medium-sized and focus on making a single product—quality ice cream. However, as Blue Bell expands, it may have problems coordinating across departments, requiring stronger horizontal linkage mechanisms.

Functional Structure with Horizontal Linkages

Today, there is a shift toward flatter, more horizontal structures because of the uncertain environment. Very few of today's successful companies can maintain a strictly functional structure. Organizations compensate for the vertical functional hierarchy by installing horizontal linkages, as described earlier in this chapter. Managers improve horizontal coordination by using information systems, direct contact between departments, full-time integrators or project managers (illustrated in Exhibit 6.5), task forces, or teams (illustrated in 6.6). Not-for-profit organizations are also recognizing the importance of horizontal linkages. An interesting example occurred at Karolinska Hospital in Stockholm, Sweden, where horizontal linkage mechanisms have dramatically improved productivity as well as patient care.

In Practice 6.4

Karolinska Hospital

When Karolinska faced a 20 percent cut in state funding in the early 1990s, the hospital's then chief executive Jan Lindsten knew dramatic action was needed to maintain the quality of patient care. The hospital had only recently been through a major reorganization, which had created forty-seven separate functional departments, each marching to their own beat. Lindsten cut that number down to eleven, but coordination was still woefully inadequate. Patients had to scale the high walls between departments, often making multiple all-day visits to Karolinska for tests and procedures—in general, only 2 percent of the time a patient spent at the hospital involved actual treatment. So Lindsten and a consulting group set about to reorganize workflow at the hospital around patient care—instead of bouncing a patient from department to department, Karolinska now envisions the illness to recovery period as a process with pit stops in admissions, X ray, surgery, etc. For example, a patient now meets a surgeon and a doctor of internal medicine together rather than separately.

The most interesting aspect of Karolinska's approach was the creation of the new position of "nurse coordinator." Nurse coordinators serve as full-time integrators, looking for situations where the baton is dropped in the handoff between or within departments. This has created new career opportunities for nurses, but it's a difficult position and nurse coordinators need strong people skills to handle the inevitable conflicts. In effect, doctors at Karolinska are now reporting to nurses, a shift in thinking that has not always been easy for either side.

However, nurse coordinators free doctors from administrative and scheduling matters and allow them to concentrate on clinical work and research. Horizontal linkages have dramatically improved performance at Karolinska. Even though three out of fifteen operating theaters have been closed due to funding cuts, the high coordination has enabled the hospital to perform three thousand more operations annually, a 25 percent increase. On the patient side, things look better too. Waiting times for surgery have been reduced from eight months to only three weeks.[24]

Karolinska Hospital is using horizontal linkages to overcome some of the disadvantages of the functional structure. Full-time integrators span the boundaries between departments and coordinate activities to serve the needs of patients as well as the interests of the organization. We will talk more about this trend toward horizontal organizing in the next chapter.

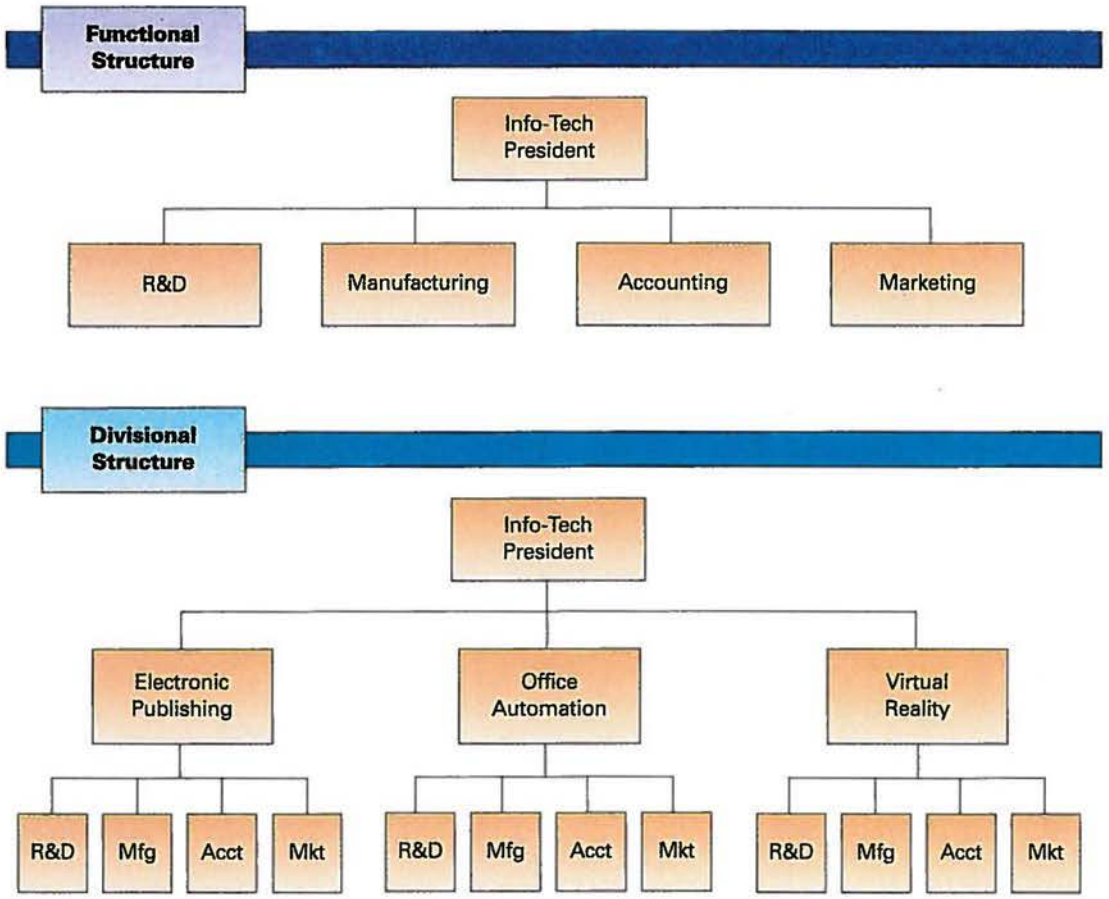
Divisional Structure

The term **divisional structure** is used here as the generic term for what is sometimes called a *product structure* or *strategic business units*. With this structure, divisions can be organized according to individual products, services, product groups, major projects or programs, divisions, businesses, or profit centers. The distinctive feature of a divisional structure is that grouping is based on organizational outputs.

The difference between a divisional structure and a functional structure is illustrated in Exhibit 6.10. The functional structure can be redesigned into separate product groups, and each group contains the functional departments of R&D, manufacturing, accounting, and marketing. Coordination across functional departments within each product group is maximized. The divisional structure promotes flexibility and change because each unit is smaller and can adapt to the

Exhibit 6.10

Reorganization from Functional Structure to Divisional Structure at Info-Tech



needs of its environment. Moreover, the divisional structure decentralizes decision making, because the lines of authority converge at a lower level in the hierarchy. The functional structure, by contrast, forces decisions all the way to the top before a problem affecting several functions can be resolved.

The divisional structure fits the context summarized in Exhibit 6.11.[25] This form of structure is excellent for achieving coordination across functional departments. When the environment is uncertain, the technology is nonroutine and interdependent across departments, and goals are external effectiveness and adaptation, then a divisional structure is appropriate.

Large size is also associated with divisional structure. Giant, complex organizations such as General Electric, PepsiCo, and Johnson & Johnson are subdivided into a series of smaller, self-contained organizations for better control and coordination. In these large companies, the units are sometimes called divisions, businesses, or strategic business units. The structure at Johnson & Johnson includes 168 separate operating units, including McNeil Consumer Products, makers of Tylenol; Ortho Pharmaceuticals, which makes Retin-A and birth control pills; and J & J Consumer Products, the company that brings us Johnson's

Context
Structure: Divisional Environment: Moderate to high uncertainty, changing Technology: Nonroutine, high interdependence among departments Size: Large Strategy, goals: External effectiveness, adaptation, client satisfaction
Internal Systems
Operative goals: Product line emphasis Planning and budgeting: Profit center basis—cost and income Formal authority: Product managers
Strengths
1. Suited to fast change in unstable environment 2. Leads to client satisfaction because product responsibility and contact points are clear 3. Involves high coordination across functions 4. Allows units to adapt to differences in products, regions, clients 5. Best in large organizations with several products 6. Decentralizes decision making
Weaknesses
1. Eliminates economies of scale in functional departments 2. Leads to poor coordination across product lines 3. Eliminates in-depth competence and technical specialization 4. Makes integration and standardization across product lines difficult

Exhibit 6.11
Summary of Divisional Organization Characteristics

Source: Adapted from Robert Duncan, "What Is the Right Organization Structure? Decision Tree Analysis Provides the Answer," *Organizational Dynamics* (Winter 1979): 431.

Baby Shampoo and Band-Aids. Each division is a separately chartered, autonomous company operating under the guidance of Johnson & Johnson's corporate headquarters.[26]

Another example of a divisional structure is Time Warner, Inc. Principal operating divisions include Warner Music, the world's largest record company, including the labels Warner Brothers, Elektra, and Atlantic; HBO, the leading pay cable television channel; Warner Brothers, maker of movies such as *Batman Forever* and television series such as *Friends*; and Time, Inc., which includes magazine publishers for *Time*, *Fortune*, and *People* as well as book publishers such as Little, Brown & Company.[27]

The divisional structure has several strengths. It is suited to fast change in an unstable environment and provides high product visibility. Since each product is a separate division, clients are able to contact the correct division and achieve satisfaction. Coordination across functions is excellent. Each product can adapt to requirements of individual customers or regions. The divisional structure typically works best in organizations that have multiple products or services and enough personnel to staff separate functional units. At corporations like Johnson & Johnson and PepsiCo, decision making is pushed down to the lowest levels. Each division is small enough to be quick on its feet, responding rapidly to changes in the market.

One disadvantage of using divisional structuring is that the organization loses economies of scale. Instead of fifty research engineers sharing a common facility in a functional structure, ten engineers may be assigned to each of five product divisions. The critical mass required for in-depth research is lost, and physical facilities have to be duplicated for each product line. Another problem is that product lines become separate from each other, and coordination across product lines can be difficult. As one Johnson & Johnson executive said, "We have to keep reminding ourselves that we work for the same corporation"[28]

Companies such as Hewlett-Packard, Xerox, and Digital Equipment have a large number of divisions and have had real problems with horizontal coordination. The software division may produce programs that are incompatible with business computers sold by another division. Customers are frustrated when a sales representative from one division is unaware of developments in other divisions. Task forces and other linkage devices are needed to coordinate across divisions. A lack of technical specialization is also a problem in a divisional structure. Employees identify with the product line rather than with a functional specialty. R&D personnel, for example, tend to do applied research to benefit the product line rather than basic research to benefit the entire organization.

Geographical Structure

Another basis for structural grouping is the organization's users or customers. The most common structure in this category is geography. Each region of the country may have distinct tastes and needs. Each geographic unit includes all functions required to produce and market products in that region. For multinational corporations, self-contained units are created for different countries and parts of the world.

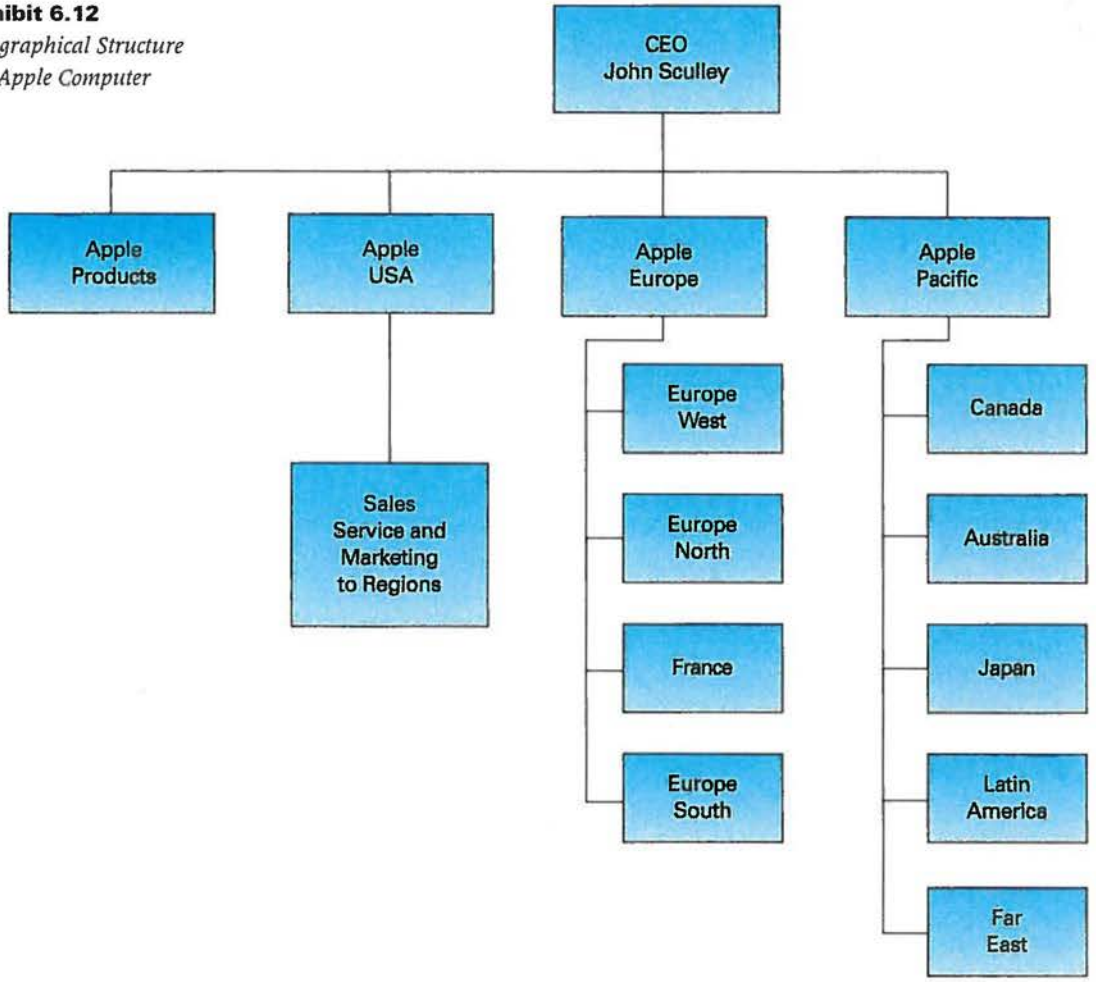
As discussed earlier in the chapter, Apple Computer reorganized from a functional to a geographical structure to facilitate manufacture and delivery of Apple computers to customers around the world. Exhibit 6.12 contains a partial organization structure illustrating the geographical thrust. Apple used this structure to focus managers and employees on specific geographical customers and sales targets. In Canada, department stores frequently use a geographical structure with a separate entity for Quebec because customers there are physically smaller, use a different language, and have different tastes than those in Ontario or the Maritime Provinces. The regional structure allows Apple or a Canadian department store chain to focus on the needs of customers in a geographical area.

The strengths and weaknesses of a geographic divisional structure are similar to the divisional organization characteristics listed in Exhibit 6.11. The organization can adapt to specific needs of its own region, and employees identify with regional goals rather than with national goals. Horizontal coordination within a region is emphasized rather than linkages across regions or to the national office.

Hybrid Structure

As a practical matter, many structures in the real world do not exist in the pure form of functional, divisional, or geographic. An organization's structure may be multifocused in that both product and function, or product and geography, are

Exhibit 6.12
Geographical Structure for Apple Computer



Source: Based on John Markoff, "John Sculley's Biggest Test," *New York Times,* 26 February 1989, sec. 3, pp. 1,26.

emphasized at the same time. One type of structure that combines characteristics of both is called the **hybrid structure**.

Characteristics

When a corporation grows large and has several products or markets, it typically is organized into self-contained units of some type. Functions that are important to each product or market are decentralized to the self-contained units. However, some functions are also centralized and located at headquarters. Headquarters functions are relatively stable and require economies of scale and in-depth specialization. By combining characteristics of the functional and divisional structures, corporations can take advantage of the strengths of each and avoid some of the weaknesses. Xerox Corporation recently reorganized into a hybrid structure, with nine nearly independent product divisions and three geographical sales divisions. CEO Paul Allaire thinks the hybrid structure can provide the coordination and flexibility needed to help Xerox get products to market faster and thrive in a competitive environment.[29]

Sun Petroleum Products restructured from a functional to a hybrid structure by combining three product divisions with several functional departments.

In Practice 6.5

Sun Petroleum Products Company

Sun Petroleum Products Company (SPPC) had sales of approximately $7 billion in the early 1980s and a workforce of 5,400 people. Its refineries produced about 500,000 barrels of products per day. The six refineries manufactured fuels, lubricants, and chemicals that were marketed by Sun's sales force.

SPPC was traditionally organized by function with each functional head reporting directly to the president or to the vice president of operations. Then a study revealed that Sun should be more responsive to changing markets. It recommended a reorganization into three major product lines of fuels, lubricants, and chemicals. Each product line served a different market and required a different strategy and management style.

The new hybrid organization structure adopted by SPPC is illustrated in Exhibit 6.13. Each product line vice president is now in charge of both marketing and manufacturing for that product, so coordination is easy to achieve. Each product line vice president also has planning, supply, and manufacturing departments reporting to him or her. The vice president in charge of refinery facilities is in charge of a functional department because there are major economies of scale by having all refineries work together. The output of these refineries becomes the input to the fuels, lubricants, and chemicals divisions. Other departments centralized as functional departments to achieve economies of scale are human resources, technology, financial services, and resources and strategy. Each of these departments provides services for the entire organization. The new structure is just right for SPPC because of the company's large size, moderate environmental change, interdependence, and goal of adapting to the environment.[30]

Strengths and Weaknesses

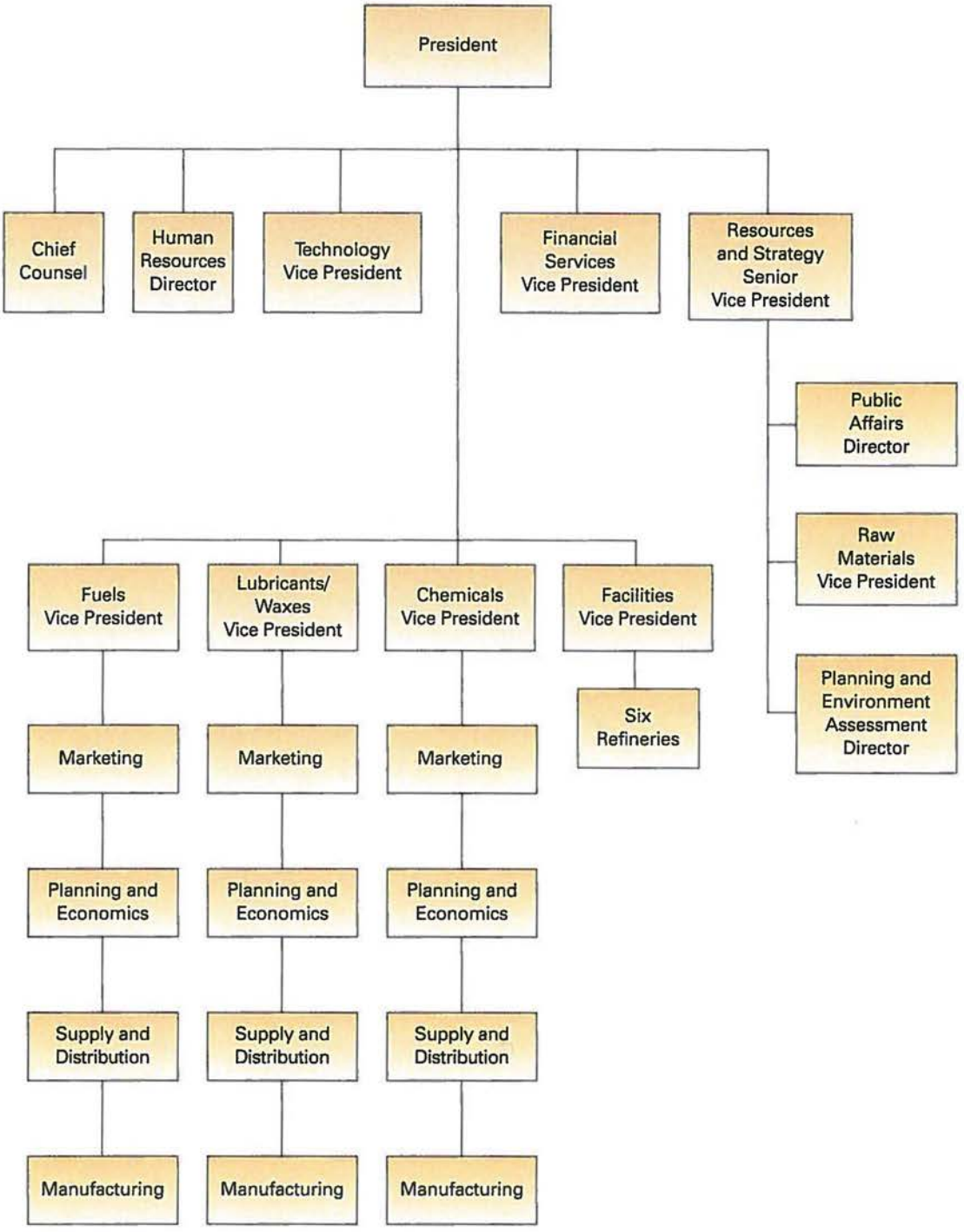
The hybrid structure typically appears in a context similar to that of the divisional structure. Hybrid structures tend to be used in an uncertain environment because product divisions are designed for innovation and external effectiveness. Technologies may be both routine and nonroutine, and interdependencies exist across the functions in product groupings. Size is typically large to provide sufficient resources for duplication of resources across product divisions. The organization has goals of client satisfaction and innovation, as well as goals of efficiency with respect to functional departments.

As summarized in Exhibit 6.14, a major strength of the hybrid structure is that it enables the organization to pursue adaptability and effectiveness within the product divisions simultaneously with efficiency in the functional departments. Thus, the organization can attain the best of both worlds. This structure also provides alignment between product division and corporate goals. The product groupings provide effective coordination within divisions, and the central functional departments provide coordination across divisions.

One weakness of the hybrid structure is administrative overhead. Some organizations experience a buildup of corporate staffs to oversee divisions. Some corporate functions duplicate activities undertaken within product divisions. If uncontrolled, administrative overhead can increase as the headquarters staff grows large. Decisions then become more centralized, and the product divisions

Exhibit 6.13

Sun Petroleum Products Company's Hybrid Organization



Source: Linda S. Ackerman, "Transition Management: An In-depth Look at Managing Complex Change," *Organizational Dynamics* (Summer 1982): 46–66. Reprinted with permission of the publisher, © 1982, American Management Association, New York. All rights reserved.

Exhibit 6.14
Summary of Hybrid Organization Characteristics

Context
Structure: Hybrid Environment: Moderate to high uncertainty, changing customer demands Technology: Routine or nonroutine, with some interdependencies between functions Size: Large Strategy, goals: External effectiveness and adaptation plus efficiency within some functions
Internal Systems
Operative goals: Product line emphasis, some functional emphasis Planning and budgeting: Profit center basis for divisions; cost basis for central functions Formal authority: Product managers; coordination responsibility resting with functional managers
Strengths
1. Allows organization to achieve adaptability and coordination in product divisions and efficiency in centralized functional departments 2. Results in better alignment between corporate and division-level goals 3. Achieves coordination both within and between product lines
Weaknesses
1. Has potential for excessive administrative overhead 2. Leads to conflict between division and corporate departments

lose the ability to respond quickly to market changes. As described in Chapter 5 on size, companies such as Nucor, Hanson Industries, and Burlington Northern have resisted administrative overhead by keeping headquarters staffs at fewer than one hundred people despite having as many as thirty-three thousand employees in product divisions. Managers in these companies minimize headquarters staffs to reduce bureaucracy and encourage division flexibility.[31]

An associated weakness is the conflict between corporate and divisional personnel. Headquarters functions typically do not have line authority over divisional activities. Division managers may resent headquarters intrusions, and headquarters managers may resent the desire of divisions to go their own way. Headquarters executives often do not understand the unique needs of the individual divisions that are trying to satisfy different markets.

The hybrid structure is often preferred to either the pure functional or pure divisional structure. It overcomes many of the weaknesses of these other structures and provides some advantages of both.

Matrix Structure

Another way to achieve focus on multiple outcomes is with the **matrix structure**. The matrix can be used when one sector of the environment requires technological expertise, for example, and another sector requires rapid change within each product line. The matrix structure often is the answer when organizations find

that neither the functional, divisional, geographical, nor hybrid structures combined with horizontal linkage mechanisms will work.

The matrix is a strong form of horizontal linkage. The unique characteristic of the matrix organization is that both product division and functional structures (horizontal and vertical) are implemented simultaneously, as shown in Exhibit 6.15. Rather than divide the organization into separate parts as in the hybrid structure, the product managers and functional managers have equal authority within the organization, and employees report to both of them. The matrix structure is similar to the use of full-time integrators or product managers described earlier in this chapter (Exhibit 6.5), except that in the matrix structure the product managers (horizontal) are given formal authority equal to that of the functional managers (vertical).

Conditions for the Matrix

A dual hierarchy may seem an unusual way to design an organization, but the matrix is the correct structure when the following conditions are met.[32]

- *Condition 1.* Pressure exists to share scarce resources across product lines. The organization is typically medium-sized and has a moderate number of product

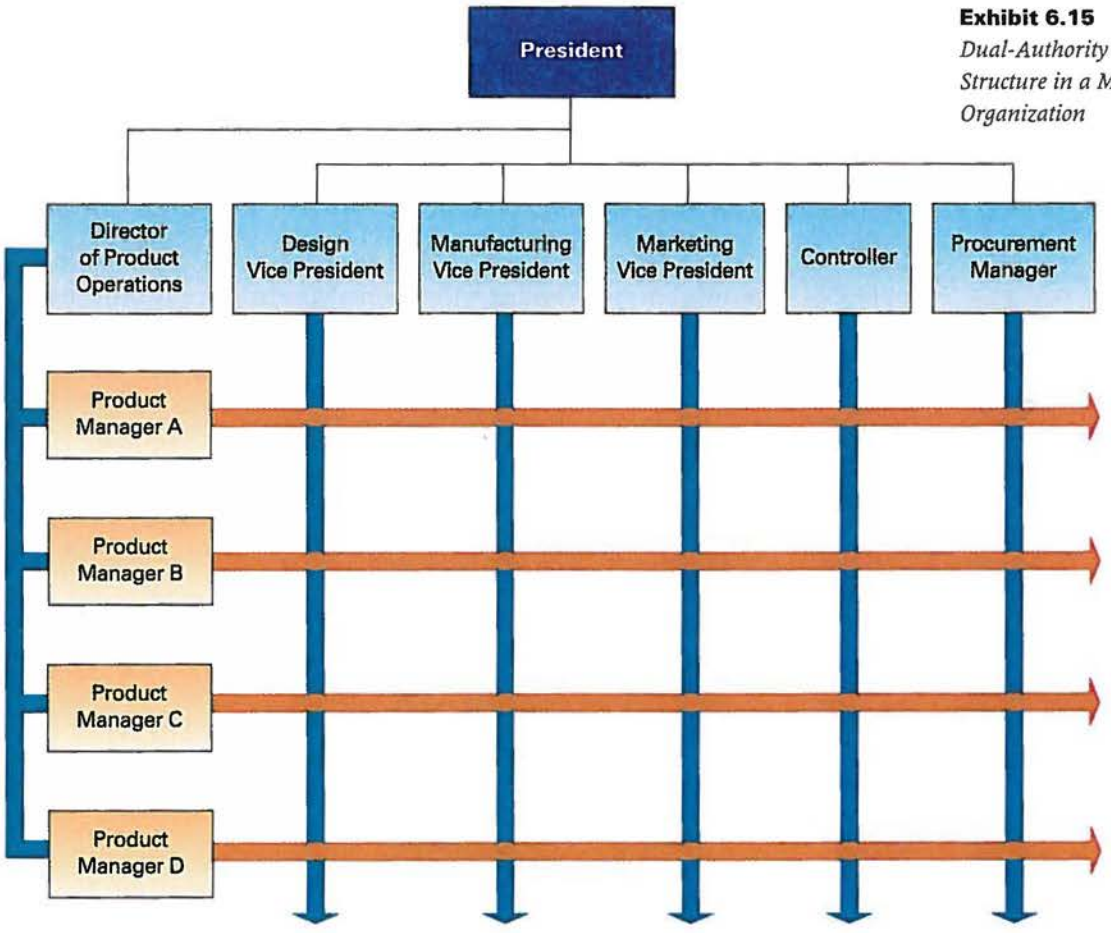


Exhibit 6.15
Dual-Authority Structure in a Matrix Organization

lines. It feels pressure for the shared and flexible use of people and equipment across those products. For example, the organization is not large enough to assign engineers full-time to each product line, so engineers are assigned part-time to several products or projects.

- *Condition 2.* Environmental pressure exists for two or more critical outputs, such as for technical quality (functional structure) and frequent new products (divisional structure). This dual pressure means a balance of power is needed between the functional and product sides of the organization, and a dual-authority structure is needed to maintain that balance.
- *Condition 3.* The environmental domain of the organization is both complex and uncertain. Frequent external changes and high interdependence between departments require a large amount of coordination and information processing in both vertical and horizontal directions.

Under these three conditions, the vertical and horizontal lines of authority must be given equal recognition. A dual-authority structure is thereby created so the balance of power between them is equal.

Referring again to Exhibit 6.15, assume the matrix structure is for a clothing manufacturer. Product A is footwear, product B is outerwear, product C is sleepwear, and so on. Each product line serves a different market and customers. As a medium-size organization, the company must effectively use people from manufacturing, design, and marketing to work on each product line. There are not enough designers to warrant a separate design department for each product line, so the designers are shared across product lines. Moreover, by keeping the manufacturing, design, and marketing functions intact, employees can develop the in-depth expertise to serve all product lines efficiently.

Key Matrix Roles

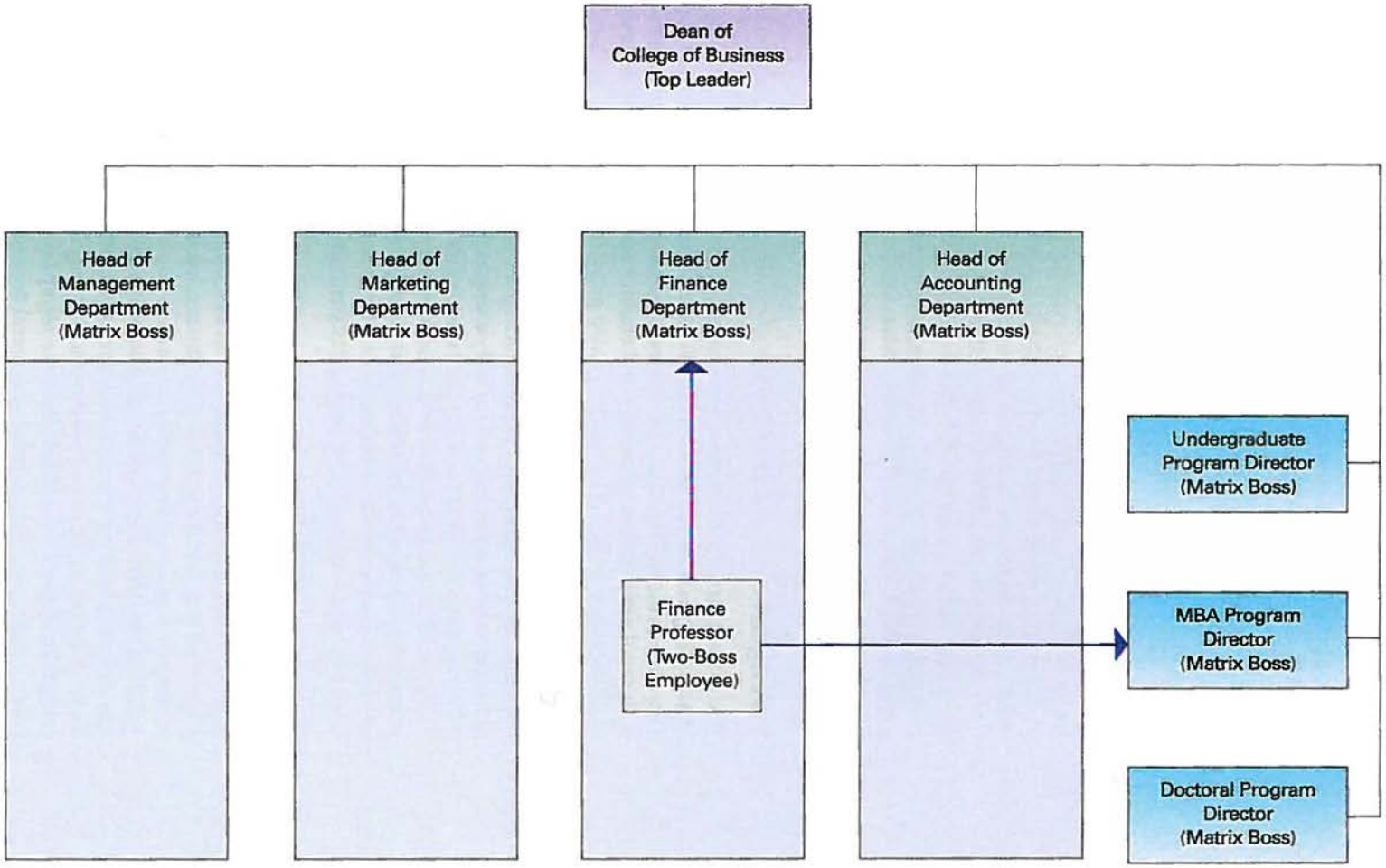
The unique aspect of matrix structure as reflected in Exhibit 6.15 is that some employees have two bosses. Working within a matrix structure is difficult for most managers because it requires a new set of skills compared with those required for a single-authority structure. For the matrix to succeed, managers in key roles have specific responsibilities. The key roles are top leaders, matrix bosses, and two-boss employees. These roles are illustrated in the College of Business matrix in Exhibit 6.16. In this matrix, the functional departments are the academic departments of management, marketing, finance, and accounting, which represent the vertical hierarchy. The horizontal reporting relationships are to the program directors for the undergraduate, MBA, and doctoral programs.

Top Leader. The dean is the **top leader**, who is the head of both command structures. The primary responsibility for this person is to maintain a power balance between the functional managers (department heads) and product managers (program directors). The top leader must also be willing to delegate decisions and encourage direct contact and group problem solving between department heads and program directors, which will encourage information sharing and coordination.

Matrix Boss. The problem for **matrix bosses**—department heads and program directors in Exhibit 6.16—is that they do not have complete control over their subordinates. Matrix bosses must work with each other to delineate activities

Exhibit 6.16

Key Positions in a College of Business Matrix Structure



over which they are responsible. The department head's responsibilities pertain to functional expertise, rules, and teaching standards. The program director is responsible for coordinating the whole program. This person has authority over subordinates for such activities as class scheduling, exams, and preventing overlapping of course content. Matrix bosses must be willing to confront one another on disagreements and conflicts. They must also collaborate on such things as performance reviews, promotions, and salary increases, since professors report to both of them. These activities require a great deal of time, communication, patience, and skill at working with people, which are all part of matrix management.

Two-Boss Employees. The **two-boss employee** often experiences anxiety and stress. Conflicting demands are imposed by the matrix bosses. The finance professor in Exhibit 6.16, for example, must cope with conflicting demands imposed by the finance department head and the MBA program director. The department head's demand to do research is in direct conflict with the MBA program director's demand that time be spent reading and developing teaching materials for use in the MBA program. The two-boss employee must confront both the department head and the MBA program director on these demands and reach a joint decision about how to spend his or her time. Two-boss employees must maintain an effective relationship with both managers, and they should display a dual loyalty toward both their departments and their programs.

Strengths and Weaknesses

The matrix structure is best when environmental uncertainty is high and when goals reflect a dual requirement, such as for both product and functional goals. The dual-authority structure facilitates communication and coordination to cope with rapid environmental change and enables an equal balance between product and functional bosses. The matrix is also good for nonroutine technologies that have interdependencies both within and across functions. The matrix is an organic structure that facilitates discussion and adaptation to unexpected problems. It tends to work best in organizations of moderate size with a few product lines. The matrix is not needed for only a single-product line, and too many product lines make it difficult to coordinate both directions at once.

The matrix structure has been used in organizations for more than thirty years. Although horizontal linkages are increasingly popular, empirical evidence of specific advantages is still relatively sparse. Exhibit 6.17 summarizes the strengths and weaknesses of the matrix structure based on what we know of organizations that use it.[33]

Internal systems reflect the dual organization structure. Two-boss employees are aware of and adopt subgoals for both their functions and their products. Dual planning and budgeting systems should be designed, one for the functional hierarchy and one for the product line hierarchy. Power and influence are shared equally by functional and product heads.

The strength of the matrix is that it enables an organization to meet dual demands from the environment. Resources (people, equipment) can be flexibly allocated across different products, and the organization can adapt to changing external requirements.[34] This structure also provides an opportunity for employees to acquire either functional or general management skills, depending on their interests.

Context
Structure: Matrix Environment: High uncertainty Technology: Nonroutine, many interdependencies Size: Moderate, a few product lines Strategy, goals: Dual—product innovation and technical specialization
Internal Systems
Operative goals: Equal product and functional emphasis Planning and budgeting: Dual systems—by function and by product line Formal authority: Joint between functional and product heads
Strengths
1. Achieves coordination necessary to meet dual demands from environment 2. Flexible sharing of human resources across products 3. Suited to complex decisions and frequent changes in unstable environment 4. Provides opportunity for functional and product skill development 5. Best in medium-sized organizations with multiple products
Weaknesses
1. Causes participants to experience dual authority, which can be frustrating and confusing 2. Means participants need good interpersonal skills and extensive training 3. Is time-consuming; involves frequent meetings and conflict resolution sessions 4. Will not work unless participants understand it and adopt collegial rather than vertical-type relationships. 5. Requires dual pressure from environment to maintain power balance

Exhibit 6.17
Summary of Matrix Organization Characteristics

Source: Adapted from Robert Duncan, "What Is the Right Organization Structure? Decision Tree Analysis Provides the Answer," *Organizational Dynamics* (Winter 1979): 429.

One disadvantage of the matrix is that some employees experience dual authority, which is frustrating and confusing. They need excellent interpersonal and conflict-resolution skills, which may require special training in human relations. The matrix also forces managers to spend a great deal of time in meetings.[35] If managers do not adapt to the information and power sharing required by the matrix, the system will not work. Managers must collaborate with one another rather than rely on vertical authority in decision making. The successful implementation of one matrix structure occurred at a steel company in Pittsburgh.

Pittsburgh Steel Company

In Practice 6.6

As far back as anyone can remember, the steel industry in the United States was stable and certain. If steel manufacturers could produce quality steel at a reasonable price, that steel would be sold. No more. Inflation, a national economic downturn, reduced consumption of autos, and competition from steelmakers in Germany and Japan forever changed the steel industry. Today, steelmakers have shifted to specialized steel products. They must market aggressively, make efficient use of internal resources, and adapt to rapid-fire changes.

Pittsburgh Steel employs 2,500 people, makes 300,000 tons of steel a year, and is 170 years old. For 160 of those years, functional structure worked fine. As the environment became more turbulent and competitive, however, Pittsburgh Steel managers realized

they were not keeping up. Fifty percent of Pittsburgh's orders were behind schedule. Profits were eroded by labor, material, and energy cost increases. Market share declined.

In consultation with outside experts, the president of Pittsburgh Steel saw that the company had to walk a tightrope. Pittsburgh Steel had to specialize in a few high-value-added products tailored for separate markets, while maintaining economies of scale and sophisticated technology within functional departments. The dual pressure led to an unusual solution for a steel company: a matrix structure.

Pittsburgh Steel had four product lines: open-die forgings, ring-mill products, wheels and axles, and steelmaking. A business manager was given responsibility and authority of each line, which included preparing a business plan for each product line and developing targets for production costs, product inventory, shipping dates, and gross profit. They were given authority to meet those targets and to make their lines profitable. Functional vice presidents were responsible for technical decisions relating to their function. Functional managers were expected to stay abreast of the latest techniques in their areas and to keep personnel trained in new technologies that could apply to product lines. With twenty thousand recipes for specialty steels and several hundred new recipes ordered each month, functional personnel had to stay current. Two functional departments—field sales and industrial relations—were not included in the matrix because they worked independently. The final design was a hybrid matrix structure with both matrix and functional relationships, as illustrated in Exhibit 6.18.

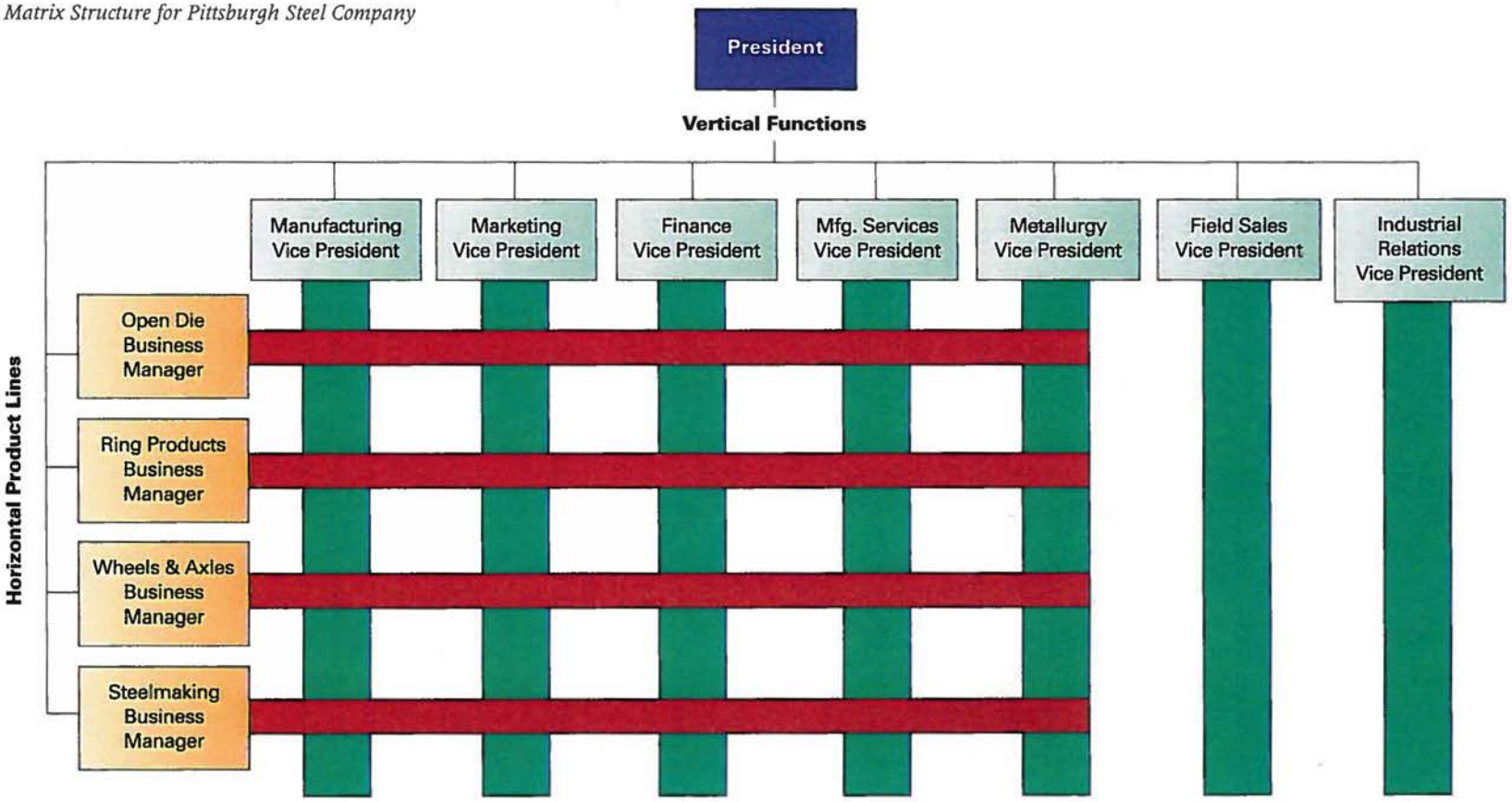
Implementation of the matrix was slow. Middle managers were confused. Meetings to coordinate across functional departments seemed to be held every day. After about a year of training by external consultants, Pittsburgh Steel is on track. Ninety percent of the orders are now delivered on time. Market share has recovered. Both productivity and profitability are increasing steadily. The managers thrive on matrix involvement. Meetings to coordinate product and functional decisions have provided a growth experience. Middle managers now want to include younger managers in the matrix discussions as training for future management responsibility.[36]

Pittsburgh Steel Company illustrates the correct use of a matrix structure. The dual pressure to maintain economies of scale and to market four product lines gave equal emphasis to the functional and product hierarchies. Through continuous meetings for coordination, Pittsburgh Steel achieved both economies of scale and flexibility.

All kinds of organizations have experimented with the matrix, including consulting firms, hospitals, banks, insurance companies, government, and many types of industrial firms.[37] This structure has been used successfully by companies such as IBM, Unilever, and Ford Motor Company, which have fine-tuned the matrix to suit their particular goals and cultures. The matrix can be highly effective in a complex, rapidly changing environment where the organization needs to be flexible and adaptable.[38] However, the matrix is not a cure-all for structural problems. Many organizations have found the matrix described here, sometimes called a balanced matrix, difficult to install and maintain because one side of the authority structure often dominates. Recognizing this tendency, two variations of matrix structure have evolved—the **functional matrix** and the **project matrix**. In a functional matrix, the functional bosses have primary authority, and project or product managers simply coordinate product activities. In a project matrix, by contrast, the project or product manager has primary responsibility, and functional managers simply assign technical personnel to projects and provide advisory expertise as needed. For many organizations, one of these approaches works better than the balanced matrix and dual lines of authority.[39]

Exhibit 6.18

Matrix Structure for Pittsburgh Steel Company



Symptoms of Structural Deficiency

Each form of structure—functional, divisional, hybrid, matrix—represents a tool that can help managers make an organization more effective depending on the demands of its situation. Senior managers periodically evaluate organization structure to determine whether it is appropriate to changing organization needs. Many organizations try one organization structure, then reorganize to another structure in an effort to find the right fit between internal reporting relationships and the needs of the external environment. Compaq Computer Corporation, for example, switched from a functional structure to a divisional structure for about a year to develop new products and then switched back to a functional structure to reduce competition among its product lines.[40]

As a general rule, when organization structure is out of alignment with organization needs, one or more of the following **symptoms of structural deficiency** appear.[41]

- *Decision making is delayed or lacking in quality.* Decision makers may be overloaded because the hierarchy funnels too many problems and decisions to them. Delegation to lower levels may be insufficient. Another cause of poor quality decisions is that information may not reach the correct people. Information linkages in either the vertical or horizontal direction may be inadequate to ensure decision quality.
- *The organization does not respond innovatively to a changing environment.* One reason for lack of innovation is that departments are not coordinated horizontally. The identification of customer needs by the marketing department and the identification of technological developments in the research department must be coordinated. Organization structure also has to specify departmental responsibilities that include environmental scanning and innovation.
- *Too much conflict is evident.* Organization structure should allow conflicting departmental goals to combine into a single set of goals for the entire organization. When departments act at cross purposes or are under pressure to achieve departmental goals at the expense of organizational goals, the structure is often at fault. Horizontal linkage mechanisms are not adequate.

Summary and Interpretation

Organization structure must accomplish two things for the organization. It must provide a framework of responsibilities, reporting relationships, and groupings, and it must provide mechanisms for linking and coordinating organizational elements into a coherent whole. The structure is reflected on the organization chart. Linking the organization into a coherent whole requires the use of information systems and linkage devices in addition to the organization chart.

It is important to understand the information-processing perspective on structure. Organization structure can be designed to provide vertical and horizontal information linkages based upon the information processing required because of an uncertain environment, technology, size, or strategy and goals. Early organization theorists stressed vertical design and relied on vertical linkages, such as the hierarchy, planning, and new positions, to provide coordination. Vertical linkages are not sufficient for most organizations in today's complex and rapidly changing world.

The trend is toward flatter, more horizontal structures. Many organizations are breaking down the vertical hierarchy in favor of cross-functional teams. Other ways organizations provide horizontal linkages are through temporary task forces; regular, direct contact between managers across department lines; and through full-time integrators, such as product managers.

Alternatives for grouping employees and departments into overall structural design include functional grouping, divisional grouping, geographic grouping, and multifocused (hybrid, matrix) grouping. The best organization design achieves the correct balance between vertical and horizontal coordination. The choice among functional, divisional, and hybrid structures determines vertical priority and, hence, where coordination and integration will be greatest. Horizontal linkage mechanisms complement the vertical dimension to achieve the integration of departments and levels into an organizational whole. The matrix organization implements an equal balance between the vertical and horizontal dimensions of structure.

Finally, an organization chart is only so many lines and boxes on a piece of paper. A new organization structure will not necessarily solve an organization's problems. The organization chart simply reflects what people should do and what their responsibilities are. The purpose of the organization chart is to encourage and direct employees into activities and communications that enable the organization to achieve its goals. The organization chart provides the structure, but employees provide the behavior. The chart is a guideline to encourage people to work together, but management must implement the structure and carry it out.

Key Concepts

departmental grouping
divisional grouping
divisional structure
functional grouping
functional matrix
functional structure
geographic grouping
horizontal linkage
hybrid structure
integrator
liaison role
matrix bosses
matrix structure
multifocused grouping
project matrix
structure
symptoms of structural deficiency
task force
teams
top leader
two-boss employee
vertical information system
vertical linkages

Briefcase

As an organization manager, keep these guides in mind:

1. Develop organization charts that describe task responsibilities, vertical reporting relationships, and the grouping of individuals into departments. Provide sufficient documentation so that all people within the organization know to whom they report and how they fit into the total organization picture.
2. Provide vertical and horizontal information linkages to integrate diverse departments into a coherent whole. Achieve vertical linkage through hierarchy referral, rules and plans, new positions, and vertical information systems. Achieve horizontal linkage through cross-functional information systems, direct contact, task forces, full-time integrators, and teams.
3. Choose between functional or divisional structures when designing overall organization structure. Use a functional structure in a small or medium-sized organization that has a stable environment. Use a divisional structure in a large organization that has multiple product lines and when you wish to give priority to product goals and to coordination across functions.
4. Implement hybrid structures, when needed, in large corporations by dividing the organization into self-contained product divisions and assigning to the product division each function needed for the product line. If a function serves the entire organization rather than a specific product line, structure that function as a central functional department. Use a hybrid structure to gain the advantages of both functional and divisional design while eliminating some of the disadvantages.
5. Consider a matrix structure in certain organization settings if neither the divisional nor the functional structure meets coordination needs. For best results with a matrix structure, use it in a medium-sized organization with a small number of products that has a changing environment and needs to give equal priority to both products and functions because of dual pressures from the environment. Do not use the matrix structure unless there is truly a need for a dual hierarchy and employees are well trained in its purpose and operation.
6. Consider a structural reorganization whenever the symptoms of structural deficiency are observed. Use organization structure to solve the problems of poor quality decision making, slow response to the external environment, and too much conflict between departments.

Discussion Questions

1. What is the definition of *organization structure*? Does organization structure appear on the organization chart? Explain.
2. How do rules and plans help an organization achieve vertical integration?
3. When is a functional structure preferable to a divisional structure?
4. Large corporations tend to use hybrid structures. Why?
5. How does organizational context influence the choice of structure? Are some contextual variables more important than others? Discuss.

6. What is the difference between a task force and a team? Between liaison role and integrating role? Which of these provides the greatest amount of horizontal coordination?
7. What conditions usually have to be present before an organization should adopt a matrix structure?
8. The manager of a consumer products firm said, "We use the brand manager position to train future executives." Do you think the brand manager position is a good training ground? Discuss.
9. In a matrix organization, how do the role requirements of the top leader differ from the role requirements of the matrix bosses?
10. In your opinion, what is the value of an information-processing perspective on structure?

Chapter Six Workbook *You and Organization Structure**

To better understand the importance of organization structure in your life, do the following assignment.

Select one of the following situations to organize:

1. The registration process at your university or college
2. A new fast-food franchise
3. A sports rental in an ocean resort area, such as jet skis
4. A bakery

Background

Organization is a way of gaining some power against an unreliable environment. The environment provides the organization with inputs, which include raw materials, human resources, and financial resources. There is a service or product to produce that involves technology. The output goes to clients, a group that must be nurtured. The complexities of the environment and the technology determine the complexity of the organization.

Planning Your Organization

1. Write down the mission or purpose of the organization in a few sentences.
2. What are the specific things to be done to accomplish the mission?
3. Based on the specifics in No. 2, develop an organizational chart. Each position in the chart will perform a specific task or is responsible for a certain outcome.
4. Add duties to each job position in the chart. These will be the job descriptions.
5. How can you make sure people in each position will work together?
6. What level of skill and abilities is required at each position and level in order to hire the right persons?
7. Make a list of the decisions that would have to be made as you developed your organization.
8. Who is responsible for customer satisfaction? How will you know if customers' needs are met?
9. How will information flow within the organization?

*Adapted by Dorothy Marcic from "Organizing," in Donald D. White and H. William Vroman, *Action in Organizations*, 2nd ed. (Boston: Allyn and Bacon, 1982) 154.

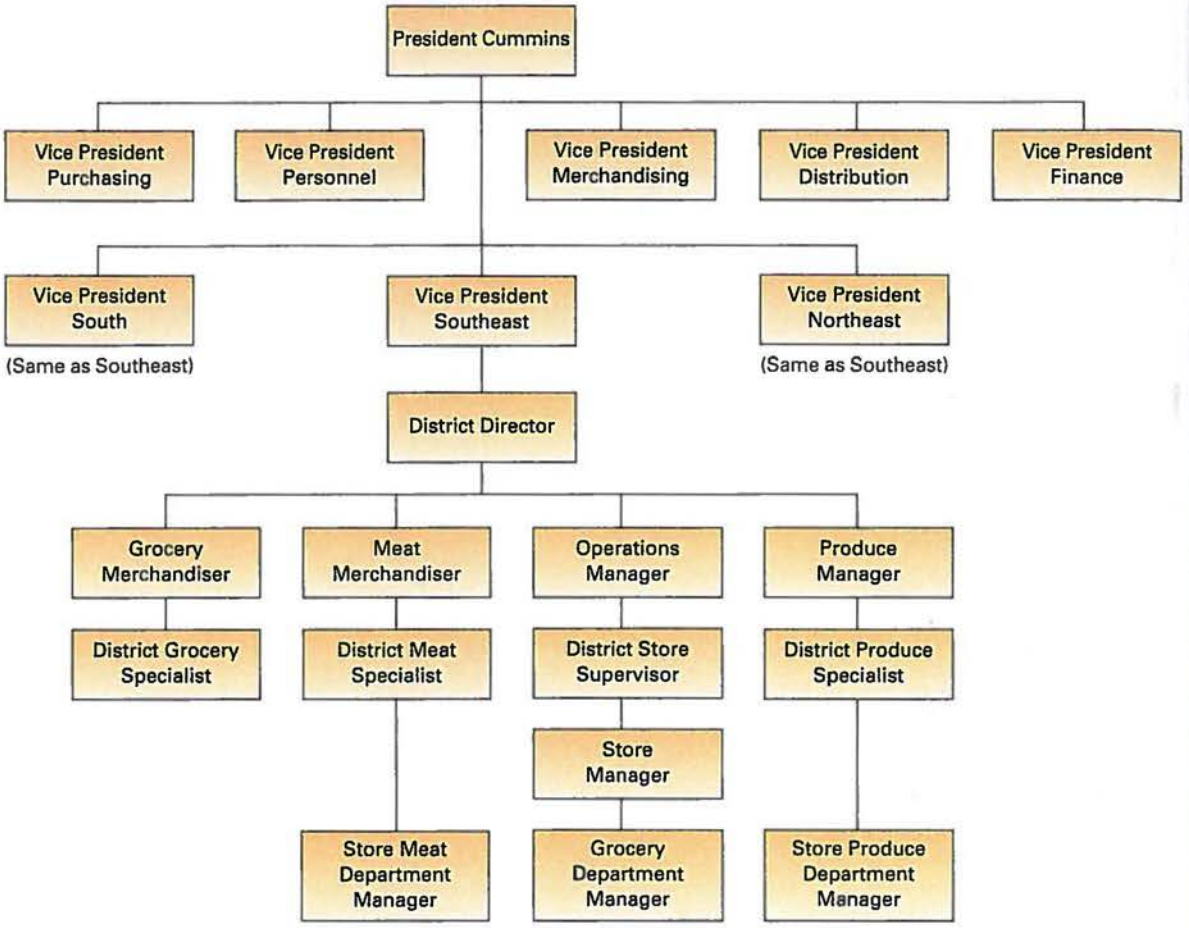
Case for Analysis *C & C Grocery Stores, Inc.**

The first C & C grocery store was started in 1947 by Doug Cummins and his brother Bob. Both were veterans who wanted to run their own business, so they used their savings to start the small grocery store in Charlotte, North Carolina. The store was immediately successful. The location was good, and Doug Cummins had a winning personality. Store employees adopted Doug's informal style and "serve the customer" attitude.

*Prepared by Richard L. Daft, from Richard L. Daft and Richard Steers, *Organizations: a Micro/Macro Approach* (Glenview, Ill.: Scott, Foresman, 1986). Reprinted with permission.

Exhibit 6.19

Organization Structure for C & C Grocery Stores, Inc.



C & C's increasing circle of customers enjoyed an abundance of good meats and produce.

By 1984, C & C had over 200 stores. A standard physical layout was used for new stores. Company headquarters moved from Charlotte to Atlanta in 1975. The organization chart for C & C is shown in Exhibit 6.19. The central offices in Atlanta handled personnel, merchandising, financial, purchasing, real estate, and legal affairs for the entire chain. For management of individual stores, the organization was divided by regions. The southern, southeastern, and northeastern regions each had about seventy stores. Each region was divided into five districts of ten to fifteen stores each. A district director was responsible for supervision and coordination of activities for the ten to fifteen district stores.

Each district was divided into four lines of authority based upon functional specialty. Three of these lines reached into the stores. The produce department manager within each store reported directly to the produce specialist for the division, and the same was true for the meat department manager, who reported directly to the district meat specialist. The meat and produce managers were responsible for all activities associated with the acquisition and sale of perishable products. The store manager's responsibility included the grocery line, front-end departments, and store operations. The store manager was responsible for appearance of personnel, cleanliness, adequate check-out service, and price accuracy. A grocery manager reported to the store manger and maintained inventories and restocked shelves for grocery

items. The district merchandising office was responsible for promotional campaigns, advertising circulars, district advertising, and for attracting customers into the stores. The grocery merchandisers were expected to coordinate their activities with each store in the district.

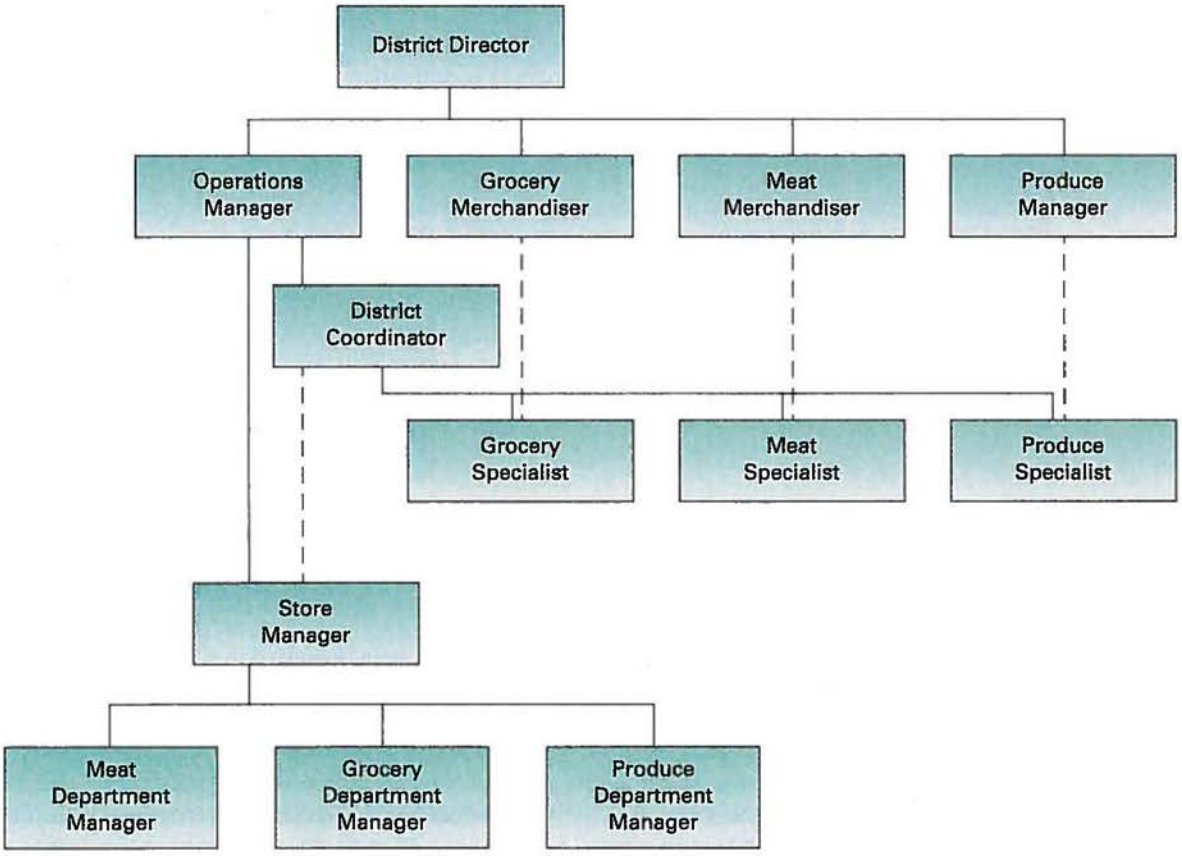
During the recession in 1980–81, business for the C & C chain dropped off in all regions and did not increase with the improved economic times in 1983–84. This caused concern among senior executives. They also were aware that other supermarket chains were adopting a trend toward one-stop shopping, which meant the emergence of super stores that included a pharmacy, dry goods, and groceries—almost like a department store. Executives wondered whether C & C should move in this direction and how such changes could be assimilated into the current store organization. However, the most pressing problem was how to improve business with the grocery stores they now had. A consulting team from a major university was hired to investigate store structure and operations.

The consultants visited several stores in each region, talking to about fifty managers and employees. The consultants wrote a report that pinpointed four problem areas to be addressed by store executives.

1. The chain is slow to adapt to change. Store layout and structure were the same as had been designed fifteen years ago. Each store did things the same way, even though some stores were in low-income areas and other stores in suburban areas. A new grocery management system for ordering and stocking had been developed, but after two years was only partially implemented in the stores.
2. Roles of the district store supervisor and the store manager were causing dissatisfaction. The store managers wanted to learn general management

Exhibit 6.20

Proposed Reorganization of C & C Grocery Stores, Inc.



skills for potential promotion into district or regional management positions. However, their jobs restricted them to operational activities and they learned little about merchandising, meat, and produce. Moreover, district store supervisors used store visits to inspect for cleanliness and adherence to operating standards rather than to train the store manager and help coordinate operations with perishable departments. Close supervision on the operational details had become the focus of operations management rather than development, training, and coordination.

3. Cooperation within stores was low and morale was poor. The informal, friendly atmosphere originally created by Doug Cummins was gone. One example of this problem occurred when the grocery merchandiser and store manager in a Louisiana store decided to promote Coke and Diet Coke as a loss leader. Thousands of cartons of Coke were brought in for the sale, but the stockroom was not prepared and did not have room. The store manager wanted to use floor area in the meat and produce sections to display Coke cartons, but those managers refused. The produce department manager said that Diet Coke did not help his sales and it was okay with him if there was no promotion at all.
4. Long-term growth and development of the store chain would probably require reevaluation of long-term strategy. The percent of market share going to traditional grocery stores was declining nationwide due to competition from large super stores and convenience stores. In the future, C & C might need to introduce non-food items into the stores for one-stop shopping, and add specialty sections within stores. Some stores could be limited to grocery items, but store location and marketing techniques should take advantage of the grocery emphasis.

To solve the first three problems, the consultants recommended reorganizing the district and the store structure as illustrated in Exhibit 6.20. Under this reorganization, the meat, grocery, and produce department managers would all report to the store manager. The store manager would have complete store control and would be responsible for coordination of all store activities. The district supervisor's role would be changed from supervision to training and development. The district supervisor would head a team that included himself and several meat, produce, and merchandise specialists who would visit area stores as a team to provide advice and help for the store managers and other employees. The team would act in a liaison capacity between district specialists and the stores.

The consultants were enthusiastic about the proposed structure. By removing one level of district operational supervision, store managers would have more freedom and responsibility. The district liaison team would establish a cooperative team approach to management that could be adopted within stores. The focus of store responsibility on a single manager would encourage coordination within stores, adaptation to local conditions, and provide a focus of responsibility for store-wide administrative changes.

The consultants also believed that the proposed structure could be expanded to accommodate nongrocery lines if enlarged stores were to be developed in the future. Within each store, a new department manager could be added for pharmacy, dry goods, or other major departments. The district team could be expanded to include specialists in these departments who would act as liaison for stores in the district.

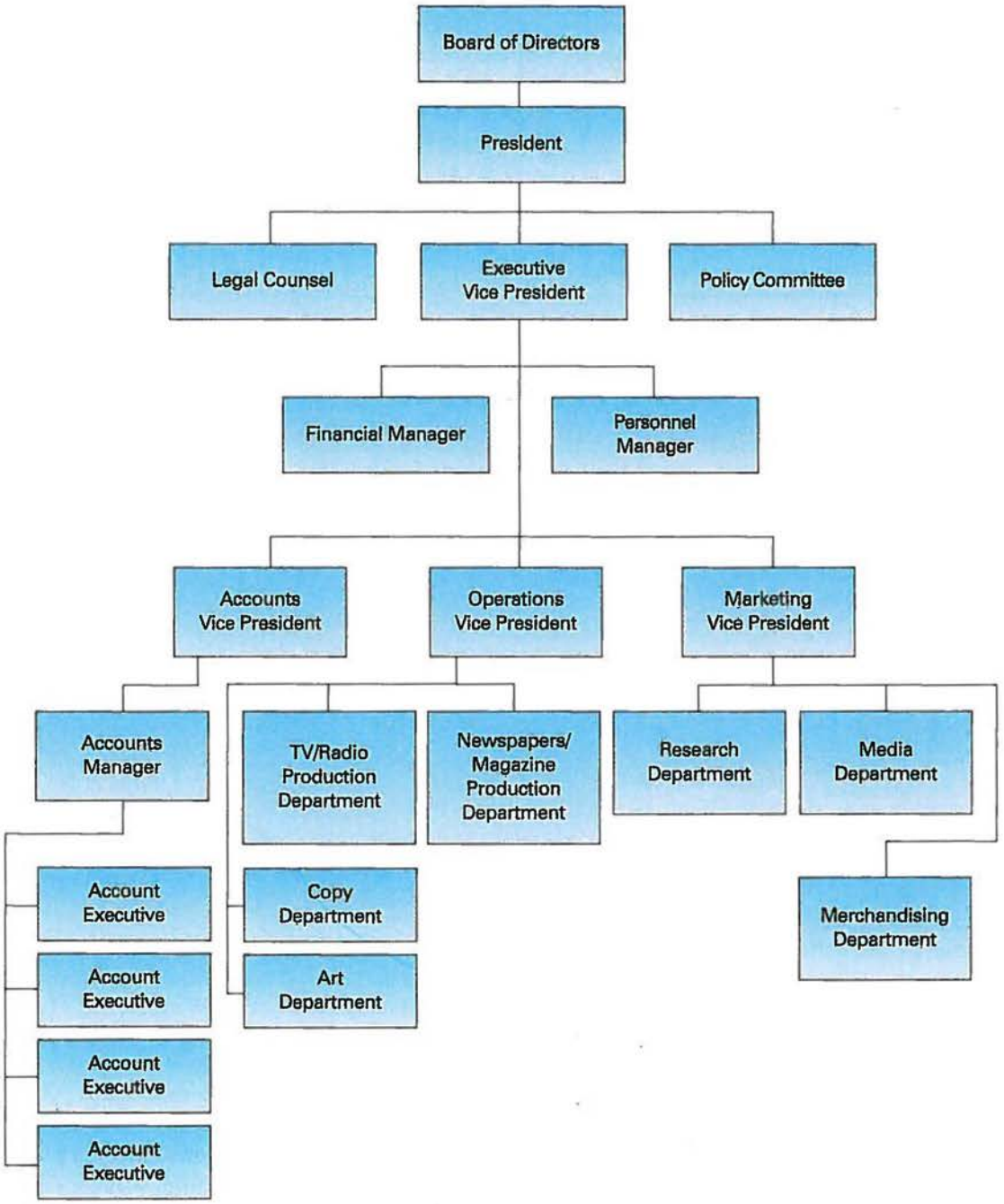
Case for Analysis *Aquarius Advertising Agency**

The Aquarius Advertising Agency is a middle-sized firm that offered two basic services to its clients: (1) customized plans for the content of an advertising campaign (for example, slogans, layouts) and (2) complete plans for media (such as radio, TV, newspapers, billboards, and magazines). Additional services included aid in marketing and distribution of products and marketing research to test advertising effectiveness.

Its activities were organized in a traditional manner. The formal organization is shown in Exhibit 6.21. Each department included similar functions.

*Adapted from John F. Veiga and John N. Yanouzas, "Aquarius Advertising Agency," *The Dynamics of Organization Theory* (St. Paul, Minn.: West, 1984), 212–17, with permission.

Exhibit 6.21
Aquarius Advertising Agency Organization Chart



Each client account was coordinated by an account executive who acted as a liaison between the client and the various specialists on the professional staff of the operations and marketing divisions. The number of direct communications and contacts between clients and Aquarius specialists, clients and account executives, and Aquarius specialists and account executives is indicated in Exhibit 6.22. These sociometric data were gathered by a consultant who conducted a study of the patterns of formal and informal communication.

Exhibit 6.22

Sociometric Index of Contacts of Aquarius Personnel and Clients

	Clients	Account Manager	Account Executives	TV/Radio Specialists	Newspaper/Magazine Specialists	Copy Specialists	Art Specialists	Merchandising Specialists	Media Specialists	Research Specialists
Clients	X	F	F	N	N	O	O	O	O	O
Account Manager		X	F	N	N	N	N	N	N	N
Account Executives			X	F	F	F	F	F	F	F
TV/Radio Specialists				X	N	O	O	N	N	O
Newspaper/Magazine Specialists					X	O	O	N	O	O
Copy Specialists						X	N	O	O	O
Art Specialists							X	O	O	O
Merchandising Specialists								X	F	F
Media Specialists									X	F
Research Specialists										X

F = Frequent – daily
O = Occasional – once or twice per project
N = None

Each intersecting cell of Aquarius personnel and the clients contains an index of the direct contacts between them.

Although an account executive was designated to be the liaison between the client and specialists within the agency, communications frequently occurred directly between clients and specialists and bypassed the account executive. These direct contacts involved a wide range of interactions, such as meetings, telephone calls, letters, and so on. A large number of direct communications occurred between agency specialists and their counterparts in the client organization. For example, an art specialist working as one member of a team on a particular client account would often be contacted di-

rectly by the client's in-house art specialist, and agency research personnel had direct communication with research people of the client firm. Also, some of the unstructured contacts often led to more formal meetings with clients in which agency personnel made presentations, interpreted and defended agency policy, and committed the agency to certain courses of action.

Both hierarchical and professional systems operated within the departments of the operations and marketing divisions. Each department was organized hierarchically with a director, an assistant director, and several levels of authority. Professional communications were widespread and mainly concerned with sharing knowledge and techniques, technical evaluation of work, and development of professional interests. Control in each department was exercised mainly through control of promotions and supervision of work done by subordinates. Many account executives, however, felt the need for more influence, and one commented:

> *Creativity and art. That's all I hear around here. It is hard as hell to effectively manage six or seven hotshots who claim they have to do their own thing. Each of them tries to sell his or her idea to the client, and most of the time I don't know what has happened until a week later. If I were a despot, I would make all of them check with me first to get approval. Things would sure change around here.*

The need for reorganization was made more acute by changes in the environment. Within a short period of time, there was a rapid turnover in the major accounts handled by the agency. It was typical for advertising agencies to gain or lose clients quickly, often with no advance warning as consumer behavior and life-style changes emerged and product innovations occurred.

An agency reorganization was one solution proposed by top management to increase flexibility in this unpredictable environment. The reorganization was aimed at reducing the agency's response time to environmental changes and at increasing cooperation and communication among specialists from different departments. The top managers are not sure what type of reorganization is appropriate. They would like your help analyzing their context and current structure and welcome your advice on proposing a new structure.

Notes

1. Thomas A. Stewart, "How To Lead a Revolution," *Fortune,* 28 November 1994, 48–61.
2. John Child, *Organization* (New York: Harper & Row, 1984).
3. Stuart Ranson, Bob Hinings, and Royston Greenwood, "The Structuring of Organizational Structures," *Administrative Science Quarterly* 25 (1980): 1–17; Hugh Willmott, "The Structuring of Organizational Structure: A Note," *Administrative Science Quarterly* 26 (1981): 470–74.
4. This discussion is based on Jay R. Galbraith, *Competing with Flexible Lateral Organizations*, 2nd ed. (Reading, Mass.: Addison-Wesley, 1994), ch. 2; Terry L. Amburgey and Tina Dacin, "As The Left Foot Follows The Right? The Dynamics of Strategic and Structural Change," *Academy of Management Journal* 37, no. 6 (1994): 427–52; Raymond E. Miles and W. E. Douglas Creed, "Organizational Forms and Managerial Philosophies: A Descriptive and Analytical Review," *Research in Organizational Behavior* 17 (1995): 333–72.
5. Galbraith, *Competing with Flexible Lateral Organizations.*
6. David Nadler and Michael Tushman, *Strategic Organization Design* (Glenview, Ill.: Scott Foresman, 1988).
7. *Ibid.*
8. Based on Jay R. Galbraith, *Designing Complex Organizations* (Reading, Mass.: Addison-Wesley, 1973) and *Organization Design* (Reading, Mass.: Addison-Wesley, 1977), 81–127.
9. Lee Iacocca with William Novak, *Iacocca: An Autobiography* (New York: Phantom Books, 1984), 152–53.
10. Alex Taylor III, "Will Success Spoil Chrysler?" *Fortune*, 10 January 1994, 88–92.
11. Based on Galbraith, *Designing Complex Organizations.*

12. Bob Lindgren, "Going Horizontal," *Enterprise,* April 1994, 20–25.
13. Barbara Ettorre, "Simplicity Cuts a New Pattern," *Management Review* (December 1993): 25–29.
14. Walter Kiechel III, "The Art of the Corporate Task Force," *Fortune*, 28 January 1991, 104–5; William J. Altier, "Task Forces: An Effective Management Tool," *Management Review* (February 1987): 52–57.
15. Keith Naughton and Kathleen Kerwin, "At GM, Two Heads May Be Worse Than One," *Business Week*, 14 August 1995, 46.
16. Paul R. Lawrence and Jay W. Lorsch, "New Managerial Job: The Integrator," *Harvard Business Review* (November-December 1967): 142–51.
17. Ann M. Morrison, "The General Mills Brand of Managers," *Fortune,* 12 January 1982, 99–107.
18. *Ibid.;* Daniel Rosenheim, "The Metamorphosis of General Mills," *Houston Chronicle,* 1 April 1982, sec. 3, p. 4.
19. Jay R. Galbraith, *Competing with Flexible Lateral Organizations,* 2nd ed. (Reading, Mass.: Addison-Wesley, 1994), 17–18; Laurie P. O'Leary, "Curing the Monday Blues: A U.S. Navy Guide for Structuring Cross-Functional Teams," *National Productivity Review* (Spring 1996): 43–51.
20. Galbraith, *Competing with Flexible Lateral Organizations,* 132–46.
21. Henry Mintzberg, *The Structuring of Organizations* (Englewood Cliffs, N.J.: Prentice-Hall, 1979).
22. Based on Robert Duncan, "What Is the Right Organization Structure?" *Organizational Dynamics* (Winter 1979): 59–80; W. Alan Randolph and Gregory G. Dess, "The Congruence Perspective of Organization Design: A Conceptual Model and Multivariate Research Approach," *Academy of Management Review* 9 (1984): 114–27.
23. Toni Mack, "The Ice Cream Man Cometh," *Forbes,* 22 January 1990, 52–56; David Abdalla, J. Doehring, and Ann Windhager, "Blue Bell Creameries, Inc.: Case and Analysis" (Unpublished manuscript, Texas A&M University, 1981); Jorjanna Price, "Creamery Churns Its Ice Cream into Cool Millions," *Parade,* 21 February 1982, 18–22.
24. Rahul Jacob, "The Struggle to Create an Organization for the 21st Century," *Fortune,* 3 April 1995, 90–99.
25. Based on Duncan, "What Is the Right Organization Structure?"
26. Joseph Weber, "A Big Company That Works," *Business Week,* 4 May 1992, 124–132; and Elyse Tanouye, "Johnson & Johnson Stays Fit by Shuffling Its Mix of Businesses," *Wall Street Journal,* 22 December 1992, A1, A4.
27. Mark Landler, "Shake-Up at Warner Music Group Results in Ouster of Its Chairman," *New York Times,* 4 May 1995, C1, C7.
28. Weber, "A Big Company That Works."
29. Lisa Driscoll, "The New, New Thinking at Xerox," *Business Week,* 22 June 1992, 120–21.
30. Adapted from Linda S. Ackerman, "Transition Management: An In-depth Look at Managing Complex Change," *Organizational Dynamics* (Summer 1982): 46–66.
31. Terrence P. Pare, "How to Cut the Cost of Headquarters," *Fortune,* 11 September 1989, 189–96; Thomas Moore, "Goodbye, Corporate Staff," *Fortune,* 21 December 1987, 65–76.
32. Stanley M. Davis and Paul R. Lawrence, *Matrix* (Reading, Mass.: Addison-Wesley, 1977), 11–24.
33. Robert C. Ford and W. Alan Randolph, "Cross-Functional Structures: A Review and Integration of Matrix Organizations and Project Management," *Journal of Management* 18 (June 1992): 267–94; Duncan, "What Is the Right Organization Structure?"
34. Lawton R. Burns, "Matrix Management in Hospitals: Testing Theories of Matrix Structure and Development," *Administrative Science Quarterly* 34 (1989): 349–68.
35. Christopher A. Bartlett and Sumantra Ghoshal, "Matrix Management: Not a Structure, a Frame of Mind," *Harvard Business Review* (July-August 1990): 138–45.
36. This case was inspired by John E. Fogerty, "Integrative Management at Standard Steel" (Unpublished manuscript, Latrobe, Pennsylvania, 1980); Bill Saporito, "Allegheny Ludlum has Steel Figured Out," *Fortune*, 25 June 1984, 40–44; "The Worldwide Steel Industry: Reshaping to Survive," *Business Week,* 20 August 1984, 150–54; Stephen Baker, "The Brutal Brawl Ahead in Steel," *Business Week,* 13 March 1995, 88–90, and "Why Steel Is Looking Sexy," *Business Week,* 4 April 1994, 106–8.
37. Davis and Lawrence, *Matrix,* 155–80.
38. Robert C. Ford and W. Alan Randolph, "Cross-Functional Structures: A Review and Integration of Matrix Organization and Project Manage-

ment," *Journal of Management* 18, no. 2 (1992): 267–94; Paula Dwyer with Pete Engardio, Zachary Schiller, and Stanley Reed, "Tearing Up Today's Organization Chart," *Business Week/21st Century Capitalism,* 18 November 1994, 80–90.

39. Erik W. Larson and David H. Gobeli, "Matrix Management: Contradictions and Insight," *California Management Review* 29 (Summer 1987): 126–38.
40. Jo Ellen Davis, "Who's Afraid of IBM?" *Business Week,* 29 June 1987, 68–74.
41. Based on Child, *Organization*, ch. 1.