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SIMPLE MATRIX STRUCTURES

In this first chapter, we focus on the two-dimensional matrix structure. This two-dimensional model was the first to appear and is still a frequently occurring structure. In its first appearance, the two-dimensional model was not even called a matrix. It was referred to as the line-and-staff model. But as the model was used in aerospace in the 1960s and in R&D labs in the 1970s, the term *matrix* was applied. The term has been used for all two-dimensional models ever since. We begin our discussion with a number of different applications.

Two-Dimensional Structures

The two-dimensional structure arises frequently in all organizations. We have already seen one example of an R&D lab in Figure I.1 in the Introduction. In the next section, we discuss the typical corporate function–profit center matrix that is common to all corporate centers. Despite a long history, this application can still generate arguments about who has the solid line and who has the dotted line. We will use this example to discuss the phenomenon of dotted lines.

The next example is of a sales organization. Sales today is one of the most complex organizations in the company. We will start with the simple geographic and national account matrix structure.

Corporate Functions

No matter what the profit centers are in a company, there is the usual matrix of corporate functions and profit centers.

These profit centers could form a regional structure (Nestlé), a customer segment structure (American Express), or a business unit structure (United Technologies). In all cases, there is at least a finance function led by the chief financial officer (CFO) who reports to the CEO, and finance leaders who report to the profit-and-loss (P&L) leaders as well as the CFO. The labels may vary, but there will be such other functions as HR, legal, strategy, and external affairs, which are structured in the same way.

There might be just a few functions, as in a holding company or conglomerate structure, or many, as in a related divisional structure. Figure 1.1 shows the Time Warner (TW) structure. TW operates as a holding company with very independent businesses. The holding company corporate center contains just a few corporate functions. These functions have a dotted-line relationship with their counterparts in the businesses. That is, the functions in the businesses report first to the business unit manager ("solid line") and second to the corporate function ("dotted line").

The Procter and Gamble (P&G) structure is a contrast to the TW structure. P&G has numerous corporate functions that play a strong role in the conduct of the enterprise. The P&G corporate structure is shown in Figure 1.2. P&G has the same standard corporate functions (HR, CFO, strategy, legal, external affairs) as TW. These functions are standard in both holding companies and divisionalized companies. But P&G also has corporate functions for the operating functions that make up the business units. These units set policy for the function, take ownership for key processes, plan for the future development of the function, and take responsibility for the assignment and development of the functional talent. The P&G corporate functions play a much more influential role than the corporate functions play in a holding company.

The top structure at P&G can be easily determined from the listing of corporate officers in the company's annual report. However, P&G does not publish organization charts showing

Figure 1.1: Time Warner Corporate Matrix Structure (Holding Company)

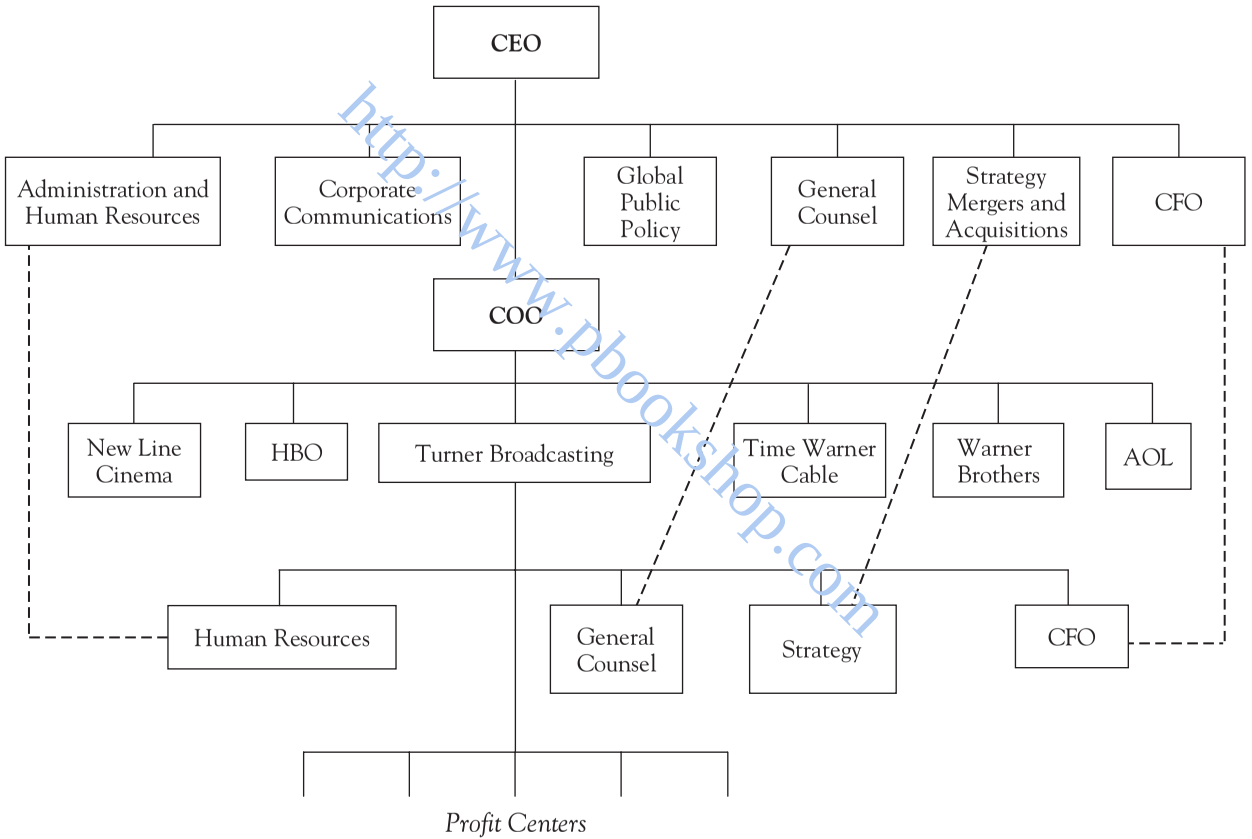
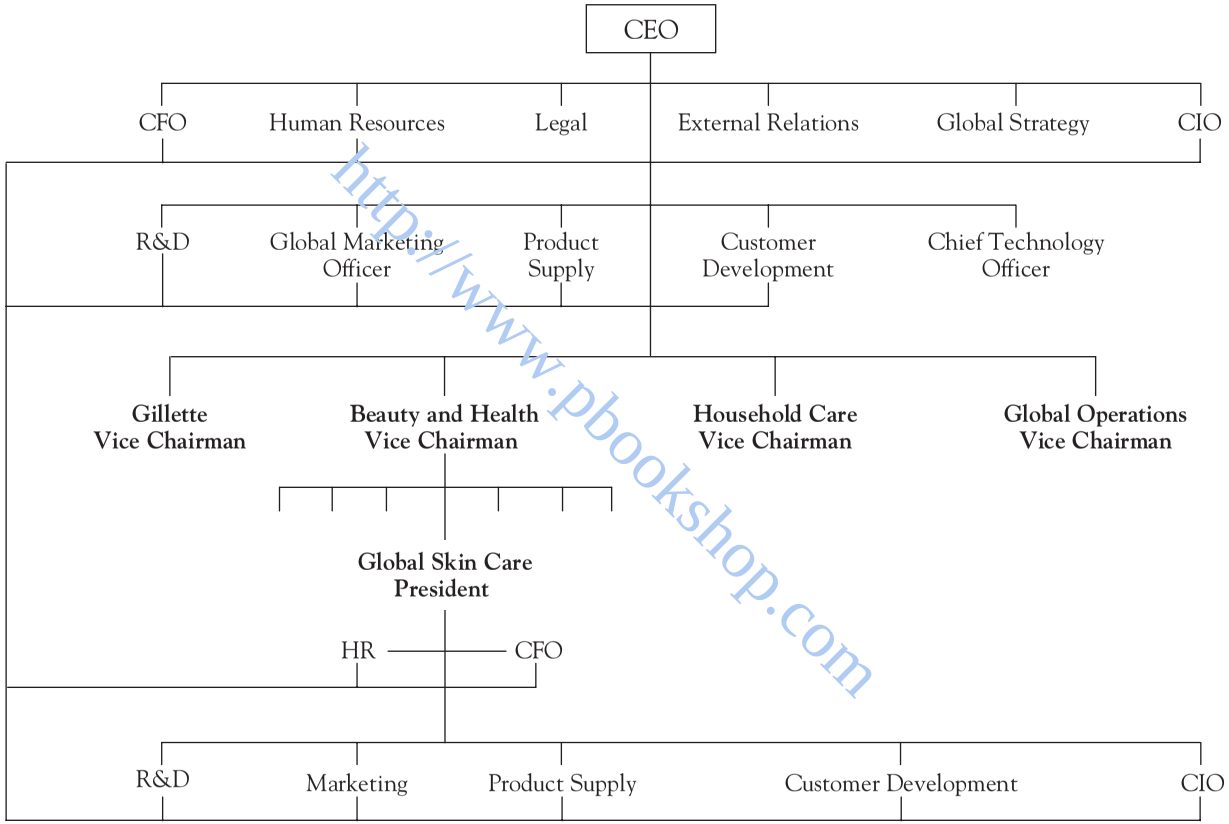


Figure 1.2: Procter & Gamble Corporate Matrix Structure



dotted and solid lines. At least I have never seen one. Nor have I heard people talk about solid or dotted-line reporting. So I asked one of my contacts at P&G about how they handle dotted and solid lines. He said, "The last time I even asked one of my two bosses which line was solid and which was dotted, he glared at me and growled 'They're both solid!!' That was about twenty years ago, and I haven't asked since." Today people refer to their line boss and their functional boss. Their line boss gives the performance reviews and operational direction. The functional boss is responsible for career development and functional direction. From my point of view, this is a healthy practice. Enormous amounts of time can be wasted in debates about reporting relationships. I have never seen a change from solid to dotted or vice versa solve the CEO's problem. It only changes which boss is the one who gets upset. It is clearly a win-lose discussion. I much prefer to use responsibility charts (Chapter Five) and shared goals (Chapter Ten). But many companies still insist on using the dotted and solid line convention. It is a holdover from the original line-and-staff days.

These corporate functions were initially called staff roles, which meant that they had no formal authority. Over time, however, it was recognized that these roles were often very influential. The roles had power and influence, but could not have the type of power that we call authority. It was always preferred to maintain the principle of unity of command. At some point, the convention arose that staff roles had a dotted-line relationship to their staff colleagues working for the profit center leaders. The profit centers or line organization had a solid line or authority relationship with those same staff functional roles. The solid line came to mean that the line manager was the real boss. So if there was a conflict between the staff leader's direction and the line leader's direction, the subordinate should follow the solid-line boss's view. Under this practice, the subordinate could be influenced by both bosses as long as there was no conflict. The solid line would then be used when there was a conflict.

A number of different practices have evolved over time for dealing with the two bosses. Today there are standard ways to talk about these practices. One was mentioned in the Introduction. Often the line boss will determine what activities will be performed and when they will be performed. The corporate functional boss will determine how the activities will be performed. This practice is useful, but there can still be conflicts. The solid line is again the conflict resolver. Other practices are used to maintain the power balance. One convention is that the dotted line goes to the boss with whom the subordinate is physically located. The solid line goes to the remote boss to compensate for the lack of day-to-day contact. Another convention is that the dotted line goes to the boss who has the responsibility for the subordinate's next career move. The solid line to the other boss is to maintain the power balance.

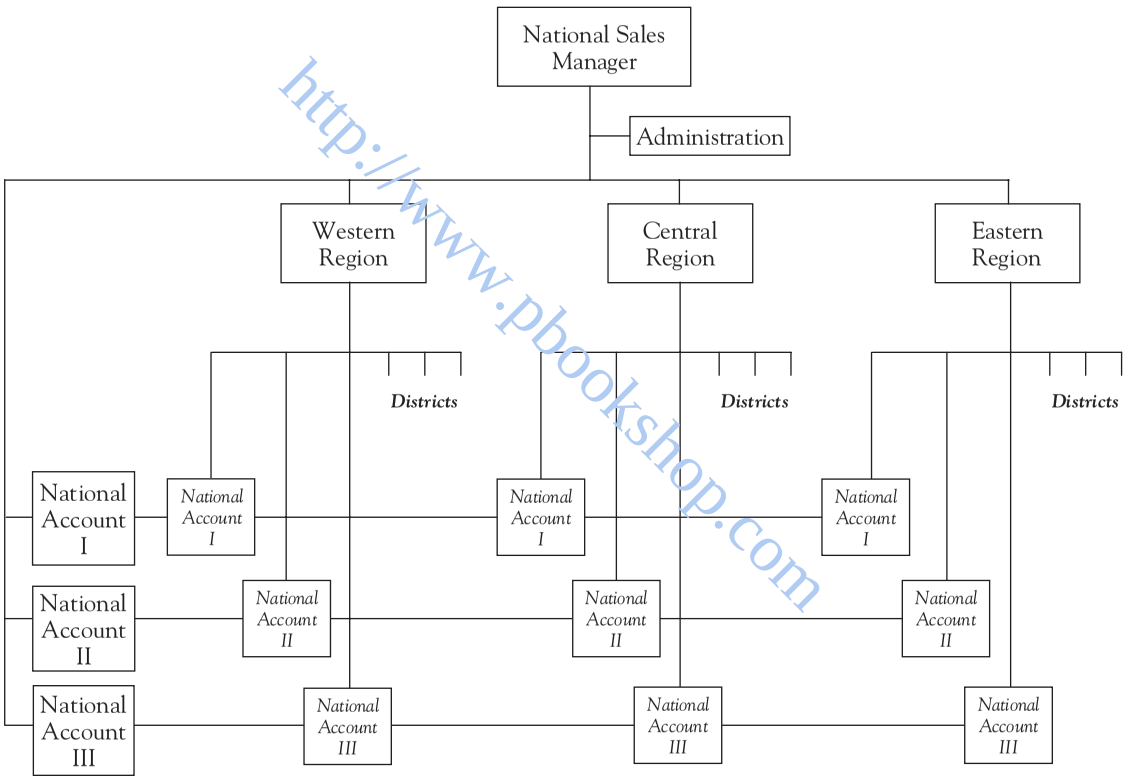
In all cases in the past, the solid-line boss made the determination on performance and submitted the salary increase and bonus request. In many cases, the solid-line boss had to collect input from the dotted-line boss but still made the final performance recommendation. Today the performance and talent management decisions are being made by a group that might be referred to as the management development committee. The purpose is to arrive at a full and fair assessment of the employee's performance (Chapter Twelve). Many of the practices that are implied by the solid line are being superseded by more modern and matrix-friendly practices. These will be discussed in later chapters.

Sales Organization Matrix

The matrix structure arises in many places throughout an organization. Figure 1.3 shows an example of a simple structure for a sales organization.

Sales organizations are usually regionally organized to minimize travel costs and have local salespeople call on local buyers.

Figure 1.3: Regional–National Account Matrix

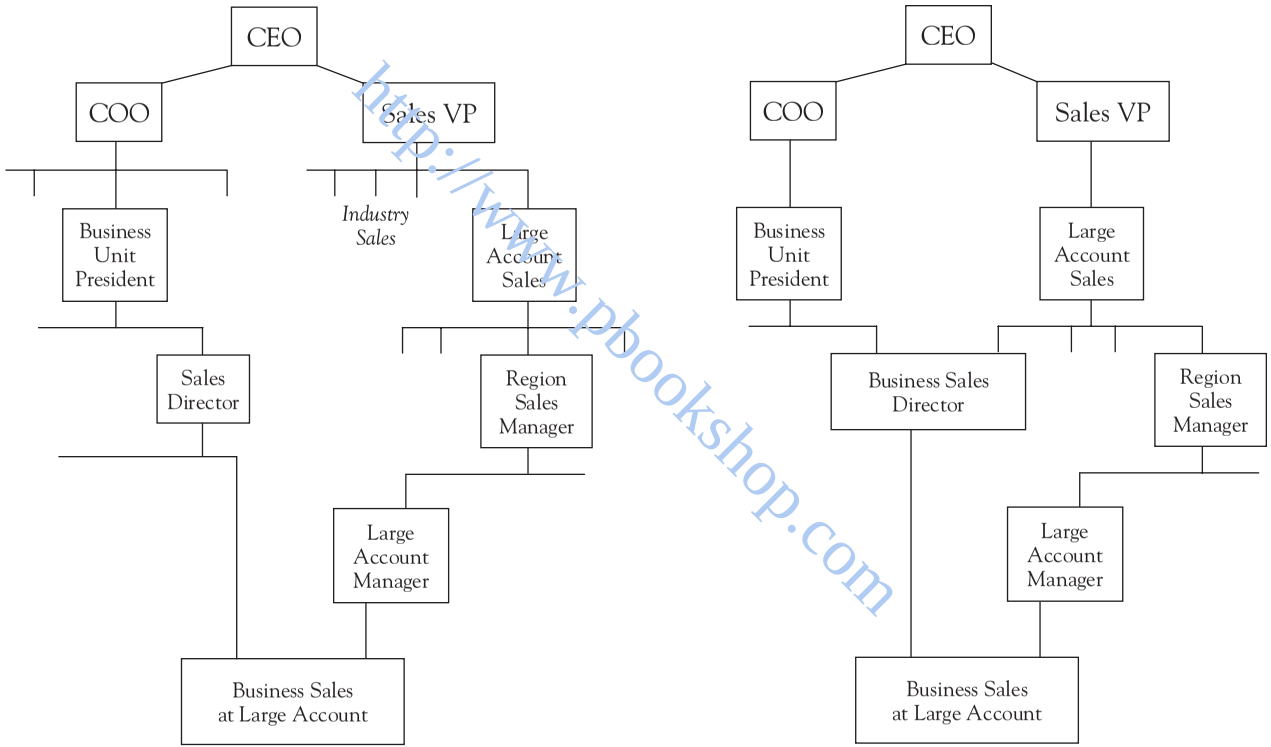


But there are often a few large national, even global, accounts. These customers ask for a single interface and often a single contract from their vendors. But these large accounts still need local salespeople to call on their national account's local offices throughout the country. The result is a regional–national account matrix, as shown in Figure 1.3. It is a simple matrix because it has only two dimensions, regions and customer accounts, and there is only one level of organization between the two-boss manager—the national account representative in the region (shown here as national account I)—and the national sales manager who can resolve disputes.

This model is the simple matrix structure. Disputes can be raised rapidly through one level and quickly be resolved. There are two, not three or four, sides to the issues. The leader is usually in touch with the issues. If need be, the national sales manager can call everyone into a room, hold a face-to-face discussion, and arrive at a decision. If there are more levels, the decision process becomes more complex. It is harder to raise an issue through two levels to the leader, in this case the national sales manager. When more levels are involved, it is more likely that distorted and different versions of the issue will come to the leader. The leader gets farther away from the day-to-day issues. In a two-level organization, if the leader calls everyone in a room, about fifty people will probably show up. The leader can still call the nine people involved in a dispute if he or she can identify the right nine actors. You can still manage a two-level matrix. However, I always discourage companies from using more than two levels, particularly if the people are scattered around the world. It is just not worth the trouble. I have seen only a few three-level matrix structures that work effectively.

An overly layered structure can often be redesigned to reduce levels. Figure 1.4 (A) is a matrix structure with too many layers. The company has a single sales organization for large accounts that buy from several business units. Each business unit has its own specialized sales force. Some customers buy

Figure 1.4: Reducing Multiple Layers to Two Layers in a Sales Structure



from only one business. Through the business unit side, there are three layers between the CEO and the salesperson who represents a business in a large account. These are the COO, the business unit president, and the sales director. On the sales side, there are four levels of management. If there is a dispute between the business sales director and the large account manager concerning the salesperson's time, the issue has to go through two and three levels of management to the CEO. The large number of layers to the CEO means that disputes will be raised reluctantly or not at all. Those issues that are raised will proceed slowly to the CEO's office. The dispute resolution process will be defective with this many levels.

An alternative structure is shown in Figure 1.4 (B). The large account manager can supervise more of the sales force, making the entire sales force operate more as a single sales organization. The business unit sales organizations report to both the large accounts manager and to the business unit president. This structure allows more sales disputes to be resolved at the lower level. These disputes will be resolved more quickly and by people knowledgeable about the sales issues. Big issues between the business unit president and the large account manager can still go to the CEO if needed. So the principle is to position the dispute resolution role as close as possible to the two-boss manager level.

The other reason the matrix structure is simple is that there are only two dimensions, geographic regions and customer accounts. However, computer companies today have product specialists who sell only hardware, another group that sells software, and a third group that sells services. Sales take place through the direct sales force but also through channel partners, such as resellers, the Internet, eBay, systems integrators, and so forth. So computer companies have at least a four-dimensional sales organization because they add products and channels to the two dimensions shown in the simple model in Figure 1.3. I do not discourage companies from adopting the multidimensional

matrix. A company's organization must be as complex as its business. If a company is multiproduct, multichannel, multicountry, and multi–customer segment, its organization must also reflect those same four dimensions. In this case, the company needs to master the complexity better than its competitors do. We will deal with multiple dimensions later in Part Two.

Pharmaceutical R&D Lab Example

Pharmaceutical research takes place in two stages, discovery and development. The purpose of the discovery phase is to find a chemical compound that shows desirable effects—some potential in treating a disease state in a human—when it is screened or tested. The development phase takes the most promising compounds from discovery and subjects them to human testing, the last test being the extensive clinical trials. Upon FDA approval of the clinical trial results, the compound is launched into the market. In this section, we examine the change to the matrix organization that the pharmaceutical labs went through in the 1990s. Research studies comparing different company labs show that those laboratories that developed an integrative capability (a matrix-like organization) performed better than those that did not (Henderson, 1994a).

The organization change was driven by changes in the knowledge base underlying the R&D process. Discovery research was initially referred to as a random process during which thousands of compounds were screened. Some came from naturally occurring substances; others were wholly new compounds created by synthetic chemists. The compounds were then injected into diseased rats to see if the compound had the desired effects. When successful, the chemists went to work creating many similar compounds to improve on the compound's desired effects and to eliminate undesirable side effects. This process was called random because the chemists

were unaware of the biochemical cause-and-effect relations that would produce the desirable therapeutic response. They would try thousands of compounds until they found some with potential.

The organization consisted of a few specialties that were collected into a functional structure. The synthetic chemists were the central function who handed their compounds to the pharmacologists. The pharmacologists tested the compounds in rats that were managed by the animal biologists or in test tubes run by analytical chemists. The pharmacologists communicated the results to the synthetic chemists, who in turn created more compounds. The communication links were simple sequential ones between the chemists and the pharmacologists. Most of the relevant information was inside the firm. A firm's real asset was its portfolio of potentially effective compounds.

This random process has now been replaced by a rational process based on designing compounds that will have the desired effect on the diseased tissue or malfunctioning organs. Underlying this change were the enormous advances in biochemistry, molecular biology, genetics, physiology, and the life sciences in general. Scientists were now able to understand the chemical reactions leading to high blood pressure, for example. They could understand the molecular structures and the chemical reactions. They could chemically screen the potential compounds without extensive use of animal subjects. But when there is an explosion of knowledge, there is usually an accompanying explosion of specialists who are experts in ever narrower knowledge areas.

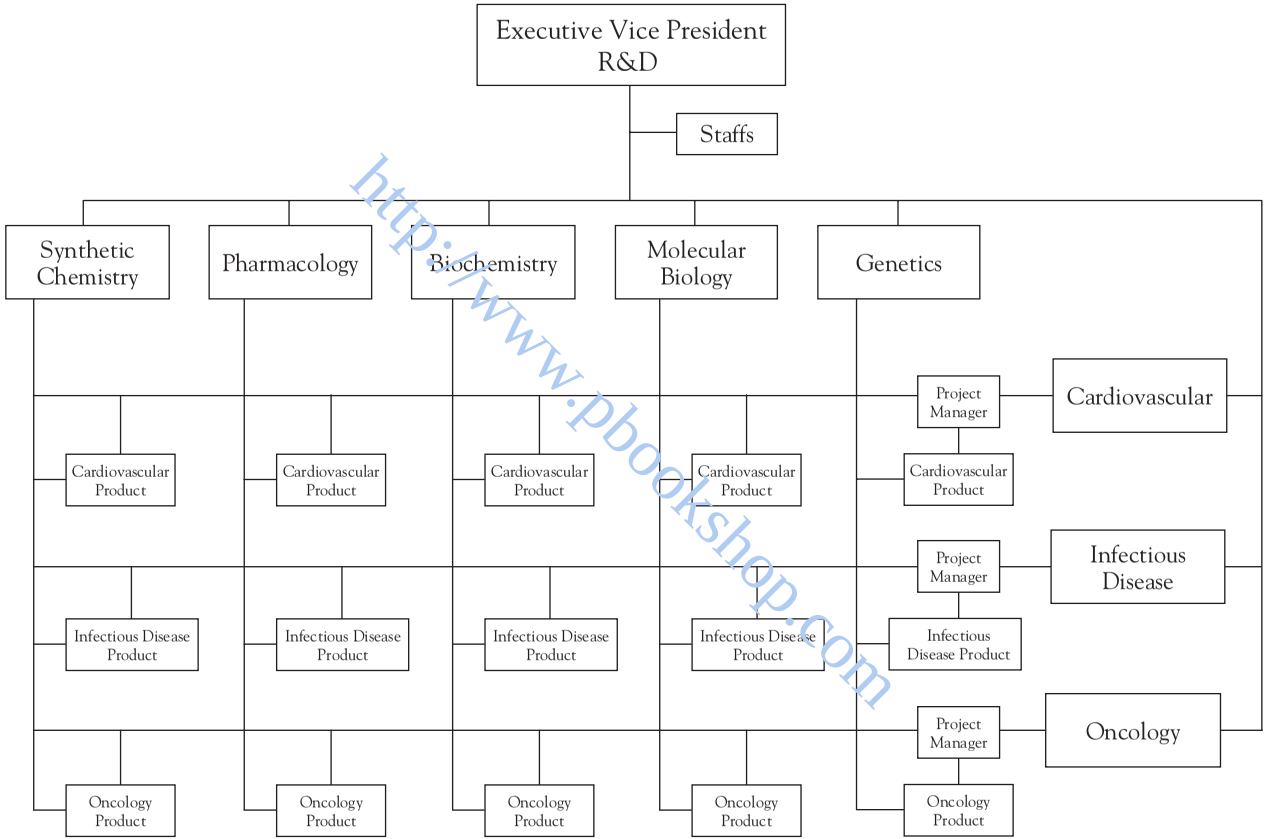
The organizations that were implemented to conduct the new rational research were much more complex. In addition to the synthetic chemists, analytical chemists, biologists, and pharmacologists who populated the old lab, molecular biologists, biochemists, metabolic biologists, molecular kineticists, combinatorial chemists, geneticists, computer modelers, and specialists in bio-informatics staffed the new labs. These specialists

needed to coordinate and communicate among themselves to design and screen new compounds. In other words, the new discovery lab had more players, and these players were more interdependent. The next challenge was, "How do we coordinate this new complexity?" The answer was to introduce project managers who could lead product teams and coordinate the specialties around promising compounds. These project managers were then organized into product groups, called therapeutic areas—for example, cardiology, central nervous system, infectious diseases, and oncology (cancer). These product groups and teams formed a matrix structure across the functional specialties. One example of such a structure is shown in Figure 1.5. It shows the two-dimensional structure of functional specialties and therapeutic areas forming teams under a project manager from the therapeutic area.

These interdisciplinary teams integrated knowledge across the specialties and focused it into promising products. The less effective labs maintained their functional organizations or switched completely to product or therapeutic area structures. The functional structures produced new knowledge, but it was not integrated and converted into new products. The product organizations produced new products, but the knowledge base decayed, and they were not able to attract specialist talent.

Henderson's research (1994a, 1994b) also shows that the most effective pharmaceutical labs also created complete and aligned organizations, as predicted by the Star Model. The most effective labs used healthy debate among peers to arrive at priorities and resource allocations. The product teams shared and integrated knowledge around products. The open debates integrated knowledge across the laboratory. Many products and treatments can be applied across therapeutic areas. Remember that Viagra was originally intended as a drug to treat heart disease. As we will see in Chapter Ten management processes characterized by open debate are a necessary means to resolve the conflicts generated in a matrix organization.

Figure 1.5: Pharmaceutical Laboratory Matrix

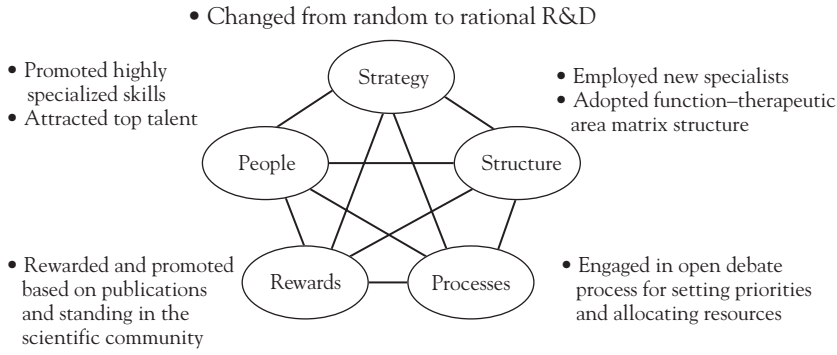


The less effective labs did not use open debate among peers. There was often a lab manager who made all the decisions. This process prevents the lab from learning from the information exchange. Some of the effective labs had leaders who made the tough decisions, but they made the calls after the debate.

The effective labs followed HR policies that attracted, rewarded, and promoted the top scientific talent. These labs encouraged their scientists to publish their research and deliver papers at scientific meetings. They promoted the scientists who had the most publications and had the best reputations in the scientific community. In this way, they attracted the top scientists to the labs. Further, these labs understood that the information to drive the rational process existed outside the lab, and thus ensured that they were integrated into the scientific community and its knowledge resources.

The Star Model shown in Figure 1.6 summarizes our pharmaceutical laboratory example. The change in strategy from the random research process to the rational process was the driving influence of the move away from a functional structure. The new structure was a balance of functions and therapeutic areas in a matrix organization. This new integrated structure was needed to coordinate the larger number of new scientific specialties

Figure 1.6: A Complete and Aligned Matrix Organization



that contributed to the discovery of new compounds. The top performers used management processes characterized by both lively debate and strong decision makers. This process leads to learning and a cross-fertilization of ideas as well as timely resolution of conflicts. The reward system functioned both to attract talented scientists and keep them plugged into their scientific communities. When most of the information exists outside the companies' boundaries, these external linkages are critical.

Summary

This chapter described the simple two-dimensional matrix structure. It arises in many situations throughout a firm. One of the most familiar and oldest examples is the corporate function–profit center matrix. This model varies from the holding company model with a few functions to the divisionalized model with many functions. The P&G model showed strong functions pursuing functional excellence and strong business units integrating across functions for product excellence. The rest of the chapter described some practices involving dotted-line relationships and the number of levels in a matrix. The final example described a high-performing R&D lab in the pharmaceutical industry as following an integrated Star Model.