2

DESIGNING INDIVIDUAL POSITIONS

As Herbert Simon (1969) has pointed out, the essence of the man-made sciences—whether engineering, medicine, or management—is *design*. Design assumes discretion, an ability to alter a system. In the case of organizational structure, design means turning those knobs that influence the division of labor and the coordinating mechanisms, thereby affecting how the organization functions. The next four chapters discuss these knobs—the essential parameters of organizational structure—and the ways in which each can be turned.

Consider the following questions:

- How many tasks should a given position in the organization contain, and how specialized should each task be?
- To what extent should the work content of each position be standardized?
- What skills and knowledge should be required for each position?
- On what basis should positions be grouped into units and units into larger units?
- How large should each unit be; how many people should report to a given manager?
- To what extent should the output of each position or unit be standardized?
- What mechanisms should be established to facilitate mutual adjustment among positions and units?
- How much decision-making power should be delegated to the managers of line units down the chain of authority?
- How much decision-making power should pass from the line managers to the staff specialists and operators?

These are the basic issues of structural design we shall be discussing. They suggest a set of nine *design parameters*—the basic components of organizational structure—that fall into four broad groupings, the subjects of these four chapters. They are listed in Table 2–1 together with the most closely related concepts from Chapter 1.

We begin with the design of individual positions. Three design parameters come into play here: the specialization of the job, the formalization of behavior in carrying the job out, and the training and indoctrination required by the job.

Job Specialization

Jobs can be specialized in two dimensions. The first is "breadth" or "scope"—how many different tasks are contained in each and how broad or narrow is each of these tasks. At one extreme, the worker is a jack-of-all-trades, forever jumping from one broad task to another; at the other extreme, he focuses his efforts on the same highly specialized task, repeated day in and day out, even minute in and minute out. The second dimension of specialization relates to "depth," to the control over the work. At one extreme, the worker merely does the work without any thought as to how or why; at the other, he controls every aspect of the work in addition to doing it. The first dimension may be called *horizontal job specialization* (in that it deals with parallel activities) and its opposite, *horizontal job enlargement;* the second, *vertical job specialization* and *vertical job enlargement.*

Horizontal job specialization

Job specialization in the horizontal dimension—the predominant form of division of labor—is an inherent part of every organization, indeed every human activity. On a seal hunt, for example, the Gilyak eskimos divide their labor within the boat among harpooner, oarsman, and helmsman (Udy, 1959:91). In fact, the term "division of labor" dates back to the eighteenth century, when Adam Smith wrote *The Wealth of Nations.* There he presented his famous example in which, even by 1776, "the division of labor has been very often taken notice of, the trade of the pin maker":

> One man draws out the wire, another straights it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations; to put it on is a peculiar business, to whiten the pins is another; it is even a trade by itself to put them into the papers. . . (Smith, 1910:5)

Organizations so divide their labor—specialize their jobs—to increase productivity. Adam Smith noted that in one pin factory, ten men specialized in their work were each able to turn out about 4,800 pins per day. "But if they had all wrought separately and independently, and without any of them having been educated to this peculiar business, they certainly

TABLE 2–1. Design Parameters

Group	Design Parameter	Related Concepts
Design of positions	Job specialization	Basic division of labor
	Behavior formalization	Standardization of work content System of regulated flows
	Training and indoctrination	Standardization of skills
Design of superstructure	Unit grouping	Direct supervision Administrative division of labor Systems of formal authority, regulated flows, informal communication, and work constellations Organigram
	Unit size	System of informal communication Direct supervision Span of control
Design of lateral linkages	Planning and control systems	Standardization of outputs System of regulated flows
	Liaison devices	Mutual adjustment Systems of informal communication, work constellations, and ad hoc decision processes
Design of decision-making system	Vertical decentralization	Administrative division of labor Systems of formal authority, regulated flows, work constellations, and ad hoc decision processes
	Horizontal decentralization	Administrative division of labor Systems of informal communication, work constellations, and ad hoc decision processes

could not each of them have made twenty, perhaps not one pin in a day . . ." (p. 5).

What are the reasons for such productivity increases? Smith notes three: the improved dexterity of the workman from specializing in one task, the saving in time lost in switching tasks, and the development of new methods and machines that come from specialization. All three reasons point to the key factor that links specialization to productivity: repetition. Horizontal specialization increases the repetition in the work, thereby facilitating its standardization. The outputs can be produced more uniformly and more efficiently. Horizontal specialization also focuses the attention of the worker, which facilitates learning. A final reason for specialization is that it allows the individual to be matched to the task. In Chapter 1 we noted that football teams put their slim players in the backfield, their squat players on the line. Likewise, Udy notes that the Gilyak eskimos put their best oarsmen toward the stern, their best shots in the bow.

Vertical job specialization

Vertical job specialization separates the performance of the work from the administration of it. Teaching offers a good example. Students who use workbooks or copy their lectures word for word have rather vertically specialized work—they simply carry out the activity. In contrast, when the students do projects, they assume control of much of the decision making in their work—their "jobs" become vertically enlarged, and they shift from passive responders to active participants. In the case of the pie filler, discussed in Chapter 1, his job was highly specialized in the vertical (as well as the horizontal) dimension. Alternatively, were he told to bake a pie to sell for $1.50 or, better still, had he owned a bakery and decided for himself what to bake and at what price, he could have been described as having a vertically enlarged job.

Organizations specialize jobs in the vertical dimension in the belief that a different perspective is required to determine how the work should be done. In particular, when a job is highly specialized in the horizontal dimension, the worker's perspective is narrowed, making it difficult for him to relate his work to that of others. So control of the work is often passed to a manager with the overview necessary to coordinate the work by direct supervision or to an analyst who can do so by standardization. Thus, jobs must often be specialized vertically because they are specialized horizontally. But not always, as we shall soon see.

Job enlargement

Job specialization is hardly a panacea for the problems of position design; quite the contrary, **job specialization creates a number of its own problems, notably of communication and coordination.** Consider a simple example, the way in which orders are taken in French and American restaurants. In this respect, the work in many French restaurants is more specialized: the maître d'hôtel takes the order and writes it on a slip of paper, and the waiter serves it. In the American restaurant, the waiter generally does both tasks. Thus, if the customer in the French restaurant has a special request—for example, to have his coffee with his dessert instead of after it as is the norm in France—a communication problem arises. The maître d'hôtel must go to the trouble of telling the waiter or making a note on the slip of paper. (In fact, it is unlikely that he will do either, and it is left to the customer to try, often in vain, to get his message across to the waiter directly.) In effect, specialization creates problems of coordination. In more complex work, such as medicine, specialization has also been a mixed blessing. The great advances—for example, open-heart surgery, control of tuberculosis, transplants of various kinds—have been brought about by specialization in research and clinical work, but so too has specialization placed all kinds of artificial barriers across the practice of medicine. Few doctors treat the body as an integrated system; rather, they treat clogged arteries, or emotional stress, or unhealthy diets.

High task specialization in the horizontal dimension also creates balancing problems for the organization. If a barbershop designates one person to cut only children's hair, it may face a situation in which adult customers are forced to wait while the children's barber stands idle. Clearly, size is an important factor here: A high volume of work facilitates high horizontal specialization. Only the large barbershops can afford children's specialists.

Another serious problem, especially in the operating core, is what high specialization in both dimensions can do to the worker—to his feelings about his work and his motivation to do it well. With the rise of Taylor's Scientific Management movement after World War I, American industry (and, for that matter, Russian industry, too) became virtually obsessed with job specialization. "One has the feeling of division of labor having gone wild, far beyond any degree necessary for efficient production," wrote James Worthy, an executive of Sears, Roebuck, in 1950 (p. 174). The belief that "all possible brain work should be removed from the shop floor and centered in the planning and laying out department" led to the most machinelike of jobs, as engineers sought to "minimize the characteristics of workers that most significantly differentiate them from machines" (p. 67). All this, Worthy argues, "has been fantastically wasteful for industry and society," failing to make proper use of "management's most valuable resource: the complex and multiple capacities of people." Because "the meaning of work itself" was destroyed, people could only be treated as means; they could no longer exercise initiative. In place of intrinsic motivation, workers had "to be enticed by rewards and threatened by punishments" (pp. 69, 70, 71).

Charlie Chaplin popularized the plight of the human robot in his pre–World War II film, *Modern Times*. But the problem has persisted to the present day. Only recently, however, with increasing worker alienation posing a direct threat to productivity itself, has there been a real thrust to change the situation. This has proceeded under the terms "job enlargement," for horizontal enlargement, and "job enrichment," for vertical coupled with horizontal enlargement (Herzberg, 1968);[1] more recently, all this has been subsumed under the broader title, "quality of working life," now sufficiently in vogue to merit the acronym QWL. Here, for simplicity's sake and to contrast with job specialization, we shall stay with the term "job enlargement," whether horizontal or vertical.

In horizontal job enlargement, the worker engages in a wide variety of the tasks associated with producing products and services. He may either do more tasks in sequence, or do them one at a time, as before, but interchange tasks with his colleagues periodically so that his work becomes more varied. For example, in the assembly of the parts of a small motor, the assembly line may be eliminated and each worker may assemble the whole motor himself, or the workers may interchange positions on the assembly line periodically. **When a job is enlarged vertically, or "enriched," not only does the worker carry out more tasks, but he also gains more control over them.** For example, a group of workers may be given responsibility for the assembly of the motor, a natural unit of work, including the power to decide how the work will be shared and carried out.

Does job enlargement pay? The proponents say yes, and back up their conclusion with enthusiastic anecdotal reports. But more detached observers report failures as well as successes, and reviews of the research suggest that although the successes probably predominate, the overall results of job enlargement are mixed.

The results of job enlargement clearly depend on the job in question. To take two extreme examples, the enlargement of the job of a secretary who must type the same letter all day every day cannot help but improve things; in contrast, to enlarge the job of the general practitioner (one wonders how—perhaps by including nursing or pharmacological tasks) could only frustrate the doctor and harm the patient. In other words, jobs can be too large as well as too narrow. So the success of any job redesign clearly depends on the job in question and how specialized it is in the first place. The natural tendency has, of course, been to select for redesign the narrowest, most monotonous of jobs, some specialized to almost pathological degrees, of which there has been no shortage in this industrialized world left to us by the followers of Frederick Taylor. Hence, we should not be surprised to find more successes than failures reported in this research.

[1]In these types of jobs, it is unlikely that vertical job enlargement could proceed without some horizontal job enlargement.

That, however, should not lead to the conclusion that job enlargement is good per se.

There is also the question of tradeoffs inherent in any attempt to redesign a job. What the writings of people like Worthy have done is to introduce the human factor into the performance equation, alongside the purely technical concerns of the time-and-motion-study analysts. That has changed the equation: **job enlargement pays to the extent that the gains from better-motivated workers in a particular job offset the losses from less than optimal technical specialization.** Thus, like job specialization, job enlargement is hardly a panacea for the problems of position design; it is one design parameter among many, to be considered alongside the others.

So far, the question of whether job enlargement pays has been addressed solely from the point of view of the organization. But the worker counts, too, as a human being who often deserves something better than a monotonous job. But here the research throws a curve, with its evidence that **some workers prefer narrowly specialized, repetitive jobs.** Nowhere is this point made clearer than in Stud Terkel's fascinating book, *Working* (1972), in which all kinds of workers talk candidly about the work they do and their feelings about it. A clear message comes through: "One man's meat is another man's poison." Occasionally, Terkel juxtaposes the comments of two workers in the same job, one who relishes it and another who detests it.

Why should the same routine job motivate one person and alienate another? Some researchers believe the answer relates to the age of the workers, others to where they live—older and urban workers having been shown in some studies to be more tolerant of narrow jobs. Others describe the differences in terms of Maslow's (1954) "Needs Hierarchy Theory," which orders human needs into a hierarchy of five groups—physiological, safety or security, love and belongingness, esteem or status, and self-actualization (to create, to fulfill oneself). The theory postulates that one group of needs becomes fully operative only when the next lower group is largely satisfied. In job design, the argument goes, people functioning at the lower end of the Maslow scale, most concerned with security needs and the like, prefer the specialized jobs, whereas those at the upper end, notably at the level of self-actualization, respond more favorably to enlarged jobs. Perhaps this explains why QWL has recently become such a big issue: with growing affluence and rising educational levels, the citizens of the more industrialized societies have been climbing up Maslow's hierarchy. Their growing need for self-actualization can be met only in enlarged jobs. The equation continues to change.

Job specialization by part of the organization

We would expect to find some relation between the specialization of jobs and their location in the organization. Productivity is more important in

the operating core, where the basic products and services get produced; also, this is where the work is most repetitive. Hence, we would expect to find the most specialized jobs there, especially in the horizontal dimension. In the vertical dimension, however, we would expect to find more variation. Many operators—such as those on assembly lines—perform the narrowest of jobs in both breadth and depth. These are the *unskilled* workers, on whom the job-enlargement programs have been concentrated. But other operators, because their specialized tasks are more complex, retain considerably control over them. In other words, their jobs are specialized horizontally but not vertically. Performing open-heart surgery, putting out fires in oil wells, and teaching retarded children all require considerable specialization, to master the skills and knowledge of the jobs. But the jobs are complex, requiring years of training, and that complexity precludes close managerial and technocratic control, thereby precluding vertical specialization. **Complex jobs, specialized horizontally but not vertically, are generally referred to as professional.** And job enlargement is not an issue in these jobs, at least not from the perspective of the worker. Society tends to look very favorably on this kind of specialization; indeed, unskilled operators frequently try to have their jobs labeled "professional" to increase their status and reduce the controls imposed on them by the administrators.

Many of the same conclusions can be drawn for the staff units, both support and technocratic. Each support staff unit has a specialized function to perform—producing food in the plant cafeteria, fighting legal battles in the corporate legal office, and so on—with the result that support-staff jobs tend to be highly specialized in the horizontal dimension. How specialized they are in the vertical dimension depends, as it does for the operator's jobs, on how complex or professional they are. In general, we would expect the support staffers of the lower echelons, such as those in the cafeterias, to have narrow, unskilled jobs subject to close control, and those at the high levels, such as in the legal office, to have more professional jobs, specialized horizontally but not vertically. As for the analysts of the technostructure, they are professionals, in that their work requires considerable knowledge and skill. Hence, we would also expect their jobs to be specialized horizontally but not vertically. However, the technocratic clerks—those who apply the systems of standardization routinely—would tend to be less skilled and therefore have jobs specialized in both dimensions.

Managers at all levels appear to perform a basic set of interpersonal, informational, and decisional roles; in that sense, their work is specialized horizontally. But in a more fundamental sense, no true managerial job is specialized in the horizontal dimension. The roles managers perform are so varied, and so much switching is required among them in the course of any given day, that managerial jobs are typically the least specialized in the

TABLE 2–2. Job Specialization by Part of the Organization

		Horizontal Specialization: High	Horizontal Specialization: Low
Vertical Specialization	High	Unskilled jobs (operating core and staff units)	Certain lowest-level managerial jobs
	Low	Professional jobs (operating core and staff units)	All other managerial jobs

organization. Managers do not complain about repetition or boredom in their work, but rather about the lack of opportunity to concentrate on specific issues. This seems to be as true for foremen as it is for presidents. That is why attempts to redesign the job of chief executive generally move in the direction of job specialization, not enlargement—for example, by creating a chief executive office in which different people split up the top job of the organization. That such efforts have been successful is far from clear (see Mintzberg, 1973a:179–80, for possible reasons why), and the job of CEO seems to remain as enlarged as ever.

Managerial jobs can differ in vertical specialization by level in the hierarchy. Whereas top managers generally have great discretion in their work, some first-line supervisors—notably assembly-line foremen, and supervisors of clerks and other unskilled workers—have highly circumscribed jobs. Indeed, some of them are so subjected to the weight of authority and the standards of the technostructure that their jobs can hardly be called managerial at all.

Our conclusions about vertical and horizontal job specialization as a function of the part of the organization are summarized in Table 2–2.

Behavior Formalization

A second parameter of organizational design, related to individual positions, has, in the opinion of David Hickson (1966–67), been a virtual obsession of organization theorists. In fact, Hickson's list of who has focused on this parameter reads like a veritable Who's Who of writers in management—Taylor, Fayol, McGregor, Argyris, Simon, Crozier, and so on. Often referred to as the *formalization of behavior*, this parameter represents the organization's way of proscribing the discretion of its members, essentially of standardizing their work processes. Behavior may be formalized in three basic ways:

- *By the position*, specifications being attached to the job itself, as in a job description
- *By the work flow*, specifications being attached to the work, as in the case of a printing-order docket
- *By rules*, specifications being issued in general, as in the various regulations—everything from dress to the use of forms—contained in so-called policy manuals

No matter what the means of formalization—by job, work flow, or rules—the effect on the person doing the work is the same: His behavior is regulated. Power over how that work is to be done passes from him to the person who designs the specifications, often an analyst in the technostructure. Thus, formalization of behavior leads to vertical specialization of jobs. Also, it stands to reason that formalization is related to horizontal specialization: the narrowest of the unskilled jobs are the simplest, the most repetitive, and the ones most amenable to high degrees of formalization.

Why formalize behavior?

Organizations formalize behavior to reduce its variability, ultimately to predict and control it. One prime motive for doing so is to coordinate activities. As noted earlier, standardization of work content is a very tight coordinating mechanism. Its corresponding design parameter, behavior formalization, is used therefore when tasks require precise, carefully predetermined coordination. Firemen cannot stop each time they arrive at a new fire to figure out who will attach the hose to the hydrant and who will go up the ladder; similarly, airline pilots must be very sure about their landing procedures well in advance of descent.

Formalization of behavior is also used to ensure the machinelike consistency that leads to efficient production. Tasks are specialized in the horizontal dimension to achieve repetition; formalization is then used to impose the most efficient procedures on them.

Formalization is also used to ensure fairness to clients. The national tax office must treat everyone equally; that is why it tends to emphasize formalization of behavior. Government organizations are particularly sensitive to accusations of favoritism; hence, they tend to proliferate rules and specifications. Sometimes rules are instituted to protect the clients, at other times the employees. For example, promotion by seniority is used to preclude arbitrary decisions by managers.

Organizations formalize behavior for other reasons as well, of more questionable validity. Formalization may, for example, reflect an arbitrary desire for order. Some tennis courts require all players to wear white, yet it is difficult to understand what difference it would make if some appeared

in mauve. The highly formalized structure is above all the neat one; it warms the hearts of people who like to see things orderly—everyone in his proper box on the organigram, all work processes predetermined, all contingencies accounted for, everyone in white.

Bureaucratic and organic forms of structure

Organizations that rely primarily on the formalization of behavior to achieve coordination are generally referred to as *bureaucracies*. It is appropriate at this point to take a close look at this important concept, since it lies at the very heart of a great deal of discussion about organizational structure.

The word *bureaucracy* had an innocent-enough beginning—it derived from the French word *bureau*, meaning "desk" or "office." But since Max Weber, the great German sociologist, used it at the turn of the century to describe a particular type of organizational structure, it has had a rather tumultuous existence. Weber intended the term as a purely technical one, and it retains that sense today in the literature of organizational theory and sociology. But elsewhere, the word has taken on a decidedly pejorative meaning—it has become a dirty word. Here the reader is asked to put aside this pejorative meaning and accept the word in its technical sense.

Weber described bureaucracy as an "ideal type" of structure, "ideal" meaning not perfect but pure. He delineated the characteristics of this pure structural type as follows:

I. There is the principle of fixed and official jurisdictional areas, which are generally ordered by rules, that is, by laws or administrative regulations.
   1. The regular activities required for the purposes of the bureaucratically governed structure are distributed in a fixed way as official duties.
   2. The authority to give the commands required for the discharge of these duties is distributed in a stable way and is strictly delimited by rules concerning the coercive means, physical, sacerdotal, or otherwise which may be placed at the disposal of officials.
   3. Methodical provision is made for the regular and continuous fulfillment of these duties and for the execution of the corresponding rights; only persons who have the generally regulated qualification to serve are employed.

II. The principles of office hierarchy and of levels of graded authority mean a firmly ordered system of super- and subordinate in which there is a supervision of the lower offices by the higher ones.

III. The management of the modern office is based upon written documents ("the files"), which are preserved in their original or draught form.

IV. Office management, at least all specialized office management—and such management is distinctly modern—usually presupposes thorough and expert training.

V. The management of the office follows general rules, which are more or

> less stable, more or less exhaustive, and which can be learned. Knowledge of these rules represents a special technical learning which the officials possess. It involves jurisprudence, or administrative or business management. (Gerth and Mills, 1958: 196–98)

Weber's description brings together a number of the concepts we have already discussed—division of labor, specialization, formalization of behavior, hierarchy of authority, chain of command, regulated communication, and standardization of work processes and of skills. But how well do all these defining characteristics hold together in real organizations? In other words, does Weber's "ideal type" really exist, or are there, in fact, different types of bureaucratic structures, each exhibiting some but not all of these characteristics?

We shall investigate this question more fully later. It is sufficient at this point to note that the research has been inconsistent, some studies finding, for example, that although measures of specialization and formalization intercorrelated, ones related to decentralization did not. The implication was that there may be some bureaucracies where decision-making power is centralized and others where it is not. With this finding in mind, **we can define a structure as bureaucratic to the extent that its behavior is predetermined or predictable, in effect standardized** (whether by work processes, outputs, or skills, and whether or not centralized). This seems to be the main thread running through Weber's description.

So far, we have talked only of bureaucratic structure. But if some organizations emphasize standardization, others presumably do not. They are characterized by flexible working arrangements, basing their coordination on mutual adjustment or direct supervision. **We shall define organic structure by the absence of standardization in the organization.** In effect, we put bureaucratic and organic structure at the two ends of the continuum of standardization.

Some dysfunctions of highly formalized structures

Perhaps no topic in management has generated more heat than the consequences of extensive formalization of behavior in organizations. Early in this century, before the Hawthorne studies of the 1930s, mentioned earlier, industrial psychologists were concerned primarily with the physiological fatigue caused by monotonous work. This was, in fact, the original focus of the Hawthorne studies themselves. But there it became apparent that fatigue was only the tip of the iceberg, that such work—highly repetitive, formalized, and specialized horizontally and vertically—created psychological as well as physiological problems for many workers. Subsequently, people like Argyris, Bennis, Likert, and McGregor build their careers on

the analysis of the psychological dysfunctions of highly formalized structures. They pointed out man's inherent propensity to resist formalization and impersonalization, and they showed the organizational "pathologies" that result from excesses in this direction. The dysfunctional consequences take various forms: the ossification of behavior, with the automatic rejection of all innovative ideas, the mistreatment of clients, increases in absenteeism, high turnover, strikes, and sometimes the subversion of the operations of the organization.

Michael Crozier (1964) looked into these issues too, in the context of two French government bureaucracies, but he came up with some very different results. For one thing, he found that many of the rules were favored by the operators, because, even though these rules may have limited their own discretion, they also reduced the arbitrary power their managers could exercise over them. The rules in effect protected the operators, giving rise to a kind of perverse democracy at lower levels in the hierarchy: everyone was treated more or less equally because everyone was controlled by the same overwhelming set of rules. As a result, however, the decisions not covered by the rules (including those to determine the rules themselves) had to be made elsewhere, at distant headquarters, which often lacked the local information needed to make such decisions.

Crozier also found that rules and central authority could not regulate quite everything. A few areas of uncertainty had to remain, and it was around these that informal power relationships developed. People who could deal with uncertainties achieved great influence. This was the case for the maintenance men in the government tobacco factories Crozier studied; these men were the only ones able to deal with machine breakdown, the one major uncertainty in these highly regulated plants.

Behavior formalization by part of the organization

One key relationship should be evident by now: **the more stable and repetitive the work, the more programmed it is and the more bureaucratic that part of the organization that contains it.** Thus, there can be considerable differences in formalization of behavior and bureaucratization across the various parts of a single organization. Although we can (and will) characterize certain organizations as bureaucratic or organic overall, none is uniformly so across its entire range of activities.

In the operating core, the part of the organization that the other parts seek to insulate and protect, we would generally expect to find the most stable conditions and the most repetitive tasks, leading to the most bureaucratic structure. This should not be taken to mean that the work of the operating core is always formalized or bureaucratized. Some organizations, such as creative research centers and small entrepreneurial firms,

tend to be rather organically structured even in their operating cores. Nevertheless, relatively speaking, **behavior formalization is most common in the operating core of the organization.**

As we leave the operating core and climb the hierarchy of authority, we would expect the work to become increasingly less repetitive and so less formalized. The middle-line manager closest to the operating core would tend to be most influenced by the conditions there, and those farthest away would operate in the most organic conditions. Of course, there can be variations in formalization at a given level of the hierarchy, depending on the work in the unit supervised and the boundary conditions it faces. Thus we might expect to find the work of a production manager more formalized than that of a corresponding sales manager, although the two may be peers in terms of their positions in the hierarchy. One is concerned primarily with stabilizing the work of the operating core; the other must remain flexible to deal with the variability of customer demands.

At the strategic apex, which typically comes face to face with the most fluid boundary—the environment at large—the work is the least programmed, and so we should expect to find highly organic conditions. This conclusion became apparent in over fifty studies of different organizations carried out by student groups of ours at McGill University. Time and again, the organigrams were put on the blackboard and the students proceeded to explain why they were not accurate at upper levels of the hierarchy. The charts specified formal authority, but they did not describe the communication patterns and power relationships that really existed there. These relationships were simply too fluid to formalize; the structure had to evolve naturally and to shift continually. In a word, it had to be organic.

In the support staff, we would expect to find a range of structures, according to the work done and the boundary conditions faced. Support units that face little uncertainty and do repetitive work, such as the plant cafeteria, would tend to be highly formalized. In contrast, in a research laboratory, where the need for creativity is high, or in a public relations department, where there are significant work variations from day to day, little of the work can be formalized and so we would expect the structure to remain relatively organic, at least if the units are to be effective.

Similarly, in the technostructure, we would expect that those units closest to the operating core, such as production scheduling, would have many rules and rather formalized work procedures. Others with more variable work, such as operations research, would probably adopt relatively organic structures. (It should be noted here that whatever its *own* structure, it is the technostructure that takes primary responsibility for the formalization of everyone else's work in the organization.)

Finally, it should be noted that organizations with strong orientations toward either bureaucratic or organic structure sometimes set up independent work constellations with the opposite kinds of structure to do special tasks. For example, in highly bureaucratic manufacturing firms, the new product or "venture" team is created as a pocket of organic structure isolated from the rest of the organization administratively, financially, spatially, and sometimes even legally. In this way, it is able to innovate, free of the restraints of bureaucracy.

Training and Indoctrination

The third aspect of position design entails the specifications of the requirements for holding a position in the first place. In particular, the organization can specify what knowledge and skills jobholders must have and what norms they must exhibit. It can then establish recruiting and selection procedures to screen applicants in terms of those position requirements; alternatively, it can establish its own programs to develop them in the candidates it hires. In either case, the intention is the same—to ensure that the jobholder develops the necessary behaviors before beginning work. Furthermore, the organization may later reinforce these behaviors with a host of personnel devices—job rotation, attendance at conferences, organizational development programs, and so on. **Training refers to the process by which job-related skills and knowledge are taught,** whereas **indoctrination is the process by which organizational norms are acquired.** Both amount to the "internalization" of accepted (that is, standardized) patterns of behavior in the workers.

Training

When a body of knowledge and a set of work skills are highly rationalized, the organization factors them into simple, easily learned jobs—that is, unskilled ones—and then relies on the formalization of behavior to achieve coordination. An automobile is a complex machine, its assembly an involved procedure. But over the years, that procedure has been reduced to thousands of simple tasks, so that today, workers with minimal skills and knowledge can assemble automobiles. Training is, therefore, an insignificant design parameter in the automobile assembly plant—it takes place in the first few hours on many jobs.

Where, however, a job entails a body of knowledge and a set of skills that are both complex and nonrationalized, the worker must spend a great deal of time learning them. For some jobs, of course, these requirements are not recorded as formal knowledge, and so they must be learned on the job: the worker assumes the role of "apprentice" under a "master," who earlier learned the job in the same way. Such work is generally referred to as *craft*. But where a body of knowledge has been recorded and the re-

quired skills have—in part at least—been specified, the individual can be trained before beginning work. This kind of work—complex and nonrationalized, yet in part recorded and specified—is referred to as *professional*. Thus, **training is a key design parameter in all work we call professional.**

The "specification" of knowledge and skill is, of course, synonomous with the "standardization" of it. Thus, training is the design parameter for the exercise of the coordinating mechanism that we have called the standardization of skills. Lest anyone doubt the relation between professionalism and standardization, we need only quote the words of a reputed professional about his most complex of professions. Writing about cardiovascular surgery, Frank Spencer discusses his "surgical cookbooks" as follows:

> The jargon term "cookbook" evolved from my loyal office staff, as this essentially describes "How I do this operation," somewhat analogous to "How I bake a cake." . . .
>
> The components of a complex operation, such as repair of tetralogy of Fallot, may be divided into 10 to 15 sequential steps, with two to five essential features in each step. If each feature is symbolized by a single word, essential steps of an operation can be readily reduced to a series of chains of symbols, varying from six to ten chains containing 30 to 40 symbols. These are committed to memory, with review frequently enough so the essential 30 to 40 symbols representing key features of an operation can be reviewed mentally in 60 to 120 seconds at some time during the day preceding the operation. (1976:1182)

Professionals are trained over long periods of time, before they ever assume their positions. Generally, this training takes place outside the organization, often in a university. (There are, of course, exceptions. For example, police forces generally train their own personnel.) In effect, the training itself usually requires a particular and extensive expertise, beyond the capacity of the organization to provide. So the responsibility for it falls away from the technostructure, to some kind of professional association, which may use the university as its training ground. In the process, of course, the organization surrenders some control not only over the selection of its workers but also over the methods they use in their work.

Once the trainees have demonstrated the required behavior—that is, have internalized the standard skills and associated body of knowledge—they are duly certified by the professional association as appropriate for the job, and are subsequently hired by the organization to perform it.

Of course, the professional training program can seldom impart all the necessary skills and knowledge; some must always remain beyond specification and standardization. So professional training must generally be followed by some kind of on-the-job apprenticeship before the person is considered fully trained. For example, as Spencer notes, after perhaps four years of postgraduate university training, the medical doctor must spend five years or more in on-the-job training, first as an intern and then as a resident, before being allowed to practice as a surgeon.

Indoctrination

Socialization "refers to the process by which a new member learns the value system, the norms, and the required behavior patterns of the society, organization, or group which he is entering" (Schein, 1968: 3). A good deal of socialization takes place informally in the organization; indeed, some of it is carried out by the informal group in contradiction to the system of formal authority. **Indoctrination is the label used for the design parameter by which the organization formally socializes its members for its own benefit.**

Organizations allow some indoctrination to take place outside their own boundaries, as part of professional training. Law students, for example, learn more at the university than just legal precedent; they are expressly given clues about how a lawyer should behave. But much socialization is related to the "culture" of the specific organization, and so indoctrination is largely a responsibility of the organization itself.

Again, a good deal of this "in-house" indoctrination activity takes place before the person starts the job, to ensure that he or she is sufficiently socialized to exhibit the desired behavior. Apprenticeship programs generally contain a good dose of indoctrination along with the training. Some organizations design programs solely for the purposes of indoctrination. Freshly minted MBAs, for example, are often put through a "training" (read "indoctrination") program on first joining a large organization. They rotate through various departments for periods too brief for them to learn the work but not to sense the culture.

Often such indoctrination is supplemented by later programs designed to reinforce the employees' allegiance to the organization. For example, they are brought together for social events or inspiring speeches by the top managers, or they are rotated in their jobs so that they develop their allegiances to the whole organization rather than to any one of its parts.

In-house indoctrination programs are particularly important where jobs are sensitive or remote—managers of the foreign subsidiary, agents of the CIA, ambassadors of the nation, mounties of the R.C.M.P. In these cases, the need for coordination is paramount, particularly for the assurance that individuals working autonomously will act in the best interests of the organization. The nature and location of the work preclude the formalization of behavior and the use of direct supervision. So the organization must rely on training, and especially on indoctrination. The Catholic Church and the Communist Party are examples of organizations

that rely heavily on indoctrination as a design parameter. Antony Jay, in his book *Management and Machiavelli*, provides us with an excellent illustration of one branch of the former's use of indoctrination:

> St. Augustine once gave as the only rule for Christian conduct, "Love God and do what you like." The implication is, of course, that if you truly love God, then you will only ever want to do things which are acceptable to Him. Equally, Jesuit priests are not constantly being rung up, or sent memos, by the head office of the Society. The long, intensive training over many years in Rome is a guarantee that wherever they go afterwards, and however long it may be before they even see another Jesuit, they will be able to do their work in accordance with the standards of the Society. (1970:70)

Training and indoctrination by part of the organization

No matter what the part of the organization, training is most important where jobs are complex, involving difficult, yet specified skills and sophisticated recorded bodies of knowledge—jobs essentially professional in nature. And indoctrination is most important where jobs are sensitive or remote, and where the culture and ideology of the organization demand a strong loyalty to it.

In some organizations—known as professional—a great deal of the work of the operating core involves complex skills and sophisticated knowledge. Examples are hospitals, law firms, social-work agencies, and school systems. In each case, the organization relies extensively on training as a design parameter. Some organizations—sometimes the same professional ones—also make extensive use of indoctrination in the operating core because their operators do sensitive jobs or work in remote places. The R.C.M.P. and the Jesuits were both cited above as examples.

Training and indoctrination are also used extensively in many of the staff units. Much of the technocratic work of the organization—for example, operations research and industrial engineering—is professional in nature. That is, it involves complex skills and knowledge that can be learned formally. So training is an important parameter in the design of their positions. Where the analysts have sensitive control responsibilities—for example, in the case of accountants who are sent out to divisions to keep watch over expenditures—indoctrination may be important as well. To ensure that their allegiances remain with the head office, job rotation from factory to factory is often used. Similarly, many of the jobs in the support staff—legal council, researcher, industrial relations specialist—are professional in nature, requiring extensive training.

In the managerial ranks—the middle line and the strategic apex—the work is certainly complex, but it is not well understood, and so formal training is not paramount. True, there are skills and knowledge to be learned, and management schools to teach them, but so much of what managers do remains beyond recorded knowledge that management can hardly be called a profession. This is exemplified by the fact that the leaders of a great many of society's most important institutions—especially government—have had no management training whatsoever. Their work is craft; they learn it by observation and by working with masters. Thus, **training is not yet considered a major design parameter at the strategic apex or in the middle line,** although organizations do try to use brief "executive development" programs where specific managerial skills or knowledge can be taught.

Indoctrination plays perhaps a more important role in the managerial ranks, since the managers are, after all, the guardians of the organization's ideology. Thus, the newly hired MBA is put through the indoctrination program, and many large organizations rotate their managers frequently. Again, where managerial jobs are also sensitive or remote—ambassador, manager of a foreign subsidiary—these indoctrination programs take on special importance.

Relating the Position Design Parameters

It has been evident throughout our discussion that specialization, formalization, and training and indoctrination are not completely independent design parameters. In essence, we have been describing two fundamentally different kinds of positions. One we have called *unskilled:* because the work is highly rationalized, it involves extensive specialization in both the horizontal and vertical dimensions, and it is often coordinated and controlled by the direct formalization of behavior. The other we have called *professional:* because the work is complex, it cannot easily be specialized in the vertical dimension or formalized by the organization's technostructure. It is, however, horizontally specialized—professionals are experts in well-defined fields—and the coordination is often achieved by the standardization of skills in extensive training programs, generally given outside the organization. (There are, of course, other kinds of work that are coordinated neither by formalization nor by training.)

This suggests that **formalization and training are basically substitutes.** Depending on the work in question, the organization can either control it directly through its own procedures and rules, or else achieve indirect control by hiring duly trained professionals. That is not to say that the one cannot supplement the other; hospitals rely on professional training to coordinate much of their operating work, yet they also have rules. But in general, most positions seem to stress one coordinating mechanism or the other, not both equally.

In the case of formalization, it is quite clear where the control of the

work lies—with the designers of the work standards, notably the organization's analysts. But the issue is less clear in the case of training. Control ostensibly rests with the professional. But although they have a good deal of discretion and appear to be autonomous, professionals are in fact products of their development, much like the actor who has learned his lines well. So some control lies too with those outside agencies that do the training and set the professional standards—universities and professional associations. Thus, **the professional organization surrenders a good deal of control over its choice of workers as well as their methods of work to the outside institutions that train and certify them and thereafter set standards that guide them in the conduct of their work.** With control passes allegiance; professionals tend to identify more with their profession than with the organization wherein they happen to practice it.

It may be recalled that Weber included training in his definition of bureaucracy: "Office management . . . usually presupposes thorough and expert training," and "only persons who have the generally regulated qualifications to serve are employed." But we have just seen that training and formalization—the latter central to the Weber definition—are to some extent mutually exclusive. Might this explain the finding that bureaucracy may be centralized or decentralized? Perhaps in one kind of organization, because the operating work is unskilled, day-to-day control of it passes to the technostructure and the structure becomes centralized; in the other, because the work is professional, control of it remains with the operators themselves, and beyond them, with their associations.

This is not the place to answer that question. Suffice it at this point to note that by our definitions, **professionalism and bureaucracy can coexist in the same structure.** Remember that we defined bureaucracy as the extent to which organizational "behavior is predetermined or predictable, in effect standardized." We did not specify *how* it is standardized.

3

DESIGNING THE SUPERSTRUCTURE

Given a set of positions, designed in terms of specialization, formalization, and training and indoctrination, two obvious questions face the designer of organizational structure: How should these positions be grouped into units? And how large should each unit be? Both questions—which pertain to the design of the *superstructure* of the organization—have received extensive consideration in the literature. In this chapter we take them up.

It is through the process of grouping into units that the system of formal authority is established and the hierarchy of the organization is built. The organigram is the pictorial representation of this hierarchy—that is, of the results of the grouping process. Grouping can be viewed as a process of successive clustering. Individual positions are grouped into first-order clusters, or units; these are, in turn, grouped into larger clusters or units; and so on, until the entire organization is contained in the final cluster. For example, soldiers are grouped into squads, squads into platoons, platoons into companies, companies into battalions, and so on through regiments, brigades, and divisions, until the final grouping into armies.

Combining this process with those described in the preceding chapter, organizational design can proceed as follows, at least in principle. Given overall organizational needs—goals to be achieved, missions to be accomplished, as well as a technical system to accomplish them—the designer delineates all the tasks that must be done. This is essentially a "top-down" procedure, from general needs to specific tasks. He or she then combines these tasks into positions according to the degree of specialization desired, and determines how formalized each should be as well as what kind of training and indoctrination it should require. The next step is to build the superstructure, first by determining what types and how many positions should be grouped into the first-order units, and then what types and how many units should be grouped into ever-more-comprehensive units, until the hierarchy is complete. This last step is, of course, a "bot-