

Management: Science, Theory, and Practice¹

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One of the most important human activities is managing. Ever since people began forming groups to accomplish aims they could not achieve as individuals, managing has been essential to ensure the coordination of individual efforts. As society has come to rely increasingly on group effort and as many organized groups have grown larger, the task of managers has been rising in importance. The purpose of this book is to promote excellence of all persons in organizations, but especially managers, aspiring managers, and other professionals.

Definition of Management: Its Nature and Purpose

Management is the process of designing and maintaining an environment in which individuals, working together in groups, accomplish efficiently selected aims. This basic definition needs to be expanded:

1. As managers, people carry out the managerial functions of planning, organizing, staffing, leading, and controlling.
2. Management applies to any kind of organization.
3. It applies to managers at all organizational levels.
4. The aim of all managers is the same: to create a surplus.
5. Managing is concerned with productivity; that implies effectiveness and efficiency.

The Functions of Management

Many scholars and managers have found that the analysis of management is facilitated by a useful and clear organization of knowledge. As a first order of knowledge classification, we have used the five functions of managers: planning, organizing, staffing, leading, and controlling. Thus, the concepts, principles, theory, and techniques are organized around these functions and become the basis for discussion.

This framework has been used and tested for many years. Although there are different ways of organizing managerial knowledge, most textbook authors today have adopted this or a similar framework even after experimenting at times with alternative ways of structuring knowledge.

Although the emphasis in this article is on managers' tasks in designing an internal environment for performance, it must never be overlooked that managers must operate in the external environment of an enterprise as well as in the internal environment of an organization's various departments. Clearly, managers cannot perform their tasks well unless they understand, and are responsive to, the many elements of the external environment—economic, technological, social, political, and ethical factors that affect their areas of operations.

Management as an Essential for Any Organization

Managers are charged with the responsibility of taking actions that will make it possible for individuals to make their best contributions to group objectives. Management thus applies to small and large organiza-

¹ This paper has been modified for this book by Heinz Weihrich from Chapter 1 of *Management: A Global Perspective*, 10th ed. by Heinz Weihrich and Harold Koontz, McGraw-Hill, Inc., New York, N.Y., 1993. Reproduced by permission of McGraw-Hill, Inc.

tions, to profit and not-for-profit enterprises, to manufacturing as well as service industries. The term "enterprise" refers to business, government agencies, hospitals, universities, and other organizations, because almost everything said in this book refers to business as well as nonbusiness organizations. Effective managing is the concern of the corporation president, the hospital administrator, the government first-line supervisor, the Boy Scout leader, the bishop in the church, the baseball manager, and the university president.

Management at Different Organizational Levels

Managers are charged with the responsibility of taking actions that will make it possible for individuals to make their best contributions to group objectives. To be sure, a given situation may differ considerably among various levels in an organization or various types of enterprises. Similarly, the scope of authority held may vary and the types of problems dealt with may be considerably different. Furthermore, the person in a managerial role may be directing people in the sales, engineering, or finance department. But the fact remains that, as managers, all obtain results by establishing an environment for effective group endeavor.

All managers carry out managerial functions. However, the time spent for each function may differ. Figure 1² shows an approximation of the relative time spent for each function. Thus, top-level managers spend more time on planning and organizing than lower level managers. Leading, on the other hand, takes a great deal of time for first-line supervisors. The difference in time spent on controlling varies only slightly for managers at various levels.

All Effective Managers Carry Out Essential Functions

All managers carry out the functions of *planning*, *organizing*, *staffing*, *leading*, and *controlling*, although the time spent in each function will differ and the skills required by managers at different organizational levels vary. Still, all managers are engaged in getting things done through people. Although the managerial concepts, principles, and theories have general validity, their application is an art and depends on the situation. Thus, managing is an art using the underlying sciences. Managerial activities are common to all managers, but the practices and methods must be adapted to the particular tasks, enterprises, and situations.

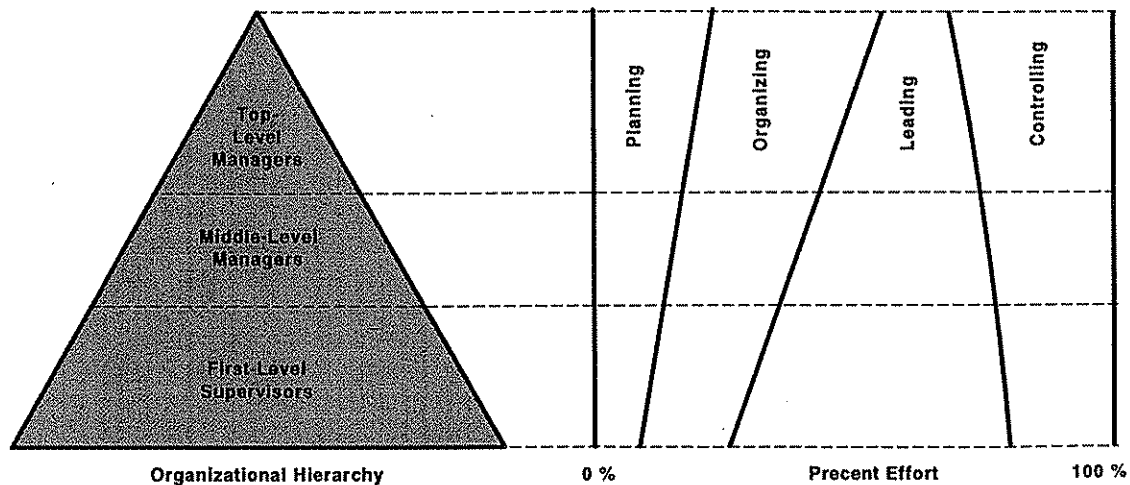


Figure 1. Time spent in carrying out managerial functions.

² This figure is partly based on and adapted from T.A. Money, T.H. Jerdee, and S.J. Carroll's "The Job(s) of Management," *Industrial Relations*, Feb. 1965, pp. 97-110.

This concept is sometimes called the *universality of management* in which managers perform the same functions regardless of their place in the organizational structure or the type of enterprise in which they are managing.

Managerial Skills and the Organizational Hierarchy

Robert L. Katz identified three kinds of skills for administrators.³ To these may be added a fourth—the ability to design solutions.

1. *Technical skill* is knowledge of and proficiency in activities involving methods, processes, and procedures. Thus it involves working with tools and specific techniques. For example, mechanics work with tools, and their supervisors should have the ability to teach them how to use these tools. Similarly, accountants apply specific techniques in doing their job.
2. *Human skill* is the ability to work with people; it is cooperative effort; it is teamwork; it is the creation of an environment in which people feel secure and free to express their opinions.

3. *Conceptual skill* is the ability to see the “big picture,” to recognize significant elements in a situation, and to understand the relationships among the elements.
4. *Design skill* is the ability to solve problems in ways that will benefit the enterprise. To be effective, particularly at upper organizational levels, managers must be able to do more than see a problem. If managers merely see the problem and become “problem watchers,” they will fail. They must have, in addition, the skill of a good design engineer in working out a practical solution to a problem.

The relative importance of these skills may differ at various levels in the organization hierarchy. As shown in Figure 2, technical skills are of greatest importance at the supervisory level. Human skills are also helpful in the frequent interactions with subordinates. Conceptual skills, on the other hand, are usually not critical for lower level supervisors. At the middle-management level, the need for technical skills decreases; human skills are still essential; and the conceptual skills gain in importance. At the top-management level, conceptual and design abilities and human skills are especially valuable, but there is relatively little need for technical abilities. It is assumed,

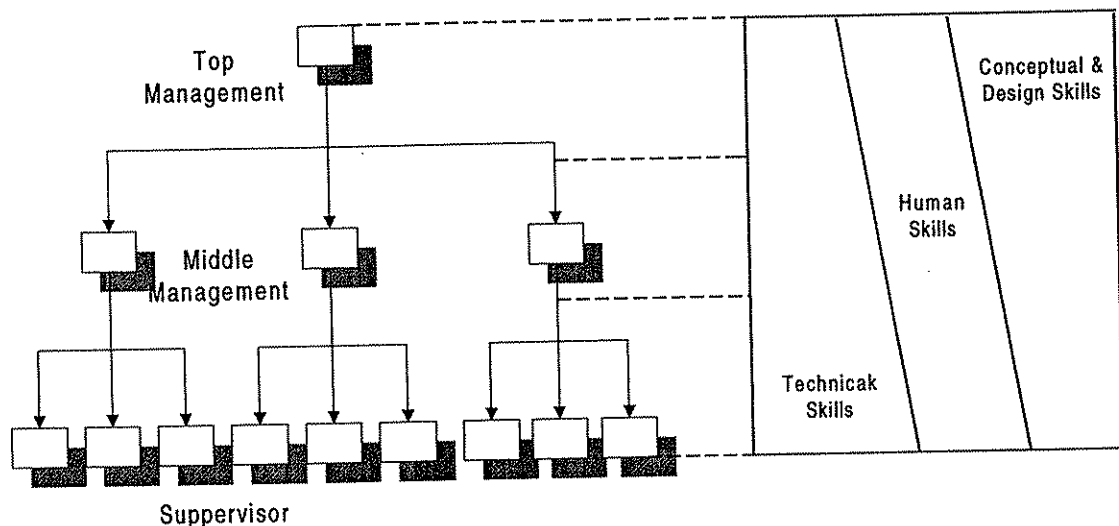


Figure 2. Skills versus management levels.

³ R.L. Katz, “Skills of an Effective Administrator,” *Harvard Business Review*, Jan.-Feb., 1955, pp. 33-42, and R.L. Katz, “Retrospective Commentary,” *Harvard Business Review*, Sept.-Oct. 1974, pp. 101-102.

especially in large companies, that chief executives can utilize the technical abilities of their subordinates. In smaller firms, however, technical experience may still be quite important.

The Aim of All Managers

Nonbusiness executives sometimes say that the aim of business managers is simple—to make a profit. But profit is really only a measure of a *surplus* of sales dollars (or in any other currency) over expense dollars. In a very real sense, in all kinds of organizations, whether commercial and noncommercial, the logical and publicly desirable aim of all managers should be a surplus—managers must establish an environment in which people can accomplish group goals with the least amount of time, money, materials, and personal dissatisfaction, or where they can achieve as much as possible of a desired goal with available resources. In a nonbusiness enterprise such as a police department, as well as in units of a business (such as an accounting department) that are not responsible for total business profits, managers still have budgetary and organizational goals and should strive to accomplish them with the minimum of resources.

Productivity, Effectiveness, and Efficiency

Another way to view the aim of all managers is to say that they must be productive. After World War II the United States was the world leader in productivity. But in the late 1960s productivity began to decelerate. Today government, private industry, and universities recognize the urgent need for productivity improvement. Until very recently we frequently looked to Japan to find answers to our productivity problem, but this overlooks the importance of effectively performing fundamental managerial and nonmanagerial activities.

Definition of productivity. Successful companies create a surplus through productive operations. Although there is not complete agreement on the true meaning of productivity, we will define it as *the output-input ratio within a time period with due consideration for quality*. It can be expressed as follows:

Productivity = $\frac{\text{output}}{\text{input}}$ within a time period,
quality considered

Thus, productivity can be improved by increasing outputs with the same inputs, by decreasing inputs but maintaining the same outputs, or by increasing output

and decreasing inputs to change the ratio favorably. In the past, productivity improvement programs were mostly aimed at the worker level. Yet, as Peter F. Drucker, one of the most prolific writers in management, observed, "The greatest opportunity for increasing productivity is surely to be found in knowledge, work itself, and especially in management."⁴

Definitions of effectiveness and efficiency. Productivity implies effectiveness and efficiency in individual and organizational performance. *Effectiveness* is the achievement of objectives. *Efficiency* is the achievement of the ends with the least amount of resources. To know whether they are productive, managers must know their goals and those of the organization.

Managing: Science or Art?

Managing, like so many other disciplines—medicine, music composition, engineering, accountancy, or even baseball—is in large measure an art but founded on a wealth of science. It is making decisions on the basis of business realities. Yet managers can work better by applying the organized knowledge about management that has accrued over the decades. It is this knowledge, whether crude or advanced, whether exact or inexact, that, to the extent it is well organized, clear, and pertinent, constitutes a science. Thus, managing as practiced is an art; the organized knowledge underlying the practice may be referred to as a science. In this context science and art are not mutually exclusive but are complementary.

As science improves so should the application of this science (the art) as has happened in the physical and biological sciences. This is true because the many variables with which managers deal are extremely complex and intangible. But such management knowledge as is available can certainly improve managerial practice. Physicians without the advantage of science would be little more than witch doctors. Executives who attempt to manage without such management science must trust to luck, intuition, or to past experiences.

In managing, as in any other field, unless practitioners are to learn by trial and error (and it has been said that managers' errors are their subordinates' trials), there is no place they can turn for meaningful guidance other than the accumulated knowledge underlying their practice.

⁴ P.F. Drucker, *Management, Tasks, Responsibilities, Practices*, Harper & Row, New York, 1973, p. 69.

The Elements of Science

Science is organized knowledge. The essential feature of any science is the application of the scientific method to the development of knowledge. Thus, we speak of a science as having clear concepts, theory, and other accumulated knowledge developed from hypotheses (assumptions that something is true), experimentation, and analysis.

The Scientific Approach

The scientific approach first requires clear *concepts*—mental images of anything formed by generalization from particulars. These words and terms should be exact, relevant to the things being analyzed, and informative to the scientist and practitioner alike. From this base, the *scientific method* involves determining facts through observation. After classifying and analyzing these facts, scientists look for causal relationships. When these generalizations or hypotheses are tested for accuracy and appear to be true, that is, to reflect or explain reality, and therefore to have value in predicting what will happen in similar circumstances. They are called *principles*. This designation does not always imply that they are unquestionably or invariably true, but that they are believed to be valid enough to be used for prediction.

Theory is a systematic grouping of interdependent concepts and principles that form a framework for a significant body of knowledge. Scattered data, such as what we may find on a blackboard after a group of engineers has been discussing a problem, are not information unless the observer has knowledge of the theory that will explain relationships. Theory is, as C.G. Homans has said, "in its lowest form a classification, a set of pigeonholes, a filing cabinet in which fact can accumulate. Nothing is more lost than a loose fact."

The Role of Management Theory

In the field of management, then, the role of theory is to provide a means of classifying significant and pertinent management knowledge. In designing an effective organization structure, for example, a number of principles are interrelated and have a predictive value for managers. Some principles give guidelines for delegating authority; these include the principle of delegating by results expected, the principle of equality of authority and responsibility, and the principle of unity of command.

Principles in management are fundamental truths (or what are thought to be truths at a given time), explaining relationships between two or more sets of variables, usually an independent variable and a dependent variable. Principles may be *descriptive* or *predictive*, and are not prescriptive. That is, they describe how one variable relates to another—what will happen when these variables interact. They do not prescribe what we should do. For example, in physics, if gravity is the only force acting on a falling body, the body will fall at an increasing speed; this principle does not tell us whether anyone should jump off the roof of a high building. Or take the example of Parkinson's law: Work tends to expand to fill the time available. Even if Parkinson's somewhat frivolous principle is correct (as it probably is), it does not mean that a manager should lengthen the time available for people to do a job.

To take another example, in management the principle of unity of command states that the more often an individual reports to a single superior, the more that individual is likely to feel a sense of loyalty and obligation, and the less likely it is that there will be confusion about instruction. The principle merely predicts. It in no sense implies that individuals should never report to more than one person. Rather, it implies that if they do so, their managers must be aware of the possible dangers and should take these risks into account in balancing the advantages and disadvantages of multiple command.

Like engineers who apply physical principles to the design of an instrument, managers who apply theory to managing must usually blend principles with realities. A design engineer is often faced with the necessity of combining considerations of weight, size, conductivity, and other factors. Likewise, a manager may find that the advantages of giving a controller authority to prescribe accounting procedures throughout an organization outweigh the possible costs of multiple authority. But if they know theory, these managers will know that such costs as conflicting instructions and confusion may exist, and they will take steps—such as making the controller's special authority crystal clear to everyone involved—to minimize or outweigh any disadvantages.

Management Techniques

Techniques are essentially ways of doing things, methods of accomplishing a given result. In all *fields of practice* they are important. They certainly are in managing, even though few really important managerial techniques have been invented. Among them are budgeting, cost accounting, network planning and

control techniques like the Program Evaluation and Review Technique (PERT) or the critical path method (CPM), rate-of-return-on-investment control, various devices of organizational development, managing by objectives, total quality management (TQM). Techniques normally reflect theory and are a means of helping managers undertake activities most effectively.

The Systems Approach to Operational Management

An organized enterprise does not, of course, exist in a vacuum. Rather, it depends on its external environment; it is a part of larger systems such as the industry to which it belongs, the economic system, and society. Thus, the enterprise receives inputs, transforms them, and exports the outputs to the environment, as shown by the very basic model in Figure 3. However, this simple model needs to be expanded and developed into a model of operational management that indicates how the various inputs are transformed through the managerial functions of planning, organizing, staffing, leading, and controlling. Clearly, any business or other organization must be described by an open-system

model that includes interactions between the enterprise and its external environment.

Inputs and Stakeholders

The inputs from the external environment may include people, capital, and managerial skills, as well as technical knowledge and skills. In addition, various groups of people make demands on the enterprise. For example, employees want higher pay, more benefits, and job security. On the other hand, consumers demand safe and reliable products at a reasonable price. Suppliers want assurance that their products will be bought. Stockholders want not only a high return on their investment but also security for their money. Federal, state, and local governments depend on taxes paid by the enterprise, but they also expect the enterprise to comply with their laws. Similarly, the community demands that enterprises be "good citizens," providing the maximum number of jobs with a minimum of pollution. Other claimants to the enterprise may include financial institutions and labor unions; even competitors have a legitimate claim for fair play. It is clear that many of these claims are incongruent, and it is the managers' job to integrate the legitimate objectives of the claimants.

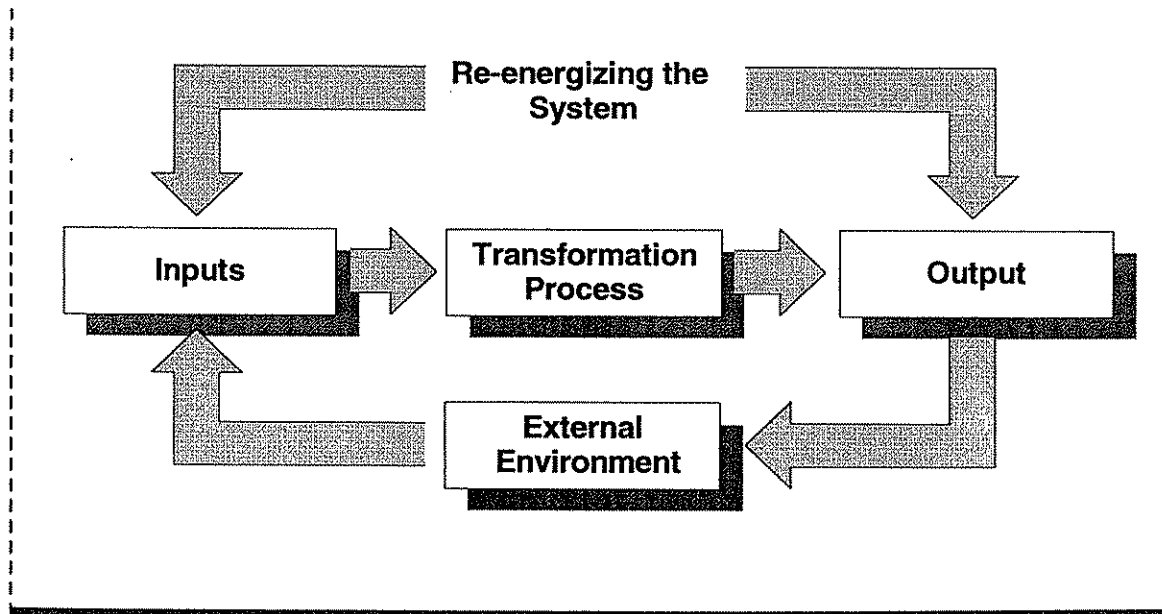


Figure 3. Input-output model.

The Managerial Transformation Process

Managers have the task of transforming inputs, effectively and efficiently, into outputs. Of course, the transformation process can be viewed from different perspectives. Thus, one can focus on such diverse enterprise functions as finance, production, personnel, and marketing. Writers on management look on the transformation process in terms of their particular approaches to management. Specifically, as you will see, writers belonging to the human behavior school focus on interpersonal relationships; social systems theorists analyze the transformation by concentrating on social interactions; and those advocating decision theory see the transformation as sets of decisions. However we believe that the most comprehensive and useful approach for discussing the job of managers is to use the managerial functions of planning, organizing, staffing, leading, and controlling as a framework for organizing managerial knowledge (see Figure 4).

The Communication System

Communication is essential to all phases of the managerial process: It integrates the managerial functions and links the enterprise with its environment. A communication system is a set of information providers and information recipients and the means of transferring information from one group to another group with the understanding that the messages being transmitted will be understood by both groups. For example, the objectives set in planning are communicated so that the appropriate organization structure can be devised. Communication is essential in the selection, appraisal, and training of managers to fill the roles in this structure. Similarly, effective leadership and the creation of an environment conducive to motivation depend on communication. Moreover, it is through communication that one determines whether events and performance conform to plans. Thus, it is communication that makes managing possible.

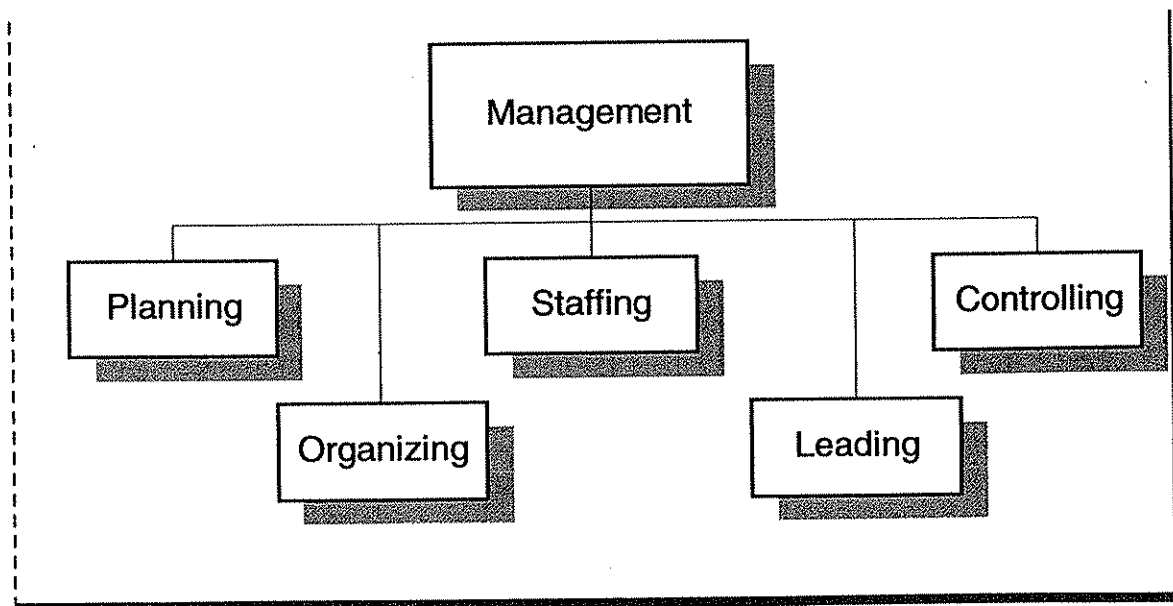


Figure 4. Management model.

The second function of the communication system is to link the enterprise with its external environment, where many of the claimants are. Effective managers will regularly scan the external environment. While it is true that managers may have little or no power to change the external environment, they have no alternative but to respond to it. For example, one should never forget that the customer, who is the reason for the existence of virtually all businesses, is outside a company. It is through the communication system that the needs of customers are identified; this knowledge enables the firm to provide products and services at a profit. Similarly, it is through an effective communication system that the organization becomes aware of competition and other potential threats and constraining factors.

Outputs

Managers must secure and utilize inputs to the enterprise, to transform them through the managerial functions—with due consideration for external variables—to produce outputs.

Although the kinds of outputs will vary with the enterprise, they usually include a combination of products, services, profits, satisfaction, and integration of the goals of various claimants to the enterprise. Most of these outputs require no elaboration, and only the last two will be discussed.

The organization must indeed provide many “satisfactions” if it hopes to retain and elicit contributions from its members. It must contribute to the satisfaction not only of basic material needs (for example, earning money to buy food and shelter or having job security) but also of needs for affiliation, acceptance, esteem, and perhaps even self-actualization.

Another output is goal integration. As noted above, the different claimants to the enterprise have very divergent—and often directly opposing—objectives. It is the task of managers to resolve conflicts and integrate these aims. This is not easy, as one former Volkswagen executive discovered. Economics dictated the construction of a Volkswagen assembly plant in the United States. However, an important claimant, German labor, out of fear that jobs would be eliminated in Germany, opposed this plan. This example illustrates the importance of integrating the goals of various claimants to the enterprise, which is indeed an essential task of any manager.

Re-energizing the System or Providing Feedback to the System

Finally, we should notice that in the systems model of operational management, some of the outputs become inputs again. Thus, the satisfaction of employees becomes an important human input to the enterprise. Similarly, profits, the surplus of income over costs, are reinvested in cash and capital goods, such as machinery, equipment, buildings, and inventory.

The Functions of Managers

Managerial functions provide a useful framework for organizing management knowledge. There have been no new ideas, research findings, or techniques that cannot readily be placed in the classifications of planning, organizing, staffing, leading, and controlling.

Planning

Planning involves selecting missions and objectives and the actions to achieve them; it requires decision making, that is, choosing future courses of action from among alternatives. There are various types of plans, ranging from overall purposes and objectives to the most detailed actions to be taken, such as to order a special stainless steel bolt for an instrument or to hire and train workers for an assembly line. No real plan exists until a decision—a commitment of human or material resources or reputation—has been made. Before a decision is made, all we have is a planning study, an analysis, or a proposal, but not a real plan.

Organizing

People working together in groups to achieve some goal must have roles to play, much like the parts actors fill in a drama, whether these roles are ones they develop themselves, are accidental or haphazard, or are defined and structured by someone who wants to make sure that people contribute in a specific way to group effort. The concept of a “role” implies that what people do has a definite purpose or objective; they know how their job objective fits into group effort, and they have the necessary authority, tools, and information to accomplish the task.

Organizing, then, is that part of managing that involves establishing an intentional structure of roles for people to fill in an organization. It is intentional in the

sense of making sure that all the tasks necessary to accomplish goals are assigned and, it is hoped, assigned to people who can do them best. Imagine what would have happened if such assignments had not been made in the program of flying the special aircraft Voyager around the globe without stopping or refueling. The purpose of an organization structure is to help in creating an environment for human performance. It is, then, a management tool and not an end in and of itself. Although the structure must define the tasks to be done, the roles so established must also be designed in light of the workers' abilities and motivations.

Staffing

Staffing involves filling, and keeping filled, the positions in the organization structure. This is done by identifying workforce requirements, inventorying the people available, recruiting, selecting, placing, promoting, planning the career, compensating, and training or otherwise developing both candidates and current job holders to accomplish their tasks effectively and efficiently.

Leading

Leading is influencing people so that they will contribute to organization and group goals; it has to do predominantly with the interpersonal aspect of managing. All managers would agree that their most important problems arise from people—their desires and attitudes, their behavior as individuals and in groups—and that effective managers also need to be effective leaders. Since leadership implies followership and people tend to follow those who offer a means of satisfying their own needs, wishes, and desires, it is understandable that leading involves motivation, leadership styles and approaches, and communication.

Controlling

Controlling is the measuring and correcting of activities of subordinates, to ensure that events conform to plans. It measures performance against goals and plans, shows where negative deviations exist, and, by putting in motion actions to correct deviations, helps ensure accomplishment of plans. Although planning must precede controlling, plans are not self-achieving. The plan guides managers in the use of resources to

accomplish specific goals. Then activities are checked to determine whether they conform to plans.

Control activities generally relate to the measurement of achievement. Some means of controlling, like the budget for expense, inspection records, and the record of labor hours lost, are generally familiar. Each measures and shows whether plans are working out. If deviations persist, correction is indicated. But what is corrected. Nothing can be done about reducing scrap, for example, or buying according to specifications, or handling sales returns unless one knows who is responsible for these functions. (Compelling events to conform to plans means locating the persons who are responsible for results that differ from planned action and then taking the necessary steps to improve performance. Thus, controlling what people do controls outcomes.

Coordination, the Essence of Managership

Some authorities consider coordination to be an additional function of management. It seems more accurate, however, to regard it as the essence of managership, for managing's purpose is to harmonize individual efforts in the accomplishment of group goals. Each of the managerial functions is an exercise contributing to coordination.

Even in the case of a church or a fraternal organization, individuals often interpret similar interests in different ways, and their efforts toward mutual goals do not automatically mesh with the efforts of others. It thus becomes the central task of the manager to reconcile differences in approach, timing, effort, or interest, and to harmonize individual goals to contribute to organization goals.

Summary

Management is the process of designing and maintaining an environment in which individuals, working together in groups, accomplish efficiently selected aims. Managers are charged with the responsibility of taking actions that will make it possible for individuals to make their best contributions to group objectives. Managing as practiced is an art; the organized knowledge underlying the practice may be referred to as a science. In this context science and art are not mutually exclusive but are complementary.

All managers carry out the functions of *planning*, *organizing*, *staffing*, *leading*, and *controlling*, although the time spent in each function will differ and the skills required by managers at different organizational levels vary. Managerial activities are common to all managers, but the practices and methods must be adapted to the particular tasks, enterprises, and situations. *The universality of management* states that managers perform the same functions regardless of their place in the organizational structure or the type of enterprise in which they are managing.