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## Behavioral Theory of the Firm

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The chapter begins with Barnard's (1938) *The Functions of the Executive* and is followed by four books from the Carnegie School: Simon's (1947) *Administrative Behavior*, March and Simon's (1958) *Organizations*, Cyert and March's (1963) *A Behavioral Theory of the Firm*, and Simon's (1982) *Models of Bounded Rationality: Behavioral Economics and Business Organization*. These books contain some of the best scholarly writings that the research literature has to offer on the behavioral theory of the firm. These research books are worth studying in detail because they continue to be widely cited today and because their clarity and relevance have not yet been surpassed.

The decision to classify the behavioral theory of the firm as part of an organizational economics approach to strategic management has its precedents, notably in the work of Barney and Ouchi (1986). Nonetheless, given that my book is part of a series, it might seem that this topic should be reserved for a research book on the behavioral foundations of strategy. I am sure it will reappear in that context. However, the behavioral theory of the firm also is part of organizational economics. Organizational economics is a multidisciplinary endeavor that draws on the broader field of economics and also gives attention to contributions from organization theory, law, and other areas. As an important example, Herbert Simon, whose 1947 and 1982 books are reviewed in this chapter, was awarded the Nobel Prize in the discipline of economics for work that included his contributions to the behavioral theory of the firm.

Furthermore, the behavioral theory of the firm serves as an important building block in transaction costs theory (Williamson, 1975). This theory is the subject of Chapter 2 and a central topic in organizational economics. Behavioral theory is also an important building block in dynamic capabilities theory and evolutionary economics (Nelson & Winter, 1982). This research is the subject of Chapter 5.

In terms of the five books chosen, Barnard (1938) combines the two cultures of science and art, and it is the aesthetic reading of Barnard that explains the intensity of students' responses to this work. Barnard offers an intense, structured, and coherent art form that depends on students' use of their capacities and their readiness to apprehend the aesthetic experience of management based on the author's intimate, habitual, interested experience (Mahoney, 2002).

Simon (1947) proposes a theory of human choice and decision making that aims to accommodate both those rational aspects of choice that have been the principal concern of economists and those properties and limitations of the human decision-making mechanisms that have attracted the attention of psychologists and practical decision makers. Simon focuses primarily on the decision-making processes that are internal to the organization and describes how organizations influence the decisions of their members, bring about consistency among those decisions, and guarantee that the decisions will be compatible with the overall organizational goals.

March and Simon (1958) persuasively argue that an adequate study of human behavior in organizations must take into account the motivational, attitudinal, and rational aspects of human behavior. Thus, both the works of economists on the planning process and the works of psychologists on organizational communication and problem-solving capabilities contribute to the evolving science of organization.

Cyert and March (1963) emphasize the actual process of making business decisions and provide detailed observations of the ways in which organizations make these decisions. Cyert and March develop an empirically relevant, process-oriented general theory of economic decision making by a business firm that, in my judgment, has stood the test of time. Cyert and March present the rudiments of a behavioral theory of the firm that have proven to be relevant both to economic theory and to the theory of complex organizations.

Simon's (1982) *Models of Bounded Rationality* takes up where *Administrative Behavior* (Simon, 1947) left off—attempting to understand decision making in its most general sense and, in particular, to show that economics and psychology could contribute to illuminating organizational decision-making processes. More specifically, Simon (1982) is concerned with explaining why there has been so little mutual influence of economics and psychology on each other, why a deeper dialogue needs to be developed between these two disciplines, and what the subject matter of their discourse could be.

In the process, Simon (1982) reveals a deep belief in and commitment to the interdependencies and complementarity of the several social sciences.

Simon borrows not only from economics but also from operations research, artificial intelligence, and cognitive psychology for the purpose of building a theory of procedural rationality (i.e., a theory of the processes of decision making) in complex, dynamic circumstances.

Though these arguments are a sufficient introduction to the chapter, I would make a final observation related to teaching. Those in strategic management who teach managers and managers-to-be will know that our students appreciate receiving not only theories for predicting but also theories that provide explanation. In other words, practitioners appreciate know-how but are deeply seeking advances in know-why. It has been my experience in teaching executives that a behavioral theory of the firm resonates with these managers and proves instructive for them. It makes beginning with the work of a practicing manager highly appropriate.

### **The Functions of the Executive (*Barnard, 1938*)**

In my judgment, this book is the most high-powered intellectual contribution to organization or economic theory ever written by a practicing manager. Barnard's (1938) purpose is to provide a comprehensive theory of cooperative behavior in formal organizations.<sup>1</sup> Barnard observes that formal organization involves conscious, deliberate, and purposeful cooperation among people. One of the indispensable functions of an organization is to promote communication among these individuals. Another function is to maintain cohesiveness by regulating the willingness of various stakeholders to serve the organization and by maintaining the stability of authority. A third function is to maintain a feeling of personal integrity, self-respect, and independent choice.

But Barnard (1938) maintains that successful cooperation in or by formal organizations is the abnormal, not the normal, condition. We observe from day to day the successful survivors among innumerable organizational failures. Failure to cooperate, failure of cooperation, failure of organization, disorganization, dis-integration, destruction of organization—and reorganization—are the characteristic facts of human history.

The executive is critical. Executives inculcate belief in a common purpose. More concretely, executives synthesize the actions of contradictory

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<sup>1</sup>In addition to Barnard's (1938) classic, Barnard (1948) provides a collection of his selected papers. For modern assessments of Barnard (1938), see Mahoney (2002); Mahoney, Huff, and Huff (1994a, 1994b); Scott (1987); and Williamson (1995). Mahoney (2002) summarizes the major elements of Barnard's (1938, 1948) theory with special attention to Barnard's concepts of leadership and responsibility that are essential for distinctive competence (Selznick, 1957).

forces and reconcile conflicting instincts, interests, conditions, positions, and ideals.

*Informal Organization.* While Barnard (1938) defines the formal organization as a system of consciously coordinated activities or forces of two or more persons, this book also emphasizes the important role of informal organization within formal organizations. Crucially, Barnard regards informal organization as a means of maintaining the personality of the individual against certain effects of formal organizations that tend to disintegrate the personality. In fact, Barnard concludes that *expansion of cooperation and the development of the individual are mutually dependent realities and that a due proportion or balance between them is a necessary condition of human welfare.*

*Incentives.* Barnard (1938) observes that incentives are fundamental in formal organization. Inadequate incentives mean dissolution, unwarranted changes of organization purpose, or failure of cooperation. Hence, in all sorts of organizations, affording adequate incentives becomes essential. The specific means available include (a) material inducements, not just money but other things; (b) personal, non-material inducements, including distinction, prestige, and personal power; (c) desirable physical conditions; and (d) ideal benefactions, by which Barnard means the capacity of organizations to satisfy personal ideals.

The remarks about personal ideals and interests are very much in line with more recent discussions about identity and identification. Barnard (1938) is also contemporary in recognizing the incentives associated with (e) social attractiveness, or the social compatibilities people feel in their work environment; (f) conditions of habitual methods and attitudes; (g) the opportunity for enlarged participation; and (h) the condition of communion, or the feeling of solidarity or comradeship. None of this solidarity happens without effort. In addition to incentives, the book discusses persuasion and the inculcation of motives as important aspects of the organization.

*Authority.* Authority is the character of a communication (or order) in a formal organization by virtue of which a contributor accepts such an order. Barnard (1938) suggests that a person can and will accept a communication as authoritative only when four conditions simultaneously are met:

- The person can and does understand the communication.
- At the time of the person's decision, the person believes that the order is not inconsistent with the purpose of the organization.

- At the time of the person's decision, the person believes the order to be compatible with his or her personal interest as a whole.
- The person is able mentally and physically to comply with the order.

Perhaps the most well-known idea in the book is found in this discussion. Barnard (1938) argues that there exists a zone of indifference in each individual within which orders are acceptable without conscious questioning of their authority. Barnard further maintains that since the efficiency of organization is affected by the degree to which individuals assent to others, denying the authority of an organization communication is a threat to the interests of all individuals who derive a net advantage from their connection with the organization, unless the orders are unacceptable to them also. Thus, nothing is more real than authority.

An interesting corollary can be found in the assertion that the fine art of executive decision making includes not deciding questions that are not now pertinent, not deciding prematurely, not making a decision that cannot be made effective, and not making decisions that others should make. These are interesting, and rather unique, observations; Barnard (1938) argues the proper use of authority preserves morale, develops competence, and maintains authority. However, the natural reluctance of some people to decide, their persistent disposition to avoid responsibility, and their fear of criticism typically overwhelm executives. Executives thus must learn to protect themselves from the excessive burdens of decision making, if they are not already protected by a well-regulated and habitual distribution of responsibilities.

Another contemporary feature of this book is that the executive process Barnard (1938) describes transcends intellectual methods. *Feeling, judgment, sense, proportion, balance, appropriateness*, and other words are used to describe what executives should aspire to become. Leadership is more a matter of art than a matter of science. The processes used are more aesthetic than logical, derived chiefly from intimate, habitual, interested experience. For Barnard, coordination is a creative act.

Executive responsibility is also emphasized. Whatever morality exists in an individual becomes effective in his or her conduct, and the organization as a collective of cooperating individuals endures in proportion to the breadth of the morality by which it is governed. This assertion is only to say that foresight, long purposes, and high ideals are the basis for the persistence of cooperation (e.g., "old men and old women plant trees").

Although emphasizing instincts and morality, Barnard (1938) believes that a science of organization is also possible. Barnard recommends that treatises on management be written from various perspectives, including social anthropology, sociology, social psychology, and institutional economics but warns that we should not deceive ourselves by thinking that a science of cooperation and organization will alone promote greater integration of social forces. Inspiration is necessary to inculcate the sense of unity and to create economic ideals. Emotional rather than intellectual acceptance is required.

Barnard (1938) presents a systems view of the organization that contains a psychological theory of motivation and behavior, a sociological theory of cooperation and complex interdependencies, and an ideology based on a meritocracy. These insights greatly influenced Simon (1947), to whose early and influential book we now turn.

### Administrative Behavior (*Simon, 1947*)

Indeed, Barnard wrote the foreword to Simon's (1947) *Administrative Behavior*. Barnard writes, "[Simon's book] has the right 'feel.' This means that I find Professor Simon's apprehension of the structure of organized action consonant with my own experience. It therefore appeals to me as sound" (p. xiii). From Simon's classic book concerning decision-making processes, readers should be able to discern principles of general organization that apply to administrative organization of great variety. Simon provides us with a self-conscious attempt to develop adequate linguistic and conceptual tools for realistically and significantly describing organizations. Simon's primary thesis is that decision making is the heart of organization and that the vocabulary of organization theory must be derived from the logic and psychology of human choice.

Simon (1947) provides a brilliant synthesis of the practical teachings of Barnard (1938) and the evolving positive science of organization theory. As already noted, Simon's *Administrative Behavior* is a landmark in organization theory as well as the economics of organization. Indeed, the organization theorist William Scott (1987, p. 45) classifies Simon within the paradigm of organizations as rational systems. From the perspective of the rational systems view, the behavior of organizations is considered as actions performed by purposeful and coordinated agents. In this sense, Simon is consistent with the logic of economics and uses the familiar language of *information*, *efficiency*, *implementation*, and *design*. Unlike neoclassical economics, however, Simon also insists

on coming to terms with cognitive limitations, which are discussed in terms of *constraints*, *authority*, *routines*, and *bounded rationality*. These terms imply that the rationality of organization behavior takes place within clearly specified limits. In short, this landmark book provides *an attention-based theory of the firm* of interest to both economic and organizational theorists.

*Bounded Rationality.* Simon (1947) observes that a person does not live for years in a particular position in an organization, exposed to some streams of communication, shielded from other streams of communication, without profound effects on what the person knows, believes, hopes, emphasizes, fears, and proposes. Researchers can understand neither the input nor the output of executives without understanding the organization in which executives work.

The term *organization*, for Simon (1947), refers to a complex pattern of human communications and relationships. This pattern of relationships provides each member of an organization or group within an organization much of the information and many of the assumptions, goals, and attitudes that enter into decisions. The pattern of relationships provides a set of stable and comprehensible expectations as to what the other members of the group are doing and how other members are likely to react to what is said and done. Every executive makes decisions and takes actions with one eye on the matter itself and one eye on the effects of this decision on the future pattern of relationships—that is to say, on its organizational consequences.

In summary, organizations are important because they provide much of the input that develops an executive's personal qualities and habits. Organizations also provide those in responsible positions the means for exercising authority and influence over others, a topic discussed in some detail in the following pages. Third, the organization influences the environments of information in which decisions are carried out.

When executives give attention to these indirect consequences, they concern themselves with organization. Sales managers react like sales managers because they occupy particular organizational positions, receive particular kinds of communications, are responsible for particular subgoals, and experience particular kinds of (economic) pressures. Executives can modify beliefs and attitudes by changing the flows of communications and thus modify decisions being made.

Decisions are also influenced by the authority relationship. On the one hand, classical organization theory emphasizes formal lines of authority in a hierarchical organization, implying (as Barnard [1938] observed) that legitimate commands are typically carried out. On the

other hand, the human relations school emphasizes the value of broad participation in decision making, demonstrates the importance of informal organization and the consequent limits on formal authority, and raises difficult questions about the human costs of excessively authoritarian environments.

These are not only different, more social, concepts of authority but also different concepts of rationality. Simon (1947) argues that the social sciences suffer from acute schizophrenia in their treatment of rationality. At one extreme, neoclassical economists attribute to “economic man” an omniscient rationality. Economic man has a complete and consistent system of preferences that allows him to choose correctly among the entire set of alternatives available to him. He is completely aware of what these alternatives are, there are no limits on the complexity of the computations he can perform to determine what alternatives are best, and he correctly makes all probability calculations. Tendencies uncovered by social psychology, traceable to Freud, which tend to reduce all cognition to affect, are at the other extreme. This alternative point of view notes that coins look larger to poor children than to rich children, observes that the pressures of a social group can persuade a person that he or she sees spots that are not there, shows that the process of group problem solving involves accumulating and discharging tensions, and so on.

Simon’s (1947) major contribution to the economics of organization, as well as to organization theory, is the argument that it is precisely in the realm where human behavior is intendedly rational, but only limitedly so, that there is room for a genuine theory of organization. Simon maintains that *organizational behavior is the theory of intended and bounded rationality—it is about the behavior of humans who satisfice because they do not have the abilities to maximize. Whereas neoclassical economic man maximizes—selects the best alternative from among all those available to him—organizational man satisfices—looks for a course of action that is satisfactory or good enough. Economic man deals with the real world in all of its complexity, whereas organization man perceives a drastically simplified model of the real world.*

What is the significance of these two characteristics of satisficing and bounded rationality for organizational man? First, because he satisfices rather than maximizes, organizational man can make choices without first examining all possible behavior alternatives and without ascertaining that alternatives considered are in fact all those available. Second, because he ignores the interrelatedness of all things (so stupefying



to thought and action), organizational man can make decisions with relatively simple rules of thumb that do not make impossible demands on the capacity for thought. These critical theoretic observations have many interesting consequences.

*Decision Making and Administrative Organization.* Simon (1947) argues that it is *the process of choice that leads to action*. Although any practical activity involves both deciding and doing, it was not commonly recognized until this important book that a theory of organization should be concerned with the processes of decision as well as with the processes of action.

Simon (1947) notes that all behavior involves conscious or unconscious selection of particular actions out of all those actions that are physically possible to the actor and to those persons over whom the actor exercises influence and authority. The term *selection* is used without any implication of a conscious or deliberate process. Selection refers to the fact that if the individual follows one particular course of action, there are other courses of action that the individual thereby forgoes.

Simon (1947) employs a definition of authority substantially equivalent to that put forth by Barnard (1938). Subordinates accept authority whenever these subordinates permit their behaviors to be guided by the decision of a superior, without independently examining the merits of that decision. When exercising authority, the superior does not seek to convince the subordinates but only seeks to obtain their acquiescence. In actual managerial practice, of course, authority is usually mixed with suggestion and persuasion. If a superior attempts to carry authority beyond a certain point, which may be described as the subordinate's zone of acceptance, disobedience will typically follow.

The magnitude of the zone of acceptance depends on the various sanctions that authority has available to enforce its commands. The structure of formal authority in an organization typically is related to the appointment, disciplining, and dismissal of personnel. Informal authority relations in the tactical (day-to-day) work of the organization commonly supplement these formal lines of authority. The formal hierarchy is largely reserved for hearing and settling disputes.

*Problems of Organizational Theory.* Simon (1947) maintains that the authority relationship enables an organization to bring about specialization in the work of making decisions so that each decision is made at the point in the organization where the decision can be made more expertly for achieving purpose. *Purpose* is defined as the objective for which an activity is carried on, and *process* as a means of accomplishing purpose.

Simplistically, the concept of purpose involves a hierarchy of decisions—each step downward in the hierarchy consisting of an implementation of the goals set forth in the step immediately prior. Behavior is purposive in so far as it is guided by general goals; it is rational in so far as it selects alternatives that are conducive to the achievement of the previously selected goals. More realistically, the achievement of purpose often requires attention along multiple dimensions in the organization. Providing a useful analogy to make this particular point, Simon (1947) states that closet space is an important item in the design of a successful house, yet a house designed entirely with a view to securing a maximum of closet space—all other considerations being forgotten—would be considered somewhat unbalanced.

Similarly, unity of command, specialization by function, and decentralization are items to be considered in the design of an efficient organization. No single item is of sufficient importance to suffice as a guiding principle for the organizational analyst. In the design of organizations, as in their operation, overall efficiency is a guiding criterion. Mutually incompatible advantages are balanced against each other, just as an architect weighs the advantages of additional closet space against the advantages of a larger living room. A valid approach to the science of organization requires that the relevant diagnostic criteria be identified, that each organizational situation be analyzed in terms of the relevant set of criteria, and that research be instituted to determine how weights can be assigned to the several criteria when they are mutually incompatible.

Simon (1947) also observes that before a science of organization can develop theoretical principles, it must possess concepts. To be scientifically useful, the concepts chosen must be operational; that is, their conceptual meanings must correspond to empirically observable facts. As an analogy, before a law of gravitation could be formulated, it was necessary to have the concepts of acceleration and weight, and there had to be commonly accepted measures of these terms.

The theory of organization, in Simon's (1947) view, is concerned with how an enterprise should be constructed and operated to accomplish its work efficiently. A fundamental principle of organization, which follows almost immediately from the rational character of "good" organization, is that among several alternatives involving the same expenditure the one should be selected that leads to the greatest accomplishment of organizational objectives, and, among several alternatives that lead to the same accomplishment, the one should be selected that involves the

least expenditure. Since this principle of efficiency is characteristic of any activity that attempts rationally to maximize the attainment of certain ends with the use of scarce means, it is as characteristic of economic theory as it is of organizational theory. In this sense, the organization man takes his place alongside the neoclassical economic man. However, as already noted, one of Simon's (1947) most important contributions to science is the argument that individuals are limited by those skills, habits, and reflexes that are no longer in the realm of the conscious.

*Limits to Rationality.* At the most simplistic level, performance may be limited by manual dexterity or reaction time, and decision-making processes may be limited by the speed of mental processes. Individuals also are limited by their values and those conceptions of purpose that influence them in making their decisions, and these tend to be shaped by their organizational experience. If their loyalty to the organization is high, their decisions may evidence sincere acceptance of the objectives set for the organization; if loyalty is lacking, personal motives may interfere with organizational efficiency. Finally, individuals are limited by their knowledge of factors relevant to their job. This limitation applies both to basic knowledge required in decision making—bridge designers must know the fundamentals of mechanics—and to the information that is required to make decisions appropriate to a given situation.

In discussing means and ends, as well as facts and values, Simon (1947) is forthcoming concerning his own (logical positivist) philosophical perspective. Simon maintains that every decision involves elements of two kinds, which are called factual and value elements, respectively. This distinction is of primary importance for organization. Simon holds as a fundamental premise the idea that ethical terms are not completely reducible to factual terms. There is therefore no way in which the correctness of ethical propositions can be empirically tested. From this positivist perspective, if a sentence declares that some particular state of affairs "ought to be," or that it is "preferable" or "desirable," then the sentence performs an imperative function and is neither true nor false.

In contrast, a statement concerning the observable world is factual if, in principle, its truth or falsity may be tested. Simon (1947) hastens to add that in practice, the separation between ethical and factual elements in judgment can usually be carried only over a short distance. Further, the values involved in organizational decisions are seldom the final values in any psychological or philosophical sense.

*Rationality in Organizational Behavior.* Rationality in the world of experience is a complex concept. Simon (1947) provides a scenario of

two soldiers who sit in a trench opposite a machine gun. One soldier stays under cover. The other soldier, at the cost of his life, destroys the machine gun with a grenade. Which action is rational? Simon suggests *that perhaps the only way to clarify these complexities is to use the term rational in conjunction with appropriate adverbs*. Action may be called objectively rational if, in fact, it is the correct behavior for maximizing given values in a given situation. An action is subjectively rational if it maximizes attainment relative to the actual knowledge of the subject. An action is consciously rational to the degree that the adjustment of means to ends is a conscious process. An action is deliberately rational to the degree that the adjustment of means to ends has been deliberately brought about (by the individual or by the organization). An action is organizationally rational if it is oriented to the organization's goals; an action is personally rational if it is oriented to the individual's goals.

*The Psychology of Organizational Decisions.* From a rational point of view, choice is the process by which an alternative for each moment's behavior is selected. The task of choice involves three steps: (1) the listing of all alternatives, (2) the determination of all the consequences that follow each of these alternatives, and (3) the comparative evaluation of these sets of consequences. Each individual, to determine uniquely the consequences of actions, must know what will be the actions of others. This knowledge is of fundamental importance for the whole process of decision making.

Things are not so simple from an organizational point of view. Simon (1947) agrees with Barnard (1938) that organizations are systems of cooperative behavior. From the logical positivist perspective, rationality concerns the selection of preferred behavior alternatives in terms of some system of values whereby the consequences of behavior can be evaluated. But Simon argues that it is impossible for the behavior of a single, isolated individual to reach a high degree of rationality. The number of alternatives the individual must explore is so great, the information the individual would need to evaluate so vast, that even an approximation to objective rationality is hard to conceive. Individual choice takes place in an environment of givens—premises that are accepted by the individual as bases for choice—and behavior is adaptive only within the limits set by these givens.

Objective rationality would imply that the behaving individual molds behavior into an integrated pattern by (a) viewing the behavior alternatives prior to choice in panoramic fashion, (b) considering the whole complex of consequences that would follow from each choice,

and (c) with the system of values as criterion singling out one from the whole set of alternatives. Observed behavior, even that which is ordinarily considered rational, possesses many elements of disconnect- edness not present in this idealized picture. However, one function the organization performs is to place members in a psychological environ- ment that helps adapt their choices to organizational objectives. It also provides them with information needed to make these choices.

Even so, if individual or organization behavior is examined over time, it exhibits a mosaic character. Each piece of the pattern may tend to be integrated with others by their orientation to a common purpose, but such purpose shifts from time to time with shifts in knowledge and attention and is held together in only slight measure by any conception of an overall criterion of choice. Actual behavior falls short, in at least two ways, from objective rationality. First, rationality requires both complete knowledge and total anticipation of the consequences that will follow each choice. In fact, knowledge of consequences is always fragmentary. Second, rationality requires a choice among all possible alternative behaviors. In actual behavior, only a few of all these possible alternatives come to mind. Complete rationality is limited by lack of knowledge.

Humans striving for rationality but restricted within the limits of their knowledge develop working procedures that partially overcome these difficulties. These procedures assume they can isolate from the rest of the world a closed system containing only a limited number of variables and a limited range of consequences. Simon (1947) notes that the problem of discovering which factors are (and which factors are not) important in any given situation is as essential to choice as knowl- edge of the empirical laws governing those factors that are finally selected as relevant. *Rational choice is feasible to the extent that the lim- ited set of factors on which a decision is based corresponds, in nature, to a closed system of variables, that is, to the extent that significant indirect effects are absent.* Only in the cases of some important decisions is it possible to bring to bear sufficient resources to unravel an involved chain of effects.

Humans do have some important abilities, including the capacity to observe regularities in nature and to communicate with others. Both help to shorten materially the learning process. The first capability means that previous experiences with other choices (of the same sort) may enable decision makers to infer something about the character of the particular choice that they face. Then, communication provides a

tremendous advantage in learning. For example, engineers designing a paved area do not have to base their attempts entirely on experimentation but can use reference sources that describe the conclusions of others. In effect, a relatively small amount of experience can serve as the basis for a wide range of decisions.

*Memory.* Memory as described in this book may be either natural or artificial—information may be stored in the mind, or it may be recorded in such a way as to be accessible. The artificial kind of memory that exists in libraries, files, and records is the most important in organizations. For either natural or artificial memory to be useful, there must be mechanisms that enable the memory to be drawn on when needed. Hence, human rationality relies heavily on the psychological and artificial associational and indexing devices that make the store of memory accessible when needed for the making of decisions.

An equally important mechanism that assists in the preservation of useful behavior patterns is habit. Habit, like memory, has an artificial organization counterpart that can be termed *organizational routine*. This idea has become important in the more recent literature, notably Nelson and Winter's (1982) work reviewed in Chapter 5.

*Attention.* Memory affects attention, where *attention* refers to the set of elements that enter into consciousness at any given time. To a considerable extent, the limits of rationality are the result of the limits of attention. It is important that both attention and behavior, once initiated in a particular direction, tend to persist in that direction for a considerable time interval. This persistence of attention holds even when the original choice of activity was a matter of relative indifference. Activity often results in psychological sunk costs that make persistence of attention in the same direction advantageous. A second reason for persistence is that the activity itself creates stimuli that focus attention toward its continuance and completion.

Simon (1947) maintains that the process of the integration of behavior involves three principal steps:

1. Individuals (or organizations) make broad decisions regarding the values to which they are going to direct their activities for substantive planning.
2. Individuals design and establish mechanisms that will direct their attention and channel information and knowledge in such a way as to cause the specific day-to-day decisions to conform to the substantive plan. This decisional activity is called *procedural planning*.
3. Individuals execute the plan.

But there are at least two intervening organizational and institutional influences on individual behavior: First, organizations and institutions permit (indeed encourage) stable expectations, and, second, organizations and institutions provide the general stimuli and attention directors that channel the behaviors of members of the group and provide those members with the intermediate goals that stimulate action.

Simon (1947) suggests the following mechanisms of organization influence:

- The organization divides work among its members. By giving each worker a particular task to accomplish, it directs and limits attention to that task.
- The organization establishes standard operating procedures.
- The organization transmits decisions by establishing systems of authority and influence.
- The organization provides (formal and informal) channels of communication running in all directions through which information flows.
- The organization trains and inculcates its organizational members.

*The Equilibrium of the Organization.* Simon (1947) maintains that individuals are willing to accept organization membership when their activity in the organization contributes, directly or indirectly, to their personal goals. The phrase *personal goals* should be understood in a broad sense. It is not restricted to egoistic goals, much less to economic goals. In a discussion reminiscent of Barnard (1938), the members of an organization contribute to the organization in return for inducements that the organization offers them. If the sum of *the contributions* is sufficient to supply the necessary inducements, the organization survives and grows; otherwise, the organization shrinks and ultimately disappears. In return for their inducements, members typically offer the organization not a specific service but their undifferentiated time and effort. Organizational members place this time and effort at the disposal of those directing the organization, to be used as those directing see fit. Thus, both the customer relation (in the commercial organization) and the employee relation originate in contract, but in contracts of different kinds. The employment contract results in the creation of an authority relationship between the organization and the employee.

How can this be? Why does the employee sign a blank check, so to speak, when entering employment? First, from the perspective of the organization, nothing would be gained by offering inducements to employees unless the employees' behaviors could be brought into

a system of organization behavior through their acceptance of its authority. Second, from the perspective of the employees, the precise activities with which their time of employment is occupied may, within certain limits, be a matter of relative indifference to them. In addition to the salary that employees receive, employees may value the status and prestige that their positions in the organization give them, and employees may value their relations with the working group of which they are part.

*Organizational Goals.* Three bricklayers were asked what they were doing. “Laying bricks,” “Building a wall,” “Helping to build a great cathedral” were their respective answers. This story conveys Simon’s (1947) idea that in the world of experience the line of demarcation between personal and professional interests is not a sharp one because personal satisfactions may arise from the competent performance of a professional role and because both personal satisfactions and dissatisfactions may arise from innumerable conditions that surround the employment relationship.

Particular professional training may provide individuals with specific techniques and knowledge for solving problems (e.g., accounting techniques, legal techniques), which are then drawn on as part of the program evoked by their roles. In this way, a chief executive with an accounting background may find different problem solutions from a chief executive, in the same position, with a legal background. Individuals may incorporate in their role not only a professional style but also a personal style. Individuals may bring to the role, for example, habits and beliefs that provide them with crucial premises for their handling of interpersonal relationships.

An interesting question is why most commercial organizations tend to maintain fairly stable goals. Simon’s (1947) answer is, first, that there are both economic and psychological sunk costs that make rapid adjustment unprofitable. Second, the organization requires know-how in a particular field—which becomes a sunk asset and part of the influencing organizational environment. Third, the organization acquires goodwill, which is also a sunk asset (i.e., the asset is not easily redeployed) and, thus, is not readily transferable to another area of activity.

*The Role of Authority.* *Authority* is defined as the power to make decisions that guide the actions of another. It is a relationship between two individuals, one superior and the other subordinate. The superior transmits decisions with the expectation that the subordinate will accept these decisions. The subordinate expects such decisions, and



these decisions influence the conduct of the subordinate. The relationship of authority is defined, therefore, in behavioral terms. Authority involves behaviors on the part of both superior and subordinate. When, and only when, these behaviors occur does an authority relationship exist between the superior and subordinate.

Individuals who do not have recognized status, or who are not recognized by their associates as expert with respect to a certain kind of knowledge, will have a more difficult time convincing their listeners that a recommendation is sound than those who possess expert credentials. Recommendations are judged partly on their merits and partly on the expertise of the persons making the recommendations. This pattern of judgments holds both because the individuals acting on the recommendations often do not have the expertise needed to judge them and because time pressures require these individuals to accept the recommendations of those whom they trust.

Furthermore, it is not implied that this resistance to irregular suggestions is entirely a weakness of organization. The specialization of decision-making functions and the fixing of responsibility for particular kinds of expertness on particular individuals are important sources of organizational efficiency that need to be balanced against the potential loss of independent ideas that results. When there is a disagreement between two persons, and when the disagreement is not resolved by discussion, persuasion, or other means of conviction, then the disagreement must be decided by the authority of one or the other participant. It is this right to the last word that is usually meant in speaking of lines of authority in an organization.

Simon (1947) proposes that the degree of obedience expected will vary with the social situation. The American workers of his day, for example, probably had a somewhat wider zone of acceptance, so far as the employer's instructions are concerned, than workers today. In part, this difference in the degree of authority may be due to the worker's weaker bargaining position back then or, conversely, the stronger sanctions of the employer, but there is probably a more fundamental change in social attitudes as to what is proper for an employer to ask an employee to do. These changed attitudes are reflected in social legislation limiting the terms of the employment contract. Professional workers and skilled workers are apt to have relatively narrow zones of acceptance, particularly in the areas of their own professional competencies.

The field of organizational behavior has stressed purpose as a sanction of primary importance. Subordinates are willing to obey commands

because subordinates realize that the coordination secured thereby is useful to the attainment of the joint purpose. Several conditions must be satisfied if purpose is to be an effective sanction of authority. Subordinates must have confidence that the command is issued in furtherance of a purpose with which they are in sympathy. Second, subordinates must have confidence that the command will be effective in achieving this purpose. This confidence may be based less on their knowledge of the correctness of the command than on their faith in the ability of those who issued the command; their recognition that those in authority have information they do not have; and their realization that their own efforts will not be effective in reaching the desired objective without some coordination from above.

Within limits, subordinates will even accept commands they know to be incorrect because they do not wish to challenge or unsettle a system of authority that they believe to be beneficial to their aims in the long run. There are, however, restrictions in the authority relationship. In a very real sense, the leader is merely a bus driver whose passengers will leave their leader unless their leader takes them in the direction they wish to go. Thus, subordinates give their leader only minor discretion as to the road to be followed.

Three functions of authority deserve special notice:

1. Authority enforces the responsibility of the individual.
2. Authority secures expertise in decision making.
3. Authority permits coordination of activities.

Simon (1947) notes that the core of many of the more important social institutions consists of a system of authority and a set of sanctions for enforcing the authority relationship. National government is the primary example, but the law of property, the church, and even families are included in this category (see Commons, 1934). Authority refers to the acceptance by subordinates of the decisions of the leader and not the power of the leader to apply sanctions in the case of noncompliance.

*Communication.* Both Barnard (1938) and Simon (1947) see communication as central to a theory of organization. Simon argues that without communication there can be no organization because there is no possibility then for the group to influence the behavior of the individual. Organization members sometimes use informal communication to advance their personal goals. From this informal behavior

the phenomenon of cliques arises—groups that build an informal network of communications and use this informal network as a means of securing power in the organization. Rivalry among cliques, in turn, may lead to general tensions in social relationships and defeat the purpose of the informal communications system.

Simon (1947) conjectures that weakness of the formal system of communications and failure to secure adequate coordination through that system probably encourage the development of cliques. A great deal of communication is categorized as gossip. In many organizations the grapevine probably plays, on the whole, a constructive role. Its chief disadvantages are, first, that it discourages frankness because confidential remarks may be spread about, and, second, that the information transmitted by the grapevine is often (deliberately or inadvertently) inaccurate. On the other hand, the grapevine is valuable as a barometer of public opinion in the organization.

It is also important that information does not automatically transmit itself from its point of origin to the rest of the organization; the individuals who first obtain the information must transmit this information. In transmitting the information, organizational members will naturally be aware of the consequences its transmission may have for them. When organizational members believe that the boss is going to be angered by the news, the news is likely to be suppressed. Hence, information tends to be transmitted upward in the organization only if its transmission will not have unpleasant consequences for the transmitters, the superior will hear of it anyway from other channels (and it is better to tell the superior first), or it is information that the superior needs in dealings with corporate leaders, and the superior will be displeased if caught without the information.

In addition, there is often failure to transmit information upward simply because subordinates cannot visualize accurately what information their superior needs. A major communication problem, then, of the higher levels of the organization hierarchy is that much of the information relevant to the decisions at this level originates at lower levels and may not reach the higher levels unless the executive is extraordinarily alert. Simon (1947) also states that there is a converse problem that arises when a superior withholds information from subordinates. This omission, again, may be accidental—the superior does not realize that subordinates need the information. On the other hand, superiors may use their exclusive possession of information as a means of maintaining authority over subordinates.

In an argument picked up by authors reviewed later in this book, notably Nelson and Winter (1982), Simon (1947) maintains that organizations, to a far greater extent than individuals, need artificial memories. Organizational routines that would become habitual in the case of the individual must be recorded in manuals for the instruction of new organization members. Among the repositories that organizations use are records systems, files, libraries, and follow-up systems. Simon also observes the importance of motivation: Every effective teacher recognizes that motivation is key to the learning process. Furthermore, personal motives may lead organization members to try to divert the communication system to their own uses and may lead organization members to withhold information from superiors and colleagues.

*The Criterion of Efficiency.* Simon (1947) notes that the simplicity of the efficiency criterion in commercial organizations is due, in large part, to the fact that money provides a common denominator for the measurement of both output and income and permits commercial organizations to be directly compared. Underlying all organizational decisions is a limitation—a scarcity—of available resources. This scarcity is the fundamental reason why time and money are costs. Because they are limited in quantity, their application to one organization purpose prevents the realization of alternative possibilities. The criterion of efficiency dictates the choice of alternatives that produce the largest economic result for the given application of resources. Simon argues that the concept of perfect efficiency is not required. Actual problems, as they present themselves to the decision maker, are always concerned with relative efficiencies, and no measure of absolute efficiency is needed. Furthermore, Simon does not assert that the criterion of efficiency dominates executives' decisions.

*The Anatomy of Organization.* If there were no limits to human rationality, organizational theory would be barren in Simon's (1947) view. Organization theory would consist of a single precept: Always select the alternative, among those available, that leads to the most complete achievement of desired goals. The need for an organizational theory resides in the fact that there are practical limits to human rationality and that these limits are not static but depend on the organizational environment in which the individuals' decisions take place. The task of organization is to design this environment so that individuals approach as close as practicable to rationality (judged in terms of the organization's goals) in their decisions.

In certain situations, it is possible to reorient individuals from identification with a subgoal of the organization to identification with a broader and more inclusive goal. When a particular item of knowledge is needed repeatedly in decision, the organization can anticipate this need and, by providing individuals with this knowledge prior to decision, can extend their area of rationality. This knowledge flow is the basic task of organization—to provide each operative employee with an environment of decision of such a kind that behavior that is rational from the standpoint of this environment is also rational from the standpoint of group values and the group situation. Simon (1947) concludes that the assumption so often made in organizational studies, that an arrangement is effective because it exists, is a circular argument of the worst sort. The only procedure of evaluation that can possibly be valid is the comparison of alternative organization arrangements in terms of their objective results. This procedure is a pragmatic test of what works in practice.

*Information Processing.* Information need not be processed just because the information is there. Nor should individuals believe that getting more information will always help solve their problems. In some cases, seeking more information indicates a touching faith in more water as an antidote to drowning. Simon (1947) counsels that (social) science does not advance by piling up information—science organizes information and compresses it. In scientific inquiry, *knowing* refers to knowing parsimoniously.

Any division of labor among decisional subsystems creates externalities, which arise out of the interdependencies among the subsystems that are ignored. What is required for the efficiency of the overall system is a factorization that minimizes these externalities and consequently permits a maximum degree of decentralization of final decisions to the subsystems and a maximum use of relatively simple and cheap coordinating devices, like the market mechanism, to relate each of the decisional subsystems with the other subsystems. Simon (1947) argues that the information-processing systems of modern civilization swim in an exceedingly rich soup of information. In a world of this kind, the scarce resource is not information; it is processing capacity to attend to information. *Attention is the chief bottleneck in organizational activity, and the bottleneck becomes narrower as we move to the tops of organizations, where parallel processing capacity becomes less easy to provide without damaging the coordinating function that is a prime responsibility of these levels.* Thus, the inherent capacity limits of

information-processing systems impose at least two requirements on organizational design: that the totality of decision problems be factored in such a way as to minimize the interdependence of the components and that the entire system be structured to conserve the scarce resource of attention.

### Organizations (*March & Simon, 1958*)

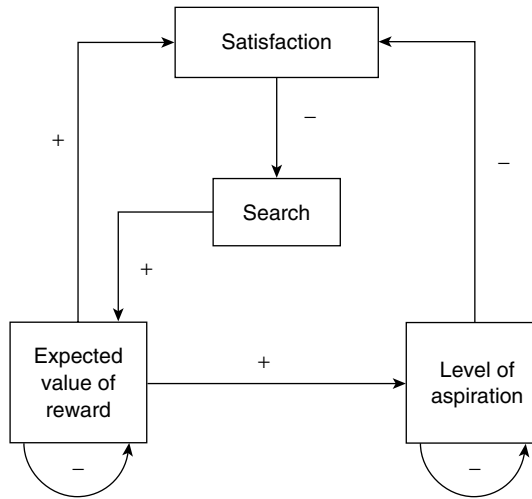
This is a good point to turn to further theoretical developments found in March and Simon (1958)—a book that moves from a “closed rational system model” to an “open rational system model” (Scott, 1987, p. 100) of the organization. The organization is viewed as evolving toward both increased order and increased complexity. It is a work that provides new insight into the coping mechanisms of the organization.

March and Simon (1958) focus on the history of formal organizations. Taking the perspective of social psychologists, March and Simon are interested in influences that impinge on individuals from their environment and how individuals respond to such influences. March and Simon argue that roles in organizations tend to be highly elaborated, relatively stable, and defined to a considerable extent in explicit and even written terms. It is this predictability that enables organizations to deal in a coordinated way with their environments.

March and Simon (1958) take the viewpoint that a decision maker can be usefully regarded as an information-processor. March and Simon provide a picture of a choosing, decision-making, problem-solving individual who can do only one or a few things at a time and who can attend to only a small part of the information recorded in memory and presented by the environment.

March and Simon (1958) note that task allocations are efficient to the extent that such task allocations are based on similarities in activities that are recognized as yielding important complementarities in task performance. The key idea is to search for complementarities or, in modern terminology, economies of scope (Baumol, Panzar, & Willig, 1982; Teece, 1980). Beyond this point, solution of the task assignment problem requires empirical knowledge of the specific empirical complementarities that exist.

Behavior in the organization is not determined in advance and once and for all by a detailed blueprint and schedule. Even if it is highly routinized, the routine has the character of a dynamic capability rather than a fixed program. March and Simon (1958, p. 48) provide their own general model



**Figure 1.1** General Model of Adaptive-Motivated Behavior

SOURCE: March and Simon (1958, p. 49)

of intraorganizational decisions. The essential steps of March and Simon's (1958) behavioral model (see Figure 1.1) are as follows:

1. The lower the satisfaction of the individual, the more search for alternative programs the individual will undertake.
2. The more search, the higher the expected value of reward.
3. The higher the expected value of the reward, the higher the satisfaction.
4. The higher the expected value of the reward, the higher the level of aspiration of the individual.
5. The higher the level of aspiration, the lower the satisfaction.

*Organizational Rewards.* March and Simon (1958) note that many organizational models historically tended to relegate the reward schemes of management to the background. However, March and Simon insist that a model of a decision maker that does not give a prominent place to economic incentives is, for most humans, a poor predictive model. Further, March and Simon argue that an organization with a promotional scheme that essentially rewards seniority will be less productive than one that relates promotion to some index of productivity.

March and Simon (1958) emphasize that since employees are often cynical regarding announced performance criteria, the factors affecting the subjective operationality of performance standards are important. March and Simon also observe that, in general, the introduction of an incentive wage scheme results in increased production over a straight hourly or day rate, and the introduction of a flat-rate payment in place of a former incentive system depresses production. An employment contract based on a flat rate typically is regarded as controlling the type of activities performed but not the rate at which activities are performed.

March and Simon (1958) note that the greater the vertical mobility within an organization, the stronger the identification of individuals with the organization. Expectations of vertical mobility create expectations of interactions as well as felt similarities between subordinates and superiors.

*Motivational Constraints: The Decision to Participate.* The decision to participate is at the core of the theory of what Barnard (1938) and Simon (1947) call *organizational equilibrium*: the conditions of survival of an organization. Equilibrium reflects the organization's success in arranging compensations to its members that are adequate to motivate their continued participation. The Barnard-Simon theory of organizational equilibrium is essentially a theory of motivation—that is, a statement of the conditions under which an organization can induce its members to continue their participation and hence increase the likelihood of organizational survival. March and Simon (1958) describe the chief participants of most business organizations and, generally, focus on the following five major stakeholders: employees, investors, suppliers, distributors, and consumers. Most obvious in any catalogue of organizational participants are the employees, including the management.

In at least one respect, an employee's relationship to the organization is quite different from that of other stakeholders. In joining the organization employees accept an authority relationship. Employees agree that within certain limits (defined both explicitly and implicitly by the terms of employment contracts) they will accept as the premises of their behavior instructions supplied to them by the organization.

On the assumption that employees act in a subjectively rational manner, March and Simon (1958) predict the scope of the authority relationship from a knowledge of the inducements and contributions of the employees and other organization members. Employees are willing to enter into employment contracts only if it does not matter to them



very much which activities (within the zone of acceptance agreed to in the contracts) the organization will instruct them to perform or if employees are compensated in some way for the possibility that the organization will impose unpleasant activities on them. It is advantageous to subject employees to the organization's authority in those aspects that are of relatively great interest to the employer, comparatively unimportant to the employees, and about which the employer cannot make accurate predictions much in advance of performance.

The problems of both defining and enforcing the employment contract are matters of concern, and potential conflict, for all organizational participants. Whether dissatisfaction with the organization leads to withdrawal from the organization depends on whether the participants perceive the employment contract as given or as subject to change. Where the contract is viewed as unchangeable, the only options are accept or reject. Where the contract can be changed, participation by no means precludes internal conflicts and bargaining.

*Conflict in Organizations by a Bargaining Outcome.* March and Simon (1958) argue that game theory, in its original form, was no more satisfactory than neoclassical economic theory in providing an exact prediction of the outcome of a bargaining situation. What game theory offered was a specification of a set of feasible outcomes—the solution of the game. For example, in the case of highly specialized executives bargaining with their organization over salary, the salary paid will be somewhere between the economic value of the best alternative available to the executives elsewhere (i.e., what the executives can guarantee to themselves without cooperation) and the cost of the organization of hiring and training replacements (i.e., what the organization can guarantee to itself without cooperation). Since this feasible range may be quite wide, the theory is not overly helpful for providing reasonably precise economic predictions. March and Simon also provide the critical comment that, with rare exceptions, bargaining theory has operated in an empirical vacuum. The assumptions about human motivations and behaviors have usually been made on the basis of introspection, inspection of special cases, and mathematical tractability.

*Cognitive Limits on Rationality.* How does the rationality of organizational man compare with that of neoclassical economic man or with the rational man of modern statistical decision theory? The rational decision makers of economics and statistical decision theory make optimal choices in a highly specified and clearly defined environment:

1. When we first encounter them in a decision-making situation, rational decision makers already have laid out before them the whole set of alternatives from which they will choose their actions. This set of alternatives is simply given; the theory does not tell them how this set of alternatives is obtained.
2. To each alternative is attached a set of consequences—the events that will ensue if that particular alternative is chosen. Existing theories related to consequences fall into three categories:
  - a. *Certainty*: theories that assume the decision maker has complete and precise knowledge of the consequences that will follow on each alternative
  - b. *Risk*: theories that assume accurate knowledge of a probability distribution of the consequences of each alternative
  - c. *Uncertainty*: theories that assume that the consequences of each alternative belong to some subset of all possible consequences but that the decision maker cannot assign definite probabilities to the occurrence of particular consequences (see Knight, 1921)
3. At the outset, the decision maker has a utility function or a preference ordering that ranks all sets of consequences from the most preferred to the least preferred.
4. The decision maker selects the alternative leading to the preferred set of consequences. In the case of certainty, the choice is unambiguous. In the case of risk, rationality is usually defined as the choice of that alternative for which the expected utility is greatest. Expected utility is defined here as the average, weighted by the probabilities of occurrence, of the utilities attached to all possible consequences. In the case of uncertainty, the definition of rationality becomes problematic.

*Some Difficulties in the Neoclassical Theory.* There are difficulties with this neoclassical model of rational man. In the first place, only in the case of certainty does the neoclassical model agree well with commonsense notions of rationality. In the case of uncertainty, especially, there is little agreement, even among exponents of statistical decision theory, as to the correct definition of rationality or whether, indeed, the term *correct* has any meaning here.

A second difficulty with existing models of rational man is that these models make three exceedingly high demands on the choice-making mechanism. These models assume that (1) all the alternatives of choice are given, (2) all of the consequences attached to each alternative are known, and (3) the rational man has a complete utility ordering for all possible sets of consequences.

*Routinized and Problem-Solving Responses.* As a challenger to the neoclassical theory of rational choice, the theory of rational choice put forth by March and Simon (1958) incorporates two fundamental characteristics: (1) Choice is always exercised with respect to a limited,

approximate, simplified model of the real situation and (2) the elements of the definition of the situation are not given but are themselves the outcome of psychological and sociological processes, including the choosers' own activities and the activities of others in the choosers' environments.

Activity (individual or organizational) can usually be traced back to environmental stimuli of some sort (e.g., customer orders). The responses to stimuli are of various kinds. At one extreme, a stimulus evokes a response that was developed and learned at some previous time as an appropriate response for a stimulus of this classification. This response is the routinized end of the continuum, where a stimulus calls forth a standard operating procedure almost instantaneously. At the other extreme, a stimulus evokes problem-solving activities directed toward finding performance activities with which to complete the response. Problem-solving activities can generally be identified by the extent to which these activities involve search: search aimed at discovering alternatives of action or consequences of action. Discovering alternatives may involve inventing and elaborating whole performance programs where these programs are not already available in the repertory of the problem solver.

*Search is partly random, but in effective problem solving search is not blind. The design of the search process is itself often an object of rational decision.* Finding the optimal alternative is a different problem from finding a satisfactory alternative. An alternative is optimal if there exists a set of criteria that permits all alternatives to be compared and the alternative in question is preferred by these criteria to all other alternatives. An alternative is satisfactory if there exists a set of criteria that describes minimally satisfactory alternatives and the alternative in question meets, or exceeds, all these criteria.

Most human decision making, whether individual or organizational, is concerned with the discovery and selection of satisfactory alternatives; only in exceptional cases is it concerned with the discovery and selection of optimal alternatives. To optimize often requires processes several orders of magnitude more complex than processes required to satisfice. An example is the difference between searching a haystack to find the sharpest needle and searching the haystack to find a needle sharp enough to sew with adequately.

An optimizing rule would be to set the standard at the level where the marginal improvement in alternatives obtainable by raising the standard would be just balanced by the marginal cost of searching for

alternatives meeting the higher standard. Of course, in practice, the marginal improvement and the marginal cost are seldom measured in comparable units or with much accuracy. Thus, the optimizing rule is more a reconstructed logic used by a researcher to make predictions of behavior, rather than characterizing the logic-in-use (Kaplan, 1964) of the manager in the actual decision-making process.

*Performance Programs.* March and Simon (1958) argue that under certain circumstances the search and choice processes are abridged. At the limit, an environmental stimulus may evoke immediately from the organization a highly complex and organized set of responses. Such a set of responses is called a *performance program*. Situations in which a relatively simple stimulus sets off an elaborate program of activity without any apparent interval of search, problem solving, or choice are not rare. Knowledge of the performance program of an organization permits one to predict in considerable detail the behavior of members of the organization.

March and Simon (1958) first argue that organizations attempt to influence employees by specifying standard operating procedures and attaching organizational rewards and penalties to them. Second, performance programs are important parts of the coordination system in the organization. These performance programs help fulfill the needs for interdepartmental predictability. Insofar as performance programs are to function as controls, the programs must be linked to variables that are observable and measurable.

March and Simon (1958) expect performance program content to be a function of *the ease of observing job activities, the ease of observing job output, and the ease of relating activities to output*. Discretion available to the organizational participants is a function of their performance programs and in particular the extent to which the programs specify activities (means) and the extent to which these programs specify products or outcomes (ends).

March and Simon (1958) observe that in organizations there generally is a considerable degree of parallelism between the hierarchical relationships between members of the organization and the hierarchical relations between program elements. That is to say, the programs of members of higher levels of the organization have as their main output the modification or initiation of programs for individuals at lower levels. An important objective of standardization is to widen, as far as possible, the range of situations that can be handled by combination and recombination of a relatively small number of elementary programs.

March and Simon (1958) contend that rational behavior involves substituting for complex reality a model of reality that is sufficiently simple to be handled by problem-solving processes. In organizations where various aspects of the whole complex problem are being handled by different individuals and different groups of individuals, a fundamental technique for simplifying the problem is to factor the problem into a number of nearly independent parts so that each organizational unit handles one of these parts and can omit the others from its definition of the situation.

March and Simon (1958) note that the tendency of members of an organizational unit to evaluate action only in terms of subgoals—even when these subgoals are in conflict with the goals of the larger organization—is reinforced by at least three cognitive mechanisms. The first cognitive mechanism is located within the individual decision maker; the second mechanism, within the organizational unit; and the third mechanism, in the environment of the organizational unit.

In the individual, there is cognitive reinforcement through selective perception and rationalization. The propensity of individuals to see things that are consistent with their established frame of reference is well established in organizational psychology. Perceptions that are discordant with the frame of reference are filtered out before they reach consciousness or are reinterpreted or rationalized to remove the discrepancy. The frame of reference serves just as much to validate perceptions as the perceptions do to validate the frame of reference.

Within the organization unit, content of in-group communication provides cognitive reinforcement. Such communication affects the focus of information and thereby increases subgoal persistence. The vast bulk of our knowledge of fact is not gained through direct perception but through the secondhand, thirdhand, and *n*th-hand reports of the perceptions of others, transmitted through the channels of social communication. Two principal types of in-groups are of significance in filtering: in-groups with members in a particular organizational unit and in-groups with members in a common profession.

Finally, there is reinforcement through selective exposure to environmental stimuli. The division of labor in the organization affects the information that various members receive. This differentiation of information contributes to the differentiation of subgoals. For example, sales personnel live in an environment of customers, company treasurers live in an environment of bankers, and each sees a quite distinct part of the business world.

March and Simon (1958) observe that weatherpersons make observations of temperature, humidity, and barometric pressure but may communicate only their conclusions in the form of weather forecasts. In organizational communication, evidence is replaced with conclusions drawn from that evidence, and these conclusions then become the “facts” on which the rest of the organization acts.

When a means of testing actions is perceived to relate to a particular goal or criterion with possible courses of action, the criterion will be called *operational*. Otherwise, the criterion will be called *nonoperational*. For some purposes, we need the further distinction between cases where means-end relations can be evaluated prior to action and cases where means-end relations can be evaluated only after the fact. March and Simon (1958) call operational goals in the former case *operational ex ante* and in the latter case, *operational ex post*.

The goal of promoting the general welfare is frequently a part of the definition of the situation in governmental policy making. It is a non-operational goal because this goal does not provide (either *ex ante* or *ex post*) a measuring rod for comparing alternative policies. Strictly speaking, whether a goal is operational or nonoperational is not a yes-no question. There are all degrees of operability. It will often be convenient, however, to refer simply to the two ends of the continuum.

Important circumstances causing the substitution of subgoals for more general goals as the criteria for decision making occur when the subgoals are perceived as operational and the goals are perceived as nonoperational. For example, a business firm may understand to some degree how its specific actions affect its market share but may understand less surely how its actions affect long-term profitability. In such circumstances, the subgoal of maintaining a particular market share may become the effective criterion of action—the operational goal. When a number of individuals are participating in a decision-making process, and these individuals have the same operational goals, differences in opinion about the course of action will typically be resolved by predominantly analytic processes (i.e., by the analysis of the expected consequences of courses of action for realization of the shared goals). When either of the postulated conditions is absent from the situation (when the goals are not shared or when the shared goals are not operational and the operational subgoals are not shared), the decision will typically be reached predominately by bargaining processes.

Interdependence does not by itself cause difficulty if the pattern of interdependence is stable and fixed because, in this case, each subprogram

can be designed to take account of all the other subprograms with which it interacts. Difficulties arise only if program execution rests on contingencies that cannot be predicted in advance. In this case, coordinating activity is required to secure agreement about the estimates that will be used as the basis for action or to provide information to each subprogram unit about the relevant activities of the others. Hence, March and Simon (1958) arrive at the research proposition that the more repetitive and predictable the situation, the greater the *tolerance for interdependence*.

*Communication and Coordination.* An important method for increasing the organization's tolerance for interdependence is to increase the efficiency of communication by making it possible to communicate large amounts of information with relatively few symbols. An obvious example is the blueprint, which provides a common plan stated in detail. A blueprint uses a carefully defined, highly developed language or set of symbolic and verbal conventions. Because of this standardized language, a blueprint can convey large quantities of information. The same attention to standardization of language is seen in accounting systems and other reporting systems that use numerical data. Accounting definitions and blueprint conventions are examples of a still more general phenomenon: technical languages, whose symbols have definite and common meanings to the members of an organization.

March and Simon (1958) observe that the world tends to be perceived by the organization members in terms of the particular concepts that are reflected in the organization's vocabulary. The particular categories and schemes of classification that the organization employs are reified and become, for members of the organization, attributes of the world rather than mere conventions.

*Organization Structure and the Boundaries of Rationality.* March and Simon (1958) maintain that because of the limits of human intellectual capacities in comparison with the complexities of the problems that individuals and organizations typically face, rational behavior calls for simplified models that capture the main features of a problem without capturing all of a problem's complexities. The simplifications have a number of characteristic features:

- Optimizing is replaced by satisficing.
- Alternatives of action and consequences of action are discovered sequentially through search processes.
- Repertories of action programs are developed by organizations and individuals, and these repertories serve as the alternatives of choice in recurrent situations.

- Each specific action program deals with a restricted range of situations and a restricted range of consequences.
- Each action program is capable of being implemented in semi-independence of the others—these action programs are only loosely coupled together.

This one-thing-at-a-time, or *ceteris paribus*, approach to adaptive behavior is fundamental to organization structure. Organization structure consists of those aspects of the pattern of behavior in the organization that are relatively stable and that change only slowly. If behavior in organizations is intendedly rational, then March and Simon (1958) expect aspects of relatively stable behavior that either represent adaptations to relatively stable elements in the environment or are the learning programs that govern the process of adaptation.

March and Simon (1958) maintain that a great deal of the inertia of going concerns can be explained on the basis of (economic and psychological) sunk costs. A simple example is whether to move to a new location with high moving costs. In addition to tangible sunk costs, persistence comes about primarily because the individual or organization does not search for, or consider, alternatives to the present course of action unless that present course is in some sense unsatisfactory. March and Simon (1958) also suggest a Gresham's law of planning: Daily routine drives out planning. Stated less cryptically, March and Simon predict that when an individual is faced both with highly programmed and highly unprogrammed tasks, the highly programmed tasks tend to take precedence over the highly unprogrammed tasks, even in the absence of strong, overall time pressure. Although left unstated by March and Simon, we may anticipate that problems of persistence can be greater for long-term strategy formulation and implementation.

*Concluding Comments.* Scott (1987) notes that there are important differences between Simon (1947) and March and Simon (1958). Although there is still a concern with the cognitive limits of individual decision makers and with how organizational structures can help to support improved decision making, March and Simon (1958) place a greater emphasis on the variable nature of challenges posed by tasks and environments. The organization is viewed as more open to its environment. Whereas some performance programs can be routinized, other performance programs must be problem-solving responses, requiring the decision maker to exercise more discretion in the face of greater uncertainty. Moreover, it is recognized that some organizations face such volatile environments that these organizations institutionalize



innovation, devising programs for routinely changing existing programs, often rapidly.

In conclusion, my understanding of the evolution of management theory in the 1947–1958 period is that in comparison with Simon (1947), March and Simon (1958) provide a stronger sense that organizations face environments of varying complexity. Furthermore, organizations must adjust their internal decision-making procedures to take these variations into account, and some environments impose levels of complexity that organizations cannot manage unless these organizations impose simplifying restrictions on the information processed.

### A Behavioral Theory of the Firm (*Cyert & March, 1963*)

We turn from March and Simon (1958) to the next landmark in the behavioral theory of the firm by Cyert and March (1963). Cyert and March focus on a small number of key economic decisions made by the firm and develop process-oriented models of the firm.

Cyert and March (1963) are concerned with the business firm and the way the business firm makes economic decisions, and the authors make detailed observations of the processes and procedures by which firms make decisions, using these observations as a basis for a theory of decision making in business organizations. Cyert and March (1963) argue that one way to understand modern organizational decision making is to supplement the microeconomic study of strategic factor markets with an examination of the internal operation of the business firm—to study the effects of organizational structure and conventional practices on the development of goals, the formation of expectations, and the implementation of choices.

Cyert and March (1963) make four major research commitments:

- To focus on the small number of key economic decisions made by the firm
- To develop process-oriented models of the firm
- To link models of the firm as closely as possible to empirical observations
- To develop a theory with generality beyond the specific firms studied

Cyert and March's (1963) conception of the theory-building task is that of constructing a theory that takes the firm as its basic unit; considers the prediction of firm behavior with respect to such decisions as price, output, and resource allocation as its goal; and *emphasizes the*

*actual process of organizational decision making.* To build the behavioral theory of the firm, Cyert and March develop four major subtheories concerning the following:

- Organizational goals
- Organizational expectations
- Organizational choice
- Organizational control

*Organizational Goals.* A theory of organizational goals considers how goals arise in an organization, how goals change over time, and how the organization attends to these goals. Cyert and March (1963) view an organization as a coalition of stakeholders, with some of these stakeholders organized into subcoalitions. In a business organization the coalition members include managers, workers, stockholders, suppliers, customers, lawyers, tax collectors, regulatory agencies, and so on. Clearly then, organizational goals must deal successfully with the potential for internal goal conflicts inherent in a coalition of diverse individuals and groups.

Since the existence of unresolved conflicts among organizational stakeholders is a key feature of organizations, it is difficult to construct a useful descriptively accurate theory of the organizational decision-making process if we insist on internal goal consistency. Cyert and March (1963) do not insist then that such a decision-making process necessarily produces consistent organizational goals.

Because individuals have limited capacities, and limited time, to devote to any particular aspect of the organizational system, such limitations constrain the bargaining process. As an adaptive response, coalition members are motivated to develop mutual control systems, such as the budget and the allocation of tasks by the division of labor and specialization. A budget becomes a precedent for future budgets; an allocation of tasks becomes a precedent for future task allocations. Thus, coalition agreements are institutionalized into semipermanent arrangements.

Another important mechanism for dealing with stakeholder conflicts is the sequential attention to conflicting goals. A consequence of this mechanism is that organizations ignore many conditions that outside observers see as direct contradictions. The decentralization of decision making (and goal attention), the sequential attention to goals, and the adjustment in organizational slack that acts as a cushion in down times permit the business firm to make decisions with inconsistent goals under many (and perhaps most) conditions.

*Organizational Expectations.* A theory of organizational expectations considers how and when an organization searches for information or new alternatives and how information is processed through the organization. Expectations are by no means independent of hopes, wishes, and the internal bargaining needs of subunits in the organization. Information about the consequences of specific courses of action in a business organization is frequently hard to obtain and of uncertain reliability. As a result, both conscious and unconscious biases in expectations are introduced. Thus, local priorities and perceptions obtain. In addition, there is some evidence of more conscious manipulation of expectations. Communication in a complex organization includes considerable biasing and influence activities—and considerable bias correction as well. In addition, organizations often protect themselves from the worst effects of influence activities by focusing on verified data in lieu of uncertain estimates and by using easily checked feedback information.

*Organizational Choice.* A theory of organizational choice needs to characterize the process by which the alternatives available to the organization are ordered and selected. Organizational decisions depend on information estimates and expectations that ordinarily differ appreciably from reality. These organizational perceptions are influenced by some characteristics of the organization and its procedures. Second, organizations consider only a limited number of decision alternatives. Finally, organizations vary with respect to the amount of resources that such organizations devote to their organizational goals on the one hand and suborganizational and individual goals on the other hand. The firm is considered to be an adaptively rational system in which the firm learns from experience. General choice procedures are summarized in terms of three basic principles:

- *Avoid uncertainty.* The firm looks for procedures that minimize the need for predicting uncertain future events. One method uses short-run feedback as a trigger to achieve action; another accepts (and enforces) standardized decision rules.
- *Maintain the rules.* Once the firm has determined a feasible set of decision procedures, the organization abandons them only under duress.
- *Simplify the rules.* The firm relies on individual judgment to provide flexibility around simple rules.

*Organizational Control.* A theory of organizational control specifies the difference between executive choice in an organization and the decisions actually implemented. Organizational control within an organization depends on the elaboration of standard operating procedures. It is hard to see how a theory of the firm can ignore the effect of such organizational

procedures on decision-making behavior within the organization. The effects fall into at least four major categories: (a) effects on individual goals within the organization, (b) effects on individual perceptions of the environment, (c) effects on the range of alternatives considered, and (d) effects on the managerial decision rules used. Cyert and March's (1963) basic theory of organizational control assumes the following:

- *Multiple, changing, acceptable-level goals.* The criterion of choice is that the alternative selected meets the demands (goals) of the coalition.
- *An approximate sequential consideration of alternatives.* The first satisfactory alternative evoked is accepted. When failure occurs, search is intensified.
- *Uncertainty avoidance.* The organization seeks to avoid uncertainty by following standard operating procedures and a policy of reacting to feedback rather than forecasting the environment.

*Summary of Cyert and March (1963).* Cyert and March propose two major organizing devices: a set of variable concepts and a set of relational concepts. The variable concepts discussed previously are organizational goals, organizational expectations, organizational choice, and organizational control. There are also four major relational concepts (see Figure 1.2):

- Quasi-resolution of conflict
- Uncertainty avoidance
- Problemistic search
- Organizational learning

*Quasi-Resolution of Conflict.* In keeping with numerous theories of organizations, Cyert and March (1963) assume that the coalition in an organization is a coalition of members having different personal goals. Members require some procedure for resolving conflicts, such as acceptable-level decision rules, sequential attention to goals, or both.

*Uncertainty Avoidance.* Cyert and March (1963) submit that organizations typically try to avoid uncertainty. First, organizations avoid the requirement that they correctly anticipate events in the distant future by using decision rules emphasizing short-run reactions to short-run feedback, rather than anticipation of long-run uncertain events. Second, organizations avoid the requirement that they anticipate future reactions of other parts of their environment by arranging a negotiated environment. Organizations impose plans, standard operating procedures, industry tradition, and uncertainty-absorbing contracts on that environment.

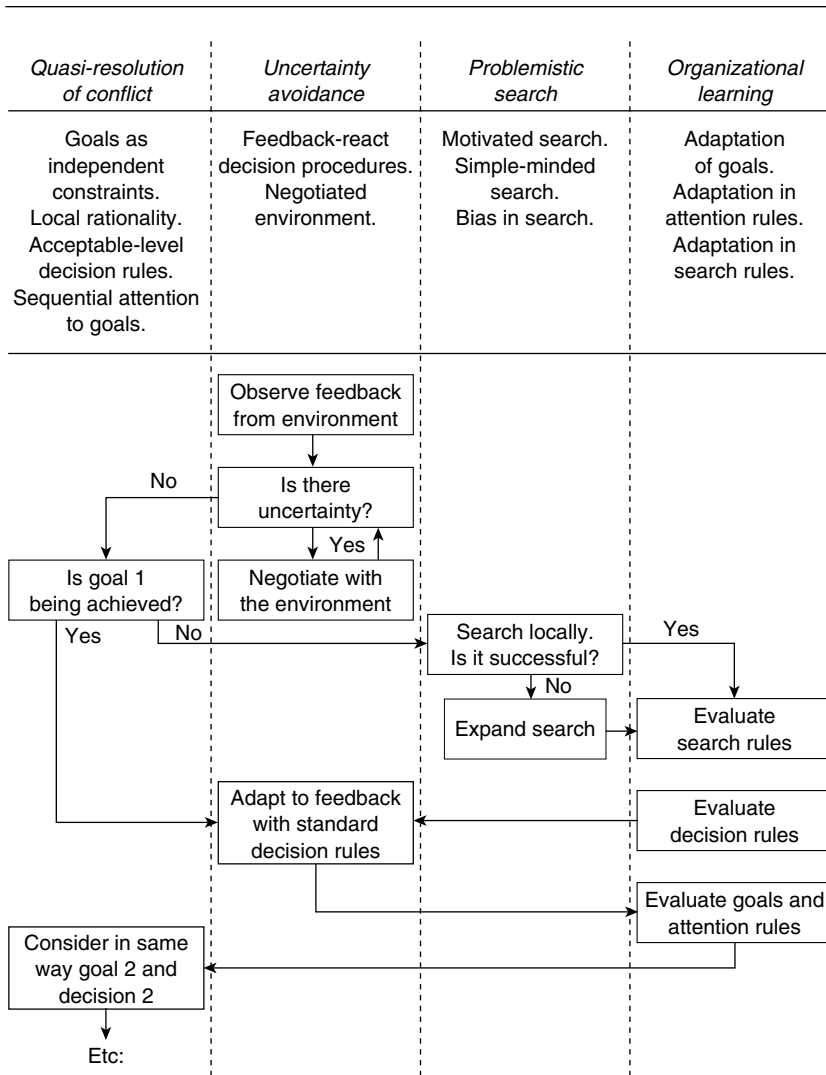


Figure 1.2 Organizational Decision Process in Abstract Form

SOURCE: Cyert and March (1963, p. 126)

*Problemistic Search.* Cyert and March's (1963) behavioral models assume that search, like decision making, is problem directed. *Problemistic search* means search that is stimulated by a problem (usually a rather specific one) and is directed toward finding a solution to that problem. Such organizational search is assumed to be motivated, simple-minded,

and biased. This bias may reflect training or experience of various parts of the organization. This bias may reflect the interaction of hopes and expectations, and communication biases are expected to reflect unresolved conflicts within the organization.

*Organizational Learning.* To assume that organizations go through exactly the same processes as individuals go through seems unnecessarily naive, but organizations exhibit (as do other social institutions) adaptive behavior over time. Cyert and March (1963) focus on adaptation with respect to three different phases of the decision process: adaptation of goals, adaptation in attention rules, and adaptation in search rules. Cyert and March submit that organizations change their goals, shift their attention, and revise their procedures for search as a function of their experience.

Scott (1987) notes that Cyert and March's (1963) concept of *coalitions* offers the following features:

- The problem of reification is avoided; individuals and groups have interests, and the processes by which these preferences come to be imposed on the organization are specified.
- It is recognized that although individuals and groups are allowed to specify the goals of the organization, there is no presumption that they do so on an equal footing, nor is it assumed that they hold common objectives.
- It is recognized that although individuals and groups impose goals on the organization, in most cases no single individual or group is powerful enough to determine completely the organization's goals; hence, the organization's goals are typically distinct from those of any of its participants.
- Allowance is made for differences in interests among participants. Some, but not all, of these differences may be resolved by negotiation, so at any time conflicting goals may be present.
- It is recognized that the size and composition of the dominant coalition may vary from one organization to another and within the organization from time to time.

In my judgment, Cyert and March's (1963) work provides a more conceptually refined and systematic outline of the behavioral theory of the firm that improves on March and Simon (1958). Three statements can summarize Cyert and March's arguments:

- The business firm is a relevant unit of investigation.
- It is possible to construct a theory of decision-making behavior within such a unit.
- Such a theory must focus explicitly on actual organizational decision processes.

To this purpose, Cyert and March (1963) show how to construct behavioral models of firm-level decision making and indicate the basic

theoretical framework within which such models are embedded. Cyert and March's (1963) behavioral theory of the firm can be applied to price and output decisions, internal resource allocations, innovations, competitive dynamics, and predictions of other organizations' behavior.

I hold the hope that current students studying the economics of organization may build on Cyert and March (1963) and connect this research agenda with other branches of organizational economics, which we consider in subsequent chapters. It is my view that building a science of organization that suppresses issues of bounded rationality and limited information processing by organizational members would lead the strategic management field up a blind alley.

Now that we have examined the classic work of Barnard (1938) and of the Carnegie School of Simon (1947), March and Simon (1958), and Cyert and March (1963), we apply the Carnegie framework to the Cuban Missile Crisis, where for 13 days the United States and the Soviet Union paused at the nuclear precipice (Allison, 1971).

### **Application: Explaining the Cuban Missile Crisis**

The Cuban missile crisis was a seminal event in the history of the United States. On the days between October 16 and October 28, 1963, the United States and the Soviet Union came dangerously close to nuclear war. Using the Carnegie School framework for explaining the crisis, we consider the following question: Why did the Soviet Union place strategic offensive missiles in Cuba?

*Why did the Soviet Union place strategic offensive missiles in Cuba?* From the Carnegie School framework, explanation for this action requires an identification of the relevant Soviet organizations and displays the patterns of organizational behavior from which the actions emerged. An explanation, from this perspective, must identify trends that reflect established organizations and their somewhat rigid operating procedures and programs. That is, governmental behavior is understood less as deliberate choices (as if from a unitary actor) and more as outputs of large organizations functioning according to standard patterns of behavior.

While the final decision to put missiles in Cuba must have been made in the presidium, the details of this operation—that is, the

(Continued)

(Continued)

path from the general decision to the actual appearance of operation missiles in Cuba—were probably delegated to appropriate Soviet organizations, such as the GRU (Soviet military intelligence), the KGB (the Communist party security agency), the SAM (the Soviet Air Defense Command), and a quite separate Soviet military service, the Strategic Rocket Forces. Standard Soviet operations, particularly when nuclear weapons were involved, imposed a very high level of secrecy. Thus, each organization's tendency to follow standard operating procedure was reinforced by a lack of information about the activity of other organizations and the impossibility of an overview of the whole operation. Allison (1971) discusses several instances where contradictory behaviors and anomalies (from the perspective of a unitary actor model) are explained from the Carnegie School framework. Many crucial details of implementation followed from organizational routines rather than from central choice.

The lesson, as Allison (1971) suggests, is that nuclear crises between machines as large as the United States and the Soviet Union have elements of genuine uncertainty. The information and estimates available to leaders about the situation will reflect organizational goals and routines as well as the facts. The alternatives presented to leaders will be much narrower than the menu of options that would typically be more desirable. The implementation of choices will exhibit unavoidable rigidities of organization's standard operating procedures. In a crisis, the overwhelming problem will be that of control and coordination of large organizations.

SOURCE: Adapted from Allison (1971)

### **Models of Bounded Rationality: Behavioral Economics and Business Organization (*Simon, 1982*)**

Finally, I conclude this first chapter with a summary of Simon's (1982) work in the research area of behavioral economics, which is worthy of careful attention by students studying the economics of organization. Simon, leading by example, shows how fruitful social science research can be for those who are not intimidated by disciplinary boundaries and that anything that can improve our understanding of complex organizations should be valued.



Simon (1982) argues that organization theory, economics (especially the theory of the firm), and cognitive psychology are all basically concerned with the same phenomena. All three are theories of human decision-making and problem-solving processes, yet each of the three domains has developed in relative isolation from the other two domains. Simon is concerned with both the causes for this isolation and its remedies.

*The Business Firm as an Organization.* Simon (1982) notes that the firm of neoclassical economic theory is little more than an entrepreneur who has attached a cost curve or a production function. Since profit maximization and internal efficiency are assumed, there is little room in the neoclassical theory for the familiar institutional characteristics of real business firms—for example, that one of a business firm's principal inputs typically is labor, a commodity that is contracted for on quite a different basis from other commodities, and that decisions are reached within a hierarchy of authority relationships among the employees.

*A Formal Theory of the Employment Relationship.* Simon (1982) observes that neoclassical economic theory abstracts away the distinctive characteristics of the employment contract, and neoclassical economic theory ignores the most significant features of the organizational process (i.e., the process of actually managing the factors of production, including the input of labor). Simon sets forth a theory of the employment relationship that reintroduces some of the more important of these empirical realities into the economic model. Perhaps in this way a bridge can be constructed in the discipline of strategic management between economists, with their theories of the firm and of factor allocations, and organization theorists, with their theories of organization—a bridge wide enough to permit some free trade of ideas between two intellectual domains that have been isolated from each other.

The authority relationship that exists between an employer and an employee, an economic relationship created by the employment contract, plays a central role in Simon's (1982) theory. Let employer  $B$  (for boss) hire employee  $W$  (for worker). We say that  $B$  exercises authority over  $W$  if  $W$  permits  $B$  to select behavior  $x$ . That is,  $W$  accepts authority when  $W$ 's behavior is determined by  $B$ 's decision. In general,  $W$  will accept authority if the decision is within  $W$ 's zone of acceptance.

We say that  $W$  enters into an employment contract with  $B$  when the former agrees to accept the authority of the latter and the latter agrees to pay the former a stated wage ( $w$ ). This contract differs fundamentally from a sales contract—the kind of contract that is assumed in typical formulations of neoclassical price theory. In the sales contract, each

contractual party promises a specific consideration in return for the consideration promised by the other contractual party. The buyer (like  $B$ ) promises to pay a stated sum of money, but the seller (unlike  $W$ ) promises in return a specified quantity of a completely specified commodity.  $W$  will be willing to enter an employment contract with  $B$  only if it does not matter to  $W$  very much which  $x$  (within the agreed-on area of acceptance)  $B$  will choose or if  $W$  is compensated in some way for the possibility that  $B$  will choose an  $x$  that is not desired by  $W$  (e.g., that  $B$  will ask  $W$  to perform an unpleasant task).

It will be advantageous to  $B$  to offer  $W$  added compensation for entering into an employment contract if  $B$  is unable to predict with certainty, at the time the contract is made, which  $x$  will be the optimal one, from  $W$ 's standpoint. That is,  $B$  will pay for the privilege of postponing, until some time after the contract is made, the selection of  $x$ . This option to wait has real options value, which is explained more fully and illustrated by a mathematical example in Chapter 5.

Simon's (1982) model deals with a particular problem of planning under uncertainty. It analyzes a business situation in which it may be advantageous to postpone a decision (selection of  $x$ ) to gain from information obtained subsequently. The postponement of choice may be regarded as a kind of liquidity preference, where the liquid resource is the employees' time, instead of money.

*A Comparison of Organization Theories.* According to Simon (1982), the economic theory of the firm and the organization theory of the firm are both concerned with the behavior of a person, or people, trying to achieve certain goals by the manipulation of (strategic) variables at their disposal. The problem of optimal, rational, or efficient behavior with respect to these goals can be formulated as a problem of finding the maximum (with respect to the strategic variables) of some function that is taken as a measure of success in attaining these goals (e.g., in the theory of the firm, finding the output that maximizes economic profit). Theories of organization, to a greater extent than the economic theory of the firm, have been concerned not only with optimal solutions but also with the whole set of viable solutions—that is, solutions that permit the survival of the organization (e.g., in the theory of the firm, outputs that yield at least a competitive rate of economic return).

In the neoclassical economic theory of the firm, a single participant, the entrepreneur, is explicitly treated as a rational individual. The other participants—employees, customers, and suppliers—enter into the neoclassical theory only implicitly as conditions to which the entrepreneur

adjusts in finding an economic solution that is optimal to the entrepreneur. One such condition is the price of the input factor labor; another is the demand schedule, which describes the behaviors of customers.

In the organizational theory, participants are generally treated in a more symmetrical way (Barnard, 1938; Simon, 1947). Participants are offered inducements for their participation in the organization. Through their participation, organizational members make contributions to the organization. The organization transforms its members' contributions into inducements that the organization, in turn, distributes to these members.

As a simple example, consider an organization with an entrepreneur, one employee, and one customer. The system of inducements and contributions may then be represented thus:

Participant	Inducements	Contributions
Entrepreneur	Revenue from sales	Cost of production
Employee	Wage	Labor
Customer	Goods	Purchase prices

Organization theory has generally been concerned not so much with optimality as with the conditions necessary for organizational survival, that is, the conditions under which the participants will continue to participate. The picture of the firm that is emerging from this research is that of a searching, information-processing, satisficing, allocating mechanism. Human thinking is an important—indeed, the most important—economic resource. The bulk of the productive wealth of our economy is not embodied in factories and machines but is found in the knowledge and skills stored in individuals' minds.

*The Scarcity of Attention.* A rabbit-rich world is a lettuce-poor world, and vice versa. Similarly, in an information-rich world, an abundance of information means a dearth of something else: a scarcity of whatever information consumes. Information consumes the attention of its recipients. In an information-rich world, most of the economic costs of information are the costs incurred by the recipients. It is not enough to know how much it costs to produce and transmit information; we must also know how much it costs, in terms of scarce attention, to receive information. As I later show, in Chapter 5, this idea informs Penrose's (1959) resource-based theory of managerial attention as the scarce resource, which is the binding constraint on the rate of the growth of the firm.

Many proposals for eliminating information overload (another phrase to describe life in an information-rich world) call for a new information system. An information-processing subsystem (a computer or new organization unit) will reduce the net demand on the rest of the organization's attention only if this subsystem absorbs more information previously received by others than it produces—that is, if this subsystem listens and thinks more than it speaks. The proper aim of a management information system is not to bring managers all the information they need but to reorganize the managers' environment of information to reduce the amount of time they must devote to receiving information. Restating the organization problem this way leads to a very different system design.

Simon (1982) notes that if a library has only one copy of each book, the library still has a high degree of informational overlap. Simon conjectures that if half of the titles in the Library of Congress were destroyed at random, little of the world's knowledge would be lost. The most important form of redundancy derives from the world's being highly lawful. Facts are lawful if they can be predicted from other facts. We need store only the fraction needed to predict these other facts. This process is exactly what science does: the process of replacing large amounts of unordered facts with tidy statements of orderly relations from which these facts can be inferred.

Simon (1982) observes that the dream of thinking everything out before we act, of making certain we have all the facts and know all the consequences, is a sick Hamlet's dream. It is a dream of someone with no analytical appreciation of the seamless web of causation, the limits of human thinking, or the scarcity of human attention.

*Theories of Decision Making in Economics and Behavioral Science.* Simon (1982) notes that the neoclassical economic theory of markets with perfect competition and rational agents is deductive theory that requires almost no contact with empirical data once the assumptions are accepted. Undoubtedly, there is an area of human behavior that fits these assumptions to a reasonable approximation, where the neoclassical microeconomic theory with its assumptions of rationality is a powerful and useful tool. Without denying the existence of this area, or its importance, Simon observes that neoclassical microeconomic theory fails to include some of the central problems of conflict and dynamics with which organization theory and strategic management have become increasingly concerned. Simon provides a metaphor to help show the reason for this failure:

Suppose we were pouring some viscous liquid—molasses—into a bowl of very irregular shape. What would we need to make a theory of the form the molasses would take in the bowl? How much would we have to know about the properties of molasses to predict its behavior under the circumstances? If the bowl were held motionless, and if we wanted only to predict behavior in equilibrium, we would have to know little, indeed, about molasses. The single essential assumption would be that the molasses, under the forces of gravity, would minimize the height of its center of gravity. With this assumption, which would apply as well to any other liquid, and a complete knowledge of the environment—in this case the shape of the bowl—the equilibrium is completely determined. Just so, the equilibrium behavior of a perfectly adapting organism depends only on its goal and its environment; it is otherwise completely independent of the internal properties of the organism. If the bowl into which we were pouring the molasses were jiggled rapidly, or if we wanted to know about the behavior before equilibrium was reached, prediction would require much more information. It would require, in particular, more information about the properties of molasses: its viscosity, the rapidity with which it adapted itself to the containing vessel and moved toward its goal of lowering its center of gravity. Likewise, to predict the short-run behavior of an adaptive organism, or its behavior in a complex and rapidly changing environment, it is not enough to know its goals. We must know also a great deal about its internal structure and particularly its mechanisms of adaptation. (p. 255)

Simon (1982) argues that broadening the definition of rationality to encompass goal conflicts and uncertainty made it difficult to ignore the distinction between the objective environment in which economic actors really live and the subjective environment that they perceive and to which they respond. When this distinction is made, we can no longer predict their behavior—even if they behave rationally—from the characteristics of the objective environment. *We also need to know something about their perceptual and cognitive processes.* Simon maintains that models of satisficing behavior are richer than models of maximizing behavior because models of satisficing behavior consider not only equilibrium but also the method of reaching equilibrium. Neoclassical economic theory is a theory of an individual choosing among fixed and known alternatives, to each of which the known consequences are attached. But when perception and cognition intervene between the decision maker and an objective environment, neoclassical economics no longer proves adequate. We need a description of the choice process that recognizes that alternatives are not given but must be sought and a description that takes into account the arduous task of determining which consequences will follow from each alternative.

Decision makers' information about their environment is actually much less than an approximation to the real environment. The term

*approximation* implies that the subjective world of decision makers resembles the external environment closely but lacks, perhaps, some fineness of detail. Actually, the perceived world is quite different from the “real” world. The differences involve both omissions and distortions and arise in both perception and inference. The sins of omission in perception are arguably more important than the sins of commission. Decision makers’ mental models of the world encompass only a minute fraction of all the relevant characteristics of the real environment, and these inferences extract only a small fraction of all the information that is present.

Perception is sometimes referred to as a *filter*. This term is as misleading as *approximation* and for the same reason: Perception implies that what comes through to the central nervous system is really quite a bit like what is out there. In fact, the filtering is not merely a passive selection of some part of a presented whole but is an active process involving attention to a very small part of the whole and exclusion, from the outset, of almost all that is not within the scope of attention.

Simon (1982) argues that every human lives in an environment that generates millions of bits of new information each second, but the bottleneck of the perceptual apparatus certainly does not admit more than 1,000 bits per second and probably much less. Equally significant omissions occur in the processing that takes place when information reaches the brain. There are hosts of inferences that might be drawn from the information stored in the brain that are not in fact drawn. The consequences implied by information in the memory become known only through active information processing and hence through active selection of particular problem-solving paths from the myriad problem-solving paths that might have been followed.

*Theories of Bounded Rationality.* Simon (1982) argues that rationality, as is typically defined in the social sciences, denotes behavior that is appropriate to the achievement of given goals, within the limits imposed by given constraints. Those theories that postulate important constraints arising from the limitations of the actors themselves as information processors may be called theories of bounded rationality.

In some sense, chess is a trivial game: If the complete decision tree of possible games was fully known, there would be nothing of interest left to play. Unfortunately, the triviality of chess, as viewed from this high level of abstraction, offers no practical guide to a player in actually choosing a move. The proof that guarantees the validity of one (and only one) of three alternatives that the game must have a value of win,

lose, or draw for white, gives no practically usable method to determine the true outcome. This relative, human difficulty necessitates the use of those incomplete, heuristic methods of playing, which constitute “good” chess, and without this human difficulty there would be no element of struggle and surprise in this game. Simon (1982) emphasizes that the chess player’s difficulty in behaving rationally has nothing to do with uncertainty—whether of consequences or alternatives—but it is a matter of complexity. There is no risk or uncertainty, in the sense in which those concepts are used in economics or in statistical decision theory, in the game of chess. It is a game of perfect information. No probabilities of future events need enter the calculations, and no contingencies, in a statistical sense, arise.

What we refer to as uncertainty in chess is uncertainty introduced into a perfectly certain environment by inability—computational inability—to ascertain the structure of that environment. But the result of the uncertainty, whatever its source, is the same; approximation must replace exactness in reaching a decision.

A satisficing decision procedure can often be turned into a procedure for optimizing by introducing a rule for optimal amount of search or, what amounts to the same thing, a rule for fixing the aspiration level optimally. Thus, the aspiration level in chess might be adjusted, dynamically, to such a level that the expected improvement in the move chosen, per minute of additional search, would just balance the incremental cost of the search.

Although such a reconstructed logic (Kaplan, 1964) is formally possible, to carry it out in practice requires additional information and assumptions beyond those needed for satisficing. First, the values of alternatives must be measured in units comparable with the units for measuring search costs to permit comparison at the margins. Second, the marginal productivity of search—the expected increase in the value per unit of search time—must be estimated on some basis. If one were designing a chess-playing program, it is doubtful whether effort spent in attempting to place the program in such a dynamic, optimizing framework would be nearly as worthwhile as an equivalent effort given to improving the selectivity of the program’s move-generating and move-evaluating heuristics. Research on satisficing procedures has focused primarily on the efficiency of search—on the nature of the heuristic methods.

Simon (1982) observes that most of the formal techniques that constitute the technical backbone of management science and operations

research are procedures for finding the best of a set of alternatives in terms of some criterion. Linear programming and dynamic programming are among the more powerful of these techniques. The dominant approach to problems in this sphere has been to simplify the real-world problems to the point where the formal optimizing models can be used as approximations.

Perhaps the technique most widely used in management science to deal with situations too complex for the application of known optimization methods is simulation. In simulation, the trial and error is supplied by the human investigators rather than by the technique of analysis itself. The satisficing approach has been most often employed in models where heuristic or trial-and-error methods are used to aid the search for plausible alternatives. These computational tools make substantially more tractable the task of matching bounded capabilities with the difficulty of the problems.

*From Substantive to Procedural Rationality.* Simon (1982) uses the term *substantive rationality* to refer to the concept of rationality developed within economics and the term *procedural rationality* to refer to the concept developed within psychology. Behavior is substantively rational when such behavior is appropriate to the achievement of given goals within the limits imposed by given constraints. Notice that, by this definition, the rationality of behavior depends on the actors in only a single respect—their goals. Given these goals, rational behavior is determined entirely by the characteristics of the environment in which such behavior takes place.

Neoclassical economic analysis rests on at least two fundamental assumptions. The first assumption is that economic actors have particular goals, for example, utility maximization or profit maximization. The second assumption is that economic actors are substantively rational. Given these two assumptions, and given a description of a particular economic environment, economic analysis (descriptive or normative) could usually be carried out using such standard tools as differential calculus, linear programming, or dynamic programming.

Thus, the assumption of utility or profit maximization on the one hand, and the assumption of substantive rationality on the other hand, freed economics from any dependence on psychology. As long as these assumptions went unchallenged, there was no reason why economists should acquaint themselves with the psychological literature on human cognitive processes or human choice. There was absolutely no point at which the empirical findings of psychological research could be injected



into the process of economic analysis. The irrelevance of psychology to neoclassical economics was complete. Behavior is procedurally rational when such behavior is the outcome of appropriate deliberation. Its procedural rationality depends on the process that generated it. Historically, there have been three main categories of psychological research on cognitive processes: learning, problem solving, and concept attainment.

*The search for computational efficiency is a search for procedural rationality, and computational mathematics is a normative theory of procedural rationality.* In this normative theory, there is no point in prescribing a particular substantively rational solution if there exists no procedure for finding that solution with an acceptable amount of computing effort. So, for example, although there exist optimal (substantively rational) solutions for combinatorial problems of the traveling-salesman type, and although these solutions can be discovered by a finite enumeration of alternatives, actual computation of the optimum is infeasible for problems of any size and complexity. The combinatorial explosion of such problems simply outraces the capacities of computers, present and prospective.

*Hence, a theory of rationality for problems like the traveling-salesman problem is not a theory of best solutions—of substantive rationality—but a theory of efficient computational procedures to find good solutions—a theory of procedural rationality.* Notice that this change in perspective involves not only a shift from the substantive to the procedural but also a shift from concern for optimal solutions to a concern for good solutions (e.g., good decision rules for inventory and workforce smoothing).

Simon (1982) argues that the demands of computability led to two kinds of deviation from neoclassical optimization: simplification of the model to make computation of an optimum feasible or, alternatively, searching for satisfactory rather than optimal choices. Simon regards both of these solutions as instances of satisficing behavior rather than optimization. To be sure, using reconstructed logic we can formally view these as optimizing procedures by introducing, for example, a cost of computation and a marginal return from computation and using these quantities to compute the optimal stopping point for the computation. But the important difference between the satisficing procedures and the optimizing procedures remains. The problem has been shifted from one of characterizing the substantively optimal solution to one of devising practicable computation procedures for making reasonable choices.

Ignorance of the future prevents decision makers from behaving in a substantively rational manner; decision makers can only adopt a rational choice procedure, including a rational procedure for forecasting or otherwise adapting to the future. Once we become interested in the procedures—the rational processes—that economic actors use to cope with uncertainty, we must broaden our horizons further. Uncertainty calls forth a whole range of actions. These actions are at least of four kinds:

- Intelligence actions to improve the data on which forecasts are based, to obtain new data, and to improve the forecasting models
- Actions to buffer the effects of forecasting errors—for example, holding inventories, insuring, and hedging
- Actions to reduce the sensitivity of outcomes to the behavior of competitors—for example, steps to increase product and market differentiation
- Actions to enlarge the range of alternatives whenever the perceived alternatives involve high risk

As organizational economics and strategic management become more concerned with procedural rationality, they will necessarily have to borrow from psychology or build for themselves a far more complete theory of human cognitive processes. Even if our research interest in strategic management is in normative rather than descriptive behavior, we will need such a theory. There are still many areas of decision—particularly those that are ill-structured—where human cognitive processes are more effective than the best available optimization techniques or artificial intelligence methods. A great deal can still be learned about effective decision procedures by studying how humans make choices.

We can expect substantive rationality only in those situations that are sufficiently simple as to be transparent to the decision maker's mind. In all other situations, we must expect that the decision maker's mind will use such imperfect information as it has, will simplify and represent the situation as it can, and will make such calculations as are within its powers (Duhaimé & Schwenk, 1985). We cannot expect to predict what the decision maker's mind will do in such situations unless we know what information it has, what forms of representations it prefers, and what algorithms are available to it.

In my judgment, there seems to be no escape from psychology. If organizational economics and strategic management are to deal with uncertainty, they will have to understand how humans in fact behave

in the face of uncertainty and by what limits of information and computability humans are bound. Bobby Fischer, in 1972, played chess differently from Paul Morphy, who played in 1861. Much of that difference was the result of the knowledge of the game that had accumulated over the century through the collective experience of the whole society of professional chess players. Organizational economics and strategic management are, like chess, inevitably culture bound and history bound. A business firm equipped with the tools of operations research does not make the same decisions, for example, concerning inventory management, as it did before it possessed such tools.

Simon (1982) maintains that (organizational) economics is one of the sciences of the artificial. Organizational economics is a description and explanation of human institutions, whose theory is no more likely to remain invariant over time than the theory of bridge design. Decision processes, like all other aspects of economic institutions, exist inside human heads. Decision processes are subject to change with every change in what humans know and with every change in their means of calculation. Simon submits that for this reason the attempt to predict, and prescribe, human economic behavior by deductive inference from a small set of unchallengeable premises must fail and has failed.

Simon (1982) suggests that organizational economics will progress as we deepen our understanding of human thought processes and will change as human individuals and human societies use progressively sharpened tools of thought in making their decisions and designing their institutions. A body of theory for procedural rationality is consistent with a business world in which humans continue to think and continue to invent; a theory of substantive rationality is not.

Simon (1982) notes that the shift from theories of substantive rationality to theories of procedural rationality requires a basic shift in scientific style, from an emphasis on deductive reasoning within a tight system of axioms to an emphasis on detailed empirical exploration of complex algorithms of thought. As organizational economics becomes more involved in the study of uncertainty, and more concerned with the complexity of business decision making, the shift in research program becomes inevitable. Wider areas of organizational economics and strategic management will replace the oversimplified assumptions of situationally constrained omniscient decision makers, with a realistic (and psychological) characterization of the limits on decision makers' rationality, and the consequences of those limits for their economic and managerial behavior.

*Simon (1982) argues that complexity is deep in the nature of things, and discovering tolerable approximation procedures and heuristics that permit huge spaces to be searched selectively is at the heart of intelligence, whether human or artificial.* A theory of rationality that does not give an account of problem solving in the face of complexity is sadly incomplete. It is worse than incomplete; such theory can be seriously misleading by providing “solutions” to organizational economic questions that are without operational significance. The theory of heuristic search, cultivated in artificial intelligence and information-processing psychology, is concerned with devising or identifying search procedures that will permit systems of limited computational capacity to make complex decisions and to solve difficult problems. As Franco Modigliani was fond of saying, “If businessmen are not now maximizers, after enough of them have graduated from business school, they will be.” So we might even expect that a positive theory of organizational economic behavior and strategic management will have to include as a subtheory the way in which business schools produce, and diffuse, decision-making techniques. Procedural rationality is the rationality of a person for whom the time and effort required for computation are scarce human resources.

Simon (1982) concludes by noting that there is a saying in politics that “you can’t beat something with nothing.” You can’t defeat a measure, or a candidate, simply by pointing to defects and inadequacies. You must offer an alternative. What then is the status of the neoclassical economic theory of the firm? There can no longer be any doubt that the micro-analytic assumptions of neoclassical economic theory—the assumptions of perfect rationality—are contrary to fact. It is not a question of approximation; the assumptions of perfect rationality do not even remotely describe the processes that humans use for making decisions in complex business situations.

Moreover, there is an alternative. If anything, there is an embarrassing richness of alternatives. Today, we have a large mass of descriptive data from both laboratory and field, which show how human problem solving and decision making take place in a wide variety of situations. A number of theories incorporate the replacement of optimization by targets and satisficing goals and mechanisms of learning and adaptation. If our research interest is in descriptive decision theory (or even normative decision theory), it is now clear that the neoclassical economic theory of the firm has been challenged by a superior alternative that provides researchers with a much closer approximation to what

is actually going on here.<sup>2</sup> Now that we have studied the behavioral theory of the firm from the Carnegie School, I turn next to Chapter 2 concerning transaction costs theory. Oliver Williamson was a doctoral student at Carnegie in the 1960s, and we shall see the influence of Richard Cyert, James March, and especially Herbert Simon on Williamson's (1975, 1985, 1996) transaction costs theory. Indeed, transaction costs theory combines their works with economics and aspects of the law in an effort to reconceptualize the problem of economic organization. Organization theory supports transaction costs theory in terms of insisting that workably realistic behavioral assumptions are an alternative to the assumptions of economics, which are typically chosen for analytical convenience; the autonomous adaptation of the market is joined with cooperative adaptation by organizations; and the embeddedness (e.g., the institutional environment) of a transaction matters (Granovetter, 1985; North, 1990). Before analyzing Williamson (1975), however, we begin the next chapter with Arrow's (1974) *The Limits of Organization*, which is followed by Coase (1988).

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<sup>2</sup>For further theory development and applications of the Carnegie School, see Allison (1971); Earl (2001); Gimeno, Folta, Cooper, and Woo (1997); Mahoney (1992c); March (1988, 1999); Scott (1987); Simon (1957, 1996); and Thompson (1967). Several consequences of bounded rationality have been observed, including (1) selective perception of information; (2) an adaptive, sequential manner of information processing; (3) mental effort that is reduced by heuristic procedures; and (4) a process of active reconstruction for memory. Systematic biases result with insensitivity to prior probability of outcomes, insensitivity to sample size, misconceptions of chance, failure to recognize regression toward the mean, the retrievability of instances, illusory correlation, insufficient adjustment and anchoring, and biases in the evaluation of conjunctive and disjunctive events (Kahneman, Slovic, & Tversky, 1982). Given the limitations and (systematic) biases of the individual, those operating from a behavioral perspective tend to view the organization as a more efficient information processor than any given individual. The firm is considered to be an institutional response to uncertainty and bounded rationality—a theme that I discuss later in transaction costs theory.

