How Senior Managers Think

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Harvard Business Review

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"It is not enough to have a good mind. The main thing is to use it well."

René Descartes

Jim LeBlanc phoned Steve Baum, who formerly worked in his division, to ask about the CEO's new

For the most part people view managers as rational, purposeful, and decisive. They see them as going through a series of stages of analysis before deciding what to do. The doing comes after the thinking. In his study of what senior managers think about and how they think, Daniel Isenberg found that this is only partly true. Most successful senior managers do not closely follow the classical rational model of first clarifying goals, assessing the situation, formulating options, estimating likelihoods of success, making their decision, and only then taking action to implement the decision. Nor do top managers select one problem at a time to solve, as the rational model implies.

Instead of having precise goals and objectives, successful senior executives have general overriding concerns and think more often about how to do things than about what is being accomplished. In addition to depending on their ability to analyze, they also rely heavily on a mix of intuition and disciplined analysis in their decision making and incorporate their action on a problem into their diagnosis of it. The author discusses some of the implications of his findings on how managers can exercise and use the skills that senior management positions call for.

corporate task force on quality control that wanted to meet with Jim. Jim, the head of the industrial equipment division of Tanner Corporation, thought that Steve, now director of technology, could help him figure out why the task force wanted to meet with him in two weeks.

"It's because you're doing so damn well down there, boss!" Steve replied.

"Gee, thanks. By the way, Steve, what's the agenda for Singer's staff meeting for next week?" (Singer was the president and Jim's boss.)

"Well, we're going to talk about the reorganization and look at the overhead reduction figures for each division. Then Singer's going to report on last week's executive committee meeting and his trip to Japan."

"How did it go?"

"His telex from Osaka sounded enthusiastic, but he just got in last night and I haven't seen him yet."

"Well," said Jim, "I guess we'll just have to see, but if you hear something, call me right away because if Osaka comes through I'm going to have to hustle to get ready, and you know how Bernie hates to shake it. Now, about the task force..."

In the space of three minutes, Jim LeBlanc got a lot done. In addition to collecting critical information about a task force that the CEO, with unusual fanfare, had personally commissioned one month ago, he also began to plan his approach to the upcoming staff meeting. He decided *not* to try to get a presentation by his marketing people on opportunities in the Far East on the agenda. Sensing that Singer *was* optimistic about the Osaka trip, Jim decided that he

should get his people ready for the possibility that the deal would materialize, which meant pulling engineers off another project for a while.

What were the thinking processes that allowed Jim to get so much done so pointedly and so rapidly? What was going on in his mind during his conversation with Steve? How, given the incomplete and uncertain information that Steve gave him, did Jim conclude that the Japan deal was imminent?

For the past two years I have studied the thought processes used by more than a dozen very senior managers while on the job. (See the insert on my research methodology.) The managers that I studied ranged in age from their lower 40s to their upper 50s, in managerial experience from 10 to 30 years, and in current job tenure from 4 months to 10 years. Their companies ranged from $1 billion divisions in *Fortune* "100" companies to $10 million entrepreneurial companies just beginning to take hold in the marketplace. Company products included low- and high-technology goods, and markets ranged from rapidly expanding to precipitately deteriorating. All but two of the executives were responsible for the overall performance of their business units. As all had been frequently promoted throughout their careers and were considered excellent performers across the board, they were a representative sample of today's successful business executives.

Two findings about how senior managers do *not* think stand out from the study. First, it is hard to pinpoint if or when they actually make decisions about major business or organizational issues on their own. And second, they seldom think in ways that one might simplistically view as "rational," i.e., they rarely systematically formulate goals, assess their worth, evaluate the probabilities of alternative ways of reaching them, and choose the path

that maximizes expected return. Rather, managers frequently bypass rigorous, analytical planning altogether, particularly when they face difficult, novel, or extremely entangled problems. When they do use analysis for a prolonged time, it is always in conjunction with intuition.

Let me make myself clear. Obviously, decisions *do* get made in organizations and these are frequently justified by data and logic. In particular, when viewed retrospectively over a long time period, effective executives often appear quite rational. Yet when studying their concurrent thinking processes, being "rational" does not best describe what the manager presiding over the decision-making process thinks about nor *how* he or she thinks.

I have a fourfold purpose in this article. First, I want to present a more accurate and empirically grounded description of what goes on inside the minds of senior managers. (See the insert on the good and bad news about cognition.) Second, I hope to offer a more accurate description of managerial thinking that should help provide a beginning language for talking about these elusive mental phenomena. Third, I hope that this language will also help to relieve some managers of the inconsistency between their view of how they are "supposed to" think and the thinking processes that, through experience, they have learned are actually quite effective. Fourth, I want to take advantage of successful senior managers' experiences to explore the managerial implications of their thinking processes.

What senior managers think about

Senior managers tend to think about two kinds of problems: how to create effective organizational processes and how to deal with one or two overriding concerns, or very general goals. These two domains of thought underlie the two critical activities that John P. Kotter found general managers engaged in: developing and maintaining an extensive interpersonal network, and formulating an agenda.[1]

A focus on process

The primary focus of on-line managerial thinking is on organizational and interpersonal processes. By "process" I mean the ways managers bring people and groups together to handle problems and take action. Whether proposing a change in the executive compensation structure, establishing priorities for a

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Research methodology

In studying these dozen executives, I conducted intensive interviews, observed them on the job, read documents, talked with their colleagues and, in some cases, subordinates, and engaged them in various exercises in which they recounted their thoughts as they did their work. I also reported my observations and inferences back to the managers to get feedback. I spent anywhere from 1 to 25 days studying each manager (the mode was two and a half days in field interviews and observation).

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1. John P. Kotter, *The General Managers* (New York: Free Press, 1982).

diverse group of business units, consolidating redundant operations, or preparing for plant closings, a senior executive's conscious thoughts are foremost among the processes for accomplishing a change or implementing a decision: "Who are the key players here, and how can I get their support? Whom should I talk to first? Should I start by getting the production group's input? What kind of signal will that send to the marketing people? I can't afford to lose their commitment in the upcoming discussions on our market strategy."

During the first months of his tenure, one area general manager I studied asked all of his business unit management teams to evaluate their own units. Subsequently, the area manager and his staff spent a day or more with each team discussing the whole area, each business unit within it, and how the two interrelated. Although he was concerned with the substance of the business-unit priorities, uppermost in his mind was a series of process concerns: How could the review process help managers be increasingly committed to their goals? How could the process help managers to become increasingly aware of the interdependencies among business units? How did his business unit managers use their people in reviewing their business units? How much management depth existed in the units?

In addition to thinking about organizational processes, successful senior managers think a lot about interpersonal processes and the people they come in contact with. They try to understand the strengths and weaknesses of others, the relationships that are important to *them*, what *their* agendas and priorities are.

For example, the CEO of a small high-technology company spent over an hour with his personnel director, a woman he rated as having performed excellently so far and whom he saw as having great potential although still inexperienced. At the time of the discussion, the CEO was considering adopting a new top-management structure under which the personnel director would report to another staff member rather than directly to him.

The CEO explained the proposed change to the personnel director, pointing out that it was not definite and that he was soliciting her reactions. Managers' "maps" of people provide them with guides to action. In this case, because of his sense of the personnel director's needs, the CEO slowed the reorganizing process so that the people who reported to him could deal with the various issues that arose.

The CEO elaborately described to me his awareness of the personnel director's concern at being new and at being a woman, and her desire to be in direct contact with him. He also understood her worry that if she reported to someone lower than him, people would perceive that the new personnel function was not very important and she would lose power.

The overriding concern

The stereotypical senior executive pays a great deal of attention to the strategy of the business, carefully formulates goals, lays out quantified and clear objectives, and sets about to achieve these objectives in the most efficient way. Whereas senior executives certainly attend to specific strategies and objectives some of the time, in their day-to-day reality specific objectives lurk in the background, not in the forefront of their thoughts.

Approximately two-thirds of the senior managers I studied were preoccupied with a very limited number of quite general issues, each of which subsumed a large number of specific issues. This preoccupation persisted for anywhere from a month to several years and, when in effect, dominated the manager's attention and provided coherence to many of his or her chaotic and disorganized activities.

The general manager of one large division of an automotive company, for example, used the word "discipline" over a dozen times in the course of a two-hour interview. For him, this concept embodied his deep concern for creating order and predictability in a division that, in his view, had become too loose before he took it over. His concern for discipline appeared in a number of diverse actions—strongly discouraging his subordinates' fire-fighting mentality, criticizing their poor preparation for corporate reviews, introducing rigorous strategic planning, encouraging time management, putting out a yearly calendar with divisional and corporate meetings printed on it, publishing agendas for many of these meetings up to a year in advance, and, by keeping recent reports in the top drawer of his desk, forcing himself to review frequently the division's activities and performance.

Regardless of its substance, the overriding concern weaves its way in and out of all the manager's daily activities, at times achieving the dimensions of an all-consuming passion.

After his first 100 days in office, an area general manager described his experience turning around a subsidiary in these words.

"The personal cost of achieving our top priorities has been huge. I dropped all outside activities. Now I have a feeling of just having emerged, like a chap who's been taken by a surf wave and rolled. Suddenly he comes up and can look at daylight again. It has been like a single-minded rage or madness. At the end of the 100 days, somehow I have awakened. It was overwhelming."

Some good and bad news about cognition

Although the study of cognition is not new, in the past 30 years the popularity and practical importance of the "cognitive sciences" have increased dramatically, adding to our knowledge of the capabilities and limitations of the human mind. The news is both "good" and "bad" in terms of our accuracy as judges and decision makers.

Some good news

The good news is that each of us possesses a wide range of congitive capabilities, including many that even the most powerful computers cannot match. For all intents and purposes the long-term storage capacity of the human memory is unlimited, capable of storing perhaps trillions of bits of information. Furthermore, much of this memory is almost immediately accessible.

The human mind is also capable of performing very complicated simulations such as giving directions to someone on how to get to an office from an airport or rehearsing an upcoming meeting. We are also capable of making huge inferential leaps with rarely a hitch. Try interpreting the following sentences: "The manager prepared the forecast using an accepted inflation estimate. He knew that it was imprecise but figured that it was better than no projection at all." Who is "he"? What is "it"? What does "projection" refer to? We know what these sentences mean, yet to interpret them correctly required the reader to make a number of inferences, which he or she usually makes with unhesitating accuracy.

Finally, we are capable of using our unlimited memory, our rapid retrieval system, and our unconscious rules of inference to attain extremely high levels of skill, such as playing chess, analyzing stocks, conducting performance appraisals, or speaking a language. These skills do not come easily, requiring years of experience and many thousands of hours of practice. Nevertheless, when we use them we compress years of experience and learning into split seconds. This compression is one of the bases of what we call intuition as well as of the art of management.

Some bad news

The same cognitive processes that underlie our greatest mental accomplishments also account for incorrigible flaws in our thinking. For instance, we easily believe that salient events occur more frequently than they really do: for example, despite the fact that dozens of examples exist where missed budgets did not lead to termination, managers interpret Sam's being fired for not making a budget as "There is a good chance that division heads who do not meet budgeted profit objectives will get axed."

A second family of flaws arises from our overconfidence in our own expertise at making complex judgments. Various cognitive biases such as the "hindsight bias," our retrospective confidence in judgments that we hesitated about making at the time ("I *knew* it wouldn't work when she first proposed it"), and our tendency to search for confirming but not for disconfirming evidence of our judgments, conspire to exaggerate that belief.

And finally, research has shown that when presented with data, we are not very good at assessing the degree of relationship among variables—even though this skill is critical for successful management. Unless the relationships are very obvious, we tend to rely on preconceptions and perceive illusory correlations.

A number of excellent books on human cognition are in print. For a nontechnical discussion of the good news, Morton Hunt's *The Universe Within* (Simon & Schuster, 1982), is a good starting place. A more technical discussion of human cognition is Stephen K. Reed's *Cognition: Theory and Applications* (Brooks/Cole, 1982). A somewhat technical but very comprehensive presentation of the bad news can be found in Daniel Kahneman, Paul Slovic, and Amos Tversky's edited volume, *Judgment Under Uncertainty: Heuristics and Biases* (Cambridge University Press, 1982).

Of course senior managers do think about the content of their businesses, particularly during crises and periodic business reviews. But this thinking is always in close conjunction with thinking about the process for getting *others* to think about the business. In other words, even very senior managers devote most of their attention to the tactics of implementation rather than the formulation of strategy.

How senior managers think

In making their day-by-day and minute-by-minute tactical maneuvers, senior executives tend to rely on several general thought processes such as using intuition; managing a network of interrelated problems; dealing with ambiguity, inconsistency, novelty, and surprise; and integrating action into the process of thinking.

Using intuition

Generations of writers on the art of management have recognized that practicing managers rely heavily on intuition.[2] In general, however, people have a poor grasp of what intuition is. Some see it as the opposite of rationality, others use it as an excuse for capriciousness, and currently some view it as the exclusive property of a particular side of the brain.

Senior managers use intuition in at least five distinct ways. First, they intuitively sense when a problem exists. The chief financial officer of a leading technical products company, for example, forecast a difficult year ahead for the company and, based on a vague gut feel that something was wrong, decided to analyze one business group. "The data on the group were inconsistent and unfocused," he said after doing the analysis. "I had the sense that they were talking about a future that just was not going to happen, and I turned out to be right."

Second, managers rely on intuition to perform well-learned behavior patterns rapidly. Early on, managerial action needs to be thought through carefully. Once the manager is "fluent" at performance, however, and the behavior is programmed, executives can execute programs without conscious effort. In the words of one general manager:

"It was very instinctive, almost like you have been drilled in close combat for years and now the big battle is on, and you really don't have time to think. It's as if your arms, your feet, and your body just move instinctively. You have a preoccupation with working capital, a preoccupation with capital expenditure, a preoccupation with people, and one with productivity, and all this goes so fast that you don't even know whether it's completely rational, or it's part rational, part intuitive."

Intuition here refers to the smooth automatic performance of learned behavior sequences. This intuition is not arbitrary or irrational, but is based on years of painstaking practice and hands-on experi-ence that build skills. After a while a manager can perform a sequence of actions in a seamless fabric of action and reaction without being aware of the effort.

A third function of intuition is to synthesize isolated bits of data and experience into an integrated picture, often in an "aha!" experience. In the words of one manager: "Synergy is always nonrational because it takes you beyond the mere sum of the parts. It is a nonrational, nonlogical thinking perspective."

Fourth, some managers use intuition as a check (a belt-and-suspenders approach) on the results of more rational analysis. Most senior executives are familiar with the formal decision analysis models and tools, and those that occasionally use such systematic methods for reaching decisions are leery of solutions that these methods suggest that run counter to their sense of the correct course of action.

Conversely, if managers completely trusted intuition, they'd have little need for rigorous and systematic analysis. In practice, executives work on an issue until they find a match between their "gut" and their "head." One manager explained to me, "Intuition leads me to seek out holes in the data. But I discount casual empiricism and don't act on it."

Fifth, managers can use intuition to bypass in-depth analysis and move rapidly to come up with a plausible solution. Used in this way, intuition is an almost instantaneous cognitive process in which a manager recognizes familiar patterns. In much the same way that people can immediately recognize faces that were familiar years ago, administrators have a repertoire of familiar problematic situations matched with the necessary responses. As one manager explained:

"My gut feel points me in a given direction. When I arrive there, then I can begin to sort out the issues. I do not do a deep analysis at first. I suppose the intuition comes from scar tissue, getting burned enough times. For example, while discussing the European budget with someone, suddenly I got the answer: it was hard for us to get the transfer prices. It rang a bell, then I ran some quick checks."

By now it should be clear that intuition is not the opposite of rationality, nor is it a random process of guessing. Rather, it is based on extensive experience both in analysis and problem solving and in implementation, and to the extent that the lessons of experience are logical and well-founded, then so is the intuition. Further, managers often combine gut feel with systematic analysis, quantified data, and thoughtfulness.

It should also be clear that executives use intuition during *all* phases of the problem-solving process: problem finding, problem defining, generating and choosing a solution, and implementing the solution.

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2. See, for example, Chester I. Barnard, *The Functions of the Executive* (Cambridge: Harvard University Press, 1938); also Henry Mintzberg, "Planning on the Left Side and Managing on the Right," HBR July–August 1976, p. 49.

In fact, senior managers often ignore the implied linear progression of the rational decision-making model and jump opportunistically from phase to phase, allowing implementation concerns to affect the problem definition and perhaps even to limit the range of solutions generated.

Problem management

Managers at all levels work at understanding and solving the problems that arise in their jobs. One distinctive characteristic of top managers is that their thinking deals not with isolated and discrete items but with portfolios of problems, issues, and opportunities in which (1) many problems exist simultaneously, (2) these problems compete for some part of his or her immediate concern, and (3) the issues are interrelated.

The cognitive tasks in problem management are to find and define good problems, to "map" these into a network, and to manage their dynamically shifting priorities. For lack of a better term, I call this the process of problem management.

Defining the problem. After learning of a state health organization threat to exclude one of their major products from the list of drugs for which the state would reimburse buyers, top executives in a pharmaceutical company struggled to find a proper response. After some time, the managers discovered that the real problem was not the alleged drug abuse the availability of the drug on the street caused. Rather, the problem was budgetary: the health services department had to drastically reduce its budget and was doing so by trimming its list of reimbursable drugs. Once they redefined the problem, the pharmaceutical executives not only could work on a better, more real problem, but also had a chance to solve it—which they did.[3]

In another case, a division general manager discovered that, without his knowledge but with the approval of the division controller, one of his vice presidents had drawn a questionable personal loan from the company. The division manager told me how he defined the problem: "I could spend my time formulating rules to guide managers. But the real fundamental issue here was that I needed to expect and demand that my managers manage their resources effectively." Although he recognized the ethical components involved, he chose to define the problem as concerned with asset management rather than cheating. Because asset management was an issue the division frequently discussed, the manager

felt that it was more legitimate and efficacious to define the problem in this way.

Making a network of problems. By forming problem categories, executives can see how individual problems interrelate. For instance, a bank CEO had a "network" of at least 19 related problems and issues that he was concerned about. Among these were: establishing credibility in international banking, strengthening the bank's role in corporate banking, increasing the range of financial services and products, being prepared to defensively introduce new products in response to competitors' innovations, developing systems to give product cost information, reducing operational costs, standardizing branch architecture, and utilizing space efficiently.

The bank CEO classified these problems in terms of broad issue categories. He found that many were related to the issue of expanding and broadening the bank's competence beyond consumer banking in which it was already firmly established. A second overarching issue was standardization of the bank's many branches with regard to architecture, physical layout, accounting systems, and so on.

Having an interrelated network of problems allows a manager to seize opportunities more flexibly and to use progress on one problem to achieve progress on another, related issue. The bank CEO likened himself to a frog on a lily pad waiting for the fly—the problem or issue—to buzz by. Having a mental network of problems helped him to realize the opportunities as they occurred.

Choosing which problem to work on. Although managers often decide to work on the problem that seems to offer the best opportunities for attack, determining which problems they ought to tackle can be hard. As one manager commented:

"I have to sort through so many issues at once. There are ten times too many. I use a number of defense mechanisms to deal with this overload—I use delaying actions, I deny the existence of problems, or I put problems in a mental queue of sorts. This is an uncomfortable process for me. My office and responsibility say I need to deal with all of these issues, so I create smoke or offer some grand theory as my only way to keep my own sanity. One of the frustrations is that I don't want to tell my people that their number one problems have lower priorities than they think they should get."

In my observations, how managers define and rank problems is heavily influenced by how easy the problems are to solve. Very shortly after perceiving that a problem exists, managers run a quick feasibility check to see if it is solvable. Only if they find it is solvable will they then invest further energy to understand its various ramifications and causes. In

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3. See my study, "Drugs and Drama: The Effects of Two Dramatic Events in a Pharmaceutical Company on Managers' Cognitions," Working Paper #83–55 (Boston: Harvard Business School, 1983).

other words, managers tend not to think very much about a problem unless they sense that it is solvable. Contrary to some management doctrines, this finding suggests that a general concept of what is a possible solution often precedes and guides the process of conceptualizing a problem.

Thus, the two stages of problem analysis and problem solving are tightly linked and occur reiteratively rather than sequentially. By going back and forth between these two cognitive processes, managers define the array of problems facing them in terms that already incorporate key features of solutions and that thus make it easier for them to take action.

One outcome of this process is that managers have an organized mental map of all the problems and issues facing them. The map is neither static nor permanent; rather, managers continually test, correct, and revise it. In the words of one CEO, the executive "takes advantage of the best cartography at his command, but knows that that is not enough. He knows that along the way he will find things that change his maps or alter his perceptions of the terrain. He trains himself the best he can in the detective skills. He is endlessly sending out patrols to learn greater detail, overflying targets to get some sense of the general battlefield."

Tolerating ambiguity. The senior managers that I observed showed an ability to tolerate and even thrive on high degrees of ambiguity and apparent inconsistency. As one top executive said:

"I think ambiguity can be destroying, but it can be very helpful to an operation. Ambiguities come from the things you can't spell out exactly. They yield a certain freedom you need as a chief executive officer not to be nailed down on everything. Also, certain people thrive on ambiguity, so I leave certain things ambiguous. The fact is we tie ourselves too much to linear plans, to clear time scales. I like to fuzz up time scales completely."

Because demands on a manager become both stronger and more divergent as responsibility increases, the need to tolerate apparent ambiguity and inconsistency also increases. For example, the top manager has to deal with stakeholders who may have adversarial roles. By responding positively to one set of demands, the manager automatically will create other conflicting sets of demands.

The reason I have called the inconsistency "apparent" is that senior managers tend to have ways of thinking that make issues seem less inconsistent. For example, the president of a leading high-technology company was considering whether to exercise or forgo an option to lease land on which to build expensive warehouse space for one of the divisions at the same time as the division was laying off workers for the first time in its history. "To spend a half million dollars on keeping the land and building warehouse space while the plant is laying off people looks terrible and makes no sense," he said, "but if next year is a good year, we'll need to be in a position to make the product."

Perceiving and understanding novelty. The managers I observed dealt frequently with novel situations that were unexpected and, in many cases, were impossible to plan for in advance. For example, one division general manager found himself with the task of selling his division, which was still developing a marketable product. In response to its shareholders, the corporation had shifted its strategy and thus decided to divest the fledgling division. How should the general manager look for buyers? If buyers were not forthcoming, would the corporation retain a stake to reduce the risk to potential new partners? How should he manage his people in the process of selling? Should he himself look for a new position or commit himself to a new owner? These were some of the unique questions the division head faced while selling his own division, and there was no industry experience to give him clear answers.

In general, the human mind is conservative. Long after an assumption is outmoded, people tend to apply it to novel situations. One way in which some of the senior managers I studied counteract this conservative bent is by paying attention to their feelings of *surprise* when a particular fact does not fit their prior understanding, and then by highlighting rather than denying the novelty. Although surprise made them feel uncomfortable, it made them take the cause seriously and inquire into it—"What is behind the personal loan by my vice president of sales that appears on the books? How extensive a problem is it?" "Why did the management committee of the corporation spend over an hour of its valuable time discussing a problem three levels down in my division?" "Now that we've shown the health services department beyond a reasonable doubt that this drug is not involved in drug abuse, why don't they reinstate it on the list?"

Rather than deny, downplay, or ignore disconfirmation, successful senior managers often treat it as friendly and in a way cherish the discomfort surprise creates. As a result, these managers often perceive novel situations early on and in a frame of mind relatively undistorted by hidebound notions.

What to do about thinking

Having looked at the inner workings of the managerial mind, what insights can we derive from our

observations? Literally hundreds of laboratory and field studies demonstrate that the human mind is imperfectly rational, and dozens of additional articles, offering arguments based on every field of study from psychology to economics, explain why.[4] The evidence that we should curtail our impractical and overly ambitious expectations of managerial rationality is compelling.

Yet abandoning the rational ideal leaves us with two glaring problems. First, whether managers think in a linear and systematic fashion or not, companies still need to strive toward rational action in the attainment of corporate goals, particularly in their use of resources. Second, we still need to spell out what kinds of thinking processes are attainable and helpful to senior managers.

Program rationality into the organization

Of course, rationality is desirable and should be manifest in the functioning of the company. One alternative to the vain task of trying to rationalize managers is to increase the rationality of organizational systems and processes. Although organizational behavior is never completely rational, managers can design and program processes and systems that will approach rationality in resource allocation and employment.

Decision support systems are one source of organizational rationality. These generally computerized routines perform many functions ranging from providing a broad and quantitative data base, to presenting that data base in easily understandable form, to modeling the impact of decisions on various financial and other criteria, to mimicking expert judgment such as in the diagnosis and repair of malfunctioning equipment or in oil field exploration.

Another rational process that many businesses employ is strategic planning. Nonrational or partly rational managers can devise, implement, and use a plan that systematically assesses a company's strengths and weaknesses, logically extrapolates a set of its competencies, proposes a quantitative assessment of environmental constraints and resources, and performs all these tasks in a time-sequenced, linear fashion.

Of course, companies have used rational systems for information gathering, strategic planning, budgeting, human resource planning, environmental scanning, and so forth for a long time. But I see these systems not only as useful but also as a necessary complement to a manager's apparent inability to be very systematic or rational in thought.

But is it possible for imperfectly rational managers to design even more perfectly rational systems? The answer is a qualified yes. There is evidence, for example, that with help people can design systems that are better than they are themselves at making judgments.[5] Creating organizational systems to improve on their own behavior is not new to managers. In order to still hear the beautiful sirens yet prevent himself being seduced by the music and throwing himself into the sea, Ulysses ordered his men to block their own ears with wax, bind him to the mast, and to tighten his bindings if he ordered them to let him go. Although Ulysses begged his sailors to release him, they obeyed his original orders and Ulysses succeeded in both hearing the sirens and surviving their perilous allure.[6]

Programming rationality into the organizational functioning is important for another reason: rational systems free senior executives to tackle the ambiguous, ill-defined tasks that the human mind is uniquely capable of addressing. Many senior managers today face problems—developing new products for embryonic markets, creating new forms of manufacturing operations, conceiving of innovative human resource systems—that are new to them and new to their companies and that they can deal with only extemporaneously and with a nonprogrammable artistic sense. In fact, it may even seem paradoxical that managers need to create rational systems in order to creatively and incrementally tackle the nonrecurrent problems that defy systematic approaches.

Hone intellectual skills

In the literature on managerial behavior there is disagreement as to how much or how often senior managers engage in thoughtful reflection. Many executives that I studied do make time for in-depth thinking, sometimes while they are alone, sometimes with their peers or subordinates, and sometimes in active experimentation.

Furthermore, most senior managers I studied constantly maintain and sharpen their intellectual abilities in order to better analyze their current or past

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4. Some of Herbert A. Simon's classic work on bounded rationality and ''satisficing'' is collected in *Models of Thought* (New Haven: Yale University Press, 1979). More recently, Amos Tversky, Daniel Kahneman, and other psychologists have described the mechanisms producing imperfect judgment and nonrational choice. See, for example, Daniel Kahneman, Paul Slovic, and Amos Tversky, ed., *Judgment Under Uncertainty: Heuristics and Biases* (Cambridge, U.K.: Cambridge University Press, 1982).

5. Louis R. Goldberg, ''Man vs. Model of Man: A Rationale, Plus Some Evidence, for a Method of Improving on Clinical Inferences,'' *Psychological Bulletin,* 1970, 73, p. 422.

6. Jon Elster, *Ulysses and the Sirens: Studies in Rationality and Irrationality* (Cambridge, Mass.: Cambridge University Press, 1979).

experiences. Rigorous thinking is a way of life for them, not a task they try to avoid or to expedite superficially.

These senior managers read books outside their fields, engage in enthusiastic discussions of political and economic affairs, attend academic lectures and management seminars, and tackle brain teasers such as word problems, chess, and crossword puzzles. One company president I studied is a regular theatergoer who can discuss Shakespearean and contemporary plays at great length, while another often immerses himself in classical music and allows ideas about difficult work-related issues to float around in his consciousness. These activities are valuable not only for their content but also for the thinking processes that they establish, develop, and refine. Whether managers indulge in such "blue sky" irrelevant activities at work or outside, they are developing critical mental resources that they can then apply to problems that arise in their jobs.

Think while doing

One of the implications of the intuitive nature of executive action is that "thinking" is inseparable from acting. Since managers often "know" what is right before they can analyze and explain it, they frequently act first and think later. Thinking is inextricably tied to action in what I call thinking/acting cycles, in which managers develop thoughts about their companies and organizations not by analyzing a problematic situation and then acting, but by thinking and acting in close concert. Many of the managers I studied were quite facile at using thinking to inform action and vice versa.

Given the great uncertainty of many of the management or business issues that they face, senior managers often instigate a course of action simply to learn more about an issue: "We bought that company because we wanted to learn about that business." They then use the results of the action to develop a more complete understanding of the issue. What may appear as action for action's sake is really the result of an intuitive understanding that analysis is only possible in the light of experience gained while attempting to solve the problem. Analysis is not a passive process but a dynamic, interactive series of activity and reflection.

One implication of acting/thinking cycles is that action is often part of defining the problem, not just of implementing the solution. Frequently, once they had begun to perceive the symptoms, but before they could articulate a problem, the managers I studied talked to a few people to collect more information and confirm what they already knew. The act of collecting more data more often than not changed the nature of the problem, in part because subordinates then realized that the problem was serious enough to warrant the boss's attention. Managers also often acted in the absence of clearly specified goals, allowing these to emerge from the process of clarifying the nature of the problem.

Yet how often do managers push their subordinates to spell out *their* goals clearly and specify *their* objectives? A creative subordinate will always be able to present a plausible and achievable goal when pressed, but in the early stages of a tough problem it is more helpful for managers to provide a receptive forum in which their people can play around with an issue, "noodle" it through, and experiment. Sometimes it will be necessary for managers to allow subordinates to act in the absence of goals to achieve a clearer comprehension of what is going on, and even at times to *discover* rather than achieve the organization's true goals.

Manage time by managing problems

All managers would like to accomplish more in less time. One of the implications of the process of mapping problems and issues is that when a manager addresses any particular problem, he or she calls a number of related problems or issues to mind at the same time. One by-product is that a manager can attain economies of effort.

For example, when working on a problem of poor product quality, a division manager might see a connection between poor quality and an inadequate production control system and tackle both problems together. To address the issues, she could form a cross-functional task force involving her marketing manager, who understands customers' tolerance for defects. (One reason for bringing him in might be to prepare him for promotion in two or three years.) She might intend the task force to reduce interdepartmental conflicts as well as prepare a report that she could present to corporate headquarters.

Managers can facilitate the process of creating a problem network in many ways. They can ask their staff to list short- and long-term issues that they think need to be addressed, consolidate these lists, and spend some time together mapping the interrelationships. Or they can ask themselves how an issue fits into other nonproblematic aspects of the company or business unit. How does product quality relate to marketing strategy? To capital expenditure guidelines? To the company's R&D center with a budget surplus? To the new performance appraisal system? To the company's recent efforts in affirmative action? To their own career plans? Managers should never deal with problems in isolation. They should always ask themselves what additional re-

lated issues they should be aware of while dealing with the problem at hand.[7]

Some suggestions

A number of suggestions on how managers can improve their thinking emerge from my study of senior managers' thought processes:

- □ Bolster intuition with rational thinking. Recognize that good intuition requires hard work, study, periods of concentrated thought, and rehearsal.
- □ Offset tendencies to be rational by stressing the importance of values and preferences, of using imagination, and of acting with an incomplete picture of the situation.
- □ Develop skills at mapping an unfamiliar territory by, for example, generalizing from facts and testing generalities by collecting more data.

- □ Pay attention to the simple rules of thumb—heuristics—that you have developed over the years. These can help you bypass many levels of painstaking analysis.
- □ Don't be afraid to act in the absence of complete understanding, but then cherish the feelings of surprise that you will necessarily experience.
- □ Spend time understanding what the problem or issue is.
- □ Look for the connections among the many diverse problems and issues facing you to see their underlying relationships with each other. By working on one problem you can make progress on others.
- □ Finally, recognize that your abilities to think are critical assets that you need to manage and develop in the same way that you manage other business assets.

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7. For an interesting application of these ideas to a different leadership setting, see my chapter "Some Hows and Whats of Managerial Thinking: Implications for Future Army Leaders," in *Military Leadership on the Future Battlefield* (New York: Pergamon Press, 1984).