Polytechnic University of the Philippines
OPEN UNIVERSITY

MN 411 – Decision Making

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INTRODUCTION

"Somewhere along the line of development we discover what we really are, and then we make our real decision for which we are responsible. Make that decision primarily for yourself because you can never really live anyone else's life." -- ***Eleanor Roosevelt***

Enlightenment is man's emergence from his self-imposed immaturity. Immaturity is the inability to use one's understanding without guidance from another. This immaturity is self-imposed when its cause lies not in the lack of understanding, but in the lack of resolve and courage to use it without guidance from another. Have courage to use your own understanding! Enlightenment means taking full responsibility for your life.

Fear is not in the habit of speaking the truth; when perfect sincerity is expected, perfect freedom must be allowed. Nor does anyone who is apt to get angry when hearing the truth should wonder why he does not hear it. For example, when I asked a business manager what had made his organization one of the best in his industry, he pointed to his CIO and said "Joe is a millionaire. He can quit any time. He says what he thinks is right!"

Mind is what your brain does consciously. Our minds perform a series of information processing in order to form strategies needed to live our daily lives. This process is known as decision making. However, aside from making decisions, because of many kinds of uncertainties we also face a problem called **decidophobia**, which is the fear of making the wrong decisions combined with nervous agitation. Moreover, fear of judgment by others is a sure path to unhappiness which is a state of mind.

Decisions are at the heart of success, and at times there are critical moments when they can be difficult, perplexing, and nerve wracking. This module provides help and guidance for making efficient and effective decisions by putting to use a well-structured approach and well-focused process known as the modeling or paradigm process. The

word paradigm comes from the Greek word *paradeigma*, meaning "model" or "pattern." A model represents a way of looking at the world, a shared set of assumptions that enable us to understand or predict behavior. Models have a powerful influence on individuals and on society because our view of the world is determined by our set of assumptions about it. To put it another way, our vision is often affected by what we believe about the world; our beliefs often determine the information that we "see."

Decision-making is about facing a question, such as "To be or not to be?" i.e., to be the one you want to be or not to be? That is a decision. Humanity has always lived in the shadow of fears. Yet almost nothing was known about fear until Freud began the study of unusual phobias. A little later, some psychologists suggested that one dread is common to all mankind: the dread of death.

Decisions, decisions and more decisions! The fear of making serious decisions is a new kind of fear, called **decidophobia**, proclaimed by Walter Kaufmann at Princeton University in 1973. The fear of making the wrong decisions is well known to any responsible manager. As Eleanor Roosevelt said, "You gain strength, courage, and confidence by every experience in which you really stop to look fear in the face." Wherever you see a successful business, someone once made a courageous decision. There has never yet been a person in the history of mankind who led a life of ease whose name is worth remembering.

The Latin word Decido has two meanings. It can mean to decide and also to fall off. Hence plants are called deciduous if their leaves fall off in the fall. The word fall started as "leaf fall" for autumn in the 15th century. The expression "take the plunge" suggests the relevance of both meanings. Making a wrong decision provokes the fear of falling.

In the serious decisions that mold the future of your business, freedom becomes tangible; serious decisions are objects of extreme dread. Serious business decisions that ultimately shape, guide, and direct our future are extremely fearful to business managers. These decisions

involve norms, standards, and the comparison and choice of goals. Learning the structured, well-focused approach to the decision-making process lessens decidophobia. The gem of Applied Management Science is that it turns the old adage that "business managers are born, not made" into myth. If one can master management science applications, then no problem is too big nor any decision too overwhelming. The goal of management science experts is to wipe out decidophobia.

Just being worried about making serious decisions is like sitting on a rocking chair--it gives you something to do but doesn't get you anywhere. Therefore worrying about making a decision is a waste of time. Moreover, making a decision and implementing one are two different things. Here is a question for you: Five frogs are sitting on a log. Four decide to jump off. How many are left? A protracted decision is only one part of the process of choosing because it lacks the commitment to implement the decision. There is a big difference between making a decision and implementing it. The measure of success is not whether you have a tough decision to deal with, but whether it's the same decision you had before. Decide like a man of action; implement like a man of thought. It does not take much strength to decide what to do, but it requires great strength to do things.

Questions:

1. Kindly react on this statement: “Enlightenment means taking full responsibility for your life.”
2. What is decidophobia? Please give three personal experiences relating to decidophobia.
3. Go to the internet and find out as much as you can about decidophobia. Write about everything you learned about decidophobia.

Module 2

STEPS IN THE DECISION MAKING PROCESS

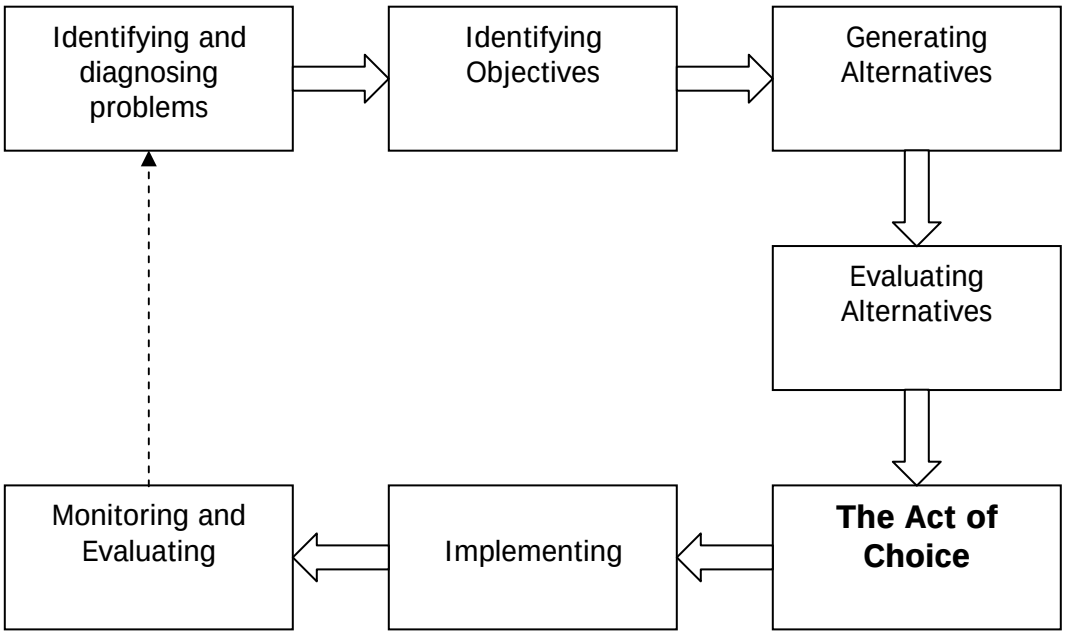
A **decision** *is a choice from among two or more alternatives*. **Decision-making**, on the other hand, *is the act of making a choice from among two or more alternatives.*

There is a tendency to view decision-making and problem solving as identical activities. While decision and decision-making are defined above, a **problem** can be described as an obstacle on the path toward a goal and **problem solving** as the act of overcoming or removing the obstacle on the path toward a goal.

Problem solving and decision-making are not the same. Decisions can be and are often made and implemented successfully in the absence of problems. Moreover, problems can be and often are identified and solved in the absence of decisions. This fact notwithstanding, decision-making and problem solving are often closely related. In this regard, Jerome Braverman notes:

> Problem solving and decision-making are not synonymous. However, decision-making (often) involves problem solving and…problem solving (often) leads to some decision. The process of selecting a particular course of action from a set of alternatives (may constitute) a problem and (possibly) a difficult one…decisions (may be) the end result of a problem-solving process…Problems (may) result from attempts to achieve the (objectives) of the organization…But solutions by themselves do not achieve (objectives)…Without a decision a problem solution (may be) worthless. Consequently, problem solving and decision-making go hand in hand.

Figure 2.1 - The Decision Making Process



Good decision-making is important at all levels in the organization. It begins with a recognition or awareness of problems and opportunities and concludes with an assessment of the results of actions taken to solve those problems.

An effective decision-making process generally includes the seven steps show above. Although the figure shows the steps proceeding in a logical sequential order, managerial decision-making often unfolds in a quite disorderly and complex manner. Keep in mind that managers are influenced at each step in the decision-making process by their individual personalities, attitudes, and behaviors, ethics and values and culture. Below is a brief examination of each step:

Identifying and Diagnosing Problems

Decision makers must know where action is required. Consequently, the first step in the decision-making process is the clear identification of opportunities or the diagnosis of problems that require a decision. Managers regularly review data related to their area or responsibility, including both outside information and reports and information from within the organization. Discrepancies between actual and desired conditions alert a manager to a potential opportunity or problem. Identifying opportunities and problems is not easy considering human behavior in organization, or some combination of individual and organizational factors. Therefore, a manager must pay particular attention to ensure that problems and opportunities are assessed as accurately as possible.

The assessment of opportunities and problems will be only as accurate as the information on which it is based. Therefore, managers put a premium on obtaining accurate, reliable information. Poor quality or inaccurate information can waste time and lead a manager to miss the underlying causes of a situation.

Even when quality information is collected, it may be misinterpreted. Sometimes, misinterpretations accumulate over time as information is consistently misunderstood or problematic events are unrecognized.

Identifying Objectives

Objectives reflect the results the organization wants to attain. Both the quantity and quality of the desired results should be specified or these aspects of the objectives will ultimately guide the decision maker in selecting the appropriate course of action.

Objectives are often referred to as targets, standards, and ends. They may be measured along a variety of dimensions. Objectives can be expressed for long spans of time (years or decades) or for short spans of time (hours, days or months). Long-range objectives usually direct much of the strategic decision making of the organization, while short-

range objectives usually guide operational decision-making. Regardless of the time frame, the objectives will guide the ensuing decision-making process.

Generating Alternatives

Once an opportunity has been identified or a problem diagnosed correctly, a manager develops various ways to achieve objectives and solve the problem. This step requires creativity and imagination. In generating alternatives, the manager must keep in mind the goals and objectives that he or she is trying to achieve. Ideally several different alternatives will emerge. In this way, the manager increases the likelihood that many good alternative courses of action will be considered and evaluated.

Managers may rely on their training, personal experience, education and knowledge of the situation to generate alternatives. Viewing the problem from varying perspectives often requires input from other people such as peers, employees, supervisors, and groups within the organization.

The alternatives can be standard and obvious as well as innovative and unique. Standard solutions often include options that the organization has used in the past. Innovative approaches may be developed through such strategies as brainstorming, nominal group technique, and the Delphi technique.

Evaluating Alternatives

The fourth step in the process involves determining the value or adequacy of the alternatives generated. Which solution is the “best?” Fundamental to this step is the ability to assess the value or relative advantages and disadvantages of each alternative under consideration. Predetermined decision criteria such as the quality desired, anticipated costs, benefits, uncertainties, and risks of the alternative may be used in the evaluation process. The result should be a ranking of the alternatives.

The Act of Choice

Decision making is commonly associated with making the final choice. Reaching the decision is really only one step in the process, however. Although choosing an alternative would seem to be a straightforward proposition—simply consider all the alternatives and select the one that best solves the problem—in reality, the choice is rarely clear-cut. Because the best decisions are often based on careful judgments, making a good decision involves carefully examining all the facts, determining whether sufficient information is available, and finally selecting the best alternative.

Implementing

The bridge between reaching a decision and evaluating the results is the implementation phase of the decision-making process. When decisions involve taking action or making changes, choosing ways to put these actions or changes into effect becomes an essential managerial task. The keys to effective implementation are (1) sensitivity to those who will be affected by the decision and (2) proper planning consideration of the resources necessary to carry out the decision. Those who will be affected by the decision must understand the choice and why it was made, that is, the decision must be accepted and supported by the people who are responsible for its implementation. These needs can be met by involving employees in the early stages of the decision process so that they will be motivated and committed to its successful implementation.

Monitoring and Evaluating

No decision-making process is complete until the impact of the decision has been evaluated. Managers must observe the impact of the decision as objectively as possible and take further corrective action if it becomes necessary. Quantifiable objectives can be established even before the solution to the problem is put into effect.

Monitoring the decision is useful whether the feedback is positive or negative. Positive feedback indicates that the decision is working and that it should be continued and perhaps applied elsewhere in the organization. Negative feedback indicates either that the implementation requires more time, resources, effort, or planning than originally thought or that the decision was a poor one and needs to be reexamined.

The importance of assessing the success or failure of a decision cannot be overstated. Evaluation of past decisions as well as other information should drive future decision making as part of an ongoing decision-making feedback loop.

Exercise:

Examining Decision Making: An Organizational View

Examine the business section of current issues of periodicals (magazines or newspapers) and identify a significant decision recently made by a major company. Choose a company that you are familiar with. Possible decisions include the decision to expand into international markets, restructure, buy other companies, or hire a new CEO.

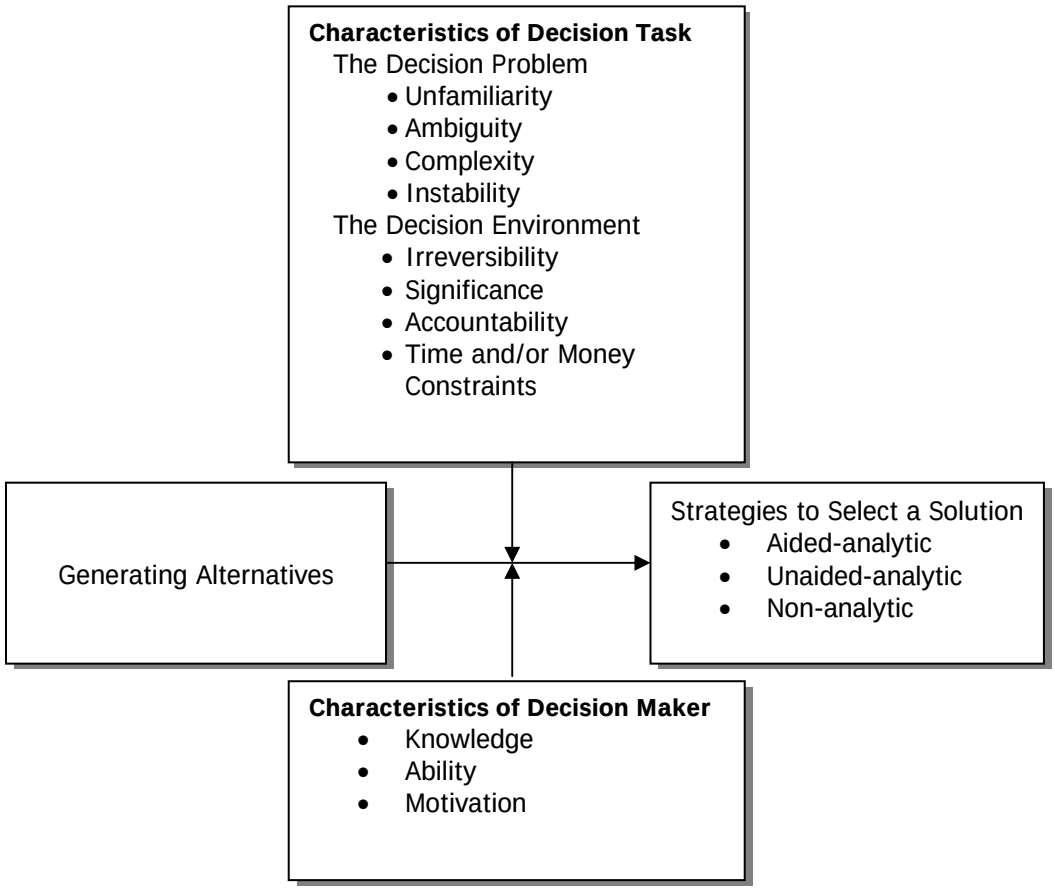
1. In the decision you identified, did the manager or managers appear to use good decision-making skills?
2. Did they follow the decision-making steps?
3. How successful was the company in implementing its decision?
4. Was the decision made by a group or an individual?
5. If you were advising the managers who made the decision, what criteria would you use?

DYNAMICS OF DECISION MAKING

Decision making is part science and part art. Accordingly, this module examines two dynamics of decision making—contingency considerations and the problem of escalation of commitment—that affect the "science" component. An understanding of these dynamics can help managers make better decisions.

Selecting Solutions: a Contingency Perspective

Managers typically satisfice when they select solutions. However, we did not probe how managers actually evaluate and select solutions. Let us explore the model in the illustration below to better understand how individuals make decisions.



Strategies for Selecting a Solution

What procedures do decision makers use to evaluate the costs and benefits of alternative solutions? According to management experts, one of three approaches is used: aided-analytic, unaided-analytic and non-analytic. Decision makers systematically use tools such as mathematical equations, calculators or computers to analyze and evaluate alternatives within an aided-analytical approach. Technicians also may be commissioned to conduct a formal study. In contrast, decision makers rely on the confines of their minds when using an unaided-analytic strategy. In other words, the decision maker systematically compares alternatives, but the analysis is limited to evaluating information that can be directly processed in his or her head. Decision-making tools such as personal computers are not used. Finally, a non-analytic strategy consists of using simple preformulated rules to make a decision. Examples are flipping a coin, habit, normal convention ("we've always done it that way"), using a conservative approach ("better late than sorry"), or following procedures offered in instruction manuals. Both the cost and level of sophistication decrease as one moves from aided-analytic to a non-analytic strategy.

Determining which approach to use depends on two sets of contingency factors: characteristics of the decision task and characteristics of the decision maker (refer again to the illustration above)

Characteristics of the Decision Task

This set of contingency factors reflects the demands and constraints a decision maker faces. In general, the greater these demands and constraints, the higher the probability that an aided-analytic approach will be used. These characteristics are divided into two components: those pertaining to the specific problem and those to the general decision environment. Unfamiliar, ambiguous, complex, or unstable problems are more difficult to solve and typically require more sophisticated analysis.

The environment also restricts the type of analysis used. For instance, a recent study of 75 MBA students revealed that they purchased and used less information for decision making as the cost of information increased. In contrast, they purchased and used more information when they were rewarded for making good decisions. These results suggest that both the cost of information and one's accountability for a decision affect the type of analysis used to solve a problem. Moreover, time constraints influence selection of a solution. Poorer decisions are bound to be made in the face of severe time pressure.

Characteristics of the Decision Maker

In the present context, knowledge, ability, and motivation affect the type of analytical procedure used by a decision maker. In general, research supports the prediction that aided-analytic strategies are more likely to be used by competent and motivated individuals.

Contingency Relationships

There are many ways in which characteristics of the decision task and decision maker can interact to influence the strategy used to select a solution. In choosing a strategy, decision makers compromise between their desire to make correct decisions and the amount of time and effort they put into the decision making process. Analytic strategies are more likely to be used when the problem is unfamiliar and irreversible. In contrast, non-analytic methods are employed on familiar problems or problems in which the decision can be reversed.

Escalation of Commitment

Escalation situations involve circumstances in which things have gone wrong but where the situation can possibly be turned around by investing additional time, money or effort. Consider the situation faced by Lyndon Johnson during the early stages of the Vietnam war. Johnson received the following memo from George Ball, then Undersecretary of State:

> The decision you face now is crucial. Once large numbers of US troops are committed to direct combat, they will begin to take heavy casualties in a war they are ill-equipped to fight in a non-cooperative if not downright hostile countryside. Once we suffer large casualties, we will have started a nearly irreversible process. Our involvement will be so great that we cannot—without national humiliation—stop short of achieving our complete objectives. Of the two possibilities I think humiliation will be more likely than the achievement of our objectives—even after we have paid terrible costs.

Unfortunately, President Johnson's increased commitment to the war helped make George Ball's prediction come true.

Escalation of commitment refers to the tendency to stick to an ineffective course of action when it is unlikely that the bad situation can be reversed. Personal examples include investing more money into an old or broken car, waiting an extremely long time for a bus to take you somewhere that you could have walked just as easily, or trying to save a disruptive interpersonal relationship that has lasted 10 years. Case studies also indicate that escalation of commitment is partially responsible for some of the worst financial losses experienced by organizations.

Researchers identified four reasons for escalation of commitment. They involve psychological and social determinants, organizational determinants, project characteristics, and contextual determinants.

Psychological and Social Determinants

Ego defense and individual motivations are the key psychological contributors to escalation of commitment. Individuals "throw good money after bad" because they tend to (1) bias facts so that they support previous decisions, (2) take more risks when a decision is

stated in negative terms (to recover losses) rather than the positive ones (to achieve gains), and (3) get too ego-involved with the project. Because failure threatens an individual's self-esteem or ego, people tend to ignore negative signs and push forward.

Social pressures can make it difficult for a manager to reverse a course of action. For instance, peer pressure makes it difficult for an individual to drop a course of action when he or she publicly supported it in the past. Further, managers may continue to support bad decisions because they do not want their mistakes exposed to others.

Organizational Determinants

Breakdowns in communication, workplace politics, and organizational inertia cause organizations to maintain bad courses of action.

Project Characteristics

Project characteristics involve the objective features of a project. They have the greatest impact on escalation decisions. For example, because most projects do not reap benefits until some delayed period, decision makers are motivated to stay with the project until the end. Thus, there is a tendency to attribute setbacks to temporary causes that are correctable with additional expenditures.

Contextual Determinants

These causes of escalation are due to external political forces outside an organization's control.

Reducing Escalation of Commitment

It is important to reduce escalation of commitment because it leads to poor decision making for both individuals and groups. Barry Staw and Jerry Ross, the researchers who originally identified the phenomenon of escalation, recommended several ways to reduce it:

- Set minimum targets for performance and have the decision makers compare their performance with these targets.
- Have different individuals make the initial and subsequent decisions about a project.
- Encourage decision makers to become less ego-involved with a project.
- Provide more frequent feedback about project completion and costs.
- Reduce the risk or penalties of failure.
- Make decision makers aware of the costs of persistence.

Although a few studies have supported some of these recommendations, additional research on the causes and reduction of escalation of commitment is needed.

Decision-Making Styles

Suppose you were a new manager. How would you tackle problems that arise and that need decisions made? Managers have different styles when it comes to making decisions and solving problems. One view of decision-making styles proposes that there are three ways managers approach problems in the workplace; they are either problem avoiders, problem solvers, or problems seekers. What are the characteristics of each approach?

A **problem avoider** ignores information that points to a problem. Avoiders are inactive and do not want to confront problems. A **problem solver** tries to solve problems when they come up. Solvers are reactive; they deal with problems after they occur. **Problem**

seekers actively seek out problems to solve or new opportunities to pursue. They take a proactive approach by anticipating problems. Managers can, and do, use all three approaches. For example, there are times when avoiding a problem is the best response. At other times, being reactive is the only option because the problem happens quickly. And innovative, creative organizations need managers who proactively seek opportunities and ways to do things better.

Another perspective on decision-making styles proposes that people differ along two dimensions in the way they approach decision making. The first is an individual's *way of thinking.* Some of us tend to be rational and logical in the way we think or process information. A rational type looks at information in order and make sure that it's logical and consistent before making a decision. Others tend to be creative and intuitive. Intuitive types don't have to process information in a certain order but are comfortable looking at it as whole.

The other dimension describes an individual's *tolerance for ambiguity.* Again, some of us have a low tolerance for ambiguity and must have consistency and order in the way we structure information so that ambiguity is minimized. On the other hand, some of us can tolerate high levels of ambiguity and are able to process many thoughts at the same time. When we diagram these two dimensions, four decision-making styles are formed: directive, analytic, conceptual, and behavioral. Let us look more closely at each style.

Directive Style

People using the directive style have low tolerance for ambiguity and are rational in their way of thinking. They are efficient and logical. Directive types make fast decisions and focus on the short run. Their efficiency and speed in making decisions often result in their making decisions with minimal information and assessing few alternatives.

Analytic Style

Decision makers with an analytic style have much greater tolerance for ambiguity than do directive types. They want more information before

making a decision and consider more alternatives than a directive style decision maker does. Analytic decision makers are best characterized as careful decision makers with the ability to adapt or cope with unique situations.

Conceptual Style

Individuals with a conceptual style tend to be very broad in their outlook at many alternatives. They focus on the long run and are very good at finding creative solutions to problems.

Behavioral Style

Behavioral style decision makers work well with others. They are concerned about the achievements of subordinates and are receptive to suggestions from others. They often use meetings to communicate, although they try to avoid conflict. Acceptance by others is important to the behavioral style decision maker.

Although these four decision-making styles are distinct, most managers have more characteristics of more than one style. It's probably more realistic to think of a manager's dominant style, others are more flexible and can shift their style depending on the situation.

Participative Management

Confusion exists about the exact meaning of participative management (PM). One management expert clarified the situation by defining participative management as the process whereby employees play a direct role in (1) setting goals, (2) making decisions, (3) solving problems, and (4) making changes in the organization. Without question, participative management entails much more than simply asking employees for their ideas or opinions.

Advocates of PM claim employee participation increases employee satisfaction, commitment, and performance. Practical experience at

Childress Buick Company, a Phoenix auto dealership, supports this view.

> Childress began empowering employees in 1988 as part of his "crisis management" plan. Customer satisfaction had dropped drastically—retention was down to 30%. To improve it, he disassembled the company's autocratic management style. Today, he stresses that he wants his employees to use their judgment and initiative from day one. The message is getting through; recently, a team from the service department decided to run a shuttle-bus service to a local horse-race track for customers who had cars in the shop.
>
> In the showroom, salesman Jim Lather finds the latitude a big asset. "We all work our own deals from start to finish," he says. "Customers are more relaxed when they know they're dealing with someone who doesn't have to go ask the manager for a price every two minutes." These days Childress enjoys retention rates of up to 70%, remarkable in the car business.

To get a fuller understanding of how and when participative management works, we begin discussing a model of participative management.

A Model of Participative Management

Consistent with both Maslow's need theory and job characteristics model of job design, participative management is predicted to increase motivation because it helps employees fulfill three basic needs: (1) autonomy, (2) meaningfulness of work, and (3) interpersonal contact. Satisfaction of these needs enhances feelings of acceptance and commitment, security, challenge and satisfaction. In turn, these positive feelings supposedly lead to increased innovation and performance.

Participative management does not work in all situations. The design of work, the level of trust between management and employees, and the employees' readiness to participate represents three factors that influence the effectiveness of PM. With respect to the design of work, individual participation is counterproductive when employees are highly interdependent on each other, as on an assembly line. The problem with individual participation in this case is that the interdependent employees generally do not have a broad understanding of the entire production process. Participative management also is less likely to succeed when employees do not trust the management. Finally, PM is more effective when employees are properly trained, prepared, and interested in participating.

Research and Practical Suggestions for Managers

Participative management can significantly increase employee job involvement, organizational commitment, and creativity. It can also lower the role conflict and ambiguity. A recent meta-analysis further demonstrates that participation only has a small but significant impact on both job performance and job satisfaction. This finding questions the practical value of using participative management to influence performance or satisfaction at work.

So what is a manager to do? We believe that PM is not a quick-fix solution for low productivity and motivation, as some enthusiastic supporters claim. Nonetheless, since participative management is effective in certain situations, managers can increase their chances of obtaining positive results by using once again a contingency approach. For example, the effectiveness of participation depends on the type of interactions between managers and employees as they jointly solve problems. Effective participation requires a constructive interaction that fosters cooperation and respect, as opposed to competition and defensiveness. Managers are advised not to use participative programs

when they have destructive interpersonal interactions with their employees.

Experiences of their companies implementing participative management programs suggest two additional practical recommendations. First, supervisors and middle managers tend to resist participative management because it reduces their power and authority. It is important to gain the support and commitment from employees who have managerial responsibility. Second, the process of implementing participative management must be monitored and managed by top management.

Questions:

1. Describe a situation where you exhibited escalation of commitment. Why did you escalate a losing situation?
2. Given the intuitive appeal of participative management, why do you think it fails as often as it succeeds? Explain.
3. Which among the different decision making style do you think is the most effective? Explain.
4. Which are you, a problem avoider, a problem solver or a problem seeker? Elaborate on your answer and cite particular examples.
5. What is the most valuable lesson about selecting solutions through a contingency perspective? Explain.
6. Identify and explain the four reasons for escalation of commitment.

Module 4

TYPES OF PROBLEMS AND DECISIONS

Managers will be faced with different types of problems and decisions as they do their jobs: that is, as they integrate and coordinate the work of others. Depending on the nature of the problem, the manager can use different types of decisions.

Well-Structured Problems and Programmed Decisions

Some problems are straightforward. The goal of the decision maker is clear, the problem is familiar, and information about the problem is easily defined and complete. Examples of these types of problems might include a customer's wanting to return a purchase to a retail store, a supplier's being late with an important delivery, a news team's responding to an unexpected and fast-breaking event, or a college's handling of a student's wanting to drop a class. Such situations are called **well-structured problems**. For instance, a server in a restaurant spills a drink on a customer's coat. The restaurant manager has an upset customer. What does the manager do? Because drinks are frequently spilled, there's probably some standardized routine for handling the problem. For example, if the server was at fault, if the damage was significant, and if the customer asks for a remedy, the manager will offer to have the coat cleaned at the restaurant's expense. In handling this problem situation, the manager uses a **programmed decision**.

Decisions are programmed to the extent that they are repetitive and routine and to the extent that a definite approach has been worked out for handling them. Because the problem is well structured, the manager does not have to go to the trouble and expense of working up an involved decision process. Programmed decision making is relatively simple and tends to rely heavily on previous solutions. The "develop-the-alternatives" stage in the decision-making process either doesn't exist or is given little attention. Why? Because once the structured problem is defined, its solution is usually self-evident or at

least reduced to very few alternatives that are familiar and that have proved successful in the past. In many cases, programmed decision making becomes decision making by precedent. Managers simply do what they and others previously have done in the same situation. The spilled drink on the customer's coat does not require the restaurant manager to identify and weight the decision criteria or to develop a long list of possible solutions. Rather, the manager falls back on a systematic procedure, rule or policy.

A **procedure** is a series of interrelated sequential steps that a manager can use for responding to a structured problem. The only real difficulty is in identifying the problem. Once the problem is clear, so is the procedure. For instance, a purchasing manager receives a request from the sales department for 15 cellular phones for use by the company's sales representatives. The purchasing manager knows that there is a definite procedure for handling the decision. The decision-making process in this case is merely executing a simple series of sequential steps.

Information technology is being used to further simplify the development of organizational procedures. Some powerful new software programs are being designed that automate routine and complex procedures. For example, at Hewlett-Packard, a comprehensive software program had automated a quarterly wage-review process of more than 13,000 salespeople.

A **rule** is an explicit statement that tells a manager what he or she ought or ought not to do. Rules are frequently used by managers when they confront a well-structured problem because they are simple to follow and ensure consistency. For example, rules about lateness and absenteeism permit supervisors to make disciplinary decisions rapidly and with a relatively high degree of fairness.

A third guide for making programmed decisions is **policy**. It provides guidelines to channel a manager's thinking in a specific direction. In contrast to a rule, a policy establishes parameters for the decision maker rather than specifically stating what should or should not be

done. Policies typically contain an ambiguous term that leaves interpretation up to the decision maker. For instance, each of the following is a policy statement:

- The customer always comes first and should always be *satisfied*.
- We promote from within, *whenever possible.*
- Employee wages shall be *competitive* for the community in which our plants are located.

Notice that *satisfied, whenever possible,* and *competitive* are terms that require interpretation. The policy to pay competitive wages does not tell a given plant's human resources manager the exact amount he or she should pay, but it does give direction to the decision he or she makes.

Ill-Structured problems and Nonprogrammed Decisions

As you can well imagine, not all problems managers face are well-structured and solvable by a programmed decision. Many organizational situations involve **ill-structured problems**, which are problems that are new or unusual. Information about such problems is ambiguous or incomplete. For example, the selection of an architect to design a new corporate headquarters building is one example of an ill-structured problem. So too is the problem of whether to invest in a new unproven technology or whether to shut down a money-losing division. When problems are ill-structured, managers must rely on nonprogrammed decision making in order to develop unique solutions. **Nonprogrammed decisions** are unique and nonrecurring. When a manager confronts an ill-structured problem, or one that is unique, there is no cut-and-dried solution. It requires a custom-made response through nonprogrammed decision making.

Integration

Whereas well-structured problems are resolved with programmed decision making, ill-structured problems require nonprogrammed

decision making. Because the lower-level managers confront familiar and repetitive problems, they most typically rely on programmed decisions such as standard operating procedures, rules, and organizational policies. The problems confronting managers are likely to become more ill-structured as they move up to the organizational hierarchy. Why? Because lower-level managers handle the routine decisions themselves and send upon the chain of command only decisions that they find unusual or difficult. Similarly, higher-level managers pass along routine decisions to their subordinates so that they can deal with more difficult issues.

Keep in mind, however, that few managerial decisions in the real world are either fully programmed or nonprogrammed. These are extremes, and most decisions fall somewhere in between. Few programmed decisions are designed to eliminate individual judgment completely. At the other extreme, even a unique situation requiring a nonprogrammed decision can be helped by programmed routines. It's best to think of these decisions as *mainly* programmed or *mainly* nonprogrammed, rather as completely one or the other.

A final point on this topic is that organizational efficiency is facilitated by the use of programmed decision making, which may explain its wide popularity. Whenever possible, management decisions are likely to be programmed. Obviously, using programmed decisions is not too realistic at the top level of the organization because most of the problems that top managers confront are of a nonrecurring nature. But there are strong economic incentives for top managers to create a standard operating procedures (SOPs), rules, and policies to guide other managers.

Programmed decisions minimize the need for managers to exercise discretion. This fact is relevant because discretion can cost money. The more nonprogrammed decision making a manager is required to do, the greater the judgment needed. Because sound judgment is an uncommon quality, it costs more to acquire the services of managers who possess it.

Some organizations try to economize by hiring less-skilled managers but do not develop programmed decision guides them to follow. Take, for example, a small women's clothing store chain whose owner, because he chooses to pay low salaries, hire store managers with little experience and limited ability to make good judgments. This practice, by itself, might not be a problem. The trouble is that the owner provides neither training nor explicit rules and procedures to guide his store manager's decisions. The result is continuous complaints by customers about things such as promotional discounts, processing credit sales, and the handling of returns.

One of the more challenging tasks facing managers as they make decisions—programmed or nonprogrammed—is analyzing decision alternatives.

Questions:

1. Identify both a programmed and nonprogrammed decision that you made recently. How did you arrive at a solution for each one?
2. Differentiate a rule from a policy. Cite examples.
3. Can you think of a specific upper-level management positions where you would make mainly programmed decisions? What about one where you would be making mostly nonprogrammed decisions? What factors make these type positions favor one type of decision making over another (i.e. the industry, function, etc.)
4. How are procedures and problems related? Explain.

ELEMENTS OF DECISION PROBLEMS

Given a complicated problem, how should one begin? A critical first step is to identify the elements of the situation. We will classify the various elements into (1) values and objectives, (2) decision to make, (3) uncertain events, and (4) consequences.

Values and Objectives

Imagine a farmer whose trees are laden with fruit that is nearly ripe. Even without an obvious problem to solve or decision to make, we can consider the farmer's objectives. Certainly one objective is to harvest the fruit successfully. This may be important because the fruit can be sold, providing money to keep the farm operating and a profit that can be spent for the welfare of the family. The farmer may have the underlying objectives as well, such as maximizing the use of organic farming methods.

Before we can even talk about making decisions, we have to understand *values* and *objectives*. "Values" is an overused term that can be somewhat ambiguous; here we use it in general sense to refer to things that matter to you. For example, you may want to learn how to sail and take a trip around the world. Or you may have an objective of learning how to speak Japanese. A scientist may be interested in resolving a specific scientific question. An investor may want to make a lot of money or gain a controlling interest in a company. A manager, like our farmer with the orchard, may want to earn profit.

An *objective* is a specific thing that you want to achieve. All of the examples in the previous paragraph refer to specific objectives. As you can tell from the examples, some objectives are related. The farmer may want to earn profit because it will provide the means to purchase food for the family or to take a trip. The scientist may want to find an answer to an important question in order to gain prestige in the scientific community; that prestige may in turn lead to a higher salary and more research support at a better university.

An individual's objectives taken together make up his or her values. They define what is important to that person in making a decision. We can make even a broader statement: A person's values are the reason for making decisions in the first place! If we did not care about anything, there would be no reasons to make decisions at all, because we would not care how things turned out. Moreover, we would not be able to choose from among different alternatives. Without objectives, it would not be possible to tell which alternative would be the best choice.

Making Money: A Special Objective

In modern western society, most adults work for a living, and if you ask them why, they will all include in their answers something about the importance of making money. It would appear that making money is an important objective, but a few simple questions (Why is money important? What would you do if you had a million dollars?) quickly reveal that money is important because it helps us to do things that we want to do. For many people, money is important because it allows us to eat, afford housing and clothing, travel, engage in activities with friends, and generally live comfortably. Many people spend money on insurance because they have an objective of avoiding risks. For very few individuals is money important in and of itself. Unlike King Midas, most of us do not want to earn money simply to have it; money is important because it provides the means by which we can work toward more basic objectives.

Money's role as a trading mechanism in our economy puts it in a special role. Although it is typically not one of our basic objectives, it can serve as a proxy objective in many situations. For example, imagine a young couple who wants to take a vacation. They will probably have to save money for some period of time before achieving this goal, and they will face many choices regarding just how to go about saving their money. In many of these decisions, the main concern will be how much money they will have when they are ready to take their holiday. If they are considering investing their money in a

mutual fund, say, they will have to balance the volatility of the fund's value against the amount they can expect to earn over the long run, because most investment decisions require a trade-off between risk and return.

For corporations, money is often a primary objective, and achievement of the objective is measured in terms of increase in the shareholder's wealth through dividends and increased company value. The shareholders themselves can, of course, use their wealth for their own welfare however they want. Because the shareholders have the opportunity to trade their wealth to achieve specific objectives, the company need not be concerned with those objectives but can focus in making its shareholders as wealthy people as possible.

Although making money is indeed a special objective, it is important to realize that many situations require a trade-off between making money and some other objective. In many cases, one can *price out* the value of different objectives. When you purchase a car, how much more would you pay to have air conditioning? How much more to get the color of your choice? These questions may be difficult to answer, but we all make related decisions all the time we decide whether a product or service is worth the price that is asked. In other cases, though, it may not be reasonable to convert everything to dollars. For example, consider the ethical problems faced by a hospital that performs organ transplant. Wealthy individuals can pay more for their operations, and often are willing to do so in order to move up in the queue. The additional money may permit the hospital to purchase new equipment or perform more transplants for needy individuals. But moving the wealthy patient up in the queue will delay surgery for other patients, perhaps with fatal consequences. What if the other patients include young children? Pricing out the lives and risks to the other patients seems like a cold-hearted way to make decision; in this case, the hospital will probably be better off thinking in terms of its fundamental objectives and how to accomplish them with or without the wealthy patient's fee.

Values and the Current Decision Context

Suppose you have carefully thought about all of your objectives. Among other things you want to do what you can to reduce homelessness in your community, learn to identify the birds, send your children to college, and retire at age 55. Having spent the morning figuring out your objectives, you have become hungry and are ready for a good meal. Your decision is where to go for lunch, and it is obvious that the large-scale, overall objectives that you have spent all morning thinking about will not be much help.

You can still think hard about your objectives, though as you consider your decision. It is just that different objectives are appropriate for this particular decision. Do you want to eat a lot or a little? Do you want to save money? Are you interested in a particular type of ethnic food, or would you like to try a new restaurant? If you are going with your friends, what about their preferences? What about a picnic instead of going a restaurant meal?

Each specific decision situation calls for specific objectives. We call the setting in which the decision occurs the *decision context*. In one case, a decision context might be deciding where to go for lunch, in which case the appropriate objectives involve satisfying hunger, spending time with friends, and so on. In another case, the context might be what to choose for a career, which would call for consideration of more global objectives. What do you want to accomplish in your life?

Values and decision context go hand in hand. On one hand, it is worthwhile to think about your objectives in advance to be prepared for decisions when they arise or so that you can identify new decision opportunities that you might not have thought about before. On the other hand, every decision situation involves a specific context, and that context determines what objectives need to be considered. The idea of a requisite model includes all of the objectives that matter, and only those that matter, in the decision context at hand. Without all of the appropriate objectives considered, you will be left with the gnawing concern that “something is missing” (which would be true),

and considering superfluous or inappropriate objectives can distract you from truly important issues. When the decision context is specified and appropriate objectives aligned with the context, the decision maker knows what situation is and exactly why he or she cares about making a decision in that situation.

Finding realistic examples in which individuals or companies use their objectives in decision making is easy. In the following example, the Boeing Company found itself needing to acquire a new supercomputer.

Boeing's Supercomputer

As a large-scale manufacturer of sophisticated aircraft, Boeing needs computing power for tasks ranging from accounting and word processing to computer-aided design, inventory control and tracking, and manufacturing support. When the company's engineering department needed to expand its high-power computing capacity by purchasing a supercomputer, the managers faced a huge task of assembling and evaluating massive amounts of information. There were system requirements and legal issues to consider, as well as price and a variety of management issues. (*Source:* D. Barnhart, (1993) "Decision Analysis Software Helps Boeing Select Supercomputer." *OR/MS Today,* April, 62-63.)

Boeing's decision context is acquiring supercomputing capacity for its engineering needs. Even though the company undoubtedly has global objectives related to aircraft production, maximizing shareholder wealth, and providing good working conditions for its employees, in the current decision context the appropriate objectives are specific to the company's computing requirements.

Organizing all of Boeing's objectives in this decision is complex because of the many different computer users involved and their needs. With careful thought, though, management was able to specify five main objectives: minimize cost, maximize performance, satisfy user needs, satisfy organizational needs, and satisfy management issues.

Decisions to Make

With the decision context understood and values well in hand, the decision maker can begin to identify specific elements of a decision. Consider our farmer whose fruit crop will need to be harvested soon. If the weather report forecasts mild weather, the farmer has nothing to worry about, but if the forecast is for freezing weather, it might be appropriate to spend some money on protective measures that will save the crop. In such a situation, the farmer has a decision to make, and that decision is whether or not to take protective action. This is a decision that must be made with the available information.

Many situations have as the central issue a decision that must be made right away. There would always be at least two alternatives; if there were no alternatives, then it would not be a matter of making a decision! In the case of the farmer, the alternatives are to take protective action or to leave matters as they are. Of course, there may be a wide variety of alternatives. For example, the farmer may have several strategies for saving the crop, and it may be possible to implement one or more.

Another possibility may be to wait and obtain more information. For instance, if the noon weather report suggests the possibility of freezing weather depending on exactly where a weather system travels, then it may be reasonable to wait and listen to the evening report to get better information. Such a strategy, however, may entail a cost. The farmer may have to pay his hired help overtime if the decision to protect the crop is made in the late evening. Some measures may take time to set up; if the farmer waits, there may not be enough time to implement some of these procedures.

Other possible alternatives are taking out insurance or hedging. For example, the farmer might be willing to pay the harvesting crew a small amount to be available at night if quick action is needed. Insurance policies also may be available to protect against crop loss (although this typically are not available at the last minute). Any of

these alternatives might give the farmer more flexibility but would probably cost something up front.

Identifying the immediate decision to make is a critical step in understanding a different decision situation. Moreover, no model of the decision situation can be built without knowing exactly what the decision problem at hand is. In identifying the central decision, it is important also to think about the possible alternatives. Some decisions will have specific alternatives (protect the crop or not), while others may involve choosing a specific value out of a range of possible values (deciding on the amount to bid for a company you want to acquire). Other than the obvious alternative courses of action, a decision maker should always consider the possibilities of doing nothing, of waiting to obtain more information, or of somehow hedging against possible losses.

Sequential Decisions

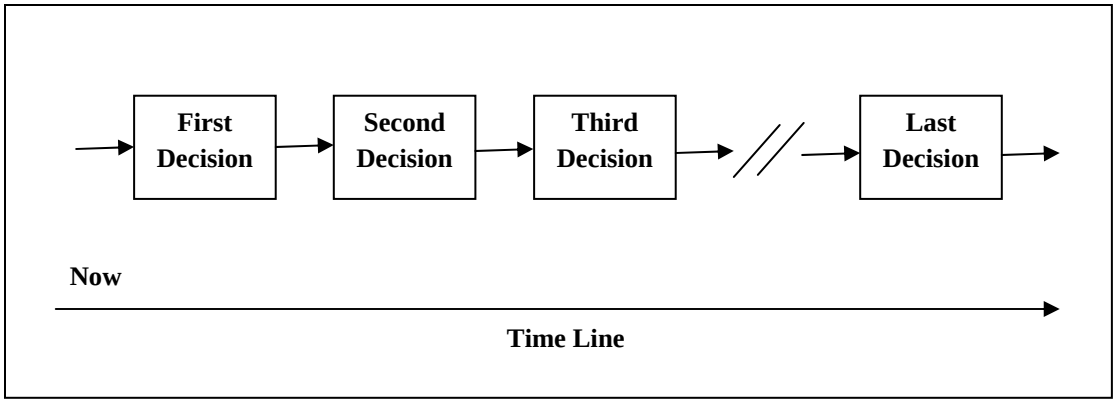
In many cases, there is simply no single decision to make, but several sequential decisions. The orchard example will demonstrate this. Suppose that several weeks of the growing season remain. Each day the farmer will get a new weather forecast, and each time there is a forecast of adverse weather, it will be necessary to decide once again whether to protect the crop.

The example shows clearly that the farmer has a number of decisions to make, and the decisions are ordered sequentially. If the harvest is tomorrow, then the decision is fairly easy, but if several days or weeks remain, then the farmer really has to think about the upcoming decisions. For example, it might be worthwhile to adopt a policy whereby the amount spent on protection is less than the value of the crop. One good way to do this would be not to protect during the early part of the growing season; instead, wait until the harvest is closer, and then protect whenever the weather forecast warrants such action. In other words, “If we’re going to lose the crop, let’s lose it clearly.”

It is important to recognize that in many situations one decision leads eventually to another in a sequence. The orchard example is a special case because the decisions are almost identical from one day to the next: Take protective action or not. In many cases, however, the decisions are radically different. For example, a manufacturer considering a new product might first decide whether or not to introduce it. If the decision is to go ahead, the next decision might be whether to produce it or subcontract the production. Once the production decision is made, there may be marketing decisions about distribution, promotion, and pricing.

When a decision situation is complicated by sequential decisions, a decision maker will want to consider them when making the immediate decision. Furthermore, a future decision may depend on exactly what happened before. For this reason, we refer to these kinds of problems as *dynamic* decision situations. In identifying elements of a decision situation, we want to know not only what specific decisions are to be made, but the sequence in which they will arise.

Figure 5.1 – Sequential Decisions



Uncertain Events

Decision problems can be complicated because of uncertainty about what the future holds. Many important decisions have to be made without knowing exactly what will happen in the future or exactly what ultimate outcome will be from a decision made today. A classic

example is that of investing in the stock market. An investor may be in a position to buy some stock, but in which company? Some share prices will go up and others will go down, but it is difficult to tell exactly what will happen. Moreover, the market as a whole may move up and down, depending on economic forces. The best the investor can do is think very carefully about the chances associated with each different security's prices as well as the market as a whole.

The possible things that can happen in the resolution of uncertain event are called *outcomes*. In the orchard example above, the key uncertain event is the weather, with outcomes of crop damage or no crop damage. With some uncertain events, such as with the orchard, there are only few possible outcomes. In other cases, such as the stock market, the outcome is value within some range. That is, next year's price of the security bought today for ₱50 per share may be anywhere between, say, ₱0 and ₱100. (It certainly could never be worth less than zero, but the upper limit is not so well defined: Different individuals might consider different upper limits for the same stock.) The point is that the outcome of the uncertain event that we call "next year's stock price" comes from a range of possible values and may fall anywhere within that range.

Many different uncertain events might be considered in a decision situation, but only some are relevant. How can you tell which ones are relevant? The answer is straightforward; the outcome of the event must have some impact on at least one of your objectives. That is, it should matter to you what actually comes to pass. Although this seems like common sense, in a complex decision situation it can be all too easy to concentrate on uncertain events that we can get information about rather than those that really have an impact in terms of objectives. One of the best examples comes from risk analysis to nuclear power plants; engineers can make judgments about the chance that a power-plant accident will release radioactive material in the atmosphere, but what may really matter is how local residents react to siting the plant in their neighborhood and to subsequent accidents if they occur.

Of course, a decision situation often involves more than one uncertain event. The larger the number of uncertain but relevant events in a given situation, the more complicated the decision. Moreover, some uncertain events may depend on others. For example, the price of the specific stock purchased may be more likely to go up if the economy as a whole continues to grow or if the overall stock market increases in value. Thus there may be interdependencies among the uncertain events that a decision maker must consider.

How do uncertain events relate to the decisions in Figure 5.1? They must be dove-tailed with the time sequence of the decision to be made; it is important to know at each decision exactly what information is available and what remains unknown. At the current time ("Now" on the time line), all of the uncertain events are just that; their outcomes are unknown, although the decision maker can look into the future and specify which uncertainties will be resolved prior to each upcoming decision.

Sometimes an uncertain event that is resolved before a decision provides information relevant for future decisions. Consider the stock market problem. If the investor is considering investing in a company that is involved in a lawsuit, one alternative might be to wait until the lawsuit is resolved. Note that the sequence of the decision is (1) wait or buy now, and (2) if waiting, then buy or do not buy after the lawsuit. The decision to buy or not may depend crucially on the outcome of the lawsuit that occurs between the two decisions.

What if there are many uncertain events that occur between decisions? There may be a natural order to the uncertain events, or there may be not. If there is, then specifying that order during modeling of the decision problem may help the decision maker. But the order of events between decisions is not nearly crucial as the dovetailing of decisions and events to clarify what events are unknown and what information is available for each decision in the process. It is the time sequence of the decisions that matters, along with the information available at each decision.

Consequences

After the last decision has been made and the last uncertain event has been resolved, the decision maker's fate is finally determined. It may be a matter of profit or loss as in the case of the farmer. It may be a matter of increase in the value of the investor's portfolio. In some cases the final consequence may be a "net value" figure that accounts for both cash outflows and inflows during the time sequence of the decisions. This might happen in the case of the manufacturer deciding about a new product; certain costs must be incurred before any revenue is obtained.

If the decision context requires consideration of multiple objectives, the consequence is what happens with respect to each of the objectives. For example, consider the consequence of a general's decision to storm a hill. The consequence might be good because the army succeeds in taking the hill, but it may be bad at the same time if many lives are lost.

One of the fundamental issues with which a decision maker must face is how far into the future to look. It is always possible to look farther ahead; there will always be more decisions to make, and earlier decisions may have some effect on the availability of later alternatives. Even death is not an obvious planning horizon because the decision maker may be concerned with effects on future generations, environmental policy decisions provide perfect examples. At some point the decision maker has to stop and say, "My planning horizon is there. It's not worthwhile for me to think beyond that point in time." For the purpose of constructing a requisite model, the idea is to choose a planning horizon such that the events and the decisions that would follow are not essential parts of the immediate decision problem. To put it another way, choose a planning horizon that is consistent with your decision context and the relevant objectives.

Once the dimensions of the consequences and the planning horizon have been determined, the next step is to figure out how to value the consequences. As mentioned, in many cases it will be possible to work

in terms in monetary values. That is, the only relevant objective in the decision context is to make money, so all that matters at the end is profit, cost, or total wealth. Or it may be possible to price out non-monetary objectives. For example, a manager might be considering whether to build and run a day care center for the benefit of the employees. One objective might be to enhance the goodwill between the company and the workforce. Enhanced goodwill would in turn have certain effects on the operations of the company, including reduced absenteeism, improved ability to recruit, and a better image in the community. Some of these, such as the reduced absenteeism and improved recruiting, could easily be translated into pesos. The image may be more difficult to translate, but the manager might assess its value subjectively by estimating how much money it would cost in terms of public relations work to improve the firm's image by the same account.

In some cases, however, it will be difficult to determine exactly how the different objectives should be traded off. In the hospital case discussed earlier, how should the administrator trade off the risks to patients who would be displaced in the queue versus the fee paid by a wealthy patient? How many lives should the general be willing to sacrifice in order to gain the hill? Many decisions, especially governmental policy decisions, are complicated by trade-offs like these. Even personal decisions, such as taking a job or purchasing a home, require a decision maker to think hard about the trade-off involved.

Questions:

1. Suppose you are in the market for a new car, the primary use for which would be commuting to work, shopping, running errands, and visiting friends.
    a. What are your objectives in this situation? What are some different alternatives?
    b. Suppose you broaden the decision context. Instead of deciding on a car for commuting purposes, you are interested in having transportation for getting around your

community. In this new decision context, how would you describe your objectives? What are some alternatives that you might not have considered in the narrower decision context?

2. Explain in your own words why it is important in some situations to consider future decisions as well as the immediate decision at hand. Can you give an example from your own experience of an occasion in which you had to make a decision while plainly anticipating a subsequent decision? How did the immediate decision affect the subsequent one?
3. Explain in your own words why it is important to keep track of what information is known and what events are still uncertain for each decision.
4. Imagine the difficulties of an employer whose decision context is choosing a new employee from a set of applicants whom he will interview. What do you think the employer's objectives should be? Identify the employer's specific decisions to make and uncertainties, and describe the relevant uncertain events. How does the problem change if the employer has to decide whether to make an offer on the spot after each interview?

Describe a decision problem that you have faced recently (or with which you are currently struggling). Describe the decision context and your objectives. What were the specific decisions that you faced, and what were the relevant uncertainties? Describe the possible consequences.

Module 6

MODELS OF DECISION MAKING

There are several models of decision making. Each is based on different set of assumptions and offers unique insight into the decision-making process. This module reviews key historical models of decision making. The first three are the rational model, Simon's normative model, and the garbage can model. Each successive model assumes that the decision-making process is less and less rational. Let us begin with the most orderly and rational explanation of managerial decision making.

The Rational Model

The rational model proposes that managers use a rational sequence when making decisions: identifying the problem, identifying the objective, generating alternative, evaluating the alternatives, making a choice, and implementing and evaluating the solutions. According to this model, managers are completely objective and possess complete information to make a decision. Despite criticism for being unrealistic, the rational model is instructive because it analytically breaks down the decision-making process and serves as a conceptual anchor for newer models.

Summarizing the Rational Model

The rational model is based on the premise that managers optimize when they make decisions. Optimizing involves solving problems by producing the best possible solution. This assumes that managers:

- Have knowledge of all possible alternatives
- Have complete knowledge about the consequences that follow each alternative.
- Have a well-organized and stable set of preferences for these consequences.

- Have the computational ability to compare consequences and to determine which one is preferred.

As noted by Herbert Simon, a decision theorist who in 1978 earned the Nobel Prize for his work on decision making. “The assumptions of perfect rationality are contrary to fact. It is not a question of approximation; they do not even remotely describe the process that human beings use for making decisions in complex situations.” Thus, the rational model is at best an instructional tool. Since decision makers do not follow these rational procedures, Simon proposed the normative model of decision making.

Simon’s Normative Model

This model attempts to identify the process that managers actually use when making decisions. The process is guided by a decision maker’s bounded rationality. **Bounded rationality** represents the notion that decision makers are “bounded” or restricted by a variety of constraints when making decisions. These constraints include any personal or environmental characteristics that reduce rational decision making. Examples are the limited capacity of the human mind, problem complexity and uncertainty, amount and timeliness of information at hand, criticality of the decision, and time demands. Consider how these constraints affected ethical decision making at Syntex Corporation.

> Back in 1985, Syntex Corp. figured it was onto something big: a new ulcer drug that promised to relieve the misery of millions—and earn the company big profits. In its annual report Syntex showed capsules of the drug spilling forth as shining examples of research. It pictured the drug’s inventor, Gabriel Garay, at work in his lab.
>
> Critics are charging that the company, after investing millions in the drug’s development, played

down—and even suppressed—potentially serious safety problems that could hinder its approval.

Mr. Garay says it was he who sounded alarms internally over enprostil, warning it could cause dangerous blood clots and actually prompt new ulcers. Even when an outside researcher agreed there were potential dangers, Syntex executives dismissed the findings as preliminary. Mr. Garay says Syntex then forced him out.

Although decision makers at Syntex may have desired the best solution to problems identified by Mr. Garay, bounded rationality precluded its identification. How then do managers make decisions?

As opposed to the rational model, Simon's normative model suggests that decision making is characterized by (1) limited information processing, (2) the use of rules of thumb or shortcuts, and (3) satisficing. Each of these characteristics is now explored.

Limited Information Processing

Managers are limited by how much information they process because of bounded rationality. This results in the tendency to acquire manageable rather than optimal amounts of information. In turn, this practice makes it difficult for managers to identify all possible alternative solutions. In the long run, the constraints of bounded rationality cause decision makers to fail to evaluate all potential alternatives.

Use of Rules of Thumb or Shortcut

Decision makers use rules of thumb or shortcuts to reduce information-processing demands. Since these shortcuts represent knowledge gained from past experience, they help decision makers evaluate current problems. For example, recruiters may tend to hire applicants receiving degrees from the same university attended by other successful employees. In this case, the "school attended"

criterion is used to facilitate complex information processing associated with employment interviews. Unfortunately, these shortcuts can result in biased decisions.

Satisficing

People satisfice because they do not have the time, information, or ability to handle the complexity associated with following a rational process. This is not necessarily undesirable. Satisficing consists of choosing a solution that meets some minimum qualifications, one that is “good enough.” Satisficing resolves problems by producing solutions that are satisfactory, as opposed to optimal.

The Garbage Can Model

As true of Simon’s normative model, this approach grew from the rational model’s inability to explain how decisions are actually made. It assumes that decision making does not follow an orderly series of steps. In fact, organizational decision making is said to be such a sloppy and haphazard process that the garbage can label is appropriate. This contrasts sharply with the rational model, which proposed that decision makers follow a sequential series of steps beginning with a problem end ending with a solution. According to the garbage can model, decisions result from a complex interaction between four independent streams of events: problems, solutions, participants, and choice looking for problems, issues, and feelings looking for decision situations in which they might be aired, solutions looking for issues to which they might be the answer, and decision makers looking for work.” The garbage can model attempts to explain how they interact, this section highlights managerial implications of the garbage can model.

Streams of Events

The four streams of events—problems, solutions, participants and choice of opportunities—represent independent entities that flow into

and out of organizational decision situations. Because decisions are a function of the interaction among these independent events, the stages of problem identification and problem solution may be unrelated. For instance, a solution may be proposed for a problem that does not exist. This can be observed when students recommend that a test be curved, even though the average test score is a comparatively high 85 percent. On the other hand, some problems are never solved. Each of the four events in the garbage can model deserves a closer look.

Problems

As defined earlier, problems represent a gap between an actual situation and a desired condition. But problems are independent from alternatives and solutions. The problem may or may not lead to a solution.

Solutions

Solutions are answers to looking for questions. They represent ideas constantly flowing through an organization. This is predicted to occur because managers often do not know what they want until they have some idea of what they can get.

Participants

These are the organizational members who come and go throughout the organization. They bring different values, attitudes and experiences to a decision-making situation. Time pressures limit the extent to which participants are involved in decision making.

Choice opportunities

Choice opportunities are occasions in which an organization is expected to make a decision. While some opportunities, such as hiring and promoting employees, occur regularly, others do not because they result from some type of crisis or unique situation.

Interactions Among the Streams of Events

Because of the independent nature of the stream events, they interact in a random fashion. This implies decision making is more a function of chance encounters rather than a rational process. Thus, the organization is characterized as a “garbage can” in which problems, solutions, participants and choice opportunities are all mixed together. Only when the four streams of events happen to connect is a decision made. Since these connections randomly occur among countless combinations of streams of events, decision quality generally depends on timing (some might use the term luck). In other words, good decisions are made when these streams of events interact at the proper time. This explains why problems do not necessarily relate to solutions and why solutions do not always solve problems. In support of the garbage can model, one study indicated that decision making in the textbook publishing industry followed a garbage can process. Moreover, knowledge of this process helped the researchers to identify a variety of best selling textbooks.

Managerial Implications

The garbage can model of organizational decision making has four practical implications. First, many decisions will be made by oversight or the presence of significant opportunity. Second, political motives frequently guide the process by which participants make decisions. Participants tend to make decisions that promise to increase their status. Third, the process is sensitive to load. That is, as the number of problems increases, relative to the amount of time available to solve them, problems are less likely to be solved. Finally, important problems are more likely to be solved than unimportant ones because they are more salient to organizational participants.

The Satisficing Model

The essence of the satisficing model is that, when faced with complex problems, decision makers respond by reducing the problems to a

level at which they can be readily understood. This is because the information processing capability of human beings makes it impossible to assimilate and understand all the information necessary to optimize. Since the capacity of the human mind for formulating and solving complex problems is far too small to meet all the requirements for full rationality, individuals operate within the confines of bounded rationality. They construct simplified models that extract the essential features from problems without capturing all their complexity. Individuals can then behave rationally within the limits of the simple model.

How does bounded rationality work for the typical individual? Once a problem is identified, the search for criteria and alternatives begins. But the list of criteria is likely to be far from exhaustive. The decision maker will identify a limited list made up of the more obvious choices. These are the choices that are easy to find and tend to be highly visible. In most cases, they will represent familiar criteria and the tried-and-true solutions. Once this limited set of alternatives is identified, the decision maker will begin reviewing them. But the review will not be comprehensive. That is, not all the alternatives will be carefully evaluated. Instead, the decision maker will begin with alternatives that differ only in a relatively small degree from the choice currently in effect. Following along familiar and well-worn paths, the decision maker proceeds to review alternatives only until he or she identifies an alternative that suffices—one that is satisfactory and sufficient. So the satisficer settles for the first solution that is “good enough,” rather than continuing to search for the optimum. The first alternative to meet the “good enough” criterion ends the search, and the decision maker can then proceed toward implementing this acceptable course of action.

One of the more interesting aspects of the satisficing model is that the order in which alternatives are considered is critical in determining which alternative is selected. If the decision maker were optimizing, all alternatives would eventually be listed in a hierarchy of preferred

order. Since all the alternatives would be considered, the initial order in which they were evaluated would be irrelevant. Every potential solution would get a full and complete evaluation. But this is not the case with satisficing. Assuming a problem has more than one potential solution, the satisficing choice will be the first acceptable one the decision maker encounters. Since decision makers use simple and limited models, they typically begin by identifying alternatives that are obvious, ones with which they are familiar, and those not too far from the status quo. Those solutions that depart least from the status quo and meet the decision criteria are most likely to be selected. This may help to explain why many decisions that people make do not result in the selection of solutions radically different from those they have made before. A unique alternative may present an optimizing solution to the problem; however, it will rarely be chosen. An acceptable solution will be identified well before the decision maker is required to search very far beyond the status quo.

The Implicit Favorite Model

Another model designed to deal with complex and non routine decisions is the implicit favorite model. Like the satisficing model, it argues that individuals solve complex problems by simplifying the process. However, simplification in the implicit favorite model means not entering into the difficult “evaluation of alternatives” stage of decision making until one of the alternatives can be identified as an implicit “favorite.” In other words, the decision maker is neither rational nor objective. Instead, early in the decision process, he or she implicitly selects a preferred alternative. Then the rest of the decision process is essentially a decision confirmation exercise, where the decision maker makes sure his or her implicit favorite is indeed the “right” choice.

The Intuitive Model

Intuitive decision making has recently come out of the closet and into some respectability. Experts no longer automatically assume that

using intuition to make decisions is irrational or ineffective. There is growing recognition that rational analysis has been overemphasized and that, in certain instances, relying on intuition can improve decision making.

What is meant by intuitive decision making? There are a number of ways to conceptualize intuition. For instance, some consider it a form of extrasensory power or sixth sense, and some believe it is a personality trait that a limited number of people are born with. For our purposes, we define intuitive decision making as an unconscious process created out of distilled experience. It does not necessarily operate independently of rational analysis; rather, the two complement each other.

When are people most likely to use intuitive decision making? Eight conditions have been identified: (1) when a high level of uncertainty exists; (2) when there is little precedent to draw on; (3) when variables are less scientifically predictable; (4) when “facts” are limited; (5) when facts do not clearly point the way to go; (6) when analytical data are of little use; (7) when there are several plausible alternative solutions to choose from, with good arguments for each; and (8) when time is limited and there is pressure to come up with the right decision.

Questions:

1. Describe a situation in which you satisficed when making a decision. Why did you satisfice instead of optimize?
2. Do you think the garbage can model is a realistic representation of organizational decision making? Explain your rationale.
3. Do you think people are rational when they make decisions? Under what circumstances would an individual tend to follow a rational process?
4. Describe in your words Simon's Normative Model.
5. What eight conditions must be met for people to use intuitive decision making? Explain each briefly.

Module 7

INDIVIDUAL AND GROUP DECISION MAKING

Individual Decision Making

Individuals in organizations make decisions. That is, they make choices from among two or more alternatives. Top managers, for instance, determine their organization's goals, what products or services to offer, how best to organize corporate headquarters, or where to locate a new manufacturing plant. Middle- and lower-level managers determine production schedules, select new employees, and decide how pay raises are to be allocated. Of course, making decisions is not the sole province of managers. Non-managerial employees also make decisions that affect their jobs and the organizations they work for. The more obvious of these decisions might include whether to come to work or not on any given day, how much effort to put forward once at work, and whether to comply with a request made by the boss. Additionally, an increasing number of organizations in recent years have been empowering their non-managerial employees with job-related decision-making authority that historically was reserved for managers alone. Individual decision making, therefore, is an important part or organizational behavior.

So every individual in every organization regularly engages in decision making: that is, they make choices from among two or more alternatives. Undoubtedly, many of these choices are almost reflex actions, undertaken with little conscious thought. The boss asks you to complete a certain report by the end of the day and you comply, assuming the request is reasonable. In such instances, choices are still being made though they don't require much contemplation. But when individuals confront new or important decisions, they can be expected to reason them out thoughtfully. Alternatives will be developed. Pros and cons will be weighed. The result is that what people do on their jobs is influenced by their decision processes.

Group Decision Making

We know that, today, many decisions in organizations are made by groups or committees. The communicative interaction in a group decision can either increase or decrease the quality of the decision over that made by an individual alone. We now look into the advantages and disadvantages of group decisions in contrast to individual decisions.

Advantages

Individual and group decisions each have their own set of strengths. Neither is ideal for all situations. The following list identifies the major advantages that groups offer over individuals in the making of decisions:

1. **More complete information and knowledge.** Two hands are better than one. There is more information in a group than typically resides with one individual. So groups can provide more diverse input into the decision.
2. **Increased diversity of views.** In addition to more input, groups can bring heterogeneity to the decision process. This opens up the opportunity for more approaches and alternatives to be considered.
3. **Increases acceptance of a solution.** Many decisions fail after the final choice has been made because people do not accept the solution. However, if people who will be affected by a decision and who will be instrumental in implementing it are able to participate in the decision itself, they will be more likely to accept it and encourage others to accept it. Participation in the process increases the commitment and motivation of those who will carry out the decision. Since members are reluctant to fight or undermine a decision they helped to develop, group decisions increase acceptance of the final solution and facilitate its implementation.
4. **Increases legitimacy.** Most societies foster democratic methods. The group decision-making process is consistent with democratic ideals and, therefore, may be perceived as more legitimate in

democratic societies than decisions made by a single person. When an individual decision maker fails to consult with others before making a decision, the fact that the decision maker has complete power can create the perception that the decision was made autocratically and arbitrarily.

Disadvantages

Of course, group decisions are not without drawbacks. The following lists the major disadvantages to group decision-making:

1. **Time consuming.** It takes time to assemble a group. The interaction that takes place once the group is in place is frequently inefficient. The result is that groups take more time to reach a solution than would be the case if an individual were making the decision.
2. **Pressures to conform.** There are social pressures in groups. The desire by group members to be accepted and considered as an asset to the group can result in squashing any overt disagreement, thus encouraging conformity among viewpoints.
3. **Ambiguous responsibility.** Group members share responsibility, but who is actually responsible for the final outcome? In an individual decision, it is clear who is responsible. In a group decision, the responsibility of any single member is watered down and less clearly defined.
4. **Domination by the few.** Group discussion can be dominated by one or a few members. If this dominant coalition is composed of low-and medium-ability members, the group's overall effectiveness will suffer.

Groupthink and Groupshift

Two by-products of group decision-making have received a considerable amount of attention by researchers. These two

phenomena have the potential to affect the group's ability to appraise alternatives objectively and arrive at quality decision solutions.

The first phenomenon, called **groupthink**, is related to norms. IT describes situations in which group pressures for conformity deter the group from critically appraising unusual, minority, or unpopular views. Groupthink is a disease that attacks many groups and can dramatically hinder their performance. The second phenomenon we review is called **groupshift**. It indicates that in discussing a given set of alternatives and arriving at a solution, group members tend to exaggerate the initial positions they hold. In some situations, caution dominates, and there is a conservative shift. More often, however, the evidence indicates that groups tend toward a risky shift.

Groupthink

Groupthink is an agreement-at-any-cost mentality that results in ineffective group decision making. It occurs when groups are highly cohesive, have highly directive leaders, are insulated so they have no clear ways to get objective information, and, because they lack outside information, have little hope that a better solution might be found than the one proposed by the leader or other influential group members. These conditions foster the illusion that the group is invulnerable, right, and more moral than outsiders. They also encourage the development of self-appointed "mind guards" who bring pressure on dissenters. In such situations, decisions, often important decisions, are made without consideration of alternative frames or alternative options. It is difficult to imagine conditions more conducive to poor decision making and wrong decisions.

Recent research indicates that groupthink may also result when group members have preconceived ideas about how a problem should be solved. Under these conditions the team may not examine a full range of decision alternatives or they may discount or avoid information that threatens the team's preconceived choice.

Irving Janice, who coined the term groupthink, focused his research on high-level governmental policy groups faced with difficult problems in complex and dynamic environments. The groupthink phenomenon has been used to explain numerous group decisions that have resulted in serious fiascoes. Of course, group decision making is quite common in all types of organizations, so it is possible that groupthink exists in private-sector organizations as well as in those in the public sector.

Groupshift

In comparing group decisions with the individual decisions of members within the group, evidence suggests that there are differences. In some cases, the group decisions are more conservative than the individual decisions. More often, the shift is toward greater risk.

What appears to happen in groups is that the discussion leads to a significant shift in the positions of members toward a more extreme positioning the direction toward which they were already leaning before the discussion. So conservative types become more cautious and the more aggressive types take on more risk. The group discussion tends to exaggerate the initial position of the group.

The groupshift can be viewed as actually a special case of groupthink. The decision of the group reflects the dominant decision making norm that develops during the group's discussion. Whether the shift in the group's decision is toward greater caution or more risk depends on the dominant prediscussion norm.

The greater occurrence of the shift toward the risk has generated several explanations for the phenomenon. It has been argued, for instance, that the discussion creates familiarization among the members. As they become more comfortable with each other, they also become more bold and daring. Another argument is that our society values risk, we admire individuals who are willing to take risks, and group discussion motivates members to show they are at least as willing as their peers to take risks. The most plausible explanation of the shift toward risk, however, seems to be that the group diffuses

responsibility. Groups decision free any single member from accountability for the group's final choice. Greater risk can be taken because even if the decision fails, no one member can be held wholly responsible.

The Abilene Paradox

The Abilene paradox is a paradox in which a group of people collectively decide on a course of action that is counter to the preferences of any of the individuals in the group. It involves a common breakdown of group communication in which each member mistakenly believes that their own preferences are counter to the group's and do not raise objections.

It was observed by management expert Jerry B. Harvey in his article *The Abilene Paradox and other Meditations on Management.* The name of the phenomenon comes from an anecdote in the article which Harvey uses to elucidate the paradox:

> July Sunday afternoons in Coleman, Texas (pop 5,607) are not exactly winter holidays. This one was particularly hot - 104 degrees as measured by the Walgreen's Rexall Ex-Lax Temperature Gauge located under the tin awning that covered a rather substantial "screened-in" back porch. In addition, the wind was blowing the fine-grained West Texas topsoil through the house. The windows were closed, but dust filtered through what were apparently cavernous but invisible openings in the walls.
>
> "How could dust blow through closed windows and solid walls?" one might ask. Such questions betray more of the provincialism of the reader than the writer. Anyone who has ever lived in West Texas wouldn't bother to ask. Just let it be said that the wind can do a lot of things with topsoil when more than thirty days have passed without rain.
>
> But the afternoon was still tolerable - even potentially enjoyable. A water-cooled fan provided adequate relief from the heat as long as one didn't stray too far from it, and we didn't. In addition, there was cold lemonade for sipping. One might have preferred stronger stuff, but Coleman was "dry" in more ways than one; and so were my in-laws, at least until someone got sick. Then a teaspoon or two for medicinal purposes might be legitimately

considered. But this particular Sunday no one was ill, and anyway, lemonade seemed to offer the necessary cooling properties we sought.

And finally there was entertainment. Dominoes. Perfect for the conditions. The game required little more physical exertion than an occasional mumbled comment, "shuffle ‘em" and an unhurried movement of the arm to place the spots in the appropriate perspective on the table. It also required somebody to mark the score; but that responsibility was shifted at the conclusion of each hand so the task, though onerous, was in no way debilitating. In short, dominoes was diversion, but pleasant diversion.

So, all in all it was an agreeable - even exciting - Sunday afternoon in Coleman, if, to quote a contemporary radio commercial, "you are easily excited." That is, it was until my father-in-law looked up from the table and said with apparent enthusiasm, "Let's get in the car and go to Abilene and have dinner at the cafeteria."

To put it mildly, his suggestion caught me unprepared. You might even say it woke me up. I began to turn it over in my mind. "Go to Abilene? Fifty-three miles? In this dust storm. We'll have to drive with the lights on even though it's the middle of the afternoon. And the heat. It's bad enough here in front of the fan, but in an un-air conditioned 1958 Buick it will be brutal. And eat at the cafeteria? Some cafeterias may be okay, but the one in Abilene conjures up dark memories of the enlisted men's field mess."

But before I could clarify and organize my thoughts even to articulate them, Beth, my wife, chimed in with, "sounds like a great idea. I would like to go. How about you Jerry?" Well since my own preferences were obviously out of step with the rest, I decided not to impede the party's progress and replied, "sounds good to me," and added, "I just hope your mother wants to go."

"Of course I want to go," my mother-in-law replied, "I haven't been to Abilene for a long time. What makes you think I wouldn't want to go?"

So into the car and to Abilene we went. My predictions were fulfilled. The heat was brutal. We were coated with a fine layer of West Texas dust, which was cemented with perspiration by the time we arrived; and the food at the cafeteria provided first-rate material for Alka-Seltzer commercials.

Some four hours and 106 miles later we returned to Coleman, Texas, tired and exhausted. We sat in front of the fan for a long time in silence. Then both to be sociable and also to break the rather oppressive silence, I said, "It was a great trip, wasn't it?"

No one spoke.

Finally, my mother-in-law said, with some slight note of irritation, "Well to tell you the truth, I really didn't enjoy it much and would rather have stayed here. I just went along because the three of you were so enthusiastic about going. I would have gone if you all hadn't pressured me into it."

I couldn't believe it. "What do you mean ‘you all?'", I said. "Don't put me in the ‘you all' group. I was delighted to be doing what we were doing. I didn't want to go. I only went to satisfy the rest of you characters. You are the culprits."

Beth looked shocked. "Don't call me a culprit. You and Daddy and Mamma were the ones who wanted to go. I just went along to be sociable and to keep you happy. I would have had to be crazy to want to go out in heat like that, You don't think I'm that crazy do you?"

Before I had the opportunity to fall into that obvious trap, her father entered the conversation again with some abruptness. He spoke only one word, but did it in the quite simple, straightforward vernacular that a lifelong Texan and particularly a Colemanite can approximate. That word was "H-E-L-L."

Since he seldom resorted to profanity, he immediately caught our attention. Then, he proceeded to explain on what was already an absolutely clear thought with, "listen, I never wanted to go to Abilene. I was sort of making conversation. I just thought you might have been bored, and I felt I ought to say something. I didn't want you and Jerry to have a bad time when you visit. You visit so seldom I wanted to be sure you enjoy it. And I knew Mama would be upset if you all didn't have a good time. Personally, I would have preferred to play another game of dominoes and eaten the leftovers in the ice box."

After the initial outburst of recrimination we all sat back in silence. Here we were, four reasonable sensible people who, on our own volition's, had just taken a 106-mile trip across a Godforsaken desert in furnace like temperatures through a cloud like dust storm to eat unpalatable food at a hole-in-the-wall cafeteria in Abilene, Texas, when none of us really wanted to go, In fact, to be more accurate, we'd done just the opposite of what

> we wanted to do. The whole situation seemed paradoxical. It simply didn't make sense.
>
> At least it didn't make sense at that time. But since that fateful summer day in Coleman, I have observed, consulted with and been a part of more than one organization that has been caught in the same situation. As a result, it has either taken a side-trip, and occasionally, a terminal journey to Abilene when Dallas or Muleshoe or Houston or Tokyo was where it really wanted to go. And for most of those organizations, the destructive consequences of such trips, measured both in terms of human misery and economic loss, have been much greater than for the Abilene group.

The phenomenon may be a form of groupthink. It is easily explained by social psychology theories of social conformity and social cognition which suggest that human beings are often very averse to acting contrary to the trend of the group. Likewise, it can be observed in psychology that indirect cues and hidden motives often lie behind peoples' statements and acts, frequently because social disincentives discourage individuals from openly voicing their feelings or pursuing their

The theory is often used to help explain extremely poor business decisions, especially notions of the superiority of "rule by committee." A technique mentioned in the study and/or training of management, as well as practical guidance by consultants, is that group members, when the time comes for a group to make decisions, should ask each other, "Are we going to Abilene?" to determine whether their decision is legitimately desired by the group's members or merely a result of this kind of groupthink.

Abilene Paradox is related to the concept of groupthink in that both theories appear to explain the observed behavior of groups in social contexts. The root of the theory is that groups have just as many problems managing their agreements as they do their disagreements. This observation rings true among many researchers in the Social sciences and tends to reinforce other theories of individual and group

What's Behind The Paradox?

It is the lack of logic that characterizes a paradox.

While it might look like conflict, the blaming, defensiveness, and other behaviors that result from a bad decision – like the trip to Abilene – are really the signs of mismanaged agreement. But truly it is not about conflict; instead the issue is "mismanaged agreement".

Mismanaged agreement is the FAILURE to do what is needed to ensure that people are in agreement for the RIGHT reasons. The following are the reasons for this occurrence:

Action Anxiety

Common occurrence when we are asked to place our thoughts and opinions at risk in front of a group of our peers or supervisors.

Negative Fantasy

Perceived risk happens to all of us – we tend to see the potential downsides – because they entail risk – more so than the potential benefits of speaking out.

Perceived Risk

Must always be weighed – both the risk and the risk of inaction; our unwillingness to take risks may well bring about the negative consequences we so fear.

Fear of Separation

Constant for all people; we enjoy groups, and worry about being excluded from them.

Confusion of Risk and Certainty

Difficult to avoid; what we imagine will go wrong if we say what's in our heart becomes more real to us than the far more likely disaster that will result from going along with the crowd.

Remaining silent and going along with the group usually has consequences too, sometimes bigger ones than any form of action might hold. One consequence of not speaking out includes lowered self-esteem – a personal risk added to the professional risk of a bad decision.

Preventative Measures

While it is always possible to turn the car around and head home, it is much easier to avoid taking the trip in the first place!

How To Break The Cycle

- Manage communication by establishing debate
- Assign fact checkers
- Be a devil's advocate
- Encourage organizational graffiti
- Managing the organizational context can enhance power and reduce risk
- The creation of the right kind of climate is essential!

When To Break The Cycle

- Before meetings / while preparing for discussions
- During meetings or discussions
- After decisions have been made (before you arrive in Abilene)

Ways To Skip The Trip

Before Meetings

- Invite the right people – with knowledge, experience and a stake in the result.
- Plan enough time for discussion.
- Clearly state the decision to be made and results to be accomplished.
- Organize available data and information.
- Develop options and evaluate impacts.

During Meetings

- Set a climate of openness and participation; give fair consideration to all options.

- Check assumptions. Ask “what happens if we don’t?”
- Review risks and benefits. Estimate the probabilities.
- What options are there to achieve the objective?
- What else could be creating this problem?
- How confident are we in our data?
- What are the chances for success if we pursue this direction?
- Establish checkpoints.
- If we’re wrong, is the situation recoverable?

After A Decision Has Been Made

- If you have reason to think an error in the decision has been made, you can check the status regularly.
- Ask yourself if the risk is greater to raise concerns and “skip the trip” or to let a poor decision stand.
- You can request assumptions be repeatedly checked.

What You Can Do…

- Keep negative fantasies and perceived risk under check. Consider the benefits of speaking out.
- Diplomatically confront decisions moving in the wrong direction, based on your knowledge and experience.
- Be prepared with backup information and good questions.

Group Decision Making Techniques

The most common form of group decision making takes place in face-to-face **interacting groups**. But as our discussion of groupthink demonstrated, interacting groups often censor themselves and pressure individual members toward conformity of opinion. Various techniques have been proposed as ways to reduce many of the problems inherent in the traditional interacting group. These are discussed in this section.

Brainstorming

Brainstorming is meant to overcome pressures for conformity in the interacting group that hold back the development of creative alternatives. It does this by utilizing an dea generation process that specifically encourages any and all alternatives while withholding any criticism of those alternatives.

In a typical brainstorming session, a half dozen to a dozen people sit around a table. The group leader states the problem in a clear manner so it is understood by all participants. Members then free-wheel as many alternatives as they can in a given length of time. No criticism is allowed, and all the alternatives are recorded for later discussion and analysis. That one idea stimulates others and that judgments of even the most bizarre suggestions are withheld until later encourages group members to “think the unusual.”

Brainstorming, however, is merely a process for generating ideas. The other techniques go further by offering methods of actually arriving at a preferred situation.

Nominal Group Technique

The **nominal group technique** restricts discussion or interpersonal communication during the decision making process, hence the term *nominal*. Group members are all physically present, as in a traditional committee meeting, but members operate independently. Specifically, a problem is presented and then the following steps take place:

1. Members meet as a group but, before any discussion takes place, each member independently writes down his or her ideas on the problem.
2. This silent period is followed by each member presenting one idea to the group. Each member takes his or her turn, going around the table, presenting a single idea until all ideas have been presented and recorded (typically on a flip chart, whiteboard or chalkboard). No discussion takes place until all ideas have been recorded.
3. The group now discusses the ideas for clarity and evaluates them.

4. Each group member silently and independently rank-orders the ideas. The final decision is determined by the idea with the highest aggregate ranking.

The chief advantage of the nominal group technique is that it permits the group to meet formally but does not restrict independent thinking, as does the interacting group.

Delphi Technique

A more complex and time-consuming alternative is the **Delphi technique**. It is similar to the nominal group technique except it does not require the physical presence of the group's members. In fact, the Delphi technique never allows the group's members to meet fact to face. The following steps characterize the Delphi technique.

1. The problem is identified and members are asked to provide potential solutions through a series of carefully designed questionnaires.
2. Each member anonymously and independently completes the first questionnaire.
3. Results of the first questionnaire are compiled at a central location, transcribed and reproduced.
4. Each member receives a copy of the results.
5. After viewing the results, members are again asked for their solutions. The results typically trigger new solutions or cause changes in the original position.
6. Steps 4 and 5 are repeated as often as necessary until consensus is reached.

Like the nominal group technique, the Delphi technique insulates group members from the undue influence of others. Because it does not require the physical presence of the participants, the Delphi technique can be used for decision making among geographically scattered groups. Of course, the Delphi technique has its drawbacks. Because the method is extremely time consuming, it is frequently not applicable where a speedy decision is necessary. Additionally, the method may not develop the rich array of alternatives as the

interacting or nominal group technique does. Ideas that might surface from the heat of face-to-face interaction may never arise.

Electronic Meetings

The most recent approach to group decision making blends the nominal group technique with sophisticated computer technology. It is called the **electronic meeting**.

Once the technology is in place, the concept is simple. Up to 50 people sit around a horseshoe-shaped table, empty except for a series of computer terminals. Issues are presented to participants and they type their responses onto their computer screen. Individual comments, as well as aggregate votes, are displayed on a projection in the room.

The major advantages of electronic meetings are anonymity, honesty, and speed. Participants can anonymously type any message they want and it flashes on the screen for all to see at a push of a participant's board key. It also allows people to brutally honest without penalty. And it is fast because chitchat is eliminated, discussions do not digress, and many participants can "talk" at once without stepping on one another's toes.

Experts claim that electronic meetings are as much as 55% faster than traditional face-to-face meetings. Yet there are drawbacks to this technique. Those who can type fast can outshine those who are verbally eloquent but poor typists; those with the best ideas do not get credit for them; and the process lacks the information richness of face-to-face oral communication.

Devil's Advocacy Approach

The last two techniques were developed to deal with complex, strategic decisions. Both techniques encourage intense, heated debate among group members. A recent study found that disagreement in structured settings like meetings can lead to better decision making. Disagreement is particularly useful for organizations operating in uncertain environments.

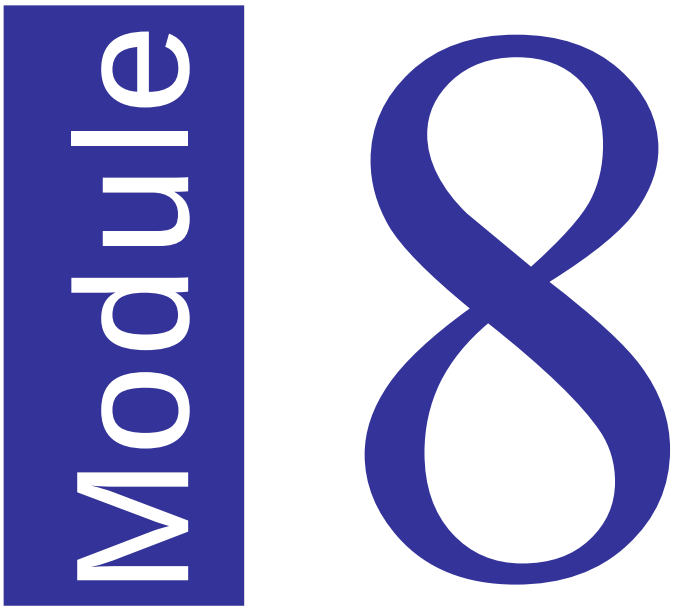
The **devil's advocacy approach** appoints an individual or subgroup to critique a proposed course of action. One or more individuals are assigned the role of devil's advocate to make sure that the negative aspects of any attractive decision alternatives are considered. The usefulness of the devil's advocate technique was demonstrated several years ago by Irving Janis in his discussion of famous fiascoes attributed to groupthink. Janis recommends that everyone in the group assume the role of devil's advocate and question the assumptions underlying the popular choice. An individual or subgroup can be formally designated as the devil's advocate to present critiques of the proposed decision. Using this technique avoids the tendency of groups to allow their desire to agree to interfere with decision making. Potential pitfalls are identified and considered before the decision is final.

Dialectical Inquiry

With **dialectical inquiry**, a decision situation is approached from two opposite points; advocates of the conflicting views conduct a debate, presenting arguments in support of their position. Each decision possibility is developed and assumptions are identified. The technique forces the group to confront the implications of their assumptions in the decision process.

Questions:

1. What is groupthink? What is its effect on decision making quality?
2. Have you ever experienced the Abilene Paradox? If yes, kindly relate what happened and what you did about it.
3. Do you prefer to solve problems in groups or by yourself? Why?
4. Describe a situation you have encountered where a decision made by an individual would have been better made by a group. Why do you feel this way?
5. Which do you think is the best group decision making technique? Defend your answer.
6. Have you ever participated in a brainstorming session? What were you brainstorming about? What was the result of the brainstorming session? Kindly relate the story.



WHAT MAKES A QUALITY DECISION?

How can managers tell whether they have made the best possible decision? One way is to wait until the results are in, but that can take a long time. In the meantime, managers can focus on the decision making process. Although nothing can guarantee a “perfect” decision, using vigilance can make a good decision more likely. **Vigilance** means being concerned for and attentive to the correct decision making procedures. Vigilant decision makers use the following procedures:

1. Survey the full range of objectives to be fulfilled and identify the values and qualities implicated by the choices.
2. Thoroughly canvas a wide range of alternative courses of action. This is the idea-gathering process, which should be quite separate from idea evaluation.
3. Carefully weigh whatever they know about the costs and risks of both the negative and positive consequences that could flow from each alternative.
4. Intensively search for new high-quality information relevant to further evaluation of the alternative.
5. Gather and take into account any new advice or information to which they are exposed, even when the information or advice does not support the course of action initially preferred.
6. Reexamine all the possible consequences of all known alternatives before making a final choice, including those originally regarded as unacceptable.
7. Make detailed provisions for implementing or executing the chosen course of action and give special attention to contingency plans that might be required if various known risks materialize.

While vigilance will not guarantee perfect decisions every time, this approach can help managers be confident they have followed procedures that will yield the best possible decision under the

circumstances. Spending more time at this stage can save time later in the decision process.

Why Are Decisions Hard?

What makes decisions hard? Certainly different problems may involve different and often special difficulties. Although every decision may have its own special problems, there are four basic sources of difficulty.

First, a decision can be hard simply because of its complexity. Simply keeping all of the issues in mind at one time is nearly impossible.

Second, a decision can be difficult because of the inherent uncertainty in the situation. In some decisions, the main issue is uncertainty. For example, imagine a firm trying to decide whether to introduce a new product. The size of the market, the market price, eventual competition, and manufacturing and distribution costs all may be uncertain to some extent, and all have some impact on the firm's eventual payoff. Yet the decision must be made without knowing for sure what these uncertain values will be.

Third, a decision maker may be interested in working toward multiple objectives, but progress in one direction may impede progress in others. In such a case, a decision maker must trade off benefits in one area against costs in another. In investment decisions, a trade-off that we usually must make is between expected return and riskiness.

Fourth, and finally, a problem may be difficult if different perspectives lead to different conclusions. Or, even from a single perspective, slight changes in certain inputs may lead to different choices. This source of difficulty is particularly pertinent when more than one person in involved in making the decision. Different individuals may look at the problem from different perspectives, or they may disagree on the uncertainty or value of the various outcomes.

Behavioral Influences on Individual Decision Making

Several behavioral factors influence the decision making process. Some affect only certain aspects of the process, while others influence the entire process. However, each may have an impact and therefore must be understood to fully appreciate the decision making process in organizations. Four individual behavioral factors—values, personality, propensity for risk, and potential for dissonance—are discussed here. Each has a significant impact on the decision making process.

Values

In the context of decision making, **values** are the guidelines a person uses when confronted with a situation in which a choice must be made. Values are acquired early in life and are a basic (often taken for granted) part of an individual's thoughts. Values' influence on the decision making process is profound:

In establishing objectives, value judgments must be made regarding the selection of opportunities and the assignment of priorities.

In developing alternatives, value judgments about the various possibilities are necessary.

In choosing an alternative, the values of the decision maker influence which alternative is chosen.

In implementing a decision, value judgments are necessary in choosing the means for implementation.

In the control and evaluation phase, value judgments cannot be avoided when corrective action is decided on and taken.

Clearly, values pervade the decision making process, encompassing not only the individual's economic and legal responsibilities but his ethical responsibilities as well. They are reflected in the decision maker's behavior before making the decision, in making the decision, and in putting the decision into effect. Indeed, some researchers state

that alternatives are relevant only as a means of achieving managerial values.

Personality

Decision makers are influenced by many psychological forces, both conscious and subconscious. One of the most important of these forces is personality. Decision makers' personalities are strongly reflected in their choices. Studies that have examined eth effect of personality on the process of decision making have generally focused on three types of variables:

- Personality variables – the attitudes, beliefs, and needs of the individual.
- Situational variables – external, observable situations in which individuals find themselves.
- Interactional variables – the individual's momentary state that results from the interaction of a specific situation with characteristics of the individual's personality.

The most important conclusions concerning the influence of personality on the decision making process are:

1. One person is not likely to be equally proficient in all aspects of the decision making process. Some people do better in one part of the process, while others do better in another part.
2. Certain characteristics, such as intelligence, are associated with different phases of the decision making process.
3. The relationship of personality to the decision making process may vary for different groups on the basis of such factors as sex, social status, and cultural background.
4. Individuals facing important and ambiguous decisions may be influenced heavily by peers' opinions.

An interesting study examined the importance of cultural influences on decision making style differences between Japanese and Australian

college students. In Japan, a group orientation exists, while in Australia, the common cultural pattern emphasizes and individual orientation. The results confirmed the importance of the cultural influence. Japanese students reported greater use of decision processes or behaviors associated with the involvement and influence of others, while Australian students reported greater use of decision processes associated with self-reliance and personal ability. In general, the personality traits of the decision maker combine with certain situational and interactional variables to influence the decision making process.

Propensity for Risk

From personal experience, we are all undoubtedly aware that decision makers vary greatly in their propensity for taking risks. This one specific aspect of personality strongly influences the decision making process. A decision maker with a low aversion to risk establishes different objectives, evaluates alternatives differently, and selects different alternatives than a decision maker in the same situation who has a high aversion to risk. The latter attempts to make choices where the risk or uncertainty is low or where the certainty of the outcome is high. The best managers need to tread a fine line between making ill-conceived, arbitrary decisions based purely on instinct (low aversion to risk) and becoming too obsessed with a reliance on numbers, analyses, and reports (high aversion to risk). Many people are bolder and more innovative and advocate greater risk taking in groups than as individuals. Apparently, such people are more willing to accept risk as members of a group.

Potential for Dissonance

Much attention has focused on the forces that influence the decision maker before a decision is made and that impact the decision itself. Only recently has attention been given to what happens after a decision has been made. Specifically, behavioral scientists have focused attention on **post decision anxiety**.

Such anxiety is related to what experts called **cognitive dissonance** over 35 years ago and what researchers today term regret theory. This theory states that there is often a lack of consistency, or harmony, among an individual's various cognitions (attitudes, beliefs, etc.) after a decision has been made. As a result, the decision maker has doubts and second thoughts about the choice, In addition, the intensity of anxiety is likely to be greater in the presence of any of the following conditions:

- The decision is psychologically and/or financially important.
- There are a number of forgone alternatives.
- The forgone alternatives have many favorable features.

Dissonance can, of course, be reduced by admitting that a mistake has been made. Unfortunately, many individuals are reluctant to admit that they have made a wrong decision These individuals are more likely to reduce their dissonance by using one or more of the following methods:

- Seek information that supports the wisdom of their decisions.
- Selectively perceive (distort) information in a way that supports their decisions.
- Adopt a less favorable view of the forgone alternatives.
- Minimize the importance of the negative aspects of the decisions and exaggerate the importance of the positive aspects.

While each of us may resort to some of this behavior in our personal decision making, a great deal of such behavior could easily harm organizational effectiveness.

Personality, specifically the level of self-confidence and persuasibility, heavily influences are closely interrelated and are only isolated here for purposes of discussion.

Questions:

1. Give 2 examples in your life where you exercised vigilance in your decision making. During each instance, did you use the procedures that vigilant decision makers use. Discuss how you did that.
2. Are decisions really hard? Discuss your answer thoroughly.
3. How important are values in good decision making? Explain.
4. What is the role of personality in making good decisions? Explain.
5. How strongly does propensity for risk influence a person's decision making?
6. What is post decision anxiety? Discuss in your words.

Module 9

ETHICAL DECISION MAKING

A Framework for Thinking Ethically

This document is designed as an introduction to thinking ethically. We all have an image of our better selves-of how we are when we act ethically or are "at our best." We probably also have an image of what an ethical community, an ethical business, an ethical government, or an ethical society should be. Ethics really has to do with all these levels-acting ethically as individuals, creating ethical organizations and governments, and making our society as a whole ethical in the way it treats everyone.

What is Ethics?

Simply stated, ethics refers to standards of behavior that tell us how human beings ought to act in the many situations in which they find themselves-as friends, parents, children, citizens, businesspeople, teachers, professionals, and so on.

It is helpful to identify what ethics is NOT:

- Ethics is not the same as feelings. Feelings provide important information for our ethical choices. Some people have highly developed habits that make them feel bad when they do something wrong, but many people feel good even though they are doing something wrong. And often our feelings will tell us it is uncomfortable to do the right thing if it is hard.
- Ethics is not religion. Many people are not religious, but ethics applies to everyone. Most religions do advocate high ethical standards but sometimes do not address all the types of problems we face.
- Ethics is not following the law. A good system of law does incorporate many ethical standards, but law can deviate from what is ethical. Law can become ethically corrupt, as some totalitarian regimes have made it. Law can be a function of power alone and designed to serve the interests of narrow groups. Law may have a

difficult time designing or enforcing standards in some important areas, and may be slow to address new problems.

- Ethics is not following culturally accepted norms. Some cultures are quite ethical, but others become corrupt -or blind to certain ethical concerns (as the United States was to slavery before the Civil War). "When in Rome, do as the Romans do" is not a satisfactory ethical standard.
- Ethics is not science. Social and natural science can provide important data to help us make better ethical choices. But science alone does not tell us what we ought to do. Science may provide an explanation for what humans are like. But ethics provides reasons for how humans ought to act. And just because something is scientifically or technologically possible, it may not be ethical to do it.

Why Identifying Ethical Standards is Hard

1. There are two fundamental problems in identifying the ethical standards we are to follow: On what do we base our ethical standards?
2. How do those standards get applied to specific situations we face?

If our ethics are not based on feelings, religion, law, accepted social practice, or science, what are they based on? Many philosophers and ethicists have helped us answer this critical question. They have suggested at least five different sources of ethical standards we should use.

Five Sources of Ethical Standards

The Utilitarian Approach

Some ethicists emphasize that the ethical action is the one that provides the most good or does the least harm, or, to put it another way, produces the greatest balance of good over harm. The ethical corporate action, then, is the one that produces the greatest good and does the least harm for all who are affected-customers, employees,

shareholders, the community, and the environment. Ethical warfare balances the good achieved in ending terrorism with the harm done to all parties through death, injuries, and destruction. The utilitarian approach deals with consequences; it tries both to increase the good done and to reduce the harm done.

The Rights Approach

Other philosophers and ethicists suggest that the ethical action is the one that best protects and respects the moral rights of those affected. This approach starts from the belief that humans have a dignity based on their human nature per se or on their ability to choose freely what they do with their lives. On the basis of such dignity, they have a right to be treated as ends and not merely as means to other ends. The list of moral rights -including the rights to make one's own choices about what kind of life to lead, to be told the truth, not to be injured, to a degree of privacy, and so on-is widely debated; some now argue that non-humans have rights, too. Also, it is often said that rights imply duties-in particular, the duty to respect others' rights.

The Fairness or Justice Approach

Aristotle and other Greek philosophers have contributed the idea that all equals should be treated equally. Today we use this idea to say that ethical actions treat all human beings equally-or if unequally, then fairly based on some standard that is defensible. We pay people more based on their harder work or the greater amount that they contribute to an organization, and say that is fair. But there is a debate over CEO salaries that are hundreds of times larger than the pay of others; many ask whether the huge disparity is based on a defensible standard or whether it is the result of an imbalance of power and hence is unfair.

The Common Good (Caring) Approach

The Greek philosophers have also contributed the notion that life in community is a good in itself and our actions should contribute to that

life. This approach suggests that the interlocking relationships of society are the basis of ethical reasoning and that respect and compassion for all others-especially the vulnerable-are requirements of such reasoning. This approach also calls attention to the common conditions that are important to the welfare of everyone. This may be a system of laws, effective police and fire departments, health care, a public educational system, or even public recreational areas.

The Virtue Approach

A very ancient approach to ethics is that ethical actions ought to be consistent with certain ideal virtues that provide for the full development of our humanity. These virtues are dispositions and habits that enable us to act according to the highest potential of our character and on behalf of values like truth and beauty. Honesty, courage, compassion, generosity, tolerance, love, fidelity, integrity, fairness, self-control, and prudence are all examples of virtues. Virtue ethics asks of any action, "What kind of person will I become if I do this?" or "Is this action consistent with my acting at my best?"

Putting the Approaches Together

Each of the approaches helps us determine what standards of behavior can be considered ethical. There are still problems to be solved, however.

The first problem is that we may not agree on the content of some of these specific approaches. We may not all agree to the same set of human and civil rights.

We may not agree on what constitutes the common good. We may not even agree on what is a good and what is a harm.

The second problem is that the different approaches may not all answer the question "What is ethical?" in the same way. Nonetheless, each approach gives us important information with which to determine

what is ethical in a particular circumstance. And much more often than not, the different approaches do lead to similar answers.

Making Decisions

Making good ethical decisions requires a trained sensitivity to ethical issues and a practiced method for exploring the ethical aspects of a decision and weighing the considerations that should impact our choice of a course of action. Having a method for ethical decision making is absolutely essential. When practiced regularly, the method becomes so familiar that we work through it automatically without consulting the specific steps.

The more novel and difficult the ethical choice we face, the more we need to rely on discussion and dialogue with others about the dilemma. Only by careful exploration of the problem, aided by the insights and different perspectives of others, can we make good ethical choices in such situations.

We have found the following framework for ethical decision making a useful method for exploring ethical dilemmas and identifying ethical courses of action.

Assessing Ethical Decisions

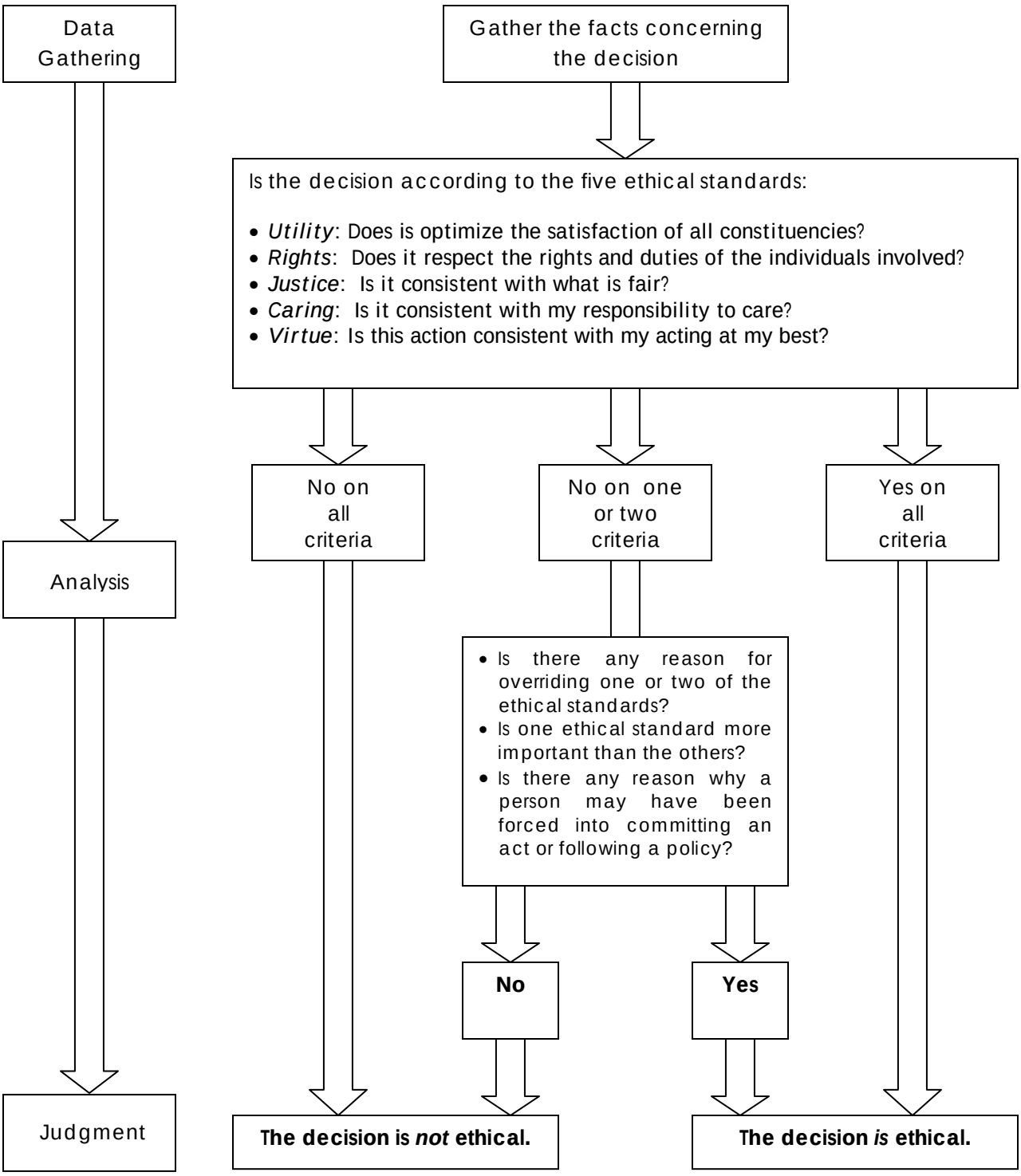
What distinguishes ethical from unethical decisions is often subjective and subject to differences of opinion. So how can we decide whether a particular decision is ethical? Below is a three-step model for applying ethical judgments to situations that may arise during the course of business activities:

1. Gather the relevant factual information.
2. Analyze the facts to determine the most appropriate moral values.
3. Make an ethical judgment based on the rightness or wrongness of the proposed activity or policy.

Unfortunately, the process does not always work as smoothly as the scheme suggests. What if the facts are not clear-cut? What if there are no agreed-upon moral values? Nevertheless, a judgment and a decision must be made. Experts point out that, otherwise, trust is impossible. And trust is indispensable in any business transaction.

In order to assess more fully the ethics of specific behavior, we need a more complex perspective. Consider a common dilemma faced by managers with expense accounts. Companies routinely provide managers with accounts to cover work-related expenses—hotel bills, meals, taxis—when they are traveling on company business or entertaining clients for business purposes. They expect employees to claim only work-related expenses. For example, if a manager takes a client to dinner and spends ₱1,000, submitting a ₱1,000 reimbursement receipt for that dinner is accurate and appropriate. But suppose that our manager has a ₱1,000 dinner the next night with a good friend for purely social purposes. Submitting that receipt for reimbursement would be unethical, but some managers rationalize that it is okay to submit a receipt for dinner with a friend. Perhaps they will tell themselves that they are underpaid and just “recovering” income due to them. Ethical standards also come into play in a case like this. Consider the five sources of such standards that were discussed earlier. Below is an expanded version that incorporates the consideration of these ethical standards.

Figure 9.1 – Assessing Ethical Decisions Flow



Now let us return to our case of the inflated expense account. While the utilitarian standard acknowledges that the manager benefits from a padded account, others such as coworkers and owners do not. Most experts would also agree that the act does not respect the rights of others (such as investors, who have to pay for the bill). Moreover, it is clearly unfair and compromises the manager's responsibilities to others. This particular act, then, appears to be clearly unethical. The figure however, also provides mechanisms for dealing with unique circumstances—those that apply only in limited situations. Suppose, for example, that our manager loses the receipt for the legitimate dinner but retains the receipt for the social dinner. Some people will now argue that it is okay to submit the illegitimate receipt because the manager is only doing so to get proper reimbursement. Others, however, will reply that submitting the alternative receipt is wrong under any circumstances. We will not pretend to arbitrate the case, and we will simply make the following point: Changes in most situation can make ethical issues either more or less clear-cut.

Ethical Dilemma Exercise

Assume you are a middle manager in a company with about a thousand employees. How would you respond to each of the following situations?

1. A close business associate has asked you for special treatment on an upcoming contract and has offered you a generous sum of money for your time and trouble. Do you accept his offer?

2. You have the opportunity to steal ₱1,000,000 from your company with absolute certainty that you would not be detected or caught. Would you do it?

3. Your company policy on reimbursement for meals while traveling on company business is that you will be repaid for your out-of-pocket costs, not to exceed ₱600 a day. You don't need receipts for these expenses—the company will take your word. When traveling, you tend to eat at fast-food (turu-turô) places and rarely spend in excess of ₱300 a day. Most of your colleagues put in reimbursement requests in the range of ₱450 to ₱550 a day regardless of what their actual expenses are. How much would you request for your meal reimbursements?

4. Your kids (or younger siblings of school age) will be going back to school next week. You have access to your department's office supplies. No one would know if you took any for personal use. Would you take pens, pencils, pad papers, or the like, from the office and give them to your kids or siblings?

5. You have discovered that one of your closest friends at work has stolen a large sum of money from the company. Would you: Do nothing? Go directly to an executive to report the incident before talking about it with your friend? Confront your friend before taking action? Make contact with your friend with the goal of persuading him/her to return the money?

Module 10

CREATIVITY

What is Creativity?

One thing is certain regarding the definition of creativity---it is much easier to identify creative acts than it is to define the term itself. We readily recognize creative acts, and we often use adjectives like novel, insightful, clever, unique, different, or imaginative. But coming up with a coherent and useful definition of the term *creativity* is not easy.

Many different scholars have attempted to define creativity. All definitions include some aspects of novelty (originality, freshness). But there is also an element of effectiveness that must be met. Slinging buckets of mud at customers as they arrive at a used-car lot is indeed a novel greeting but may not be very effective in selling cars. But offering coupons for a cosmetic mud pack, an evening at the local mud-wrestling arena, or a therapeutic and relaxing mud bath might be very effective as well as novel. And what about creating a television advertisement in which the car lot's owner offers customers the opportunity to dunk him in a mud bath set up at the lot specifically for this purpose?

For our purposes in this module, we are particularly concerned with the development of creative alternatives in decision problems. To be sure, creativity arises in many different situations; a novel and elegant proof of a mathematical theorem, an artist's creativity in painting or music and a storyteller's clever retelling of an old tale are a few examples. When we think of creativity in decision making, though, we will be looking for new alternatives with elements that achieve fundamental objectives in ways previously unseen. Thus, a creative alternative has both elements of novelty and effectiveness, where effectiveness is thought of in terms of satisfying objectives of a decision maker, a group of individuals, or even the diverse objectives held by different stakeholders in a negotiation.

Theories of Creativity

Why do creative thoughts seem to come more readily to some people than to others? Or in certain kinds of situations? Many scholars have tried to understand the creative process, and in this section we review some of the psychological bases of creativity.

Perhaps the most basic approach relates creativity to Maslow's concept of self-actualization. For example, an expert describes self-actualization as, among other things, being able to perceive reality accurately and compare culture objectively, having a degree of genuine spontaneity, and being able to look at things in a fresh, naïve, and simple way. The same expert claims that these and other qualities help people, even those without special talent, to act creatively, and he reviews some recent psychological evidence to support this proposition. This is good news for many of us. Self-actualization, happy lives, and creativity all seem to go hand in hand and to some extent can be developed by anyone. One need not have the special talent of an Einstein, Mozart, or Alexander the Great to reap the creative rewards that follow from self-actualization.

Others have attempted to delve more deeply into the process of creative thoughts itself. Psychoanalytic theories generally maintain that creative productivity is the result of preconscious mental activity. These theories suggest that our brain is processing information at a level that is not accessible to our conscious thoughts. Behavioristic theories argue that our behavior, including creative behavior, is simply a conglomerate of responses to environmental stimuli. Appropriate rewards (stimuli) can lead to more creative behavior.

A cognitive approach suggest that creativity stems from a capacity for making unusual and new mental associations of concepts. A researcher proposed that creative thought is just one manifestation of a general process by which people acquire new knowledge and thereby learn about the world. This process includes as the first step the production of "variations," a result of mentally associating elements of a problem in new ways. People who are more creative are better at

generating a wider range of variations as they think about the problems they face. Having a broader range of life experiences and working in the right kind of environment can facilitate the production of variations. Finally, some people simply are better at recognizing and seizing appropriate creative solutions as they arise; the ability to come up with creative solutions is not very helpful if one ignores those solutions later.

Phases of the Creative Process

Preparation

In this first stage, the individual learns about the problem. This includes understanding the elements of the problem and how they relate to each other. It may include looking at the problem from different perspectives or asking other people what they know or think about the problem. Spending effort understanding fundamental objectives, decisions that must be made (along with the immediately available set of alternatives), uncertainties inherent in the situation, and how these elements relate to each other prepares the decision maker for creative identification of new alternatives.

Incubation

In the second stage, the prepared decision maker explores, directly or indirectly, a multitude of different paths towards new alternatives. We might also use the terms *production* or *generation* of alternatives. The decision maker may do many things that seem to have a low chance of generating a new alternative, such as eliminating assumptions or adopting an entirely different perspective. Apparently playful activities may evoke the idea of the decision maker "playing" with the decision.

One explanation of unconscious incubation as a valid element of the creative process has been suggested by researchers in artificial intelligence. The explanation is based on a "blackboard" model of memory in the human brain. When the brain is in the process of doing other things –when a problem is incubating – parts of the blackboard are erased and new items put up. Every so often, the new information

just happens to be pertinent to the original problem, and the juxtaposition of the new and old information suggests a creative solution; in other words, the process of coming up with a new and unusual association can result simply from the way the brain works. An attractive feature of this theory is that it explains why incubation works only a small percentage of the time. Too bad it works so infrequently!

Illumination

This is the instant of becoming aware of a new candidate solution to a problem, that flash of insight when all the pieces come together, either spontaneously (Aha!) or as the result of careful study and work. Illumination is sometimes said to be a separate stage, but you can see that illumination is better characterized as the culmination of the incubation stage.

Verification

In the final step the decision maker must verify that the candidate solution does in fact have merit. (How many times have you thought you had the answer to a difficult problem, only to realize later—sometimes moments, sometimes much later—that your "dream solution" turned out to be just that: an impossible dream?) The verification stage requires the careful thinker to turn back to the hard logic of the problem at hand to evaluate the quality of the candidate solution. In our decision-making context, this means looking very carefully at a newly invented alternative in terms of whether it satisfies the constraints of the problem and how well it performs relative to the fundamental objectives.

Although there are many ways to think about the creative thought process, the cognitive approach described above, including the stages of creativity, can help us to frame the following discussion. We turn now to ways in which our creativity can be hindered, and we follow with suggestions about how to reduce or eliminate such blocks and thereby increase our creativity.

Blocks to Creativity

With a clear understanding of the creative process, we are now in a position to discuss ways in which that process can be derailed, albeit inadvertently. This section describes three kinds of creativity blocks, All of these blocks interfere with the creativity process by hindering the generation and recognition of new and unusual solutions to a problem or alternatives in a decision situation.

Framing and Perceptual Blocks

These blocks arise because of the ways in which we tend to perceive, define, and examine the problems and decisions that we face. To get a feel for these blocks, consider the following two problems. Give serious effort to solving these problems before reading on.

> **The Monk and the Mountain**
>
> At dawn one day, a monk begins to walk along a path from his home to the top of the mountain. Never straying from the path, he takes his time, travelling at various speeds, stopping to rest here and there, and arrives at the top of the mountain as the sun sets. He meditates at the top of the mountain overnight and for the next full day. At dawn the following morning, he begins to make his way back down the mountain along the same path, again relaxing and taking his time, and arrives home in the afternoon. Prove that there is a spot along the path that the monk occupies at the same time of day going up and coming down.
>
> **Making Cigars**
>
> Lonesome Molly loves to smoke cigars, and she has learned to make one out of five cigar butts. Suppose she collects 25 butts. How many cigars can she make?

Did you solve either one? The monk problem is difficult to solve if you try to maintain the frame in which it is cast: that the same monk travels up and down on two different ways. Change the frame, though, and imagine identical monks taking the uphill and downhill journeys on the same day, each one starting at dawn. Now it is easy to see that the monks will meet somewhere along the path at some time during the day. At that instant, they are at the same spot in the path; hence in the original problem there must be a point along the path that the monk in the problem occupies at the same time going up and coming down.

Lonesome Molly can obviously make at least five cigars out of the 25 butts that she finds. But you were right to suspect that the obvious answer is not correct! The answer lies in thinking not about the gross requirement of butts to make a cigar but to frame the problem in terms of net usage. Molly indeed requires five butts to make a cigar. For each one she makes, (and smokes), however, she has one butt left. The net consumption per cigar is four butts. So if she has 25 butts to start with, she can make six cigars out of the original 25 butts and smokes those five cigars, which yields five butts from which she can make a sixth cigar. After she smokes the last one, she has one butt left (and needs to find only four more for her next smoke).

Here are some specific blocks relating to framing and perception that hinder our creative potential:

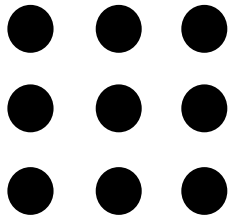
Stereotyping

Suppose you are a personnel manager and an individual with long hair and no necktie applies for a job as an engineer. Imagine your reaction. What would you think about the person? A typical mental strategy that most people use is to fit observations (people, things, events, and so

on) into a standard category or stereotype. Much of the time this strategy works well because the categories available are rich enough to represent most observations adequately. But when new phenomena present themselves, stereotyping and associated preconceived notions can interfere with good judgment.

Tacit Assumptions

Consider the classic nine-dot puzzle. Lay out nine dots in a square, three dots per row, and then, without lifting your pencil, draw four straight lines that cross all nine dots. Try it before you read on.



The nine-dot puzzle is a nice example, but what does this block have to do with decision making? People often look at problems with tacitly imposed constraints, which are sometimes appropriate and sometimes not. Suppose you believe you need more warehouse space for your business, so you have your real-estate agent look for warehouses of a specific size to rent. The size, however, may be an inappropriate constraint. Perhaps so much space is not necessary or may be divided among several smaller warehouses. Perhaps some characteristics of your product would permit a smaller warehouse to be modified in a clever way to provide adequate storage.

Inability to Understand a Problem at Different Levels

This block can be manifest in different ways. First is the familiar issue of isolating the precise decision context that requires attention. Suppose you are a national sales manager for a brand of motorcycle spare parts. Sales in Northern Luzon are down. Knowing your regional

salesperson, you suspect that the problem is motivational. The "obvious" solution is to pressure or sweet-talk the salesperson into better sales. But is the problem just what you think? Could it be a marketing problem—for example, competition with a regional brand that has been developed specifically for the area? What about a distribution problem? Perhaps it is difficult for the one warehouse in the region to supply the area's special needs. Even if the problem does lie with the salesperson, other possibilities exist, such as personal problems or personality conflicts with local business owners.

Another manifestation is focusing too much on detail and not being able to reframe the decision in a broader context, a problem commonly called "not seeing the forest for the trees." Many decisions require attention to a large amount of detailed information. For example, consider the issues involved in deciding whether to attempt a takeover of another firm, or where to site a new manufacturing plant. The sheer volume of information to be processed can keep the decision maker from seeing new and promising alternatives.

Inability to See the Problem from Another Person's Perspective

Where the previous block relates to seeing the problem itself in different ways, this one relates to seeing the problem through someone else's eyes and with their values. When a decision involves multiple stakeholders, it is always important to understand the values, interests, and objectives of other parties. Really creative solutions incorporate and satisfy as many competing objectives as possible, and an inability to understand others' values can interfere with the development of such solutions. For example, finding a meaningful way to achieve peace in the Mindanao requires the parties to consider the interests of Muslims and Christians, as well as other people in the region.

Value-based Blocks

Blocks in this category relate to the values we hold. In many cases our values and objectives can interfere with our ability to seek or identify truly creative alternatives in a decision situation.

Fear of taking a Risk

To get a feel for this block, try the following game at a party with a lot of friends. Each person is assigned to be a particular kind of barnyard animal: cow, donkey, chicken, goat, sheep, or whatever else you designate. The more people, the better. After everyone has been assigned to be an animal, the organizers count three. On the count of three, each person looks directly at his or her nearest neighbor and makes the sound of his or her animal as loudly as possible. For obvious reasons, this is called the Barnyard Game. Almost all participants feel some reluctance to play because they risk appearing silly in front of their friends.

There is nothing inherently wrong with being afraid to take a risk. In fact, the idea of taking a risk aversion is a basic concept in decision making under certainty; we have seen, for example, that the basic risky decision requires the decision maker to determine whether the risk of a loss (relative to a sure thing) is justified by a possible but uncertain gain. It may be counterproductive, though, not to offer a creative alternative for consideration in a decision problem because you risk others thinking your idea is impossible, too “far out,” or downright silly. What are the consequences of presenting a far-out idea that turns out to be unacceptable? The worst that might happen is that the idea is immediately determined to be infeasible. (Making far-out suggestions can have a more subtle value. Outsiders often have a difficult understanding exactly what the problem is. Presenting far-out ideas for action is a sure way to get a clear statement of the problem, contained in a plain and often arrogant explanation of why the idea will not work. Although this technique cannot be used in every situation,

when it works the result is a better understanding of the decision situation.)

Status Quo Bias

Decision making automatically means that the decision maker is considering at least one alternative that is different from the status quo. As indicated earlier, the ability to deal with change is becoming increasingly important for managers and decision makers. Studies show, however, that many people have a built-in bias toward the status quo. The stronger that bias, the more difficulty one may have coming up with creative problem solutions and alternatives.

Reality versus Fantasy

An individual may place a lot of value on being realistic and a low value in fantasizing. Creative people must be able to control their imagination, and they need complete access to it. Many exercises are available for developing an enhanced imagination and the ability to fantasize.

Judgment and Criticism

This block arises from applying one's values too soon in the creative process. Rather than letting ideas flow freely, some individuals tend to find fault with ideas as they arise. Such fault finding can discourage the creation of new ideas and can prevent ideas—one's own or someone else's—from maturing and gathering enough detail to become usable. Making a habit of judging one's own thoughts inevitably sacrifices some creative potential.

Cultural and Environmental Blocks

All decisions are made in some sort of social and cultural environment. The blocks that we describe here represent ways in which that environment may hinder the production and recognition of creative alternatives in decision situations.

Taboos

This type of block has to do with what is “proper behavior” or “acceptable” in a cultural sense; taboos may exist for no apparently good reason.

Strength of Tradition

As we mentioned previously, individuals can resist change because of a bias toward the status quo. There is a cultural counterpart to this block; in many cases, the socio-cultural environment in which a decision maker operates places a high value on maintaining tradition. Adopting change can be difficult in such a situation, which in turn can hinder the production of creative suggestions in the first place.

Reason and Logic versus Humor, Fantasy, and Artistic Thinking

There is a clean block against using feelings, intuitions, and emotions in business problem solving. Certainly valuable insights and understanding come from analytical treatments of any given problem; indeed these skills are important in decision making, and a course in decision analysis offers to teach such skills. However, valuable cues and ideas can also arise by admitting and examining feelings, intuitions, and emotions. For example, doing so can help understand the values of others who may have a stake in a decision.

In a decision-making course much of the emphasis is on the development of analytical thinking. Unfortunately, little effort is put into more artistically oriented thinking skills such as using imagery, being playful, storytelling, or expressing and appreciating feelings. Such activities tend to be culturally blocked because of the stress placed on analysis. From the discussion in this module, it would appear that artistic thinking can play an important role in the development of creative alternatives. The best possible arrangement is for an individual to be “mentally ambidextrous,” or good at switching between analytical and artistic thinking styles. This enhances creative

development of potential alternatives without sacrificing subsequent careful analysis.

Organizational Issues

Without a doubt, different organizations have different characteristics or cultures, and organizational culture can have a strong influence on decision making. Many of the issues that we have already discussed can be a part of an organization's decision-making culture. For example, an organization may have a culture that in subtle ways promotes criticisms and judging of ideas, stereotyping, or being risk-averse. Humor, playfulness, or artistic thinking may be frowned upon, or change may be resisted in order to preserve company traditions. For all of the reasons discussed above, such characteristics can reduce the creative potential of individuals in the organization.

By their very nature, organizations can impede creative thought. As an expert points out, "the natural tendency of organization to routinize, decrease uncertainty, increase predictability, and centralize functions and controls is certainly at odds with creativity." Other features of organizations also can hinder creativity. Examples include excessive formal procedures (red tape) or lack of cooperation and trust among co-workers. Hierarchical organizational structures can hinder creativity, which in turn can be aggravated by supervisors who tend to be autocratic.

Teresa Amabile has studied creativity and organizations for over twenty years. Her work has led to a detailed model of individual creativity in the organizational context. First, individual creativity requires three ingredients: expertise in the domain, skill in creative thinking, and intrinsic motivation to do the task well. In other words, we need someone who is good at what he or she does, who likes to do it just because it is interesting and fun, and who has some skill in creative thinking, perhaps along the lines of the creativity-enhancing techniques we discuss later in this module.

Amabile's work shows how the organizational environment can influence individual creativity. In particular, she warns that expecting detailed and critical evaluation, being closely watched, focusing on tangible rewards, competing with other people, and having limited choices and resources for doing the job all can hinder one's creativity. When she compared high- and low-creativity scenarios in organizations, though, the results indicated that a delicate balance must be maintained. For example, workers need clear overall goals, but at the same time they need autonomy in how to achieve those goals. Likewise, evaluation is good as long as it focused on the work itself (as opposed to the person) and provides informative and constructive help. Such evaluation ideally involves peers as well as supervisors. Although a focus on tangible rewards can be detrimental, knowing that one's successful creative efforts will be recognized is important. A sense of urgency can create a challenging atmosphere, particularly if individuals understand the importance of the problem on which they are working. If the challenge is viewed as artificial, however, such as competing with another division in the company or having an arbitrary deadline, the effect can be to decrease creativity. Thus, although creativity is essentially an individual phenomenon, managers can have a significant impact on creativity in their organizations through goal setting, evaluation, recognition and rewards, and creating pressure that reflects a genuine need for a creative solution.

Finally, even though managers can help individuals in their organizations be more creative, one can develop a "blind spot" because of a long-term association with a particular firm; it becomes difficult to see things in a new light simply because certain procedures have been followed or perspectives adopted for a long time. The German word *betriebsblind* for this situation literally means "company blind." One of the important roles that consultants serve is bringing a new perspective to the client's situation.

Value-focused Thinking for Creating Alternatives

There are a number of different ways in which fundamental and means objectives can be used as a basis for creating new alternatives for decision alternatives. In this part we review some of these techniques.

Fundamental Objectives

The most basic techniques use the fundamental objectives directly. For example, take one fundamental objective and, ignoring the rest, invent a (possibly hypothetical) alternative that is as good as it could be on that one objective. Do this for each fundamental objective one at a time, and keep track of all of the alternatives you come up with. Now go back and consider pairs of objectives; what are good alternatives that balance these two objectives? After doing this for various combination of objectives, look at the alternatives you have listed. Could any of them be modified so that they would be feasible or perhaps satisfy the remaining objectives better? Can any of the alternatives be combined?

A related approach is to consider all of the fundamental objectives at once and imagine what an alternative would look like that is perfect in all dimensions; call this the ideal alternative. Most likely it is impossible, but what makes it impossible? If the answer is constraints, perhaps some of those constraints can be removed or relaxed.

Still another possibility is to go in the opposite direction. Find a good alternative and think of ways to improve it. The fact that the alternative is a good one in the first place can reduce the pressure of finding a better one. In searching for a better one, examine the alternative carefully in terms of the objective: on which objectives does it perform poorly? Can it be improved in these dimensions?

Means Objectives

This can provide a particularly fruitful hunting ground for new alternatives. The reason for this is simply that the means objectives. In complicated problems with many fundamental objectives and many related means objectives, this approach can generate many possible courses of action. For example, consider the following decision situation.

Transportation of Nuclear Waste

One of the problems with the use of fission reactors for generating electricity is that the reactors generate substantial amounts of radioactive waste can be highly toxic for extremely long periods of time. Thus, management of the waste is necessary, and one possibility is to place it in a storage facility of some sort. Transporting the waste itself is hazardous, though. The decision situation includes the selection of a type of storage cask in which the material will be shipped, followed by the selection of a transportation route and a choice as to how many casks to ship at once. The uncertainties include whether an accident occurs, the amount of radiation released, and whether an efficient evacuation plan exists when and if an accident occurs.

Means objectives are associated with each of the decisions and uncertainties. For example, a means objective is to select the best possible cask, and that might include designing a special kind of cask out of a particular material with appropriate size and wall thickness specifications. Selecting a transportation route that travels through a sparsely populated area is a means objective to reduce potential exposure in the case of an accident. In selecting the number of casks to ship at once, one would want to balance the chance of a larger accident with larger and less frequent shipments.

> In examining the uncertainties, obvious means objectives come to mind. For example, an important means objectives is to reduce the chance of accident, which in turn suggests strict rules for nuclear waste transportation (slow speeds, driving during daylight hours, and special licensing of drivers, additional maintenance of roads along the route, and so on). Reducing the amount of radiation released in an accident and increasing the chance of an efficient evacuation plan being in place suggest the transportation route.

The means objective is very useful in identifying new alternatives. Moreover, using a means-objectives network can ensure that at man aspects of the decision problem as possible are covered; the decision maker can see exactly what the new alternatives help achieve and can perhaps further develop he alternatives to attain a level of balance among the fundamental and means objectives.

The Decision Context

Finally, it is always possible to broaden the decision context as part of the search for new ideas. As argued earlier, part of the creative process requires that the decision maker look at a problem from as many different perspectives as possible, and considering a broader context is guaranteed to reveal a different view of a decision situation.

QUESTIONS:

1. Choose a decision that you currently face. What are your objectives in this situation? List your means objectives, and for each means objective list at least one alternative that could help achieve that objective.

2. In discussing the perceptual block of stereotyping, we used the example of a person with long hair and no necktie applying for a job as an engineer. Did you imagine thins person as male or female? Why? Was there a block involved in your perception? Describe it.

3. The point is often made that formal schooling can actually discourage young children from following their natural curiosity. That curiosity is an important element of creativity, and so it may be the case that schools indirectly and inadvertently are causing children to become less creative than they might be. What does this imply for those of us who have attended school for many years? What can you suggest to today's educators as ways to encourage children to be curious and creative?

4. Describe a situation in which unconscious incubation worked for you. Describe one in which it did not. Can you explain why it worked in the first case but not in the second?

5. One of the technological problems that we face as a society is the increasing use of plastics in disposable items. The plastics dumped in landfills release dioxins (toxic chemical substances) into the soil. Write down five to ten different ways to recycle 5 gallon plastic water containers. Assume that the containers are rinsed out and reasonably clean, but not sterile. Look at your list. Does it reflect fluent thinking, flexible thinking, or both?

Module 11

HOW THE MIND WORKS: FROM DECIDING TO ACTION

What is mind? No matter.
What is matter? Never mind!

- - Homer

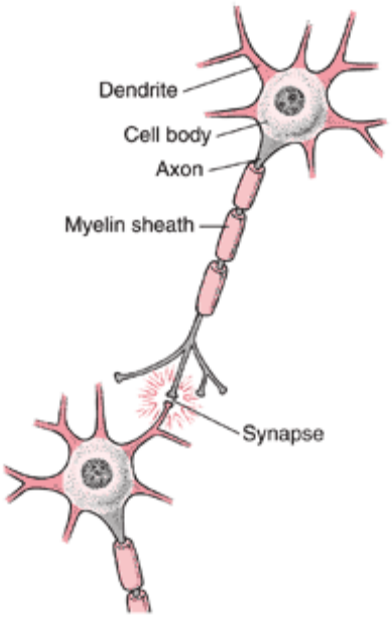
The many debates over mind and matter cover much of the history of human thoughts. The main engaging question, prior to the age of Enlightenment was how a nonphysical (i.e., mind) causes a physical (e.g., movements)?

Behavioral and Brain Sciences

It is a fact that humankind use crude information, such as colors, sounds, etc., in the environment in order to behave in a certain way. When forms of energy we call "stimuli" impose on us our response begins. Creating an inner copy of the information, which is a representation of reality, does this. However this representation is at the service of the "will" in determining our behavior.

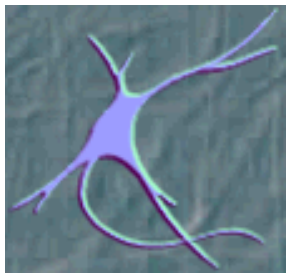
In recent years there have been more interesting studies on the static geometry, i.e., the anatomy of the brain, leading to important testable predictions. However, the valuable progress in the brain/mind problem should be a comparative study in discovering relations between the physical dynamical structures generated by brain activity and the mental/conceptual structures. This includes the topology of subjective time and its alterations in psychopathology.

The brain is made up of billions of nerve cells. The portion of the brain responsible for thought and memory consists primarily of nerve cells, or neurons. Each neuron has three parts, dendrites (inputs), a cell body, and an axon (output) as shown below:



Neurons Are Responsible for Thought and Memory

The dendrites connect to the axons of other neurons. When these other neurons are stimulated, the dendrites convey the signal to the cell body via a synapse or connection, which either excites or inhibits the neuron with a different strength for each synapse:



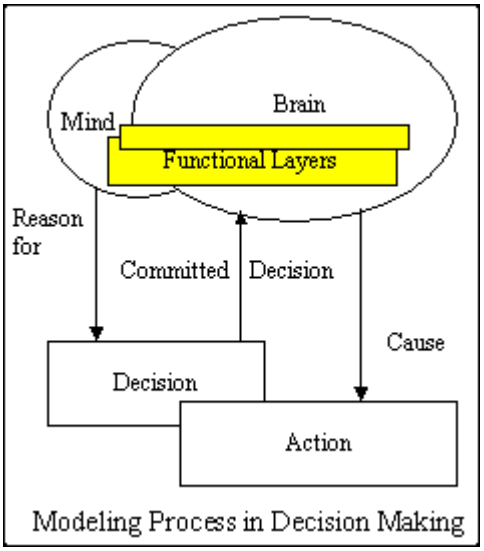
A Snapshot of a Synapse

When the excitation sufficiently outweighs inhibition, the neuron "fires". This sends a signal down its axon, which in turn excites or inhibits other neurons, and perhaps causes a muscle to move.

For at least three reasons, we are interested in knowing how our mind works:

1. Better decisions are made by knowing the mechanism of our mind.
2. Happiness or unhappiness are the states of mind.
3. A better understanding of the mind can lead to setting new priorities as to what is taught/learned.

Mind is what your brain does consciously, recall the often used phrases such as: never mind!, mind the gap, or mind your own business. A strategic thinking process is a neural network process inside our brains through many functional layers. The following figure depicts the brain and mind functionality:



Modeling Process in Decision Making

The focal point of practical reasoning is action, as the focal point of empirical reasoning is observation. Perceptual takings or 'judgments' are the thoughts which typically arise from the impact of the world on our mind through our sensory capacities.

Consciousness thinking is self-knowledge, that is, knowing what you know. Moreover, the process of becoming conscious distributes what you know throughout your brain via the brain neural network branches, i.e., chains of thought. Unlike the connectivity between only two nodes of the network (what we call memorizing), the availability,

and therefore expansion, of what you know throughout your neural network branches makes the information processing of your brain accurate. Thus, you possess a reflective, brilliant mental model of reality. However, one must be cautioned that the way we choose to see the world (i.e., modeling) creates the world we see.

It is necessity to integrate your observations, your experiences, and your knowledge into a mental model. Your duty is whether the model is true or false, whether it represents reality rationally. Unfortunately, it might be a grab-bag of notions snatched at random, whose sources, validity, context and consequences you do not know, notions which, more often than not, you would drop like a hot potato if you knew.

Human beings are basically electrochemically driven membrane processes. We take in oxidant and fuel, we change the form of it, things move through membranes, and we oxygenate our blood - that's how nature works.

Neural connections, shown as the functional layers in the above figure, are formed in the brain at very early times in development, and at first they are present in an immature pattern of wiring that only grossly approximates the adult precision. In order for the adult pattern of connections to form, neural function is necessary. The adult brain consists of about 1 trillion (10^{12})-nerve cells, each connected to at least 20,000 other cells. The possible combinations are greater than the number of molecules in the known universe. Each neuron makes a very stereotyped set of connections with specific partner neurons. Unlike common belief that our mind works like a computer, a useful analogy is to think of nerve cells as rather like a telephone system. Our brains employ a mixture of chemical and electrical signals to send and receive phone calls within the brain. Each nerve cell sends a long process, an axon-like a phone line- to connect itself to other cells that can be located the equivalent of hundreds of miles away. The brain contains well over 1,000 trillion connections.

Learning Defined

Learning can be defined as: *the process of connectivity of the nodes within your neural network of the brain.* The mind is like the stomach. It's not how much you put into it, but how much it digests. Knowledge is the only instrument of production that is not subject to diminishing returns. During brain connectivity development (i.e., education), all these connections have to be formed from scratch-nerve cells are made in different places in the brain by undergoing many successive cell divisions. Then each cell has to spin out its long process towards the appropriate target neurons.

The process is much like stringing phone lines from one city to another-between New York and Philadelphia, for instance. First, trunk lines between the two cities must be laid down. Then, phones at specific addresses within each city need to be wired so that when a specific phone number is dialed, only that phone rings and not the wrong numbers.

The brain first sets down a basic framework of circuits-rather like trunk lines according to strict circuit diagrams determined by a genetic blueprint. Then, long before the adult precise circuits are formed, the "switch" is turned on: brain function itself completes the wiring process by running test patterns on the circuits, thereby selecting correct connections and eliminating errors. Using the phone analogy, it is as if, once the trunk lines are strung between two cities, the first set of phone calls to be placed cause many phones to ring because many connections, including the correct ones, are formed initially. Then, a process of error-correction occurs, in which phoning it eliminates the incorrect connections and strengthens the correct ones.

Special early cell types in the brain place these molecules in specific combinations and locations, and they are sensed molecularly by the growing axon tips of "pioneer" neurons as they spin out the first connections. Once these early connections are formed, neural function begins and neurons signal to each other by sending chemical-electrical

signals over their long distance connections. In the phoning process itself, the frequent use of connections strengthens them with rewards of special nerve growth factors and other signaling molecules. The inappropriate use of wrong connections causes their elimination. It is in this second phase of wiring where experience of the world can have a profound influence on the selection and maintenance of connections.

This observation forms the basis for the classic model of the critical period for brain development. Because different parts of the brain mature at different rates and times, neuroscientists believe there are different critical periods for different functions. A challenge for the future is to learn exactly what those periods are in terms of the specific development of brain circuits, for instance, for language acquisition, or reading.

An initial activity-independent step in which the basic framework of connections is constructed strictly according to the genetic blueprint, followed by a step in which brain function selects and refines from a wealth of possible connections. This second step is a prolonged period that experience can profoundly influence the important details of brain circuitry.

There are just not enough genes to account for the incredible precision of connectivity present in the adult brains (over 1,000 trillion connections). An elegant solution is to "hard wire" the trunk lines with specific molecular guidance clues, but then flip the switch to "on" early and let neural function make the final decisions. And this flexibility in final decision-making, after all, is what lets us adapt to our environment. For example, the brain does not know if it is going to have to learn English, Spanish, or Japanese after birth. An elegant solution to the wiring problem is to establish the fundamental framework of language circuitry using strict molecular mechanisms and then sculpt out the details depending on specific experiences after birth. Without this superb flexibility, we could not learn or remember or adapt to our environment-in short, those properties that make us uniquely human.

Not much useful theory has been developed to explain how "reason for decision" and "cause for action" are related. A primary reason for this lack of knowledge is that reason for decision is treated as a multi-faceted and rich construct, while cause for action is an external manifestation which is subject to interpretation.

Categorization Process of the Memory

Categorization is the cognitive process by which distinct entities are treated as equivalent. It allows us to understand and make predictions about objects and events in our world. The categorization process is based on criteria to group together entities in the same category. These criteria include perceptual or structural similarity, and the commonalties of their elements that provide homogeneity about the entities that belong to them.

The categorization of objects and concepts facilitate a common goal and serve the similar function. As we deepen our understanding of the external world, the representation of concepts and objects changes. Therefore, the categorization process is intimately tied to our new criteria, and the context in which the entities influence the way they are classified.

Persistence of A Model

Mind retains a thought process of a model of an external world for limited duration, unless a new thought replaces it. For example, when someone is talking to you, his/her voice echoes in your mind, till you replace it with new thought. It is evident that the mind retains vision for a split second. This accounts for the fact that when a motion picture flashes a series of progressive images, instead of the mind seeing the flashing of a series of images, it sees the illusion of motion.

Motivation in Making Decisions

The mind is generally unwilling to allocate energy to decisions whose value it is not convinced. The unspoken and even unconscious questions "what is it good for?" and "will I be able to do that?" can frequently confuse our efforts to take in a decision.

Information Versus Knowledge

Information is a commodity capable of yielding knowledge. Knowledge is information-produced by self. Information possesses a meaning which can only be interpreted in the light of knowledge. Purposeful action is based, not on information, but on knowledge. There are two types of knowledge: knowing that, and know how. We all know that 12X12 = 144. "Knowing how" is more critical since it captures "knowledge about" rather than "knowledge of" which belongs to memory. "Knowing how" requires systematic study and reflection, judgment, proposition, testing, and its integration with some other relevant forms of know-how. "Knowing how" is an ultimate source of strategic advantage within the organizational systems of the firm. Simply knowing how is not enough, because there might be other ways of achieving the same goal. For example, Nissan's plants in Japan, Mexico and the US use different mixes of technology and labor to create the same cars with almost similar overall productivity.

Knowledge base which is a set of facts and rules (such as, if-then-else) obtained from experience and stored in our memory. Knowledge isn't how much you have committed to memory. It's being able to differentiate between what you do know and what you don't. It's the correct connectivity of the brain neural networks and how wide these networks are.

As we age, we use different parts of the brain for memory tasks. Recent studies have found that older adults use their frontal cortex for simple short-term memory tasks. Younger people use that area for complex short-term memory tasks. Older adults also activate both

hemispheres for spatial memory; younger people use the left hemisphere.

Inference is a part of neural network of our brains that analyzes available data and the facts and rules stored in the knowledge base of the brain.

Understanding is the integrated mind that is able to span the relevant functional areas across the brain by the neural network connectivity. What is it indeed that gives us the feeling of elegance in understanding? It is the harmony of the diverse parts, their symmetry, their happy balance; in a word it is all that introduces order, all that gives unity, that permits us to see clearly and to comprehend at once both the ensemble and the details.

Non-sensory experiences represent almost all context information in consciousness. They condition most aspects of conscious cognition including voluntary retrieval, perception, monitoring, problem solving, emotion, and evaluation, meaning recognition. Many peculiar aspects of non-sensory qualitative context that resist being 'grasped' by an act of attention, are explained as adaptations shaped by the cognitive functions they serve. The most important non-sensory experience is coherence or "rightness." Rightness represents degrees of context fit among contents in consciousness, and between conscious and non-conscious processes. Rightness (not familiarity) is the feeling-of-knowing in implicit cognition. The experience of rightness suggests that neural mechanisms "compute" signals indicating the global dynamics of the neural network integration.

Understanding is the ability to give meaning. In other words, understanding is possible only by an anticipation of meaning which it constitutes interconnectivity of a specific and limited neural networks. The interconnectivity exhausts itself to a resourceful finite thought called understanding. This implies that, if it takes a lot of words to say what you have in mind, give it more thought.

Consecutive strategic thinking is a process which does not allow you to go out of the boundary of the subject of your thought. This focusing process should be taught at an early education. For example, a student in the class can be called upon to talk for five minutes about his/her uncle, when he/she goes out of the boundary and talks about uncles' neighbor for too long the class will shout "you are out of focus"

Focusing on one-thing-at-a-time the prefrontal cortex and other key areas of the brain handle tasks like a browser. When doing two things, those parts of the brain repeatedly switch from one task to another. Therefore, it's better to do one thing at a time rather than three things at once. Otherwise, your lost time when moving from one task to another increases even more with the complexity of the problem. Since activating the rules for each task takes several tenths of a second, therefore multitasking, in the end, takes more time than doing one thing at a time.

Why do we need to analyze? We need analysis because our minds think about specific and limited ways, one thing at a time. Then, after the analysis process, we synthesize what belongs together to see the whole or to solve the problem. There are different moods of knowledge such as: symbolic knowledge, declarative knowledge, representation, and procedural knowledge. For example, symbolic knowledge is needed for development of mathematical and statistical thinking.

Experiences and feelings are inherently conscious states. There is something it is like to feel pain, to have an itch, to experience bright red. Philosophers call this sort of consciousness "phenomenal consciousness." Even though phenomenal consciousness seems to be a relatively primitive matter, something more widespread in nature than higher-order or reflective consciousness, it is deeply puzzling.

Why are people different? We are all different because we all have different history. Thoughts and emotions give us a sense of continuity, our identities, create our conscious selves, our personalities which are not "localized" components of the brain, but are a function of the

organism's life-history, cumulative experience, the totality of memories stored, recollected, analyzed, modified, and retained in the physical configurations of the network-connectivity in the brain.

Experience includes the collection of all the mistakes we have made in the past. Recently, a manager was asked if he was going to fire an employee who made a mistake that cost the company $600,000. No, the manager replied, "I just spent $600,000 training him. Why would I want somebody to hire his experience."

Roots of Decision Making

The West was born 500 years ago when Europe broke free of the centralized control of the Roman Catholic Church. Self and consciousness has diverse perspectives, including, Psychology, Sociology, Philosophy, Neuroscience, Cognitive Science, and Media Studies, etc. The active topics relevant to decision making in these areas are:

- Where we came from: Self and consciousness in pre-human species. Are humans really unique? and through human history is there something special about modern self and consciousness?
- Where we are now: Humans as biological beasts and cognitive creatures—The brain and mind as biological and cognitive systems underlying self and consciousness.
- Where we are now: Humans as social beings—The social underpinnings of self and consciousness, including how self and consciousness emerge in face-to-face interactions over the course of development and how societal belief systems impact and often disturb the self and consciousness of individuals.
- Where we might go: Where humans will likely go in the future, including how human selves and consciousness might be changed by interacting with computers and related electronic media.

Perception of color, sounds and their physical reality: We see colors for a purpose and the act of seeing is part of what the later Wittgenstein

called a language game. For instance, a good apple is an edible color, so it is wrong to reduce colors to waves, as their function is much wider. The same applies to sounds and airwaves; the growl of a bear is not really airwaves in the wider context of danger. Because they serve a functional purpose, sensible images cannot be reduced to isolated scientific facts but exist in their own right as primaries. Their perception is usually right because of evolution, whether we consider colors as wavelengths, or photon's states energy. The brain's perceived image and sound are a construct put together according to what we "expect" to see or hear.

Deciding Among Models

Suppose you decide to use a model for a particular process for making concrete decisions about your own life and those of others, who may be affected, directly or indirectly, by your decisions, that is the ultimate reason why we have models? We create some models de novo from our own experience, but most we learn from external sources, including formal education.

Now, supposing one is presented with two apparently competing models of a process. One of them (A) has more objective evidence for its validity in the form of scientifically controlled studies, ability to be mathematically confirmed, reliable historical documentation, endorsement by experts in the field, and so forth. The other (B) is untested and perhaps un-testable, and is endorsed by people with less impressive pedigrees. However, based on your limited experience, applying model B in cases where the two differ in their recommendations produces a better result.

Questions:

1. Why should we be interested in learning how our mind works?
2. What is learning? How does a person learn?
3. What is categorization?
4. What is persistence of a model?
5. What is knowledge? What are the two types of knowledge?
6. Why do we need to analyze?
7. What are the active topics relevant to decision making?

Module 12

DECISION MAKING TOOLS

The techniques in this module will help you to make the best decisions possible with the information you have available. With these tools you will be able to map out the likely consequences of decisions, work out the importance of individual factors, and choose the best course of action to take.

Tools to be discussed are:

- **Pareto Analysis.** Selecting the most important changes to make.
- **Paired Comparison Analysis.** Evaluating the relative importance of different options.
- **Grid Analysis.** Selecting between good options.
- **Decision Trees.** Choosing between options by projecting likely outcomes.
- **PMI.** Weighing the pros and cons of a decision.
- **Force Field Analysis.** Analyzing the pressures for and against change.
- **Six Thinking Hats.** Looking at a decision from all points of view.
- **Cost/Benefit Analysis.** Seeing whether a change is worth making.

In this module we will look at a set of good techniques that help you to select between different options. These are very useful when you have to take a go/no-go decision. This part finishes by discussing Decision Trees, which are excellent Decision Making tools. If you are suffering from decidophobia, these tools will get you moving again.

Do remember, though, that the tools in this module exist only to assist your intelligence and common sense. These are your most important assets in good Decision Making.

Pareto Analysis - Choosing the Most Important Changes to Make

Pareto analysis is a very simple technique that helps you to choose the most effective changes to make.

It uses the Pareto principle - the idea that by doing 20% of work you can generate 80% of the advantage of doing the entire job. Pareto analysis is a formal technique for finding the changes that will give the biggest benefits. It is useful where many possible courses of action are competing for your attention.

How to use tool:

To start using the tool, write out a list of the changes you could make. If you have a long list, group it into related changes.

Then score the items or groups. The scoring method you use depends on the sort of problem you are trying to solve. For example, if you are trying to improve profitability, you would score options on the basis of the profit each group might generate. If you are trying to improve customer satisfaction, you might score on the basis of the number of complaints eliminated by each change.

The first change to tackle is the one that has the highest score. This one will give you the biggest benefit if you solve it.

The options with the lowest scores will probably not even be worth bothering with - solving these problems may cost you more than the solutions are worth.

Example:

A manager has taken over a failing service center. He commissions research to find out why customers think that service is poor.

He gets the following comments back from the customers:

1. Phones are only answered after many rings.
2. Staff seem distracted and under pressure.
3. Engineers do not appear to be well organized. They need second visits to bring extra parts. This means that customers have to take more holidays to be there a second time.
4. They do not know what time they will arrive. This means that customers may have to be in all day for an engineer to visit.
5. Staff members do not always seem to know what they are doing.

6. Sometimes when staff members arrive, the customer finds that the problem could have been solved over the phone.

The manager groups these problems together. He then scores each group by the number of complaints, and orders the list:

- *Lack of staff training:* items 5 and 6: 51 complaints
- *Too few staff*: items 1, 2 and 4: 21 complaints
- *Poor organization and preparation:* item 3: 2 complaints

By doing the Pareto analysis above, the manager can better see that the vast majority of problems (69%) can be solved by improving staff skills.

Once this is done, it may be worth looking at increasing the number of staff members. Alternatively, as staff members become more able to solve problems over the phone, maybe the need for new staff members may decline.

It looks as if comments on poor organization and preparation may be rare, and could be caused by problems beyond the manager's control.

By carrying out a Pareto Analysis, the manager is able to focus on training as an issue, rather than spreading effort over training, taking on new staff members, and possibly installing a new computer system.

Key points:

Pareto Analysis is a simple technique that helps you to identify the most important problem to solve.

To use it:

- List the problems you face, or the options you have available
- Group options where they are facets of the same larger problem
- Apply an appropriate score to each group
- Work on the group with the highest score

Pareto analysis not only shows you the most important problem to solve, it also gives you a score showing how severe the problem is.

Paired Comparison Analysis - Working Out the Relative Importance of Different Options

Paired Comparison Analysis helps you to work out the importance of a number of options relative to each other. It is particularly useful where you do not have objective data to base this on.

This makes it easy to choose the most important problem to solve, or select the solution that will give you the greatest advantage. Paired Comparison Analysis helps you to set priorities where there are conflicting demands on your resources.

It is also an ideal tool for comparing "apples with oranges" - completely different options such as whether to invest in marketing, a new IT system or a new piece of machinery. These decisions are usually much harder than comparing three possible new IT systems, for example.

How to use tool:

To use the technique, you will be needing a worksheet. You can use this to compare each option with each other option, one-by-one. For each comparison, you will decide which of the two options is most important, and then assign a score to show how much more important it is.

Follow these steps to use the technique:

1. List the options you will compare. Assign a letter to each option.
2. Mark the options as row and column headings on the worksheet.
3. Within the cells compare the option in the row with the one in the column. For each cell, decide which of the two options is more important. Write down the letter of the more important option in the cell, and score the difference in importance from 0 (no difference) to 3 (major difference).

4. Finally, consolidate the results by adding up the total of all the values for each of the options. You may want to convert these values into a percentage of the total score.

Example:

As a simple example, an entrepreneur is looking at ways in which she can expand her business. She has limited resources, but also has the options she lists below:

- Expand into overseas markets
- Expand in home markets
- Improve customer service
- Improve quality

Firstly she draws up the Paired Comparison Analysis table in Figure 1:

Figure 1: Example Paired Comparison Analysis Table (not filled in):

	Overseas Market (A)	Home Market (B)	Customer Service (C)	Quality (D)
Overseas Market (A)	Blocked Out (Step 3)			
Home Market (B)	Blocked Out (Step 4)	Blocked Out (Step 3)		
Customer Service (C)	Blocked Out (Step 4)	Blocked Out (Step 4)	Blocked Out (Step 3)	
Quality (D)	Blocked Out (Step 4)	Blocked Out (Step 4)	Blocked Out (Step 4)	Blocked Out (Step 3)

Then she compares options, writes down the letter of the most

important option, and scores their difference in importance. An example of how she might do this is shown in figure 2:

Figure 2: Example Paired Comparison Analysis Table (filled in):

	Overseas Market (A)	Home Market (B)	Customer Service (C)	Quality (D)
Overseas Market (A)		A,2	C,1	A,1
Home Market (B)			C,1	B,1
Customer Service (C)				C,2
Quality (D)				

Finally she adds up the A, B, C and D values, and converts each into a percentage of the total. This gives these totals:

- A = 3 (37.5%)
- B = 1 (12.5%)
- C = 4 (50%)
- D = 0.

Here it is most important to improve customer service (C) and then to tackle export markets (A). Quality is not a high priority - perhaps it is good already.

Key points:

Paired Comparison Analysis is a good way of weighing up the relative importance of different courses of action. It is useful where priorities are not clear, or are competing in importance.

The tool provides a framework for comparing each course of action against all others, and helps to show the difference in importance between factors.

Grid Analysis - Making a Choice Where Many Factors must be Balanced

Grid Analysis (also known as Decision Matrix analysis, Pugh Matrix analysis or MAUT which stands for Multi-Attribute Utility Theory) is a useful technique to use for making a decision. Decision matrices are most effective where you have a number of good alternatives and many factors to take into account.

How to use tool:

The first step is to list your options and then the factors that are important for making the decision. Then use a worksheet. Lay the options out on the worksheet table, with options as the row labels, and factors as the column headings.

Next, work out the relative importance of the factors in your decision. Show these as numbers. We will use these to weight your preferences by the importance of the factor. These values may be obvious. If they are not, then use a technique such as Paired Comparison Analysis to estimate them.

The next step is to work your way across your table, scoring each option for each of the important factors in your decision. Score each option from 0 (poor) to 3 (very good). Note that you do not have to have a different score for each option - if none of them are good for a particular factor in your decision, then all options should score 0.

Now multiply each of your scores by the values for your relative importance. This will give them the correct overall weight in your decision.

Finally add up these weighted scores for your options. The option that scores the highest wins!

Example:

A windsurfing enthusiast is about to replace his car. He needs one that not only carries a board and sails, but also that will be good for business travel. He has always loved open-topped sports cars. No car he can find is good for all three things.

His options are:

- A four wheel drive (4x4), hard topped vehicle
- A comfortable 'family car'
- An estate car
- A sports car

Criteria that he wants to consider are:

- Cost
- Ability to carry a sail board at normal driving speed
- Ability to store sails and equipment securely
- Comfort over long distances
- Fun!
- Nice look and build quality to car

Firstly he draws up the table shown in Figure 1, and scores each option by how well it satisfies each factor:

Figure 1: Example Grid Analysis Showing <u>Unweighted</u> Assessment of How Each Type of Car Satisfies Each Factor

Factors:	**Cost**	**Board**	**Storage**	**Comfort**	**Fun**	**Look**	**Total**
Weights:							
Sports Car	1	0	0	1	3	3	
4x4	0	3	2	2	1	1	
Family Car	2	2	1	3	0	0	
Estate Car	2	3	3	3	0	1	

Next he decides the relative weights for each of the factors. He multiplies these by the scores already entered, and totals them. This is shown in Figure 2:

Figure 2: Example Grid Analysis Showing <u>Weighted</u> Assessment of How Each Type of Car Satisfies Each Factor

Factors:	**Cost**	**Board**	**Storage**	**Comfort**	**Fun**	**Look**	**Total**
Weights:	**4**	**5**	**1**	**2**	**3**	**4**	
Sports Car	4	0	0	2	9	12	**27**
4x4	0	15	2	4	3	4	**28**
Family Car	8	10	1	6	0	0	**25**
Estate Car	8	15	3	6	0	4	**36**

This gives an interesting result: Despite its lack of fun, an estate car may be the best choice.

If the wind-surfer still feels unhappy with the decision, maybe he has underestimated the importance of one of the factors. Perhaps he should weight 'fun' by 7!

Key points:

Grid Analysis helps you to decide between several options, while taking many different factors into account.

To use the tool, lay out your options as rows on a table. Set up the columns to show your factors. Allocate weights to show the importance of each of these factors. Score each choice for each factor using numbers from 0 (poor) to 3 (very good). Multiply each score by the weight of the factor, to show its contribution to the overall selection. Finally add up the total scores for each option. Select the highest scoring option.

Grid Analysis is the simplest form of Multiple Criteria Decision Analysis (MCDA), also known as Multiple Criteria Decision Aid or Multiple Criteria Decision Management (MCDM). Sophisticated MCDA is involves highly complex modeling of different potential scenarios and advanced mathematics.

Decision Tree Analysis - Choosing Between Options by Projecting Likely Outcomes

Decision Trees are excellent tools for helping you to choose between several courses of action. They provide a highly effective structure within which you can lay out options and investigate the possible outcomes of choosing those options. They also help you to form a balanced picture of the risks and rewards associated with each possible course of action.

How to use tool:

You start a Decision Tree with a decision that you need to make. Draw a small square to represent this towards the left of a large piece of paper.

From this box draw out lines towards the right for each possible solution, and write that solution along the line. Keep the lines apart as far as possible so that you can expand your thoughts.

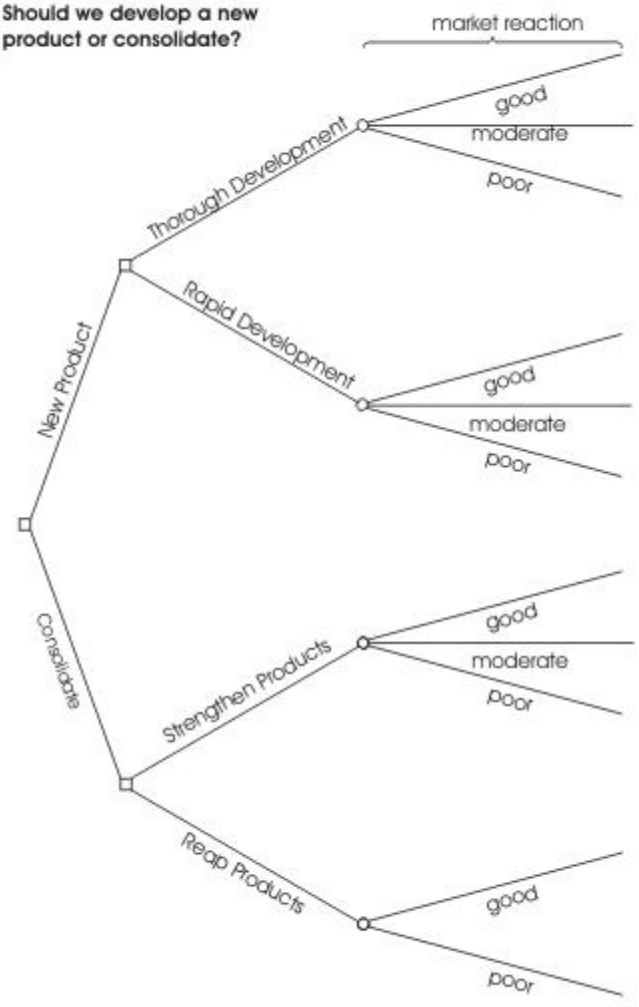
At the end of each line, consider the results. If the result of taking that decision is uncertain, draw a small circle. If the result is another decision that you need to make, draw another square. Squares represent decisions, and circles represent uncertain outcomes. Write the decision or factor above the square or circle. If you have completed the solution at the end of the line, just leave it blank.

Starting from the new decision squares on your diagram, draw out lines representing the options that you could select. From the circles draw lines representing possible outcomes. Again make a brief note on the line saying what it means. Keep on doing this until you have drawn out as many of the possible outcomes and decisions as you can see leading on from the original decisions.

An example of the sort of thing you will end up with is shown in Fig. 1:

Once you have done this, review your tree diagram. Challenge each square and circle to see if there are any solutions or outcomes you have not considered. If there are, draw them in. If necessary, redraft your tree if parts of it are too congested or untidy. You should now have a good understanding of the range of possible outcomes of your decisions.

Figure 1:
Example Decision Tree:
Should we develop a new product or consolidate?



Evaluating Your Decision Tree

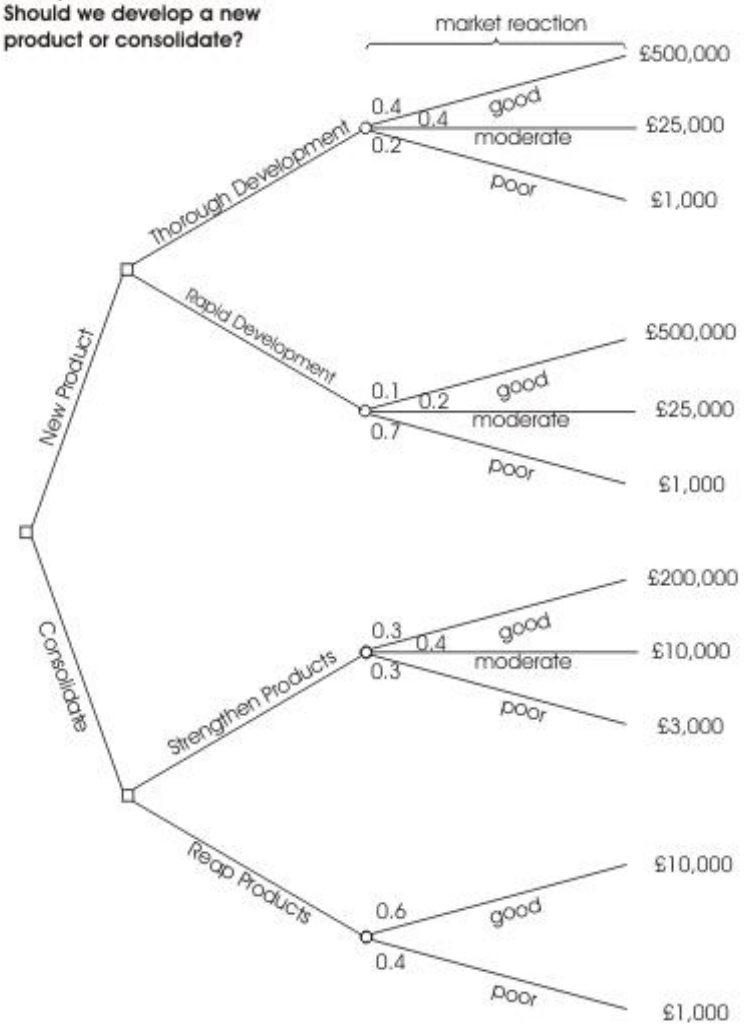
Now you are ready to evaluate the decision tree. This is where you can work out which option has the greatest worth to you. Start by assigning a cash value or score to each possible outcome. Estimate how much you think it would be worth to you if that outcome came about.

Next look at each circle (representing an uncertainty point) and estimate the probability of each outcome. If you use percentages, the total must come to 100% at each circle. If you use fractions, these must add up to 1. If you have data on past events you may be able to

make rigorous estimates of the probabilities. Otherwise write down your best guess.

This will give you a tree like the one shown in Figure 2:

Figure 2
Example Decision Tree:
Should we develop a new product or consolidate?



Calculating Tree Values

Once you have worked out the value of the outcomes, and have assessed the probability of the outcomes of uncertainty, it is time to start calculating the values that will help you make your decision.

Start on the right hand side of the decision tree, and work back towards the left. As you complete a set of calculations on a node

(decision square or uncertainty circle), all you need to do is to record the result. You can ignore all the calculations that lead to that result from then on.

Calculating the Value of Uncertain Outcome Nodes

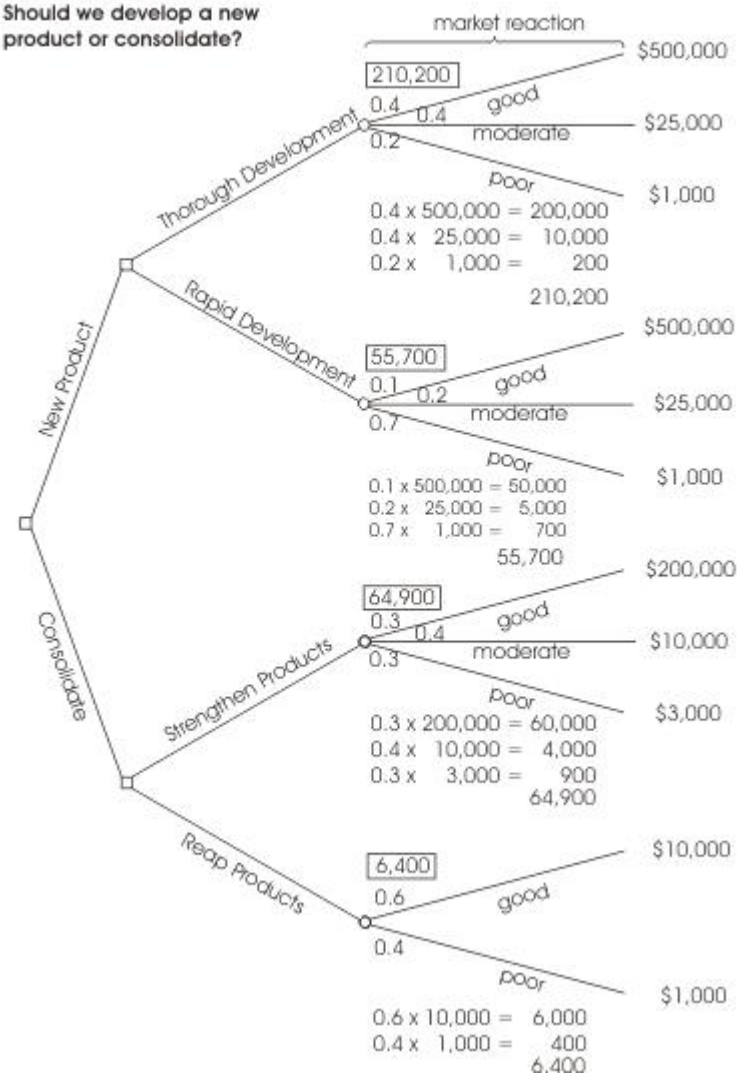
Where you are calculating the value of uncertain outcomes (circles on the diagram), do this by multiplying the value of the outcomes by their probability. The total for that node of the tree is the total of these values.

In the example in Figure 2, the value for 'new product, thorough development' is:

0.4 (probability good outcome) x £500,000 (value) =	£200,000
0.4 (probability moderate outcome) x £25,000 (value) =	£10,000
0.2 (probability poor outcome) x £1,000 (value) =	£200
+	**£210,200**

Figure 3 shows the calculation of uncertain outcome nodes:

Figure 3
Example Decision Tree:
Should we develop a new product or consolidate?



Note that the values calculated for each node are shown in the boxes.

Calculating The Value of Decision Nodes

When you are evaluating a decision node, write down the cost of each option along each decision line. Then subtract the cost from the outcome value that you have already calculated. This will give you a value that represents the benefit of that decision. Note that amounts already spent do not count for this analysis - these are 'sunk costs' and (despite emotional counter-arguments) should not be factored into the decision.

When you have calculated these decision benefits, choose the option that has the largest benefit, and take that as the decision made. This is the value of that decision node.

Figure 4 shows this calculation of decision nodes in our example:

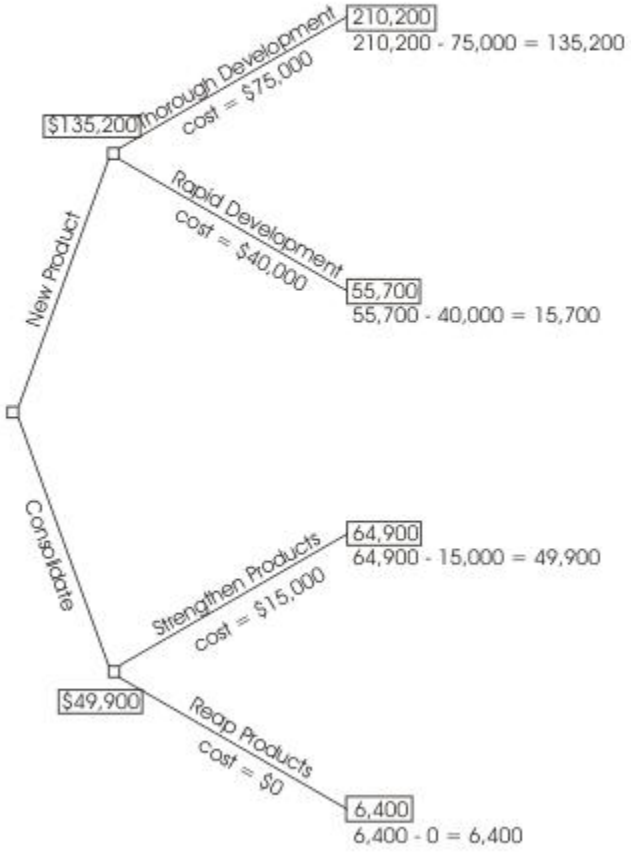
In this example, the benefit we previously calculated for 'new product, thorough development' was £210,000. We estimate the future cost of this approach as £75,000. This gives a net benefit of £135,000.

The net benefit of 'new product, rapid development' was £15,700. On this branch we therefore choose the most valuable option, 'new product, thorough development', and allocate this value to the decision node.

Result:

By applying this technique we can see that the best option is to develop a new product. It is worth much more to us to take our time and get the product right, than to rush the product to market. It is better just to improve our existing products than to botch a new product, even though it costs us less.

Figure 4:
Example Decision Tree:
Should we develop a new product or consolidate?



Key points:

Decision trees provide an effective method of Decision Making because they:

- Clearly lay out the problem so that all options can be challenged
- Allow us to analyze fully the possible consequences of a decision
- Provide a framework to quantify the values of outcomes and the probabilities of achieving them
- Help us to make the best decisions on the basis of existing information and best guesses.

As with all Decision Making methods, decision tree analysis should be used in conjunction with common sense - decision trees are just one important part of your Decision Making tool kit.

Many other similar techniques are explained in the book Management Science by Wayne Winston and Christian Albright - this is reviewed at the top of our right hand side bar.

PMI – Weighing the Pros and Cons of a Decision

PMI stands for 'Plus/Minus/Interesting'. It is a valuable improvement to the 'weighing pros and cons' technique used for centuries.

PMI is an important Decision Making tool: the mind tools used so far in this section have focused on selecting a course of action from a range of options. Before you move straight to action on this course of action, it is important to check that it is going to improve the situation (it may actually be best to do nothing!) PMI is a useful tool for doing this.

How to use tool:

To use PMI, download our free worksheet. In the column underneath 'Plus', write down all the positive results of taking the action. Underneath 'Minus' write down all the negative effects. In the 'Interesting' column write down the implications and possible

outcomes of taking the action, whether positive, negative, or uncertain.

By this stage it may already be obvious whether or not you should implement the decision. If it is not, consider each of the points you have written down and assign a positive or negative score to it appropriately. The scores you assign may be quite subjective.

Once you have done this, add up the score. A strongly positive score shows that an action should be taken, a strongly negative score that it should be avoided.

Example:

A young professional is deciding where to live. Her question is 'Should she move to the big city?' She draws up the PMI table below:

Plus	Minus	Interesting
More going on (+5)	Have to sell house (-6)	Easier to find new job? (+1)
Easier to see friends (+5)	More pollution (-3)	Meet more people? (+2)
Easier to get places (+3)	Less space (-3)	More difficult to get own work done? (-4)
	No countryside (-2)	
	More difficult to get to work? (-4)	
+13	**-18**	**-1**

She scores the table as 13 (Plus) - 18 (Minus) - 1 (Interesting) = - 6

For her, the comforts of a settled rural existence outweigh the call of the 'bright lights' - it would be much better for her to live outside the city, but close enough to travel in if necessary.

PMI was codified by Edward de Bono in his book Serious Creativity.

Key points:

PMI is a good way of weighing the pros, cons and implications of a decision. When you have selected a course of action, PMI is a good technique to use to check that it is worth taking.

To use the technique, draw up a table with three columns headed Plus, Minus and Interesting. Within the table write down all the positive points of following the course of action, all the negatives, and all the interesting implications and possible outcomes.

If the decision is still not obvious, you can then score the table to show the importance of individual items. The total score should show whether it is worth implementing the decision.

Force Field Analysis – Understanding the Pressures For and Against Change

Force Field Analysis is a useful technique for looking at all the forces for and against a decision. In effect, it is a specialized method of weighing pros and cons.

By carrying out the analysis you can plan to strengthen the forces supporting a decision, and reduce the impact of opposition to it.

How to Use the Tool:

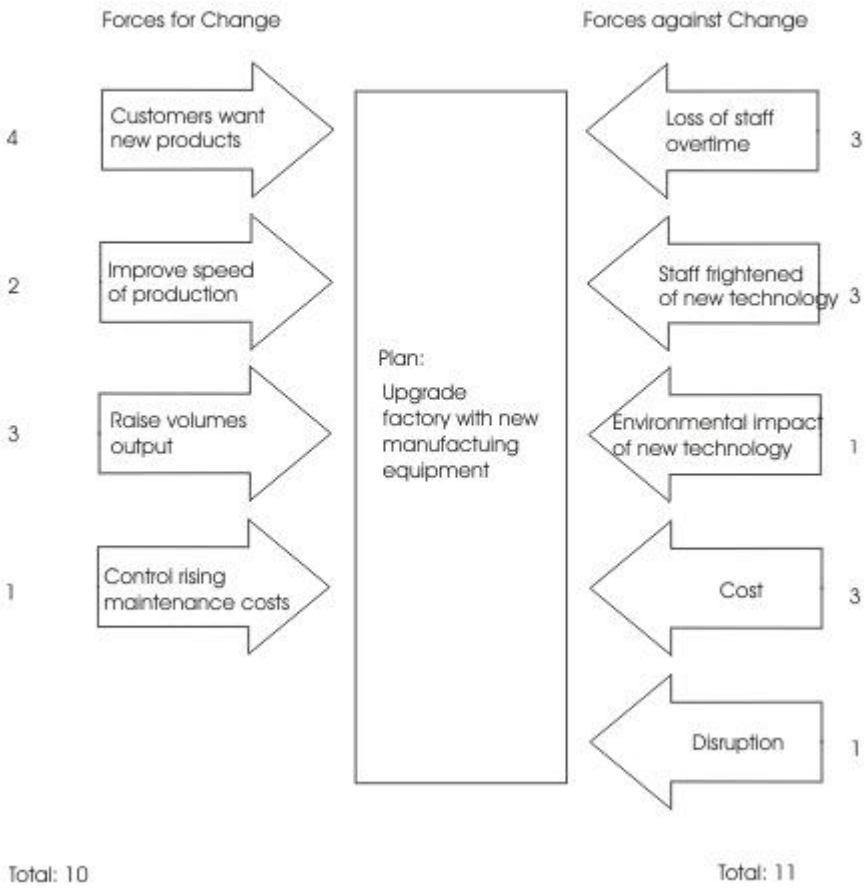
To carry out a force field analysis, first download our free worksheet and then use it to follow these steps:

- Describe your plan or proposal for change in the middle.
- List all forces for change in one column, and all forces against change in another column.

Assign a score to each force, from 1 (weak) to 5 (strong).

For example, imagine that you are a manager deciding whether to install new manufacturing equipment in your factory. You might draw up a force field analysis like the one in Figure 1:

Figure 1
Force Field Analysis Example



Once you have carried out an analysis, you can decide whether your project is viable. In the example above, you might initially question whether it is worth going ahead with the plan.

Where you have already decided to carry out a project, Force Field Analysis can help you to work out how to improve its probability of success. Here you have two choices:

- To reduce the strength of the forces opposing a project, or
- To increase the forces pushing a project

Often the most elegant solution is the first: just trying to force change through may cause its own problems. People can be uncooperative if change is forced on them.

If you had to implement the project in the example above, the analysis might suggest a number of changes to the initial plan:

- By training staff (increase cost by 1) you could eliminate fear of technology (reduce fear by 2)
- It would be useful to show staff that change is necessary for business survival (new force in favor, +2)
- Staff could be shown that new machines would introduce variety and interest to their jobs (new force, +1)
- You could raise wages to reflect new productivity (cost +1, loss of overtime -2)
- Slightly different machines with filters to eliminate pollution could be installed (environmental impact -1)

These changes would swing the balance from 11:10 (against the plan), to 8:13 (in favor of the plan).

Key points:

Force Field Analysis is a useful technique for looking at all the forces for and against a plan. It helps you to weigh the importance of these factors and decide whether a plan is worth implementing.

Where you have decided to carry out a plan, Force Field Analysis helps you identify changes that you could make to improve it.

Six Thinking Hats – Looking at a Decision From All Points of View

'Six Thinking Hats' is a powerful technique that helps you look at important decisions from a number of different perspectives. It helps you make better decisions by forcing you to move outside your habitual ways of thinking. As such, it helps you understand the full complexity of the decision, and spot issues and opportunities to which you might otherwise be blind.

This tool was created by Edward de Bono in his book '6 Thinking Hats'.

Many successful people think from a very rational, positive viewpoint. This is part of the reason that they are successful. Often, though, they may fail to look at a problem from an emotional, intuitive, creative or negative viewpoint. This can mean that they underestimate resistance to plans, fail to make creative leaps and do not make essential contingency plans.

Similarly, pessimists may be excessively defensive, and more emotional people may fail to look at decisions calmly and rationally.

If you look at a problem with the 'Six Thinking Hats' technique, then you will solve it using all approaches. Your decisions and plans will mix ambition, skill in execution, sensitivity, creativity and good contingency planning.

How to Use the Tool:

You can use the Six Thinking Hats technique in meetings or on your own. In meetings it has the benefit of blocking the confrontations that happen when people with different thinking styles discuss the same problem.

Each 'Thinking Hat' is a different style of thinking. These are explained below:

- **White Hat:** With this thinking hat you focus on the data available. Look at the information you have, and see what you can learn from it. Look for gaps in your knowledge, and either try to fill them or take account of them. This is where you analyze past trends, and try to extrapolate from historical data.

- **Red Hat:** 'Wearing' the red hat, you look at problems using intuition, gut reaction, and emotion. Also try to think how other people will react emotionally. Try to understand the responses of people who do not fully know your reasoning.

- **Black Hat:** Using black hat thinking, look at all the bad points of the decision. Look at it cautiously and defensively. Try to see why it might not work. This is important because it highlights the weak

points in a plan. It allows you to eliminate them, alter them, or prepare contingency plans to counter them.

Black Hat thinking helps to make your plans 'tougher' and more resilient. It can also help you to spot fatal flaws and risks before you embark on a course of action. Black Hat thinking is one of the real benefits of this technique, as many successful people get so used to thinking positively that often they cannot see problems in advance. This leaves them under-prepared for difficulties.

- **Yellow Hat:** The yellow hat helps you to think positively. It is the optimistic viewpoint that helps you to see all the benefits of the decision and the value in it. Yellow Hat thinking helps you to keep going when everything looks gloomy and difficult.

- **Green Hat:** The Green Hat stands for creativity. This is where you can develop creative solutions to a problem. It is a freewheeling way of thinking, in which there is little criticism of ideas. A whole range of creativity tools can help you here.

- **Blue Hat:** The Blue Hat stands for process control. This is the hat worn by people chairing meetings. When running into difficulties because ideas are running dry, they may direct activity into Green Hat thinking. When contingency plans are needed, they will ask for Black Hat thinking, etc.

  A variant of this technique is to look at problems from the point of view of different professionals (e.g. doctors, architects, sales directors, etc.) or different customers.

Example:

The directors of a property company are looking at whether they should construct a new office building. The economy is doing well, and the amount of vacant office space is reducing sharply. As part of their decision they decide to use the 6 Thinking Hats technique during a planning meeting.

Looking at the problem with the White Hat, they analyze the data they have. They examine the trend in vacant office space, which shows a sharp reduction. They anticipate that by the time the office block would be completed, that there will be a severe shortage of office space. Current government projections show steady economic growth for at least the construction period.

With Red Hat thinking, some of the directors think the proposed building looks quite ugly. While it would be highly cost-effective, they worry that people would not like to work in it.

When they think with the Black Hat, they worry that government projections may be wrong. The economy may be about to enter a 'cyclical downturn', in which case the office building may be empty for a long time.

If the building is not attractive, then companies will choose to work in another better-looking building at the same rent.

With the Yellow Hat, however, if the economy holds up and their projections are correct, the company stands to make a great deal of money.

If they are lucky, maybe they could sell the building before the next downturn, or rent to tenants on long-term leases that will last through any recession.

With Green Hat thinking they consider whether they should change the design to make the building more pleasant. Perhaps they could build prestige offices that people would want to rent in any economic climate. Alternatively, maybe they should invest the money in the short term to buy up property at a low cost when a recession comes.

The Blue Hat has been used by the meeting's Chair to move between the different thinking styles. He or she may have needed to keep other members of the team from switching styles, or from criticizing other peoples' points.

Key points:

Six Thinking Hats is a good technique for looking at the effects of a decision from a number of different points of view.

It allows necessary emotion and skepticism to be brought into what would otherwise be purely rational decisions. It opens up the opportunity for creativity within Decision Making. The technique also helps, for example, persistently pessimistic people to be positive and creative.

Plans developed using the '6 Thinking Hats' technique will be sounder and more resilient than would otherwise be the case. It may also help you to avoid public relations mistakes, and spot good reasons not to follow a course of action before you have committed to it.

Cost/Benefit Analysis – Evaluating Quantitatively Whether to Follow a Course of Action

You may have been intensely creative in generating solutions to a problem, and rigorous in your selection of the best one available. However, this solution may still not be worth implementing, as you may invest a lot of time and money in solving a problem that is not worthy of this effort.

Cost Benefit Analysis or CBA is a relatively simple and widely used technique for deciding whether to make a change. As its name suggests, you simply add up the value of the benefits of a course of action, and subtract the costs associated with it.

Costs are either one-off, or may be ongoing. Benefits are most often received over time. We build this effect of time into our analysis by calculating a payback period. This is the time it takes for the benefits of a change to repay its costs. Many companies look for payback over a specified period of time e.g. three years.

How to use tool:

In its simple form, cost-benefit analysis is carried out using only financial costs and financial benefits. For example, a simple cost

benefit ration for a road scheme would measure the cost of building the road, and subtract this from the economic benefit of improving transport links. It would not measure either the cost of environmental damage or the benefit of quicker and easier travel to work.

A more sophisticated approach to building a cost benefit models is to try to put a financial value on intangible costs and benefits. This can be highly subjective - is, for example, a historic water meadow worth $25,000, or is it worth $500,000 because if its environmental importance? What is the value of stress-free travel to work in the morning?

These are all questions that people have to answer, and answers that people have to defend.

The version of the cost benefit approach we explain here is necessarily simple. Where large sums of money are involved (for example, in financial market transactions), project evaluation can become an extremely complex and sophisticated art.

Example:

A sales director is deciding whether to implement a new computer-based contact management and sales processing system. His department has only a few computers, and his salespeople are not computer literate. He is aware that computerized sales forces are able to contact more customers and give a higher quality of reliability and service to those customers. They are more able to meet commitments, and can work more efficiently with fulfillment and delivery staff.

His financial cost/benefit analysis is shown below:

Costs:

New computer equipment:

- 10 network-ready PCs with supporting software @ $1,225 each
- 1 server @ $1,750
- 3 printers @ $600 each
- Cabling & Installation @ $2300
- Sales Support Software @ $7500

Training costs:

- Computer introduction - 8 people @ $ 200 each
- Keyboard skills - 8 people @ $ 200 each

Sales Support System - 12 people @ $350 each

Other costs:

- Lost time: 40 man days @ $ 100 / day
- Lost sales through disruption: estimate: $10,000
- Lost sales through inefficiency during first months: estimate: $10,000

Total cost: $55,800

Benefits:

- Tripling of mail shot capacity: estimate: $20,000 / year
- Ability to sustain telesales campaigns: estimate: $10,000 / year
- Improved efficiency and reliability of follow-up: estimate: $25,000 / year
- Improved customer service and retention: estimate: $15,000 / year
- Improved accuracy of customer information: estimate: $5,000 / year
- More ability to manage sales effort: $15,000 / year

Total Benefit: $90,000/year

Payback time: $55,800 / $90,000 = 0.62 of a year = approx. 8 months

Tip:
The payback time is often known as the break even point. Sometimes this is more important than the overall benefit a project can deliver, for example because the organization has had to borrow to fund a new piece of machinery. The break even point can be found graphically by plotting costs and income on a graph of output quantity against $. Break even occurs at the point the two lines cross.

Inevitably the estimates of the benefit given by the new system are quite subjective. Despite this, the Sales Director is very likely to introduce it, given the short payback time.

Key points:

Cost/Benefit Analysis is a powerful, widely used and relatively easy tool for deciding whether to make a change.

To use the tool, firstly work out how much the change will cost to make. Then calculate the benefit you will from it.

Where costs or benefits are paid or received over time, work out the time it will take for the benefits to repay the costs.

Cost/Benefit Analysis can be carried out using only financial costs and financial benefits. You may, however, decide to include intangible items within the analysis. As you must estimate a value for these, this inevitably brings an element of subjectivity into the process.

*Larger projects are evaluated using formal finance/capital budgeting, which takes into account many of the complexities involved with financial Decision Making. This is a complex area and is beyond the scope of this site, however books on capital budgeting are shown on the side bar

Exercise:

Using Decision Trees in Everyday Life

Think about the decisions you make each semester before registering for your college subjects. Your subject selections are no doubt driven to a large extent by the requirements of your curriculum. Your selection of specific subjects are probably influenced by such factors as the instructor, the time of day, conflicts with other classes, and conflicts with work schedules. Your decision process probably has some sequential elements to it: for example, “if I schedule this class at this time, then these classes cannot be scheduled because…” Develop a tree diagram to illustrate the sequential decision aspects of the class scheduling process that you went trough this semester.

Module 13

DECISION ANALYSIS

Why Study Decision Analysis?

The obvious reason for studying decision analysis is that carefully applying its techniques can lead to better decisions. But what is a good decision? A simple answer might be that it is one that gives the best outcome. This answer, however, confuses the idea of a lucky outcome with a good decision. Suppose that you are interested in investing an inheritance. After carefully considering all options available and consulting with investment specialists and financial planners, you decide to invest in stocks. If you purchased a portfolio of stocks in 1982, the investment most likely turned out to be a good one, because stocks values increased dramatically during 1980s. On the other hand, if your stock purchase had been in early 1929, the stock market crash and the following depression would have decreased the value of your portfolio drastically.

Was the investment decision a good one? It certainly could have been if it was made after careful consideration of the available information and thorough deliberation about the goals and possible outcomes. Was the outcome a good one? For the 1929 investor, the answer is no. This example illustrates the difference between a good decision and a lucky outcome: You can make a good decision but still have an unlucky outcome. Of course, you may prefer to have lucky outcomes rather than make good decisions! Although decision analysis cannot improve your luck, it can help you to understand better the problems you face and thus make better decisions. That understanding must include the structure of the problem as well as the uncertainty and trade-offs inherent in the alternatives and outcomes. You may then improve your chances of enjoying a better outcome; more important, you will be less likely to experience unpleasant surprises in the form of unlucky outcomes that were either unforeseen or not fully understood. In other words, you will be making a decision with your eyes open.

The preceding discussion suggests that decision analysis allows people to make effective decisions more consistently. This idea itself deserves discussion. Decision analysis is intended to help people deal with

difficult decisions. It is a “prescriptive approach designed for normally intelligent people who want to think hard and systematically about some important real problems” according to experts.

This prescriptive view is the most appropriate way to think about decision analysis. It gets across the idea that although we are not perfect makers, we can do better through more structure and guidance. We will see that decision analysis is not an idealized theory for super rational and omniscient beings. Nor does it describe how people actually make decisions. In fact, sufficient experimental evidence from psychology shows that people generally do not process information and make decisions in ways that are consistent with the decision-analysis approach. (If they did, then there would be no need for decision analysis; why spend a lot of time studying decision analysis if it suggest that you do what you already do?) Instead, using some fundamental principles, and informed by what we know about human frailties in judgment and decision making, decision analysis offers guidance to normal people working on hard decisions.

Although decision analysis provides structure and guidance for systematic thinking in difficult situations, it does not claim to recommend an alternative that must be blindly accepted. Indeed, after the hard thinking that decision analysis fosters, there should be no need for blind acceptance; the decision maker should understand the situation thoroughly. Instead of providing solutions, decision analysis is perhaps best thought of as simply an information source, providing insight about the situation, uncertainty, objectives, and trade-offs, and possibly yielding a recommended course of action. Thus, decision analysis does not usurp the decision maker’s job. According to another author, *“The basic presumption of decision analysis is not at all to replace the decision maker’s intuition, to relieve him or her of the obligations in facing the problem, or to be, worst of all, a competitor to the decision maker’s personal style of analysis, but to complement, augment, and generally work alongside the decision maker in exemplifying the nature of the problem. Ultimately, it is of most value if the decision maker has actually learned something about the problem and his or her own decision-making attitude through the exercise.”*

We have been discussing decision analysis as if it were always used to help an individual make a decision. Indeed, this is what it is designed for, but its techniques have many other uses. For example, one might use decision-analysis methods to solve complicated inference problems (that is, answering questions such as “What conclusions can be drawn from available evidence?”). Structuring a decision problem may be useful for understanding its precise nature, for generating alternative courses of action, and for identifying important objectives and trade-offs. Understanding trade-offs can be crucial for making progress in negotiations settings. Finally, decision analysis can be used to justify why a previously chosen judgment was appropriate.

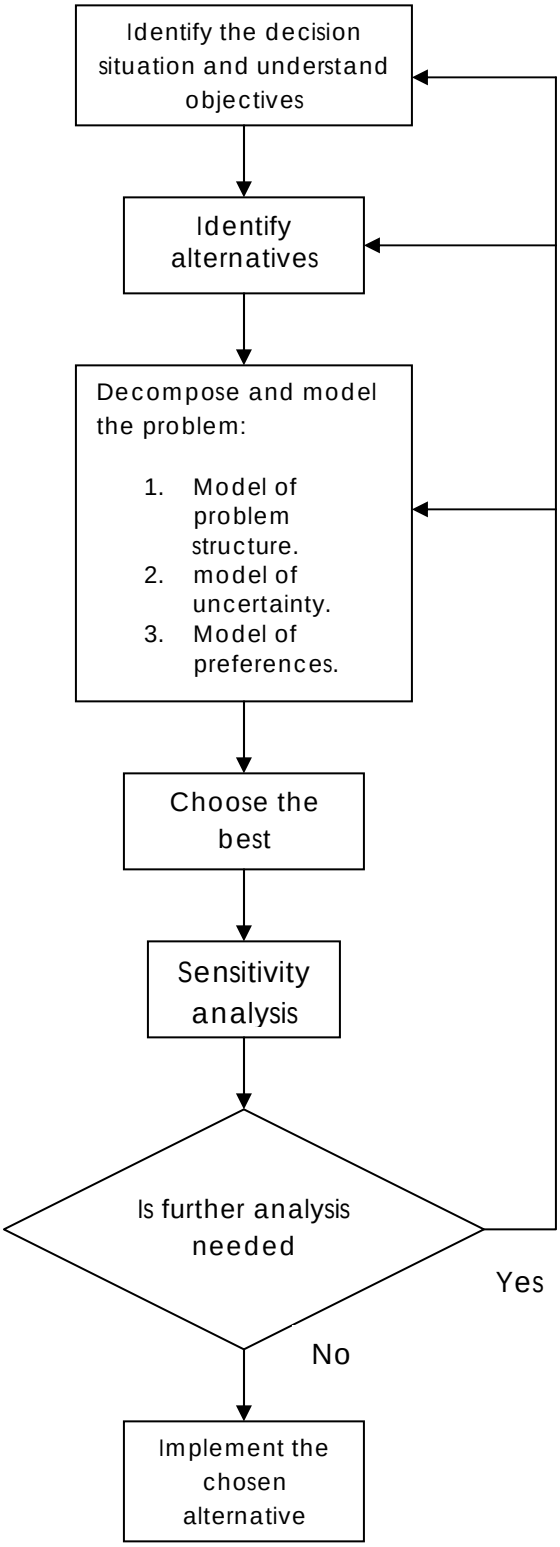
Subjective Judgments and Decision Making

Personal judgments about uncertainty and values are important inputs for decision analysis. It will become clear through this module that discovering and developing these judgments involves thinking hard and systematically about important aspects of decisions.

Managers and policy makers frequently complain that analytical procedures from management science and operations research ignore subjective judgments. Such procedures often claim to generate “optimal” actions on the basis of purely objective inputs. But the decision-analysis approach allows the inclusion of subjective judgments. In fact, decision analysis requires personal judgments; they are important ingredients for making good decisions.

At the same time, it is important to realize that human beings are imperfect information processors. Personal insights about uncertainty and preferences can be both limited and misleading, even while the individual making the judgments may demonstrate an amazing overconfidence. An awareness of human cognitive limitations is critical in developing the necessary judgmental inputs, and a decision maker who ignores these problems can magnify rather than adjust for human frailties. Much current psychological research has a direct bearing on the practice of decision-analysis techniques.

Figure 13.1 – A decision-analysis process flowchart



The Decision-Analysis Process

Figure 13.1 shows a flowchart for the decision-analysis process. The first step is for the decision maker to identify the decision situation and to understand his or her objectives in that situation. Although we usually do not have trouble finding decisions to make or problems to solve, we do sometimes have trouble identifying the exact problem, and thus, we sometimes treat the wrong problem. Such a mistake has been called an “error of the third kind.” Careful identification of the decision at hand is always important. For example, perhaps a surface problem hides the real issue.

Understanding one’s objectives in a decision situation is also important first step and involves some introspection. What is important? What are the objectives? Minimizing cost? Maximizing profit or market share? What about minimizing risks? Does risk mean the chance of monetary loss, or does it refer to conditions potentially damaging to health and the environment? Getting a clear understanding of the crucial objectives in a decision situation must be done before much more can be accomplished. In the next step, knowledge of objectives can help in identifying the alternatives, and beyond that the objectives indicate how outcomes must be measured and what kinds of uncertainties should be considered in the analysis.

Many authors argue that the first thing to do is to identify the problem and then to figure out the appropriate objectives to be used in addressing the problem. Others argue the opposite; it is far better, they claim, to spend a lot of effort understanding one’s central values and objectives, and then looking for ways—decision opportunities—to achieve those objectives. The debate notwithstanding, the fact is that decisions come in many forms. Sometimes we are lucky enough to shape our decision-making future in the way the latter suggests, and other times we find ourselves in difficult situations that we may not have anticipated. In either case, establishing the precise nature of the decision situation (which we will later call the decision context) goes

hand in hand with identifying and understanding one's objectives in that situation.

With the decision situation and pertinent objectives established, we turn to discovery and creation of alternatives. Often a careful examination and analysis of objectives can reveal alternatives that were not obvious at the outset. This is an important benefit of a decision-analysis approach. In addition, research in the area of creativity has led to a number of techniques that can improve the chance of finding new alternatives.

The next two steps, are called "modeling and solution." Much of this module will focus in decomposing problems to understand their structures and measure uncertainty and value; indeed, decomposition is the key to decision analysis. The approach is to "divide and conquer." The first level of decomposition calls for structuring the problem in smaller and more manageable pieces. Subsequent decomposition by the decision maker may entail careful consideration of elements of uncertainty in different parts of the problem or careful thought about different aspects of the objectives.

The idea of modeling is critical in decision analysis, as it is in most quantitative or analytical approaches to problems. As indicated in Figure 13.1, we will use models in several ways. We will use influence diagrams or decision trees to create a representation or model on the decision problem. Hierarchical and network models will be used to understand the relationships among multiple objectives, and we will assess utility functions in order to model the way in which decision makers value different outcomes and trade off competing objectives. These models are mathematical and graphical in nature, allowing one to find insights that may not be apparent on the surface. Of course, a key advantage from decision-making perspective is that the mathematical representation of a decision can be subjected to analysis, which can indicate a "preferred" alternative.

Decision analysis is typically an repetitive process. Once a model has been built, sensitivity analysis is performed. Such analysis answers

“what if” questions: “If we make a slight change in one or more aspects of the model, does the optimal decision change?” If so, the decision is said to be sensitive to these small changes, and the decision maker may wish to reconsider more carefully those aspects to which the decision is sensitive. Virtually any part of a decision is fair game for sensitivity analysis. The arrows in Figure 13.1 show that the decision maker may return even to the identification of the problem. It may be necessary to refine the definition of objectives or include objectives that were not previously included in the model. New alternatives may be identified, the model structure may change, and the models of uncertainty and preferences may need to be refined. The term decision-analysis cycle best describes the overall process, which may go through several iterations before a satisfactory solution is found.

In this repetitive process, the decision maker’s perception of the problem changes, beliefs about the likelihood of various uncertain eventualities may develop and change, and preferences for outcomes not previously considered may mature as more time is spent in reflection. Decision analysis not only provides a structured way to think about decisions, but also more fundamentally provides a structure within which a decision maker can develop beliefs and feelings, those subjective judgments that are critical for a good solution.

Requisite Decision Models

In the early 1980s, the term requisite decision modeling was introduced. This marvelous term captures the essence of the modeling process in decision analysis. In the proponent’s words, “a model can be considered requisite only when no new intuitions emerge about the problem”, or when it contains everything that is essential for solving the problem. That is, a model is a requisite when the decision maker’s thoughts about the problem, beliefs regarding uncertainty, and preferences are fully developed. For example, consider a first-time mutual-fund investor who finds high, over-all long-term returns

appealing. Imagine, though, that in the process in researching the funds the investor begins to understand and become wary of highly volatile stocks and mutual funds. For this investor, a decision model selected a fund by maximizing the average return in the long run would not be requisite. A requisite model would have to incorporate a trade-off between the long-term returns and volatility.

A careful decision maker may cycle through the process shown in Figure 13.1 several times as the analysis is refined. Sensitivity analysis at appropriate times can help the decision maker choose the next modeling steps to take in developing a requisite model. Successful decision analysts artistically use sensitivity analysis to manage the iterative development of a decision model. An important goal of this book is that you begin to acquire this artistic ability through familiarity and practice with the concepts and tools of decision analysis.

Where Is Decision Analysis Used?

Decision analysis is widely used in business and government decision making. Perusing the literature reveals the applications that include managing research-and-development programs, negotiating for oil and gas leases, forecasting sales for new products, understanding the world oil market, deciding whether to launch a new product or new venture, and developing ways to respond to environmental risks, to name a few. And some of the largest firms make use of decision analysis. A particularly important arena for decision-analysis applications has been in public utilities, especially electric power generation. In part this is because the problem utilities face (e.g., site selection, power generation methods, waste cleanup and storage, pollution control) are particularly appropriate for treatment with decision-analysis techniques; they involve long time frames and hence a high degree of uncertainty. In addition, multiple objectives must be considered when a decision affects many different stakeholders groups.

In the literature, many of the reported applications relate to public-policy problems and relatively few to commercial decisions, partly

because public-policy problems are interest to such a wide audience. It is perhaps more closely related to the fact that commercial applications often are proprietary; a good decision analysis can create a competitive advantage of the firm, which may not appreciate having its advantage revealed in the open literature. Important public-policy applications have included regulation in the energy (especially nuclear) industry and standard setting in a variety of different situations ranging from regulations for air and water pollution to standards for safety features on new cars.

Another important area of application for decision analysis has been in medicine. Decision analysis has helped doctors make specific diagnoses and individuals to understand the risks of different treatments. Institutional-level studies have been done such as studying the optimal inventory or usage of blood bank or the decision of a firm regarding different kinds of medical insurance to provide its employees. On a grander scale, studies have examined policies such as a widespread testing for various forms of cancer or the impact on society of different treatment recommendations.

This discussion is by no means exhaustive; the intent is only to give you a feel for the breadth of possible applications of decision analysis and a glimpse at some of the things that have been done. Many other applications are describe in cases and examples throughout the book; by the time you have finished, you should have a good understanding of how decision analysis can be (and is) used in many different arenas.

Questions

1. Give an example of a good decision that you made in the face of some uncertainty. Was the outcome lucky or unlucky? Can you give an example of a poorly made decision whose outcome was lucky?

2. Explain how modeling is used in decision analysis. What is meant by the term “requisite decision model”?

3. What role do subjective judgments play in decision analysis?

4. At a dinner party, an acquaintance asks whether you have read anything interesting lately, and you mention that you have begun to read a text on decision analysis. Your friend asks what decision analysis is and why anyone would want to read a book about it, let alone write one? How would answer?

5. Give an example in which a decision was complicated because of difficult preference trade-offs. Give one that was complicated by uncertainty?

6. Describe a decision that you have had to make recently that was difficult. What were the major issues? What were your alternatives? Did you have to deal with uncertainty? Were there important trade-offs to make?

Module 14

DECISIONS CONCERNING PERSONAL LIFE

Total quality begins with total personal quality, organizational empowerment begins with individual empowerment, and managing information system means managing your life. The same decision-making process one faces in business arises in all other aspects of one's life, but they are obscured in other parts of life because they are not overlaid with as many complexities that arise in business. If you expect people who do not treat themselves well to treat the world well, you will be sorely and surely disappointed.

We all know the difference between "right" and "wrong", and we can tell "good from "bad". But we also know that the more difficult decisions come when we have to choose between good and better. The toughest decisions of all are those we have to make between bad and worse.

Many people believe that predetermined destiny rather than their own decisions govern the affairs of their lives. Personal mastery teaches us to choose. Choosing is a courageous act that entails opting for various courses of actions that will define one's destiny. Destiny is not a matter of chance. It is a matter of choice. Striving for goals (i.e., the objective of your decisions) that do not reflect your values and consequently do not make your life joyful is how we make ourselves unhappy. But if you do not know what you want, then how will you know how to achieve it? Have a very clear picture of what you want out of life and what it will take to get it. There is a popular, classic song in which a raspy female voice exclaims to her independent female audience, "*use what you got.....to get what you want.*"

Be realistic about your abilities. When there is a way, there is a will. The opposite is not true as many people unfortunately believe and have taken as the basis for decisions concerning their personal life. Thinking about strategies to strive after that are beyond your abilities can ruin your life. If a goal is unattainable and you go after it anyway, the consequential failure may cause you pain and diminish your energy

(and resources of the organization). You do best in your profession and your personal life by doing well with respect to your capacity and values rather than trying to do better than another person or organization. Judge your success by what you had to give up in order to get it.

He knows not his own strength that has not met challenge. When you are facing a decision, then you are sounding-out the depth of your own strengths and the richness of your resources. One is responsible for one's own life. Passivity provides no protection.

All religions, arts, philosophy, morality, and sciences are branches of the same tree. All these aspirations have pondered the search for what constitutes a good life. Yet only in the last decades has the study of well-being become a scientific endeavor. The results indicate that the goals and values of personal life are very subjective and mostly cultural. Most people spend a lifetime searching for happiness. They chase idle dreams, addictions, religions, even other people, hoping to fill the emptiness that plagues them. The irony is that the only place they ever needed to search was within.

One must decide for oneself: Leaders and followers face different problems. The leaders have to wonder if the followers will follow them faithfully and the followers wonder if the leader will bring them to the "promised land". In essence, the leaders and the followers are slaves to each other's needs.

FACTORS CONTRIBUTING TO BEING A GOOD DECISION MAKER

Self-esteem (not pride)

Self-esteem is a big factor in making good decisions. Some people easily pressured into doing things by others are easily told what to do because they have very low self-esteem. Never feel sorry for yourself -

- it has a deadly effect on your thinking. Recognize all problems, no matter how difficult, as opportunities for enhancement and/or affirmation of your life, and make the most of these opportunities. Creativity in making good decisions requires having a clear mind.

Courage

Courage is to think for yourself. When one has low self-esteem one can be talked into doing almost anything because one depends on others too much for advice. This is all because one may not have strength and courage to listen to his/her own thoughts. There are many ways to escape from your own strategic thinking engagement. For example, have you asked yourself why you read newspapers? Could it be an escape device? As a reporter puts it "Fact that is fact every day is not news; it's truth. We report news, not truth." It may be a shock to most of us that, Thomas Jefferson said "I do not take a single newspaper, nor read one a month, and I feel myself infinitely the happier for it." You ought to never try to avoid the duty of making up your mind for yourself. If you do not make decision for yourself, others do it for you: "You're legally allowed to drink now so we figured the best thing for you was a car." Major decisions require courage. We must have courage to bet on our decisions, to take the calculated risk, and to act.

The Gift of Learning

Of all the gifts that a parent can give a child, the gift of learning to make good choices is the most valuable and long lasting.

Listen and Think for Yourself

It takes education and courage to gain more self-esteem to be positive or confident in decision-making. Listen to yourself and think for yourself. This won't get you into trouble because of someone else. Courage means the act of intelligent risk taking while looking forward into the future.

Honesty

Honesty is to be the one you are. Be objective about yourself and others. It is important to identify your weaknesses as well as your strengths, and

Love

Love means caring about yourself and other people. It means that you go to sleep at night knowing that your talents and abilities were used in making decisions that served others. The wonderful thing about love is that it embraces, without binding.

Acceptance of One's Self

To be honest, you must fully accept that at this moment, you can only be what you are. no more, no less; however, with the inevitable passing of each moment of time, you will gradually, but surely change -- to become more or less, better or worse, stronger or weaker. Your choice is the direction of change: it is yours alone. The only true *competition is the rivalry within* your changing self. It is the very basis of a good decision making.

Hard Decisions

Only you can change your life. No one can make decisions for you when it comes to serious questions, such as, What ought I to do?, What should I believe?, What can I know?, How should I live? What Ralph Waldo Emerson tells us is that the only good answers to such questions are personal and examined ones, rarely those adopted by large groups; conscious, reasoning minds should neither pray to strange Gods, nor encourage the vanities of the self. That alone can set us on the path to freedom. All the interest of your education should come together to make decisions for yourself. What is the use of education if you cannot face these questions to your own satisfaction?

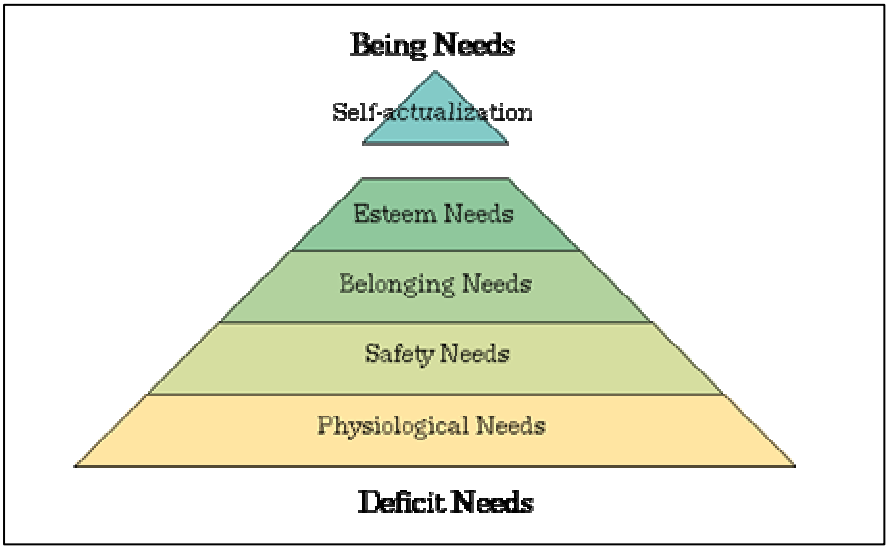
While you are making these decisions, you feel for the time being that your life is your own. Do not envy others, because who envies others does not obtain peace of mind. Everything starts with yourself -- with you making up your mind about what you're going to do with your life.

Talk to Yourself

In personal decision-making there is no one better to talk to than yourself if you really want to get things worked out. No other person has as much information about your problems, and no one knows your skills and capabilities better.

Self-Realization

Maslow's work specifies that individuals have a hierarchy of needs ranging from basic needs for survival and safety to higher-level needs for esteem and self-actualization, as shown in the following figure:



1. **Physiological Needs.** These are primarily biological needs. They include such things as the need for adequate nutrition, shelter, warmth and medical care.

2. **Safety Needs.** After physiological needs, the second most compelling needs that individuals face are safety and security.
3. **Belongingness and Love Needs.** When physiological and safety needs have been addressed, the next set of needs -- those related to belongingness, affection and love -- can emerge.
4. **Esteem Needs.** If the first three needs are fulfilled, the need for esteem may become dominant. This refers both to self-esteem and to the esteem a person gets from others.
5. **Self-Actualization Needs.** The highest level of needs, those that individuals are able to satisfy when all other more basic needs have been met, is the need for self-actualization. Self-actualization is a person's need to be what he/she is. A musician must make music, an artist must paint, a poet must write, if he is to be ultimately at peace with himself.

What does Maslow mean by his observation with respect to self-realization? My answer is: If you were meant to be a street sweeper, sweep streets like Michelangelo painted pictures, like Shakespeare wrote poetry, like Beethoven composed music; sweep streets so well that everybody will have to pause and say, Here lived a great sweeper, who swept his job well.

Popular Strategies in Avoiding Personal Decisions

Decisions shape our personal lives, however decision-making can be a stressful, bewildering personal responsibility. Decidophobia is the fear of making your own decisions. The comparison and choice of goals and standards arouses the most intense decidophobia but the only way to insure stability in the strategic thinking is to bring about fear. In the past few decades, the field of decision-making has concentrated on showing the limitations of decision makers—that is, that they are not very rational or competent and their thoughts are clouded with a plethora of possibilities, variables and outcomes. In short, there is the lack of a well-focused structured decision-making process.

Strategies That Enable Decidophobes to Avoid Making Their Own Decisions

Religion

Religion and the proclamation of what is good and evil is the most popular one. It is through this unity that the decidophobe avoids confrontation. Instead of inviting us to evaluate alternative standards, it gives us norms as well as detailed standards.

Every religion too, is a model for questions such as: How should I live, What should I believe? How should I behave? What should I do and so on. In Islam, for example, a man may have more than one wife (officially up to four, at any given time), but he should not drink wine. In Christianity the opposite is allowed. Here you have a choice.

Models are always changing to adapt to reality. For example, Martin Luther, and John Calvin among others, found a need for *reformations* and modified the Catholic model. The same happened with the Eastern models, such as Buddhism which is the reformed Hinduism. Models, in general, should be able to provide "insights" useful to cope with the decision problem. In the case of religious models, the question "how should I live?" is not a decision problem. The imperative and authoritative answers to almost all similar decisions are already given. However, there is only one big decision one must make first -- "the leap of faith." While the organized religions are life-enhancing for those who need their services, they are not life-affirming (e.g., concepts of origin sin and redemption as its cure).

The source of all religion and metaphysics is the recognition of a higher power, such as god(s), or "the-thing-in-itself", respectively. Much of what passes for religious faiths, and metaphysics idols (i.e., ideas) amounts to a side bet, covering a vague belief that "there must be something" or that man needs to believe. Philosophy and religion are accustomed in constructing models such as, metaphysics of a higher world, and another-world, in order to despise this world.

Believing in God, while is sometimes advantageous health-wise, can have the reverse effect: it can predict mortality. A study of 600 older hospital patients, 95% of whom were believers, found that people who felt alienated from God, or who blamed the devil for their illness, had a 19% to 28% increased risk of dying over the following two years.

Drifting

Instead of choosing how to live and what to believe, The drifting person simply follows the "status quo". On the opposite end of the spectrum is the person who has no ties, no code of conduct, or purpose. These types of individuals are afraid of making any decision, no matter how small.

Allegiance to A Movement

This strategy identifies the people who are dissatisfied both with traditional life styles and with being adrift, so they join a movement. This is an indication of a person's fear of "standing alone".

Allegiance to A School of Thought

This strategy helps to give one an identity. People of this nature share a way of thinking and deal with problems in the same way.

Exegetical Thinking

In this strategy one reads in the text, assumes that the text that one reads is right and therefore, treated as an authority. This enables the exegete to read his own ideas into the text and get them back endowed with authority. The exegetical thinker fears independence and independent thinking.

Manachaeism

For the Manachaeist, the decision is most important and generally makes itself; the choice is loaded. It is when all the odds are stacked,

all the good is on one side, all the evil on the other. It ignores all other alternatives.

Moral Rationalization

The idea is that the moral rationalist, through rational thought, can make decisions. However, that moral rationalism may involve an inadequate conception of reason and responsibility. Man -- a reasoning rather than a reasonable animal.

Pedantry

This strategy emphasizes on a "microscopic distinction". Decidophobia engulfs the pedantic person, as they never get around to considering major decisions and do not look at, or see, the big picture. Action always generates inspiration. Inspiration seldom generates action.

The Wave of the Future

Although this strategy overlaps with religion, allegiance to a movement or to a school, and to ignore other alternatives and, like other strategies, there is a fear of standing alone and unsupported. Ideals are acceptable because they are "the wave of the future". Idealism increases in direct proportion to one's distance from the decision problem.

Marriage

One of the most popular strategies is that of marriage. This strategy is based on the premise that in marriage, the decisions are left, in most cultures to the husband. However, either spouse can succumb. Decisions are either a consensus of the two or there is a disagreement and one ends up "going along" with the other.

Heuristics

This is a method to help solve a problem, commonly informal. It is particularly used for a method that often rapidly leads to a solution that is usually reasonably close to the best possible answer. Heuristics are “rules of thumb”, educated guesses, intuitive judgments or simply common sense.

In more precise terms, heuristics stand for strategies using readily accessible, though loosely applicable, information to control problem-solving in human beings and machines.

Questions:

1. Is there any truth to this statement: “But if you do not know what you want, then how will you know how to achieve it?” Explain your answer.
2. What role does self-esteem play in good decision making?
3. How does exegetical thinking help a decidophobe not to make decisions?
4. What is drifting? Have you encountered any person who is a drifter? Why do you think did he become such?
5. How can acceptance of one’s self make one a better decision maker?