Geometry of choice is the driving force behind decisions. Although the source of decisions is the missions, structure, strategies, and operations of organizations, it also shapes the identity and boundaries of the organization in proportion to its environment. The success and progress of organizations is the result of the quality of decisions and the type of solution selection. Organizations require intelligent infrastructure and dynamic capabilities.

This book teaches you how to change behaviors to implement decisions and achieve desired performance by selecting the environment and overcoming its challenges with a deep understanding of decision-making and its methods. The prudent guidance of macro strategies and continuous environmental changes creates new situations for the organization within the framework of creative decisions. By reading this book, you can, in addition to mastering the platform and mechanisms of decisions, become a successful player in the complex and dynamic arena of competition while systematically combining expertise, experience, and innovation, so that you can progress with decision-making approaches to uncertainties and environmental conditions.

This book provides a set of methods and decision-making styles to guide you through complex, changing, and ambiguous scenes of challenges by enhancing awareness and cognition.

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Geometry of Choice: Structure and Logic of Human and Organizational Decisions

Geometry of Choice

Structure and Logic of Human and Organizational Decisions

Mohammad Reza Hamidizadeh
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Ahlul Bayt International University

The Geometry of Choice:

Structure and Logic of Human and Organizational Decisions

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Resources

The Geometry of Choice: Structure and Logic of Human and Organizational Decisions

Mohammad Reza Hamidizadeh,
Professor at Shahid Beheshti University

Preface

Given that decision-making constitutes the most sensitive role, duty, and responsibility of management and a sign of both successes and failures, understanding the essence of a decision problem and selecting its optimal solution have always been among the most challenging tasks for decision-makers. The critical dimension of decision problems lies in their sensitivity to time and context—as changes in temporal or spatial conditions reshape the very structure of the issue. Problems emerge within the continuum of time and space, and within the context of unfolding events and phenomena. Therefore, every problem must be interpreted, analyzed, and even experienced within its corresponding temporal and spatial frame.

Of course, the problem arises when a phenomenon deviates from one of these aspects: 1) time, 2) place, 3) conditions, 4) value system, 5) function, and 6) the alignment of interests with the values of its categories.

To achieve an effective and desirable solution, several simultaneous and sequential stages must be undertaken—collectively referred to as the decision-making process. Without decision-making, no activity can begin, and no accomplishment can occur. The discrepancy between objectives and performance, between expectations and reality, and the inability to achieve goals stem primarily from poor understanding of the decision

problem, inadequate application of decision-making processes, inefficient use of analytical techniques, and improper implementation.

One distinctive feature of decision-making lies in the high complexity of its internal and external environments. This complexity manifests in the diversity of variables and the dependence of actions on irregular, chaotic, and unstable behavioral patterns. Such environmental complexity has transformed modeling and optimization into essential sub-disciplines of management science, thereby necessitating the inclusion of decision-management specialists within consulting teams.

Employing systematic methodologies, nurturing the power of metaphorical reasoning, cultivating trend-recognition and variable-identification skills, broadening perspectives, and refining the filtering and selection of environmental and organizational factors collectively shape the analytical and perceptual capabilities of managers and experts.

Problem-solving, in essence, is a cognitive process that transforms a given (actual) state into a desired (ideal) one, even when no explicit method is available. It represents a type of thinking and behavior aimed at reaching a goal that is not easily attainable. This concept is grounded in four fundamental ideas:

1. Problem-solving is a cognitive act that occurs within the individual's mental and perceptual system; thus, it can only be inferred indirectly through the solver's behavior.
2. Problem-solving is a process, involving manipulation of information within the cognitive structure of the solver. It relies on performing cognitive operations upon internal representations of one's knowledge.
3. Problem solving is directional and its goal is to solve the problem.
4. Problem-solving is goal-directed, and its ultimate aim is to resolve the problem.
5. Problem solving is a personal matter because the difficulty of transforming a given state of a problem into a desired state depends on the current knowledge of the problem solver.

Since individuals try to identify, classify, and implement decision-making issues within the framework of their own desires and their environment, sometimes the results of this process, while bearing the seal of approval of the power of perception, do not align with reason, logic, and intelligence. Why?

This book has been written in response to such multilayered and complex dimensions of decision-making. It seeks to illuminate the subtle mechanisms of how decisions are shaped, understood, and enacted in organizational and managerial contexts.

It is hoped that by reading this book, the reader will grasp the distinctive insights and tangible dimensions of decision-making, and experience the sense that one must continuously strive to become a person endowed with energy, competence, and vitality—someone capable of evaluating consequences meticulously and utilizing the full capacity of the mind and intelligence to make effective and efficient decisions.

Mohammad Reza Hamidizadeh
Professor at Shahid Beheshti University

Chapter 1
Organizational Structure and Process

Objectives

- Familiarization with the subject and nature of decision-making along with its assumptions.
- Explanation of the decision-making process, the function of thinking in decision-making, and understanding the foundations of the decision-making system.
- Familiarization with rational-organizational decision-making methods, their dimensions, characteristics, and structure.
- Understanding the methods of evaluating and controlling decisions.

Introduction

Since decision-making is one of the most critical responsibilities of organizational managers, they are constantly faced with the challenge of choice within organizations. To achieve an optimal choice, certain steps must be taken, either simultaneously or sequentially, which is known as "decision-making." Without decision-making in organizations, no action or activity is initiated or realized. Therefore, decision-making is a familiar concept for individuals and groups who typically make their choices based on perception, assumptions, and awareness of the consequences of their decisions. However, understanding rational-organizational decision-making methods is of great importance for guiding and establishing communication between different decision-making styles.

The duality between objectives and performances, expectations and realities, and the inability of organizations to achieve their designed goals stem from a key issue: the weakness in understanding the decision-making process and the lack of a solid foundation for a rational-organiza-

tional decision-making system.

This chapter introduces and analyzes the process of making rational-organizational decisions by designing the structure and theoretical process of decision-making within a systemic thinking framework. By adopting a systemic thinking style, the characteristics of linear and non-linear thinking styles in problem identification and resolution are also discussed. Furthermore, the evaluation approaches for goal-achievement solutions, including systemic, strategic factors, competitive values, operational research, and economic perspectives, are examined. The final section of the decision-making process is dedicated to evaluation and control, presenting seven key indicators for assessing the potential efficiency of organizational decisions.

The Subject and Nature of Decision-Making

One of the most sensitive responsibilities of managers, which they constantly deal with and ultimately determines the future success or failure of their organization and managerial effectiveness, is decision-making. Organizations often face unresolved issues and unrealistic expectations due to the discrepancy between their aspirations and actual realities. This forces managers to make more precise and sensitive decisions.

In the process of making organizational decisions, managers usually follow a rational approach by defining the issue at hand, gathering all relevant facts with respect to the timeframe, scope, and level of sensitivity, formulating solutions, prioritizing them, and finally selecting the solution that aligns with conditions, capabilities, resources, and time constraints for execution.

In the real world, managers still oscillate between making decisions based on complete facts and fully rational-organizational decision-making. This situation leads to weaknesses in problem recognition. Linguistically, the term "decision" means determination and resoluteness in undertaking an action. However, from a managerial science perspective, decision-making has two dimensions:

1.The internal dimension, which reflects the intent, purpose, and will to act, representing the preparation phase.

2. The external dimension, which can be defined as the selection of an operational process from among two or more mentioned alternatives.

Thus, decision-making involves a sequence of steps to select a specific course of action. However, the organizational decision-making process can be enhanced by utilizing systemic thinking and developing a creative and practical definition of the decision-making subject. Efforts to compile critical facts using specialized information systems expand the scope, dimensions, and scenarios of decision-making, while also allowing for the inclusion of various quantitative and qualitative evaluation criteria that consider economic aspects.

Every manager, regardless of organizational circumstances, is compelled to make decisions for daily activities. The personal and professional life of every individual, especially managers, is filled with decision-making responsibilities. Rational-organizational decision-making, which originates from systemic thinking and approaches, is a fundamental and structural process in organizations. Managers make decisions based on the communications and information they understand through organizational structures, individual behaviors, and group dynamics. While managers within organizations differ in cultural and professional backgrounds, lifestyle, and geographical location, they all engage in decision-making. Managers are ultimately responsible for the outcomes of their decisions; however, they continuously face situations with multiple possible scenarios, requiring them to compare alternatives and evaluate results.

The source of every movement, action, and operation lies in the decision made. The goal of every decision is to resolve an issue that emerges from the surrounding conditions and environment. Therefore, in making decisions, it is crucial to consider its subject and nature in relation to four pillars1 :) Strategy, 2) Environment, 3) Structure, 4) Resources.

Although an event or occurrence may arise from specific conditions and environments, a decision is made accordingly. Hence, the root of decision-making is in events and circumstances, and these decisions, upon realization, shape new events.

To guide decision-making, the nine-fold textual analysis approach

should be employed to examine, analyze, and understand the essence, purpose, and function of the relevant event or occurrence.

Assumptions in the Decision-Making Arena

Assumptions form eleven perspectives for each decision-making subject, outlined as follows:

1. Every issue arises within an event or a sequence of realities.
2. Identifying the nature of the issue, its dimensions, and characteristics within the mentioned event or sequence.
3. Finding diverse solutions for resolving the decision-making issue.
4. Examining and evaluating the consequences of different solutions, selecting, and implementing the most appropriate solution.
5. Viewing decision-making as a growth-oriented process. As conditions and environments gradually change, the decision-maker achieves the desired outcomes through a series of successive decisions. The nature of today's issues remains interconnected and closely related to past issues; the achievement of present decision goals enables future decision-making.
6. Exploratory approach in decision-making, involving an investigation into the decision-making process and searching within its framework, typically based on discovering the causes of occurrences and identifying explicit decision-making strategies. However, extensive searches for new and innovative solutions should not be overlooked.
7. Identifying and analyzing whether decisions are structured or unstructured.
8. Considering the practical aspect in decision-making by exploring solutions to errors and willingness to respond to problem-solving discoveries, leading to knowledge enhancement. Alongside striving to make accurate and efficient decisions using rational-technical structured decisions under conditions of certainty, the complexity of the environment forces decision-makers to make choices that

involve risk and potential errors. These errors must be quickly corrected. The decision-maker should recognize the psychological and social dimensions of solutions and available opportunities to adapt effectively to evolving conditions.

9. Considering the seven key characteristics of the decision-maker when making decisions:
   - Past experiences
   - Insight, cognitive, and analytical skills
   - Situational opportunities
   - Specialized knowledge and management skills
   - Attitude, level of optimism and anxiety
   - Conditions, constraints, and available resources
   - Foresight and broad-mindedness
10. Examining the recognition of each decision based on four dimensions:
    - Analytical,
    - Essential,
    - Occurrence conditions and
    - Thinking approach

This significantly enhances the accuracy and reliability of the decision-making process.

11. Understanding and utilizing the decision-making cycle, which consists of seven components, as depicted in Figure 1.

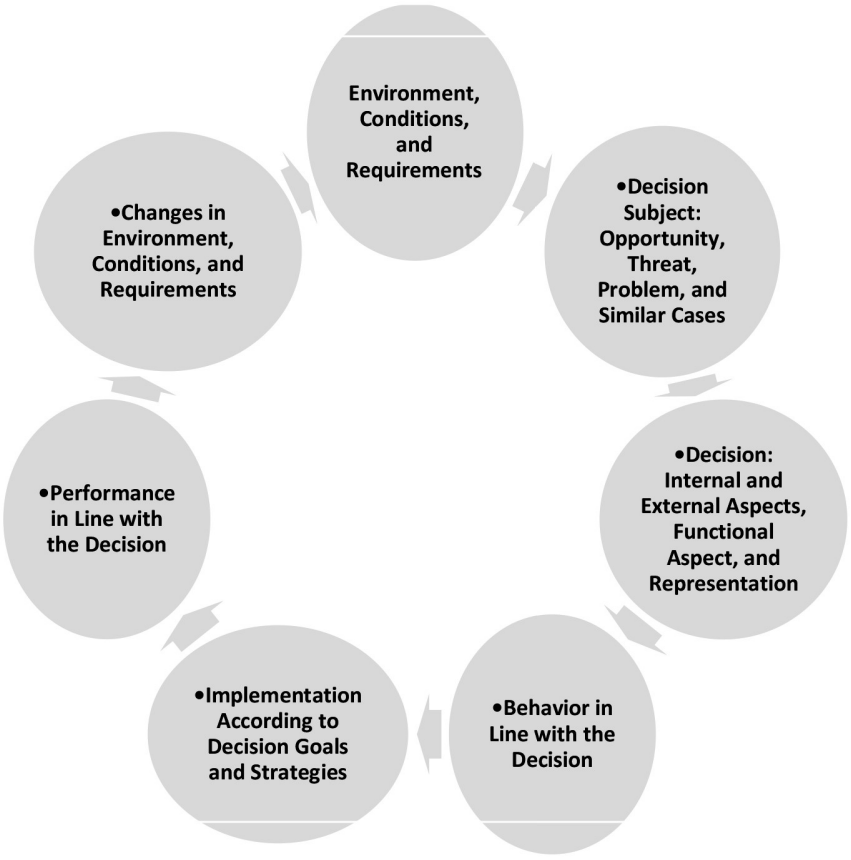


Figure 1. The Seven-Element Cycle of Decision-Making Dynamics

Decision-Making Process and Model

Decisions should be regarded as tools, not as ultimate goals. In reality, they serve as organizational mechanisms to achieve a desired state. Decisions can be considered an organization's response to an issue. An issue represents the gap arising from the non-fulfillment of goals and plans. Each decision results from a dynamic process influenced by multiple factors. Although a unique model for the dynamic behavioral decision-making process is presented in Figure 1-1, relying on a fixed method for scientific decision-making is unrealistic. This model represents a continuous and dynamic process, not a series of mechanical steps. Each component should be examined naturally to guide the decision-making process. Decision-making fundamentally means selecting an option for implementation. Additionally, decision-making should be seen as a multi-stage process, where actual selection is just one phase.

Initially, the process should be conceptualized as fully rational and systematic, then compared with what happens in practice.

Therefore, Figure 3 presents a simplified decision-making model. Managerial decisions at all levels should maintain logical coherence and alignment, covering goal definition, strategies, policies, and operational programs.

Consistency and integration are crucial because missions, goals, strategies, execution methods, budgets, and plans define the framework for managerial decisions. There is a fundamental distinction between a clear, flawless conceptual idea and the complex, ambiguous reality of managerial decision-making. A manager's ability to make scientific, rational, and logical decisions is constrained by cognitive capacity and limited information.

Given these constraints, managers cannot always make optimal or complete decisions, instead, they navigate uncertainty, seeking the most reasonable course of action.

To effectively utilize decision-making discussions, each problem or opportunity must first be converted into an issue, then analyzed using Figure 2 for planned decisions and the early stages of unplanned decision-making.

Issues that arise sporadically, with unpredictable outcomes, compel management to adopt this process. However, for recurring and routine issues, the entire process in Figure 2 is unnecessary. If the organization's policies and guidelines cover such issues, managers do not need to develop or evaluate solutions.

The components of Figures 2 and 3 are detailed below, based on prior research (Shapiro, 2002; Tuite & Chisholm, 2007)

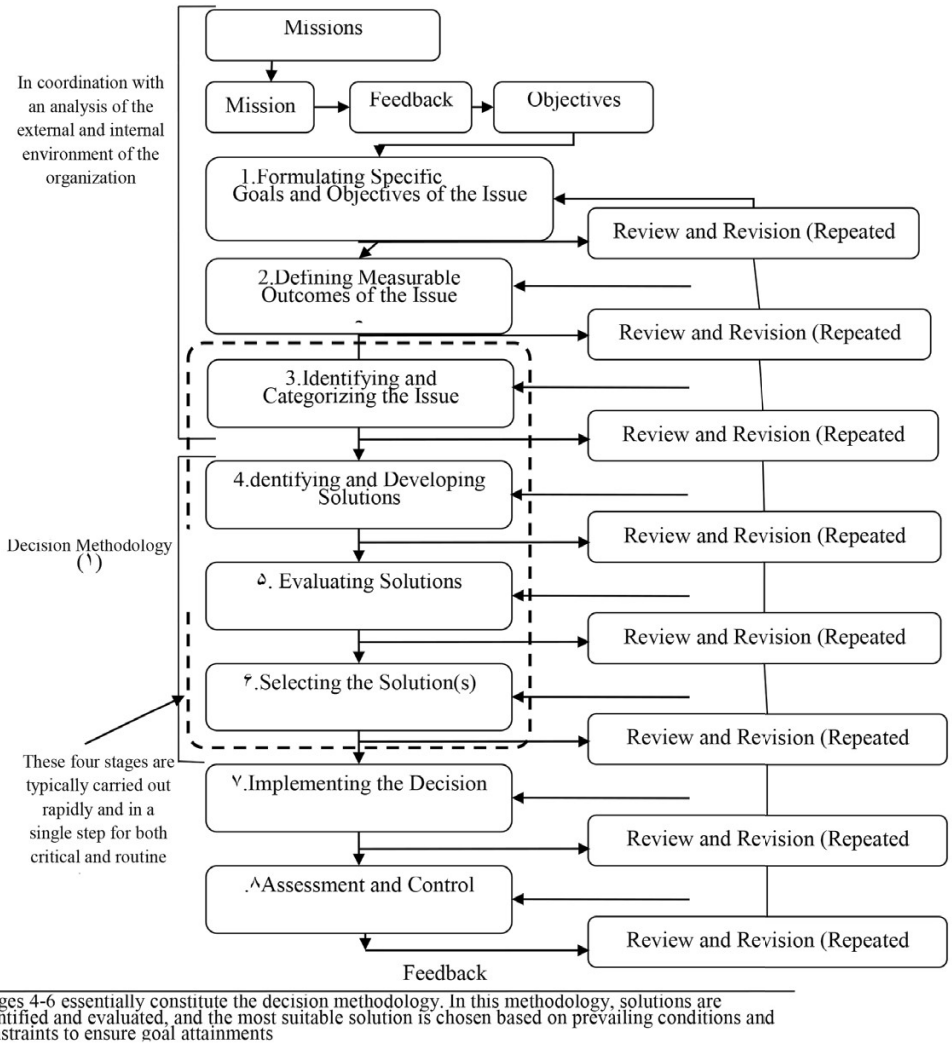


Figure 2. Structure, Dynamic Process, and Decision-Making Behavior

1 and 2. Formulating and Structuring Specific Goals and Measurable Outcomes

According to Figure 2, the prerequisite for formulating specific goals and objectives in decision-making is to understand the missions, organizational objectives, strategies, policies, and programs. Every decision problem must align with these prerequisites; otherwise, it falls outside the organization's scope of authority.

Goals drive organizations toward their objectives; therefore, evaluating objectives, which are the outcomes of decisions, is crucial. Con-

versely, if specific objectives are to be achieved, corresponding goals must be pursued to ensure realization. The acceptance of goals is built on rational thinking, but their implementation must be examined with deliberation, as though initiates vision, whereas deliberation ensures forward-thinking outcomes. Goals represent causes (the present and potential performance), while outcomes, as indicators of completion, shape the future. Achieved goals are considered realized objectives.

Organizations can predict expected outcomes by defining their goals and objectives and determine the appropriate metrics for measuring results. The relationship between productivity and performance highlights the necessity for organizations to employ goal-oriented strategies to reach desired objectives.



Figure 3. Simplified Model of Decision-Making Issues

3. Identifying and Categorizing Issues

A fundamental condition for making decisions is the existence of a gap between what should be and what currently exists, which is defined as a problem. If no problem exists, no decision-making is necessary. This phenomenon emphasizes the necessity of having goals (starting points) and objectives (endpoints) since a problem signifies a gap between an organization's goals and objectives and its actual performance levels. When a discrepancy arises between desired and actual results, a problem (or problems) can be identified. However, precisely diagnosing the problem requires a multidisciplinary and multi-skilled approach. At this stage, the problem should be analyzed based on the following dimensions (Table 1):

a) Analytical Perspective

b) Nature of the Issue

c) Conditions of Occurrence

d) Thinking Style

This ensures that the decision-making issue is approached with strategic insight, significantly improving accuracy and reliability throughout the decision-making process.

Table 1. Identification and Classification of Decision-Making Topics

Dimension	Mechanism
Analytical	• Perception and deep understanding of the issue • Recognition of solutions • Identification of signs and symptoms of the issue
Occurrence Conditions	• Certainty • Uncertainty: Risk, lack of certainty, ambiguity (fuzzy) • Contradiction
Nature	• Ordinary • Critical • Opportunities
Thinking Style	• Linear (analytical, reductionist) • Systemic (non-linear, holistic) • Strategic and intelligent

Analytical Dimension. Issues are generally classified into three types based on their analytical approach: perception and deep understanding of the issue, recognition of solutions, and identification of signs and symptoms of the issue. These three factors provide a foundation for making the right decision.

Every decision-making topic must be understood with precision. Understanding it in depth is the essence of grasping its core. Individual perceptions help maintain or defend against undesirable events, as individuals adjust their behavior accordingly. Negative information can distort the perception of meanings, variables, realities, and relevant issues or even completely obscure them, whereas positive and beneficial information has the opposite effect.

For example, if a department manager fails to recognize the growing need to encourage specialists to participate in in-service training and, at

the same time, this matter is highly valued by senior management, with allocated funds and facilities, the department manager may lose this opportunity, leading to misalignment. Therefore, the perceptual aspect of an issue is crucial, as managers differ in their ability to recognize and comprehend an issue.

Recognition of Solutions. This aspect refers to the method of deriving conclusions based on solutions. In practice, the manager (decision-maker) must carefully gather evidence regarding the issue at hand to gain a proper understanding of its solution and address it within the decision-making framework without rushing. Upon initial diagnosis, the manager should not hastily settle on the first solution that comes to mind without analyzing its cause(s).

For example, a department manager may claim that the motivation of employees in providing quality services has declined and, therefore, suggest that motivation be solely reinforced by the HR department. However, there may be alternative solutions. Perhaps the selected motivation factor is due to insufficient information, but if one only focuses on solutions without a thorough analysis of the problem, the importance of decision-making may be overlooked.

Identification of Signs and Symptoms of the Issue. Individuals must recognize the signs and symptoms indicating an issue to correctly identify its existence and avoid misinterpretation. Diagnosing one or more signs related to an action, without conducting a logical and comprehensive analysis to define the issue precisely, does not justify assuming the presence of a problem. Signs alone do not necessarily represent the complete nature and scope of the issue.

For instance, a 25% reduction in service provision by specialists is a sign of a problem, not the problem itself. The manager must identify the root cause of the decline to uncover the actual issue. If the mechanisms of the analytical dimension for recognizing decision-making topics are ignored, they can become obstacles to decision-making.

Nature of Issues. Organizational issues are typically categorized into three types based on their nature:

a) Opportunities, b) Critical issues, c) Ordinary issues

Critical and ordinary decision-making issues usually manifest themselves as indicated in Table 2, and it is the manager's responsibility to identify them in a timely manner and steer them in the right direction. Ordinary decision-making issues emerge from routine operations and are repetitive in nature. These routine tasks were once new and carefully considered, with plans devised for their execution.

Critical issues arise due to disruptions in the sequence of operations, unavailability of required resources, loss of a skilled individual, and similar factors. The main distinction between routine and critical issues lies in their scale—routine issues are much smaller in volume and scope compared to critical issues. Critical issues have a broader structure and are often influenced by external organizational factors.

On the other hand, opportunities must be identified and selected outside the organization. Opportunities must be discovered. Most managers do not document events, and ultimately, those who are less meticulous lose potential opportunities. Given that most critical and routine issues require immediate attention due to their nature, managers must allocate time to address them swiftly.

As a result, the decision-making process becomes integrated, where the four stages (3-6) are completed collectively without excessive time consumption, relying more on mental and perceptual aspects. This allows managers to dedicate time to identifying significant and new opportunities. Many organizations, through effective management and delegation, avoid routine and critical issues and instead move toward long-term and extensive opportunities by planning, setting objectives, and strategic execution.

Table 2. Nature and Characteristics of Decision Themes

Handling Approach	Essential Characteristics	Approach Type
• Immediate attention required, time-consuming • Immediate attention required, time-consuming • Long-term activity and extensive action based on goals and plans	• Self-Evident • Self-evident • Requiring Exploration	• Critical • Ordinary • Opportunities

Conditions of Occurrence. Issues are typically categorized into three types based on their conditions of occurrence:

a) Under Certainty Conditions: Issues occurring under certainty conditions are called single-outcome reliable or dependable issues, as it is clear what will happen in the future. In this situation, each decision leads to only one outcome. Reliable information, accurately measured, is available to facilitate decision-making. Thus, the future is easily predictable, the situation is controlled, and the result is definitive.

b) Under Uncertainty Conditions: Issues arising under uncertainty reveal situations where the outcome is not definite. If a decision has at least two or multiple possible outcomes, uncertainty applies. In this context, issues are further categorized into ambiguous, risky (hazardous), and uncertain situations.

In ambiguous and risky conditions, when a decision is made, the feasibility, probability, and accuracy of the decision's results are determinate and predictable. Sufficient information is available, but outcomes may appear in diverse forms and across broad domains. Fuzzy logic and probabilities may be applied to forecast outcomes. However, if there is insufficient information and probabilities or similar rules cannot be used for prediction, uncertainty conditions arise, making it impossible to predict outcomes.

c) Under Contradiction Conditions: In contradiction conditions, a duality emerges between decision-making situations and conflicting in-

terests. The benefit of one choice may simultaneously harm another choice, and vice versa. Thus, conflict and contradiction arise in decision-making. (Arabzadeh, 2010; McLucas, 2004).

Thinking Styles. Essentially, in identifying the nature and characteristics of decisions, several thinking styles exist. From a neurological perspective, human thinking can be categorized into five types, as illustrated in Figure 4.

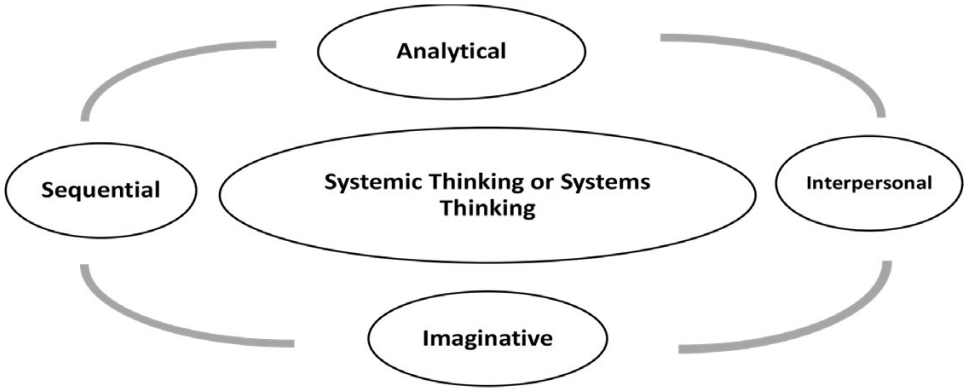


Figure 4. Types of Thinking

- Analytical Thinking. This type of thinking relies on data, facts, logic, and efficiency. Individuals with this thinking style operate in a logical, realistic, critical, technical, specialized, analytical, and quantitative manner.

- Sequential Thinking. Structure, details, principles, and plans play a crucial role in this thinking style. Individuals with sequential thinking are conservative, structured, methodical, detail-oriented, principled, and systematic planners.

- Imaginative Thinking. This thinking style is based on insight, context, future orientation, and innovation. People with imaginative thinking work in a visual, holistic, intuitive, innovative, conceptual, and creative way.

- Interpersonal Thinking. Values, symbols, communication, and emotions are the key components of this thinking style. Individuals using interpersonal thinking are people-oriented, dynamic, emotional, spiritual, empathetic, and value-driven.

Thus, individuals with analytical thinking learn through reliable sources, external learning, and judgment analysis. In contrast, sequential thinkers acquire knowledge procedurally, developing it through experimentation, practice, practical viewpoints, and structured skills, emphasizing organization and details.

Meanwhile, those with interpersonal thinking engage in interactive learning, gaining knowledge through experience, feedback, discussions, and values, relying on people's emotions. On the other hand, imaginative thinkers have internal learning, relying on insights derived from imagination, visualization, and creativity.

Humans establish preferences or dominant thinking modes for themselves within each of these four thinking styles. This dominant mode is referred to as "Cognitive (Thinking) Preference." A higher skill level and quick response are among the advantages of this cognitive preference. The stronger a person's preference in one thinking style, the greater their discomfort or reluctance toward the opposing style.

Nonlinear (Systemic) Thinking. Nonlinear thinking leads to the development of an open decision-making model that interacts with the environment. Systemic thinking is a comprehensive approach to gaining structured insight into complex situations and problems to make the advantages of systemic thinking accessible to everyone. Systemic thinking differs from systematic thinking and system thinking approaches

Table 3: Systemic and Systematic Thinking

Systemic Thinking	Systems of Thinking	Systematic Thinking
-Integrating linear and nonlinear analytical thinking with combinatory thinking to foster multi-perspectival thinking -Analytical thinking is more effective when combined with combinatory thinking -Linear analytical thinking (fragmented analysis)	-In linear thinking, reductionism, fragmented analysis, and external observation dominate	-Thinking about how phenomena interact with each other -Methodical thinking -A multi perspective approach with a systemic focus

In Figure 2, a conceptual framework for understanding systemic and analytical thinking is presented. The systemic thinking approach intertwines linear and nonlinear analytical thinking with combinatory thinking, fostering a multi-perspectival outlook. Analytical thinking is more effective when used in conjunction with combinatory thinking. Linear analytical thinking (reductionist analysis) results in the development of a closed decision-making model that lacks interaction with its environment. In contrast, nonlinear thinking emphasizes holistic perception, goal orientation, introspection, and environmental assessment.

The focus of combinatory (holistic) thinking—which arises from systemic, strategic, and intelligent thinking—is abbreviated as Tem Sareh.

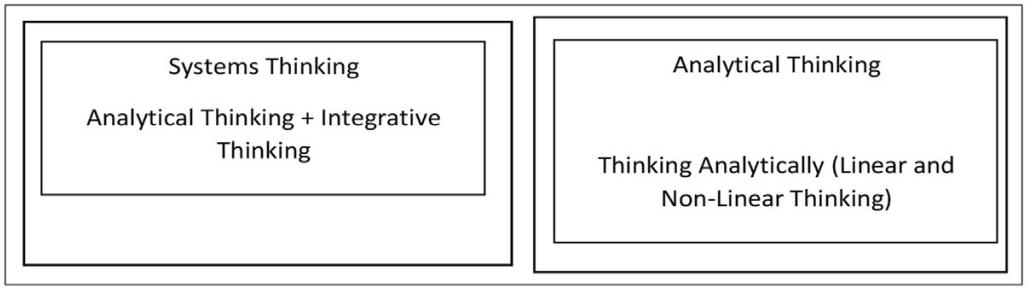


Figure 5. Comparison Between Analytical and Systemic Thinking

Systemic thinking, which complements analytical reductionist thinking, greatly assists planners in adopting a holistic and comprehensive perspective. The study of intellectual paradigms, analytical methodologies in sciences, and epistemological approaches are subjects in the philosophy of science that executive planners and managers can leverage in formulating plans to achieve developmental goals.

Nonlinear thinking is holistic, goal-driven, introspective, and environment-sensitive. Systemic thinking is not confined to a single scientific discipline; rather, it is an interdisciplinary approach. It focuses on wholes rather than components, fundamentally shifting the mindset from specialized compartmentalization to integrating insights from different disciplines, thus enhancing intellectual effectiveness.

Systemic thinking contemplates the interrelated components of complex systems. A system consists of a set of 1) interdependent and 2) interconnected components that 3) form a unified structure to 4) perform specific functions while 5) generating synergy, 6) collaboration, 7) regeneration, 8) structured communication, control, and feedback mechanisms in interaction with the environment. Additionally, systems possess 9) self-determination capabilities aimed at 10) achieving specific objectives in 11) functional coordination to establish a 12) unified, 13) goal-oriented, 14) energetic, and 15) dynamic entity.

This system exhibits five key characteristics:

1. Dynamic Movement (Being Adaptive),
2. Interactive Behaviors,
3. Causal Cyclic Behaviors,

4. Dynamic Mechanisms,
5. Feedback-Driven Applications

Systemic thinking is rooted in the following elements:

1. Creativity and Lateral Thinking – Developing diverse solutions, conceptualizing skill functionality, and the "mechanism of thought".
2. Managing Constraints – Any factor that limits the efficiency and performance of a system relative to its objectives.
3. Creative Problem-Solving – A structured methodology for innovative problem resolution.
4. Interactions – multi-directional internal and external communications influencing impact and responsiveness.
5. Processing – Natural language processing (NLP), a subset of artificial intelligence, which is used for analyzing and synthesizing large volumes of textual and non-textual data.

This approach embodies group thinking among networked individuals, who engage in discussions regarding beliefs, values, and systems to determine whether they align with the goals of their work environment. Systemic thinking, which emphasizes networking the components of a phenomenon under study, is a critical method for knowledge enhancement, growth, and achieving sustainable success within systems.

Figure 6 illustrates the interaction between internal and external environments, highlighting diverse challenges that emerge. Figures 7 and 8 present these two thinking approaches. Table 3-1 outlines the features of each thinking style in advancing decision-making and problem-solving.

As a result, it becomes evident that systemic thinking empowers managers to develop a mental model of realities, facilitating better problem resolution. In essence, this thinking approach fosters an open decision-making model, where every issue or system is considered part of a larger problem or system with interdependencies among its various components.

Thus, environmental factors and personal attributes—such as interests, motivations, and objectives—affect decision-making. In contrast, lin-

ear thinking disregards the impact of personality, interests, motivations, and individual goals (Gibson, 2012)

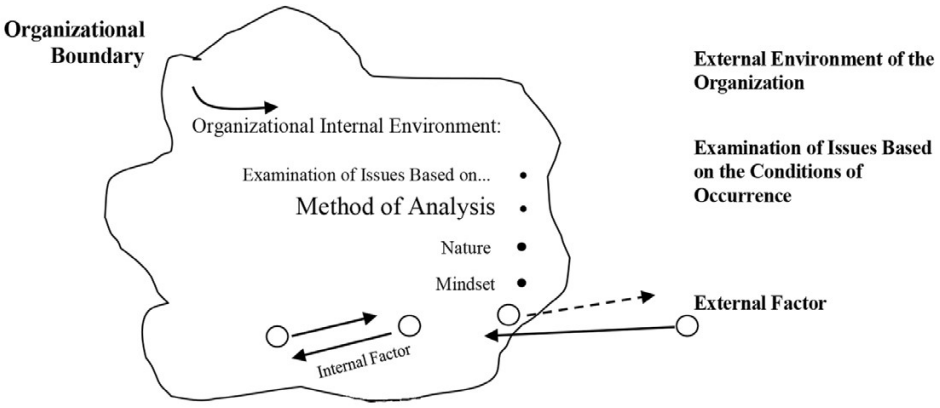


Figure 6. Interaction Between the Internal and External Environment of the Organization

4. Identification and Development of Solutions

This stage involves designing the methods, tools, and strategies for resolving issues. Before making a final decision, the potential solutions must be identified, determined, and their probable outcomes evaluated.

For instance, a department manager might identify an inadequately trained specialist as the primary cause of a decline in expert service delivery. The management should then identify potential solutions as follows:

a) Implementing a specialist training program by the organization's training unit.

b) Conducting a specialist training program through an external professional training organization.

c) Enhancing on-the-job training with more intensive and updated programs.

The process of developing solutions is truly an exploratory effort, in which both the internal and external environments of the organiza-

tion are examined to gather relevant information for designing possible solutions. It is evident that this research should be conducted within cost constraints and a given timeframe. However, comprehensive efforts in structuring and formulating solutions are necessary to ensure a precise selection of the best approach.



Figure 7. The Model of Linear Thinking

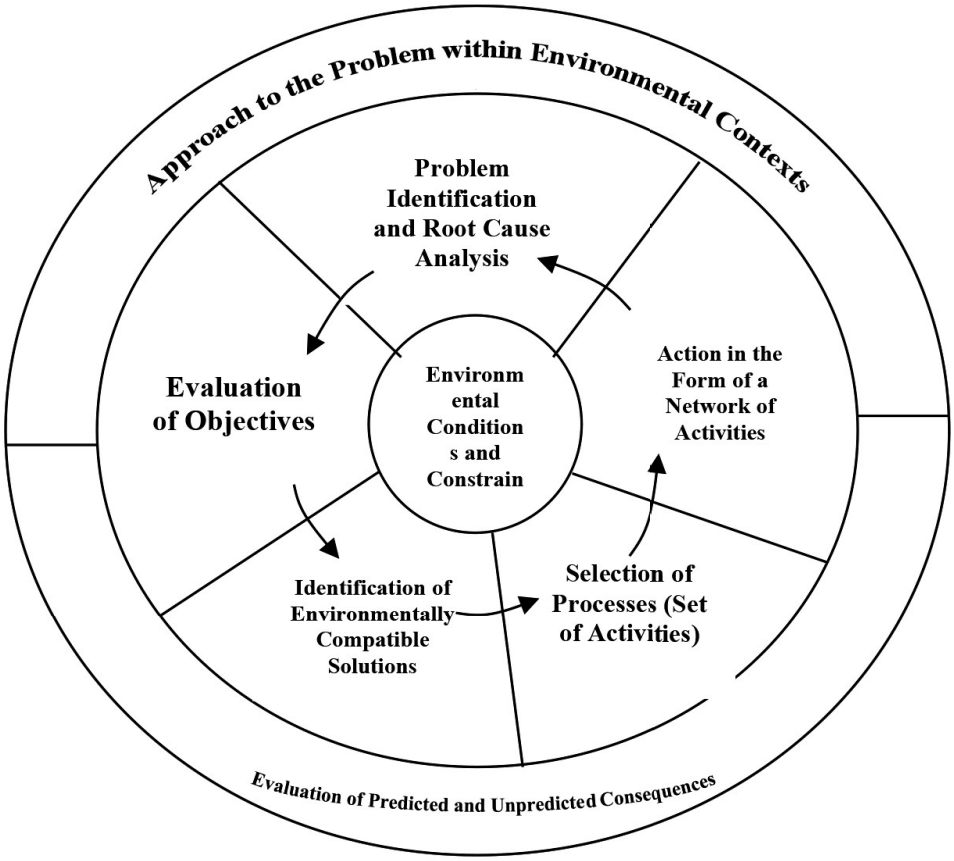


Figure 8. Systemic Thinking Style Model

Environmental Conditions and Requirements, Issue Identification and Causal Analysis, Examination of Goals, Process Selection (Set of Activities), Action as a Network of Activities, Identifying Solutions Based on Environmental Conditions, Viewing the Issue Within the Context

of Environmental Conditions, Examination of Expected and Unexpected Outcomes.

Table 4. Characteristics of Linear and Non-Linear Thinking in Issue Identification and Resolution

Feature	Linear Thinking (Analysis-Oriented)	Non-Linear Thinking (Systemic)
1	Identifying the issue in a segmented and case-specific manner	Identifying the issue within the framework of goals and the environment (goal analysis).
2	Considering the occurrence of an issue as single-causal.	Recognizing the emergence of an issue within environmental conditions (causal analysis).
3	Accepting a single solution as sufficient for resolving the issue	Determining multiple solutions for the issue (identifying solutions based on environmental conditions).
4	Identifying a solution based on expected impacts.	Selecting a process involving a set of actions (realities).
5	Choosing a single solution.	Predicting the consequences of the issue within environmental conditions.
6	Treating the issue as resolved upon implementation.	Acting within a network of realities; solutions are assessed by identifying and measuring both predicted and unpredicted outcomes. The issue does not stop, as conditions continue to evolve.

5. Evaluation of Solutions

After structuring and developing possible solutions, it is necessary to

evaluate and compare them. In every decision-making scenario, the objective is to choose a solution that yields the most desirable results. This further emphasizes the necessity of having clear goals and objectives for decision-making and potential organizational restructuring. When selecting solutions, the decision-maker must thoroughly review prior goals and objectives. The relationship between a solution and its outcome is based on three possible conditions:

a) Certainty: This condition indicates the availability of sufficient information, as the decision-maker has adequate knowledge about the probability of outcomes for each solution. The selected solution results in a single definite outcome.

b) Uncertainty: There is very limited information, and the decision-maker cannot determine the probability of outcomes for each solution. Although multiple outcomes may exist, evaluating them is not feasible due to the lack of clarity in their probabilities.

c) Risk: Information is limited, yet the decision-maker can estimate the likelihood of different outcomes for each solution. Based on these estimated probabilities, the most favorable solution is selected.

The most common scenario in decision-making is under conditions of risk. In such cases, statisticians and operations research analysts can assist decision-makers in evaluating and ranking solutions effectively. The methodologies used in these analyses offer significant benefits in assessing solutions.

Table 4-1 presents several approaches for evaluating solutions. These approaches are applied based on the specific characteristics of a decision-making issue and the solutions proposed for it. For instance, if multiple solutions with different conceptual perspectives are suggested, it is necessary to use several evaluation approaches from Table 4-1. Ultimately, the solution that receives the most favorable evaluation and aligns with the decision-maker's preferences is selected.

Table 5. Approaches to the Evaluation of Solutions

Evaluation Approaches	Characteristics
Goal Achievement Approach	• Assessing the effectiveness of solutions in terms of achieving objectives using available means and resources. • Rational and goal-oriented solutions within the framework of: • Adaptability of solutions to the organization's (or problem's) intermediate and final objectives. • Adaptability of solutions to the conditions and assumptions of the objectives. • Solutions being as controllable and manageable as possible. • General consensus on the usefulness of the solutions. • Defining measurement indicators for solution operations. • Using management by objectives as a tool for assessing solution effectiveness.

Evaluation Approaches	Characteristics
Systemic Approach	• Adaptability of solutions to the ultimate and intermediate objectives of the problem (or organization). • Examining objectives within a set of precise criteria as a component. • Emphasizing long-term growth and survival criteria of the organization, such as: * The organization's ability to acquire resources. * Maintaining itself within a social phenomenon. * Successful interaction with the external environment. • Considering specific outcomes and the means to achieve objectives. • Addressing mechanisms for solutions to adapt to environmental relationships to ensure: • Continuous data reception. • Production of acceptable outputs. • Flexibility in responding to environmental changes. • Organizational efficiency in converting inputs to outputs. • Clarity in internal communication. • Level of conflict among organizational groups. • Employee job satisfaction. • Adaptability of solutions to input-output ratios and other organizational efficiency metrics. • Acknowledging mechanisms and solutions that account for interdependencies among organizational realities.

Evaluation Approaches	Characteristics
Strategic Factors Approach	• Solutions' compatibility with environmental demands to ensure organizational survival. • Solutions' compatibility with interdependencies among organizational realities at different levels. • Recognizing organizations as political arenas when selecting solutions. • Adaptability of solutions to the pursuit of problem (organization) objectives within the framework of: • Environmental compatibility. • Benefits and public consensus. • Identifying the strengths and weaknesses of solutions within the organization's internal environment. • Identifying opportunities, capabilities, and demands of solutions within the external environment. • Identifying threats, constraints, and limitations of solutions within the external environment. • Recognizing and determining the key critical factors affecting the organization's survival by top management. • Evaluating the relative power of solutions within the framework of key survival factors. • Determining expectations of key critical factors influencing solutions for organizational survival. • Comparing different expectations, determining shared and conflicting expectations, categorizing strategic factors, and setting various objectives

Evaluation Approaches	Characteristics
Competitive Values Approach	• Identifying key variables in the effectiveness of solutions. • Determining how key variables relate to each other in solutions. • Defining evaluation criteria for solutions based on decision-making positions and benefits, such as: * Return on investment. * Market share. * Product innovation. * Job security. • Evaluation objectives being based on personal values, preferences, and individual benefits. • Using competitive values in solution evaluations with the following characteristics: * Flexibility vs. Control: * Valuing flexibility for innovation, adaptability, and change. * Valuing control for stability, order, and predictability. • Emphasizing well-being and improvement of organizational members. • Emphasizing organizational improvement. Emphasizing organizational means and resources (considering long-term internal processes). • Emphasizing final organizational outcomes (focusing on short-term results). • Focusing on flexibility, resource acquisition, planning, efficiency, effectiveness, access to information, stability, cohesive workforce, and skilled workforce

Evaluation Approaches	Characteristics
Operations Research Approach	• Using models to understand and rely on solution modeling. • Identifying and determining dependent variables influencing solutions. • Classifying quantitative statistical, mathematical, and research techniques based on solution characteristics and assumptions. • Identifying solutions based on decision-making situations. • Applying quantitative evaluation techniques based on occurrence conditions, such as: • Certainty. • Uncertainty (risk, ambiguity, contradiction).
Economic Approach	• Applying economic governance laws with an emphasis on cost-benefit analysis techniques for evaluating solutions. • Using final and incremental decision rules to assess solutions according to their efficiency. • Considering efficiency criteria, including: • Technical efficiency. • Allocation efficiency. • Internal efficiency. • Dynamic efficiency. • Economic efficiency

Robbins, 2005; McGuigen et al., 2007; Hamidizadeh, 2021.

6. Choosing solutions

The objective of selecting a strategy is to solve a problem to achieve predetermined goals. This is highly significant as it demonstrates that a decision is not an end in itself but merely a tool for attaining the final objective. While decision-makers select a strategy to reach their goal, this selection should not be considered an isolated action. If it is

perceived as such, the factors leading to decision-making and guiding it might be overlooked. Specifically, decision-making processes must include implementation, monitoring, and evaluation of the impacts of the strategies.

The execution of a decision signifies the process of establishing infrastructure and providing necessary tools for fully implementing the embedded plan. Hence, even the best decisions will not lead to success without proper execution. In an operational sense, execution entails activities such as:

1. Developing organizational action plans and scheduling their implementation,
2. Establishing the organizational execution structures,
3. Defining systems for discipline, reward, punishment, and organizational performance,
4. Preparing and provisioning the required tools and infrastructure for the organization.

An organization is more successful when it can execute its decisions using the best implementation methods. However, it must be noted that even a weak decision cannot be successfully executed, no matter how well it is implemented. The critical point is that decision-making is not a mechanical action but a dynamic process. Many managers select strategies that achieve one objective at the expense of others. Organizations generally cannot attain two equivalent goals simultaneously. If one objective is optimized, the optimization of another is reduced accordingly. For example, improving service delivery in an organization may come at the cost of employee morale, and vice versa. Therefore, decision-makers must navigate conflicting goals, as they operate in real-world contradictory environments.

In some cases, organizational goals may rely on social and public objectives. The presence of consumer advocacy groups and environmental organizations supports this notion. These groups prioritize societal concerns over organizational priorities and may challenge them. However, when an organization's goal conflicts with another organization's

goal or with societal interests, the values of the decision-maker become significantly influenced by the selected strategy. Individual values impact the decision-making process, and their consequences must be clearly understood.

In decision-making, sometimes achieving optimal solutions is impossible. Decision-makers do not have complete probabilistic knowledge of all available strategies and their consequences. Instead of striving for absolute optimization, if decision-makers focus on achieving satisfactory outcomes by evaluating and selecting strategies based on organizational and environmental conditions, they can better utilize organizational resources.

7. Implementation of Decisions

If a decision cannot be implemented, it indicates that the decision-maker is highly theoretical. In other words, decisions must be efficiently executed to achieve their intended purpose. Sometimes, decisions appear excellent on paper but lack the necessary characteristics for execution. Thus, implementation plays a crucial role in selecting strategies that align with conditions and available resources. In most cases, the correctness of a decision can be assessed by studying the behavior of those affected by it. Employees, unlike other resources, cannot simply be controlled. The validity of a technical decision can be determined by the satisfaction or dissatisfaction of employees. Therefore, management must not only select appropriate solutions but also transform these solutions into appropriate organizational behaviors. This can be achieved by establishing effective communication with individuals and groups.

Target and Instrumental Variables. To implement decisions, they must be categorized into target variables and instrumental variables.

- Target Variables: These variables are those whose attainment at specific, desirable, and satisfactory levels is the objective. Examples include market share, production levels, productivity rates, and production costs. These variables are significant because reaching their optimal levels directly impacts the organization's performance.

- Instrumental Variables: These are the variables through which decision-makers can effectively steer organizational objectives and determine their levels with relative precision. Target variables are influenced by variations in instrumental variables through existing relationships. Instrumental variables are further divided into primary instrumental variables and intermediate instrumental variables, both of which facilitate the achievement of target variables.
- Primary Instrumental Variables: These are variables that organizational experts can directly manipulate to achieve their goals. They serve as the foundation for goal attainment and mark the initial steps toward reaching organizational objectives.
- Intermediate Instrumental Variables: These variables act as mediators in transmitting the effects of primary instrumental variables onto target variables. They form a bridge between target and primary instrumental variables, either facilitating (accelerators) or hindering (barriers) the attainment of specific target levels.

Now, when taking steps in strategic decision-making, it is essential to consider the causal dimension along with its associated components (Figure 8).

1. Content: What is the decision's substance, in what environment, and under what conditions and assumptions?
2. Scope: Which groups of objectives should be prioritized in the network?
3. Essence: What benefits and advantages will the decision provide to its stakeholders?
4. Style: What kind of distinct behavior should be adopted to highlight the knowledge-based actions of decision stakeholders?
5. Changes: How much of the decision has already been realized, and to what extent does its current position require modification?
6. Outcomes and Consequences: Given the rationale behind the decision, what results, achievements, and impacts will it generate?

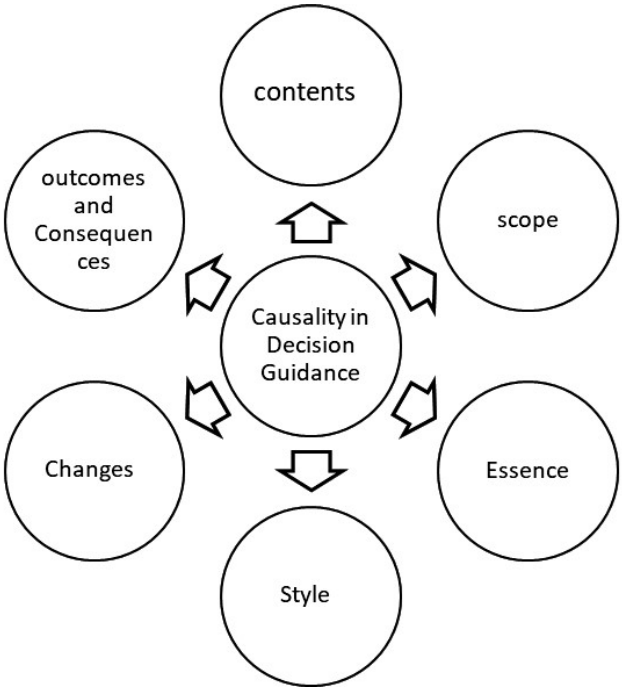


Figure 8. Causality in Decision Guidance

Decision implementation is a subject with clear and explicit boundaries. To thoroughly examine this topic, providing an accurate and well-defined definition is essential. Decision implementation refers to the realization of the predetermined outcomes of a decision at both the organizational and business levels. An organization successfully implements a decision when it can materialize its planned competencies, competitive advantages, enablers, and business portfolio in practice. Similarly, if a business unit can deliver its expected value proposition to its target customer through its competitive advantages, it has effectively implemented and operationalized its decision.

At times, there exists a gap between the ideal and actual states. This gap can be attributed to 1) incorrect assumptions in planning, 2) rapid changes in environmental factors, unforeseen events, and similar occurrences. Therefore, an organization is always in the process of fully implementing its decisions. Thus, this concept can be defined as the continuous reduction of the gap between an organization's predicted objectives and the actual business outcomes.

Principles of Decision Implementation. These principles represent five fundamental aspects: causality, significance, alignment, continuity, and transparency.

1. Principle of Causality: This principle involves identifying the activities that lead to the achievement of the organization's decision-making goals and ensuring that plans, projects, systems, and organizational processes are aligned accordingly.
2. Principle of Significance: This principle focuses on prioritizing critical functional activities that have been identified as necessary to achieve decision-making objectives.
3. Principle of Alignment: This principle ensures that essential activities are not in conflict with each other and that they collectively guide the organization toward the intended direction.
4. Principle of Continuity: This principle emphasizes the alignment of plans, projects, systems, and organizational processes with the defined objectives of activities, ensuring their execution and accountability for their outcomes.
5. Principle of Transparency: Ensuring intellectual clarity in the decision implementation process reflects the importance of transparency. In this principle, individuals must have a clear understanding of the decision, the method of its implementation, and the associated roles and responsibilities.

8. Evaluation and Control

Evaluation involves assessing decision implementation activities based on the decision's objectives. By collecting data on the progress of activities, organizations can determine the extent to which objectives have been achieved. Efficient management periodically measures decision results and compares them with the set goals. This process is called strategic control, where actual decision results and performances are compared with predicted outcomes (goals). In case of deviations, necessary corrections and modifications must be applied.

The importance of measurable objectives is reaffirmed here, as per-

formance assessment is impossible without them. If necessary, adjustments should be made in one of the following areas: (1) selecting an alternative solution, (2) the implementation phase, or (3) the initial goal if it is deemed unattainable. If the primary goal is revised, the entire decision-making process must be reactivated.

Strategic Control. Strategic control consists of four key stages:

1. Control of Principles and Assumptions: Every strategy is based on specific principles and assumptions that guide its progression.

•Environmental Factors: These include the quality of knowl-

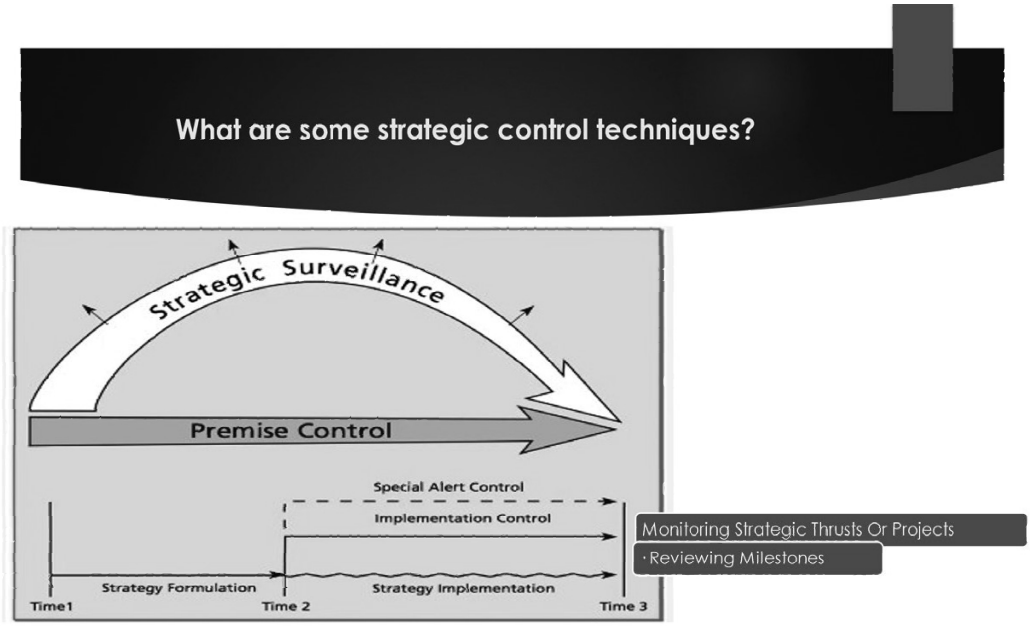


Figure 9. Some strategic control techniques

4. Control of Special Awareness. This type of awareness essentially falls under the three previously mentioned types of control, encompassing aspects of bias (systematic and directional deviations) and noise (irregular and scattered disturbances) while also accounting for unexpected and random events. This type of control involves recognizing signs and indications of occurrences, trends, opportunities, threats, and similar factors. Therefore, these controls require strategic operations and monitoring during execution, the identification of hidden issues, and necessary adjustments.

A crucial point is that, during the implementation of a decision, a manager cannot assume that the initial target will inevitably be achieved. Instead, they must design and implement control and evaluation systems to ensure the realization of actual results. In most centralized organizations, middle managers have the ability to make decisions. In decentralized systems, decision-making is carried out at much lower levels of the organization. By delegating authority and responsibility to middle managers, they can make quick decisions without having to wait weeks for approvals within the organization.

Criteria for Evaluating the Potential Efficiency of Scientific Decisions (Gibson, et al, 2012; Jagdev et al., 2004).

1. Objective Quality of the Decision: This criterion examines the extent to which the formal decision-making process has been implemented. The degree of realization of this process reflects its adaptability to conditions, resources, employee capabilities, and financial and technical capacities.
2. Acceptance by Implementers: This criterion assesses the level of satisfaction and cooperation among individuals involved in executing the decision.
3. Level of Goal Achievement: The extent to which the objectives have been met through the implementation of the decision is evaluated. Essentially, it measures what portion of the intended goals has been realized.
4. Extent and Quality of Impact (Positive and Negative) on Other Decisions: Does the decision operate in isolation with only its direct consequences, or does it serve as a foundation and catalyst for other decisions?
5. Degree of Business Sustainability and Capital Growth: This measures how much the decision has contributed to prolonging the lifespan of operations and generating added value.
6. Relative Contribution of the Decision's Potential in Enhancing the Organization's Long-Term Survival and Development.

Conclusion

Through decision-making, managers not only define and give meaning to an organization but also articulate its internal and external dimensions and establish its scope. Based on the discussions and analyses presented in this chapter, the following conclusions can be drawn:

- The fundamental determinant of an organization's success or failure in achieving its goals and fulfilling its duties is the structure, dynamic processes, and behavioral patterns of decision-making.
- The scientific decision-making process enhances problem-solving by leveraging systematic thinking and a systemic approach. This process applies both to structured, independent, pre-planned decisions and to unstructured, spontaneous, and dependent decisions by providing appropriate mechanisms.
- The scientific decision-making process is influenced by past experiences and performance, cognitive, analytical, and perceptual skills, information accuracy and breadth, and situational opportunities. Rational and logical use of these factors is essential.
- Decisions serve as mechanisms and tools for achieving objectives, fulfilling expectations, and shaping performance. They initiate processes rather than being the ultimate goal or performance outcome.
- Decisions reflect the intellectual and analytical capabilities of an organization, demonstrating its expertise in problem-solving.
- Rational organizational decisions embody the identity, character, independence, and commitment to justice of an organization and invite judgment from stakeholders.
- Every decision is either a step toward achieving the organizational goal or a step away from it.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analyti-

cal dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. Explain the gradual transformation of the decision-making process in the contemporary era from the perspective of management scholars.
2. Why does the decision problem arise and with what nature?
3. What factors influence decision-makers when making a decision?
4. Outline the frameworks of rational–organizational decision-making.
5. What stages constitute the dynamic and behavioral process of decision-making?
6. Elaborate on the decision-making model for opportunity-based issues.
7. Explain the methods for identifying and classifying problems from different dimensions.
8. Explain the model and characteristics of linear and systemic thinking, and state their differences.
9. Write the stages and differences between the goal-oriented approach and the systems approach in evaluating alternatives.
10. Write the stages and differences between the strategic factors approach and the competing values approach in evaluating alternatives.
11. Write the stages and differences between the operations research approach and the economic approach in evaluating alternatives.
12. What relationship exists between the selection of alternatives and the implementation of decisions?
13. What are the indicators for evaluating the potential efficiency of rational–organizational decisions?

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chap-

ter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. Without decision-making, no action or activity in organizations begins or materializes; thus, managers are always confronted with the problem of choice in organizations.
2. John Dewey described the decision-making process as incremental, asserting that through incremental change, the decision-maker gradually achieves the intended outcomes via a series of successive decisions.
3. According to Lindblom, the decision-making process is described as incremental, since with gradual changes in conditions and environment, the decision-maker arrives at the desired outcomes through a series of successive decisions.
4. The application of Lindblom's model pertains to decision problems that are novel and emerging in nature.
5. If the search in the decision-making process results in exploration within the vicinity of obvious alternatives, the decision-making process assumes an exploratory character.
6. According to Mintzberg, the decision-making process comprises three stages: (1) the identification stage, including close observation and evaluation of internal and external organizational conditions; (2) the design stage, involving the identification, formulation, and evaluation of alternatives; and (3) the choice and implementation stage.
7. According to Ridg(e), efficient decision-making entails exploration for confronting error and willingness to respond through discovery.
8. Organizations generally face unresolved problems and unrealistic possibilities due to the mismatch between their expectations and reality, and their failure to achieve programmatic objectives.
9. In the process of organizational decision-making, managers typically, in pursuit of rationality, define the problem and gather all

relevant facts by considering the time horizon, scope of coverage, and sensitivity.

10. Any decision concerning human relations is strongly influenced by past experience, perceptual, cognitive, and analytical skills in recognizing opportunities under various conditions, professional knowledge and management, contextual factors, and magnanimity.
11. Decisions are not tools but goals; in fact, they are regarded as organizational mechanisms through which problematic situations are examined.
12. No essential difference exists between a transparent, flawless idea and the ambiguous, convoluted reality of managerial decision-making.
13. Individual perceptions cannot be considered as mechanisms of preservation or defense against unfavorable events.
14. Consistency and coherence are important in that missions, objectives, strategies, methods of implementation, budgets, and programs determine the framework of managerial decisions.
15. In linear thinking, the decision problem is examined in interaction with its environment.
16. The four stages of problem identification and classification, formulation of alternatives, evaluation of alternatives, and choice of alternatives, in critical and routine problems, are generally completed in a single step and rapidly.
17. Recognizing symptoms as an indicator of a problem is, in fact, a method of leaping to conclusions.
18. Analytically, problems are divided into three types: perceptual, definition in terms of solutions, and recognition of symptoms as problem existence.
19. If problems are classified according to certainty, uncertainty, and conflict, in fact their conditions and types are being considered.
20. In a risky and uncertain situation, once a decision is made about a problem, the probability and accuracy of decision outcomes are

determined and predictable.

21. The mode of thinking that leads to the development of a closed decision-making model without environmental interaction is systemic or linear.

22. In non-linear thinking, action is undertaken as a network of realities; the solution can be evaluated by identifying and measuring the network of outcomes.

23. In the goal-oriented approach to evaluating alternatives, the compatibility of alternatives with environmental demands for organizational survival is considered.

24. Organizations generally cannot achieve two goals simultaneously at the same level; if one goal is optimized, the optimization of the other diminishes proportionally.

25. Rational–organizational decisions demonstrate the identity, personality, independence, and justice-seeking of an organization and require the judgment of its stakeholders.

26. In a risk situation, information is limited; however, the decision-maker can specify the probability of outcomes of alternatives and select the preferred alternative based on estimated probabilities of results.

27. If the effectiveness of alternatives is measured in terms of the degree of goal achievement using available means and resources, the evaluation approach is of the goal-attainment type.

28. In the systems evaluation approach, attention to mechanisms and alternatives focuses on the interdependencies among organizational realities across the entire organization.

29. In the strategic factors evaluation approach, the identification and determination of key critical factors influencing alternatives for organizational survival is undertaken by top management.

30. In the competing values approach to evaluation, emphasis should be placed on the welfare and well-being of organizational members as well as the final results of the organization.

31. At times, an organizational objective may rest upon contextual or specific objectives.
32. The validity of a decision can be tested by studying the behavior of individuals affected by that decision.
33. Effective management periodically measures decision outcomes; without measurable objectives for performance, no valid judgment can be made.
34. By objective quality of a decision is meant the degree of satisfaction and cooperation obtained from individuals involved in decision-related issues.
35. Indicators of evaluating the potential efficiency of scientific decisions may include the degree of increased job survival, the augmentation of working capital, and the relative share of the potential capacity of the decision.

Chapter 2
Dynamics and Behavioral Implications

Objectives

- Understanding the dynamics, root causes, and behavioral consequences of individual decision-making from the perspectives of values, personality, risk inclination, adaptability, and flexibility.
- Familiarization with the consequences of group decision-making and a comparative analysis with individual decision-making.
- Examining the organizational factors influencing decisions in terms of policies, external constraints, and decision-making styles.

Introduction

Although the consequences and quality of a decision remain uncertain until it is implemented and assessed, decision science acknowledges the significance of shaping a new environment following the realization of decisions. Thus, it aims to guide decisions toward an optimal future environment by addressing both soft aspects (thoughts, plans, and visions) and hard aspects (methods, techniques, and structures).

Analysis of the Underlying Causes of Decisions

To properly analyze the root causes of decisions, it is necessary to follow a structured nine-step approach, as illustrated in Figure 3:

1. Origin Analysis: Identifying the core and source of emergence, as well as its objective.
2. Temporal Viability: Determining the time of occurrence, temporal conditions, and situational aspects of the subject.

3. Contextual Positioning: Assessing the subject's status and placement within time, space, geography, and its supporting entities.
4. Flow Dynamics: Identifying the flow in which the subject is embedded, its role within that flow, and the new flow it generates.
5. Variability: Recognizing the factors that induce change, assessing the sensitivity of the subject in different contexts (events, timeframes), and evaluating how it influences and is influenced by various conditions.
6. Uncertainty: Identifying uncertainty-inducing factors corresponding to the level of variability of the subject, understanding the nature of uncertainty, and analyzing the characteristics of uncertainty-generating environments.
7. Complexity: Analyzing how environmental factors interact with the subject and how intertwined these influences become.
8. Environmental Ambiguity Generation: Understanding how changeability, uncertainty, and complexity contribute to ambiguity over time and in various situations.
9. Destination Analysis: Evaluating the final trajectory of the subject within an evolving event flow, based on performance assessment, outcomes, and overall fate.
10. These nine aspects reflect the manifestations of past, present, and future phenomena and events within the relevant domain under study (Figure 1).

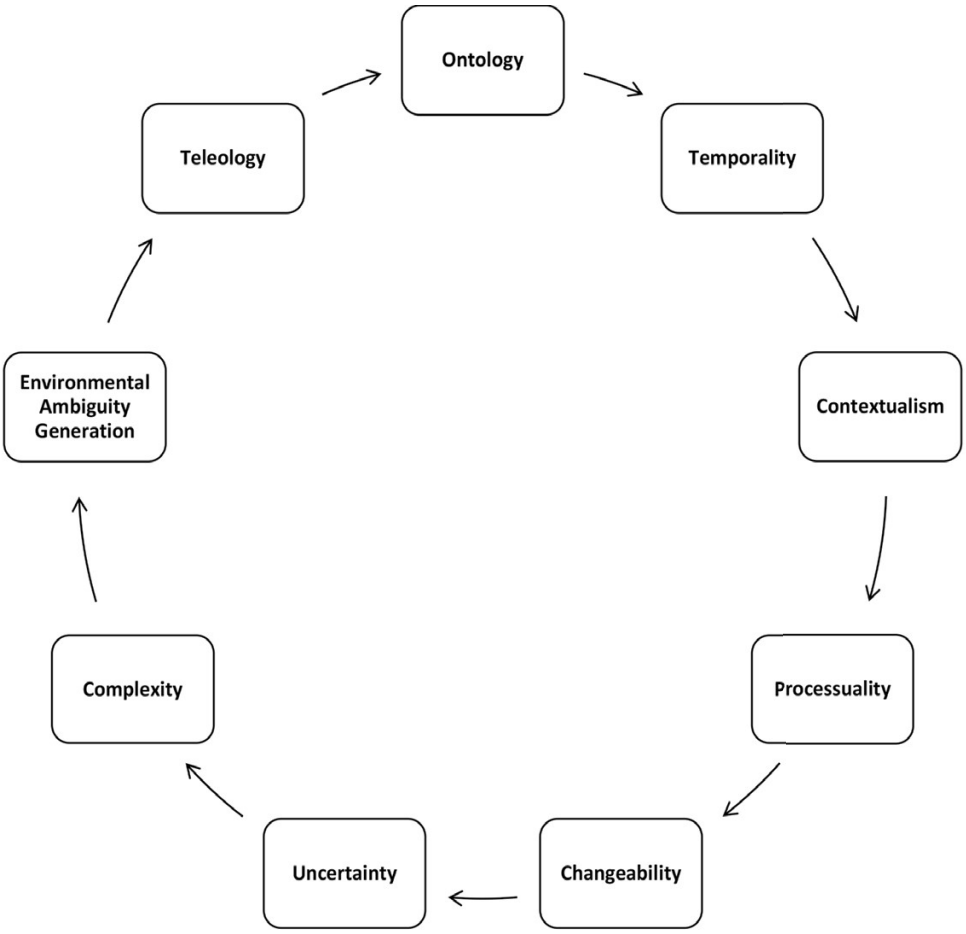


Figure 1. The Causal Loop of Phenomenology

To effectively manage the nine environmental conditions, the following nine strategic approaches must be applied:

1. Any given subject—whether an opportunity or a threat, a strength or a weakness—must be examined to determine its origin, core objective, and root cause(s). It is essential to analyze its source(s), driving forces, and limiting factors (intermediaries, mediators, and intervening elements). This foundational understanding guides the subsequent steps in analysis.

2. Temporal Analysis: Evaluating the chronological context of the subject, such as the season, month, week, day, or even specific hour of occurrence. Understanding the active temporal factors and time progression speed is crucial.

3. Situational Context: Defining the subject's position within its environment, stakeholders, and broader ecosystem while assessing its directional trajectory.

4. Flow Integration: Determining how the subject is shaped by existing flows, how it generates new flows, and its overall positioning within ongoing trends. Tracking past, present, and future event timelines in relation to the flow creates awareness, knowledge, behavioral insights, and strategic actions.

5. Variability Management: To navigate variability effectively, it is essential to monitor change-inducing factors and drivers of transformation within events and processes. This involves analyzing, modeling, and predicting change in a forward-looking and optimistic manner.

6. Uncertainty Reduction: Uncertainty should be mitigated through thinking (initial evidence), thoughtfulness (end-state analysis), and knowledge-based understanding of the environment and the subject under study.

7. Simplifying Complexity: Complexity should be deconstructed into well-structured and transparent components. This requires gathering subject-matter information, identifying goals and complexity-inducing factors, and leveraging mechanisms for homogenization to clarify intricate elements.

8. Identifying Ambiguity Factors: Ambiguity should be mapped by analyzing phenomenon patterns, movement paths, behavioral attributes, and feedback structures to refine, streamline, and enhance clarity in problem-solving.

9. End-State Analysis: Future outcomes of an event must be foreseen and analyzed through deliberate observation and reflection. By understanding expected results, strategic architectural and engineering interventions can shape the future trajectory of a given subject.

Decision-Making Dynamics and Future Orientation

Decision-making is inherently networked and dynamic, with strategic

directions evolving continuously over time. As environmental changes unfold, the capabilities and resources of decision-makers are subject to transformation. Decision dynamics and management encompass three distinct yet interconnected domains (Figure 4):

1. Cognitive Dynamics: This aspect relates to the decision-maker's perceptual mechanisms, which shape awareness and recognition. Cognitive dynamics rely on the psychological foundation of the decision-maker, meaning that decisions are influenced by individual cognitive structures rather than objective external realities.

2. Interpretive Dynamics: Decision-makers assess how stakeholders and external audiences react to internal and external changes. This process involves evaluating responses to external events and adjusting strategies accordingly.

3. Behavioral Dynamics: Once a decision is selected for implementation, behavioral dynamics take effect. Strategic decisions not only operationalize intended courses of action but also reshape the environment itself. Organizations utilize behavioral dynamics to influence both internal and external outcomes, driving performance and proactive engagement rather than merely reacting to events. Despite the common areas of the three types of dynamics, their mechanism of differentiation will help the dynamics of strategy. In interpretive dynamics, the main focus is on understanding the dynamics of 1) the goal, 2) the environment, 3) competitive advantages in challenges, and 4) how competitive resources change. However, in cognitive dynamics, the emphasis is on the causal structures and relationships that arise in it. However, in behavioral dynamics, the emphasis is on the activities that the organization implements in order to strengthen the enabling advantages and add values.

Tools for using future cognition techniques

These tools are the future cognition techniques according to Table 1 and Figure 2.

Every person needs to have insight into the future situation for their strategic decisions. The formation of the image of the future in the

minds of individuals plays a fundamental role in shaping their dynamic professional future. To achieve ideas, theories, and business strategies, the future cognition techniques in Table 2 can be used.

To be empowered in creating and utilizing those nine strategies of divination, it is necessary to have a positive attitude and feeling towards the conditions and characteristics of the environment in order to create a center of positive energy and focus on the resulting density, to manage the relevant matters in a thoughtful, pragmatic, and extraordinary way within the framework of time- ology.

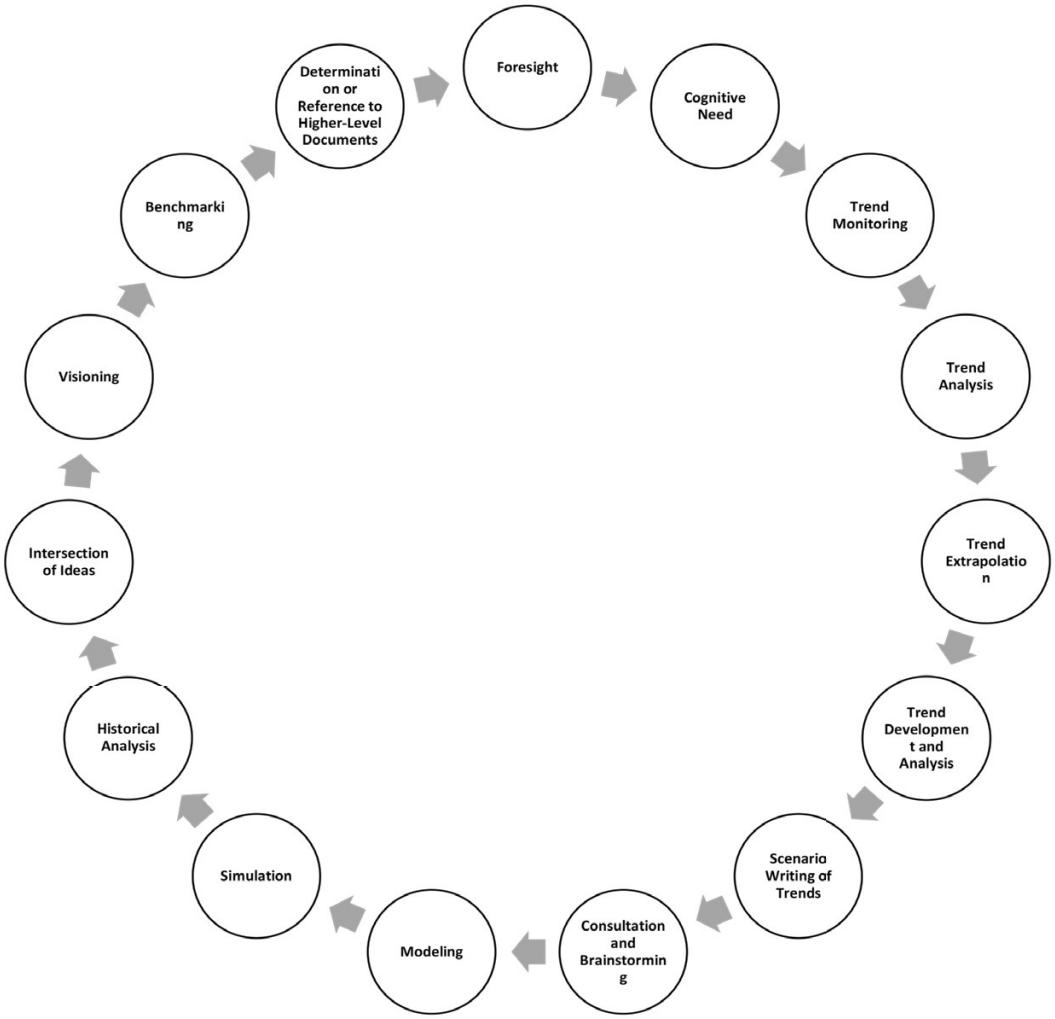


Figure 2: Sequence of Using Foresight Techniques in Decision-Making

Table 1. Future-Oriented Decision Analysis Techniques

No.	Technique	Description
1	Cognitive Need	Examining the needs of individuals and societies from the perspective of stakeholders and higher-level documents.
2	Foresight	Continuous monitoring of changes at various levels in diverse fields and resource bases.
3	Trend Monitoring	Detailed understanding of existing trends and their significance in industry or specific sectors.
4	Trend Analysis	Studying specialized trends with a focused perspective to discover the cause, nature, speed of development, and possible continuation.
5	Trend Extrapolation	Quantitative and qualitative extrapolation of the future based on past events and changes.
6	Trend Development and Analysis	Division and reanalysis of trend events based on their bases, structure, and outcomes.
7	Scenario Writing	Creating scenarios based on the combination of multiple assumptions and probabilistic logic.
8	Consultation and Brainstorming	Utilizing teamwork, collaboration, and brainstorming, especially from experts and professionals.
9	Modeling	Recreating events based on logical models and theoretical assumptions.
10	Simulation	Extracting and simulating results based on the created model and testing its alignment with real-world outcomes.

No.	Technique	Description
11	Historical Analysis	Analyzing past events, identifying exit points, and predicting possible future directions.
12	Intersection of Ideas	Gathering opinions from experts and practitioners to examine shared issues and challenges from different perspectives.
13	Visioning	Creating collective foresight about future possibilities and aligning on a unified long-term vision.
14	Benchmarking	Identifying key indicators of successful experiences in similar sectors.
15	Reference to Higher-Level Documents	Basing actions and decisions on higher-level documents, beliefs, values, and behaviors expected of individuals.

Understanding and analyzing consequences

To navigate future environments and steer decision-making toward optimal outcomes, it is essential to analyze influencing factors (Figure 3). The consequences of strategic decisions are shaped by individual, group, and organizational dimensions, as well as by internal and external organizational constraints (Drucker, 2007; Tuite & Chisholm, 2007).

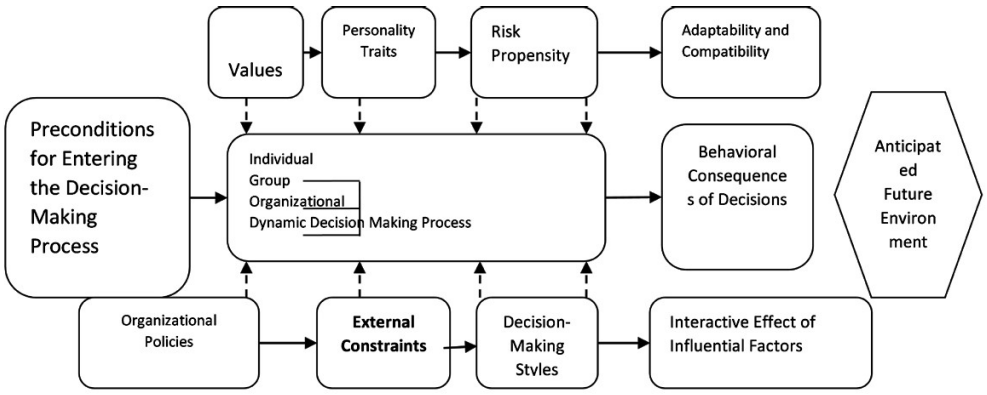


Figure 3. Factors Influencing and Affecting the Dynamic Decision-Making Process

Organizational decision-making is further shaped by:

-Decision-Making Styles – Formalized strategic approaches that guide organizational governance.

-External Constraints – Regulatory, political, and economic factors that limit decision-making autonomy.

-Organizational Policies – Internal frameworks that define permissible courses of action.

By synthesizing these behavioral and organizational perspectives, decision-makers can develop a holistic approach to navigating complex, uncertain, and evolving environments.

Behavior of individual decision-making mechanisms

Several behavioral factors that influence the dynamic and behavioral structure and process of decision-making can be examined. Some of them affect only specific aspects of the process, while others affect the entire process. Each of them can have an effect, so they must be fully recognized in the analysis of the scientific decision-making process and structure (Shapiro, 1997). In this section, four individual behavioral factors are examined:

1. Values – Core principles that shape decision-making frameworks.

2. Personality – Individual psychological traits that impact decision biases and risk tolerance.

3. Risk Appetite – The degree of willingness to engage in uncertainty.

4. Adaptability & Flexibility – The ability to adjust strategies in response to evolving environments.

Each of these factors interacts dynamically with decision-making processes, contributing to the overall strategic landscape and behavioral decision frameworks.

Values. Values can be considered as an individual's guiding principles that assist them in making choices when faced with decision-making situations. Individuals acquire values throughout their lives, and these

values form an essential part of their cognitive framework. Values are shaped based on beliefs, thoughts, and personal experiences. Additionally, value systems influence the beliefs, laws, customs, culture of society, and organizational structures. The values and personalities of individuals develop under the influence of both societal culture and organizational environment.

The impact of values on rational-organizational (scientific) decision-making processes and structures manifests in the following aspects:

1. In goal setting: Value judgments should be incorporated into the identification and formulation of goals by considering opportunities and prioritization in decision-making.

2. In strategy development: Value judgments about responsibilities, methods of accomplishing tasks, and problem-solving approaches can accelerate or hinder goal achievement.

3. In strategy selection: Decision-making values influence the choice of strategies. Each strategy utilizes specific conditions and capabilities to resolve issues. Values, through the perspectives they create, access and select conditions and capabilities according to their expectations.

4. In control and evaluation stages: When making sound decisions, it becomes inevitable to use value judgments for defining evaluation criteria, control stages, and the frequency of assessments.

The impact of values on the dynamic behavioral aspects of decision-making processes can be identified and analyzed in the decision-maker's behavior before making a decision and during its implementation.

Personality. Decision-makers are influenced by numerous psychological factors, both conscious and unconscious. One of the most significant of these factors is personality. Personality is a set of relatively stable traits and tendencies that define commonalities and differences in individuals' psychological behaviors, such as thoughts, emotions, beliefs, needs, and actions, which persist over time. The manifestations of

personality evolve in accordance with an individual's age, knowledge, and varying circumstances and situations.

In essence, personality consists of a collection of thoughts, words, habits, behaviors, and actions of an individual. The personality traits of decision-makers are strongly reflected in the choices they make. Studies indicate that personality's influence on decision-making processes is generally associated with the following aspects (Gibson, 1991; Saadat, 1993, p. 8):

-Psychological variables: These include individuals' thoughts, emotions, beliefs, and needs.

-Situational variables: These reflect the contexts in which a person positions themselves and defines their goals. Individuals identify themselves within specific environments and situations and express their personality traits accordingly.

-Communication variables: These encompass an individual's interactions in society based on their expertise and status. Essentially, individuals' perceptions of the future influence how they navigate their current circumstances in relation to those expectations. Their outlook on the future and related cognitive horizons shape their interactions with others, which emerge from their specific personality attributes.

The most significant conclusions regarding the influence of personality on decision-making processes are as follows:

-No single individual can possess all the specialized aspects required for decision-making; some individuals perform better in certain phases of the decision-making process than others.

-Successfully progressing through different stages of decision-making requires a degree of intelligence.

-The relationship between personality and decision-making processes varies across different groups, depending on their social conditions and circumstances.

Overall, the personality characteristics of a decision-maker integrate

with the contingency and communication variables of the decision issue and influence the decision-making process. Fundamentally, these factors originate from individuals' values and personalities, which, in turn, shape their decision-making behavior.

Key attributes related to decision-making influenced by personality include:

-Clarity in perspectives, attitudes, and viewpoints

-Insightfulness in beliefs and responsibilities

-Absolute certainty in perception, thinking, and analysis

-Accuracy and diligence in actions to fulfill convictions

-Mental and physical well-being along with perseverance in clarity, insight, and certainty

-Expansion and development in professional realities, enhancing effectiveness and efficiency

-Appreciation and recognition of efforts, services, and contributions of colleagues and human resources

These factors manifest throughout an individual's life based on their experiences, shaping their values and personality.

Risk Propensity. Undoubtedly, decision-makers exhibit widely varying tendencies in accepting certainty, uncertainty, and risk. This trait is a specific aspect of an individual's personality that significantly impacts the decision-making process. A decision-maker who is less risk-averse formulates and sets different objectives and evaluates and selects strategies differently compared to a manager who avoids risk.

Managers with a lower tolerance for risk take different steps in setting objectives, considering options, and selecting strategies. They strive to ensure that their decisions involve minimal risk or uncertainty, thereby increasing their confidence in achieving the desired outcomes (Shanley, 2004).

Adaptability and Flexibility. Before making decisions, factors that influence the decision-maker and the decisions themselves must be

carefully analyzed. During decision-making, it is essential to examine whether the decision-making style is participatory, centralized, or decentralized. Accordingly, influencing factors can be categorized into those affecting the decision-maker before, during, and after the decision is made.

Behavioral scientists have extensively studied pre-decision anxiety—a phenomenon characterized by concern over the potential misalignment between expectations and reality or vice versa. This type of anxiety has been referred to as "cognitive dissonance" (Klaph, 1991).

Following a decision, issues related to adaptability, inconsistency, and misalignment between perceptions, attitudes, and individual beliefs often arise. Whenever an individual holds conflicting or inconsistent knowledge, beliefs, or perceptions about a subject, cognitive dissonance occurs. As a result, the decision-maker begins to doubt their choice and rethinks their decision.

In such situations, anxiety emerges when a gap exists between personal beliefs and reality. Most individuals attempt to reduce inconsistency and misalignment by striving to adapt and achieve harmony (Beroggi, 2010).

Moreover, the likelihood of experiencing anxiety increases under specific conditions, as outlined in Figure (4).

Recognizing the orientations of decision-making and their consequences plays a critical role in reducing inconsistency and anxiety. These elements are presented in Table (2).

Inconsistency can be mitigated by acknowledging mistakes. Unfortunately, many individuals are reluctant to accept that their decisions may be flawed and attempt to justify them as correct. Such individuals often seek to reduce their anxiety through one or more of the following methods:

- Searching for information that supports their decision rationale
- Filtering or distorting information to confirm their choices
- Dismissing opposing viewpoints and overemphasizing uncertainty

- Downplaying the negative aspects of decisions while exaggerating their positive aspects

Managers must ensure that such decision-making tendencies do not manifest in their organizations, given the detrimental impact of misguided decisions on effectiveness, efficiency, and organizational economics.

Personality traits, particularly self-confidence, determination, and motivation, strongly influence adaptability. Ultimately, all behavioral effects interact and influence one another.

The Existence of Highly Favorable Aspects in Forgotten Solutions

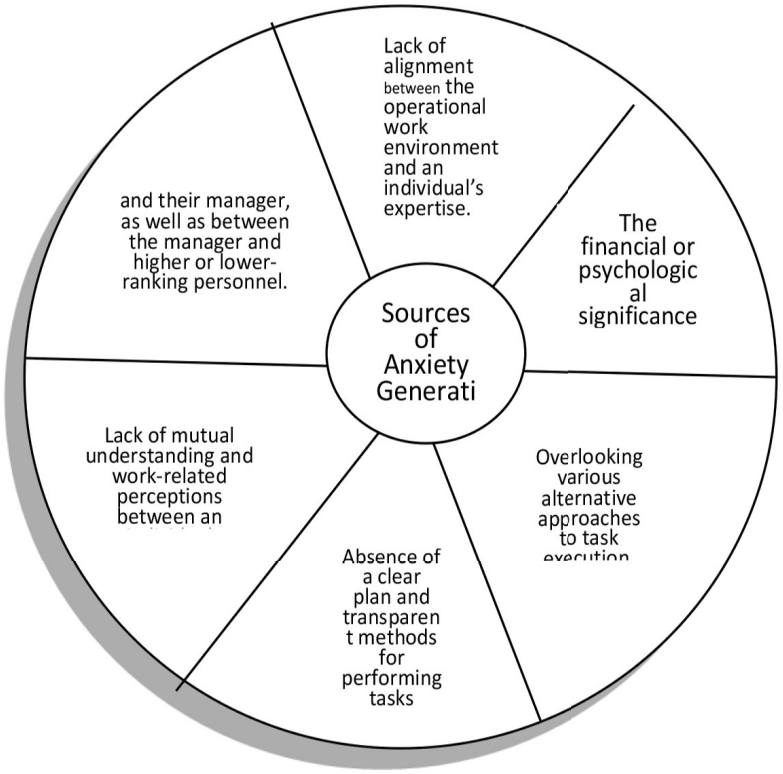


Figure 4. Sources of Anxiety Generation

The Positive and Negative Effects of Decisions Arising from Individual Behaviors

Decisions made based on personal behaviors can have both constructive and destructive consequences.

Table 2. Positive and negative effects of decisions resulting from individual behaviors

Positive Consequences	Negative Consequences
• Enhances competency and results in deserved rewards. • Maintains balance in actions and behaviors. • Provides insight into complex tasks and their underlying principles. • Develops clarity, wisdom, and sound judgment. • Fosters well-being in beliefs, convictions, physical health, and mental stability. • Ensures positive long-term outcomes. • Improves self-esteem and fosters respect among colleagues. • Encourages consideration for employees and organizational stakeholders. • Cultivates benevolence, integrity, and the pursuit of success. • Leads to overall prosperity and fulfillment. • Encourages obedience and adherence to ethical standards. • Facilitates learning from past mistakes and implementing corrective measures. • Strengthens job stability and increases professional growth and investment. • Promotes effective utilization of talents and resources. • Creates an atmosphere of joy, optimism, and collaboration. • Enhances motivation and commitment to responsibilities.	• Leads to oppression and injustice. • Encourages deceit and envy. • Results in acts of tyranny. • Causes inefficiencies and delays in completing tasks. • Leads to unpreparedness in decision-making and execution. • Invites internal temptations and self-doubt. • Fosters tendencies toward symbolism and deviation depending on circumstances. • Induces fear, anxiety, restlessness, and impatience. • Contributes to instability, insincerity, and lack of reliability in commitments. • Promotes betrayal and inconsistency in decision-making. • Encourages decision-making driven by personal desires rather than logic. • Gives rise to arrogance, jealousy, and prejudice. • Leads to anger and distress. • Fosters recklessness and stubbornness

Group Decision-Making

To achieve an effective decision-making process, it must always be acknowledged that two minds are better than one, and more than two is even better. Therefore, efforts should be made to bring together the skills, knowledge, experiences, ideas, opinions, and ultimately the collective wisdom of the group to benefit from synergy. In fact, decisions should typically be based on collective realities when the following conditions apply:

-The outcome of the decision affects each individual or organizational unit within the group.

-The proposed solution holds vital significance and credibility for the group's audience since customer satisfaction is achieved through teamwork rather than individual efforts.

-The problem-solving process has long-term practical implications.

-The issue is sensitive, and group members need to understand how the decision was made. Important and sensitive matters often require careful planning, work discipline, and serious actions. Essentially, every good decision consists of two major components: quality and commitment. A high-quality decision accounts for all relevant facts and effectively utilizes information to yield a logical and rational choice. The second component, commitment, involves the dedication of those responsible for implementing the decision. Even the most effective and innovative decision is futile if the individuals involved are not committed to its execution.

Thus, it can be asserted that a weak decision, even if eagerly implemented by every individual, remains ineffective and unproductive due to a lack of quality.For instance, if a group decides to support a marathon to boost morale, but its members neither participate nor train for the event, then organizing the marathon becomes meaningless. Hence, such a decision is weak.In most organizations, decisions are made through committees, task forces, and other collective activities. Managers frequently encounter situations where they must seek and integrate judgments during group meetings. This is particularly relevant for un-

planned and novel issues with unpredictable outcomes. Often, these types of problems fall outside the scope of individual decision-making. The increasing complexity of such matters necessitates drawing upon diverse expertise. Moreover, recognizing that decisions must ultimately be accepted and implemented by different organizational units highlights the need for group decision-making. Many managers spend up to 80% of their time in committees, commissions, and meetings (Kelley, 2005).

Historically, an effective manager was perceived as someone who was omniscient, exceptional, resolute, single-minded, and fast-moving toward goals, making decisions independently while subordinates followed suit. However, the modern and future effective manager is one who actively participates in a team and leverages the expertise and knowledge of the group to find suitable solutions when dealing with diverse, novel, and unstructured issues.Although group decisions are based on knowledge—integrating data, information, evidence, facts, science, experiences, and values—and draw upon diverse opinions and ideas, they are time-consuming. However, those involved in group decision-making are more likely to implement the decisions than others.To enhance the effectiveness of group decision-making, group members (both managers and employees) must continuously learn new theories, familiarize themselves with modern techniques, and even develop innovative approaches. Consequently, a crucial mechanism in group decision-making is the concept of "consensus." Consensus means that members of the group can align with a particular individual's perspective to solve a problem and collectively agree to support the decision and execute the required actions.

Mechanisms for Achieving Consensus. To reach consensus within a group, attention must be given to the following points:

- Honesty and directness when expressing opinions and viewpoints.
- Avoiding hasty adjustments of personal beliefs with every discussion and debate.
- Refraining from instant judgment of others' opinions and ideas.

- It is essential to allow group members to express their opinions and even ask questions. Providing individuals with the opportunity to propose unconventional and untested ideas fosters creativity and increases participation. It is worth noting that some of the world's greatest discoveries emerged when they were least expected.
- Willingness to compromise and be flexible, avoiding personal conflicts, power struggles, and behind-the-scenes politics, which helps build trust among group members.
- Progressing systematically, addressing decisions and issues in the necessary sequence, and ensuring that each member understands the decision-making process and how proposals are applied.
- Achieving consensus on the problem at hand and the objectives.
- Ensuring that all group members have access to the same information.
- Preventing confusion when some members discover that others have received more or different information.
- Allocating adequate but not excessive time for reaching consensus—prolonged discussions may cause members to lose interest in the issue and its consequences.

Thus, consensus is reached when all group members:

- Have spoken and been heard.
- Are honest, transparent, and accurate.
- Have had their opinions listened to and considered.
- Have actively shared information.
- Feel ownership over the decision and are willing to support its implementation (Kelley, 2005, Chapters 1 & 2; Whetton & Cameron, 2003, Sections 1 & 2).

Individual vs. Group Decision-Making

Researchers have extensively studied the effectiveness of individual vs. group decision-making. Group decision-making requires significantly

more time than individual decision-making, but it involves specialists and experts who analyze various aspects of a problem. Decisions made by an average of five participants yield better results than individual decisions. Unfortunately, open discussions can negatively impact behavioral factors such as pressure to conform and persuade others. This pressure may stem from dominant personalities in the group or situational influences, causing lower-status participants to be influenced by those with higher status and accept their views. Additionally, some members assume the role of experts and specialists and impose their opinions. Group decision-making is most effective for unstructured, unplanned, and interdependent decisions, especially under conditions of increased uncertainty (Figure 6).

Advantages of Group Decision-Making. Not all decisions should be made collectively; some are best made by individuals with input from others. A key indicator of a manager's success is their ability to determine which decisions should be made by a group and which should be made individually. Nevertheless, the benefits of group decision-making can be summarized as follows:

- New and unconventional ideas: Participants in the decision-making process often provide fresh insights. Some of these ideas may be unusual and divergent from conventional wisdom, potentially sparking better cycles of innovation.
- Minimizing misunderstandings and biases: Each group member brings their own preferences, biases, and inclinations to the discussion. Group deliberation fosters debate and integration of these perspectives, ensuring that misunderstandings are addressed before problem resolution and implementation.
- Enhanced learning and personal development: Effective decision-making requires both intelligence and critical thinking. Studying issues, analyzing consequences, and engaging in rational reflection elevates both the mind and decision quality.
- Greater challenge and autonomy: Individuals involved in problem-solving become more motivated to improve their own work and that of their group. They develop a stronger sense of respon-

sibility and independence.

- Improved mutual understanding: Engaging in decision-making enhances one's comprehension of other decisions within the organization, leading to better recognition of challenges and trade-offs.
- Better outcomes: Since most decisions require implementation by individuals in various positions, group decisions often yield superior results (Kelley, 2005, Chapter 2).

The advantage of group decision-making over individual decision-making can be analyzed through Figure (5), which highlights the decision-making process in unstructured, unplanned, and interdependent scenarios. The horizontal axis of Figure (5) represents the impact of group structures on decision-making stages (Drucker, 2007).

Figure (5) illustrates the probable relationship between decision quality and decision-making methods. As decision-making progresses from individual to collective approaches, decision quality improves. Additionally, as the level of intergroup interaction increases, more complex problems require collective knowledge and decision-making, leading to better-quality decisions and higher commitment to execution.

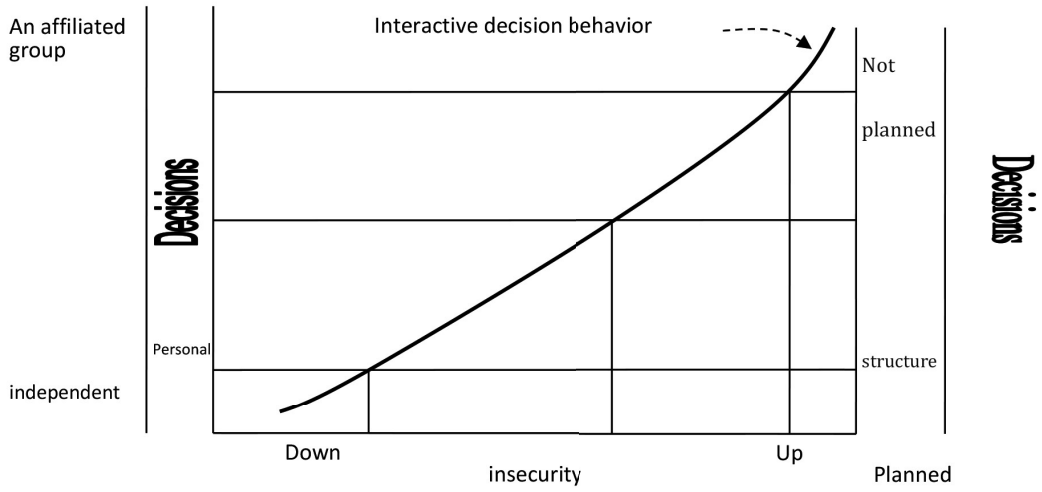


Figure 5. Interaction of decision types with the level of uncertainty

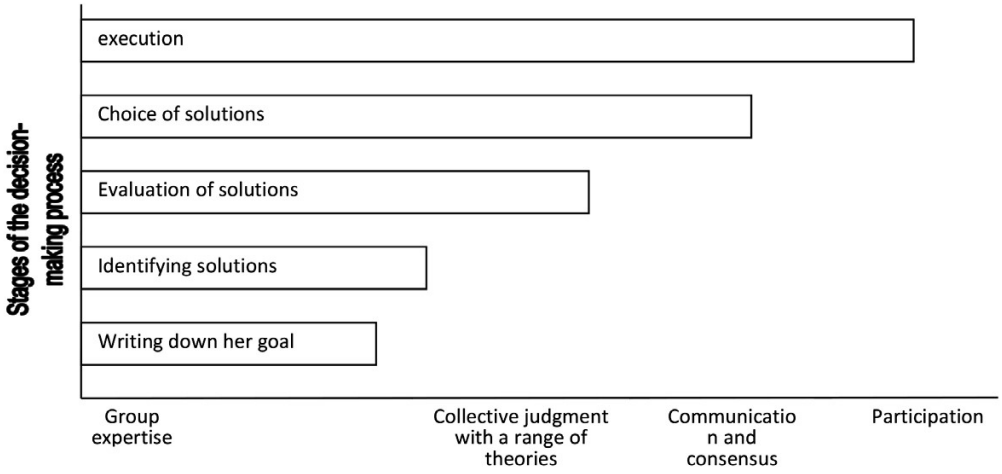


Figure 6. The advantage of group decision-making over individual decision-making

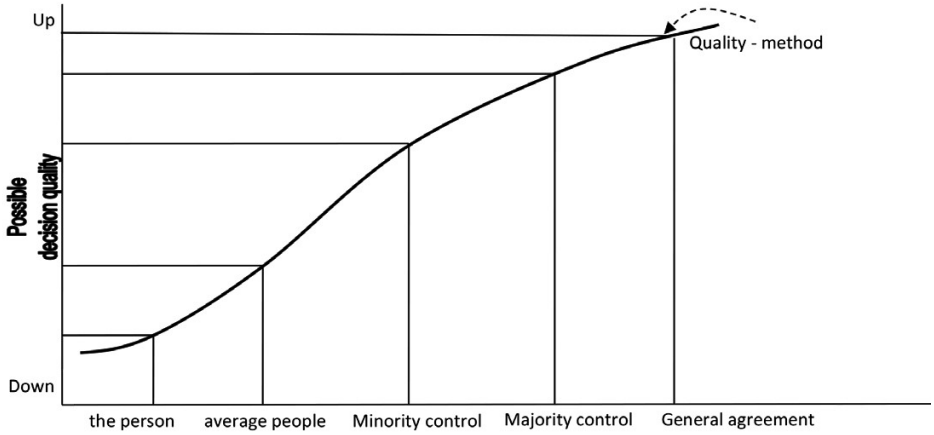


Figure 7. Probable relationship between the quality of group decision-making and the methods adopted

Factors Influencing Decisions

These factors include organizational policies, external constraints, and decision-making styles, which are examined in detail below.

Table 3. Influential factors and their impact on decisions

Characteristics	Level	Territory	Structure	Independence	Influencing factors
• Plays an effective role in creating resources and their utilization • Promotes the reliability and success of the organization's programs • Determines the paths, direction, and communications of the organization	Strategies	wide	Low	Flexible and Low predictability	Policies
• Specific conditions of the general environment • Specific conditions of the specific environment • Transparency of the environment • Existence of risk and uncertainty in the environment	Strategies and Tactics	Certain, changeable, and influential	Up	Inflexible and Low predictability	External Constraints

Characteristics	Level	Territory	Structure	Independence	Influencing factors
• Stable / unstable decision-making processes • Improves the quality, speed and effectiveness of decisions • Involves people in decision-making • Determines the flow of communication and information	Technical and operational, innovative and creative	General and inclusive	Up	Flexible, and predictable	Decision-making styles

In Table 3, the influencing factors are examined from the angles of independence, structure, scope, level of organizational hierarchy, and characteristics. As can be seen, policies are related to the strategic level and decisions of organizations, external constraints are related to the strategic and tactical levels of the organization, and decision-making styles are related to the technical and operational levels, as well as the quality of initiatives and innovations in presenting new products. In fact, it can be stated that the guiding level of the three influencing factors on the organization is the hierarchical levels of the organization. Although the scope of the influencing factors is specified in Table 2-2, paying attention to their characteristics determines a manifestation of their mechanism and role (Dess et al., 2010; Shapiro, 2002).

Influential Factors and Their Impact on Decisions

Several key factors influence decision-making processes within organizations, each varying in terms of independence, structure, scope, level, and characteristics.

1. Organizational Policies

Organizational policies are generally flexible but have low predictability in terms of their impact. Their influence on decision-making is relatively low in terms of independence, but their scope is broad. At the strategic level, policies play a crucial role in shaping decisions and guiding the organization's long-term direction. The major effects of organizational policies include:

- Resource Creation & Utilization: They significantly affect how resources are allocated and utilized.
- Increasing Confidence & Success Rates: Policies help enhance the certainty and effectiveness of organizational programs.
- Defining Organizational Pathways & Communication: They establish the strategic direction of the organization and influence internal and external communication.

2. External Constraints

External constraints tend to be inflexible and less predictable compared to internal policies. Their influence on decision-making is high, as they shape both strategic and tactical approaches. These constraints operate within defined yet variable scopes, meaning they can change depending on environmental factors. Their impact on organizations includes:

- General Environmental Conditions: Factors such as economic trends, government regulations, and technological advancements affect decision-making.
- Industry-Specific Conditions: Competition, customer preferences, and supply chain dependencies introduce additional constraints.
- Environmental Transparency: The clarity of information available about external conditions influences the quality of decisions.
- Risk & Uncertainty: External factors often introduce uncertainty, making decisions more complex.

Organizational Policies and Their Role in Decision-Making

Organizational policies significantly impact decision-making processes, often serving as both guidelines and limitations for managers. Since these policies set predefined frameworks and constraints, managers must often make decisions that conform to these policies, even if they fall below the ideal level.

The primary reason for this is to ensure a minimum level of customer satisfaction while maintaining a balance among internal power groups within the organization. To enhance decision-making quality, managers should focus on two key aspects:

1. Increasing Awareness: Understanding the implications of organizational policies enables better decision-making.
2. Developing Readiness: Being prepared to adapt and respond to policy-related constraints helps improve organizational effectiveness.

These policy-driven considerations directly influence an organization's ability to achieve its goals and fulfill its mission, as illustrated in Figure 7. The way organizations navigate and apply these policies plays a critical role in determining their overall effectiveness and success.

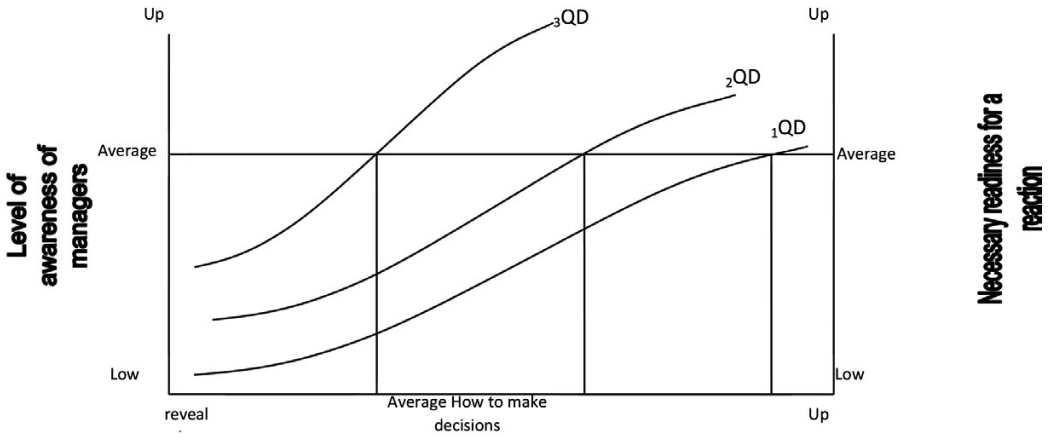


Figure 8. S-shaped graph of the quality of decisions (Qualities of Decision = QD) in relation to the level of knowledge and readiness of managers

Necessary Readiness for Response. Each QDi curve represents a specific level of awareness, readiness, and decision quality of managers. For instance, QD_1 illustrates the interactive quality of managerial decisions up to a moderate level of readiness and awareness, whereas QD_3, despite reflecting a high level of awareness and readiness, only achieves a moderate decision quality.

Political Skills and Organizational Decision-Making Mechanisms. Political skills and the functioning of organizational mechanisms enhance decision-making processes. These skills are closely related to bargaining processes, compromise, strategies, and specific organizational behaviors, and they prove useful in gathering information to achieve organizational objectives. Members of an organization who make various efforts to accomplish the organization's goals must possess and continuously develop these skills. Organizational politics are closely associated with the following factors:

- The relationships between individuals and the level of friendship in these relationships;
- Integrity and partial loyalty;
- Pressure from informal organizational groups;
- The complex psychological network of human resources.

The foundation for understanding these factors lies in management knowledge. In reality, personal characteristics, behaviors, and needs of individuals, leadership styles, management approaches, and psychological, sociological, and human relations networks play a prominent role in understanding these factors. It is important to note that adopting political strategies is inevitable for organizations. Experienced managers, by considering this reality, leverage it to enhance decision quality, effectiveness, efficiency, and executive power.

The Role of Policies in Organizations. Policies are generally considered as tools for achieving the organization's annual goals. These policies usually include guidelines, regulations, and procedures that the organization follows to attain its declared objectives. In decision-making processes, policies serve as directives and guidelines. They define the

organization's routine and repetitive conditions.

For the successful implementation of strategies, policies must be in place to manage daily affairs. By adopting policies, solving everyday issues becomes easier, and they provide guidance that facilitates the execution of strategies. Policies help delineate the boundaries and limitations of administrative, economic, and financial activities and provide a framework for rewarding or penalizing individuals based on specific behaviors. Policies strengthen decision-making capabilities.

They serve as a foundation for implementing specific controls by management, thereby ensuring organizational coordination. Policies define the type of work that needs to be done and the personnel responsible for executing it. They promote the delegation of authority to employees and managers at different levels of the organization, allowing them to address and resolve issues as they arise. Many organizations prepare policy manuals and guidelines that specify decision-making processes and employee conduct. Regardless of their scope, policies function as mechanisms that reinforce strategy implementation and steer annual and long-term objectives (David, 2011; Hitt et al., 2020).

External Constraints on Decision-Making

The effectiveness of managerial decisions is also influenced by external factors. The most prominent of these factors can be examined within two main environments—general and specific—which act as constraints on decision-making.

- General Environment: Economic, social, cultural, and political conditions, as well as governmental laws and regulations.
- Specific Environment: Realities and capabilities of competitors, customers, suppliers, and other influencing factors within this environment.

Mid-level and lower-level managerial decisions are generally influenced directly by the type of technology, timing of operations, occupational safety laws, labor relations, and legal employment regulations. Meanwhile, top-level and senior executives are more affected by regulations

and legal decisions related to competition, introducing new products to outperform competitors, potential mergers, advertising, environmental pollution, taxation, and other factors impacting organizational operations. Managers must consider external factors when making internal decisions, as these elements are connected to both the specific and general environments of organizations and influence their internal decision-making. These external influences may manifest in financial, legal, labor union, governmental regulatory, monetary, financial, and customs policies (Forgang, 2015; Jagdev et al., 2004).

Decision-Making Styles

Decision-making styles vary significantly depending on an organization's structure and culture. Unlike external constraints, they are more flexible and predictable, allowing for adaptation based on needs. Their influence on decision-making is high, and they typically apply to general and comprehensive decision-making frameworks. At the technical and operational level, decision-making styles influence innovation, execution speed, and efficiency. Their key effects include:

- Standardizing or Adjusting Decision-Making Procedures: Organizations can either formalize decision-making processes or adjust them to improve responsiveness.
- Enhancing Decision Quality, Speed, & Effectiveness: A well-structured decision-making process leads to higher-quality, faster, and more effective decisions.
- Encouraging Participation: Decision-making styles that incorporate input from multiple stakeholders enhance engagement and collaboration.
- Defining Communication & Information Flow: The way decisions are made influences how information is shared and communicated within an organization.

These factors collectively shape decision-making processes. As observed, organizational policies relate to strategic decision-making, while external constraints impact both strategic and tactical levels. Decision-making styles, on the other hand, are linked to the technical and

operational aspects of an organization. Essentially, the guiding level of these influencing factors is determined by the organizational hierarchy. While their scopes have been specified, it is their characteristics that define their mechanisms and role in decision-making (Dess et al., 2010; Shapiro, 2002).

Decision-making styles are categorized based on the level of authority concentration and the distribution of decision-making power in decision-making processes, as depicted in Figure 7-2. These styles are classified into centralized, decentralized, and participatory decision-making.

Centralized Decision-Making. In alignment with organizational governance models, some organizations adopt a centralized decision-making style. In this approach, decisions are typically made at the senior management level. Generally, according to management principles and conventions, managers make decisions based on their legitimate authority and their expertise and information dominance. However, decision-making should align with the following mechanisms:

1. Agile organizational processes.
2. Context, content, environment, conditions, and assumptions.
3. The extent to which stakeholders benefit from objectives.
4. The essence of decisions in delivering benefits to stakeholders.
5. A style that highlights distinctive behaviors for knowledge-based actions.
6. Adaptations that indicate decision implementation and the need for adjustments.
7. Outcomes and consequences—what results, achievements, and impacts will these decisions generate?
8. Decision quality

Decentralized Decision-Making. In this style, decisions are made at various levels, from top management down to the lowest organizational ranks. Individuals in this system must possess the necessary knowledge, information, and technical skills for decision-making. Employees in decentralized decision-making environments feel trusted and valued for their expertise. This approach not only accelerates decision-making and

problem-solving but also enhances employees' knowledge and skills, resulting in a high level of acceptance of decisions. Lower-level managers and employees, being closer to the organization's issues and opportunities, can make better decisions than senior managers. Senior managers, lacking direct interaction with operational challenges, typically focus on broad strategic aspects rather than specialized details. The level of concentration and specialization precisely determines the decision-making style of individuals and organizations.

Participatory Decision-Making . Many managers recognize the advantages of utilizing employees' decision-making contributions at all organizational levels. Although participatory decision-making often involves small group discussions, leading to more decentralized approaches, delegating authority to individuals is one of the most common methods of employee participation. In this style, managers delegate authority to subordinates so that they can independently address issues, assuming responsibility with the expertise and knowledge allocated within their teams. Consequently, by delegating decision-making power, the decision-making process becomes more agile, operational processes are streamlined, organizational costs are reduced, and stakeholder satisfaction is enhanced. Employees take responsibility for the outcomes of their decisions and gain experience for future leadership roles. Experienced managers heavily rely on employees and organizational experts due to their specialized, technical knowledge and expertise. However, this should not lead to managers becoming detached from the organization's daily operations. Instead, managers should stay informed through the organization's intranet and provide necessary guidance. Effective participatory tools include the formation of permanent committees, such as:

- Strategic planning committees
- Complaint resolution committees
- Promotion and job evaluation committees
- Specialized problem-solving teams

(Drucker, 2007; Bazerman, 2005)

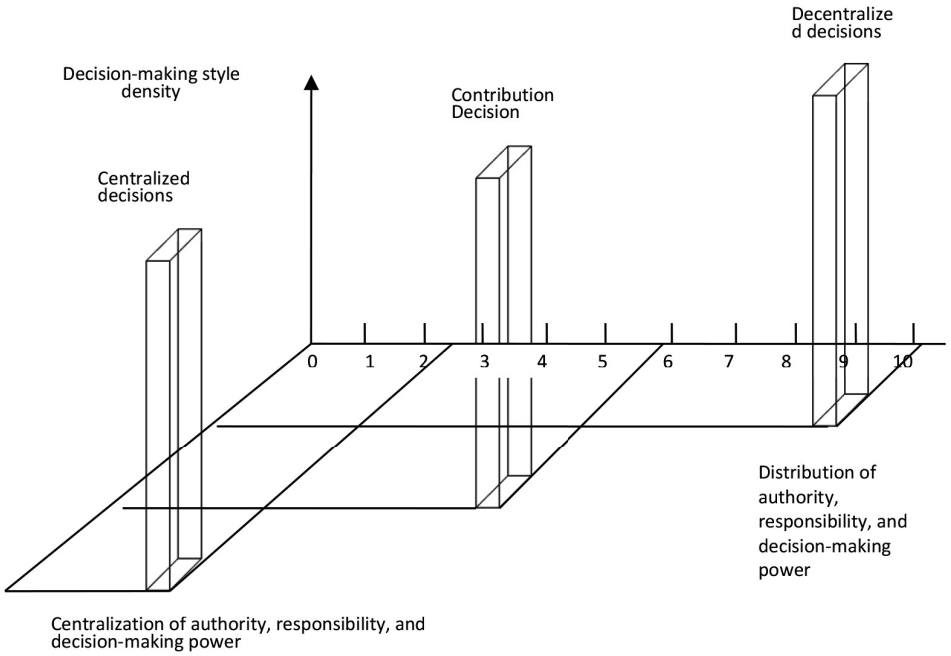


Figure 8. Decision-making methods based on locus of authority and decision-making power

Decision-Making Approaches

Based on the Focus of Authority and Decision-Making Power, decision-making approaches can be classified based on the distribution of authority, responsibility, and decision-making power. These approaches range from decentralized decisions, which allow for broader participation, to participatory decisions, where authority is shared among stakeholders, and finally to centralized decisions, where decision-making power is concentrated.

Decision-making styles can be assessed in terms of their density, which reflects the extent to which authority, responsibility, and decision-making power are distributed or concentrated. The decision-making process moves along a continuum from decentralized to centralized approaches, with varying degrees of participation and involvement.

At one end of the spectrum, decentralized decision-making allows for a higher level of distribution in authority, ensuring that multiple individuals or groups contribute to the decision-making process. Participatory

decision-making represents a middle ground, where power is shared but still coordinated. On the other end, centralized decision-making consolidates authority in a single entity or a small group, ensuring more control and consistency in decision implementation.

Decision-making styles also vary in terms of their density, meaning the extent to which decisions are based on broad participation or centralized control. The density of decision-making styles reflects the emphasis on either distributed authority and shared responsibility or a more hierarchical and top-down approach.

Conclusion

The world of individuals is shaped by decisions and their consequences. Understanding the behavioral impacts of individuals, groups, and organizations on decision-making enhances the quality of perception, decision-making capabilities, awareness, and preparedness. These effects and consequences function as key indicators for understanding decision-making dynamics, guiding causality in decisions, and evaluating decision-making conditions. Decision-makers rely on these factors to make informed choices, considering behavioral consequences and broader implications. The more a decision-maker is aware of the factors influencing decisions, the better they can manage and control these elements.

Since individuals differ in cognitive abilities, intelligence, cultural and physical environments, geographical conditions, competencies, expertise, problem-solving skills, and decision-making capacities, it is unrealistic to expect uniform readiness, awareness, and decision-making proficiency across all individuals. This becomes even more significant when considering the impact of personality, values, risk-taking tendencies, and adaptability on the decision-making processes of individuals, groups, and organizations.

Convergence and divergence in decision-making depend on several factors. On one hand, they are influenced by the initial agreement on the decision problem, understanding of decision-making processes, and the mechanisms used for decision formulation. On the other hand, they are

shaped by impact assessment, consideration of decision consequences, and evaluation of the environment that emerges after the decision is implemented. Therefore, taking into account intellectual perspectives and decision-making methodologies within structured frameworks, along with the utilization of appropriate strategies and styles while considering internal and external organizational constraints, plays a vital role in the effective management of decision-making systems.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. Identify the four individual behavioral factors that influence the dynamic process and structure of decision-making.
2. Elaborate on the concept of values and specify their consequences for goal formulation, alternatives, choice of alternatives, and the control and evaluation stage.
3. Define personality and explain its psychological, situational, and relational variables.
4. Describe the mechanisms through which personality traits influence decision problems, and identify the factors derived from these mechanisms that affect decision-making.
5. What is meant by adaptability and flexibility? Explain in detail.
6. Write down the inappropriate methods of reducing anxiety, as suggested by those who emphasize the fallibility of individual decisions.
7. Identify the sources of anxiety.
8. State the positive and negative consequences of decisions arising from individual behaviors.
9. What is group decision-making and under what circumstances is it

utilized?

10. What are the differences between group decision-making and individual decision-making?
11. Explain the advantages of group decision-making over individual decision-making using a diagram of the quality–method relationship.
12. Name the organizational factors that influence decisions.
13. Explain the factors influencing organizational decisions from the perspective of autonomy, structure, scope, level, and characteristics.
14. Describe how organizational policies influence decisions.
15. Explain how external constraints influence decisions.
16. Elaborate on the three major decision-making styles.
17. Explain how decision-making styles affect decisions.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. When decisions are unstructured, unplanned, and interdependent, group decision-making is more appropriate.
2. One of the sources of anxiety is the presence of highly appealing aspects in forgotten alternatives.
3. Inconsistency arises when an individual holds fragmented and conflicting knowledge, beliefs, or perceptions about an issue.
4. The influence of personality on the decision-making process is generally based on personality, situational, and relational variables.
5. At the goal-formulation stage, value judgments should not be involved in the selection of opportunities and the allocation of priorities.

6. Organizational policies should have no relation to interpersonal relations or the degree of friendliness among individuals.
7. Decisions are effective when they achieve their objectives within the designated time frame, available resources, managerial capabilities, and existing constraints.
8. Moving from accepted methods of group decision-making, from the level of consensus to the individual level, increases the potential quality of decisions.
9. Decision science, by recognizing the importance of shaping the new environment after decision implementation, seeks to guide decisions toward defining a desirable future environment from both software and hardware perspectives.
10. The "software" dimension of decisions refers to ideas, programs, and visions, while the "hardware" dimension refers to methods, techniques, and structures.
11. Values can be regarded as operational guidelines that organizations confront when facing situations of choice.
12. Value judgments must be applied in the identification and formulation of goals, with respect to the selection of opportunities and the allocation of priorities.
13. Value judgments regarding the responsibilities of alternatives for task completion and problem-solving may result in the elimination of goals.
14. The psychological variables of personality are shaped by individuals' beliefs and needs.
15. When variables target observable external conditions and individuals find themselves in environments created by these variables, they are categorized as relational variables of personality.
16. Personality traits of decision-makers, combined with situational and relational variables of decision problems, influence the decision-making process.
17. Foresight in perspectives, attitudes, and viewpoints, as well as in-

sight and discernment in beliefs and duties, emanates from the values and personality of individuals.

18. Once a decision has been made, there is no longer a need for adaptability, nor is there concern with inconsistencies and the coordination of diverse perceptions, attitudes, and beliefs.
19. Recognizing the directions of decision-making and their consequences plays a significant role in reducing inconsistency and anxiety.
20. Rejecting opinions, resisting alternatives, and exaggerating uncertainties are among the methods of reducing anxiety used by individuals unwilling to accept inconsistency.
21. Personality—particularly reliance on beliefs, willpower, and motivation—strongly affects adaptability.
22. Among the negative consequences of decisions stemming from individual behavior are restlessness, irritability, anger, hostility, stubbornness, and obstinacy.
23. Among the positive consequences of decisions stemming from individual behavior are enhanced self-esteem, increased collegiality, error correction, and constructive feedback in decision-making and implementation.
24. According to the probabilistic relationship of decision quality, the greater the level of consensus, the higher the probable quality of the decision.
25. With an increase in high uncertainty, decisions tend to become unstructured, unplanned, and more interdependent.
26. Managers, in order to improve decision quality, must possess the awareness and preparedness to react to political considerations, thereby influencing organizational success.
27. Political skills act as mechanisms that enhance organizational decision-making.
28. Political skills are closely linked to bargaining processes, negotiation, and organizational forms, and they prove useful for gathering

information to achieve organizational goals.

29. Policies serve as tools for achieving the annual objectives of organizations and are regarded as determinants of routine, day-to-day organizational conditions.
30. By adopting policies, day-to-day problem-solving becomes easier, providing guidelines through which strategies can be formulated.
31. Through policies, the boundaries and scope of various administrative, economic, and financial tasks can be determined.
32. Decisions made by middle and senior managers of organizations are generally under the direct influence of occupational safety regulations, labor relations, and legal labor requirements.
33. In line with traditional norms and classical management principles, managers generally make decisions based on the legitimacy they attribute to themselves.
34. Since lower-level managers and organizational members are more closely connected with organizational issues and opportunities, they can sometimes make decisions more effectively than top-level managers.
35. The greater the managers' awareness of decision conditions, the greater their readiness to respond effectively.

Chapter 3
Typology and Mechanisms of Decision-Making

Objectives

- To become familiar with the diversity and characteristics of decisions in organizational and managerial contexts
- To examine the mechanisms, interactions, and scope of different types of decisions

Introduction

Among the sensitive and vital aspects of managerial duties, the following can be highlighted: 1) environmental analysis, 2) recognition of events and incidents, 3) resources, and 4) the thoughts and insights available to organizational managers. These four factors—guided by decision-making, communication, coordination, evaluation, control, and leadership—shape both the performance and the future of organizations. In order to effectively fulfill these duties, management must rely on decisions and the decision-making process.Managerial decisions are highly diverse; therefore, for a clear and accurate understanding of organizational governance, a typology of decisions based on systematic classification is essential. The effectiveness of decisions varies depending on organizational conditions, the environment, and available resources. Accordingly, as illustrated in Figure 3-1, managerial decisions are categorized into ten distinct groups.

Recognizing the types and classifications of decisions is a prerequisite for improving the decision-making skills of managers. Decision-making without knowledge of the subjects, characteristics, nature, process, mechanisms, and consequences of decisions cannot be sustainable. Indeed, many unstable decisions are the result of decision-makers' lack

of awareness, inability to make choices, or inappropriate methods of implementation. The very nature of decisions necessitates attention to their structural analysis. The greater the managers' expertise and knowledge about decisions, the more challenges in decision-making are reduced, and the gaps between theory and practice, visions and missions, as well as performance and objectives are significantly minimized.

The fundamental source of success and prosperity—or failure and decline—of organizations lies in the typology of decision subjects, patterns, styles, and quality of decision-making. Managers, who bear ultimate responsibility for all decisions, in fact provide the foundation for organizational movement, guidance, and transformation through their choices. In essence, managers, by making decisions, take on the role of architects and engineers of both the internal and external environment of the organization, delineating its identity and boundaries. Environmental conditions are the outcome of managers' mental perceptions and analyses. However, since individual mindsets differ, their analytical capacity with regard to the environment—whether from a cultural or logical perspective—may vary.

Accordingly, this chapter has been composed to enhance understanding of decision types, managerial decision-making skills, and the anatomy of decisions, both explicit and implicit, taken at different levels within organizations.

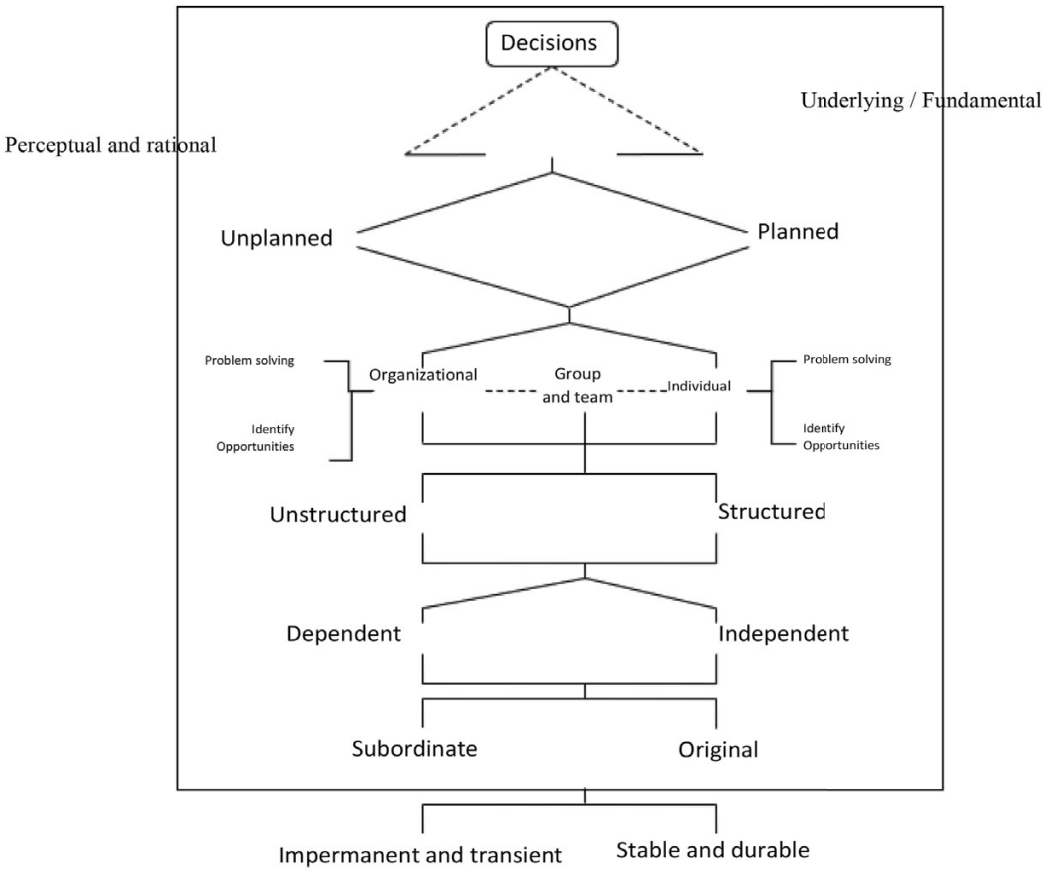


Figure 1. Typology of Decisions

The types of decisions presented in this chapter are classified in accordance with the rationale outlined in Table 1. However, it should be noted that all of them must be applied in alignment with organizational knowledge.

Table 1. Reasons for various decisions

No	Nature of Classification	Types of Decisions
1	Having a fundamental and underlying dimension	Differentiating and distinguishing decisions; integrating and consolidating decisions; sustaining and adaptive decisions

No	Nature of Classification	Types of Decisions
2	Frequency and level of certainty	Planning decisions; non-planning decisions
3	Organizational tasks and hierarchical levels	Strategic, tactical, technical, and operational decisions
4	Sources and functions	Organizational, individual, group, and team decisions
5	Degree of definition and clarity	Structured and unstructured decisions
6	Degree of intuition	Perceptual (intuitive) and rational decisions
7	Level of orientation	Problem-solving decisions; opportunity-recognition decisions
8	Degree of independence	Independent and dependent decisions
9	Environment and interaction with the external environment	Primary (internal) and secondary (boundary) decisions
10	Degree of influence on stability and sustainability	Stable and enduring decisions; unstable and short-lived decisions

Underlying and Fundamental Decisions

In essence, all decisions stem from four fundamental categories, namely: differentiating and distinguishing decisions, integrating and consolidating decisions, sustaining decisions, and adaptive decisions. The first category, referred to as fundamental and underlying decisions, provides the mission, purpose, and common mechanism for other types of decisions, with each type drawing from this classification according to its own nature (Hamidizadeh, 2021).

1. **Differentiating and Distinguishing Decisions.**

These decisions divide the main tasks of the organization into subtasks, assign them to organizational units and positions, and direct the process of work division.

2. **Integrating and Consolidating Decisions.**

Such decisions are responsible for establishing communication and coordination among organizational units and various tasks. They aim to create organizational coherence to achieve missions, visions, objectives, performances, and the implementation of policies.

3. **Sustaining Decisions.**

This type of decision examines the degree of interaction among organizational components, the extent of organizational adaptability to the environment, and the prevention of disequilibrium caused by rapid changes. They foster organizational stability and safeguard the current status.

4. **Adaptive Decisions.**

These decisions involve adjusting and reconciling internal and external organizational demands. In practice, they emphasize planned changes aimed at meeting needs and capitalizing on external opportunities.

Planning and Non-planning Decisions

The second group in the typology of decisions, following fundamental and underlying ones, and often attracting considerable attention among scholars, is based on frequency and level of certainty: planning and non-planning decisions. If planning and policy-making are regarded as the most significant managerial duties, these decisions lie at the core of such responsibilities.

Planning Decisions. These decisions are derived from strategies and plans, whose mission is to operate within the framework of programs to ensure the technical and operational implementation of strategies. They align with every element and level of strategies and plans, as missions and visions define the objectives, structures, functions, processes, and mechanisms of such decisions. Programs are inherently filled with decisions; therefore, only through their execution can goals be realized. Consequently, these decisions are designed, planned, and made in a manner that enables step-by-step administration of strategies and plans, proving most effective in handling repetitive and routine issues.

They typically rely on predefined and established procedures to address problems and specific conditions.

These decisions are taken in accordance with strategies, plans, policies, regulations, and procedures. In cases where an issue is recurring, and its components can be defined, analyzed, and forecasted, the matter can be addressed through programmed decision-making. This category, however, limits managerial discretion, as decisions must conform to strategies and plans. As a result, managers' time is freed to address other pressing matters.

Nevertheless, every decision is, in some sense, new and unprecedented. Yet, because managers are bound by strategic commitments and realities, they rely on the dynamic decision-making process presented in Chapter 1 (Figure 1-1). Hence, these decisions delineate the scope of responsibilities, functions, domains, mechanisms, evaluations, and controls, so as not to unnecessarily occupy managers' time.

Non-Planning Decisions. In contrast, non-planning decisions occur unexpectedly, are novel, and cannot be anticipated in advance. They are therefore initially unstructured, meaning established procedures and routines cannot be applied to their analysis. These decisions pertain to unusual and unique issues within strategies and plans. Generally, if an issue is not repetitive enough to warrant specific policies and procedures, or is so significant that it requires special attention, it falls within this category. Senior managers, positioned at the higher levels of organizational hierarchy, frequently encounter such decisions, which often carry a tactical dimension.

Although broad in scope, these two classifications differ sharply. Given that managers often face numerous non-programmed decisions in their daily realities, they must remain cognizant of the near-irretrievable consumption of resources. Decisions that utilize resources represent lost opportunities; therefore, it is vital to identify potential sources of such decisions in various ways. Table 2 presents the distinctive characteristics of these two types.

It is important to note that the essence of decision-making distinguishes managers from non-managers. The quality of decisions ultimately

determines their effectiveness in managerial roles. Senior managers, due to constant interactions with the external environment, are more often engaged with non-programmed decisions, while technical and operational managers mostly employ programmed decisions. Middle managers primarily supervise and control programmed decisions, though they may occasionally participate in non-programmed ones.

To identify the type of decision at hand, the following factors must be considered:

1. The subject and nature of the decision.
2. Whether the issue is situated within strategies and programs and whether it is repetitive.
3. The degree of certainty or uncertainty surrounding the issue.
4. The organizational level of the managers handling the decision.

Senior managers, tasked with formulating programmed decisions within strategies and plans, often face challenges stemming from neglect of long-term planning. This problem typically affects short-term control, efficiency, and effectiveness, diminishing the authority and responsibilities of lower-level managers. Consequently, these outcomes negatively influence employee motivation and job satisfaction (Gibson, 2012; Bubnicki, 2004).

Table 2. Characteristics of Planning and Non-Planning Decisions

Aspects	Planning Decisions	Non-Planning Decisions
Subject and issue	-Within the framework of strategies and plans; common, repetitive, routine -Most certain with regard to causal relationships	-New, unstructured -Uncertain regardless of causal relationships

Aspects	Planning Decisions	Non-Planning Decisions
Procedure	Dependent on strategies, plans, policies, regulations, and established procedures	-Essential for creativity, insight, and inspiration -Ability to solve problems innovatively - Creative identification of constraints, opportunities, strengths, and weaknesses
Examples in Organizations	-Competency evaluation system for the promotion of employees and experts -Compensation and salary system -Job qualification system -Periodic information related to the level of production, supply, and their indicators; generally, the outputs of the organization and their types -Annual organizational budgeting -Holding training programs consistent with organizational strategies and plans -Laws, bylaws, and subject-specific regulations	-Revision of organizational structures -Occurrence of an environmental shock affecting organizational inputs and internal processing procedures -Feedback from audiences depending on the type of activities in the environment and markets -Challenges in acquiring resources -Termination of cooperation with several experts of the organization who possess rich knowledge assets

Hierarchical Decisions

The third type of decisions, derived from organizational tasks and hierarchical levels, are referred to as hierarchical decisions. Since every organization, by virtue of its managers' responsibilities, duties, and authority, possesses multi-layered structural hierarchies, decisions must accordingly be made in line with these hierarchical levels. These levels

generally include strategic, tactical, technical, and operational, which correspond to strategic, tactical, technical, and operational decisions. The characteristics of these decisions are outlined in Table 3, and in this section, each is explained in detail.

Strategic Decisions. Strategic decisions constitute the operational counterpart of organizational strategies. They encompass those decisions directed toward the mission, vision, outlook, future, and objectives of organizational programs, while examining, studying, and influencing organizational realities over the long term. Typically, these decisions are made under conditions of uncertainty caused by environmental changes, technological advancements, and the availability of resources and time.

Strategic decision-making provides organizations with purpose, competitive advantage, and direction in all dimensions. Given their inherent discretion and freedom, such decisions are often innovative and discretionary, made intermittently in specific periods. They define rules and directions that the organization as a whole must follow, and the responsibility lies with top-level managers. These decisions are frequently novel, complex, broad in scope, and involve uncontrolled variables such as environmental changes, government actions, customer demands, economic conditions, trade developments, competitor moves, and social transformations.

The process underlying strategic decisions is influenced by organizational structure and culture, shaped by four key factors:

- Vision, expertise, and beliefs
- Degree of complexity and scope
- Degree of structural formalization
- Degree of centralization and decentralization

Strategic decisions generally concern the entire organization rather than a single unit or division. They determine the direction, trajectory, and effectiveness of the organization. As they align with the long-term foundation of organizational programs in relation to financial capacity, environmental factors, and future foresight, they serve as the emblem

and identity of the organization. These decisions typically fall within the headquarters domain of the organization.

Tactical Decisions. Tactical decisions are made by managers positioned immediately below the senior strategic managers. Their primary responsibility lies with deputies or middle managers, and their role is centered on communication, coordination, supervision, and control—functions vital to organizational performance. Also referred to as method-oriented decisions, tactical decisions translate senior strategic decisions into actionable directives for lower-level managers (technical and operational), ensuring alignment between objectives and performance.

While strategic decisions provide direction for the entire organization, they must be operationalized by tactical managers in technical and operational units to become executable. The burden of ensuring this transition rests heavily on tactical managers. Therefore, the quality, precision, accuracy, and timeliness of tactical decisions are of utmost importance to organizational success. These decisions also fall within the organizational headquarters domain.

Technical Decisions. Technical decisions are made by managers subordinate to tactical managers and primarily concern the optimization of resources. These include planning and scheduling production, delivering services, determining technology, and managing the application of resources and technical inputs, as well as balancing capital and labor. In essence, technical decisions operationalize and make strategies and plans implementable.

The scope of planning for technical decisions is narrower than for tactical decisions, yet they provide greater managerial discretion compared to operational decisions. These decisions belong to the line (or field) management domain of the organization.

Operational Decisions. Operational decisions are taken at the lowest organizational levels. They have limited time horizons, clear responsibilities, and directly address the production of goods and services. Falling within the line management domain, these decisions can endanger the survival, dignity, and credibility of the organization if they deviate from its overarching objectives.

Operational decisions are directly engaged with the transformation of inputs into the desired outputs of the organization. They can be managed, executed, and forecasted under different circumstances using quantitative methods and techniques. While the highest level of planning, supervision, and control rests with strategic managers, the scope of authority and responsibility diminishes as one moves down the organizational hierarchy.

These decisions are made continuously and routinely, often updated to guide organizational operations in accordance with the expectations of technical managers. They also address problems arising from the implementation of strategies and plans. Operational decisions are associated with organizational planning details, review processes, inspections of deviations from plans, and the ongoing adjustment and correction of procedures, resource utilization, and modifications during execution.

At this level, managers endeavor to enforce organizational policies and procedures precisely in order to manage daily affairs, resolve problems, address complaints, and allocate resources efficiently. These managers usually possess technical and operational insight rather than strategic foresight—except in cases where such foresight is explicitly required of them. Their opportunities for creativity and independent judgment are relatively limited (Koontz & Weihrich, 2015; David, 2011).

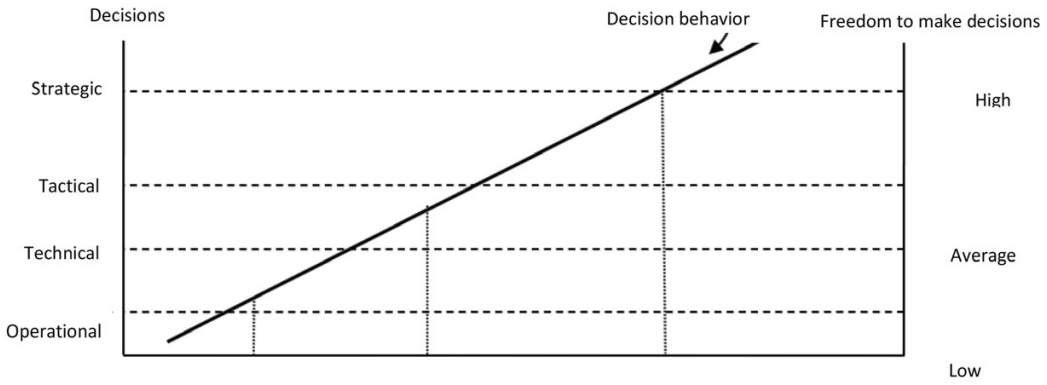


Figure 2. Hierarchical Decisions with Scope of Planning and Degree of Decision-Making Freedom

The main difference between **strategic decisions** and **operational decisions** lies in the degree and level of organizational duties, responsibilities, authority, and structure. Since strategic decisions are novel and unprecedented, they are often referred to as **unstructured decisions**, as they may, to a large extent, be independent of the influence of prior decisions. Once made, these decisions are almost irreversible, whereas tactical, technical, and operational decisions, respectively, are more flexible.

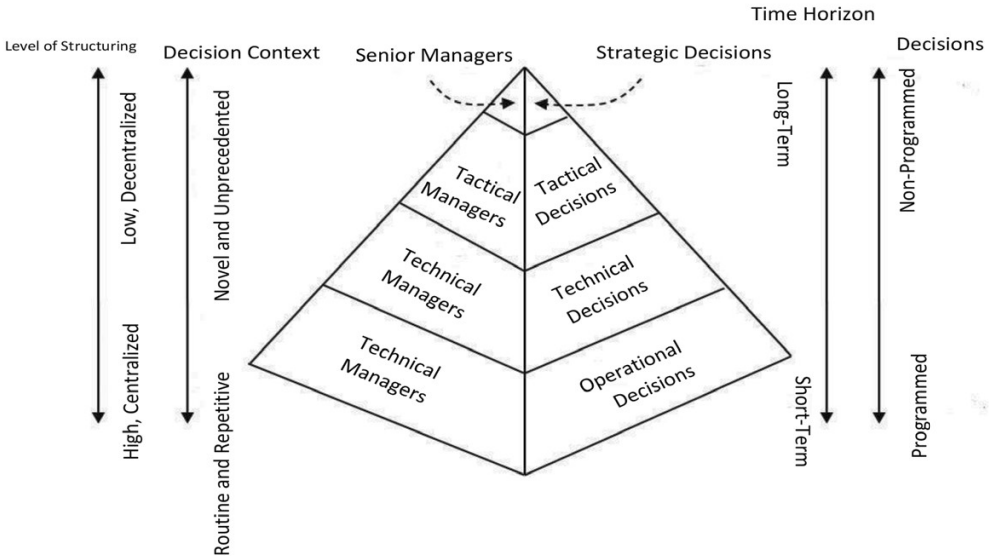


Figure 3. Dimensions and Characteristics of Hierarchical Decisions

Table 3. Indicators for Identifying Types of Decisions

Distinguishing Feature	Strategic	Tactical	Technical	Operational
Relationship of the organization with its environment	High	Medium	Low	Very Low
Having discretionary and non-continuous aspects	High	Medium	Low	Very Low

Distinguishing Feature	Strategic	Tactical	Technical	Operational
Having a coordinating aspect	High	Medium	Medium	Low
Timeframe of decisions: past, present, future	Future	Present & Future	Present	Past
Ability to be executed through higher-level organizational decisions	Very High	High	Medium	Low
Involving broader segments of large organizations	Very High	High	Medium	Low
Impact on organizational performance in the long run	Very High	High	Medium	Low
Goal orientation in all dimensions	Very High	High	Medium	Low
Diversity of responsibilities in decision-making levels	Very High	High	Medium	Low

Organizational, Individual and Group/ Team Decisions

The fourth type of decisions can be classified, based on sources and functions, into three categories: **organizational, individual and group/team decisions**, each with its own mechanisms for analysis.

Organizational Decisions. These are decisions that managers make based on organizational resources, tasks, formal capacities, and official responsibilities. Managers often delegate such decisions within the framework of organizational policies to subordinates in order to accel-

erate workflow, leverage employee knowledge, and enhance participation. Organizational decisions correspond to the position and responsibilities of the organization and are aligned with its current realities, future prospects, and available resources. As organizational members whose insight, prudence, and capabilities determine the organization's vitality, managers embody organizational strategies through these decisions. Individual, group, and organizational decisions manifest across the four hierarchical levels of decision-making (see Figure 4).

Individual Decisions. These decisions are made by a manager as a person, rather than as an organizational actor. Such decisions cannot be delegated, nor should they be influenced by higher-level managers or other powerful stakeholders. They rely on the manager's own expertise, prudence, knowledge, magnanimity, breadth of vision, intellectual quality, capacity for reasoning and reflection, dedication, and passion for work. These attributes cannot be transferred to others through delegation.

In many situations, it is difficult to separate individual decisions from organizational ones, since they often overlap. Such decisions are rooted not in the interests of the organization but in the individual's interests. Managers should not allow personal traits, preferences, or biases to interfere with administrative issues. Steering organizational realities based on personal behaviors diverts programs from organizational objectives.

At times, a lack of understanding and inability to distinguish between individual decisions—based on personal views and interests—and organizational decisions—based on organizational goals—creates tendencies harmful to both. In some cases, professional managers make decisions that affect not only their personal career status and prospects but also the organization's success. This overlap generates conflicts of interest, overlapping responsibilities, and clashing perspectives. One example is when a manager secretly negotiates with senior managers of another organization to secure a transfer during an economic or commercial crisis, thereby ensuring career continuity, job security, and preservation of status and dignity (see Figure 5).

Group and Team Decisions. Alongside individual and organizational

decisions, the third type includes group and team decisions. These are typically made by formal groups and teams as well as informal groups within organizations, and subsequently implemented. Members of organizations, often through professional associations and expert groups, analyze and deliberate on organizational issues and make corresponding decisions.

Due to the technical breadth of certain issues, individuals cannot decide alone. Therefore, organizations sometimes establish specialized or matrix groups to deliberate, consult, and even decide on such matters. These decisions generally align with the thinking of the relevant manager, who then endorses them. However, there are occasions when the manager perceives the group's decision as inconsistent with the professional orientation of the organization or department and opts for an alternative course of action.

In addition to formal workgroups and teams, informal groups also form within organizations based on shared professional or personal characteristics among members across different ranks. These groups develop their own leadership and sometimes make decisions aligned with organizational interests. Yet, at other times, they make decisions that contradict organizational policies and interests, even altering official decisions—though occasionally they reinforce organizational goals and outcomes (Keli, 2005; Hill & Jones, 2007).

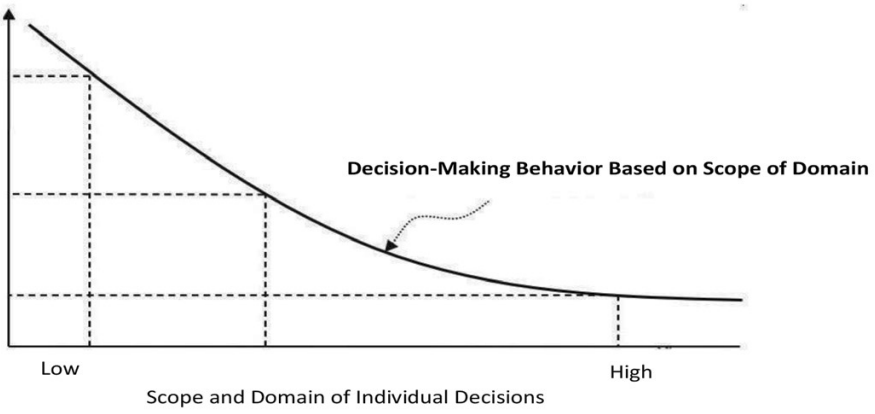


Figure 4. Interaction Between the Scope and Domain of Individual and Organizational Decisions

Structured and Unstructured Decisions

The fifth type of decisions, categorized based on the degree of definition and clarity of their content, consists of structured and unstructured decisions**.**

Structured Decisions. When organizational decisions are well-defined, highly explicit, and contain no ambiguity within their main framework, they are referred to as structured decisions. Decisions made by first-level (operational) managers typically exhibit a high degree of structure. Influencing factors for such decisions include organizational history of events and performance, objectives, and managerial decision-making processes, all of which also serve as limiting factors.

Unstructured Decisions. In contrast**,** unstructured decisions are those that are not fully defined or clearly articulated, making them difficult to comprehend. These decisions are hard to make and even more challenging to implement.

Because they lack roots in the organizational realities of the past, the timeframe for their decision-making process cannot be precisely determined. Unlike previously encountered issues, decision-makers have no clear image of how to make or execute such decisions. Typically associated with organizational problems, these decisions often emerge under crisis conditions or constraints and do not follow any specific rule, procedure, or model (see Table 4).

Table 4. Characteristics of Structured and Unstructured Decisions

Decisions	Structured	Unstructured
Features	Meaning, dimensions, and scope specified Main framework and tiers (levels) specified High compatibility with organizational structure and duties Rooted in the organization's history Length of the decision-making process known Mode of decision-making specified The field of operational and technical decisions Clear, explicit, and comprehensible	Meaning, dimensions, and scope unspecified Length of the decision-making process unknown Mode of decision-making unspecified Emerge from crisis conditions and constraints Do not follow a specific rule, procedure, or model Low executability Mode of decision-making specified Time of implementation unspecified Not rooted in the organization's history Unclear and not explicit

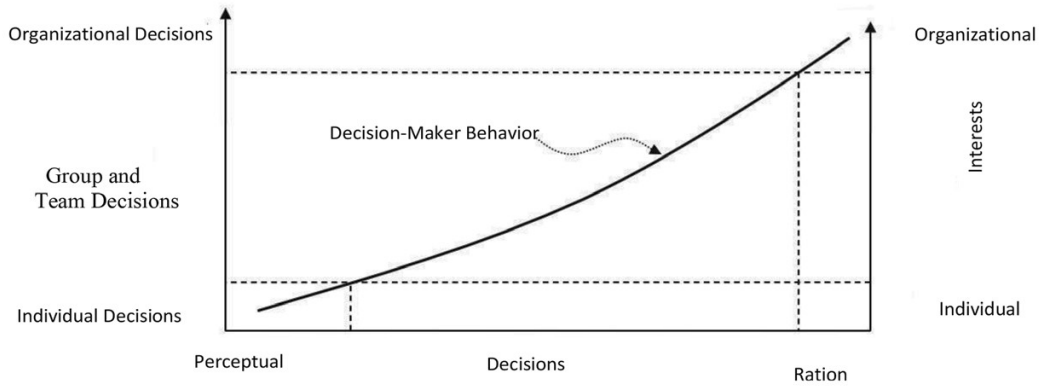


Figure 5. Decision-Maker Behavior Based on Benefits, Degree of Intuition, and Tasks

Coordinating (tactical) decisions fall between structured and unstructured decisions. They are subject to fewer constraints than operational decisions, but more than strategic decisions. Technical and operational decisions are generally structured, although at times they also overlap with unstructured decisions (Koontz & Weihrich, 2015; David, 2011).

Perceptual and Rational Decisions

The sixth category of decisions, viewed in terms of the degree of intuition and sensory involvement, are perceptual and rational decisions.

Perceptual Decisions. Since individuals' perceptions and senses serve as the bridge between the external world of realities and their inner mental world, managers occasionally face situations where they must make perceptual and intuitive decisions. Such decisions rely on experience, instantaneous analysis, and managerial insight. In these cases, managers gather limited information and make quick decisions. Most problems requiring creative and innovative solutions are grounded in managers' perceptual ability and imagination (see Figure 5).

Rational Decisions. In contrast to perceptual decisions, rational decisions are characterized by objectivity and logic, though still connected to individual perception. They are closely tied to achieving organizational goals and are defined in alignment with professional expertise, thereby ensuring high effectiveness, as they represent the scientific dimension of the organization. Both quantitative and qualitative data play an essential role in these decisions. Managers making rational decisions employ scientific methods to gather extensive quantitative evidence in order to perform detailed analysis.

While the desirability of rational decisions is usually higher, perceptual and intuitive decisions are of greater importance. In strategic decision-making, perceptual and intuitive approaches are used more often, whereas rational decisions dominate technical and operational domains. Middle managers often attempt to link organizational realities to past experiences, while first-level managers usually rely on their experience to make day-to-day operational decisions.

Managers must not only be familiar with the features and mechanisms

of perceptual and rational decisions but also recognize their importance. Every manager should cultivate the ability to respond quickly and effectively to situations. This skill emerges through the development of perception, intuition, and judgment, acquired over time through experience and practice. On the other hand, managers should be able to think forward (by improving their capacity to use forecasting models to analyze variables) and backward (by enhancing perceptual capacity to identify patterns, trends, developments, and connections between seemingly unrelated events) (Gibson et al., 2012; Ranyard et al., 2011).

Problem solving and Identifying opportunities Decisions

Problem solving Decisions. These decisions are employed to address current and predictable issues within the organization. Many managers, particularly those inclined toward rationality, prefer problem-solving decisions. Such decisions fall within a domain of managerial rationality (science- and knowledge-based expertise). The rationality of managers' decisions is subject to several limiting factors, which also delineate their scope. Scholars argue that managers typically solve problems through rationality. The limiting factors include:

- Efforts to change goals and sustain transformations
- Ambiguity in defining issues and their dimensions
- Limited resources for data collection and developing alternative solutions
- Weaknesses and limitations in memory, reasoning, perception, and analysis of realities by individuals
- Inadequate forecasting of outcomes and insufficient knowledge about their occurrence

Instead of always striving for optimal solutions, managers often pursue satisfactory ones. In other words, they attempt to achieve several overarching organizational goals satisfactorily rather than maximizing profits or narrower, partial objectives. Since physical, economic, social, and psychological factors impose constraints on organizational realities, managers must operate within these boundaries.

Identifying opportunities Decisions. Since organizations can ensure both growth and long-term sustainability by identifying and effectively exploiting opportunities, recognizing opportunities is considered a critical activity. Such decisions encompass the potential for organizational growth, resource enhancement, and the advancement of efficiency across other organizational objectives. These decisions are influenced by several factors, including willingness to take risks, the ability to identify opportunities (unmet demands, needs, and pathways for progress), and the capacity to exploit them effectively.

When organizations underperform, they expose themselves to risks rooted in managerial decisions, whereas sound managerial and organizational performance minimizes exposure to threats. Thus, organizational performance is heavily influenced by managers' ability to seize opportunities, making corresponding decisions for implementation essential (White, 2004; Hill & Jones, 2007).

Independent and Dependent Decisions

Decisions can also be classified according to their degree of dependence on other decisions. The extent of dependency of one decision on others is measured by four factors:

Influence of past and future decisions. Many current decisions are affected by past ones. At times, past decisions are so significant that they determine critical and sensitive points, which are subsequently relied upon by present decision-makers. Similarly, decisions may also be influenced by future conditions, to the extent that the decision-maker must anticipate and accept possible future outcomes.

Influence of organizational areas and units. This factor assesses the extent to which a decision is connected to other parts of the organization. Some decisions affect only specific units, while others influence the broader organizational environment and its various divisions.

Temporal positioning of the decision and its execution compared to past and future decisions. The implementation of organizational programs, in terms of precedence and sequence, indicates that some decisions can be made independently of prior ones, whereas others require

a series of past decisions to have been established.

Speed of execution and realization. Independent decisions are characterized by swift adoption and strong executability. In contrast, dependent decisions, due to assumptions requiring alignment across other organizational units and over time, are often slower to adopt and weaker in implementation.

These four factors interact with one another, where one can accelerate or slow down the others. According to Table 3-5, strategic and, to some extent, tactical decisions tend to be unstructured and dependent, serving as models for the decision-making process, while technical and operational decisions gravitate toward structured and independent choices (Koontz & Weihrich, 2015; Bubnicki, 2004).

Major and minor decisions

Major Decisions. Also called **internal decisions**, these are those that originate within the organization in alignment with specific tasks and responsibilities (see Figure 3-6).

In primary decisions, the data required for decision-making are drawn from within the organization, and the outputs are also directed back internally. Such decisions are aligned with all organizational changes, showing little inclination for innovation in existing conditions. They typically have minimal influence on daily operations and organizational realities.

Since primary decisions can be made at all organizational levels, they are, by nature, more operational than strategic, though they remain applicable across the entire hierarchy.

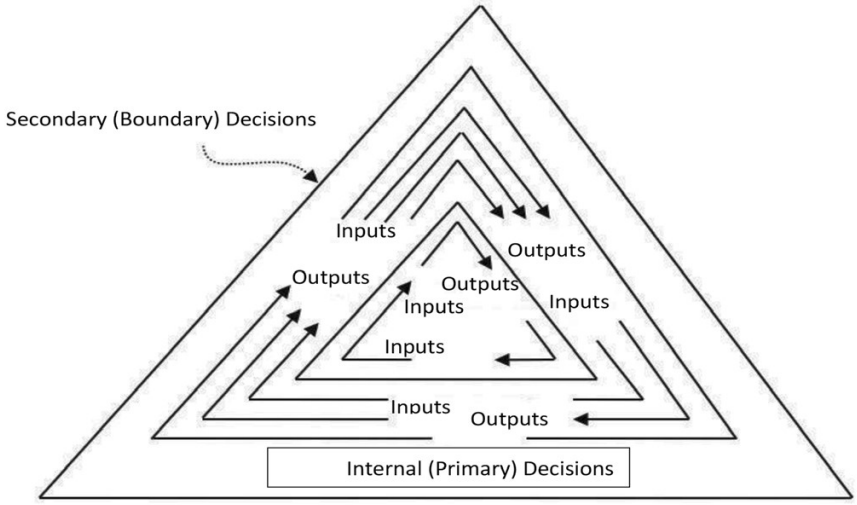


Figure 6. Major and Minor Decisions

Minor Decisions. Secondary decisions, also referred to as boundary decisions, represent another category of choices situated at the interface between an organization's internal and external environments. When confronted with such decisions, managers are responsible for maintaining and balancing the relationship between the organization and its internal/external environment. These decisions are generally accompanied by uncertainty regarding the reliability of acquired information and the determination of the appropriate timing for implementation. Information gathered from the external environment of the organization is often discontinuous, whereas information collected from the internal environment tends to be continuous (Saadat, 1993; Yoon & Hwang, 1995)

Stable and Enduring vs. Unstable and Short-Lived Decisions

All the decisions reviewed in this chapter may be subject to momentary or short-term changes under specific conditions. Fluctuations arising before or even during implementation often contribute to their instability. Hence, another classification of decisions emerges, distinguishing between stable and enduring decisions and unstable and short-lived decisions.

A decision is regarded as stable and enduring if it meets, or can create,

the following conditions:

- Acceptance by members
- Streamlining of tasks
- Reduction of costs
- Increase of benefits and advantages
- Progress toward objectives
- Adaptation to conditions
- Utilization of experiences
- Contribution to a peaceful environment

Unstable and short-lived decisions, on the other hand, generate dispersion and instability in organizational policies, programs, procedures, and even functions. Over time, such decisions erode managers' confidence, diminishing their capacity for judgment, evaluation, and even discernment. Therefore, managers must endeavor to adopt decisions grounded in thorough study, deep reflection, foresight, and consideration of long-term consequences.

Table 5 Comparative explanation of hierarchical decisions with structured and unstructured decisions

Decisions	Decision framework	How it occurs	Status	Results
Independent and operational decisions: structured	- Appropriateness for the situation in which an individual is making a decision; - There is internal autonomy due to the limited scope of the decision; - Decisions are clear, unambiguous, and understandable and do not affect other decisions.	- To appear reasonable; - To have a normal and common aspect	- Few uncontrollable factors; - Limited nature of decision; - Documented decision positions	- The existence of multiple factors and cases for each outcome; - The predictability of the outcomes (to some extent)
Dependent and strategic decisions: Unstructured	- Need for a large number of decision makers; - Impact of the decision outcome on the entire organization	- The possible lack of clarity of possible solutions; - The difficulty of adopting solutions in a unified manner; - The lack of general consensus on the results they agree upon.	- The existence of many uncontrollable factors; - The unknown nature of uncontrollable factors; - The difficulty in predicting factors	- The existence of multiple states for each condition; - The difficulty of predicting multiple states for each condition

Decisions	Decision framework	How it occurs	Status	Results
Tactical and Dependent Decisions: Structured and Unstructured	- Being suitable for reflecting strategic decisions into departmental decisions in the organization; - Having a boundary and interactive aspect to the decisions; - Having a buffer role for interdepartmental decisions;	- The controlling and coordinating aspect of making sectoral and border decisions	- The diversity of controllable and uncontrollable factors; - The power of entanglement, the orderliness of the process	- Having various scenarios for planning and execution; - Ensuring the success or failure of sectoral and inter-sectoral decisions

Conclusion

Decisions constitute the starting point of all transformations and movements within organizations. The organizational environment is not only shaped by managerial decisions but its boundaries and scope are also defined through them. A comprehensive understanding of decisions in all their dimensions requires overcoming the challenges of decision-making and properly directing them. Every decision must be made not only in accordance with its features but also aligned with its mechanisms and within the framework of styles applicable to it.

In this chapter, decisions were classified into ten categories. Based on the analyses, the following conclusions can be drawn:

1. Managerial decision-making in organizations stems from, and is influenced by, both specific and general aspects of culture and environment.

2. Managers make decisions based on professional necessity, organizational levels, and environmental conditions.
3. Decision-making and management are synonymous; in other words, the central function of management is decision-making.
4. The scope of production—goods and services—and the organizational realities of the environment are shaped by managerial decisions.
5. The only reliable factor within the management system is the managers themselves, who must always make decisions with limited and incomplete information.
6. Managers bear the ultimate responsibility for all decisions.
7. Uncertainty and ambiguity are two common phenomena that play a prominent role in the decision-making process.
8. The organization interacts with its environment through the perceptions and decisions of its management system, which determine its efficiency and effectiveness.
9. The management system is sometimes unable to precisely define situations and issues for managers; therefore, managers may not always consider realistic reactions in decision-making.
10. The aspirations of managers and the collective perceptions within the organizational environment evolve over time and may result in improvement and development.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. Why is the classification of decisions necessary, and which criteria can be used for such classification?

2. Explain the objectives and functions of differentiating, integrating, sustaining, and adaptive decisions.
3. List the types of decisions based on the rationale and nature of their classification.
4. Explain the difference between programmed and non-programmed decisions.
5. What are the differences among decisions based on hierarchical levels? Explain.
6. Describe the dimensions and characteristics of hierarchical decisions with a diagram.
7. What is the difference between individual, group, team, and organizational decisions?
8. What is the difference between structured and unstructured decisions?
9. Explain the mechanisms and functions of perceptual and rational decisions.
10. Elaborate on problem-solving decisions and opportunity-recognition decisions.
11. Why do independent and dependent decisions exist, and what are their functions?
12. What is the difference between primary and secondary decisions?
13. Which indicators can be used to identify stable and enduring versus unstable and short-lived decisions?
14. Explain the interrelationship among different types of decisions.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. Understanding and classifying decisions is a prerequisite for im-

proving managers' decision-making skills.

2. The greater the managers' knowledge of decisions, the more significantly the problems of decision-making and the gap between theory and practice, goals and performance, are reduced.
3. Environmental conditions are, in fact, the result of decision-makers' mental interpretations.
4. Decisions that divide the main organizational functions into sub-functions, assign them to posts and units, and direct the division-of-labor process are called differentiating decisions.
5. Decisions that examine the degree of organizational interaction, adaptation with the environment, and prevention of disequilibrium are called adaptive decisions.
6. Considering the degree and quality of a decision's impact on other decisions cannot be a suitable criterion for evaluating its potential effectiveness.
7. In programmed decisions, managerial discretion is somewhat limited because the organization decides instead of the manager.
8. Decisions are classified, based on their orientation, into problem-solving and opportunity-recognition decisions.
9. Decisions are classified, based on repetition and certainty, into stable and unstable decisions.
10. Tactical decisions are usually novel, unanticipated, and unstructured.
11. The process of strategic decisions is influenced by complexity, level, degree of structural formalization, and the extent of centralization or decentralization.
12. Effective strategic decisions cannot be regarded as the driving force of organizational management.
13. The scope of technical and operational decisions, in terms of time (present and future), is relatively moderate to low.
14. The goal orientation of operational decisions is very high, and the

executability of strategic decisions is also very high.

15. The newer and more unprecedented the decision, the shorter its time horizon becomes.
16. Individual decisions are made by the manager as an organizational member, not as a person.
17. A structured decision is one that is well-defined, very clear, and explicit, with no ambiguity in its main framework.
18. Rational decisions have a factual and logical nature and are defined in close connection with achieving organizational goals.
19. Many managers prefer to make problem-solving decisions within the realm of perceptual decisions.
20. The degree of desirability of perceptual decisions is generally higher, but rational decisions are more important.
21. Managers must be able to reflect on the past by strengthening their perceptual ability to identify patterns, trends, developments, and relationships among seemingly unrelated events.
22. Decisions can be classified, based on dependency on other decisions and interaction with the external environment, into independent vs. dependent and primary vs. secondary decisions.
23. The rationality of managers' decisions depends on the absence of ambiguity in defining problems and their dimensions.
24. Opportunity-recognition decisions should not be influenced by the willingness to take risks, the ability to identify opportunities, or the capacity to exploit them effectively.
25. Perceptual decisions are based on managers' experience, instantaneous analysis, and insight.
26. The presence of calmness, tension, anxiety, reassurance, vitality, and enthusiasm for work are reflections of the effects of managerial decisions.
27. Political skills serve as mechanisms that enhance organizational decision-making.

28. As the level of structuring decreases, the level of decision-making tends toward centralization.
29. The more decisions become programmed, the longer their planning horizon becomes.
30. Due to the breadth of technical issues, individuals cannot decide alone; hence organizations sometimes establish specialized groups or even matrix structures.
31. Unstructured decisions are associated with organizational problems, often arising from crises and constraints, and do not follow precise rules, procedures, or models.
32. Decisions rooted in organizational history, with a known and defined process, are structured decisions.
33. The greater the scope of organizational decisions, the narrower the scope of individual decisions.
34. Middle managers often attempt to link organizational realities with past experiences; likewise, first-level managers usually rely on their experience to make daily operational decisions.
35. Managers must be able to think about the future (by enhancing their ability to use forecasting models to analyze variables) and the past (by improving perceptual capacity to identify patterns, trends, and connections among seemingly unrelated events).
36. Efforts to change goals and sustain transformations, weaknesses in forecasting results, and insufficient knowledge about their occurrence all affect the rationality of managerial decisions.
37. Decisions may also be influenced by future conditions, to the extent that the decision-maker must be able to accept expected probable outcomes.
38. Dependent decisions are characterized by rapid adoption and high executability.

Chapter 4
Soft and Theoretical Approaches

Objectives

- To become familiar with the scope, features, and range of soft factors influencing organizational decision-making.
- To gain an understanding of theoretical approaches to decision-making and their defining indicators.
- To recognize how decision-making methods and styles can be applied to diverse arenas of managerial practice.

Introduction

A specialized perspective on decision-making, and the recognition of its inherently professional nature, play a critical role in enhancing the awareness, skills, and mechanisms of managers, ultimately leading to the improvement of organizational leadership. In contemporary scholarship, owing to the vast expansion of specialized decision-making knowledge, this dimension of managerial responsibility is regarded as an independent discipline—one that, more than any other academic field, integrates both qualitative and quantitative dimensions.

The qualitative dimension, which represents the "soft" aspects of decision-making, exerts profound influence. It renders the discipline of decision-making highly dependent on insights drawn from theories, hypotheses, and models in psychology, sociology, law, and organizational science. Conversely, the quantitative dimension, representing the "hard" aspects, is equally significant due to the tangible and intangible factors, explicit and implicit constraints, and the inherent goal-oriented nature of decisions, all of which demand the achievement of optimal

outcomes.

The scope of theoretical decision-making methods presented in this chapter is relatively limited; nevertheless, managers must make decisions under varying conditions, ranging from certainty to ambiguity, uncertainty, and complexity. The emphasis of this chapter lies in the qualitative and theoretical aspects of decision-making, with an attempt to shed light on the semi-tangible and influential factors that shape managerial choices.

Through the decisions they make, organizational leaders delineate and materialize the environment and boundaries of their organizations. The perceptions of stakeholders are, to a large extent, reflective of the courage, prudence, and precision with which managers allocate resources and align capabilities toward achieving objectives. In practice, however, managerial positions are often entrusted to non-specialists, whose knowledge of management remains minimal. This phenomenon leads to the proliferation of redundant cycles of repeated realities and distances organizations from their aspirations. Yet, such shortcomings have motivated scholars to devote increasing attention to the specialized dimensions of management—particularly decision-making—in order to articulate its structure and essence, and to cultivate the theoretical foundations and models upon which managerial competence can be developed.

In this context, managerial decisions manifest themselves in a range of psychological and organizational outcomes, including serenity, tension, anxiety, confidence, vitality, and motivation. Many organizational challenges stem from inconsistencies between decision-making and implementation; oftentimes, the decisions articulated differ substantially from those executed. This deficiency is rooted in technical weaknesses within the decision-making processes of management.

Accordingly, this chapter examines decision-making methods and their procedural mechanisms. Given the sensitivity and pivotal role of decisions in securing efficiency, effectiveness, and organizational success, decision-making has evolved into a cross-disciplinary specialization. Its significance becomes increasingly pronounced in societies where trans-

formations are rapid and accelerating.

Decision-Making Methods

By identifying the contextual, conditional, and organizational factors that shape decision-making, the analysis of various approaches becomes more accessible. The methods examined herein include:

- Decision-making through group and team selection
- Decision-making through expert judgment
- Decision-making through administrative regulations
- Decision-making through interactive models

Interactive models themselves comprise several sub-models, including:

- The Team Model
- The Political Model
- The Occasional Procedures Model
- The Analytical Model
- The Normative Decision Model (Wheelen & Hunger, 2012; Drucker, 2007; Koontz & Weihrich, 2015; Gibson et al., 2012).

Decision-Making through Group and Team Processes

Managers and organizations are often unable to make critical decisions in isolation; rather, decisions are shaped through processes of reciprocal interaction. This mutual influence emerges at the very core of the organization and in the interrelationships among its various units. In practice, such exchanges engage experts, managers, and employees at multiple hierarchical levels.

The most significant decisions taken through this method concern strategies, goals, organizational programs and structures, innovation, design, reduction of hierarchical specialization, subsidiary organizations, and even lower-level operational matters. Other important group-based organizational decisions often pertain to inter- and intra-organizational projects, promotions and advancements, appointments and

employment contracts, budgeting, training programs, and the design of shared work procedures.

To comprehend the roles of individuals and groups in influencing decisions, it is essential to examine and analyze the decision-making process and hierarchy. This can be undertaken in three stages:

a) Identification

At this stage, the necessity and requirements of decision-making must be recognized, and situational analyses conducted. This often requires the application of personal initiative. Human resource decisions, in particular, are highly sensitive, and given the complexities of hierarchical specialization, organizational change is difficult without considering factors such as:

- Individuals' receptiveness to change and transformation
- Levels of comprehension, initiative, and autonomy among employees
- The readiness and supportive context for enabling change
- The capacity to carry out tasks while recognizing complexities and interdependencies

Through creative and work-oriented mindsets, individuals generate a driving force that motivates them to pursue, analyze, and resolve issues. Such motivation also nurtures curiosity and fosters continual adaptation of realities and behaviors.

b) Research and Design

This stage includes investigation, identification, and the design of problem-solving approaches. Sometimes, this responsibility is carried out by organizational members themselves, enabling them to provide precise and detailed solutions. In other cases, special groups, working alongside operational personnel, take on this task. Accordingly, managers, by exercising authority, determine the scope of discretion available to operational units.

c) Selection

The final stage involves evaluating, assessing, and choosing the most appropriate solution. Organizations typically delegate this responsibility to permanent committees or influential individuals. Such delegation to lower hierarchical levels accelerates the formulation, organization, and implementation of goals and programs.

For non-routine decision-making, the following stages can be aligned with the organizational hierarchy:

- Familiarizing managers and experts with the decision-making process
- Engaging groups and operational units with horizontal interrelations in goal formulation and development
- Facilitating the stage of solution selection within the vertical hierarchy, utilizing insights from groups, permanent committees, managers, and, in some cases, representatives of other organizations or even governmental authorities

Decision-Making through Expert Judgment

Experts are composed of individuals who, over time, accumulate knowledge through experience, thereby attaining professional expertise and internal independence. Owing to their accumulated experience, knowledge, skill, and insight, the opinions and ideas of experts are often profound, comprehensive, and forward-looking. Experts exert substantial influence on organizational decision-making, particularly on those decisions that shape and guide the core missions of organizations. Examples include decisions related to promotion, retention and provision of human resources, organizational development plans, and similar matters.

The primary input for expert-driven decision-making derives from the knowledge resources selected and valued both by the experts themselves and their colleagues, within internal and external organizational contexts. Consequently, the solutions they develop reflect the cumulative training and professional experiences acquired throughout their careers.

Decision-Making Based on Administrative Regulations

Administrative regulations are the outcomes of organizational policies. These policies create a framework within which effective strategic decisions can be made. Policies are considered as the guiding principles, signposts, and reference points that direct the decision-making process. Although strategic choices highlight the operational courses of action available to management, their selection is only possible within the boundaries of these policies. Thus, prevailing and authoritative policies enable the utilization of operational pathways that can effectively contribute to achieving strategic decisions.

Compared with other organizational components, policies constitute fundamental criteria in assessing organizational readiness to mobilize capabilities for strategic choices. Essentially, policies serve as instruments for achieving annual objectives. A policy is comprised of:

a) Guidelines,

b) Regulations, and

c) Procedures,

all of which organizations and their officials must observe in pursuit of declared objectives. Policies are employed as guiding tools in the decision-making process. They establish the conditions for daily and recurring operations, are often formulated around specific activities, and are contextualized by their respective organizational environments. Moreover, policies can be tailored to a single unit within the organization and applied exclusively at that level.

Within the hierarchical structure of organizations, several factors emerge that constrain and direct managerial decision-making and the administration of specialized personnel. These include common organizing practices such as direct supervision, issuance of formal orders, establishment of administrative regulations, compliance with rules, job descriptions, and organizational policies. Collectively, they shape the framework of decision-making through administrative regulation. The most notable factors are:

- Missions, strategies, and organizational policies
- Areas of specialization and job descriptions
- Professional knowledge levels of experts
- Performance indicators, responsibilities, and functions
- Division of labor and operational processes

The use of administrative rules, procedures, and policies contributes to the standardization of work practices, minimizing discretionary and arbitrary behaviors in the execution of duties. This standardization plays a pivotal role in mobilizing and guiding organizational resources toward objectives, while also providing the foundations for coordination, monitoring, and control.

Within organizations, managers and experts exert significant control over programs and realities associated with human resources, training, production, research, planning, and organizational structuring. This control is exercised through their participation in councils and committees, the acceptance of related responsibilities, and even the assumption of administrative roles that may exceed their actual capacity—often at the cost of postponing other organizational duties.

Because many administrative decisions are made collectively and by consensus through expert groups and managers, this decision-making style falls within the domain often referred to as "administrative directives." This form of decision-making can also be viewed as a distinguishing feature of organizational subsystems, which comprise various units and departments.

For instance, in order to enhance human resource capabilities and skills, a comprehensive strategic plan with the following characteristics can strengthen administrative regulations:

a) Identification of resources and channels for human resource supply

b) Assessment of the current situation, needs analysis, estimation, and workforce planning

c) Retention strategies such as programs for skill development, capacity building, and welfare or health services

d) In-service training programs designed to update knowledge and improve skills

e) Compensation methods linked to performance improvements and productivity indicators

Managers also play a central role in formulating operational procedures for organizational subsystems, thereby directing and guiding them. Consequently, participation in committees and councils, as well as the diversity and membership composition of these bodies, are of particular importance, as they provide the foundation for the emergence of such administrative processes.

In practice, managers devote substantial time to human resource programs. Even when they demonstrate little intrinsic interest, critical issues relating to human resources nonetheless consume considerable portions of their daily work. As a result, managers evolve into influential and skillful actors who indirectly shape organizational strategies and contribute to their advancement.

Decision-Making Based on Interactive Models

This approach to decision-making encompasses five distinct models, as outlined in Table 1.

Table 1 Characteristics of interactive decision-making models

Models	Characteristics
Team-Oriented	- Decision-making based on the behavior of specialists - Ability to formulate and design long-term and strategic programs - Prevalence of collective and shared interests - Analysis is primarily undertaken to enhance understanding, achieve consensus, facilitate communication, and defend the legitimate interests of all group members

Models	Characteristics
Political	- Decision-making based on individual behavior - Prevalence of personal interests - Capacity to resolve critical issues - Existence of diverse analyses, some of which may be unrealistic but can generally contribute to clarifying facts - Intense competition for securing benefits despite constraints - Reliance on verbal analyses and arguments framed within individual insights and perceptions to elucidate realities
Occasional	- Creation of unexpected verbal and behavioral diversity within the organization - Capacity to resolve incidental and unforeseen problems - Greater utilization of a matrix organizational structure - Prevalence of impartiality / disregard for specific or group interests
Analytical	- Selection of solutions from among those identified and evaluated - Ability to formulate and design strategic and technical programs - Utilization of logical, analytical, and rational discussions and arguments to strengthen reasoning, perceptions, and critical thinking - Prevalence of the organization's rational interests
Normative	- Identification of opportunities, problems, crises, threats, and constraints - Improvement and development of decisions through intelligent and innovative methods - Capacity to resolve critical issues, constraints, threats, and opportunities - Application of chosen methods based on creative thinking, careful analysis, and sound judgment

Team Model

One of the most common methods of organizational decision-making is the team model. In this approach, decisions are made by members from both the internal and, at times, external environments of the organization. Thus, various individuals and groups participate, each contributing diverse roles and areas of expertise toward a shared organizational goal.

In this model, collective interests and influential specialists serve as the driving force of the decision-making process. The objective is to generate intellectual and professional synergy to arrive at appropriate solutions for decision problems—often novel and unprecedented in nature. Although the team model is sometimes considered synonymous with the group model, the two differ: in the group model, particular behavioral and perceptual norms may form, which at times introduce biases and shift decision-making toward the interests of influential individuals. In contrast, the team model emphasizes collective participation and consensus-based decision-making.

Contexts in which the team model is applied include:

- Acceptance of a shared mission
- Presence of influential managers, subordinate units, and reputable small professional groups
- Existence of a gap between goals and performance, and efforts to close this gap
- Presence of political interactions among individuals, managers, units, and parent or affiliated organizations
- Presence of competent and qualified supervisors to guide organizational performance

Political Model

In this model, collective interests diverge from and conflict with personal interests. As a result, it is not always possible to reach consensus on shared goals across all groups. Coordination is weak, and individuals employ political mechanisms as tools to secure outcomes favorable to their personal interests.

In the long run, the decision-making process may not necessarily be governed by collective group interests or personal interests alone; rather, it often becomes a hybrid of both. While collective interpretations and understandings may initially guide the pursuit of common goals, divergence and discord frequently arise during the adoption and execution phases. Still, there are occasions when individuals pursuing differ-

ent organizational objectives achieve broad-based agreement.

When resources decline and organizations face constraints, decision-making tends to become intensely competitive and conflictual. If resources are allocated irrationally, specific groups may feel threatened, thereby imbuing the process with distinctly political dimensions.

Distinguishing between the team model and the political model cannot be achieved solely by evaluating individual behavior; it also requires additional criteria and methods. In practice, except under entirely polarized conditions, decision-making frequently incorporates both models, despite their complexities. To ensure success and feasibility, it is often necessary to employ the team model, subsuming individual expertise and interests within collective goals.

Nevertheless, during times of major organizational change, managers may interpret shared goals differently, creating conflict. In such cases, groups may forego common resources and instead leverage their collective power and influence to shape the course of change—effectively shifting the decision-making process toward the political model. Thus, the distinction between team and political models lies not in behaviors alone but in the motivations of the actors.

Within the framework of the team model, actions are geared toward exerting greater effort and applying pressure to secure organizational benefits and improvements. In contrast, the political model is primarily aimed at defeating or marginalizing opponents in pursuit of personal gain. Consequently, a combination of team and political models often plays a significant role in shaping decision-making processes. These models can therefore be regarded as the strategic code of conduct for an organization's executive forces.

Occasional Procedures Model

The third model explaining organizational decision-making is known as the "organized anarchy" or "occasional procedures model." Its defining features include:

- Identification of potential solutions for addressing problems and

challenges

- Recognition of emotions, perceptions, insights, and judgments to uncover important decision-making opportunities—where emotions evolve into perceptions, and perceptions lead to insights
- Formation of a group of managers tasked with confronting such decision-making situations

In this model, behaviors often arise without specific intent and tend to align with the nature of the issue at hand, since goals are frequently ambiguous and lack clarity. Consequently, the means of achieving them are also problematic. Participation in decision-making, under this model, lacks credibility and stability due to high costs, excessive time demands, and significant energy requirements. As a result, no particular interests are actively pursued. Unlike the team model, which emphasizes collective interests, and the political model, which prioritizes personal interests, the occasional procedures model is characterized by a relative absence of self-interest.

Here, the precise process of decision-making is less important than the ability of managers to respond effectively to unforeseen events. These situations emerge suddenly, without preparation or prediction, compelling immediate decisions. It is therefore essential to analyze past organizational decision-making conditions, to determine whether such approaches were used primarily for key issues or for more explicit and hidden matters, and at which stage critical decisions were made.

Importantly, participation can be stabilized, for example, through a matrix organizational structure, ensuring that whenever serious or occasional issues arise, a matrix team is formed to make decisions. In such cases, the cost of non-participation outweighs the cost of participation.

This model often applies to managers or individuals who perceive goals differently and for whom decision-making is vital to problem-solving. Since managers guide organizations, contradictions in their perceptions can pose serious challenges to organizational continuity, requiring resolution if the organization is to sustain itself in the long term.

Accordingly, reliance on individuals who contribute proposals and

solutions without prioritizing personal interests is critical, as their intellectual and professional capacities constitute valuable and relatively inexpensive resources. Organizations must harness these resources to strengthen their ability to confront future occasional crises. Still, within this model, the absence of self-interest can influence the decision-making process to a degree comparable to the impact of collective or personal interests in the team and political models.

In conclusion, although the occasional procedures model contributes to describing and clarifying decision-making processes, its application within the operational domain of organizations remains marginal. Its primary utility lies in the higher levels of organizational decision-making.

Analytical Model

The analytical model, also referred to as the rational model, is characterized by its emphasis on identifying feasible alternatives, distinguishing acceptable proposals from unacceptable ones, and selecting the most appropriate solution. This approach is highly compatible with technical organizational structures. Thus, elements of analytical decision-making can also be found within the team, political, and occasional procedures models. Nevertheless, the application of the analytical model is particularly important in organizations for the following reasons:

- The structural thinking of organizational members within interactive decision-making processes
- The necessity of intra-organizational communication to clarify the dimensions of decisions
- The reliance on analytical reasoning in hierarchical organizational decision-making
- The existence of conflicts among senior managers in making strategic decisions
- The motivational, logical, and transparent nature of organizational decisions
- The limited knowledge and skills of senior managers in making

operational and executive decisions

- The necessity for managers to employ perception, reasoning, insight, and intelligence in comprehensive decision-making at both organizational and sub-organizational levels
- The lack of adequate information across different decision-making positions
- The presence of threats, constraints, and opportunities, which requires managers to exercise rational, logical, and analytical reasoning
- The necessity of structuring facts, behaviors, and reactions of individuals and organizations within the framework of formal organizational arrangements and objectives, while balancing organizational forces
- The need to secure the consent and agreement of individuals, regardless of the extent of their actual activity or participation, in order to prevent disruptive negative reactions

Normative Decision Model

The normative model, also referred to as the prescriptive model, reflects decision-making styles shaped over time in response to the quality of events, professional standards, and cultural norms. This model unfolds in three distinct and sequential stages:

1. Problem Identification. At this stage, opportunities, issues, and crises are recognized and diagnosed. Both the symptoms and the underlying causes of problems are considered.
2. Solution Identification. This stage constitutes the core of the decision-making model. Here, one or more solutions are identified, designed, and structured using exploratory and intelligent techniques. These methods often involve four sub-steps:
    - Efforts by decision-makers to identify existing solutions
    - Preparing for the likelihood of imminent problems or issues
    - Identifying, ranking, and evaluating alternative solutions

- Employing exploratory and innovative approaches in the search process

In this process, when decision-makers face failure, they return to the design stage, revisit traditional solutions, and refine available options. Due to the high cost of designing ad-hoc solutions, organizations typically prefer identifying a portfolio of alternatives rather than focusing on isolated solutions.

3. Selection of the Optimal Method. The aim of this stage is to select the most suitable method that aligns with the circumstances and fulfills the decision-making objectives. There is no inherent requirement to develop solutions that exclusively favor particular groups. Creative thinking, careful analysis, and rational judgment are not independent phases but rather successive steps within a single process. Typically, numerous small and large decisions are made, and the process repeats until a final decision is reached and the procedures themselves become institutionalized. Given this dynamic, the stages maintain a close relationship with established authority structures, necessitating the approval of supervisors before advancing to subsequent phases (Stacey, 2018).

Conclusion

Decision-making patterns and models reflect the realities organizations face in their decision-making contexts. In essence, models provide managers with sets of assumptions designed to yield logical outcomes. They offer frameworks for explaining the nature of decision-making phenomena and clarifying their relationships with other organizational processes. Moreover, decision-making models can identify the most critical factors shaping decisions and propose useful policies for addressing organizational problems.

Based on the analysis presented in this chapter, the following conclusions can be drawn:

- Decisions are influenced by organizational policies, and decision-making styles largely depend on managerial perceptions of these factors.

- External constraints, shaped by the general and specific environments of the organization and the level of environmental transparency, significantly affect decisions.
- Initiative, innovation, and creativity emerge from the administrative environment, the organizational structure, and the roles played by organizational members.
- Improvements in efficiency and effectiveness depend on the extent of participation of organizational members in decision-making processes.
- The choice of decision-making styles is influenced by the organizational structure and the level of professional knowledge and awareness among organizational members.
- The clearer the decision-making procedures of experts are, the less managers will intervene with subjective and discretionary approaches.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. Explain the role of decision-making methods in shaping the organization, its environment, and its boundaries.
2. What differences exist between group-based decision-making and the team model?
3. Distinguish between decision-making through professional expertise and the normative decision model.
4. Differentiate between decision-making based on administrative regulations and the analytical model.
5. Under what conditions and circumstances is the occasional procedures model applicable?

6. What is the mechanism of the political decision-making model, and in which contexts is it most relevant?
7. Discuss the comparative features of decision-making models.
8. To understand the roles of individuals and groups in influencing decisions, the decision-making process should be analyzed in three stages:

    a) Identification,

    b) Research and Design,

    c) Selection.
    Explain these three stages.
9. List and explain the reasons why the analytical model is particularly important in organizations.
10. Explain the normative decision-making model.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. Belief in the professional nature of decision-making plays a major role in enhancing managers' knowledge, skills, and mechanisms, thereby improving organizational leadership.
2. Through their decisions, managers disrupt the organization's environment and boundaries and delineate new ones.
3. Many organizational problems stem from inconsistencies between decisions and their implementation; the cause of such deficiencies lies in managerial decision-making processes.
4. Decision-making through reciprocal processes emerges at the core of the organization and in the relationships among its units.
5. Since lower-level managers and members have closer contact with organizational issues and opportunities, they can make better deci-

sions than top-level managers.

6. Experienced managers rely heavily on employees and specialists because their technical knowledge and professional insights are essential for decision-making.
7. Decisions concerning goals, organizational structures, innovation, design, reduction of hierarchical specialization, and subordinate organizations are made through administrative regulations.
8. Individuals lacking creativity and work motivation can nevertheless generate a driving force that encourages them to examine and resolve problems.
9. Administrative regulations are derived from organizational policies. Policies establish a framework within which effective strategic decisions can be made.
10. Policies are recognized as guidelines and signposts that direct decision-making. Although strategic choices indicate operational pathways, their selection is only possible within the context of policies.
11. Compared with other organizational components, policies constitute fundamental bases for assessing organizational readiness to utilize its capabilities in strategic choices.
12. A policy consists of: a) guidelines, b) regulations, and c) procedures that organizations and their officials must follow to achieve declared objectives. Policies serve as decision-making guidelines.
13. Policies originate from undesirable organizational conditions. They are often written around individuals and their implementation depends on related circumstances.
14. For dealing with non-routine decision-making, familiarizing managers and experts with the process, according to hierarchical levels, is essential.
15. The use of administrative rules, procedures, and policies, while standardizing work practices, reduces discretionary and arbitrary execution of tasks.
16. Managers and specialists exercise control over organizational pro-

grams and activities through participation in councils and committees.

17. In the model where collective interests and influential groups drive the decision-making process, this is the political model.
18. When resources are reduced and the organization faces constraints, decision-making loses its competitive nature.
19. In the occasional procedures model, the decision-making process itself is not particularly important; rather, what matters is managers' ability and perception in responding to unforeseen events that occur without preparation or prediction.
20. In the occasional procedures model, decision-making is characterized by the absence of self-interest.
21. The analytical model is highly compatible with technical organizational structures and requires intra-organizational communication.
22. When identifying opportunities, problems, crises, threats, and constraints is the priority, the normative decision-making model is most appropriate.
23. The normative model comprises three stages: identification, solution identification, and selection of the best method.
24. Strategic choice is the most sensitive variable in political decision-making.
25. Sources of environmental uncertainty are dynamic, as they have the potential to create the future, sustain long-term vitality, and ensure organizational survival.
26. Managerial effectiveness depends on the significance, influence, and soundness of major decisions.
27. Experts are individuals with high levels of independence who, through accumulated professional knowledge, exert influence within organizations.
28. The primary input of expert-driven decision-making comes from knowledge resources selected by senior and operational managers,

and problems are solved in ways that reflect their training and work experiences.

29. Managers devote more time to human resource programs than to anything else. Even if they are not particularly interested, urgent HR issues consume a significant share of their daily work.
30. In the team model, collective interests and influential individuals are not considered the guiding force of the decision-making process.
31. Individuals turn political factors into a tool to determine the outcome of decisions in their favor in order to achieve personal interests.
32. The decision-making problem takes on political dimensions when resources are spent irrationally and certain groups are threatened.
33. Sometimes conflicts arise among managers due to different perceptions of common goals.
34. The political and team decision-making models are distinguished and identified based on the behavior of individuals, not on their motivation.
35. In the occasional procedures model, the occurrence of behaviors is without purpose and purpose, and the idea of a decision-making process is not very important.
36. Decision-making occasionally occurs, of course, only in situations where managers and individuals face conflict in their perception of their goals.
37. The distinctive feature of the analytical model is the identification of solutions, the separation of acceptable proposals from unacceptable proposals, and the selection of the best solution.
38. The decision-making method of the analytical model is fundamentally different in nature from team, political, and occasional decision-making models.
39. The solution identification stage forms the core of the decision-making model, so one or more solutions are designed, identified, and adjusted using intelligent exploration techniques.

Chapter 5
Environmental Analysis

Objectives

- To develop familiarity with the environment, approaches to its classification, and its components
- To analyze the dynamics of influence and reciprocity between organizational decisions and the environment

Introduction

Since the environment constitutes the foundation of organizational activities and the lifeblood of their survival, it becomes the principal determinant of mission, continuity of operations, and decision-making conditions. The success or decline of organizations is shaped within the environment, which itself is constantly changing and evolving. Hence, continuous monitoring and interpretation of environmental events—both in the specific and the general domains—are essential for determining the strategic positioning of organizations.

Organizations are essentially formed based on the perceptions and knowledge of their founders, leaders, and professionals. The establishment and advancement of organizational strategies can therefore be pursued through an analysis of environmental contexts and the processes underlying organizational design and governance. At times, however, challenges arise in identifying organizational identity due to perceptual barriers inherent in human cognition. Many organizations struggle with defining and analyzing their environment, leading to confusion and inefficiencies.

In fact, environments are largely constructed by organizations them-

selves. Organizations operate within the environment, while simultaneously adhering to its overarching goals, missions, strategies, and policies, leveraging environmental resources to achieve success.

For managers to align the provision of products and services with societal needs, expectations, aspirations, and standards, they must develop a comprehensive understanding of the environment—its structures, behavioral dynamics, classifications, and mechanisms. The greater the awareness of the environment, the more effectively organizational decisions can align with environmental objectives and organizational missions. As a result, the expectations of policymakers to transform organizations into learning entities can be fulfilled.

The environment serves as both the sole source of organizational inputs and the exclusive consumer of its outputs. It sustains organizational life while simultaneously exposing it to uncertainty through constant transformations. The environment shapes the boundaries of organizations in line with managerial capabilities, skills, and perceptions. Therefore, organizations must achieve symbiosis with their environment to secure long-term survival and stability.

Definition of environment

The environment is a set of conditions, forces, contexts, factors, and components that influence the formation and functioning of organizations, and the organization affects it to the extent of its capabilities. The environment is the container of the organization. The organization manifests itself in the environment and grows and develops. The environment is the reality of the organization, but this reality is interpreted and interpreted in the organization. Therefore, the environment is in the organization because the managers and experts of the organization, in proportion to their perception, shape the environment with their activities, in an objective and subjective architectural and engineering way for the organization. Events and incidents that depend on events in the environment are recognized, analyzed, and interpreted in accordance with the mindset, insight, and understanding of the organization's staff.

Subjective and Objective Environment

The environment for organizations is expressed and inferred in two aspects: 1) subjective, and 2) objective. The characteristics of these two environmental aspects are presented in Table 1-5 (Rezaian, 2018; Robbins, 2020).

Table 1. Subjective and Objective Dimensions of Organizational Environment

Environment	Characteristics
Subjective	- The manager's perception of conditions, forces, contexts, factors, and components - The level, quality, and degree of the manager's understanding and comprehension of conditions, forces, contexts, factors, and components - The manifestation of conditions, forces, contexts, factors, and components shaped by managerial thinking, interpretation, and emotions - The breadth of organizational knowledge and strategic horizons
Objective	- Tangible realities and observable phenomena surrounding the organization, including conditions, forces, contexts, factors, and components - The environment and market in relation to the organization's physical presence - The breadth of the organization's environmental interactions and linkages

Homogeneous and Heterogeneous Environments

The environment can be classified into homogeneous and heterogeneous categories based on the level of transparency and certainty. In a homogeneous environment, transparency, structure, and the degree of certainty are high. Managers can clearly adjust organizational behaviors and structures by utilizing research findings for modification, correction, and improvement of decision-making methods. In such environments**,** opportunity identification and goal-setting are relatively easy**.**

In contrast, a heterogeneous environment is characterized by low transparency, weak structure, and limited certainty, with highly interwoven and complex elements. Recognizing opportunities and setting goals within such contexts becomes challenging. Due to the scarcity and ambiguity of information, managers face significant decision-making dilemmas**.** Under these conditions, the demand for decision-making becomes more acute and critical (see Figures 1 and 2).

According to Figure 1-5, the higher the level of transparency and clarity of information, the more homogeneous the environment becomes. Conversely, as the transparency of information decreases and ambiguity increases, the environment tends toward heterogeneity. In other words, an environment is considered heterogeneous when the level of visibility and clarity of phenomena is low and information is opaque**.**

In a heterogeneous environment, as illustrated in Figure 2-5, the diversity of events and event-dependent phenomena is high. In other words, the greater the diversity within the environment**,** the higher its degree of heterogeneity. Conversely, when the level of diversity decreases, the environment shifts toward homogeneity and convergence.

Therefore, to promote greater utilization of the environment, research, especially environmental research, plays a critical role in decision-making because it is a source of specialized information and is considered one of the foundations of cognition (Ranyard, et al., 2011).

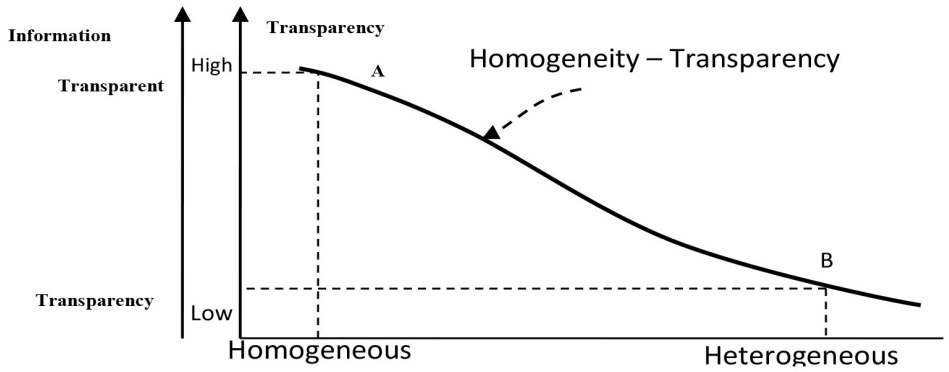


Figure 1. The Relationship between Environmental Homogeneity and Transparency

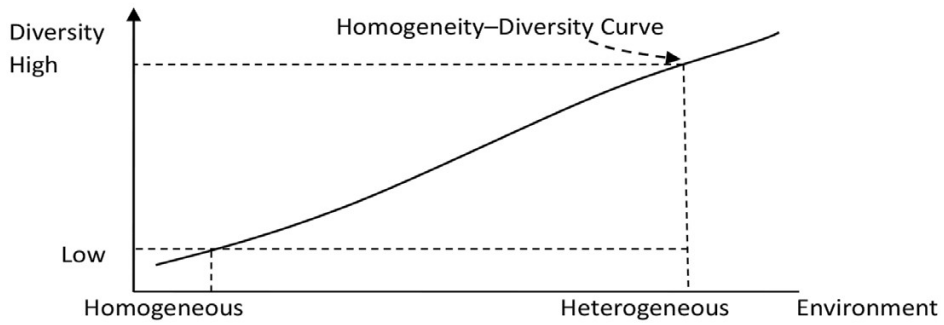


Figure 2. Environmental Homogeneity–Diversity Behavior

Turbulent Environment (BANI)

This environment—also referred to as **BANI**—is understood to arise from four elements: brittleness**,** anxiety-inducing conditions**,** nonlinearity, and incomprehensibility.

An individual who frames most events, causes, and decisions through notions of brittleness, anxiety, nonlinearity, and incomprehensibility inevitably cultivates failure and despair—i.e., a pessimistic outlook on life—often rooted in limited literacy and understanding. Such individuals struggle to find answers; yet within a multi-capability scenario, discovering answers remains possible across domains.

Notably, having more information, when coupled with increased literacy and knowledge, yields deeper meaning about unfolding events. Amid growing noise, one must examine, dissect, analyze, and interpret issues with sustained, truth-based, intelligent insight, finding the path forward through disciplined thinking. In a complex, nonlinear world, capabilities must be enhanced through strategic, systemic, and creative thinking**.**

Brittle. Brittleness describes the vulnerability and weakness of global systems. What appears solid and robust may, in fact, shatter easily. In a turbulent environment, a system can seem to function well while standing on the brink of collapse. Accordingly, even when actions appear reliable, flexible, and fail-safe, precautionary measures are required, and one should avoid relying 100% on existing routines and operations. In

this era, any environment or market may sit at the threshold of recession and decline, even as appearances and profits look sound and activities proceed according to plan. Moreover, in times of crisis, sectors such as supply chains, energy, and global trade can trigger disruptions across multiple other sectors—and thus across the world.

The scenario of a turbulent environment projects a bleak image of the future, as the number of anxious and depressed individuals is steadily rising. Nevertheless, empowerment through studying authentic sources of knowledge, enhancing critical thinking, and cultivating intellectual understanding can guide humanity toward constructing a desirable future through the application of wisdom.

If continuation appears to be the only viable path forward, it becomes the responsibility of each individual to explore credible and untainted resources in order to gain strength, uncover the future, and design a satisfactory and sustainable state through proper planning.

By outlining the defining features of a turbulent world, the BANI framework provides the necessary structure and vision to comprehend the realities we must endure. This framework does not merely describe problems but offers a problem-solving challenge by highlighting the skills and behaviors required to confront them. From this perspective, the turbulent environment serves both as a conceptual framework and a practical toolbox for the future.

In brittle systems, resilience or the capacity to absorb shocks is absent, as they collapse easily. Global and interconnected systems—engineered for maximum efficiency and relentless pursuit of profit—are tightly coupled, and thus highly fragile. Even minor disruptions or changes in one domain can trigger snowball effects, potentially leading to the collapse of entire systems.

Accordingly, brittleness demands resilience, which implies preparedness across multiple scenarios and readiness for unexpected events within a wide range of possibilities. To achieve this, organizations and individuals must rely on:

1. Backup plans,
2. Flexible structures,
3. Adaptable processes,
4. Development of core competencies,
5. Resource diversification, and
6. Building capacities that enable resistance to shocks.

Diversity stands as the cornerstone of resilience. A workforce that thinks and acts uniformly is ineffective when facing unexpected or novel challenges. Conversely, creating conditions that foster inclusiveness and a sense of belonging among diverse individuals expands the breadth and depth of collective capabilities, enabling organizations to respond more effectively to large-scale disruptions.

Anxiety. Anxiety has now become a pervasive condition. Droughts, excessive rainfall, and floods, together with unexpected and destructive events, place human beings in a state of constant anticipation of the next crisis. Reliance on governments, institutions, or even official information sources is no longer sufficient. Major socio-political events, such as the global pandemic, have intensified stress and insecurity, severely challenging people's beliefs about reality.

At the same time, decisions can have disproportionate and potentially catastrophic impacts, while the speed and scale of disruptions require individuals to make rapid choices with limited information. The world is complex and dynamic, locked in a constant state of change that fuels further anxiety. In today's information-saturated environment, an overload of data functions much like excess oil in an engine—causing more harm than good. Although technologies exist to assist decision-making, under pressure and stress people often feel powerless and incapable of making critical choices. The result is passivity—watching events unfold without taking action—while becoming dependent on the decisions of others, even when aware that those decisions may not represent the best option for the common good.

In an age overwhelmed by information, misinformation, fake news,

doubts, and fleeting opportunities, it is essential to cultivate the ability to respond positively. This requires stepping back, observing situations from a distance, evaluating them holistically, recognizing both challenges and opportunities, and developing creative solutions. These conditions highlight the importance of leveraging multiple intelligences, particularly *emotional and sensory intelligence*. By doing so, individuals can embrace multi-perspectival thinking and develop multi-competence capacities for themselves and their organizations.

As a constructive response, this form of anxiety—while dangerously overwhelming—demands a human-centered approach. Empathy has become a key capacity for leaders in societies, institutions, and organizations, enabling them to recognize the impacts of anxiety on individuals and help maintain balance. This requires strong, trust-based relationships that can withstand pressure. Organizations must be committed to examining internal processes that may heighten anxiety and prioritize the cultivation of psychologically safe cultures and environments**.**

At the same time, excessive fear often results in over-analysis, risk aversion, and even paralysis of action. Therefore, fostering decisive leadership capacity across all levels of society has become essential.

Nonlinearity. In today's globalized world, events no longer unfold in linear, proportional, or even logical ways. Minor actions can trigger disproportionate, large-scale consequences that reverberate across multiple geographies and domains. Processes may spiral out of control with the smallest disruptions, making the identification of cause-and-effect relationships extremely difficult.

The climate emergency offers a clear example of nonlinearity: carbon emissions in one part of the world return as extreme weather in another. Immense ethical and environmental pressures cast long shadows over both minor and major daily activities; the seasons have become irregular to the point of being unrecognizable; and there exists a confusing disconnect between the accelerating deterioration of global conditions and the sluggish response of decision-makers.

According to the nonlinear structure, every phenomenon follows causal loops. Life seems to flow within a nonlinear platform, where every-

thing unfolds cyclically—moving back and forth—without the apparent end being the true conclusion. Consequently, one must exercise caution: without actively designing a desired future, drafting long-term plans to anticipate change is unlikely to be effective. Decisions generate diverse consequences, many of which must be identified, analyzed, and understood in the present to inform future planning. The end of one decision invariably marks the beginning of another. Hence, in today's conditions, there will always be beginnings, middles, and endings, each end serving as the foundation for a new beginning.

Therefore, individuals and organizations must be prepared to assess and analyze issues continuously, considering causal loops in bi-directional and multi-directional forms. In a world full of shocks, surprises, and disruptions**,** intellectual clarity and decision-making agility are essential, coupled with a commitment to generating innovative solutions. Agility is thus a critical differentiator for organizations, demanding the cultivation of intellectual foresight, continuous learning, and the ability to project forward. Only then can actors achieve accurate awareness of themselves, others, and the consequences of their actions, thereby pursuing life's endeavors with wisdom grounded in truth.

Incomprehensibility. In a nonlinear world, problems are not merely ambiguous—they are often extremely difficult to comprehend. Emerging challenges are so complex and fast-moving that it becomes increasingly difficult to identify satisfactory answers. Paradoxically, the more one strives to understand a problem, the less clear it may appear. At times, the acquisition of additional data and information only exacerbates **confusion and disorientation.**

Moreover, justifying or understanding the behavior and decision-making of artificial intelligence technologies, or even certain human actors in positions of power, proves challenging. With one's current level of knowledge and literacy, problems cannot be fully grasped, producing a state of meaningless disorder and instability**.**

What, then, is the solution? The contemporary world demands leaders who not only look outward but also inward—leaders who are capable of trusting intuition, instinct, and reason simultaneously. A critical

competence of leadership lies in the ability to seek counsel from intellectuals and thought leaders in order to identify vital pathways forward. Many of today's challenges—often referred to as ***conceptual and cognitive challenges***—do not merely call for technical specialists. Instead, they require enlightened leaders who can innovate, accurately identify vulnerabilities, learn both with and from others, and make decisions based on information available within practical constraints.

The Future. The future is still unfolding. This raises a fundamental question: Is the turbulent environment merely the latest fashionable buzzword in management discourse, or is it a critical framework to help organizations navigate the future? The answer depends on how it is applied.

The turbulent environment provides a descriptive lens of global turbulence—marked by brittleness, anxiety, nonlinearity, and incomprehensibility—while simultaneously equipping individuals with a language and framework to interpret unfolding realities and undertake necessary actions. The BANI framework should thus be regarded as a tool to help organizations adapt and maximize their probability of long-term success.

It would be misleading to assume that turbulent environments allow for neatly defined problems or straightforward solutions. Indeed, the core characteristic of the BANI vocabulary is that challenges are inherently ambiguous, uncertain, and resistant to simplistic answers. As emphasized earlier (see Chapter 2), overcoming such challenges requires rigorous root-cause analysis and deliberate goal-setting to identify viable pathways forward.

Rather than eliminating complexity, the BANI framework enables organizations and leaders to better understand the varieties of problems and experiences they encounter, while also highlighting the capacities, behaviors, and skills necessary for effective response.

Organizations that will endure and thrive in this future are those that embrace the lessons of the turbulent environment:

- Recognizing its defining characteristics,

- Investing in research and problem-solving strategies, and
- Cultivating agility, pragmatism, and resilience.

Such organizations can draw upon six strategic imperatives: 1) Goal setting and flexibility, 2) Awareness and anxiety, 3) Realism and optimism, 4) Pragmatism and extraversion, 5) Intelligence and emotion, and 6) Time perception and rationality.

1. Goal-setting and flexibility,
2. Awareness and management of anxiety,
3. Realism coupled with optimism,
4. Pragmatism combined with extraordinary vision,
5. Intelligent and emotionally engaged action,
6. Time perception and wisdom.

These organizations foster vibrant cultures of learning and collaboration. Rather than merely assembling technical experts, they develop individuals who are enlightened, diverse, innovative, and highly conscious. By adopting human-centered approaches, they prioritize empathy, active listening, and trust-building as cornerstones of their strategy.

Classification of Environments Based on Stimuli

Environments can be classified along two primary dimensions: breadth of stimuli and intensity of stimuli.

- By breadth, environments are divided into general and specific domains.
- By intensity, they are categorized into weak-stimulus environments and strong-stimulus environments.

Weak-stimulus environments include simple, static, and stable conditions characterized by either *unrelated components* or *interconnected but predictable components*. In contrast, strong-stimulus environments encompass dynamic, complex, and reactive conditions, populated by highly volatile and continuously changing elements.

According to Table 2, reactive environments and environments with

wholly mutable elements are in fact complex and dynamic environments—conditions that cannot be adequately interpreted or managed through simplistic or linear modes of environmental analysis, such as the BANI framework alone. Conversely, stable environments with either unrelated or interrelated components fall under the category of simple and static environments.

Thus, eight categories of environments can be derived based on the types of decisions made within them and the impact those decisions exert upon the environment. These categories range across the full spectrum, from simple to fully mutable environments, and manifest across both general and specific environmental domains, depending on prevailing decision-making conditions.

Beyond the multiple classifications already outlined in Tables (1-5) and (2-5), an eight-fold classification system is further introduced in this chapter, structured according to decision-making logics (Hamidizadeh, 2023). These include environments that are:

1. Programmed
2. Non-programmed
3. Structured
4. Unstructured
5. Perceptual
6. Rational
7. Independent and Dependent
8. Stable and Unstable

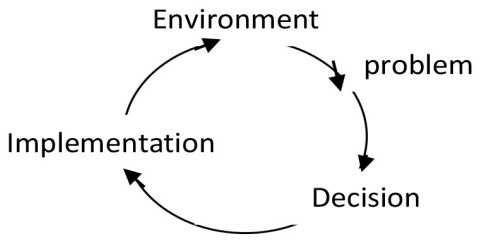


Figure 1. Environment–Decision Causal Loop

Table 2. Classification of Environments Based on Stimuli

Stimuli	Environment	Characteristics
Breadth	General	An environment shared by all organizations, encompassing demographic, cultural, social, economic, political, educational, technological, legal, natural, ecological, communicative, and security–military factors.
	Task	A professional, work-related, and exclusive environment for each organization, including internal members, clients, suppliers, competitors, regulatory institutions, trade unions, and labor associations.
Intensity	Weak	A simple, static, and stable environment with limited and minor variables that may change gradually. It includes environments with unrelated or interrelated components, characterized by low expectations, low uncertainty, and low dynamism.
	Strong	A dynamic, complex, reactive, and volatile environment with complementary and evolving variables. It features extensive diversity, numerous large-scale and multi-purpose organizations, high instability, environments with highly volatile activities, significant uncertainty, high systemic turbulence, and extensive interconnection among local elements.

Programmed Environment

In this environment, most behaviors, actions, operations, and decisions are based on planning; therefore, the environment assumes a programmatic character. Safeguarding programs and operating within such a framework are considered socially acceptable behaviors. Rewards and penalties are determined according to the rules and regulations necessitated by the adoption of such programs. The future is consistently projected as a clear vision for the present environment. Planners and deci-

sion-makers, through strategic perspectives, conceptualize planning as a continuous and dynamic process. One of the most prominent features of this environment is the alignment of realities at macro, sectoral, and cross-sectoral levels. The autonomy of managers and experts within organizations is relatively defined and constrained, since programs tend to make decisions in place of managers. The following factors play a role in identifying this environment:

- The nature of decisions in guiding future events and advancing the overarching goals of organizations and society;
- The extent of goal orientation and idealism among decision-makers;
- The degree of formality within organizational relations and structures.

It is noteworthy that the level of reliance on performance feedback in such environments is relatively high, given the programmatic nature of their structures.

Non-Programmed Environment

In this type of environment, planning is undefined. The extent of managerial adherence to program development is very low. Operations and issues are not forecasted in advance; therefore, most activities and operations lack structure, and existing procedures have little effectiveness. The environment is constantly awaiting unforeseen issues, for which ad hoc solutions—detached from any programmatic continuum—are proposed and implemented. Adherence to the prevailing conditions and context is regarded as social order. Fragmented approaches, pursuit of immediate interests, and present-orientation are the hallmarks of this environment. The extent of reliance on performance feedback is relatively low. Identification of this environment is based on the following criteria:

- The nature and scope of decisions;
- The type of perspective and degree of foresight;
- The degree of repetitiveness of decisions;
- The extent to which decision-makers are oriented toward individu-

al, social, or organizational interests;

- The level and quality of perceptual and analytical capacity.

Structured Environment

The hallmark of this environment lies in the clarity of objectives, missions, policies, procedures, and even issues and components. The dominant mode of thinking in such an environment is sequential reasoning. Another distinguishing feature is the homogeneity and transparency of communication patterns, programs, and issues. In fact, once an environment becomes programmatic, the stronger the adherence of individuals, managers, and organizations to robust cultural and regulatory norms, the greater the structural orientation of the environment is expected to be.

Unstructured Environment

When objectives, missions, policies, procedures, and issues are not clearly defined, they cannot be adequately comprehended or interpreted. Such an environment is categorized as heterogeneous and unstructured. Conducting operations and ensuring organizational continuity in such an environment is extremely difficult and precarious. Environments undergoing transitional phases from one stage to another often experience structural deficiency. The stronger the adherence of managers to organizational culture and reinforcement of organizational climate, the less pronounced the disorderly structural state becomes. In such environments, decisions rarely have roots in the organizational past. Decision-making processes lack clear timelines because decisions are novel and deviate from previous experiences. Consequently, decision-makers cannot form clear images of decision-making processes or execution mechanisms. The likelihood of crisis-proneness and encountering constraints in unstructured environments is particularly high.

Perceptual Environment

The more subjective the environment becomes, the stronger the perceptual and sensory roles in its understanding. The prevailing cognitive

mode in such environments is imaginative thinking. In general, perception relies on the human capacity for abstraction. Therefore, understanding physical components of the environment depends heavily on abstraction as well as perceptual acuity. As managers' perceptual capacity increases, goal orientation and problem-recognition skills improve, thereby enhancing managerial competence and the application of specialized knowledge. In such environments, managers may face situations where perceptual decisions are preferred. Such decisions, grounded in managerial insight and analysis, reinforce the foundations of the perceptual environment.

In these environments, even with limited access to information, managers demonstrate decisiveness and courage, continuing to act. Problem-solving tends to be creative, intelligent, and innovative, with imagination and perceptual acuity playing central roles. As long-term planning increases, the perceptual environment gains distinctive value in forecasting future scenarios, thereby strengthening the foundations of planning.

Rational Environment

In this environment, decisions acquire a professional, research-oriented, and logical character. Managers place emphasis on the collection of quantitative evidence and engage in detailed examination and analysis before making decisions. Quantitative and technical decision-making and planning techniques occupy a central position. Unlike perceptual environments, where reliance is placed on intuition and experiential knowledge, rational environments prioritize expertise, knowledge, and recognition of decision-making mechanisms. The most salient characteristics of rational environments include:

- Reliance on analytical and interpersonal reasoning;
- Integrated, coherent, and up-to-date information systems;
- Symbolization and schematic representation of environmental phenomena;
- Clear definition of objectives, criteria, missions, and policies;

- Mapping of intra-system and inter-system communication networks;
- Speed and volume of information transmission and exchange;
- Cognitive soundness and accuracy of comprehension.

Independent and Dependent Environments

Environments may also be classified based on their degree of dependency on other environments. The degree of dependency is assessed by:

- The extent to which superior environments shape programmatic elements;
- The level of interaction and influence from regional and sectoral environments;
- The degree of reliance on economic resources and strategies from other environments;
- The level of compliance with external policies, programs, and strategies;
- The extent of interaction among environmental components;
- The degree of knowledge and technological input sourced from external environments;
- The level of attention to creativity, innovation, and entrepreneurial capacity;
- The strength of endogenous investment and entrepreneurship.

Independent environments are knowledge-generating, while dependent environments are knowledge-consuming. Independent environments exhibit higher levels of goal-setting, cultural identity-building, talent development, and problem-solving capacity.

Stable and Unstable Environments

All environments presented in this chapter are subject to short-term, medium-term, and long-term fluctuations caused by contextual factors and requirements. Such variations may lead to either slow or rapid transformations depending on their intensity, scope, depth, and complexity.

Consequently, environments are classified as either stable or unstable.

Environments are considered stable when they cultivate the following conditions; otherwise, they are deemed unstable:

- Acceptance of environmental elements for survival;
- Assumption of roles and responsibilities within defined authorities;
- Adherence to standards and procedures, whether codified or non-codified;
- Transparent circulation of information across vertical and horizontal organizational hierarchies;
- High levels of mutual trust among internal elements;
- Achievement of objectives and maximization of benefits;
- Independence and intellectual orientation of members;
- Adaptation to evolving knowledge and technology components;
- The presence of reassuring environmental standards.

In fact, unstable environments are largely produced by unstable, unstructured, and non-programmatic decisions. The greater the degree of managerial commitment to established decisions and decision-acceptance standards, the more stable the environment will be. Conversely, if instability increases, organizations must diversify their planning capacities. Therefore, organizations operating in unstable environments must demonstrate agility and adaptability in offering diverse outputs aligned with environmental demands. Since organizational growth and achievement of developmental goals depend on environmental stability, unstable environments disrupt organizational dynamism. Within unstable environments, only organizations with wide market shares and strong economic returns are more likely to survive.

Environment and Uncertainty

The environment is the primary source of uncertainty in decision-making. Assessing managerial capabilities in organizational decision-making requires an understanding of the complexity of the specific environment, managerial competencies, resource allocation, and decision-mak-

ing styles. This perspective highlights the demand for decision-making under conditions of environmental change, complexity, and uncertainty, while resources, capabilities, and managerial skills serve as indicators of supply to meet that demand (Bubnicki, 2004).

Indeed, a manifestation of environmental analysis for cultivating decision-making skills and designing organizational operations is presented in Figure 2-5. In this model, the development of decision-making competencies is expanded across four domains:

a. Identification of opportunities and innovative solutions;

b. Technical–analytical;

c. Judgmental–analytical; and

d. Rational–technical (Stacey, 2018; Hamidizadeh, 2023).

The conceptual tools examined and analyzed in this book are classified within these four domains.

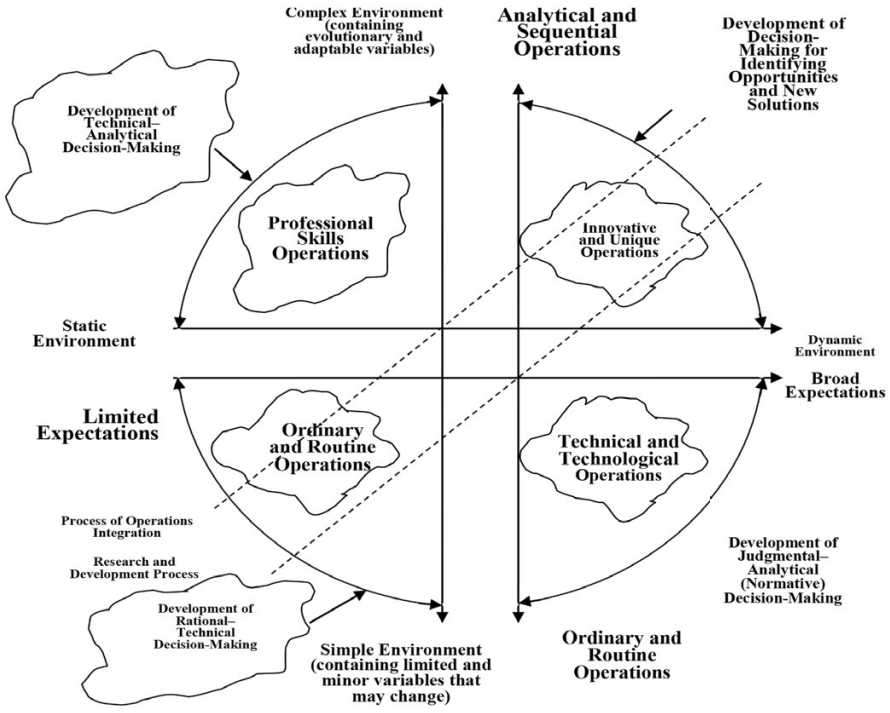


Figure 2. Environmental Analysis and Behaviors for Developing Decision-Making Skills and Organizational Operations

According to Figure 2, an environment positioned along the continuum from dynamic to complex is characterized by novel and unique operations, where decision-making exhibits analytical, sequential, and intellectual orientations, aimed at cultivating the identification of new opportunities and solutions. An environment situated along the continuum from static to complex is distinguished by professional skill operations, with decision-making oriented toward the development of technical and analytical techniques. In a dynamic environment, the level of expectations is broad, whereas in a static environment, the level of expectations is limited.

If the continuum extends from dynamic to simple, the environment is marked by technical and technological operations, and decision-making is directed toward the development of judgment–analytical (normative) techniques. Conversely, if the continuum spans from static to simple, the environment is characterized by ordinary and routine operations, with decision-making focused on the cultivation of rational and technical techniques.

The process of integrating operations along these four environmental continua generates a diversity of research and development processes, aligned with the specific decision-making models and operational patterns.

Moreover, as environmental uncertainty intensifies, ambiguity and multiplicity of factors increase, thereby necessitating more comprehensive and extensive information for decision-making. Figures 3-5 and 4-5 illustrate different behaviors of uncertainty in relation to factors such as change, complexity, and dynamism within both general and specific environments (Stacey, 2018; Robbins, 2005).

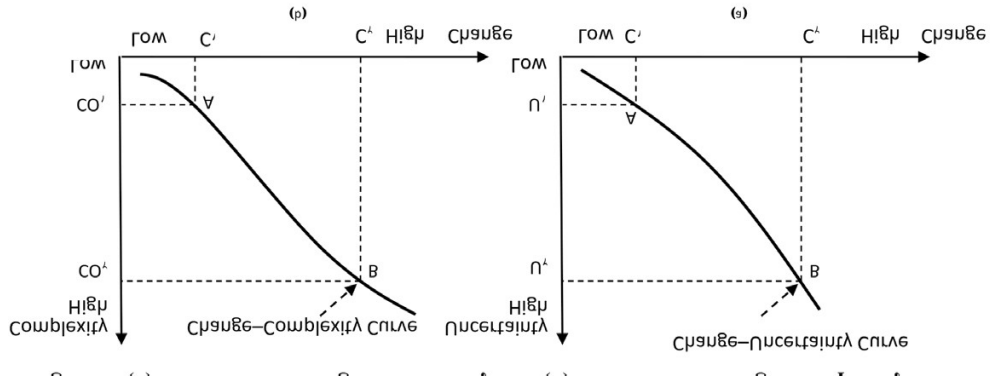


Figure 3. (a) Behavior of Change–Uncertainty and (b) Behavior of Change–Complexity

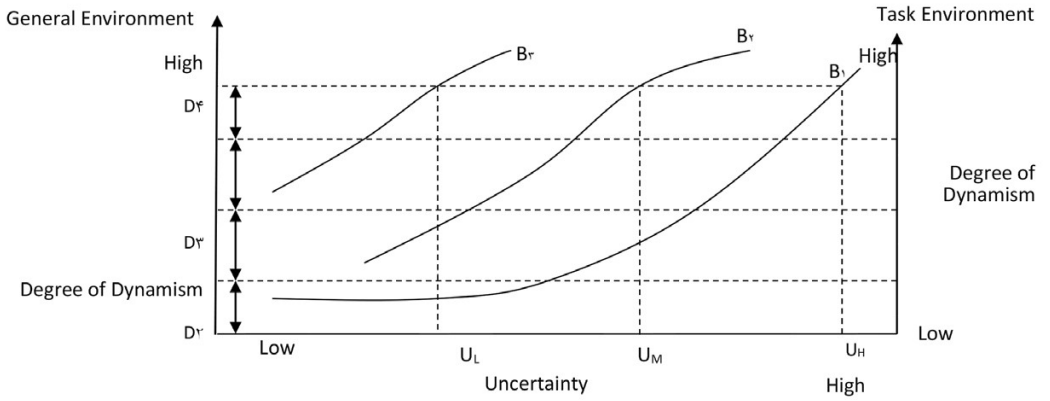


Figure 4. Organizational Behavior in the General and Specific Environments and the Degree (Intensity) of Uncertainty

According to Figure 3 (a)As the degree of change increases, the uncertainty facing the decision-maker also rises; conversely, when change diminishes, uncertainty declines. On the same basis, an increase in the level of change leads to greater environmental complexity, thereby making decision-making more difficult.

By examining Figure 4, it can be observed that the greater the dynamism of the general environment, the higher the level of uncertainty. The dynamism of the specific environment is directly correlated with the dynamism of the general environment; one cannot expect the general environment to be characterized by low dynamism while the specific organizational environment demonstrates high dynamism. In any case, organizational behavior and performance (Bi) are shaped through the interaction of three components: the dynamism of the general environment, the dynamism of the specific environment, and the degree of uncertainty, based on the services and products provided.

- Curve $\mathbf{B_1}$ represents the behavior and performance of an organization whose broad product range has resulted in high dynamism in its general environment, and consequently, high uncertainty.
- Curve $\mathbf{B_3}$, by contrast, represents behavior and performance under conditions of low uncertainty, since the scope and market share of its products have generated such a situation.

Supply and demand decision

To better understand the interaction of factors affecting decision-making, these factors are examined in two sections: the demand column and the supply column.

Demand side. In this section, environmental demand is examined. Demand (or opportunity) must be recognized and assessed through the lens of decision-making and its components. Understanding the impact of the environment on decision-making is of critical importance. Since the environment is in constant flux, updating environmental information is essential—particularly data pertaining to technical, production, and economic policies, which signal new environmental innovations. In this way, needs, wants, and emerging environmental demands can be identified.

Among the most significant factors determining decision-making styles under conditions of uncertainty are the scale and type of environmental changes and scientific/technological developments, even in situations where stability is maintained. Indeed, when the environment does not change, decision-making can be undertaken and implemented with certainty.

Factors shaping the Demand Column include:

- Diversity and multiplicity of elements in the general and specific environment.
- Complexity and the nature of relationships among environmental elements.
- The degree and intensity of change in environmental components over time.
- Levels of change across environmental elements over time.
- Domains of uncertainty in which the behavior and effects of environmental elements cannot be predicted.
- Change-inducing factors and their interrelationships, including cyclical or random occurrences.
- The time intervals between the onset of new conditions and the

emergence of further changes.

- Strategic policies of environmental institutions.
- The absorptive capacity and resilience to confront change-inducing factors.
- Evaluation of organizational performance within the environment and the feedback of results for decision-making positions.

Supply side. The supply side reflects the organization's strategic orientation. In this column, the organization's resources, capabilities, and managerial competencies are emphasized. Managerial perceptions regarding how to meet demand—closely tied to the decision context—are influenced by the following factors:

- The diversity and uncertainty of the situation at hand.
- Knowledge, skills, analytical power, and the analytic orientation of work groups and teams.
- Conditions, resources, opportunities, and situational demands.
- Styles and approaches to decision-making.
- Availability of research outputs and policies governing the use of such research.
- The organizational environment and contextual realities.

Sources of information in the Supply Column, which enhance problem-solving capacity, include:

- Skills, knowledge, insight, intelligence, and personal integrity of managers and experts.
- Documents, records, written information, communication networks, and scientific/professional knowledge bases.
- Readiness to face new conditions, operational capacity, and the ability to assess situations, threats, constraints, opportunities, and demands.
- Mechanisms for consulting with experts, advisors, and professionals.

- Proficiency and capability in applying scientific and technical methods and techniques.
- Feedback from prior experiences and performance evaluations in guiding decision-making and policymaking.

In general, when managers address problems and make decisions, they, like any individual, rely upon their knowledge, skills, prudence, analytical ability, breadth of vision, wisdom, foresight, risk-taking orientation, and accumulated experience (Figure 5) (Harrison & Pelletier, 1998; Uhlir, 2003).

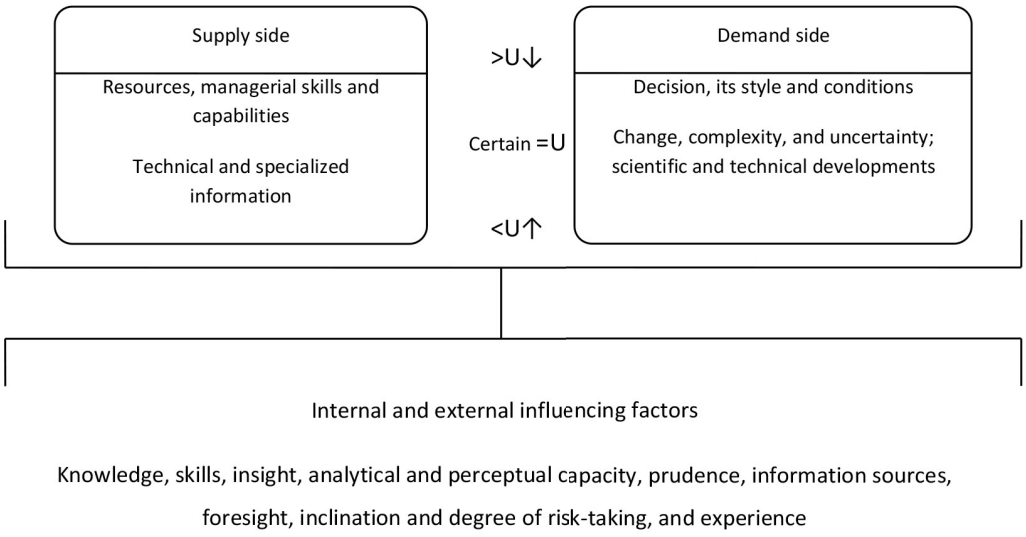


Figure 5. Conditions for the Emergence, Reduction, and Increase of Uncertainty (U) and Influencing Factors

These types of personal attributes can also be enhanced through the utilization of documented knowledge, such as books and scientific or research journals, which contribute to the dissemination of technical and scientific developments. The extent to which these resources are utilized depends on the managers' abilities to think critically, conduct research, engage in exploration, and perform precise evaluations.

Moreover, the critical issues that managers face essentially function as input data to the decision-making system, influencing the generation of processes for both existing and new outputs. Managers must cultivate experience within diverse environments to strengthen their operational capacity in both domestic and international markets.

The intensity and degree of uncertainty increase under the following general conditions:

- When managerial resources, capabilities, and skills are weaker and less adequate than the demands of the decision-making situation;
- When the demand for information exceeds the available supply. In such conditions, decision-making becomes extremely challenging.

Ultimately, the state of uncertainty is contingent upon the balance between supply and demand. If the supply of information equals or surpasses the demand, decision-making transitions out of a crisis mode, becomes routine, and uncertainty diminishes (Figures 5 through 8).

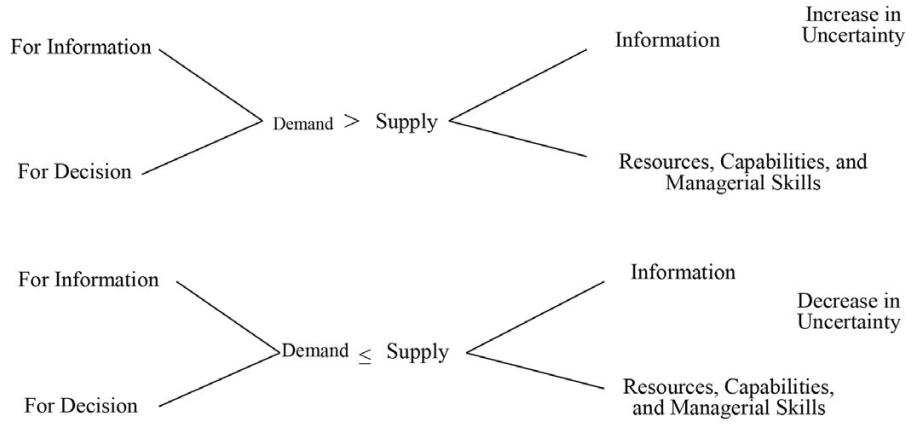


Figure 5-6. Interaction of Supply and Demand with Uncertainty

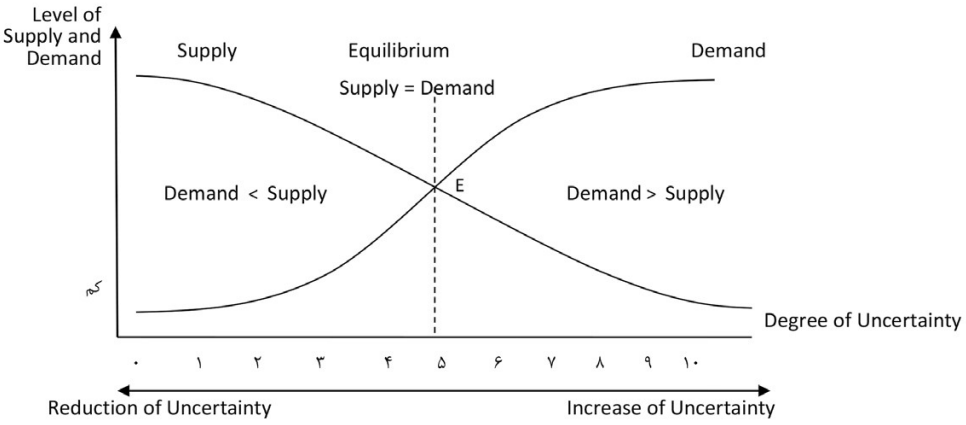


Figure 7. The Behavior of Supply, Demand, and Uncertainty

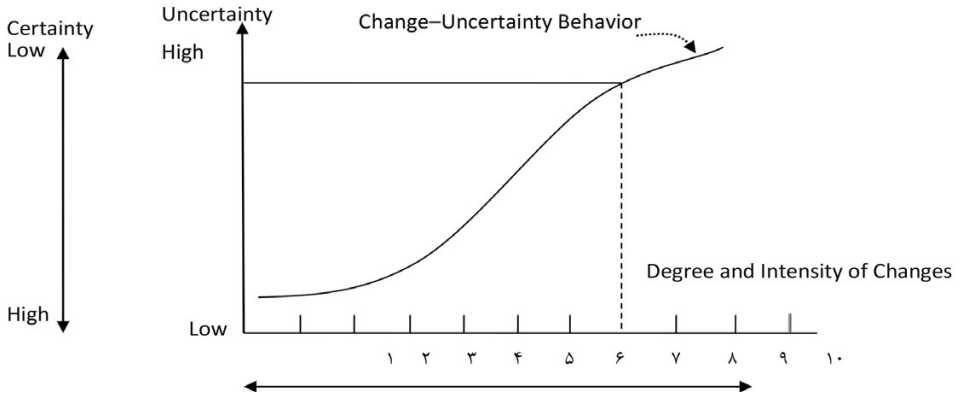


Figure 8. Changes and Uncertainty Behavior

Conclusion

Understanding, examining, analyzing, and classifying the environment is the starting point for any utilization of environmental resources and benefits, as well as for empowering organizations to meet environmental demands (opportunities). By analyzing and interpreting the external and internal environments of organizations, managers can define and clarify the domain and scope of their decisions and organizational programs. Recognizing the environment requires a coherent and efficient information system that continuously provides decision-makers with updated data on environmental changes and transformations. Each environment should not only be classified based on its characteristics but should also be utilized in accordance with its mechanisms and within the framework of its behaviors and functions.

When making decisions, careful attention must be paid to the following environmental approaches:

- Environmental boundaries and the diversity in the classification of organizational environments are shaped by managers' beliefs, perceptions, expectations, and available information.
- The components and characteristics of the general environment are common to all organizations, while the components of the specific environment are unique to each organization's domain. Therefore, managers must thoroughly examine the components of the general environment in order to accurately identify the components

of their specific environment, and subsequently, design programs and deliver outputs within that framework.

- The degree and intensity of homogeneity, heterogeneity, levels of change, complexity, environmental conditions, and the nature of interactions, compatibility, and incompatibility are undeniable realities for organizational goal-setting and performance. Accordingly, organizational outputs must align with them.
- Identifying the nature and type of environment, clarifying organizational behavior, and evaluating performance provide significant assistance in establishing effective interaction and adapting organizational missions and objectives to societal demands.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. What is the interaction between the environment and the organization? Explain.
2. Describe the environment from different perspectives.
3. Explain subjective and objective environments.
4. What are homogeneous and heterogeneous environments? What are their characteristics?
5. What is a turbulent environment? What are its features?
6. Classify environments based on the breadth and intensity of stimuli.
7. Explain the characteristics of general and specific environments.
8. Describe the characteristics of simple-static and dynamic-complex environments.
9. Classify environments based on types of decisions.

10. Explain programmed and non-programmed environments.
11. Explain structured and unstructured environments.
12. What are the features of perceptual and rational environments?
13. Explain independent and dependent environments.
14. How can an independent environment be achieved?
15. Explain stable and unstable environments and describe the indicators of stabilization.
16. What is the relationship between uncertainty and the environment?
17. Draw the environmental cognition model and the behaviors of decision-making skill development in organizations, and explain their features.
18. Using diagrams, explain models of change–uncertainty behavior, change–complexity behavior, and organizational behavior in general and specific environments.
19. What is meant by the demand column? Describe the factors influencing it.
20. What is meant by the supply column? Describe the factors influencing it.
21. Explain the conditions of uncertainty variation by drawing related figures based on supply and demand levels.
22. What is the relationship between decisions, supply, demand, information, and uncertainty?

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. The environment is the determinant of missions and the sustaining force for organizational operations and decision-making conditions, and it is constantly evolving.

2. Complexity, change, occasional ambiguity, and lack of structure in environmental components are features of an organization's internal environment.
3. The environment shapes organizational life and confronts it with uncertainty, while defining organizational boundaries within the framework of managerial capabilities, skills, and perceptions.
4. Opportunities, positions, and demands cannot be derived from information originating in the analysis of environmental components.
5. The subjective environment of organizations is formed based on perceptions, realities, and surrounding observations.
6. The subjective environment of organizations is shaped by the breadth of communications and the physical presence of the organization.
7. With increasing diversity, the environment tends toward heterogeneity, while with more transparent information and higher clarity, environmental homogeneity increases.
8. A person who frames life through thoughts of brittleness, anxiety, complexity (nonlinearity), and incomprehensibility fosters indifference.
9. Brittleness describes the vulnerability and weakness of global systems. Something brittle lacks true strength and can easily be broken.
10. By describing the features of the turbulent world, the framework provides the much-needed structure and insight into what must be experienced.
11. Essentially, brittleness requires resilience, as preparation for various scenarios means readiness for unexpected events within the range of possible futures.
12. In a world full of information, threats, and misinformation, one must know how to respond positively. This requires adopting an elevated perspective, distancing from situations, observing and

evaluating them, identifying positive aspects and opportunities, and offering creative solutions.

13. According to nonlinear structures, every phenomenon follows causal loops.
14. Agility is a key differentiator for organizations in this era, and they must nurture analytical thinking and wisdom to engage in continuous learning.
15. A turbulent environment is a descriptive portrayal of global chaos with features of brittleness, anxiety, nonlinearity, and incomprehensibility, enabling humans to enhance their understanding and equipping them with a language to interpret surrounding events and take necessary actions.
16. Environments are classified as weak or strong based on the breadth of stimuli.
17. Environments are classified as general or specific based on the breadth of stimuli.
18. When environmental stimuli are strong, expectations broaden and evolve, and numerous competitors with similar objectives emerge in the environment.
19. In programmed environments, most behaviors, actions, operations, and decisions are based on planning, thereby creating a structured atmosphere.
20. Managerial discretion and autonomy in programmed environments are relatively constrained, as programs make decisions in place of managers.
21. In a non-programmed environment, existing methods gain higher efficiency, and for each issue, an ad hoc and non-continuous solution is proposed and implemented.
22. The utilization of feedback on performance in a non-programmed environment is high, and such an environment can be identified through the nature of decisions, managerial perspectives, and foresight.

23. If the level and type of communications, programs, and even issues are transparent within an environment, the environment is considered structured.
24. The greater the adherence of managers to organizational culture and the reinforcement of organizational space components, the less the degree of environmental unstructuredness will be.
25. The more the environment assumes a subjective dimension, the greater the perceptual role in understanding it, with perception being grounded in human abstraction capacity.
26. Rational decisions are based on managers' analysis and insight, thereby strengthening the foundations of a perceptual environment.
27. With the extension of long-term planning horizons, the perceptual environment assumes a distinct role in envisioning future environments.
28. Explaining intra- and inter-system communication networks, the speed and volume of information exchange, and the soundness of thought and accuracy of understanding significantly contribute to enhancing the perceptual environment.
29. To assess the degree of an environment's dependency on other environments, the following indicators can be used:
    a. The extent of attention to and utilization of creativity, innovation, and novelty.
    b. The entrepreneurial capacity of the environment, and the level of scientific and technological infusion from other environments.
30. Acceptance of environmental elements for survival; high trust among internal environmental actors; and the degree of independence and intellectual orientation of members contribute to strengthening the foundations of a stable environment.
31. Unstable environments disrupt organizations' utilization of dynamic processes.

32. To assess managers' capabilities in organizational decision-making, the level and complexity of the specific environment, managerial skills, resource allocation, and decision-making styles must be determined.
33. Managerial resources, capabilities, and skills are indicative of demand, which must be met.
34. If the spectrum of environmental fluctuations lies between dynamic and complex, operations assume an analytical and intellectual nature, often manifesting in novel and unique forms.
35. The cultivation of rational–technical decision-making pertains to environments with dynamic yet simple characteristics.
36. The cultivation of judgmental–analytical (normative) decision-making is primarily grounded in technical and technological operations.
37. With the acceptance of higher uncertainty, both the volume of environmental changes and the level of environmental complexity increase.
38. The dynamism of the specific environment is inversely related to the dynamism of the general environment.
39. The demand column encompasses decisions and their components, and it is influenced by the complexity and nature of inter-element relationships within the environment.
40. Managerial perception in fulfilling demand is influenced by situational conditions, opportunities, and demands, as well as by decision-making styles and the environmental domain of organizational realities.
41. The extent of managers' utilization of internal and external influencing factors depends on their ability to conduct research, exploration, and precise evaluation.
42. If the supply of information equals or exceeds the demand for information, decision-making shifts into a state of crisis, assumes an abnormal character, and uncertainty increases.

43. Environmental boundaries and diversity in organizational environmental classifications are shaped by managers' beliefs, perceptions, expectations, and available information.
44. The degree and intensity of homogeneity, levels of change, the nature of interactions, and incompatibilities are undeniable realities for organizational performance; therefore, organizational outputs must distance themselves from these factors.

Chapter 6
Modeling the Measurement of Effectiveness

Objectives

- Familiarization with the model for measuring the effectiveness of strategic decisions.
- Familiarization with the domains and constructs for assessing the effectiveness of strategic decisions.
- Examination of the consequences of effective strategic decision-making.

Introduction

Given that strategic decisions serve to define and guide organizational goals and determine the scope and nature of decisions—such as hierarchical, programmed and non-programmed, structured and unstructured, rational, perceptual, problem-solving, and similar types—the importance of evaluating these decisions surpasses that of others. When strategic decisions are confronted with errors or deviations in identifying directions and long-term objectives, or in determining the type of interactive behavior with the environment, the entire organization is exposed to major risks. Therefore, the identification, design, and development of indicators for assessing their effectiveness are of paramount importance.

In this chapter, by defining a model of assessment indicators—particularly for strategic decisions—each construct of the model will be examined and analyzed. Subsequently, the method for developing evaluation indices for strategic decisions will be presented. To establish a feedback structure that reflects the consequences of evaluating strategic decisions on other organizational decisions, the modeling approach is em-

ployed to clarify how goals are achieved and to identify the implications of strategic decision-making.

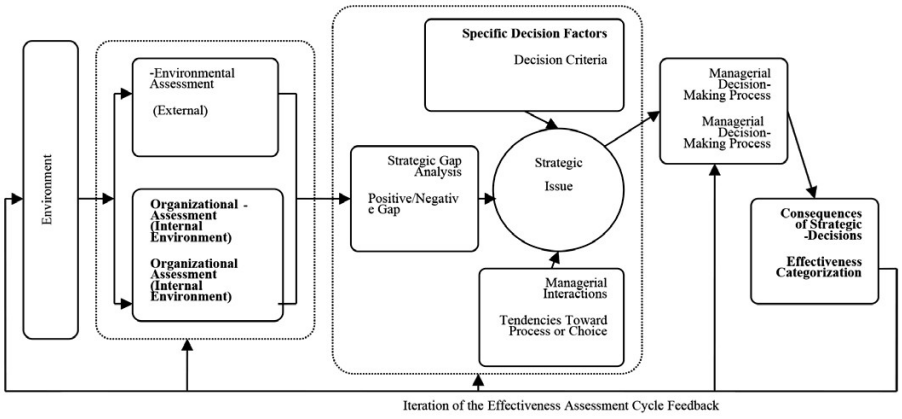
In any case, the model and mechanisms for measuring the effectiveness of strategic decisions presented in this chapter can also be adapted—with minor modifications—for other types of decisions.

Model for Measuring Effectiveness

Although achieving strategic planning is made possible through the establishment of strategic management within the organization, the fundamental framework of management and strategic planning is inherently based on decision-making. If these decisions, according to their hierarchical levels and operational applications, lose their effectiveness, the success of strategic management and planning cannot be realized (Hamidizadeh, 2024; Forgang, 2004).

Thus, sufficient attention must be devoted to determining the model, criteria, and constructs of strategic decision effectiveness. This chapter introduces and defines the model and criteria for strategic decision effectiveness and examines the seven-domain model of effectiveness, as shown in Table 6.

For the analysis of domains in measuring the effectiveness of strategic decisions, Model 6-1 is utilized to clarify the interrelationship between strategic decision-making and organizational effectiveness.



Source: Harrison & Pelletier, 1998; and Hamidizadeh, 2024.

Figure 1. Model for Measuring the Effectiveness of Strategic Decisions

Table 1. Domains, Constructs, and Mechanisms of Strategic Decision Effectiveness

Domain	Constructs	Mechanisms
Environmental Assessment	- Environmental opportunities and threats - General environment factors - Specific environment factors -Mission and strategic policies	- Realistic information in interaction with organizations in various forms - Explaining environmental opportunities and threats to align organizational missions with external environment conditions and adapting strategies accordingly - Characterizing environmental developments in a way that facilitates decision-making and strengthens strategy implementation - Analyzing internal and external organizational roles in alignment with organizational needs and societal goals - Analyzing mission, objectives, and policies
Organizational Assessment	- Management - Organizational mission - Objectives - Strategic policies - Rules and regulations - Strategic orientation	- Capable actors responsible for the achievement of organizational missions - Commitment and willingness of management and employees to organizational goals - Development of appropriate behavioral patterns to achieve strategic goals - Assessing management competency in identifying opportunities and threats - Rules and regulations as guiding principles for organizational activities - Orientation toward mission, objectives, and policies

Domain	Constructs	Mechanisms
Strategic Gap Analysis	- Positive gap - Negative gap - Strategic gap	- Recognition of strategic gaps in line with external environmental needs and expectations - Suitability of factors in the external and internal environment for bridging the strategic gap - Determining the scope of the strategic problem and selecting the most appropriate strategy to resolve the gap
Strategic Issue	- Nature of the issue - Scope of the issue	- Defining the issue within the scope of strategic problem recognition - Clarifying the dimensions of the problem for managers and decision-makers
Decision-Specific Factors	- Structural characteristics of decision-making processes - Availability and quality of information - Risk orientation - Rationality	- Stability of organizational structures and their influence on decision-making processes - Sufficient information to support identification of opportunities and threats - Analytical review of existing realities and predicting possible developments based on accurate analysis - Decision-making models based on rationality and systematic analysis - Managing decisions under risk through systematic and rational approaches
Managerial Interactions	- Management reports - Clarification of decision -making processes - Managerial oversight	- Clarifying the results of the decision-making process - Transparency and accuracy of management reports - Clarification of responsibilities in decision-making - Extent of oversight of management on decision-making processes

Domain	Constructs	Mechanisms
Decision-Making Process in Management	- Steps of decision-making - Models of decision-making - Decision-making rules	- Involving managers and experts in the decision-making process - Evaluating the comprehensiveness of decisions in alignment with organizational goals - Commitment to organizational culture and mission in decision-making - Designing decision-making models consistent with the organization's mission and goals - Evaluating decision-making steps based on rational and analytical foundations
Feedback and Control	- Objectives and goals - Strategic indicators - Feedback mechanisms	- Setting measurable objectives aligned with strategic goals - Strategic indicators as benchmarks for evaluating decisions - Feedback mechanisms for adjusting processes and strategies - Evaluation of performance and outcomes to ensure alignment with strategic objectives
Outcomes of Strategic Decisions	- Results and effectiveness - Benefits and consequences - Organizational learning	- Tools to enhance efficiency and effectiveness of decisions - Strategic effectiveness as a reflection of performance outcomes - Feedback on results and evaluation of outcomes - Organizational learning and knowledge creation based on decision-making results

Therefore, the objectives pursued in this chapter are as follows:

- To determine how the effectiveness of organizational strategic decisions can be assessed
- To identify the criteria for measuring the effectiveness of strategic decisions
- To explain how to utilize the concepts and factors of effectiveness measurement in strategic decision-making

Strategic Decisions

Strategic decisions represent the most significant managerial endeavors, and strategic choice constitutes the most critical variable in strategic management. In this section, a set of constructs are elaborated that determine the effectiveness of senior management's strategic decisions within the broader framework of organizational effectiveness. The effectiveness of strategic decisions is categorized and classified based on planning horizons, managerial capability for guidance, managerial orientation toward a specific strategic choice, and the processes through which such decisions are shaped. The components that form the effectiveness of strategic decisions are examined and modeled accordingly.

The complexity of strategic decisions is exceptionally high due to their close association with the sources of environmental uncertainty. These components are inherently dynamic, as they carry the potential to shape the future, ensure long-term vitality, and secure organizational survival. The most prominent features of such decisions are their content, mechanisms, and intended objectives. Strategic decisions not only determine the long-term health of an organization but also define its capacity for excellence and its level of service to society (Jagdev et al., 2003; Schwenk, 1995).

Managerial effectiveness is not measured merely by the magnitude of decisions taken, but rather by the significance, impact, and soundness of those decisions. Managers must consider not only the analytical and problem-solving dimensions of decisions but also their strategic depth and scope. Strategic decisions, in fact, are those that fall within

the domain of responsibility, cognition, and essential growth of senior management, delineating the pace and direction of organizational operations (Harrison, 1992).

Since organizations make strategic decisions within the framework of their missions, goals, and environmental dynamics, these decisions must be highly interconnected. This interconnection creates a model of coherence that guides and integrates the organization. Such a model reflects the organization's use of strategy. More specifically, strategy determines the fundamental objectives and directs managerial behavior toward adopting specific courses of action and allocating resources appropriately. The strategic selection of objectives, policies, and actions is a highly sensitive endeavor. Consequently, scarce and durable resources must be deployed rationally, perceptually, and analytically to meet the expectations of managerial success (Thompson & Strickland, 1983; Thompson, 1967).

The nature and scope of senior management's responsibilities position them at the forefront of making highly significant strategic decisions. The effectiveness of organizations is closely tied to the knowledge, vision, and administrative competence of managers who are capable of making effective strategic choices. Effective decisions are those that achieve their intended goals within the prescribed timeframe, available resources, managerial competencies, and contextual constraints. For instance, a strategic choice that fulfills its objectives within the constraints of time, budget, technology, and environmental limitations—while minimizing opportunity costs—exhibits high effectiveness. Conversely, strategic choices that impose substantial financial burdens, debts, or opportunity costs on the organization are deemed inefficient. Thus, a strategic choice that fails to achieve its primary objectives, even at the expense of losing certain predefined attributes, cannot be considered effective.

The articulation of concepts and definition of effectiveness indicators are crucial for organizations in their early stages of growth and development. However, the primary challenge lies in establishing clear methods and mechanisms for the precise measurement of decision effectiveness.

Effectiveness indicators are typically applied at the organizational level. While disaggregating them across different managerial levels is not straightforward, it is necessary to evaluate effectiveness with respect to specific managerial domains, such as human resources, production, finance, and accounting, within the framework of management or leadership levels (Hamidizadeh, 2024; Forgang, 2004).

In designing an organizational effectiveness assessment model, the indicators for measuring the effectiveness of strategic decisions serve as foundational elements. Hence, the theory of effectiveness is primarily formulated at the upper levels of the organization, though its concepts can be extended to lower levels of management as well. Accordingly, strategic decisions constitute a set of behavioral and directional choices made by experts, managers, and specialized units across the organization. Therefore, organizational effectiveness indicators must be aligned with the criteria for effective strategic choices that senior managers employ to achieve long-term objectives. When the effectiveness of decisions at the top organizational level is low, it indicates that such decisions are being driven by lower-level considerations. Similarly, when criteria for effectiveness are explicitly defined for senior management's decisions, those decisions will influence and guide the performance of all managerial levels. In this sense, effective strategic decisions serve as the driving force of organizational management (Molloy & Schwenk, 1995; Priem et al., 1995; Rojapopalan et al., 1993; Schwenk, 1995).

Environmental Assessment

Organizations cannot operate in isolation; they are inevitably embedded within environmental components. Every organization function within the context of its external environment. Since strategic orientation emphasizes environmental considerations, strategic decision-makers must account for external factors when selecting strategies. Accepting the influence of relevant external forces is essential for explaining the effectiveness of an organization's external environment. Environmental factors introduce uncertainties across multiple dimensions, making it difficult for management to fully identify and analyze the consequences of strategic decisions.

In strategic behavior analysis, management must identify the interactions among multiple external forces, conduct thorough analyses, and determine appropriate mechanisms. As these forces are constantly changing, it is crucial to discern patterns within such changes so that organizations can control manageable aspects and adapt to uncontrollable ones. Environmental assessment is conducted across four main domains:

1. Stakeholder groups
2. Environmental structures
3. Opportunities and threats
4. Socio-political factors

Stakeholder Groups. Stakeholder groups consist of individuals and entities engaged with the organization in various capacities. Their interests are intertwined with organizational interests and behavior; therefore, the decisions they make directly influence the outcomes of strategic organizational choices. These groups can be regarded as components of the organization's specific environment, not only impacting the organization but also being influenced by it. Stakeholders include shareholders, employees, managers, suppliers of economic resources, creditors, customers, partner organizations, regulatory authorities, and others. Securing stakeholder alignment with strategic decisions enhances organizational effectiveness by harmonizing them with envisioned future realities and co-creating the organization's future (Robbins, 2005; King & Cleland, 1976).

Environmental Structures. Complexity, change, and, at times, lack of transparency and structure are defining attributes of external environments. In explaining environmental structures, the interactions among components, their mechanisms, significance, and impact are of paramount importance. The pace, acceleration, and stability of change, alongside the complexity and level of structuring, significantly contribute to environmental uncertainty. These elements directly influence strategic decision-making processes, their effectiveness, and subsequent outcomes. The greater the variety and intensity of uncertainties, the

more challenging it becomes to formulate a unified strategic decision. Since most strategic decisions are shaped by external environments aimed at creating the organization's future, they are inherently accompanied by planning under uncertain conditions (Forgang, 2004; Jagdev et al., 2003).

Opportunities and Threats. Among the most critical external factors for strategic decision-making are the identification of opportunities, market positions, and actual or potential environmental demands. The primary source for recognizing opportunities and demands lies in the analysis of environmental components. Opportunities, contingencies, and external contexts shape the organization's long-term benefits and behaviors. They define the trajectory of organizational growth, health, and financial direction. Accordingly, organizations can capitalize on opportunities by leveraging accumulated capital, capabilities, prudence, and execution power. Managers must be prepared to accept specific levels of risk associated with opportunities and demands. Therefore, opportunities must be identified, assessed, and planned prior to making strategic decisions, ensuring their integration into decision-making. In this sense, effectiveness evaluation is closely tied to the organization's ability to capitalize on environmental opportunities (Hofer & Schendel, 1978).

Information gathered to identify opportunities also assists management in recognizing and categorizing constraints and limitations. Threats, constraints, and restrictions emerge from environmental components in various forms, often abruptly disrupting organizational activities. These threats may stem from technological breakthroughs, the emergence of substitute products, shifts in economic trends, globalization, government policies, changes in consumer lifestyles and values, depletion of natural resources, demographic shifts, intensified market competition, cultural intrusions, and more (Thompson & Strickland, 1983, pp. 89–90). To evaluate the effectiveness of strategic decisions, organizations must analyze and assess the impact of these threats and constraints on operations.

Socio-Political Components. The first dimension of socio-political components reflects the requirements, assumptions, and conditions

necessary for legislation, policy-making, legal regulations, and lawful organizational activities. The second dimension, a role-based perspective, emphasizes the organization's social responsibilities. These responsibilities must align with existing laws and organizational commitments to social welfare and public interests. The third dimension considers the broader consequences of organizational realities, highlighting their contribution to societal progress and national growth objectives. In this way, socio-political components encompass the normative, legal, and consequential aspects of organizational-environment interactions (Drucker, 2007; Lehman, 2007).

Organizational Assessment

One of the key dimensions of strategic decision-making within the internal environment of an organization is addressing internal weaknesses. In determining the effectiveness of strategic choices, evaluating the organization's internal capabilities is of paramount importance. The most effective strategic decisions are likely to emerge when an organization's major strengths are leveraged to gain further advantages. These strengths should be reinforced, weaknesses corrected, and deficiencies compensated. Ultimately, weaknesses and deficiencies must be eliminated to enhance future competitive advantages. Achieving this optimal condition requires a systematic analysis of both general and specific organizational capabilities, ensuring that opportunities are capitalized upon to counter external threats and constraints in alignment with social responsibilities.

Among the critical approaches to comprehensive organizational assessment is the evaluation of capability domains, which enables management to systematically assess organizational strengths and weaknesses. In this evaluation, distinctive aspects of organizational capability must be identified and leveraged, functioning as "springboards" that create significant advantages and competitive superiority for the organization.

Highlighting the organization's capabilities, strengths, and weaknesses is crucial for making effective strategic decisions in the following ways (Leontiades, 1982; David, 2003):

1. To capitalize on external environmental opportunities, efficient use of internal strengths is generally required.
2. To safeguard the organization against external threats, awareness of internal strengths and weaknesses is necessary in order to establish an appropriate defensive system.
3. Few organizations demonstrate distinctive and substantial superiority across all domains of capability.

Therefore, effective strategic decisions establish a balance between defensive and offensive forces to achieve an optimal equilibrium. This equilibrium is contingent upon awareness of the external environment and the precise utilization of internal resources.

Management. The foremost and most critical dynamic enabler of any organization is its management. Management is the vital force that drives organizational motion and dynamism, representing the key factor in advancing overall performance. The manifestation of managerial values and competencies is most evident in the judgments and decisions of managers. For organizations to achieve effective strategic choices, sound managerial judgment is indispensable, as senior managers are the principal strategic decision-makers. The degree of perceptiveness, sensitivity, and responsiveness in decision-making processes depends on managerial capabilities. Consequently, management is regarded as solely responsible for the organization's overall movement and dynamism (Priem et al., 1995).

Technology. To achieve meaningful results from capability assessments, an organization's technological capacity must be examined and analyzed. Technology can be defined as the systematic application of knowledge to accomplish organizational tasks or to implement approaches for achieving goals and objectives (Hamidizadeh, 2024). Technology encompasses the methods and principles required to bring about the necessary changes to reach desirable outcomes within organizational functions (Galbraith, 1990; Taylor, 1970). According to Simon (1979), technology represents the knowledge of how tasks are performed and how human objectives are attained.

Thus, the very nature of technology is inherently transformative, and through these transformations management can hope to adopt and implement effective strategic decisions. Accordingly, management must continuously explore organizational technological advantages, remain vigilant in countering technological obsolescence, and maintain readiness to update technology as needed. Organizational effectiveness is directly dependent on the optimization of technological capacity.

Policies. Organizational policies provide guiding frameworks that enable effective strategic decision-making. Policies function as reference points, guidelines, and signposts that direct decisions. Although strategic courses of action specify the operational pathways ahead, their selection is facilitated by policies. Therefore, prevailing and authoritative policies establish the foundation for adopting specific operational pathways that contribute to effective strategic decisions. Compared to other organizational components, policies constitute fundamental pillars in the assessment of organizational readiness for leveraging capabilities in strategic choices (Hamidizadeh, 2023; Harrison & Pelletier, 1998).

Resources. Organizational assessment is completed by analyzing available resources, which are typically classified into six categories:

1. **Institutional resources**: Stakeholder groups, goodwill, plans and programs, political skills, and social accountability capacity.
2. **Informational resources**: Data from analyses of economic, social, and cultural trends; market positioning; consumer behavior studies; and competitor programs.
3. **Financial resources**: Cash, quasi-cash assets, credits, and cash inflows.
4. **Physical resources**: Equipment, facilities, raw materials, and finished products.
5. **Human resources**: Time, energy, intelligence, perception, learning capacity, and adaptability.
6. **Technological resources**: Machinery, technical staff, projects, documentation, economic efficiency, knowledge, expertise, and experience (Kono, 1999; Shanley, 2004).

Strategic Gap Analysis

Since strategic decisions, by their very nature, define an organization's interaction with its environment, this interaction can be assessed through the concept of the **strategic gap**. This interaction emphasizes the alignment between internal capabilities (supply side) and external environmental factors (demand side), which management must consider to ensure effective strategic decisions.

The strategic gap refers to the difference between the organization's internal resources (supply) and the external demands (decision conditions). Accordingly, the strategic gap indicates the degree of alignment—or misalignment—between organizational goals, strategies, and resources and the opportunities and threats present in the external environment. It reflects the imbalance between the current strategic position of the organization and its desired strategic position.

A strategic gap emerges when annual resource allocations are insufficient to meet external expectations. Eliminating the strategic gap requires enhancing organizational capabilities to fully exploit all attainable opportunities and mitigate all identifiable threats. Although achieving this state is difficult, it is possible through comprehensive planning and full utilization of available productive capacities. However, sustaining such an optimal state is rarely long-term.

Strategic gaps can take three forms:

1. Positive gap
2. Negative gap
3. Zero gap

Of these, positive and negative gaps are the most common and represent realistic states organizations face in varying environmental conditions. The zero-gap state is rare in practice and is largely aspirational.

Positive Strategic Gap. A positive strategic gap arises when the organization's internal capabilities (supply) exceed the dominant environmental demands (demand). This represents an optimal condition for effective strategic decision-making. Under this scenario, management

is efficient, technology is advanced and up-to-date, policies are comprehensive, and resources are utilized productively within performance standards. Consequently, strategic decisions yield favorable outcomes for both the organization and its environment.

In such circumstances, the strategic gap is typically small and positive. Effective strategic decisions are made within a framework of interactive values between internal and external components, balancing current and future values of financial resources, cost-effectiveness, opportunity costs, and organizational priorities. This state represents a hallmark of efficient decision-making in organizations with effective management.

When management fosters maturity in internal organizational capabilities, a small positive strategic gap is consistently maintained. However, if the positive strategic gap becomes excessively large, it signals underutilization of organizational strengths, idle productive capacities, ineffective developmental policies, and an inability to capitalize on greater environmental opportunities (see Figure 2–6).

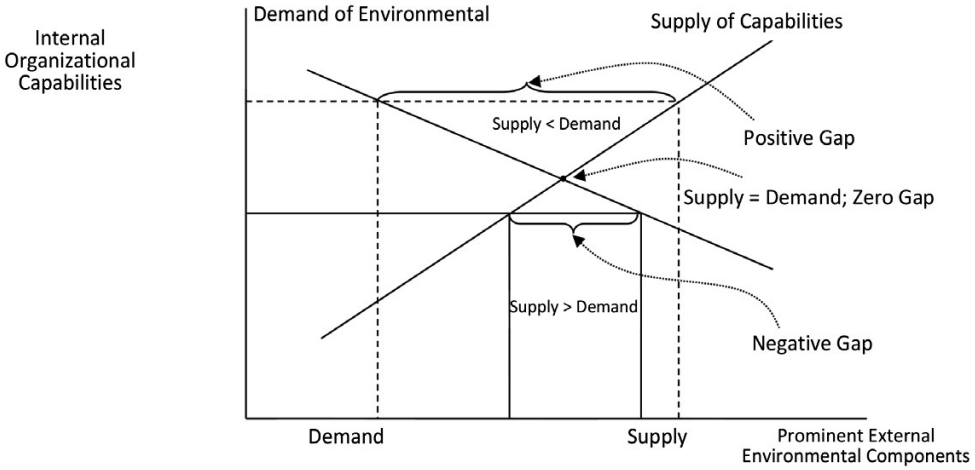


Figure 2. Strategic Gap Analysis

Strategic Negative Gap. A **strategic negative gap** arises when the prominent environmental factors (**demand side**) outweigh the internal capabilities (**supply side**) of the organization. Consequently, due to inherent internal weaknesses, the organization lacks the ability to:

- exploit opportunities and favorable positions,
- operate effectively within the existing competitive structure,
- advance its operations in the face of technological constraints and threats,
- function within the boundaries of legal and regulatory requirements,
- or adapt to the complexities of environmental conditions.

As a result, the organization fails to meet its expected social and economic responsibilities.

To eliminate this imbalance, management must immediately implement corrective and effective actions to enhance productive capacity. Reengineering, reinforcement, and supportive initiatives are essential to transform internal weaknesses into strengths, thereby elevating the level of organizational capability to capitalize on attractive external opportunities.

A small negative gap, if neglected by management without taking the necessary corrective measures, can escalate into a dangerous situation, requiring fundamental, comprehensive, rigorous, and demanding interventions. Clearly, a negative gap is always undesirable, and effective strategic decision-makers never endorse such conditions.

Strategic Zero Gap. Although a stable equilibrium between supply and demand forces cannot always be expected, under certain conditions the **strategic gap tends to converge toward zero.** Achieving a complete balance between organizational capabilities and prominent environmental forces is rare.

Factors such as:

- insufficient information,
- weak professional expertise,
- time lags in responding to induced environmental changes,
- delays in managerial response,
- technological bottlenecks,

- and managerial shortcomings

all contribute to the inevitability of some level of strategic gap.

In other words, organizations should expect the existence of a gap, preferably a positive one. Nevertheless, when management determines that the gap has been reduced to the minimum possible level, it can be concluded that the organization has achieved an adequate strategic fit in addressing strategic issues.

This condition represents a favorable state for effective strategic decision-making, and most organizations should set achieving this balance as a primary strategic objective (McLucas, 2004; Forgang, 2004).

Strategic Issue

Special Topic: After identifying the type of strategic gap and analyzing it, the recognition of management tendencies and the specific decision factors for designing the decision-making process is regarded as a strategic issue. The effectiveness indicators of a strategic issue may revolve around the following aspects:

- The ability to create rapid and significant change;
- The extent and degree of consideration of various conditions and substitute resources for future programs;
- The extent of goal utilization and achieving initial agreement or a specific perception;
- The speed of responsiveness to urgent and critical issues;
- The quality of operational control through budgetary target achievement;
- The level of effective growth planning via medium-term forecasting of operations;
- The degree of enhanced organizational sensitivity toward the market and competitive situation through strategic thinking;
- The extent of capability in managing all resources to secure competitive advantages and contribute to future creation;

- The level of investment in strengthening and expanding the organization's position in the external environment;
- The degree of increase in organizational return on investment (ROI);
- The level of improvement in the status and competitiveness of products in a specific industry or market segment;
- And the optimization of resource productivity, costs, and waste.

Analysis of Specific Decision Factors

A wide range of specific factors, with different characteristics and natures, can be identified that influence the effectiveness of decisions.

- When the type of factor reflects the characteristic or nature of the decision itself, strategic decisions are classified and assessed at the complex, advanced, and prominent level.
- If the factor is defined in interaction with the environment and contextual conditions facing the decision, strategic decisions are described in three forms: dynamic, incremental, and indeterminate.
- Another group of factors concerns the degree of effectiveness of the decision itself. In this situation, the extent and quality of goal attainment should serve as the measure for evaluating decisions within the framework of relevant constraints.

An illustration of such factors was presented in the initial model of this chapter for effective strategic decision-making. Consequently, the approach of this chapter has been to trace, examine, and analyze these manifestations.

In this discussion, a set of factors is reviewed to facilitate the identification of the path toward effective strategic choice and the acceleration of progress toward efficient results. Thus, it is expected that these factors can be tangibly applied to define the criteria, indicators, and standards for evaluating the effectiveness of strategic decisions.

- Criteria essentially represent the characteristics of strategic decisions under evaluation, which are considered the main or signifi-

cant aspects for judgment.

- Indicators are measures that reveal the status of one or more factors in relation to strategic decisions. Overall, an indicator system can display the current or desired state of decisions and clarify their changes.
- Standards (benchmarks) specify the desired level of the indicator(s) that define the quality of criteria. Like criteria, determining standards is a matter of judgment, and therefore, setting standards will vary according to the levels of decision-making and is influenced by place and time (Bazargan, 2002).

To organize and present the specific factors affecting the effectiveness of strategic decisions (as illustrated in Figure 1), two key studies were employed:

1. Samuel Trall (1966): The first study, conducted in the 1960s, on 100 complex organizations.
2. Harbison (1992): The second study, carried out in the 1990s, to update Trall's research.

This later study included 108 private corporations in the Bay Area of San Francisco, with the statistical units entirely comprising board members. Both studies used the same specific factors for determining the effectiveness of strategic decisions.

The comparative findings of these two studies are detailed below (Harrison & Pelletier, 1998).

Compatibility with operational constraints. It is generally reasonable to assume that the source of effective strategic decisions is mostly due to the performance of commercial companies. In other words, the existence of operational constraints in policies, methods and actions creates parameters for explaining the path of strategic choices towards achieving the institutional mission and achieving long-term management goals. Based on the reference model, an introspective view of the organization should be created so that all the characteristics of the organization can be observed in it and the reactions of the elements of the organization are presented in its framework. Function is proportional to its struc-

ture and the tasks (internal realities) of the organization are the focus of attention. The function of the organization or its role should be examined within the framework of missions, balance of realities and resource management. The three factors of mission, balance of realities and resource management are referred to as the "management software package" (Hitchins, 2003). Trall's (1966) study revealed that most effective decisions have a high compatibility with operational constraints. The Bay Area board response in Harrisburg's study revealed the same operational constraints that were raised in effective strategic decisions in Trall's study. The board's desire was more to create change and innovation. Overall, the results of both studies showed that it is reasonable to assume that effective strategic decisions are embedded in the context of the business realities of the companies. For example, the similarities between the marketing and distribution networks of two different product groups and end-uses for two companies, food and tobacco, led to differences in their logical and effective areas.

Optimal Decision Timing. Strategic decision making requires optimal timing. The defining point of optimality is roughly the state of the flourishing of the opportunity invested or the advantage gained in the organization. Basically, timing can have positive or negative effects. If a business schedules the introduction of a new product and the elimination of its previous product too early or even too late and the decision is not made in time, the work presented may not be considered effective. Optimal timing is the most important factor for effective strategic decisions that deserves improvement. Thrall (1966, p. 275 B-) observed that decision makers do not make a conscious effort to determine the optimal time to make a decision, but in both studies, timing needed improvement.

Optimal Use of Information. At times, decision-makers, without considering the costs, benefits, and resources, recklessly and without prior thought, engage in gathering information. In principle, the collection and analysis of information require time, equipment, and human resources, thereby imposing costs on the organization. These costs must be weighed against the resources and results derived from decision-making based on that information. Since both optimal timing of

decisions and optimal use of information are essential guarantees for the success and survival of an organization, decision-makers must consistently enhance their readiness in these two areas (Sarafizadeh, 2008).

Influence of the Decision-Maker. Since strategic decisions are most often made at the highest levels of management, the board of directors assumes the role of strategic designers of the organization, acting as advisors to senior managers. In reality, the degree of awareness, knowledge, skill level, analytical capacity, opportunity recognition, character, values, and risk orientation of these managers has a significant impact on strategic design patterns and the quality of strategic decisions.

Risk–Return Approach. There is a fundamentally positive relationship between risk and the return on investment opportunities. According to classical economic theory, most organizations and investors are risk-averse. Risk-taking implies that as decision-related risks increase, the returns from investment projects also rise.

It is assumed that managerial decision-making is rational: with increased potential benefits, the potential losses associated with risk also rise. However, some studies have revealed that managerial decision-making is not strictly based on rational economic behavior but is instead influenced by perceptions, insights, and analytical interpretations of forthcoming events and projections of future economic conditions.

Consequently, decision-makers may sometimes accept higher levels of risk relative to the actual return. Thus, for effective strategic decisions, decision-makers require only a sufficiently acceptable level of information, enabling them to analyze and project elements of situational intelligence.

As risk levels increase, expected returns also rise, although the broader economic and business environment may not always support such expectations. In such cases, the innovative actions of investors can provide assurance of achieving higher returns if they accept the associated risks.

While earlier studies frequently classified decision-makers as risk-averse, more recent research shows that due to greater utilization of analyti-

cal–cognitive capabilities and better awareness of unexpected opportunities, managers are increasingly risk-tolerant, confident in their ability to overcome such conditions. Conversely, where confidence is lacking, effective strategic managers avoid those scenarios. In any case, the risk–return approach serves as an appropriate criterion for assessing the effectiveness of strategic decision-making.

Level of Perception. Findings from Trall (1966) and Harrison (1992) indicate that successful strategic decision-making—and even successful implementation—requires high levels of knowledge, insight, perception, and analytical ability.

What diminishes effectiveness is the gap between high-level decision-making and operational-level implementation. Bridging this gap through participatory decision-making at both levels plays a decisive role in enhancing strategic decision effectiveness. Accordingly, this specific decision factor—degree of participation—can be employed as a criterion for determining the effectiveness of strategic decision-making

Managerial Tendencies

Managers cannot be regarded as lacking inner drives and motivations; therefore, their tendencies play a crucial role in the success of an effective strategic decision-making model. Within the framework of this chapter's model, managerial tendencies can be divided into two categories:

1. Orientation toward the decision-making process
2. Orientation toward the strategic decision itself

Both orientations exert significant influence on the quality and effectiveness of strategic choices.

Orientation toward the Decision-Making Process. Managerial inclinations toward the areas and domains of the decision-making process are based on two characteristics:

1. Reinforcement of the decision-making process through the attainability of managerial objectives;

2. Constraint of strategic decision-makers' options due to the openness of the process to various limitations and external environments.

Attainability of Strategic Objectives. The foundation of the strategic decision-making process rests on managerial goals. Thus, these goals define the purpose, direction, and continuity of the process. Managerial objectives determine the effective endpoints that guide decisions. They also define the operational decisions required for implementation.

If decisions are framed within the scope of strategic effectiveness, achieving objectives becomes essential. However, goals may create a weak and deficient framework for effective strategic decision-making if:

1. They exceed current organizational capabilities;
2. They are inherently unattainable for certain reasons;
3. Managerial execution weaknesses prevent their realization.

Openness of the Process. For the decision-making process to contribute to effective strategic choices, it must be open rather than closed. The clearest differences between open and closed approaches to strategic decision-making are outlined in Table 2-6. Accordingly, the following expectations arise:

1. An open process transforms the fixed, predetermined objectives of a closed process into dynamic goals and aspirational targets.
2. The assumption of completeness of alternatives in a closed process—limited by constraints of information, time, location, and perception—becomes, in an open process, a willingness to explore new and alternative options.
3. The pursuit of an optimal outcome in a closed process shift, in an open process, to seeking a satisfactory level of results that simply ensure goal attainment.
4. Unlike a closed process, an open process fosters continuous interaction between the organization and external stakeholders in its environment.

Table 2. Characteristics of Open vs. Closed Processes

Closed Process	Open Process
Linear Thinking Style (Analytical – Decomposition-Oriented)	Systems Thinking Style (Non-linear)
Fixed and Predefined Goals	Dynamic and Adaptive Aspirational Goals
Examination of Issues in Isolation	Examination of Issues within the Environmental Context
Attention to Components and Explicit Aspects of Issues	Attention to the Whole and the Internal Mechanisms of Issues
Necessity of Achieving Optimal Goal Outcomes	Necessity of Achieving a Satisfactory Level of Goals
Exclusion of Interaction among External Stakeholders	Establishing Continuous Interaction among External Stakeholders

Orientations Toward Decisions. These orientations toward strategic decisions revolve around two key factors:

1. The quality of calculations or judgments embedded in strategic decisions.
2. The nature of optimization or satisficing of the outcome that management seeks to achieve through the decision-making strategy.

Strategic Decision-Making Strategies. A strategic decision-making strategy encompasses three dimensions:

1. Decision-maker's preferences for achieving a specific outcome.
2. Knowledge required to attain the assumed result.
3. Implementation approach.

In most strategic choices, managerial preferences are relatively clear. However, to achieve the desired result, there must be alignment between the strategic unit and the decision-maker. Due to unpredictable environmental changes, the exact outcome of a strategic decision cannot be clearly determined. Instead, the decision-maker must proceed

toward strategic outcomes under uncertainty and choose a course of action despite incomplete information.

As such, creating expected strategic results becomes highly important, ensuring that all planning activities are directed toward achieving these outcomes. To reach this satisfactory condition, a normative/judgmental decision-making strategy should be employed. Indeed, one of the most salient characteristics of many effective strategic choices is their alignment with a normative strategy.

In most cases, it is assumed that sufficient information about the desired outcome of a particular course of action is available to the decision-maker, enabling them to achieve the highest level of results within the strategic objective. This approach emphasizes quantitative components and conducts the necessary analysis based on computational techniques; hence, it is referred to as the "computational decision-making strategy." Essentially, the computational strategy simplifies the complexity of the decision problem, placing it at a manageable level, while simultaneously enhancing the knowledge and capability of the strategic decision-maker and positioning them at a higher level.

In contrast, within the normative decision-making strategy, uncertainty is always present in most strategic choices, and human perceptual limitations are acknowledged alongside other constraints.

Outcomes of Strategic Choices. The outcome represents a level of consequences that reflects the result of the selected course of action. Strategic objectives evaluate strategic outcomes through the process of strategic choice. These outcomes can be categorized into two groups:

1. Optimal outcomes – These are achieved under the assumption that the ability to attain the best possible result in alignment with the strategic goal exists. If the outcome of a strategic choice falls short of the optimal level, the optimal outcome is not realized, and thus the optimization of strategic decision-making is unattainable. An individual or organization that pursues optimization regards only the achievement of the best outcome as the hallmark of an effective strategic choice.

2. Satisficing outcomes – In practice, the best outcome that a strategic decision-maker seeks is achieved merely by attaining the defined strategic objectives. In this case, it is not necessary to exceed the predetermined goals to be considered effective. If striving for outcomes beyond the defined goals becomes the focus, it requires elevating the level of objectives. However, caution must be taken to avoid raising the objectives to a point where their achievement becomes unattainable. This adjustment in goal levels is referred to as a "satisficing outcome." This type of outcome is recommended for all strategic choices.

Satisficing outcomes emerge from a normative decision-making strategy. In this approach, the decision-maker's strong preference for a particular course of action is met by accepting a level of results that are feasible, because under existing knowledge and capabilities, not all expected outcomes can be achieved. Instead, efforts are made to secure outcomes that approximate the desired expectations as closely as possible.

Strategic choices can only be considered effective when their achievements fall within the scope of attainable goals through the application of the open strategic management decision-making process. This principle is referred to as the "satisficing principle" in strategic decision-making (Harrison & Pelletier, 1998).

Management Decision-Making Process

The components of the management decision-making process are, in fact, the functions of decision-making, which present the decision as a program. The constructs of this process not only interact strongly with one another but are also dynamic and mobile in nature. Each of these functions has its own unique structure, and these structures have their own tasks, features, and mechanisms.

Each stage of the decision-making structure is a subsystem of the overall decision-making process that must be harmonized with it. These stages, in turn, play a critical role in producing effective outcomes. The mechanisms within the stages indicate how managerial objectives can be achieved. Achieving goals is the conventional expectation of man-

agerial decision-makers. To better understand how effectiveness is attained, the dynamic process of managerial decision-making must be analyzed.

Goal-Setting. The first stage of the managerial decision-making process is goal-setting. This process, by embedding a feedback structure and creating synergistic forces, facilitates the achievement and enhancement of goals. The process has a cyclical and iterative nature; with new goal-setting, re-embedding becomes necessary in order to strengthen the ability to meet new expectations.

The importance of goals is such that they play a foundational role in generating the managerial decision-making process. Therefore, before any action, goals must be clearly defined, well understood, and documented (Drucker, 2007).

Accordingly, within the decision-making process, the goal is interpreted as the end-point toward which managerial decision-making is directed. Goals must contain measures, comparisons, and performance evaluations to enable the assessment of effectiveness. If goals are not structured, it will not be possible to determine the effectiveness of managerial decisions in achieving organizational objectives.

Identifying and discovering solutions. For the design, selection, and utilization of appropriate alternatives, both the internal and external environments of the organization must be examined for information gathering. The information should not only bring forth the set of conditions and requirements necessary for designing and developing alternatives but must also demonstrate, alongside the feasibility of these alternatives, the potential for goal attainment.

Identification and discovery of alternatives are activities that are shaped within the framework of the diagnostic ability, analytical capacity, and decision-making skills of managers, becoming viable in proportion to these capabilities.

This process is closely linked with the values, experiences, perceptual abilities, and risk tolerance of the managers engaged in decision-making. Managers must be able to balance the realities of identifying and

discovering alternatives across the following dimensions:

1. The costs of acquiring additional information,
2. The benefits derived from such information, and
3. The aspirational levels of goals.

The costs of acquiring additional information must be weighed against the ultimate value obtained (Harrison, 1999).

Comparison and Evaluation of Alternatives. The outcomes of the identification and discovery stage must generate sufficient information for the design and classification of alternatives. The next step is the comparison and evaluation of alternatives. Each alternative possesses a different capacity to achieve the decision objectives; therefore, the level of effectiveness assessment will inevitably vary.

The number of alternatives identified depends on the amount of effort devoted to their recognition and discovery. It must always be considered that there may exist alternatives of which the decision-maker is not fully aware. If such alternatives are overlooked, they are automatically excluded from the decision-making process.

Each alternative requires its own specific resources. Thus, it is necessary to examine what resources, time, personnel, and facilities each alternative demands in order to determine whether their provision and implementation are feasible. Some alternatives, although not problematic in terms of resources and other requirements, may still fail to deliver the expected decision outcomes.

Therefore, the decision-maker must be able to estimate the effectiveness of each alternative. To do this, they should map the interaction between alternatives and their related outcomes within the framework of the decision objectives.

The process of comparing and evaluating alternatives is generally composed of several sequential and iterative tasks. These tasks bring forth a high level of precision and specific operational knowledge.

To finalize this stage, the first step is to reduce the number of available alternatives based on their degree of effectiveness, feasibility, and

implementability. Next, a multi-criteria evaluation of the remaining alternatives must be conducted. Alternatives should be assessed from multiple perspectives, and such evaluation must be linked both to their ability to achieve management's objectives and to their capacity to generate desirable outcomes.

The result of this stage is the selection of an appropriate alternative consistent with the level of strategic decision-making—although this choice also depends on the perceptions and belief systems of the decision-makers.

Selection of an Alternative. Although decision-making itself is an exploratory process and the ultimate expression of individual will, the selection of a single alternative from among several possibilities is regarded as one of the most critical phases of the managerial decision-making process.

When making a decision—regardless of its objectives—it is the alternatives themselves that shape the outcomes of the decision. Hence, decisions define the efforts, actions, and transformations that follow (Hill et al., 2007).

Nevertheless, the selection stage, while merely a part of the broader dynamic decision-making process, constitutes an independent investigative procedure (Simon, 1966). If attention is given only to the act of choice in isolation, there is the risk that the necessary set of preparatory actions enabling such a choice will be neglected. Consequently, the examination and analysis of the types of outcomes may be overlooked, and the risks and challenges of anticipating decision consequences may be ignored (Jagdev et al., 2003).

Decision-makers always consider alternatives within the framework of managerial objectives; however, some alternatives may only fulfill a portion of the related objectives. Very few alternatives can be identified and utilized to completely achieve the stated goals. Therefore, alternatives must be evaluated using a goal-attainment appraisal approach through the following steps (Hamidizadeh, 2023, p. 82):

- Assessing the effectiveness of alternatives in terms of the extent to

which objectives are achieved, given the available tools, resources, time, and budget.

- Adhering to rationality and goal orientation of alternatives within the framework of:
    1. Compatibility of alternatives with the organization's (and the issue's) sequential, intermediate, and ultimate goals.
    2. Consistency of alternatives with the conditions and assumptions underlying the objectives.
    3. The extent to which alternatives are controllable and manageable.
    4. Broad consensus and agreement on the usefulness of alternatives.
    5. Defining performance measurement indicators for alternatives.
- Using management by objectives (MBO) as a tool to measure the effectiveness of alternatives.

Therefore, the decision-maker usually cannot choose the optimal alternative due to constraints arising from prevailing conditions and available resources. Moreover, at times, the best alternative from the decision-maker's perspective may not be fully acceptable to the organization or its employees. Consequently, the decision-maker may be compelled to select an alternative that does not fully align with the intended objectives. Ultimately, the chosen alternative becomes one that is not only suited for specific goals but also addresses multiple objectives, thereby adding greater sustainability to strategic decisions (Yoon & Hwang, 1995).

By defining the window of outcomes of alternatives and evaluating their effectiveness from both the positive and negative perspectives of organizational employees and customers, the likelihood of achieving beneficial outcomes from the chosen alternative increases.

Implementation of Decisions. A review of decision-making theory reveals that most scholars have discussed the decision-making process only up to the stage of selecting alternatives. This implies that decisions were traditionally viewed not as instruments, but as ends in themselves. However, in the dynamic decision-making process, decisions are instruments for achieving managerial objectives within the framework of dy-

namic internal and external organizational interactions. In fact, the true value of decisions can only be assessed after they are implemented. Managers should not consider their work complete merely by selecting the best alternative. If a decision cannot be fully implemented, achieving the expected and desirable results cannot be anticipated.

Effective decision-makers plan for each decision. In reality, each decision is a program that has a goal, a means of reaching it, and associated resources. Every decision changes circumstances. Managers must anticipate potential obstacles and be prepared to face counteractions and opposing responses (Tuite & Chishollen, 2007).

It is essential that, at the time of decision-making, adequate planning for proper execution be carried out to ensure the realization of expected programmatic results. Even the best decisions often fail due to overlooked resource requirements such as financial funds, physical and operational space, human resources, supervisory competence, or deficiencies in employee skills.

A decision that lacks clarity in definition, scope, and responsibilities, but has no provision for effective implementation mechanisms, becomes valueless. Converting decisions into implementable programs is an indispensable part of the decision-making process. Unless a decision is supported by actionable alternatives and mechanisms for realization, its effectiveness cannot be assessed. The effectiveness of a decision is thus highly tied to the selected implementable alternatives (Stacey, 2005).

Monitoring and Control. A decision-maker cannot assume that, once implemented, the outcomes of a decision will naturally align with managerial objectives. Establishing a monitoring and control system for each decision is necessary to ensure that the expected planned results are achieved. This system includes three stages:

1. Defining criteria based on managerial objectives;
2. Measuring actual performance against the established criteria; and
3. Adjustment (conformance).

Compliance. If actual performance indicates an unacceptable deviation from the criteria, management must implement corrective actions to

achieve actual performance in line with an acceptable level of conformity. Therefore, it is expected that an implemented decision will generate outcomes that correspond to the managerial objectives initially forecast. Such outcomes represent the result of effective strategic decision-making.

Outcomes of Strategic Decisions

The outcomes of decisions are shaped along two dimensions: management orientations toward the decision-making process and management orientations toward the decision itself. In Table 3-6, the fourfold grouping of A, B, C, and D is presented to illustrate the status and level of effectiveness of strategic decisions.

- The column classification of the table concerns management's orientation toward the decision-making process, while the row classification relates to management's orientation toward the decision itself.
- These orientations encompass dimensions that were previously presented in Figure 1-6, where the components of effective strategic decision-making were introduced.

In Group A of Table 3, the best set of managerial orientations for achieving effective strategic decision outcomes is presented. As such, the decision embodies achievable outcomes aligned with decision objectives. Strategic decision-making in this group involves two aspects:

1. Achievable objectives stemming from a positive strategic gap;

2. An open approach to the decision-making process.

When strategic decisions are evaluated using appropriate criteria, the source of these criteria must be the specific decision factors. These factors lead to satisfactory outcomes, obtained through the use of normative decision-making strategies.

In contrast, Group D represents the worst set of managerial orientations toward effective strategic decision-making. In this group, unattainable objectives derived from a negative strategic gap are pursued through a closed decision-making process. When strategic decisions are evaluated using inappropriate criteria, these criteria also originate from the same set of specific decision factors. Consequently, outcomes man-

ifest within the framework of operational decision-making strategies.

Group D thus embodies indefensible orientations in both process and outcome dimensions, inevitably leading decisions to failure. Conversely, Group A offers highly probable effective outcomes for decision-makers. This group encompasses three beneficial dimensions:

1. A positive strategic gap;
2. An open approach to the decision-making process; and
3. Major expectations of achieving attainable objectives.

Table 3. Grouping of Strategic Decision Effectiveness Outcomes

Determination Intent Expressing Intent to Use the Decision-Making Process	Achievable Goals Unachievable Goals Negative Gap; Closed Process Positive Gap: Open Process	Process Intent / Willingness to decide	Expressing Intent to Use the Decision
B: Failure to Realize the Effectiveness of the Outcomes of Strategic Decisions with Unachievable Goals within the Framework of the Closed Management Decision-Making Process	A: Achievability of the Effectiveness of the Outcomes of Strategic Decisions, More Reassuring the Probability of Expected Outcomes	- Appropriate Criteria -Normative Decision-Making Strategy; - Satisfying Incorrect Outcome Criteria; - Operational Decision-Making Strategy; - Maximizing Outcomes	
D: The emergence of unacceptable management preferences towards the decision process and the decisions themselves, creating ineffective consequences for strategic decisions	C: Expanding the limited possibilities for the effectiveness of the consequences of strategic decisions by directing real preferences towards the decisions, not the process		

While Groups A and D, as illustrated in Figure 3-6, represent the positive and negative extremes of a continuum, Groups B and C encompass the intermediate characteristics of this continuum. For example, Group B reflects actual tendencies toward decisions with the following characteristics:

1. Unattainable objectives (beyond perception and execution);
2. A negative strategic gap;
3. A closed orientation toward the managerial decision-making process; and
4. The impossibility of achieving desirable outcomes.

Therefore, achieving satisfactory results for Group B is not feasible, solely due to the unattainability of objectives and the incompatibility of the closed managerial decision-making process with the normative approach to strategic choice.

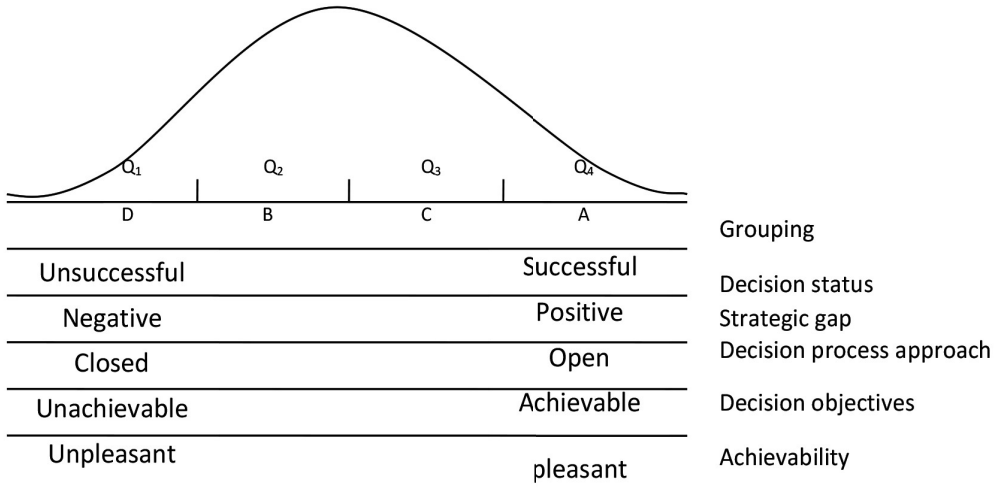


Figure 3. Behavior of the Characteristics of Effective Strategic Decisions

On the other hand, Group C contains decisions with the following characteristics:

1. Achievable objectives;
2. A positive strategic gap;
3. An open approach to the decision-making process of management;

and

4. The feasibility of attaining desirable outcomes.

However, in applying operational decision-making strategies, it is confronted with a set of inappropriate criteria. The consequences arising from the lack of effectiveness in the results of strategic decision-making must be minimized. To transfer a less effective strategic decision in Group C into an effective strategic decision in Group A, managerial tendencies toward strategic decisions must be corrected by accepting desirable outcomes through a normative decision-making strategy.

Nevertheless, it should be noted that the outcomes of strategic decisions are not always in accordance with the grouping of Table 3. However, by utilizing managerial inclinations in line with that table, one can achieve a logical framework for identifying effective strategic decision-making outcomes (Harrison and Pelletier, 1998).

Conclusion

The sensitive and fruitful aspect of strategic decisions—one that has often received less attention—is understanding the extent of their effectiveness. The purpose of this chapter was, in fact, to utilize dynamic and open thinking in order to design and architect the structure of effective strategic decisions. Questions such as "What is the process and arrangement of the components of the effectiveness assessment model?" and "How can such arrays be selected, organized, and formulated?" were among the key topics addressed in this chapter.

Clarifying the levels and characteristics of each construct within the domains of the effectiveness assessment framework requires an understanding of conditions and contingencies and achieving a degree of diagnostic capacity. Strategic managers must acquire such diagnostic ability for themselves, as it is precisely this capacity that differentiates them from other managers and leads to success, achievement, and effectiveness in performance. The awareness of how to utilize organizational capabilities in guiding effective decisions is thus dependent on the cultivation of managers' diagnostic competence.

Another key outcome of this chapter was the presentation of indicators that strengthen diagnostic capacity in distinguishing whether or not strategic decisions are effective, based on various domains that emerge within the framework of strategic management processes. The explanation of these effectiveness-assessment indicators encompasses the entire process of strategic management and planning. Finally, the grouping of outcomes and the evaluation of outcome states—presented after the introduction of a monitoring and control system—represented additional features in consolidating the findings regarding the effectiveness of strategic decisions, as elaborated in the concluding sections of the chapter.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

Draw a model for measuring the effectiveness of strategic decisions1.

2.Name the areas and structures of each of those areas for measuring the effectiveness of strategic decisions.

Describe strategic decisions and write their characteristics3.

What is meant by the foundations of the environment? Explain it4.

In environmental assessment, we deal with stakeholder groups, describe these groups5.

Describe the opportunities and threats of environmental assessment6.

7.What role do socio-political components play in environmental assessment?

8.What is meant by organizational assessment? And in what ways is it important to draw the

manifestations of capabilities, strengths and weaknesses to determine effective strategic decisions?

Describe the role of management and technology in organizational assessment9.

Name the types of resources, giving examples for each10.

What is meant by strategic gap analysis? Explain it with a diagram11.

Write the difference between positive and negative strategic gaps12.

Write the role of the specific issue and its areas in explaining the strategic problem13.

Describe the role of criteria in the analysis of specific decision factors.14.

15.What is meant by adapting to operational constraints in the analysis of specific decision factors.

16.Explain the role of the optimal amount of information and the amount of perception in the analysis of specific decision factors.

Write two characteristics of the tendencies towards the decision-making process17.

Write the characteristics of open and closed processes in the achievement of strategic goals18.

19.Write two tendencies towards strategic decision and name three aspects of strategic choice strategies.

What is the result and how many groups are strategic outcomes divided into? Explain20.

Name the components of the management decision-making process21.

22.What are the steps in which solutions are evaluated based on the goal-achievement evaluation approach? Please name them.

Write the three stages of the monitoring and control system.23.

24.Explain the consequences of strategic decisions by preparing a table grouping the consequences of the effectiveness of strategic decisions.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please

specify which statements are true and which are false. For validation, refer to the chapter.

1. Strategic decisions, if faced with errors and deviations when identifying long-term direction and goals and determining the type of interactive behavior with the environment, expose the entire organization to major risks.

2. The separation and classification of the effectiveness of strategic decisions is presented based on the planning horizon, leadership capabilities and management tendencies for a specific strategic choice, as well as the process of their formation.

3. Strategic decisions are actually those decisions that fall within the scope of responsibility, perception, knowledge and basic development of senior management and explain the direction and acceleration of operations.

4. Effective decisions are those that achieve their goals within the framework of the specified time, available resources, management capabilities and upcoming limitations.

5. The theory of effectiveness is proposed for high levels of the organization. Organizational effectiveness indicators should be considered within the framework of effective strategic choice indicators that senior managers use to achieve long-term goals.

6. Since the approach to strategy is based on consideration of the environment, strategic decision makers must consider internal factors when choosing a strategy

7. The interests of stakeholder groups are tied to the interests and behavior of the organization. The members of these groups can be considered components of the organization's general environment.

8.The complexity, change, sometimes transparency, and lack of structure of environmental components are characteristics of the internal environment of organizations.

9 (٩.The greater the amount and variety of uncertainties, the more difficult it will be to explain the strategy of a single decision. Since a major

part of strategic decisions are formed from the external environment that must create the future environment of the organization, they are always accompanied by planning under conditions of uncertainty.

10.The evaluation of the effectiveness of strategic decisions is closely related to the opportunities, situations and demands of the environment that open up before the organization. This type of effectiveness should show the extent to which these decisions have been able to take advantage of the opportunities.

11.To evaluate the effective status of strategic decisions, the impact of threats, bottlenecks and limitations on the organization's operations must be identified, classified and assessed.

12. The contribution of the development of the realities of organizations to the movement of society to achieve the planned goals of national growth and development is to influence.

13. To protect the organization from threats from the external environment, it is necessary to be aware of the weaknesses and strengths of the organization's internal environment in order to enable the formation and establishment of an appropriate defense system.

14. According to Simon, technology is the knowledge of how to do things and how to achieve operations.

15. Current policies create the possibility of achieving those types of work that can be used to achieve effective strategic goals.

16. Institutional resources include stakeholder groups, goodwill, planning and planning, political skills, and social accountability.

١٧17. Human resources include time, energy, intelligence and perception, learning ability, and the ability to learn quickly.

18. A strategic gap disappears when the capabilities of the organization are enhanced to the point of being able to take advantage of all available opportunities and all specific threats are removed from around the organization.

19. When the organization's management can create a state of development for the organization's internal capabilities, there is always a posi-

tive and small strategic gap in the organization..

20. A negative gap always has an unpleasant aspect, and effective strategic decision-makers do not approve of these conditions in any way..

21. Criteria target the characteristics of strategic decisions that are considered as the main or important aspects of the decision to guide..

22.The source of effective strategic decisions is mostly from the planning horizons of commercial companies.

23. Since the two components of optimal decision timing and the number of operations are guaranteed for the survival of the organization, decision makers should always increase their readiness in these areas.

24. What reduces the effectiveness of strategic decisions is the existence of a gap between the high levels of decision-making and its implementers at the operational levels of the organization.

25. The foundation of the strategic decision-making process relies on management objectives, these objectives shape the purpose, direction and continuity of that process.

26. The orientation towards strategic decision revolves around the nature of the enhancement or satisfaction of the result that management tries to achieve through the use of the decision-making strategy.

27. To achieve the desired result, there must be a single goal between the strategic and decision-making departments

28. The computational decision-making strategy reduces the complexity of the decision problem to a simple level and, in return, enhances the knowledge and capability of the strategic decision-maker.

Satisfactory outcomes arise from the normative decision-making strategy.29.

30. Goal setting provides the achievement and improvement of goals by implementing a feedback structure and creating a multiplier force.

31.Identifying and finding solutions is formed within the framework of the level of literacy, analytical power, and ability of decision-makers and becomes capable accordingly.

32. The goal in the management decision-making process refers to the starting point from which the decision-making direction of managers is derived.

The costs of obtaining more information are measured in relation to the priority of goals.33.

34. Although some solutions may not cause problems in terms of resources and other requirements, they may be able to achieve the expected goals of the decision.

35. Decision is a process of exploration and the highest level of demonstration of the will of the individual.

36. The selected solution is likely to be a solution that will not be suitable only for specific goals, but will also consider other goals and will have a multi-objective aspect.

37. By examining the background of decision-making theorizing, it can be found that decisions were considered not as a means but as a goal and an end.

38. The source of the criteria for evaluating strategic decisions should be the specific factors of the decision. These factors have satisfactory consequences that are achieved by using a normative decision-making strategy.

39. The expression of the desire to use the decision-making process in a continuum is measured based on achievable goals, positive gap, and open process.

40. The expression of willingness to benefit from a decision is measured based on appropriate criteria, normative decision-making strategy, degree of satisfaction with incorrect outcome criteria, operational decision-making strategy, and maximizing outcomes.

Chapter 7
Decision Support System

Objectives

- To become familiar with the concept and nature of decision support systems.
- To identify the characteristics and types of decision support systems.
- To gain knowledge about artificial intelligence systems and knowledge-based expert systems for decision-making.

Introduction

Management Information Systems (MIS) transform data derived from both internal and external organizational sources into meaningful information. This information must be delivered in an appropriate form to managers at all organizational levels, in alignment with their responsibilities, in order to empower them to make effective and timely decisions for planning, directing, and controlling activities. Such systems can be regarded as integrated mechanisms designed to provide information that supports organizational planning, control, and operations. By collecting historical, current, and future-oriented data regarding internal operations and external awareness, these systems assist in operations, management, and decision-making, thereby supplying information in a timely manner Management information systems become strategic when they are able to change the way an organization competes.

Managers manage and move the organization forward based on decision-making at different organizational levels, and they always move within its space. Managers need information with a specific structure

within the framework of the level they are in so that they can best perform their role (Klein & Sales, 2001). Managers administer and advance organizations through decision-making at various hierarchical levels, continuously navigating within its dynamic environment. At each level of the organizational hierarchy, managers require uniquely structured information that enables them to optimally fulfill their roles. Based on the foundations established in previous chapters concerning decision types and decision-making environments, this chapter is dedicated to examining Decision Support Systems (DSS) for managers.

Concept and Nature

Decision Support Systems (DSS) represent the application of decision-making models that provide support to the decision-making process by delivering relevant information. By employing and analyzing decision-making models, DSS are capable of addressing complex problems and assisting decision-makers, particularly at middle and upper organizational levels, by offering analytical insights.

If the decision-making process is conceptualized in three phases the Decision Support System primarily contributes to the first stage, while simultaneously assisting in the design of potential solutions.

1. Identification and classification of the problem or issue
2. Design
3. Choice

Throughout these three phases, the pursuit of a rational solution may involve questioning, analysis, application of diverse models, and utilization of various systems, including accounting systems.

Decision-makers, through thorough data analysis and the application of multiple methodologies, evaluate alternative approaches and select the one most capable of resolving the problem or creating opportunities. The types of decisions discussed in earlier chapters also play a significant role in the design of DSS. Consequently, the design of a Decision Support System must incorporate such classifications, and, in accordance with Figure 1, establish the framework for data analysis, information processing, and tabulation (Steven, 2002).

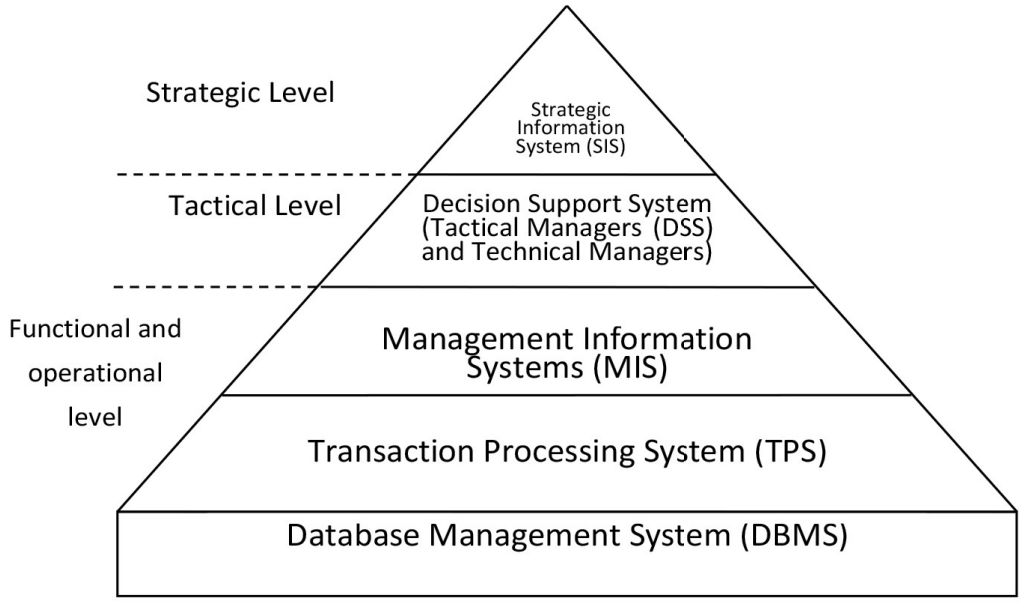


Figure 1. Th Position of the Decision Support System within the Hierarchy of Information Systems

Since hierarchical and programmed decision-making—such as structured decisions and similar types—are rule-based in nature, they can be computerized. In these cases, the inputs, processing, analysis, and decision alternatives are predetermined; therefore, decision support systems can be developed within the framework of such established rules. In contrast, for unprogrammed, unstructured, and intuitive decisions, these rules are neither fixed nor clearly defined. Consequently, in the context of such decision situations, Decision Support Systems (DSS) play a crucial role.

Decision Support Systems (DSS) employ a variety of models such as operations research, budgeting, project planning, and inventory control models, as well as cost accounting systems and material requirements planning (MRP) systems. They can also utilize essential data stored in databases, establishing connections through application interfaces in order to interactively analyze problems and generate results (Lewis, 2007).

DSS are interactive computer-based systems designed primarily for senior-level managers within organizations. They are frequently applied to

solve specific problems that are not repetitive or routine in nature but are instead case-specific, characterized by novelty and a lack of precedent. DSS are particularly developed for problems that are relatively unstructured and unique. Accordingly, a DSS must possess flexibility and adaptability to accommodate changes introduced by users according to situational requirements, thereby ensuring proper alignment with decision contexts.

A DSS represents an interactive information system that relies on a set of user-friendly software and hardware components. It provides managers at different levels—especially at tactical and strategic levels—with diverse and analytical information to support decision-making.

By employing DSS, information deficiencies can be mitigated, enabling managers to improve the quality of their decisions. For this reason, the incorporation of new technological innovations—including advanced hardware and software (e.g., color graphics, management information systems, planning and forecasting models, query languages, and even artificial intelligence)—is essential to maintain the currency and effectiveness of DSS.

DSS facilitate the overall decision-making process by assisting in the selection of an optimal solution among several alternatives. Some DSS are even equipped with the capability to generate solutions and recommendations based on the specific criteria defined by decision-makers. Thus, managers, with the aid of DSS, gain the ability to move beyond predesigned and periodic reports, and by posing a range of "what-if" questions (e.g., *what would happen if this occurs?*), they can significantly broaden their intellectual horizons (Uhlir, 2003).

Characteristics of Decision Support Systems

Decision Support Systems (DSS), when properly designed, implemented, and utilized, can offer the following capabilities within the framework of flexibility, modeling, and database management:

- Assisting and advising decision-makers by providing solutions throughout the decision-making process.
- Designed specifically for unstructured and semi-structured deci-

sions.

- High efficiency and applicability at tactical (departmental, technical) and strategic (enterprise-wide) levels.
- Provision of diverse and multipurpose models, simulation facilities, and analytical tools for decision-makers.
- Ability to deliver services without requiring continuous expert intervention.
- Rapid adaptability and responsiveness to the informational needs of decision-making environments.
- Mechanisms for promptly delivering decision-makers' informational requirements.
- Capacity for integration with comprehensive databases.
- Compatibility with diverse managerial decision-making styles.
- Facilitation of communication among different decision-making levels through the application of practical models.
- Joint design and implementation by both end-users and system analysts.
- Utilization of economic, scientific, and engineering principles as well as management tools and techniques.
- High degree of independence in guiding managers by leveraging data from DBMS, and information from TPS and MIS.
- Ability to test decision approaches and evaluate sensitivity of results with respect to variations in parameters and decision assumptions.
- Capacity to utilize data and information from both internal and external organizational sources (Drucker, 2007; Beroggi, 2002).

Types of Decision Support Systems

DSS can be categorized based on the type of analysis and functionality into the following types:

1. Status Query Systems

   Some managerial decisions, particularly at operational and technical levels, rely only on one or two aspects of the decision context. These systems do not require precise computations, complex analyses, or elaborate choice mechanisms. If the decision situation is clear and well-defined, the decision can be made automatically.

2. Analytical Systems

   In several DSS applications, simple data-processing tools are employed to construct the system. Generally, such systems are grounded in data and process analysis, including comparisons of alternative solutions and strategies, evaluation criteria, and the use of mathematical formulas and relationships. Examples include systems for cash-flow analysis, warehouse inventory analysis, and personal portfolio analysis.

3. Information Analysis Systems

   These systems analyze data and produce informational reports. Some reports may highlight exceptional cases and provide unique analyses and insights. Such reports are particularly useful for assessing situational conditions. Examples include sales analysis, accounts receivable systems, marketing research analysis, and production resource planning systems.

4. Accounting Systems

   Although these systems do not directly contribute to decision-making, they are useful for monitoring core business activities and evaluating performance. Their content primarily consists of processed data that, when required, lead to formal reports. They often provide descriptions and interpretations of financial liquidity, inventory, and personnel affairs.

5. Model-Based Systems

   These systems are grounded in simulation and optimization models for decision-making. The decisions they address are often nonrecurring and provide strategic guidelines for operations.

Examples include marketing mix decisions, material composition, scheduling and sequencing, optimal routing, facility planning systems, and capital asset pricing models.

In general, to properly conceptualize a DSS, one must consider the managerial functions and the diversity of decisions required by managers. For a comprehensive overview of DSS characteristics, reference can be made to Table 1.

Table 1. Characteristics of Different Types of Decision Support Systems

System	Information Source	Method
Query and Response	• Databases • Reference files	Query-and-response systems
Data Analysis	• Databases and files	Data processing programs
Information Analysis	• Processed data files • Processed databases	Analytical programs and application of practical models
Accounting	• Transactions, primary files, and databases	Operations processing systems and information processing systems
Model-Based	• Information databases and external data sources	Simulation modeling and development of application-specific models

Fundamentally, the models employed in Decision Support Systems (DSS) can be classified into three categories:

1. Operations Research Models

2. Management Science Models
3. Behavioral Models

Behavioral Models. These models are useful in understanding the interactions among variables and in analyzing changes in their behavior. Decision-makers can rely on these behavioral interrelations to inform their decisions.

Most trend analysis models, statistical analysis models, and forecasting models fall within this category. Trend analysis models illustrate how various variables influence the configuration of past and future trends. Regression models, in addition to assessing the behavioral fit between independent and dependent variables, also indicate the degree of their correlation, thereby assisting in identifying the impact of one variable on others. Such models are widely applied in process control, manufacturing, agricultural sciences, medicine, psychology, and marketing (Png & Lehman, 2007).

Management Science Models. These models are constructed on the basis of principles from business management, accounting, and economics. They are employed for monitoring events and tracking the consequences of decisions. In addition to these models, several management systems can be adapted into DSS models, such as:

- Budgeting systems
- Cost accounting and activity-based costing systems
- Capital budgeting systems
- Investment return models
- Production control and planning systems
- Scheduling systems
- Human resource planning systems
- Forecasting models for personnel management

The application of these models enhances rule-based decision-making in organizational processes and minimizes individual biases in decision-making procedures.

Operations Research Models. These models are grounded in a mathematical framework, expressed in terms of variables and parameters. The solutions and outcomes derived from such models are inherently quantitative and mathematical, which provides clarity and transparency. Each model is built upon a set of assumptions that are aligned with empirical evidence and the realities of the subject under investigation. These assumptions must be constructed in a manner that ensures solutions reflect the actual situation (Lawrence, 2007; Lewis, 2007).

Software Tools

Although the various types of Decision Support Systems (DSS) are developed within the frameworks of behavioral models, operations research, and management science, they nonetheless rely on a variety of software tools, as illustrated in Figure 2-7.

- **Application Development.** Some DSS provide managers with the ability to develop computer-based applications tailored to the decision-making process. By entering, processing, and storing data, these applications generate reports that managers wish to receive.

Through a set of dedicated DSS menus and options, managers can create customized data entry screens with the desired outputs. Users are also able to design and establish a DSS-specific database, as well as define how data should be extracted from the organization's central database for use within the DSS. Application programs in the DSS environment may be employed both occasionally and continuously, depending on managerial needs.

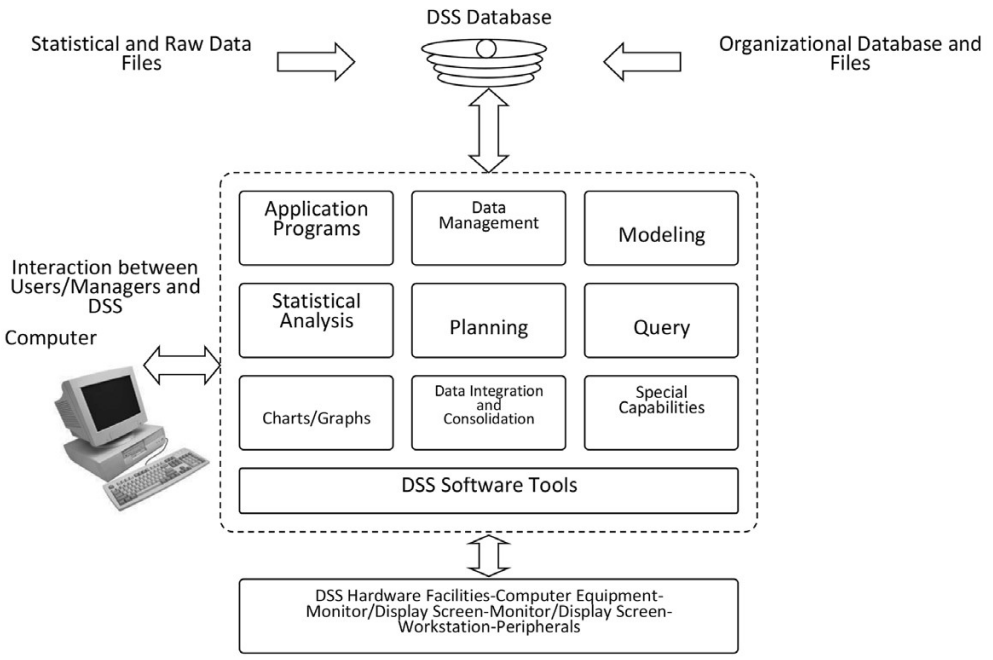


Figure 2. Decision Support System

- **Data Management.** Every DSS establishes a specialized approach to database management. In practice, the software mechanisms for storing, maintaining, and retrieving data are unique to the system. A DSS must be capable of ensuring coordination and compatibility between its own databases and the software tools of the DSS environment (Uhlir, 2003; Bubnicki, 2004).

DSS Application Programs. DSS application programs are generally not permanent; therefore, each application must be developed in accordance with its specific database. As illustrated in Figure 3, the data sources for a DSS application are as follows:

1. Data stored in the DSS database: These data are available and can be utilized for any DSS application.
2. Newly entered data: For example, data entered through a keyboard into the DSS database.
3. Organizational computer files and comprehensive databases: The DSS data management system can extract data from existing files and organizational databases.

Modeling. DSS provide users with the capability to apply mathematical modeling techniques in order to represent the operational dimensions of a system in a computerized environment and language. Modeling tools are thus employed to generate the systems required for decision-making.+

Statistical Analysis. Through this capability, DSS can analyze data according to managerial requirements using descriptive and inferential statistical methods. The statistical tools of DSS are highly diverse, enabling users—provided they are familiar with statistical methods and instruments—to apply techniques such as regression analysis, risk analysis, trend analysis, and others.

Planning. Senior and tactical managers often require planning functionalities within DSS environments to facilitate decision-making. Tools employed for planning in DSS software environments include forecasting models, goal evaluation techniques, and what-if analysis. For example, with project management software, managers can forecast working conditions for complex projects or develop plans and schedules for their intended projects. Such planning also takes into account multiple objectives and their prioritization. Moreover, sensitivity analysis—evaluating the effects of new conditions or modified data inputs—is supported.

Query. With DSS software, managers can conduct online queries of DSS databases using natural language-like questions. Querying essentially represents the capability of tabulating data from databases based on user requirements and expressed expectations.

Charts. By utilizing DSS charting software, users can generate various graphical representations of existing data, such as pie charts, line charts, bar charts, distribution charts, and others. Charts serve as effective tools for presenting key data in a visually appealing manner to capture the audience's attention. In contrast, tabular data presentations may not always achieve this effect. Therefore, in many situations, charts tailored to user preferences are more effective (Steven, 2003; Beroggi, 2002).

Data Integration and Consolidation. In dynamic environments, the ability to compare external environmental data with internal organiza-

tional data becomes essential. DSS software, with its inherent capabilities, can acquire the necessary data from diverse sources and present them in consolidated or comparative tables. In certain cases, multivariate tables are required, which can only be developed through the integration and consolidation of multiple data sources.

Special Capabilities. Since supporting diverse decision-making environments is regarded as one of the primary objectives of DSS software, any type of analysis desired by managers can be performed by installing the appropriate software and utilizing the DSS database. Examples include financial analysis, and SWOT analysis (strengths, weaknesses, opportunities, and threats).

Structure of an Applied DSS. To better understand the structure of an applied DSS, refer to Figure 3-7. Input data for DSS include:

- Transaction Processing System (TPS) data,
- Management Reporting System (MRS) data within the organization,
- Data obtained from external sources, and
- Data generated by DSS models and DSS programs.

The DSS can store its model-generated data so that these can be modified and reused as needed. Alongside these, DSS also stores data from specific studies. As the user interacts with DSS in an online manner, submitting requests, the system generates or adapts the relevant models, populates them with data, and produces the requested outputs. User requests may be presented in the form of text, structured reports, or graphical charts.

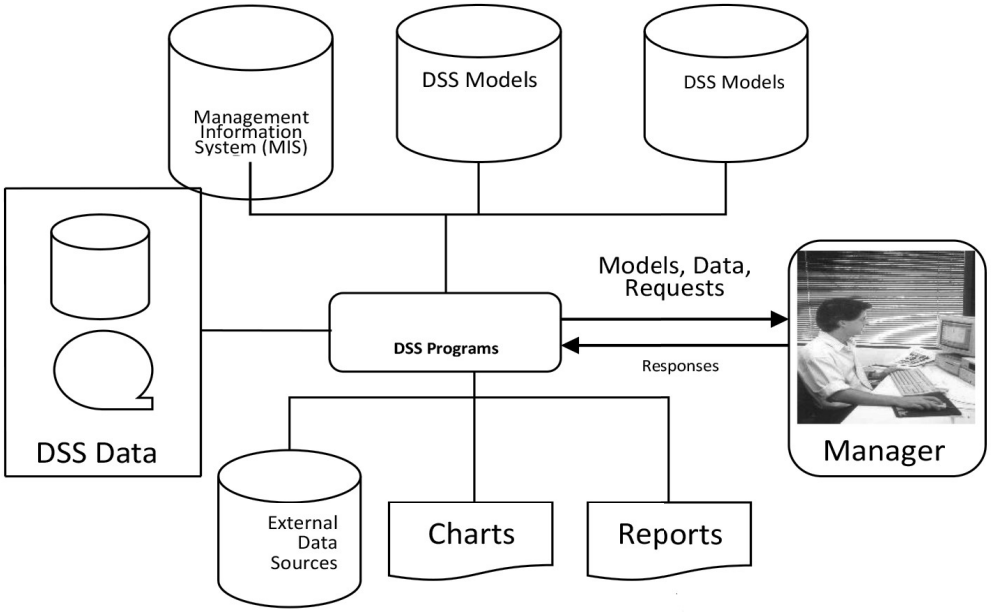


Figure 3. Structure of an Applied DSS

Group Decision Support System (GDSS)

This computer-based system supports working groups engaged in specific tasks or pursuing common objectives by providing them with collaborative tools from the perspective of information sharing and analytical interaction. In a Group Decision Support System (GDSS), it is assumed that advanced communication mechanisms enable the adoption of valid and reliable decisions. Through problem definition, discussion, and time savings, the possibility of examining multiple solutions is facilitated. The evaluation of alternative courses of action increases the likelihood of reaching an optimal solution.

Based on this system, different expert groups can either meet simultaneously for electronic negotiations or communicate asynchronously (offline) at different times. Electronic mail (e-mail) serves as one of the primary tools for asynchronous group negotiations. Therefore, the purpose of GDSS is to provide communication channels through which members of working groups can exchange views on specific issues while reviewing the relevant analytical data presented on their computer screens (Tuite & Chisholen, 2007)

Artificial Intelligence System

Experts and managers rely on their natural intelligence to handle and analyze decision-making problems by leveraging the diversity of their knowledge and reasoning capabilities. If natural intelligence can be supported with knowledge and rationality, it becomes possible to develop an Artificial Intelligence (AI) system. When artificial intelligence is integrated into a database, the decision support system benefits directly from AI capabilities.

These systems typically consist of three components (see Figure 4):

1. Knowledge-based expert systems
2. Natural language systems (local or native languages)
3. Perceptual systems (vision, speech, and touch)

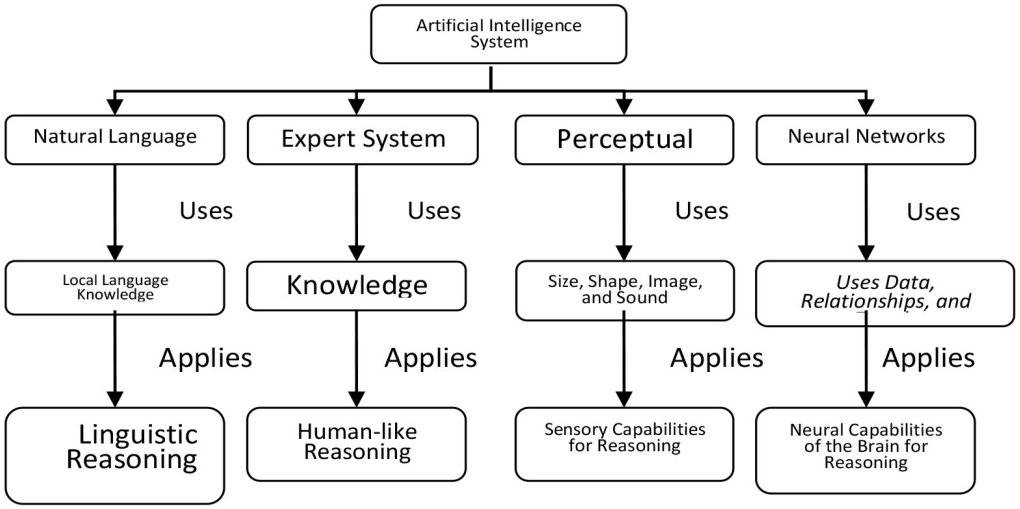


Figure 4. Hierarchical Diagram of Artificial Intelligence

Artificial Intelligence System is a software-based technique designed to utilize non-numerical data that are represented in the form of symbols, expressions, and patterns. This system employs methods such as symbolic processing, scientific and social reasoning, and conceptual modeling to solve problems. AI systems are applicable in areas such as design, recognition, interpretation, analysis, planning, scheduling, testing, training, computer structuring, forecasting, and many similar domains.

AI serves as an assistant to humans, relieving experts of the responsibility for handling routine and ordinary problems, thereby enabling them to devote their time to solving more complex issues. Artificial intelligence can enhance the accuracy and quality of computations, analyses, and responses, while also preventing common human errors. Moreover, it can deliver rapid and effective solutions to emerging and complex problems.

Knowledge-based expert systems

Knowledge-based expert systems represent a specific type of AI system that has found widespread Knowledge-Based Expert Systems (KBES).

Multivariate decision-making in the real world, as well as addressing complex and unique problems, increases the cognitive ambiguities and complexities that decision-makers must confront, particularly under resource constraints and multiple competing objectives. In such circumstances, the use of flexible and open systems becomes essential.

Knowledge—comprising information, science, experience, analytical ability, perception, values and beliefs, insight, and intelligence for generating innovative solutions—is manifested within organizations in both explicit and tacit forms. Explicit knowledge encompasses a wide range of analytical reports, man-made artifacts, and visible work methods. By contrast, tacit knowledge resides within individuals and can only be shared through specific channels (Gottschalk, 2005).

Most problem-solving contexts in market-driven systems are unstructured and unprogrammed, and the perceptual dimension in solving such problems is significant. Two main approaches are employed to solve these problems:

1. Generalized Problem-Solving Approach

This method examines all possible options within operational constraints. By adopting a trial-and-error process and evaluating alternatives against objectives, a suitable option is eventually selected. However, the chosen solution may not necessarily be the best or the most optimal.

2. Knowledge-Based Problem-Solving Approach

Within the constraints of a specific domain, this approach limits the set of alternatives to those informed by relevant knowledge. By applying knowledge-based reasoning, the most appropriate alternative is selected. In this approach, options with initial logical validity are considered, and through systematic reasoning, a reliable solution to the problem is achieved.

The foundation of the generalized approach lies in procedures and processes, whereas the foundation of the knowledge-based approach is rooted in reasoning mechanisms and the tacit knowledge of individuals.

In a Knowledge-Based Expert System (KBES), knowledge itself is regarded as the foundation. Given the diversity of knowledge sources, key questions arise regarding line and staff processes: What are the sources of knowledge production? Where are they located? Which knowledge should be applied, and in what context? Consequently, identifying knowledge repositories in work processes, extracting, refining, storing, enriching, utilizing, and sharing knowledge represent critical realities of KBES design and implementation.

Essentially, the knowledge possessed by experts—derived from their experience and expertise—is often vast, unstructured, and individually owned. This knowledge is valuable and must be captured, separated from individuals, and transferred into organizational systems for broader access. Innovative solutions typically emerge from such knowledge. Therefore, a KBES must extract, classify, and store expert knowledge to enhance accessibility and minimize knowledge bottlenecks (Wiig, 2004; Steven, 2002).

To construct a KBES, two prerequisites must be met:

1. Availability of experienced individuals with strong problem-solving and knowledge-based reasoning abilities.
2. Willingness of experts to share their tacit knowledge with the organization for problem-solving purposes.

The knowledge embedded in the system comprises theories, models, rules, experiences, analytical information, solutions, roadmaps, prob-

lem-solving methodologies, and similar elements.

A KBES consists of three core components:

- Inference Mechanism
- User Control Mechanism
- Knowledge Base

As shown in Figure 5, KBES encompasses software systems that store information, science, and knowledge, and simulate human reasoning and inference.

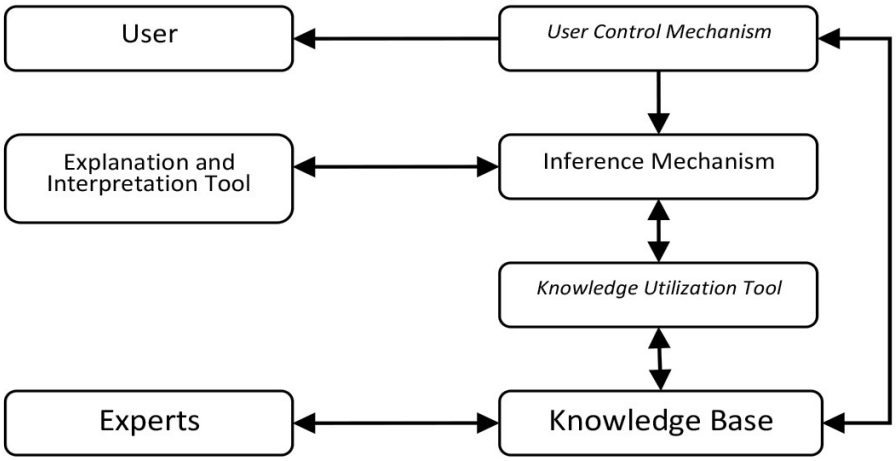


Figure 5. Model of a Knowledge-Based Expert System

Knowledge Base. The knowledge base, which functions as a structured memory with retrieval capabilities, stores various types of data, information, scientific methods and rules, experiences, specific cases, and innovative algorithms derived from expertise. For each user, a customized knowledge base must be developed. It can contain general knowledge and gradually developed theories, as well as specialized knowledge obtained from new experiences and heuristic rules.

Inference Engine (Inference Mechanism). The primary goal of this system is to examine the information, rules, and relationships within the knowledge base in order to generate responses, predictions, and recommendations. The inference engine is essentially a tool for interpreting knowledge and applying logical reasoning in specific situations,

thereby providing expert advice and guidance.

Explanation and Interpretation Tool. This tool enables the user to understand how the expert system reached a particular conclusion. Through the explanation component, the system can reference all facts and rules applied in the reasoning process, thereby enhancing transparency and trust in the system's outputs.

Knowledge Utilization Tool. One of the most challenging tasks in developing an expert system is the creation and updating of the knowledge base. Specialized software has improved the feasibility of constructing knowledge bases, thereby reducing some of the difficulty involved. The knowledge utilization tool facilitates the creation and modification of knowledge bases, with its primary purpose being to provide efficient and user-friendly means for preparing and maintaining all components of the knowledge base. This tool is typically menu-driven, allowing users to easily interact with it (Devenport, 2005).

User Control Mechanism. The user control mechanism is integrated within the inference engine. It is used to guide the selection, interpretation, reasoning, and direction of inferences derived from the knowledge base. For designing, implementing, modifying, and using expert systems, a specialized user interface is employed. The primary objective of this interface is to facilitate the development and use of the expert system by end-users. In expert systems, text-based interfaces (menus, forms, and notes) are often more common than graphical interfaces, which are more prevalent in DSS applications.

Perceptual Systems. These systems leverage sensory capabilities—such as size, shape, image, and sound—for reasoning. Another dimension of AI involves visual systems, which consist of hardware and software that enable computers to collect, store, and manage images. Such systems can be integrated into various robots, providing them with visual capabilities. Robots equipped with visual systems can even recognize colors to a certain extent.

Natural Language Processing (NLP). Through natural language processing, computers can comprehend phrases and commands expressed in any language and respond accordingly. NLP allows users to

retrieve information without typing commands; for example, by speaking into a microphone connected to the computer, the spoken signals are converted into text files or program instructions.

Learning Systems. Another dimension of AI is learning systems, which consist of software, hardware, and computers. These systems perform assigned tasks, modify them, or adjust their behavior in response to varying conditions based on feedback (both predictive and retrospective). In doing so, they exhibit adaptive, task-specific behavior.

Neural Networks

One important aspect of AI is the neural network, which is a computer system designed to function in a manner analogous to the human brain, aiming to simulate its tasks. Similar to the human brain, neural networks utilize extensive parallel and sequential processing. With neural network software, computers can simulate subject-specific neural networks for particular applications.

Neural networks are capable of processing massive amounts of data simultaneously, learning to recognize patterns, and self-adjusting to resolve problems in their specific domain.

Key characteristics of neural networks include:

- Ability to retrieve information even if some neural nodes fail.
- Rapid updating of stored data based on new information.
- Capability to identify relationships and trends within large databases.
- Ability to solve complex problems in contexts where sufficient information is unavailable.
- Capability to solve complex problems requiring sophisticated statistical, operations research, and decision-making computations (Steven, 2002; Beroggi, 2002).

Conclusion

In today's context, understanding decisions, processes, types, mechanisms, methods, and models of decision-making is a necessary con-

dition for guiding organizations. However, given the expanding scope and increasing complexity of decision-making environments, the utilization of Decision Support Systems (DSS) constitutes the sufficient condition for effective organizational leadership.

Although managers must be familiar with the core capabilities of knowledge and expertise, possessing qualities such as intelligence, insight, analytical ability, and reasoning remains an indispensable personal attribute for the successful leadership of organizations. Consequently, the design, implementation, and utilization of decision support systems serve as a vital aid to managers within organizational environments.

Indeed, it can be asserted that every organization and every manager should develop specialized decision maps for both the organization and themselves. By leveraging appropriate architecture, information and communication technologies, and domain-specific expertise, they can employ DSS to accelerate progress toward effectiveness and enhance the efficiency of organizational functions.

If decision support systems are not institutionalized within organizations in the contemporary era, the productivity of decision-making knowledge will inevitably diminish. At a minimum, DSS provide organizations with a memory-based, perceptive, intelligent, and environmentally aware system, capable of recognizing both internal and external events and trends.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. Define Management Information Systems (MIS) and specify in what sense they acquire a strategic dimension.
2. Define Decision Support Systems (DSS) and identify the stage(s) of the decision process in which a DSS is employed.

3. By drawing a schematic, indicate the position of a DSS within the hierarchy of information systems, and elaborate further on distinctive DSS features.
4. Describe the capabilities of a DSS and the features that follow from those capabilities.
5. Enumerate the types of DSS; for each type, state its main information sources and methodological approach.
6. Explain the three classes of models used in DSS.
7. List common DSS software tools.
8. Depict and explain the architecture of a sample, application-oriented DSS.
9. What is a Group Decision Support System (GDSS) and how does it operate?
10. Present Artificial Intelligence (AI) and draw its hierarchical taxonomy.
11. Explain knowledge-based expert systems (KBES) and describe two problem-solving approaches within such systems.
12. Specify the prerequisites for building a KBES and draw the KBES system model.
13. Name and then explain the components of a KBES model.
14. What are neural networks? List the distinctive features of these networks.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. Management Information Systems (MIS) convert data from internal and external sources into information and provide that information on a scheduled basis.

2. Decision Support Systems (DSS) operationalize decision-making models and support decision-making by delivering information and analyses to decision-makers at middle and upper organizational levels.
3. A DSS is situated at the divisional/functional level of the organization and consists of interactive computer-based systems designed for top-level managers.
4. DSS are designed to address less-structured, semi-structured, and unique problems.
5. If a DSS is co-designed and implemented jointly by end-users and systems analysts, its ability to test decision alternatives and conduct sensitivity analysis within changing conditions is diminished.
6. In data analysis systems, simple data-processing tools are used to build systems because decisions rest on the analysis of data and processes.
7. In a model-driven DSS, principal information sources are a database and externally sourced data.
8. A DSS must be able to ensure compatibility and integration between its databases and its software tools.
9. DSS applications are generally non-permanent; therefore, a separate database must be created for each application.
10. Tools commonly used for planning within a DSS environment include forecasting models, goal evaluation, and what-if analysis.
11. Given appropriate capabilities, any analysis desired by managers can be performed by installing the relevant software and using the DSS database.
12. In Group Decision Support Systems (GDSS), expert groups can meet synchronously for electronic meetings or asynchronously for non-simultaneous electronic discussions.
13. If natural (human) intelligence can be supported with knowledge and reasoning facilities, the result is a data-processing information system.

14. Artificial Intelligence (AI) is a software technique for exploiting numeric data displayed in various forms.
15. AI serves as a human assistant and can assume responsibility for routine, day-to-day problem-solving, freeing specialists to focus on complex problems.
16. Although knowledge comprises information, science, experience, analytical and perceptual ability, values and beliefs, keenness, and insight for novel problem-solving, it can nonetheless be identified in organizations in two forms: tacit and explicit.
17. Because most problem-solving conditions are embedded in market systems, two approaches—generalized and knowledge-based—are employed to solve such problems.
18. In the knowledge-based approach, options that possess preliminary inferential plausibility are considered, and problems are solved through logical reasoning with confidence in reaching the best local solution.
19. A prerequisite for building a KBES is that experienced individuals externalize their tacit knowledge to the organization and agree to share it.
20. Each user should have a dedicated knowledge base that may contain general information and theories introduced over time, as well as domain-specific knowledge derived from new experience and heuristics.
21. A control/strategy mechanism is used to select, interpret, infer, and guide the reasoning process drawing on the knowledge base.
22. Among the easiest and most appealing tasks in building an expert system is the creation and continuous updating of the knowledge base.
23. Another branch of AI is learning systems. Such systems consist of software, hardware, and computing resources, and they perform their functions on that basis.
24. Neural networks exploit massively parallel and sequential process-

ing and possess the ability to solve complex problems for which sufficient explicit information is not available.

25. Every organization and manager should develop maps of diverse, specialized decisions and, using appropriate architecture, information and communication technologies (ICT), and domain expertise, deploy decision support systems to accelerate achievement of effectiveness and to enhance the efficiency of organizational functions.

Chapter 8
Creative Problem Solving

Objectives

- To become acquainted with the fundamental concepts of creativity and creative problem solving.
- To examine the levels of innovation, the evolutionary patterns of systems, and the methods of attaining creativity.
- To familiarize with the principal tools of the Theory of Inventive Problem Solving and to analyze the barriers to creativity.

Introduction

Creativity is the innate capability through which an individual can generate and synthesize ideas, theories, and scientific hypotheses in a unique manner, thereby establishing novel interconnections among them. Thus, creativity entails the utilization of mental capacities to formulate new thoughts and ideas and to generate fresh information. Creativity represents the starting point of every innovation and bears an inherently individual dimension.

Creativity constitutes one of the human faculties that manifests in all individuals, albeit proportionate to their cognitive abilities and emotional intelligence. The advancement and transformation of human societies have invariably been indebted to the purposeful exploitation of this capacity. By understanding creativity and the processes of attaining it, a model for being creative can be designed, thereby expanding the scope of human thought and enhancing creative problem solving.

The Theory of Inventive Problem Solving was initially proposed by G. Altshuller (1940) from Russia. By examining numerous inventions, he discovered that diverse technical systems exhibit similar stages of achieving creativity and evolution. He thus argued that creativity, although partially genetic, is not solely innate but rather a process shaped by scientific principles and experiential learning.

The Russian acronym TRIZ (Teoriya Resheniya Izobretatelskikh Zadatch) is the original formulation of the Theory of Inventive Problem Solving, which in English is also referred to as TIPS (Theory of Inventive Problem Solving). This theory can be recognized as systematic innovation. It provides a methodological framework to reinforce creativity and innovation, offering solutions for substantial improvements in design (Terninko et al., 2002, p. 26).

The Theory of inventive problem-solving rests upon the general principle that the evolution of all technical systems follows natural, cognitive, and objective laws. According to these principles, whenever the development of one component of a technical system reaches its maximum functional potential, it inevitably encounters conflict with other components. This evolutionary process ultimately necessitates the improvement of the less-developed component. Through a continuous and progressive cycle, the system approaches its ideal state. Understanding this evolutionary trajectory enables one to predict the future development of technical systems.

The purpose of the Theory of Inventive Problem Solving is to uncover how creativity is achieved. Hence, by striving to comprehend the process of creativity, this theory introduces novel methods for tackling complex problems. It assists users in systematizing highly intricate cognitive processes by providing logical reasoning and knowledge bases, thereby enhancing systems engineering. Although employing this theory as a creativity tool imposes various challenges on individuals and organizations, its extensive application ultimately results in solving process-related problems in production (Bazerman, 2005).

In this chapter, the fundamentals of creative problem solving—including technical systems, levels of innovation, the law of ideality, con-

tradictions, and the evolution of technical systems—will be discussed. Subsequently, the main tools of the theory and its problem-solving framework will be elaborated. Finally, by examining the approaches to achieving creativity and recognizing its barriers, the application of the Theory of Inventive Problem Solving will be explored.

Foundations of Creative Problem Solving

The foundations of this theory consist of five principal elements, described as follows:

1. Technical Systems

Any device that performs a task is considered a technical system. Examples include automobiles, pencils, books, refrigerators, calculators, and the like. A technical system is composed of at least two subsystems. For instance, a passenger car consists of subsystems such as the body, engine, steering, braking, and electrical systems. Each of these, in turn, contains its own subsystems, which themselves qualify as technical systems. Each subsystem carries out a specific function.

The hierarchy of technical systems ranges from simple two-element systems with minimal complexity to highly complex systems comprising numerous components. Table 1 presents the hierarchy of the transportation system. As shown, the transportation system encompasses subsystems such as vehicles, roads, road maps, drivers, service facilities, and similar elements. The automobile, as a technical system, is composed of subsystems such as the powertrain, braking system, heating system, steering mechanism, and electrical system. The braking system, in this sense, is a subsystem of the technical system of the automobile, but in relation to the pedal system, it may be regarded as a supra-system.

Whenever a technical system performs its function inadequately or defectively, it must be repaired or improved. Within the Theory of Inventive Problem Solving, the simplest technical system is regarded as being composed of two elements, where one element transmits energy to another. In principle, to rectify the deficiencies of a technical system, one must hypothetically consider the simplest system, in which subsystems exchange energy.

For example, chalk and a blackboard do not constitute a technical system unless mechanical energy is applied to the chalk, enabling interaction with the blackboard. In this case, the chalk, the blackboard, and the applied force collectively form a functional technical system. Separately, chalk and blackboard each represent distinct technical systems. Chalk possesses a molecular structure; the interaction among the molecules of different chemical elements within its structure creates the substance of chalk. To improve the adhesive quality of chalk molecules, the molecular structure as a technical system must be analyzed (Meshbaki & Ghorbanizadeh, 2004, p. 78).

Table 1. Technical systems of transportation and their subsystems

Technical Systems	Related Subsystems
Transportation	Automobiles; Roads; Road maps; Drivers; Service facilities
Automobiles	Powertrain; Braking system; Heater; Steering system; Electrical system
Braking system	Brake pedal; Hydraulic cylinder; Brake fluid; Brake pedal assembly
Brake pedal assembly	Pedal; Pedal base plate
Pedal	Component A; Component B; Chemical force
Chemical force	Molecules A; Molecules B

Source: Shulyak, 2003, p. 2

All subsystems interact with each other within the higher system. Any change in the subsystems creates a change in the higher system (supersystem).

To solve a problem, attention must be paid to the interaction of the existing system with the higher and lower systems. Technical systems are considered to be similar to vital systems. They should not be considered eternal and eternal, but rather they come into being, mature and disappear, giving way to new systems (Shuliak, 2003, p. 2).

2. Levels of innovation. Creative ideas should not be considered equal in terms of creative value. They can be classified into five categories according to Table 2-8 (Savransky and Kreich, 1996, pp. 42-43; Shuliak, 2003, p. 3).

Progression from one level of innovation to the next requires greater knowledge and imposes stronger psychological barriers on the creative individual. Profitability, benefits, and costs also increase proportionally.

Source: Sauransky & Kritch, 1996, pp. 42–43; Shulyak, 2003, p. 3

To achieve creativity, it is necessary for the individual and the organization to have the following conditions: 1) broad thinking; 2) experience; 3) necessary tools; 4) techniques for doing things; 5) freedom of action in carrying out affairs; 6) sufficient knowledge; 7) fertile intelligence; 8) a spirit of participation in carrying out affairs; 9) sharing efforts; 10) doing diverse things; 11) benefiting from favorable conditions; 12) the ability to do things; 13) moving things forward; and 14) having a young and innovative mind (Hitchins, 2003).

Table 2. Levels of innovation

Level of Innovation	Characteristics
1	Application of established methods to repetitive tasks and routine problem solving
2	Minor modifications to the existing system using known methods to resolve problems
3	Fundamental improvements by employing diverse methods, leading to major modifications in existing approaches
4	Attaining novel creativity through the application of new scientific (not merely technical) principles to previously existing system functions
5	Rare scientific discoveries or pioneering creativity leading to the creation of entirely new systems

Alt-Schuler (1960) was able to obtain the frequency distribution of innovation levels according to Table 3-8 by examining patent registration documents.

Table 3. Distribution of creative problem-solving solutions based on levels of innovation

Level of Innovation	Type of Innovation	Frequency (%)
1	Evident solutions	32%
2	Minor improvements	45%
3	Creativity within existing paradigms	18%
4	Creativity beyond existing paradigms	4%
5	Scientific discovery	Less than 1%

Source: Zlotin et al., 1999, p. 6

According to Altshuller's research, levels 1 to 3 account for over 90% of creative outcomes and are relatively transferable. Thus, a particular problem is more than 90% likely to have been addressed in another context or time. By contrast, creativity at levels 4 and 5 occurs rarely, yet it expands the frontiers of knowledge.

3. The Law of Ideality. The Theory of Inventive Problem Solving (TRIZ) is based on the Law of Increasing Ideality and Desirability. According to this law, systems evolve toward greater levels of ideality. Ideality is measured as the ratio of the total beneficial effects of a system to its total harmful effects.

The primary objective of every technical system is to perform its designated function. From the conventional engineering perspective, fulfilling such a function necessitates the provision of appropriate mechanisms or tools. However, within the inventive problem-solving paradigm, while performing the function remains essential, it does not necessarily require the addition of new mechanisms or tools to the system.

According to the law of ideality, every technical system throughout its lifecycle tends toward:

1. Reliability,
2. Simplicity,
3. Effectiveness, and
4. Greater ideality.

The improvement of a technical system thus aims to bring it closer to the ideal state, where costs, required space, energy consumption, and other inefficiencies are minimized.

In their evolutionary trajectory, systems attempt to reduce costs and enhance human satisfaction, thereby approaching their primary evolutionary position. In TRIZ, this position is referred to as the Ideal System. Ideal systems become attainable when real systems simultaneously enhance their beneficial functions and eliminate harmful ones. For example, modern multimedia computers rapidly approach ideality, as they integrate the functions of television, telephone, and facsimile machines, while significantly reducing cost, size, and weight compared to early computers (Sawaransky & Krich, 1996, pp. 24–25).

Ideality also implies maximizing the utilization of the system's available resources, both internal and external. The more efficiently a system harnesses these resources, the closer it comes to achieving ideality. The further a system is from its ideal state, the greater the functional enhancement required to reach the desired level. Once a system achieves an ideal state, new and higher-order levels of ideality emerge. Thus, ideal states are not static but dynamic, presenting evolving targets that systems must reach through specific mechanisms.

Moreover, utilizing available resources without increasing costs also moves the system closer to its ideal state.

The effectiveness of creativity lies in its ability to overcome barriers that obstruct qualitative improvement in a technical system on the path toward ideality. Several approaches may be employed to render a system more desirable:

- **Expanding the system's current functions**, such as a park incorporating a library, conference hall, information technology facilities, and communication services.
- **Transferring more functions to the element that performs the system's final operation**, for instance, integrating subsystems into computer networks through information and communication technologies.
- **Delegating certain functions to the supra-system or external environment**, such as replacing manually operated greenhouse windows with automated mechanisms that use thermally sensitive metals to regulate temperature.
- **Leveraging internal and external resources** to provide improved and faster services to users.

4. Contradictions. A solution becomes more effective when the creative individual resolves a technical problem involving a contradiction. Contradictions occur when improving one feature or parameter of a system negatively affects another. The challenge is to develop a solution that eliminates this trade-off.

Technical systems typically involve multiple parameters—such as weight, size, color, speed, and strength—that describe their physical state. Identifying contradictions during problem solving clarifies the core issues. For example, enhancing engine power (a positive effect) usually requires increasing engine size (a negative effect). Thus, a creative approach must enable higher power while mitigating negative consequences. If technical contradictions remain unresolved, achieving systemic improvement becomes impossible (Hitchens, 2003; Moghimi, 2004).

Another form is the physical contradiction, which arises when a system or component requires two mutually exclusive properties. For example, airplane wheels are essential for takeoff and landing, but harmful during flight due to drag and reduced speed. This contradiction is resolved through temporal separation, by introducing retractable landing gear.

Physical contradictions can be addressed using four principles (Terninko, Zusman & Zlotin, 2002, p. 118):

1. Spatial separation,
2. Temporal separation,
3. Separation between the whole and its parts,
4. Conditional separation.

5. Evolution of Technical Systems

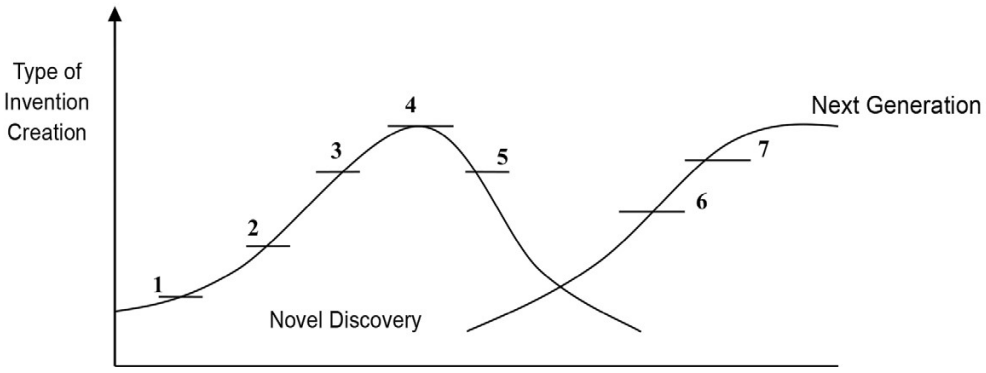
The evolution of technical systems can be explained through eight patterns, as summarized in Table 8-4 (Shulyak, 2003, p. 4). The first of these is the life-cycle model, depicted in Figure 8-1, consisting of eight distinct stages:

- **Stage 0.** Discovery is made (levels 4 and 5 of innovation), though its potential applications are not yet apparent. Example: scientific understanding of thermodynamics.
- **Stage 1.** Certain elements of the system emerge before the full system itself. Example: invention of the internal combustion engine before the automobile as a system.
- **Stage 2.** A new system, such as the primitive automobile, is created but develops slowly.
- **Stage 3.** As society recognizes the system's value, rapid growth occurs—for automobiles, this stage corresponds to mass production, which reduces costs.
- **Stage 4.** The system reaches maturity, and market expansion slows as saturation occurs.
- **Stage 5.** The resources required for improving the initial concept become exhausted; the generation of new creative ideas declines toward zero. Example: until the 1950s, automobile wheels lacked electronic controls, but once stages four and five were surpassed, electronic wheel-control systems emerged, dramatically enhancing performance.
- **Stage 6.** A new generation of systems replaces the initial system.

Example: in the 1980s, advanced mechanical powertrains were integrated with electronic control systems, revolutionizing driving and transportation management.

- **Stage 7.** Limitations of the new system become apparent. Example: electric and alternative-fuel vehicles emerging as potential competitors to conventional automobiles.

Figure 1. Life-Cycle Curve of an Invention



Source: Sauransky & Krich, 1996, p. 24.

Table 4. Patterns of Technical System Evolution

Pattern	Description
1. Life Cycle	The system evolves through distinct developmental stages, typically represented by an S-shaped curve.
2. Increasing Degree of Ideality	Over time, the system tends toward higher levels of efficiency, simplicity, and desirability.
3. Uneven Development of Subsystems	Different subsystems evolve at varying rates, creating imbalances and opportunities for innovation.
4. Transition to a Supra-System	The system integrates into a broader supra-system, acquiring new functions and relationships.
5. Transition to the Micro-Level (Miniaturization)	The system evolves toward miniaturization and operates at smaller scales, including micro- and nano-levels.

Pattern	Description
6. Transition from Mechanical to Electro-Mechanical Systems	Mechanical systems evolve by incorporating electrical, electronic, and digital components.
7. Increasing Use of Fields (Substitution of Mechanical Systems)	Fields (e.g., electromagnetic, thermal, acoustic) increasingly substitute traditional mechanical processes.
8. Transition to Higher-Level Control Systems	Systems evolve toward integration with intelligent control, automation, and self-regulating mechanisms.

Source: Shulyak, 2003, p. 4

Characteristics of Creative Individuals and Organizations

Individuals. Creative individuals are generally characterized by six distinctive attributes (Hitchens, 2003; Moghimi, 2009; Khomenko & Sokol, 2001; Drucker, 2007):

1. **Psychological and Cognitive Health.** The ability to generate a large number of ideas rapidly, combined with strong capacity for accurate comprehension and a high level of rationality.
2. **Flexibility in Perception.** The capability to abandon existing rules and mental frameworks and adopt new perspectives, cognitive patterns, and conceptual structures.
3. **Invention.** The capacity to create and propose novel suggestions and innovative solutions.
4. **Preference for Complexity over Simplicity.** A tendency to engage with new and challenging problems, displaying strong interest in confronting complex and ambiguous conditions.
5. **Independence of Judgment.** The ability to offer unique insights and novel perspectives, distinguishing oneself from peers and colleagues.
6. **Higher Social Status.** Creative individuals are often highly regard-

ed in society and enjoy greater acceptance compared to others.

Organizations. Creative organizations demonstrate the following features:

1. **High Level of Competition and Intensity of Activities.** Organizational operations are characterized by strong competitiveness and concentrated efforts.
2. **Elevated Cultural Values.** Within such organizations, wasting time is perceived as unacceptable; cultural norms reinforce discipline and efficiency.
3. **Managerial Accessibility.** Managers recognize that knowledge is widely dispersed across the organization. They maintain open communication channels, engaging directly with individuals and experts, and actively seek their opinions.
4. **Respect for Individuals.** People are viewed as the organization's most valuable assets. Since these assets are developed through years of service, organizations invest heavily in their growth and well-being, showing special respect to ensure that employees contribute effectively.
5. **Provision of Public-Oriented Services.** Creative organizations welcome the opportunity to serve employees and customers alike, remaining receptive to their ideas and feedback.
6. **Multi-Skilled Workforce.** Employees are not restricted to a single area of expertise. Instead, the organization facilitates exposure to diverse tasks, offers multiple training programs, and cultivates learning capabilities. Organizational learning is therefore grounded in individuals who are continuous learners.
7. **Teamwork.** Creative organizations promote and reinforce a spirit of teamwork. Cross-functional teams collaborate to generate new ideas and solutions.
8. **Long-Term Employee Relationships.** Since employees are considered intellectual assets possessing tacit and individual knowledge, creative organizations avoid losing them easily and foster long-term

loyalty.

9. **Managerial Receptiveness to Change.** Managers encourage innovative ideas and seek to implement new transformations within the organization. Organizational dynamism is thus realized through the institutionalization of novel perspectives (Rantanen, 2002; Tuite et al., 2007).

The Process of Achieving Creativity

This process consists of five stages, as described below and summarized in Table 5:

1. **Preparation.** The first stage involves attraction to, or fascination with, a subject, along with readiness to engage with it. This stage often requires acquiring new information. The individual needs considerable free time, autonomy, and the freedom to explore areas beyond the immediate scope of their work.
2. **Incubation (Reflection on the Problem).** Reflection on the problem in pursuit of inspiration. This stage may occur very rapidly, and its definition and observation are highly difficult—meaning that it is not recognized prior to its occurrence. At times, the raw material from the first stage may combine with an idea or solution. The individual requires minimal external control and freedom from excessive constraints.
3. **Persistence and Perseverance.** At this stage, the idea is tested to determine its usefulness and productivity. Senior management supports creative individuals by providing resources, equipment, and facilities, helping them achieve results more easily and rapidly.
4. **Insight and Illumination.** Here, the idea is refined and modified for practical application and utilization. Stages three and four often require significant time investment. As Edison noted, "Genius is one percent inspiration and ninety-nine percent perspiration," underscoring the role of hard work and vision.
5. **Verification.** Without this stage, most creative efforts become neutralized. Verification entails internal validation and implementation

within the organization—meaning that the idea must first be accepted and endorsed by key organizational stakeholders. Only then should it be presented and offered to external customers (Moghimi, 2009; Savransky et al., 1996).

Table 5. The Process of Achieving Creativity

Stage	Description
1. Preparation	Initial attraction to a subject; requires new information, free time, autonomy, and exploration beyond one's direct work domain.
2. Incubation	Reflection on the problem in pursuit of inspiration; may occur suddenly and unpredictably. Minimal external control is necessary.
3. Persistence	Testing the idea to assess its usefulness; supported by senior management through resources and facilities.
4. Insight	Refinement and modification of the idea for practical use; requires time and effort, emphasizing hard work and vision.
5. Verification	Internal validation within the organization, followed by external implementation and offering to customers.

Formation of New Ideas

The human brain is composed of two hemispheres:

- **Right Hemisphere (Architect and Visionary).**

This hemisphere is associated with visualization, future creation, transformation, change-seeking, design, imagination, dream orientation, intuition, and innovation. It plays a central role in generating new ideas.

- **Left Hemisphere (Engineer and Pragmatist).**

This hemisphere guides individuals through prediction, preparedness, adaptability, calculation, logical reasoning, inference, goal orientation, and focus on results.

The ultimate outcome of a creative brain's activity is **idea generation**

rather than judgment. While judgment is constrained by existing facts, imagination transcends the known and ventures into the unknown—creating possibilities beyond conventional logic (e.g., making two plus two greater than four).

The prerequisite for generating new ideas lies in their creation through imagination. The more imagination and vision are cultivated, the more achievable their realization becomes.

The human brain also comprises upper and lower hemispheres. The upper hemisphere corresponds to short-term memory and conscious thought, while the lower hemisphere represents long-term memory and the subconscious. Information initially enters through the upper hemisphere and, through repetition, is transferred to the lower hemisphere, becoming ingrained in long-term memory. Dreams, flashes of new ideas, and subconscious inspirations are products of the lower hemisphere. Thus, while conscious thought initiates an idea, deeper reflection and insight occur in the subconscious.

Forms of imagination can be classified as:

1. **Creative imagination** – controllable and often enjoyable, including visualizations, anticipatory imagination, reconstructive imagination, and structural imagination.
2. **Non-creative imagination** – less controllable and often unproductive, including fantasies, dreams, anxieties, and depressive thoughts.

Conditions for the Growth of Creative Individuals

Creative individuals flourish under specific conditions, as outlined below:

1. **Risk Tolerance.** Employees should be encouraged to take risks, view mistakes as learning opportunities, and accept failure without fear of consequences.
2. **Reduced External Control.** Rules, regulations, and rigid controls must be minimized, with self-regulation taking precedence.

3. **Reduced Job Specialization.** Overly narrow job descriptions constrain creativity, whereas multiple job functions broaden perspectives.
4. **Acceptance of Ambiguity.** Excessive emphasis on clarity and objectivity restricts creativity; ambiguity should be tolerated.
5. **Tolerance of Conflict.** Diversity of viewpoints should be encouraged, as consensus is not always synonymous with successful performance.
6. **Tolerance of Unrealistic Approaches.** Even impractical or seemingly irrational ideas must be tolerated, as they may ultimately lead to creative solutions.
7. **Focus on Results Rather than Tools.** Goals should be clearly defined, while employees are encouraged to consider multiple methods of achieving them.
8. **Comprehensive Communication.** Communication should flow horizontally and vertically. Open communication facilitates the proliferation of ideas.

Methods of Achieving Creativity

Although creativity methods are diverse, the following represent prominent approaches (Hitchens, 2003):

1. **Causal Loop Modeling and Influence Diagrams.**

- Causal-loop models depict potential cause–effect relationships through directional arrows.
- Influence diagrams illustrate confirmed causal interactions among factors.

2. **End-State Analysis / Transition Diagrams.** A method for describing nonlinear systems and systemic thinking to engage with the environment. This approach enables abstraction at the highest levels to be translated into specific problem contexts.
3. **Fishbone Diagram.** Uses a diagram resembling a fish skeleton to display the major causal branches of a phenomenon. Group dis-

cussion facilitates detachment from personal ownership of ideas, fostering collective problem ownership.

4. **Team/Group Situation Analysis.** Designed to broaden perspectives within a group, this method gathers all stakeholders to collectively examine objectives and perspectives.
5. **Brainstorming.** Structured sessions where diverse participants generate numerous solutions in a limited time. Rules include suspending criticism and preventing negative responses to encourage idea flow.
6. **Brainwriting (Idea Generation in Writing).** Participants write down their ideas within a short time frame (e.g., two minutes). Papers are circulated, and new ideas are added iteratively. This process continues for several rounds, after which all ideas are read, synthesized, and organized.
7. **Pictorial Group Technique.** A five-step method:
    - Posing an initiating question;
    - Silent idea generation by participants;
    - Group discussion of ideas informally;
    - Detailed examination and refinement of ideas;
    - Voting to prioritize ideas.

This technique is especially effective when combined with structural modeling.

8. **Force Field Analysis.** This method is derived from the behavioral sciences. The force field is the result of the balance between driving forces and restraining forces. Every problem is influenced by a set of opposing and agreeing forces in a state of equilibrium. If the opposing forces, some of which are driving and some restraining, are identified and used to regulate facts and programs, the driving forces can be further directed and the restraining forces prevented from occurring. This method is one of the expert tools for understanding and dealing with phenomena.

9. **Red Team Formation.** Considering a consumer who is both knowledgeable, gullible and skeptical and who looks at the proposed plans or solutions with a critical eye. This person, with his strong criticism, causes creativity to emerge in the people who have designed a product and want to sell it to him and must eliminate its shortcomings so that he will buy it.

   Mechanism for creating a red team: The red team uses a few customers who are not convinced in such a way that with each criticism, experts can re-examine the product or program and work in question and eliminate the mentioned shortcomings.

10. **Structuring Method.** A modeling approach where the phenomenon under study is broken down into constituent factors and their interrelationships. Tools include:

    - Role-playing networks and matrices,
    - Sequencing and ranking of roles,
    - Prioritizing interactions and clarifying behaviors.

Main Tools of the Theory of Inventive Problem Solving

Typically, every problem possesses its own ideal solution. In order to identify an appropriate and acceptable solution, the problem must be addressed at a higher cognitive level than the one in which it originally emerged. A problem cannot be solved within the same conceptual framework that created it; instead, it requires intellectual elevation and resolution from a higher standpoint.

Creative Problem Solving (TRIZ) employs several tools—such as principles, algorithms, and patterns—to achieve this objective. While no single technique can independently generate a creative solution, TRIZ provides a logical starting point and systematic approach to facilitate the discovery of innovative solutions (Sauransky & Krich, 1996, p. 59).

1. Principles. The tools designed to resolve and overcome technical contradictions are referred to as *principles*. They represent general recommendations for action within a technical system or regarding the design of a system.

2. Principle of Segmentation. According to this principle, the components of a technical system can be divided into smaller, connectable parts. For example: *How can a tire be prevented from puncturing when a nail penetrates it?* Following the principle of segmentation, the inner space of the tire can be divided into several independent sections, thereby minimizing the potential damage to the air-retaining chamber.

3. Principle of Periodic Action. This principle suggests replacing continuous operations with periodic, intermittent, or pulsating actions. For instance, a warning light attracts more attention by blinking rather than emitting steady illumination. Similarly, continuous irrigation of a lawn may damage the soil and waste water, whereas an automatic pulsating sprinkler system resolves this problem (Shulyak, 2003, p. 5).

4. Algorithm of Inventive Problem Solving (ARIZ)

ARIZ (Algorithm for Inventive Problem Solving) serves as TRIZ's analytical instrument. It comprises a structured sequence of nine steps, summarized in Table 8-6 (Shulyak, 2003, p. 6).

The utilization pattern of TRIZ's principles and tools is depicted in Figure 2. This figure demonstrates that:

- whenever contradictions are central to the problem, the *principles of creativity and innovation* must be applied;
- if the objective is system improvement, *forecasting tools* are employed;
- if the goal is understanding the mechanisms of problem creation, *causal-effect analysis tools* are used.

Once the appropriate tool is selected, its concepts must be carefully evaluated and then applied. It should also be noted that the application of any solution frequently generates new problems, which in turn necessitate repeated application of the process illustrated in Figure 8-2.

Table 6. The Nine Steps of the Algorithm for Inventive Problem Solving (ARIZ)

Step of the Algorithm	Description
1. Problem Definition and Reformulation	Clarify and reformulate the problem using precise terms and definitions to ensure accurate understanding.
2. Problem Analysis and Modeling	Analyze the problem through a systemic framework, identify contradictions, and model the situation to highlight key dynamics.
3. Goal Formulation	Define the primary objective of the system and the desired end state for solving the problem.
4. Resource Identification	Identify and classify all available resources, both internal and external, that can be used to resolve the problem.
5. Formulation of the Ideal Final Result (IFR)	Define the Ideal Final Result by envisioning the best possible solution with minimal cost, complexity, and side effects.
6. Contradiction Identification	Determine the core contradictions within the problem that prevent achieving the ideal result.
7. Application of Inventive Principles	Employ TRIZ inventive principles to address and resolve identified contradictions.
8. Evaluation of Proposed Solutions	Assess and compare alternative solutions in terms of effectiveness, feasibility, and potential side effects.
9. Selection and Implementation of the Optimal Solution	Choose the most appropriate solution, implement it within the system, and validate results for continuous improvement.

It should be noted that the outcome of the first three steps in Table 6 is the transformation of an ambiguous problem into a specific physical

problem and the identification of the physical contradiction. In many cases, the problem is resolved by the end of the third step; however, the process can also be extended to steps seven, eight, and nine when necessary.

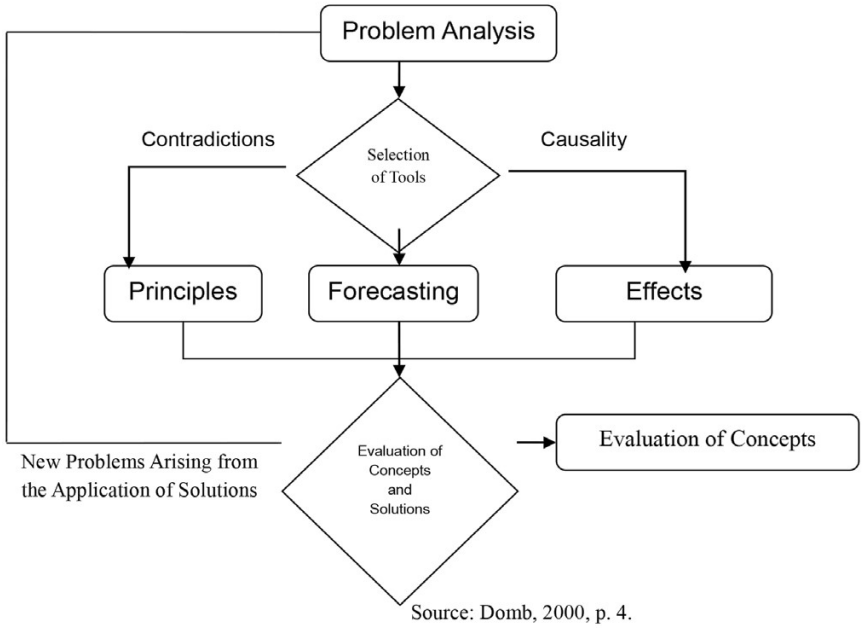


Figure 8-2. Model for the Application of TRIZ Tools

Source: Domb, 2000, p. 4.

5. Problem-Solving Model. In problem solving, one often needs to discover something from the realm of the unknown. Individuals always carry mental maps and prior knowledge that shape the way they perceive interesting aspects of their environment.

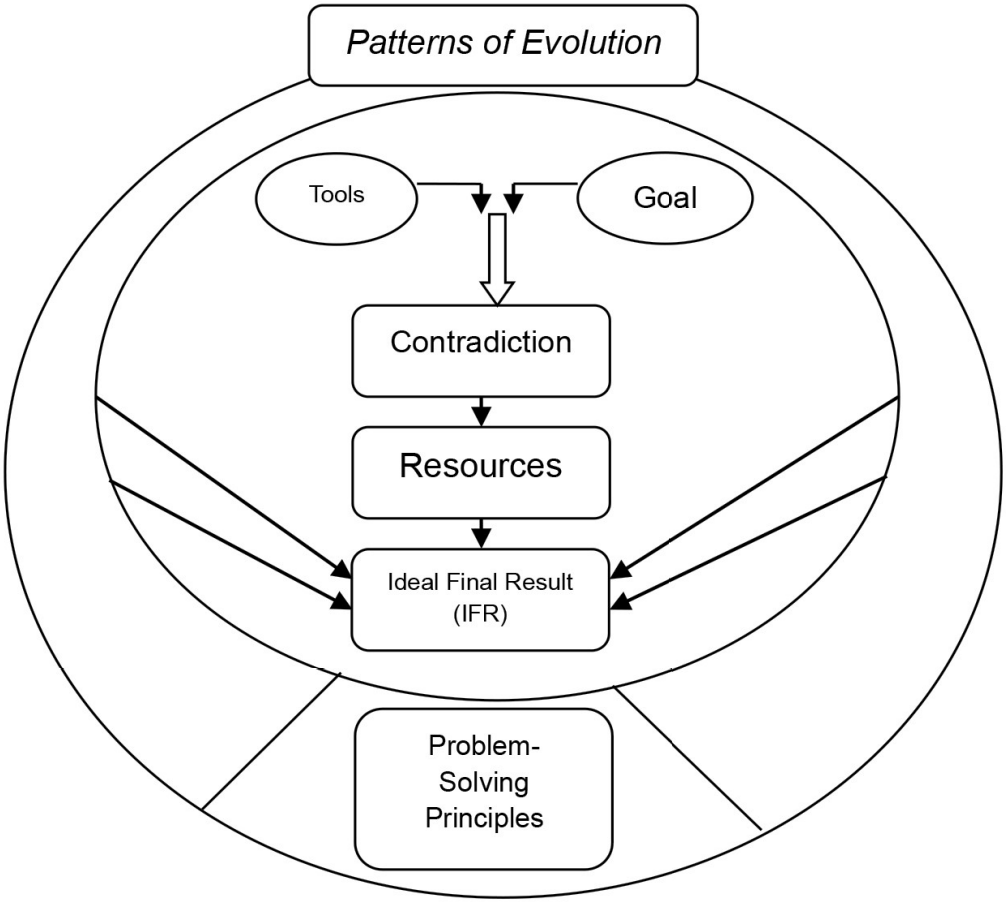


Figure \3. Problem-Solving Model Based on TRIZ

According to Figure 3, the problem represents a contradiction between the goal and the tools, which is illustrated by a broken arrow. The unknown area in the model corresponds to the *Ideal Final Result (IFR)*. The patterns of evolution and problem-solving principles serve as general solutions or ideation templates applicable across a wide range of industries and business contexts. By utilizing TRIZ, it is possible to generate novel insights regarding potential solutions even prior to the formal study of the problem.

Comparison of Creative Problem Solving and Brainstorming

Creative Problem Solving (TRIZ) represents a systematic and structured approach to solving inventive problems, whereas brainstorming is a relatively simple tool for generating ideas. The differences between

these two methods are summarized in Table 8-7 (Nakamura, 1997, p. 2).

The two methods stem from distinct disciplinary backgrounds. Brainstorming originated in the field of marketing, where it has been applied in activities such as merchandising, product naming, product planning, and related areas. In contrast, inventive problem solving (TRIZ) emerged from the field of engineering.

In engineering, ideas are typically sought in accordance with the innate logic of generation and are regarded as objectives within the natural sciences. In this sense, the quality of ideas is markedly different, thereby requiring different types of knowledge for their creation. The thinking process in engineering is predominantly causal, focusing on cause–effect relationships. Conversely, marketing thinking follows effects, seeking to understand how new ideas appeal to individuals, whether they create favorable impressions, or whether they exert a strong influence on the market, regardless of whether they leave direct effects.

Thus, it can be stated that:

- TRIZ proposes a step-by-step methodology for systematic reasoning,
- whereas brainstorming applies a perceptual and intuitive leap-based method for idea generation (Nakamura, 1997, p. 2).

Table 7. Comparative Analysis of the Characteristics of Creative Problem Solving and Brainstorming

Dimension of Comparison	Creative Problem-Solving Method	Brainstorming Method
Field of Origin	Engineering sciences (physics, chemistry, mathematics, natural sciences)	Marketing field (merchandising, product naming, product planning)
Required Knowledge	Requires systematic and scientific knowledge	Does not necessarily require knowledge
Nature / Quality of Ideas	Systematic pursuit of originality; high-quality ideas	Quantity of ideas is pursued rather than quality

Dimension of Comparison	Creative Problem-Solving Method	Brainstorming Method
Structure of Thinking	Step-by-step, logical, systematic	Perceptual, intuitive, spontaneous
Idea Generation	Refinement and recording of individual ideas; testing of inventive principles	Free expression, interaction, and group participation
Information Processing	Recording and testing of inventive principles, analytical registration of ideas	Group discussion and idea exchange without formal registration
Skill Structure	Analytical, synthetic, and evaluative skills	Social and participatory skills
Thinking Approach	Goal-oriented, cause–effect based	Effect-oriented, market impression-based
Learning Time	Several months	A few hours
Cause of Failure	Over-rigidity in applying principles; excessive reliance on technical knowledge	Lack of diversity and idea repetition

Application of Creative Problem Solving in Management

The prerequisite for applying creative problem solving is the examination, analysis, and understanding of processes (Altshuller, 1996, p. 3). In practice, however, challenges emerge that need to be resolved. For instance, processes may be:

- Entirely unidentified;
- Recognized but undocumented (knowledge resides only in the minds of experts);
- Documented but not modeled (e.g., written records);
- Modeled but not simulated (e.g., process diagrams);
- Both modeled and simulated.

With the increasing complexity of processes, the value of modeling and simulation for analyzing and applying algorithms of inventive problem solving significantly rises. By adopting a systematic approach in managerial decision-making, through TRIZ's knowledge base and analytical methods, management problems can be addressed as follows:

1. **Identification and Theoretical Explanation of Contradictions.**

This involves identifying and conceptually explaining non-technical contradictions, such as administrative and organizational conflicts, across multiple levels (individual, group, team, departmental, organizational, or even industry-wide). The desired outcome is the fundamental reduction or elimination of undesirable tendencies while maintaining and strengthening all beneficial factors.

2. **Positive Perspective on Complexity.**

TRIZ does not aim to oversimplify interactions; instead, it provides a detailed description of multidimensional and highly complex interactions. Understanding complexity itself serves as a prerequisite for identifying optimal solutions.

3. **Attention to Patterns of Evolution.**

TRIZ introduces a systemic, hierarchical view of the evolutionary development of entities and their contradictory elements. Evolutionary criteria—such as adaptability, controllability, and periodic functionality—enhance systematic problem analysis and decision evaluation.

4. **Predictive Risk Assessment.**

Managerial decisions and strategies must undergo **anticipatory failure analysis**. Managers systematically attempt to uncover potential weaknesses in proposed solutions, leveraging all available resources to identify risks. Consequently, hidden threats are revealed, enabling managers to avoid them in subsequent stages.

5. **Utilization of Resources and Knowledge.**

Knowledge management requires the timely application of individual, collective, and organizational knowledge. Managers should expand

knowledge boundaries and facilitate rapid access to relevant data and information (Roushty, 2001, p. 8; Meshbaki & Ghorbanizadeh, 2004, pp. 76–91).

Barriers to Achieving Creativity

Individuals encounter various barriers in their pursuit of creativity. By recognizing these obstacles, they can work toward overcoming them. These barriers fall into six categories, as outlined in Table 8: 1) Self-Confidence and Risk-Taking, 2) Need for Conformity, 3) Over-Reliance on Abstractions and Theoretical Constructs, 4) Dependence on Systematic Analysis, 5) Occupational Success Orientation, 6) Physical Environment

When individuals positively evaluate their tendencies toward these components, it indicates that such barriers are less present in them. Conversely, disagreement with these components signals that such obstacles play a significant role in hindering personal creativity.

To measure the degree of one's tendency toward the six components in each barrier, a five-point scale can be applied: 1) Strongly Agree, 2) Somewhat Agree, 3) Agree, 4) Disagree, 5) Strongly Disagree.

Accordingly, for each category of barriers:

- a minimum score of 5 reflects a very low level of obstacles to creativity;
- a score approaching 30 indicates that the barrier is significantly present in the individual.

Table 8. Barriers to Achieving Creativity

Type of Barrier	Mechanisms
Self-Confidence and Risk-Taking	Evaluating beliefs and identifying useful aspects for application- Lack of self-confidence

Type of Barrier	Mechanisms
Need for Conformity	Feeling uncomfortable when confronted with colleagues' beliefs or general disagreement with ideas and plans- Tendency to conform and present ideas and plans that align with the majority- Avoiding situations where management is present- Lack of willingness to present ideas in front of groups- Excessive dependence on colleagues' suggestions when presenting ideas instead of contributing independently to group coordination
Reliance on Abstractions and Theoretical Constructs	Strong preference for abstract solutions that may not have practical applicability for the problem- Excessive reliance on risk calculations based on past experiences- Excessive emphasis on rational factors for learning that can suppress creativity- Tendency to delay posing questions or providing answers out of fear of being mistaken- Focusing questions more on the value of goals and actions rather than on idea generation- Believing that every problem must have a completely correct and definitive answer before acceptance
Dependence on Systematic Analysis	Comfort in logical reasoning and analysis- Preferring step-by-step methods to real and practical ideas- Viewing creative ideas as unstructured, vague, and simplistic- Preference for formal and systematic testing rather than experimentation through trial-and-error- Preferring visual symbols and signs to represent ideas rather than experimenting with them

Type of Barrier	Mechanisms
Reliance on Findings and Systematic Analysis	- Encountering problems that fall outside one's area of specialization. - Lack of awareness of methods for systematization and simplification of problems. - Seeking multiple solutions but being limited by having only a few feasible options. - Feeling excitement and challenge in finding a solution to a problem. - Ability to think creatively and generate innovative solutions. - Being compelled to provide innovative answers to a problem.
Occupational Success	- Being overly cautious in dealing with problems, assuming every problem must be solvable.- Relying solely on practical answers, with the hope that they will lead to applicable solutions.- Limiting ideas due to resource constraints or project-based thinking.- Believing that project goals alone define the scope of creativity.- Assuming that issues and creativity are not directly related to one another.- Considering additional creativity as unrelated to organizational goals and tasks.
Physical Environment	- Lack of sufficient time or appropriate opportunities to solve problems.- Being subject to management conditions where problem-solving may not be acceptable or welcomed.- Lack of adequate facilities, physical tools, and equipment necessary for problem-solving.- Physical environment not conducive to problem-solving.- Lack of proper space and time for focusing and reflecting on solutions.- Needing an environment that provides comfort, time for immersion, and opportunities for renewal and change.

Source: Pfeffer, 1990.

Conclusion

Although achieving a precise and universal model for inventive and creative problem solving is challenging, the method presented in this chapter—based on the foundations of creative problem solving—provides a systematic approach that enhances the likelihood of attaining innovative solutions. It should be emphasized that TRIZ does not seek to replace human creativity; rather, it aims to understand the structure and process through which creative individuals achieve innovation.

In the context of inventive problem solving, various principles and tools were introduced. By applying these across diverse scientific and technical domains, it becomes possible to make purposeful and effective use of creative potential, thereby increasing both the quantity and quality of innovative solutions.

Due to its strong foundation in extensive research and the analysis of documented patents worldwide, the TRIZ methodology offers a unique framework and structure for solving problems creatively—distinguishing it from other problem-solving approaches.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. What is creativity, and how is it related to the Theory of Inventive Problem Solving (TRIZ)?
2. Explain the general rule underlying TRIZ.
3. Name the foundations of TRIZ (comprising five parts).
4. State the characteristics of the levels of innovation.
5. What is the purpose of the Law of Ideality, how does it relate to TRIZ, and what is its mechanism of ideality?
6. What methods do you propose—under the Law of Ideality—to

make a system more desirable (ideal)?

7. How can physical contradictions be resolved?
8. Describe the eight stages of the life-cycle model used for the evolution of technical systems.
9. List the features of the eight evolutionary patterns of technical systems.
10. List and explain the traits of creative individuals.
11. Name and describe the characteristics of creative organizations.
12. Name the five stages of the creativity process and discuss their features.
13. Explain the two forms of imagery in humans.
14. Describe the features of the human brain relevant to creativity.
15. Explain the conditions that foster the growth of creative individuals.
16. List the methods for achieving creativity.
17. Describe the graphic group technique and the red-team method.
18. Distinguish idea stimulation from brainwriting (idea generation by circulation).
19. Present the core tools of TRIZ.
20. Name the nine steps of the Algorithm of Inventive Problem Solving (ARIZ).
21. What is the difference, within ARIZ, between setting the Ideal Final Result (IFR) using external objects and effect resources?
22. What is the difference between analyzing the problem model and analyzing the steps leading to the solution in ARIZ?
23. Draw the two TRIZ diagrams: problem-solving schema based on TRIZ and the model for leveraging TRIZ tools.
24. Compare TRIZ with brainstorming, and—across ten comparative dimensions—state the attributes of each.

25. Explain the application model of TRIZ for management.
26. List the barriers to creativity.
27. Explain how systematic analysis can itself become a barrier to creativity.
28. Explain how the need for conformity and the use of abstractions can become barriers to creativity.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. Creativity is the aptitude by which individuals can combine ideas, theories, and scientific hypotheses in a unique manner and establish novel connections among them.
2. The general rule of TRIZ is that the evolution of all technical systems follows natural, mental, and objective laws.
3. The aim of TRIZ is to discover how creativity is attained and to enable the capability to solve difficult problems through novel methods.
4. Any artifact that performs a function is a technical system, which must be repaired or improved when it performs its function inadequately or incompletely. A technical system consists of at least two elements such that one element delivers energy to the other.
5. To solve a problem, one must consider the interaction of the focal system with supersystems and subsystems.
6. All creative ideas are equal in creative value.
7. A rare scientific discovery or breakthrough creativity in a new system corresponds to Level 1 innovation.
8. Advancing a specific task such that the existing method undergoes fundamental revision corresponds to Level 5 innovation.

9. Initial conditions for achieving creativity at individual and organizational levels include: broad thinking, favorable circumstances, a youthful/renewing mindset, freedom to act, productive intelligence, and a collaborative spirit.
10. Ideality of a system is measured by the ratio of total useful effects to the total harmful effects of that system.
11. The more a system exploits its available resources, the closer it approaches ideality.
12. To enhance a system's ideality one may: add functions to the current system; transfer functions from the system to the end-executing element; offload functions to the supersystem or environment; and use internal/external resources available to deliver faster/better service.
13. A physical contradiction arises when the system or one of its elements requires two mutually opposing properties.
14. Physical contradictions are resolved using four separation principles: spatial, thermal/fusional, componential, and condition-dependent separation.
15. Stage 3 of the life-cycle model refers to the system's maturity and to development at a scale where the market approaches saturation.
16. Stage 7 indicates that some limitations of the initial system become visible in the new system.
17. The evolutionary patterns of technical systems include: life cycle, dynamization, multiplication loop, macro-to-micro transfer, synchronization, duplication, non-uniform (disproportionate) development of components, and human replacement.
18. The ability to generate many ideas quickly, to comprehend accurately, and to exhibit a high level of rationality indicates psychological and cognitive health in a creative person.
19. A creative organization welcomes service provision to employees and customers and is receptive to their ideas.
20. If an organization readily loses its knowledge workers, it is not a

creative organization.

21. Preparation refers to the stage where an idea emerges and is then tested to determine its usefulness and generativity.
22. Finding new ideas that were previously non-inferable signifies the replacement of unconfirmed assumptions with new ones and reflects the persistence/insistence stage of achieving creativity.
23. The left hemisphere (operational) undertakes imagery and future creation, emphasizing design, generation, and intuition.
24. Human imagery is divided into two types: creative imagery (fully controllable and often pleasurable) and non-creative imagery (less controllable).
25. Tolerance of impractical ideas, focus on results, and comprehensive communication are conditions that foster creative individuals.
26. Under the final-state/transition method (transition diagrams), the highest level of absolutism in analysis becomes feasible.
27. Idea stimulation is most fruitful when group members differ in age, experience, and discipline.
28. In force-field analysis for creativity, one uses the balance between driving and restraining forces.
29. By the periodic action principle, instead of continuous operation in TRIZ, one should employ periodic or pulsed operation.
30. In ARIZ, the second step is to analyze the problem model, whereas modifying or restating the problem is only possible after solution and evaluation.
31. Evolution patterns and problem-solving principles provide application-specific solutions with operational capabilities mainly used in laboratory contexts.
32. The direction of thinking in brainstorming is oriented toward an ideal state, whereas in TRIZ the emphasis is on group thinking.
33. Engineering thinking follows effects (causes), whereas marketing thinking is based on cause-and-effect analysis.

34. Understanding complexity is itself a precondition for discovering the best solution.
35. Managers should extend the frontiers of knowledge and facilitate rapid access to integrated data and knowledge bases.
36. Among the barriers to creativity are the need for conformity and the need for achievement (success-orientation).
37. By systematic analysis is meant being captivated by issues outside one's area of expertise.
38. Establishing uninterrupted time blocks for problem solving and discriminating between major and minor physical disturbances pertain to the physical-environment barrier to creativity.
39. In TRIZ, principles and tools are introduced that, when applied across scientific and technical domains, enable purposeful and effective use of creative capacity.
40. If you endorse the listed components and agree with them, the barrier(s) is less present in you; if you disagree, it indicates the presence of that barrier to personal creativity.

Chapter 9
Methods of Behavior Change

Objectives

- To define and describe the characteristics of human behavior and understand how behaviors are formed.
- To examine methods of behavior change, contexts, approaches, models of change, and behavioral guidance.

Introduction

Since the implementation of any decision is accompanied by behavioral change, the aim of this chapter is to focus on behavior, its mechanisms, and how it can be altered through principles and methods that help in understanding and transforming human behavior to achieve optimal performance. Although decision implementation alters the environmental conditions in which the decision problem occurs, such changes also, in turn, influence individual behavior.

Behavior and its modification belong to the "soft" domain; though methods of behavioral change may take different forms, they are often highly challenging. Examples include: aligning behavioral changes in everyday routines with decision content, performing a series of consistent positive actions to address the decision problem, influencing reciprocal interactions to foster desired behaviors in others, engaging in pleasant and alternative activities to counter undesirable ones, practicing regularly and participating in groups, or imposing fines/costs to discourage the repetition of certain behaviors. Each approach emphasizes a particular aspect of human behavior and offers a pathway for change.

Behavior: Definition and Characteristics

Human behavior is the focal point in behavior change, as it plays a central role in enhancing the effectiveness of decision implementation. Behavior can be defined in various ways, each highlighting different features, dimensions, and manifestations. In fact, six key definitions outline the distinguishing features of behavior:

1. Behavior is what individuals do or say. It encompasses a person's actions and is therefore dynamic rather than static. For instance, labeling someone as "angry" does not itself define behavior. However, identifying what the individual says or does when angry constitutes a behavioral definition.
2. Behavior has measurable dimensions. These include frequency, duration, intensity, and physical force. For example:
   - Frequency: counting how many times an act occurs (e.g., Ahmadi bit his nails twelve times during a group session).
   - Duration: measuring the time span from start to finish (e.g., Ahmadi jogged for thirty minutes).
   - The intensity of the behavior and the physical force involved in the behavior can be measured (e.g., Ahmadi pressed a chair using his body weight).
   - Therefore, frequency, duration, intensity, and physical force are dimensions of a behavior.
3. Behaviors can be observed, described, and recorded. Because behavior involves physical dimensions, it is perceivable. Other individuals can witness it directly or detect it through their senses, allowing for description and documentation.
4. Behavior affects the environment. The environment includes both the physical and social spheres (what others or oneself do). For instance:
   - Turning on a light switch → lamp illuminates (effect on physical environment).
   - Raising one's hand in a group session → moderator invites the

person to speak (effect on others).

- Reading a phone number from an address book (effect on oneself). Sometimes the impact is indirect or not immediately visible, yet all human behaviors influence the physical and/or social environment, whether or not we are consciously aware of it (Johnson & Pennypacker, 2019).

5. Behavior is lawful. It systematically occurs under the influence of environmental events. Basic behavioral principles describe functional relationships between human actions and environmental factors. By identifying environmental events that generate behavior, one can manipulate the environment to induce behavioral change. If we consider the methods of change as a structure, these basic behavioral principles are like its building blocks. By recognizing the environmental events that create behaviors, we can transform the environmental events in order to change behavior. For example, an employee who receives substantial managerial attention rarely displays disruptive behavior (e.g., throwing objects, shouting, or banging on items). Conversely, lack of managerial attention often correlates with more frequent disruptive behavior. Thus, a functional relationship exists between disruptive behavior and the degree of audience attention.
6. Behavior can be overt or covert. Behavior changes methods primarily address overt (observable) behaviors—actions that can be recorded by others besides the actor. Covert behaviors, by contrast, are private events (Skinner, 1974). For instance, thinking cannot be observed or recorded by others; only the thinker experiences it. The field of behavior modification largely concentrates on overt, observable actions (Miltenberger, 2006, Ch. 12).

Behavioral Instances

To better understand the defining features of behavior, several examples of both common and problematic behaviors are presented, which may serve as cases where behavior modification techniques can be applied:

1. Ahmadi sits at his computer and types a letter to his manager. This constitutes a behavior because striking the keys while typing is an action; it has physical dimensions (frequency of keystrokes, duration of typing), is observable and measurable, impacts the environment (letters appear on the screen), and is lawful (this behavior is the result of prior learning since pressing keys produces letters on the computer screen).
2. Ahmadi opens the oil pan of his car and places a container underneath to drain the oil. He removes the oil filter, closes the drain plug after the oil is completely discharged, replaces the filter, pours four liters of oil into the engine, and finally pulls out the dipstick to measure the oil level. This instance represents a chain of behaviors with multiple components. Each component displays behavioral characteristics. For example, using a wrench to loosen the drain plug is an action (rotating the wrench), has measurable dimensions (six turns in ten seconds), is observable, affects the environment (the plug is removed, and oil flows into the container), and is lawful (because in the past, the same action produced the same result). Hence, there is a functional relationship between the behavior and its outcome.
3. Ahmadi is thinking in his office when suddenly he stands up, and his manager arrives at his desk with a proposal. This instance also meets the descriptive criteria for behavior (physical dimensions, observability, environmental impact, and lawfulness). However, unlike the previous example, the behavior of standing influences the social environment: the manager reacts to Ahmadi's action. Historically, whenever Ahmadi exhibited unusual behavior, the manager responded, creating a functional relationship between non-normative behavior and managerial attention.
4. While working on an assembly line, Ahmadi secretly drops metal shavings into conveyor bearings several times during a shift. This causes the belt to malfunction, giving him a 45-minute break while repairs are made. Dropping metal shavings is an observable and measurable act (occurring multiple times per shift), has environ-

mental impact (equipment breakdown), and is lawful because the functional link between the act (sabotage) and its result (rest time) sustains the behavior.

5. Ahmadi fails to submit a paper he was supposed to prepare for a session on behavior change, delaying it for a week. He later hands it in and excuses the delay by claiming that library staff were uncooperative. The session leader accepts the excuse without penalty. On the day of the session, Ahmadi is absent, again excusing himself as needing more time. The leader once more extends the deadline. Here, lying about library visits is a behavior: it involves speech (an act), has frequency (twice), is observable, impacts the social environment (the leader grants extensions), and is lawful (there is a functional relationship between the lie and its beneficial outcome).
6. Ahmadi, a jealous employee, frequently engages in disruptive actions during meetings. For instance, when denied extended speaking time, he puts his head on the desk or repeatedly leaves the room under false pretenses. Each time he does so, the session leader interrupts proceedings, reassures Ahmadi, and allows him additional speaking time. This constitutes behavior because it is repeatable, observable, impacts the social environment, and is lawful: the functional relationship lies between the disruptive act and the resulting managerial attention.

Behavior Change: Definition and Characteristics

Behavior modification is a branch of psychology that focuses on the analysis and alteration of human behavior—including that of employees and managers. Through analysis, functional relationships between environmental events and specific behaviors can be identified, helping to clarify why certain behaviors occur.

According to models of change, advanced and comprehensive methods can be devised to help individuals adjust their behaviors. In practice, behavior change involves altering environmental events to influence behavior. Specialists use such methods to support individuals in modifying socially significant behaviors, aiming to improve certain aspects

of their lives. The term applied behavior analysis (ABA) is often used synonymously with behavior modification (Baer et al., 1968).

Key Features of Behavior Change (Kazdin, 2018; Gambrill, 1977)

1. Emphasis on behavior

Behavior modification is designed to alter observable actions rather than inner states or traits. It does not target labels such as *autism* itself, but rather the problematic behaviors associated with such conditions.

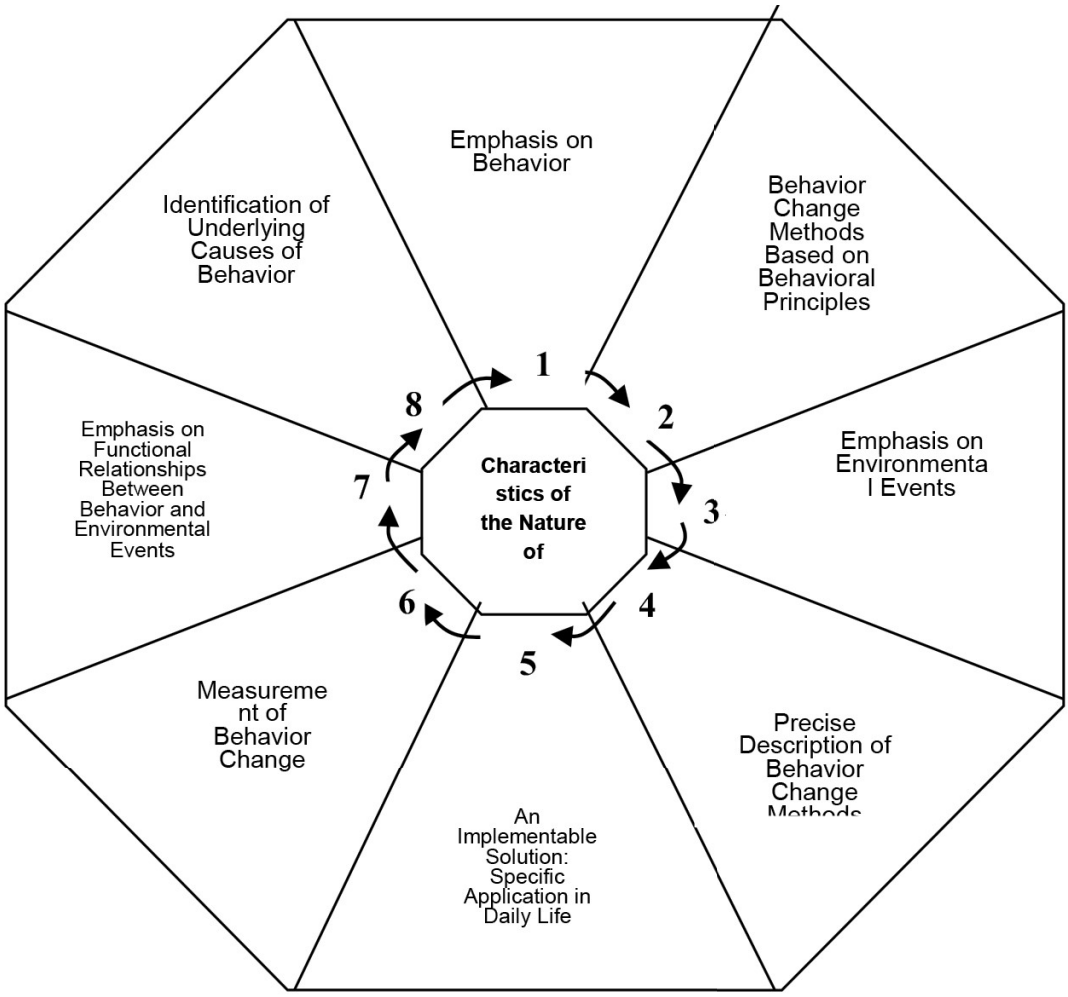


Figure 9-1. Characteristics of the Nature of Behavior Change

The primary objectives of behavior change are to address both behavioral deficits and behavioral excesses through systematic methods. Within this framework, the "target behavior" is defined as the specific

behavior to be modified. A behavioral excess refers to an undesirable target behavior for which the individual seeks to reduce its frequency, duration, or intensity. For example, excessive reliance on attending multiple meetings to advance tasks is a form of behavioral excess. Conversely, a behavioral deficit represents inadequacies in the desired target behavior, where the individual must increase its frequency, duration, or intensity. Practicing and studying are illustrative cases of remedying behavioral deficits.

2. Methods of Behavior Change Based on Behavioral Principles

Behavior modification essentially denotes the application of fundamental principles, originally derived from experimental research conducted on laboratory animals. The scientific study of behavior has been referred to as "experimental analysis of behavior" or simply "behavior analysis" (Skinner, 1953, 1966). The scientific examination of human behavior is termed "experimental analysis of human behavior" or more commonly "applied behavior analysis (ABA)". Techniques of behavior modification are grounded in applied behavior analysis, a body of research that has been extensively implemented for several decades.

3. Emphasis on Current Environmental Events

Behavior change involves the evaluation and modification of current environmental events that functionally interact with behavior. Human behavior is regulated by environmental events; hence, the aim of behavior modification is to identify these controlling variables. Once identified, such variables are altered to bring about behavioral change. Effective behavior modification strategies transform the functional relationship between behavior and controlling environmental events to yield desirable changes.

It is critical not to mistakenly treat diagnostic labels as causal explanations of behavior. For example, a manager might claim that an "autistic" employee in his department displays disruptive behaviors such as shouting, self-injury, or refusal to follow instructions. The manager then concludes that autism is the cause of such behaviors. However, autism is merely a descriptive label for a behavioral pattern and does not constitute a physical phenomenon; therefore, it cannot be considered

the causal factor. Instead, the determinants of behavior must be sought in the environment.

4. Precise Description of Behavior Change Methods

Behavior modification methods consist of specific interventions that emerge following decision-making processes. These interventions manifest as modifications in environmental events that functionally relate to behavior. Thus, methods of behavior change must demonstrate their capacity to generate the targeted environmental alterations that correspond to the implementation of managerial or clinical decisions (Baer et al., 1968).

5. Practical Application in Everyday Life

Behavioral interventions are shaped by individuals accumulated knowledge throughout life and are reinforced through experience and feedback. Although experts and scholars continue to refine behavior modification methods, everyday practitioners—such as teachers, parents, managers, and supervisors—also employ these techniques to foster desired environments. After acquiring adequate training, they can utilize principles such as:

- Classical conditioning: a neutral stimulus may elicit a conditioned reflex.
- Law of Effect: behaviors producing favorable outcomes are more likely to recur in the future.
- Observable behavior as the subject of psychology: environmental events govern behavior in its entirety; hence, stimulus–response psychology posits that external stimuli evoke individual responses.
- Distinction between respondent and operant conditioning: through operant conditioning, the probability of future behaviors can be regulated by manipulating their consequences.

6. Measurement of Behavior Change

A central hallmark of behavior modification is its emphasis on measurement. Behavior is recorded both before and after interventions to determine the effectiveness of applied strategies. Moreover, evaluation

extends beyond immediate intervention to assess whether changes persist over time. For instance, if a supervisor aims to enhance productivity through behavior modification techniques, the number of units assembled daily should be recorded before the intervention. After implementation, continued recording of workers' behaviors will reveal whether productivity increases. Long-term observation further clarifies whether workers sustain these improvements or whether additional interventions are necessary.

7. Non-Emphasis on Past Events as Direct Causes

Although awareness of past experiences may provide valuable insights into current controlling variables, behavior modification does not attribute causality to historical events. Prior learning experiences influence present behavior, and understanding these can help in analysis. Nevertheless, current controlling variables hold greater relevance for effective intervention since, unlike past events, they can be directly manipulated to produce behavioral change.

8. Rejection of Hypothetical Underlying Causes

In contrast to certain branches of psychology—such as psychoanalytic approaches, which often ascribe behavior to unresolved unconscious conflicts (e.g., inferiority or superiority complexes)—behavior modification rejects such hypothetical explanations. These constructs are generally unverifiable. Skinner (1974) referred to them as "explanatory fictions." Hypothetical underlying causes cannot be measured nor can they demonstrate functional relationships between environment and behavior. Consequently, they lack utility in the scientific analysis and modification of behavior (Miltenberger, 2005, Ch. 1).

Techniques for Establishing and Increasing Desirable Behavior

These techniques fall into three main domains: differential reinforcement, shaping, and behavioral skills training methods.

1. Differential Reinforcement

Differential reinforcement refers to the application of reinforcement

and extinction with the dual aim of increasing the occurrence of desirable target behaviors while simultaneously reducing interfering or competing behaviors. This technique follows the paradigm of: Antecedent → Response → Consequence.

In differential reinforcement, every occurrence of the desired behavior is systematically reinforced, thereby increasing its likelihood in the future. At the same time, undesirable behaviors that interfere with the target behavior are no longer reinforced, which leads to their gradual decrease. Hence, differential reinforcement is a combination of reinforcing desirable behavior while extinguishing undesirable behavior.

Key considerations when applying differential reinforcement include:

- Do you intend to increase the frequency of the desirable behavior?
- Has the target behavior occurred at least a few times previously?
- Do you have access to appropriate reinforcers that can be delivered following the behavior?

If the target behavior does not yet occur, alternative strategies such as shaping or prompting should be used initially. Once the behavior is established, differential reinforcement can then be employed to maintain and strengthen it. Identifying an effective reinforcer that can be applied consistently is essential; otherwise, differential reinforcement cannot be successfully implemented.

Steps for differential reinforcement:

1. Define the desirable behavior.
2. Define the undesirable behaviors.
3. Identify appropriate reinforcers.
4. Reinforce the desirable behavior immediately and consistently.
5. Withhold reinforcement from undesirable behaviors.
6. Apply intermittent reinforcement schedules to maintain the target behavior (Miltenberger, 2005, Ch. 2).

2. Shaping

Whereas differential reinforcement requires at least occasional occurrences of the target behavior, shaping is used when the individual does not currently display the desired behavior at all. Shaping involves the differential reinforcement of successive approximations of the target behavior until the full behavior is acquired.

For instance, in language development, successive approximations may include: babbling, vocalizing parts of words, incomplete words, full words, short phrases, complete sentences.

The process begins by identifying a "starting behavior" (the first approximation) that bears some resemblance to the target behavior. By reinforcing this behavior, its frequency increases. Subsequently, reinforcement is withheld until the individual emits a slightly closer approximation, which is then reinforced. This cycle continues, with each successive approximation reinforced and previous approximations extinguished, until the target behavior is reliably exhibited.

Examples of successive approximations:

- Moving an object toward a goal.
- Positioning the object directly in front of the goal.
- Approaching the goal more closely.
- Emitting the expected behavior toward the goal.
- Manipulating the goal with the stimulus object.
- Grasping the goal with the stimulus object.
- Altering the goal using the stimulus object.

Guidelines for effective shaping. The following guidelines ensure proper use of shaping.

1. Define the target behavior clearly. By defining the target behavior, the success of the shaping program is determined.
2. Ensure shaping is appropriate—if the behavior already occurs occasionally, differential reinforcement is preferable. If the individual has already exhibited the target behavior at least occasionally, there

is no need to use shaping; in this case, differential reinforcement can be used to increase the frequency of the target behavior. Shaping is used to re-establish a behavior that the individual is not currently exhibiting.

3. Identify a starting behavior that occurs at least occasionally. The starting behavior, or first approximation, should be a behavior that the person has engaged in at least once before. The starting behavior should be somewhat related to the target behavior.

4. Break down shaping into small, successive stages, each closer to the target behavior. In shaping, the individual must learn each stage well before moving on to the next. Each stage should be a closer approximation to the target behavior. The most appropriate change is a moderate change in behavior.

5. Select appropriate reinforcers and deliver them immediately after each desired approximation. The trainer should be able to deliver the reinforcer immediately after the appropriate behavior. The amount of reinforcer should be sufficient so that the person is not easily persuaded. Conditioned reinforcers are suitable for this purpose.

6. Reinforce each successive approximation while extinguishing previous ones. After the starting behavior is selected, each instance of the behavior is reinforced until the behavior occurs reliably, then reinforcement begins for the next approximation. In this case, reinforcement of the approximation of the previous behavior should be avoided. With this process, differential reinforcement of successive approximations continues until the target behavior occurs and is reinforced.

7. Moving at the right pace through shaping. Since each approximation is a means to the next approximation. When a person has learned one approximation well, the time to move on to the next one begins. Reinforcing one approximation too many times may make it difficult to move on to the next stage, and the person may continue to participate in the previous approximation. If a person has not learned an approximation well, it will be impossible or at

least difficult to move on to the next stage. Successful movement from one stage to the next may be facilitated by telling the person what is expected or by pointing out or guiding appropriate behavior. (Cooper et al., 2020; Martin & Pear, 214).

3. Behavioral Skills Training (BST) Methods

Behavioral skills training refers to a structured process that combines modeling, instruction, rehearsal, and feedback. These methods are typically applied simultaneously in training sessions to help individuals acquire essential functional skills.

- Presenting a pattern: The correct behavior is demonstrated for the learner, who then observes and imitates the model. Modeling may be live (another person demonstrates the behavior in context) or symbolic (the behavior is presented through video, audio, cartoons, or films). Effective modeling requires that the learner possesses adequate imitative skills.
- Instruction: Clear and specific explanations of the expected behavior are provided. Instructions must detail exactly which behaviors are expected and under what conditions they should occur.
- Rehearsal (Practice): The learner performs the target behavior in a controlled setting, which allows practice of the newly taught skills.
- Feedback: Corrective and reinforcing feedback is provided immediately after the rehearsal to refine and strengthen the learner's performance.

Numerous factors affect the effectiveness of modeling and instruction, which are summarized in Table 1 of the source text.

Table 1. Factors Influencing the Effectiveness of Presenting a pattern

Factors
1. When the model demonstrates the correct behavior, the behavior must be immediately followed by a successful consequence (reinforcer).
2. The individual observing the model must have the opportunity to observe the model's correct behavior multiple times.
3. The complexity of the modeled behavior should be within the developmental level and capabilities of the observer.
4. The model must be similar to the observer in terms of demographic, personal, or social characteristics.
5. The model must demonstrate the behavior in an appropriate context so that the observer can realistically anticipate achieving success.
6. The model's behavior should be reinforced (positively or negatively) in the presence of the observer.
7. The modeled behavior should be clearly defined and easily distinguishable from other behaviors.
8. The modeled behavior should be presented in a realistic and natural sequence (i.e., the modeled behavior must be demonstrated in the proper order of occurrence).

Source: Bandura, 1977; Miltenberger, 2005, pp. 95–96.

Training. Training describes appropriate behavior to the learner. To be effective, training must be specific and describe precisely the behaviors that the learner is expected to perform. Training must specify appropriate conditions under which the learner is expected to engage in the behavior. The following factors may affect the effectiveness of training.

1. Instruction must be presented at a level appropriate to the learner's comprehension; if it is too advanced, learning becomes difficult, while if it is overly simplistic, it may lead to frustration or anger in the learner.
2. Trainers must be perceived as credible and authoritative by the learner.

3. The learner should practice the behavior immediately after receiving instruction.
4. When the observation of behavior is combined with increased learning ability, instruction should be accompanied by modeling.
5. During instruction, the learner must maintain adequate attention.
6. The learner should engage in repetition to ensure accurate reception of the instruction. Correct repetition of instructions increases the likelihood of appropriate behavior.

Practice. Practice provides the learner with an opportunity to perform the behavior following instruction or observation of a modeled behavior. Practice constitutes a critical component of behavioral skills training because it enhances the learner's performance, provides opportunities for reinforcement, and allows for evaluation and correction of mistakes that may occur during the execution of the behavior.

The factors that enhance the effectiveness of practice are presented in Table 2.

Table 2. Factors Influencing the Effectiveness of Practice

Factors
1. The behavior should be practiced in an appropriate context where the practice closely resembles the real situation in which the behavior is expected to occur.
2. Practice sessions must be programmed in such a way that they are initially simple and easy, then gradually progress toward more complex behaviors and challenging situations.
3. Correct behavior should be reinforced immediately.
4. Practice must be accompanied by appropriate feedback to guide and correct errors.
5. The behavior should be practiced repeatedly until the learner can consistently and accurately demonstrate the correct behavior.

Feedback. The trainer must provide immediate feedback following the learner's performance of the behavior. Feedback includes praise or other reinforcers regarding correct performance. When necessary, feedback should also involve error correction or additional instruction on how to improve performance. Feedback is often complemented by differential reinforcement of certain aspects of behavior while correcting others.

To enhance the effectiveness of feedback, the following considerations must be observed:

1. Feedback should be delivered immediately after the behavior.
2. Feedback must always address a specific aspect of behavior, including praise or another form of reinforcement.
3. Praise should be descriptive and address all relevant aspects of the behavior, both verbal and nonverbal.
4. When providing corrective feedback, avoid negativity; do not describe the learner's performance as "bad" or "wrong."
5. Always praise some aspect of performance before providing corrective feedback.
6. At any given time, corrective feedback should focus only on one aspect of performance. If the learner has performed multiple aspects incorrectly, concentrate on one initially to avoid overwhelming or discouraging the learner.

Behavioral skills training (BST) procedures can also be conducted in group settings, as group members often require the acquisition of similar skills. Individuals lacking self-confidence can be trained in groups. Modeling and instructions are provided to the entire group, whereas each member must role-play the skill and receive feedback from the trainer and other group members. Each participant continues to practice the skill until they can perform it accurately across a variety of simulated situations (Miltenberger, 2016, Ch. 4).

Methods for Reducing Undesirable Behavior

These methods consist of differential reinforcement for decreasing problem behaviors, the use of punishment, time-out and response cost, as well as positive punishment procedures and ethical principles of punishment.

1. Differential Reinforcement Procedures for Decreasing Problem Behavior

Differential reinforcement procedures are designed to decrease problem behaviors and include the following:

- Differential Reinforcement of Other Behavior (DRO). In this method, reinforcement is delivered contingent on the absence of the problem behavior during a specified interval. Intervals can be whole interval or momentary. In whole interval DRO, the problem behavior must not occur throughout the entire interval for reinforcement to be delivered. In momentary DRO, the absence of the problem behavior is required only at the end of the interval for reinforcement to occur.
- Differential Reinforcement of Low Rates of Responding (DRL). In this method, reinforcement is delivered when the frequency of the behavior decreases to a specified criterion level. Variations include full-session DRL and spaced-responding DRL. In full-session DRL, reinforcement is provided if the behavior occurs fewer than a predetermined number of times during the entire session. In spaced-responding DRL, reinforcement follows a behavior only if a specified amount of time has passed since the previous occurrence.
- Differential Reinforcement of Incompatible Behavior (DRI). Reinforcement is delivered contingent upon the occurrence of a behavior that is physically incompatible with the problem behavior. Variations include whole interval DRI and functional communication training (FCT). In whole interval DRI, the incompatible behavior cannot occur simultaneously with the problem behavior, while in FCT, reinforcement is contingent upon the occurrence of a com-

municative response that serves as an alternative.

2. Use of punishment: deprivation and fines

Punishment is a fundamental behavioral principle. It occurs when a behavior is followed by a consequence that results in a decrease in the likelihood of that behavior's recurrence. The consequence may involve the presentation of an aversive stimulus (positive punishment) or the removal of a reinforcing stimulus (negative punishment). In both forms, the probability of the behavior decreases.

Typically, punishment procedures are implemented only after less intrusive interventions (such as extinction, differential reinforcement, or antecedent manipulations) have proven ineffective in reducing the problem behavior. Punishment often takes the form of negative punishment, whereby reinforcing events are removed following the occurrence of problem behavior. Two common negative punishment procedures are time-out and response cost.

In deprivation, the individual loses access to all sources of reinforcement associated with the problematic behavior. Deprivation is usually brief, lasting one to ten minutes. Deprivation is the short-term withdrawal of positive reinforcement. There are two types of deprivation: exclusive and non-exclusive. In exclusive deprivation, the individual is removed from the environment and taken to a room or location of deprivation. While in non-exclusive deprivation, the individual is removed from all sources of reinforcement but remains in the environment where the problematic behavior occurs. Exclusionary Time-Out: The individual is removed from the reinforcing environment and placed in a designated time-out area.

For deprivation to be effective, the environment in which the problem behavior occurs must be reinforcing. Deprivation is not appropriate for problem behaviors that are sustained by escape or sensory stimulation. When using the deprivation method, the following points should be considered.:

- Identifying the functional properties of the problem behavior.
- Selecting a context in which time-out will be effective.

- Ensuring the procedure is safe and minimally harmful.
- Determining the appropriate duration of time-out.
- Preventing escape from the time-out environment.
- Minimizing opportunities for interaction during the time-out period.
- Assessing the acceptability of time-out within the specific setting.

Response Cost. Response cost (penalty) involves the removal of a specific amount of a reinforcer contingent upon the occurrence of the problem behavior. Response cost qualifies as a negative punishment procedure when it reliably decreases the likelihood of the behavior. The amount of loss can be directly tied to the severity or frequency of the misbehavior. Reinforcers removed through response cost may be tangible items, privileges, or activities.

For response cost to be effective, the behavior-change agent must maintain control over the reinforcer being withdrawn. Importantly, reinforcer removal should never result in physical harm to the individual or violate ethical considerations.

Whenever response cost is used, it should be paired with differential reinforcement procedures to strengthen desirable alternative behaviors or to reinforce the nonoccurrence of the problem behavior. Indeed, differential reinforcement should accompany all punishment or extinction strategies.

Although the methods of punishment, deprivation, and extinction are similar and are used to reduce problem behavior, they have the following differences:

- In extinction, the problem behavior is not followed by a reinforcing event that previously maintained the behavior;

- In deprivation, the person is removed from access to all reinforcing resources associated with the problem behavior;

- In fines, a certain amount of the reinforcer (but not the reinforcer of the problem behavior) is removed following the problem behavior.

When using the method of punishment, it is necessary to observe the following points:

- Determine the type of reinforcer that is being removed

- Determine whether the loss of the reinforcer is immediate or delayed

- Whether the reinforcer is moral or not

- Determine whether the type and amount of the penalty are practical and acceptable

When applying response cost, the following considerations are essential:

- Clearly identify the type of reinforcer to be withdrawn.
- Specify whether the loss will be immediate or delayed.
- Ensure that the procedure meets ethical standards.
- Define the practicality and acceptability of the type and amount of loss imposed.

3. Positive Punishment Procedures and Ethical Principles of Punishment

Positive punishment procedures involve the application of aversive events or stimuli contingent upon the occurrence of a problem behavior, resulting in a decrease in the future likelihood of that behavior. This form of positive punishment is grounded in the principle of contiguity, which states that when a low-probability event (aversive activity) is made contingent upon the occurrence of a high-probability behavior (problem behavior), the high-probability behavior will subsequently decrease (Miltenberger & Groffeyuka, 1981).

Positive punishment methods consist of aversive activities such as overcorrection (positive practice and restitution overcorrection), contingent exercise, guided compliance, and physical restraint.

Overcorrection. This procedure is primarily applied to reduce aggressive and disruptive behaviors among individuals who often display signs of behavioral or cognitive impairments in decision-making and

performance. Under overcorrection, the individual is required to engage in the behavior for an extended duration. Overcorrection takes two main forms:

- Positive Practice: The individual is required to repeatedly engage in the correct, appropriate form of the behavior following the occurrence of a problem behavior. In essence, the person must perform the correct response multiple times.
- Compensation. Compensation is a method by which, when a problematic behavior occurs, the individual must correct the environmental effects of the problematic behavior and restore the environment to a better condition than it was before the problematic behavior. If necessary, physical guidance is used to ensure that the individual participates in compensatory activities.

Contingent Exercise. In this procedure, the individual must perform a physical exercise contingent upon the occurrence of a problem behavior. Unlike overcorrection, where the corrective activity is related to the problem behavior (either through practicing the correct form or repairing environmental disruption), contingent exercise requires the individual to engage in unrelated physical activity to reduce the likelihood of the problem behavior. The exercise must be physically feasible and safe for the individual to perform.

Guided submission. In this method, the person is physically guided when the problem behavior occurs (such as performing a specific task). At the beginning of the method, if the person agrees to the requested activity, the physical guidance must be withdrawn. The withdrawal of physical guidance is conditional on the occurrence of the requested activity (submission). Submission is negatively reinforced. Guided submission has two effects: 1) positive punishment of the problem behavior, when the aversive stimulus (physical guidance) is used following the problem behavior, 2) negative reinforcement of submission with the desired activity because the aversive stimulus is removed following submission. However, if the problem behavior is negatively reinforced by escaping from the desired activity, in the "guided submission method", the reinforcer (escape) is withheld and extinction techniques are used in

addition to positive punishment and negative reinforcement.

Physical Restraint. Physical restraint is a punitive procedure in which the change agent physically immobilizes a part of the individual's body that is involved in the problem behavior. Consequently, the individual is prevented from engaging in the misbehavior. Since most individuals experience physical immobilization as aversive, physical restraint functions as punishment. A common form of restraint is the response blocking procedure, in which the change agent physically blocks the individual from completing the problem behavior immediately after initiation.

Ethical Principles of Punishment. Before implementing any punishment procedure, a number of ethical considerations must be addressed, including: Informed consent, Exhaustion of alternative treatments, Safety of the recipient, Severity of the problem behavior, Clear procedural guidelines, Adequate training and supervision, Peer review and accountability. These ethical principles are outlined in detail in Table 3.

Table 3. Ethical Principles of Punishment and Their Characteristics

Ethical Principle	Characteristic
Informed Consent	Awareness and informed consent of the individual receiving the punishment procedure must be obtained regarding the purpose and manner of its application, possible side effects, and the expected duration of use.
Alternative Treatments	Consideration and documentation must show that other less intrusive and non-aversive interventions have been attempted prior to the use of punishment procedures.
Recipient Safety	The punishment procedure must not endanger the physical or psychological well-being of the recipient.

Ethical Principle	Characteristic
Severity of the Problem	The punishment procedure should only be considered when the intensity or persistence of the problem behavior justifies its application.
Implementation Guidelines	Clear and precise procedural guidelines must be provided to ensure consistent application of the punishment procedure.
Training and Supervision	Practitioners must receive adequate training and continuous supervision in the application of punishment procedures.
Peer Review	The punishment procedure should be subject to peer review before implementation to ensure appropriateness and ethical compliance.
Accountability	Continuous monitoring, evaluation, and documentation of the effects of the punishment procedure must be conducted. Practitioners are responsible for accurate implementation and for reporting any adverse outcomes.

4. Habit Reversal Procedures

These procedures emphasize a therapeutic approach that targets the individual engaging in the problematic behavior, rather than the change agent. The purpose of habit reversal is to reduce the frequency of undesirable habitual behaviors. Habitual behaviors generally do not significantly interfere with an individual's social functioning; however, they often cause annoyance to the person themselves or to significant others in their life.

Habitual behaviors typically manifest as nervous habits, motor tics, and speech disfluencies such as stuttering. Examples of such behaviors are presented in Table 4.

Table 4. Habitual Behaviors and Their Examples

Habitual Behaviors	Examples
Sensory Habits	Thumb sucking, nail biting, hair pulling, or repetitive object manipulation (e.g., twirling a pencil, biting on clothing).
Motor Tics	Rapid, repetitive, and stereotyped motor movements, such as repeated blinking of the eyes or repeated head jerking.
Stuttering (Speech Disfluency)	Repetition of words or syllables, prolonged pronunciation of a word, or frequent pauses within speech.

Source: Woods, Miltenberger, & Flach (1996)

Habit Disorders are repetitive, non-functional behaviors that often occur outside the individual's conscious awareness, meaning the person may not even recognize the behavior. *Habit reversal training (HRT)* is implemented in a clinical session with a client exhibiting a habit disorder; the client then applies the strategies learned in session whenever the habit occurs outside the clinical setting.

Components of Habit Reversal Training (HRT) include:

- Teaching the individual to recognize and become aware of each occurrence of the habit behavior.
- Implementing a competing response contingent on the habit behavior.
- Applying social support strategies.
- Using motivational procedures that encourage the individual to consistently employ the competing response to eliminate the habit behavior.

The effectiveness of HRT lies in the use of the competing response, which functions either as a punisher (for habits and tics) or as an alternative incompatible behavior that replaces the habit.

5. Behavioral Contracts

Behavioral contracts are structured agreements that employ reinforcement and punishment to help individuals manage their own behavior. Such contracts are particularly useful for those who seek to increase desirable target behaviors or decrease undesirable ones. A behavioral contract is a written document that typically specifies the following:

- The target behavior;
- The consequences of occurrence or non-occurrence of the target behavior;
- The agreed-upon time frame;
- The method of measuring the target behavior;
- The individual responsible for delivering the consequences.
- Unilateral contracts involve an agreement between one party who specifies the target behavior to be changed and the contract manager who administers the contingencies.
- Bilateral contracts involve two parties, each specifying desirable target behaviors for the other to change.
- Quid pro quo contracts are structured so that one person's behavior change serves as reinforcement for the other person's behavior change.
- Parallel contracts involve both parties committing to change their own behaviors, with consequences arranged for each party's performance.

The primary purpose of a behavioral contract is to manipulate contingencies in a way that increases the likelihood of the individual engaging in the specified target behavior.

Methods for Reducing Fear and Anxiety

Fear and anxiety problems involve both operant and respondent behaviors. A particular stimulus situation elicits autonomic arousal (respondent behavior), while the presence of fear-inducing stimuli also evokes

operant avoidance or escape responses.

In fear-provoking situations, relaxation training techniques are employed to help individuals achieve calmness. Four commonly used relaxation techniques are:

1. Progressive Muscle Relaxation (PMR): systematically tensing and relaxing major muscle groups.
2. Diaphragmatic Breathing: slow, deep breathing to induce calmness.
3. Attentional Focusing Exercises: shifting attention from anxiety-provoking stimuli to calming scenes.
4. Behavioral Rehearsal of Relaxed Postures: emphasizing and practicing calm body positions.

The overall aim of these techniques is to establish relaxation as a counter-conditioning response to anxiety-provoking stimuli (Masters et al., 1987).

Methods of overcoming fear include 1) systematic desensitization and 2) real-life desensitization. The goal of these two methods is to create peace in the individual. In systematic desensitization, the individual finds peace, therefore, it is necessary for the individual to visualize scenes of fear-provoking situations in a hierarchy from the minimum to the maximum level of fear-provoking, and to describe and eliminate the factors that cause the fear. By doing this, the individual understands that his fear is not real.

In real-life desensitization, the individual gradually faces real fear-provoking situations in a hierarchy from the lowest to the highest level, and by accepting the groundlessness of the fear, creates peace within himself or engages in the opposite behavior of escape or avoidance (Davis et al., 1988; Papen, 1988).

An important component of these two desensitization methods is progress through the hierarchy. The individual gradually faces the fear-provoking scenes or situations through the hierarchy and engages in self-treatment and reaches peace. One of the very important factors in achieving peace is the constant mention of the divine names on the

days of the week. Learning the different names of God (such as the names of God in the Jushen Kabir prayer), each of which has a specific function and effect for different situations of encounter or scene of fear, is essential.

Cognitive Behavior Modification

While behavior modification emphasizes the analysis and change of overt, observable behaviors, cognitive behavior modification (CBM) focuses on analyzing and altering covert behaviors—internal cognitive processes.

For behavior modification procedures, the target behavior must be clearly defined and measurable. Observable behaviors can be directly recorded either by an independent observer or through self-monitoring by the individual exhibiting the target behavior.

By contrast, cognitive behaviors are covert and cannot be directly observed by an independent recorder. Therefore, individuals engaging in cognitive behavior must recognize and self-record their occurrences. Examples of cognitive behaviors include: 1) Thinking, 2) Self-talk, 3) Problem-solving, 4) Self-evaluation, 5) Planning, 6) Imagining behaviors, or 7) Visualizing specific situations.

Cognitive behavior modification is used to alter specific cognitive behaviors often referred to as cognitive labels. These labels, however, do not define the behavior itself but rather categorize it. Just as with overt behaviors, cognitive behaviors may involve excesses (maladaptive cognitions targeted for reduction) or deficits (adaptive cognitions targeted for increase).

Procedures for Cognitive Behavior Modification include:

1. Cognitive Restructuring
2. Cognitive Therapy
3. Cognitive Coping Skills Training
4. Self-Instructional Training (Miltenberger, 2016, Ch. 11).

1. Cognitive restructuring. In this method, the therapist approaches the client (the person with the behavioral problem) to identify the cognitive behaviors that are frustrating. The therapist helps the client to summarize these frustrating thoughts. Frustration thoughts are thoughts that create emotional responses such as fear, anxiety, or anger. The steps of cognitive restructuring (cognitive recognition) are as follows:

- Identifying the frustrating thoughts and situations

- Identifying the emotional or behavioral response that follows the thoughts

- Working to reduce the frustrating warning and increase rational or desirable thinking

A variety of changes are expected to occur from cognitive restructuring. These changes include 1) rational-emotional therapy, 2) systematic rational restructuring, and 3) cognitive therapy.

2. Cognitive Therapy. This approach aims to increase the individual's contact with reinforcing contingencies and to replace distorted self-talk with rational and adaptive self-talk. After dysfunctional cognitions have been identified, the next step is for the individual to critically evaluate them and actively replace them with more accurate, logical, and constructive thoughts.

3. Cognitive Coping Skills Training. In this method, therapists teach clients specific self-statements that they can use to improve their performance in difficult situations. Clients are trained through instruction, modeling, rehearsal, and feedback in role-play scenarios that simulate real-life problem situations. The goal is to strengthen coping self-talk that enhances performance.

According to Spiegler and Guevremont (1993), three specific strategies are commonly employed:

- Self-instructional training
- Stress-inoculation training
- Problem-solving therapy

4. Self-Instructional Training. This strategy typically involves three stages:

1. Identifying the problematic situation and defining the most appropriate adaptive behavior for that context.
2. Selecting the most useful self-instructions for dealing with the problematic situation.
3. Using behavioral skills training procedures to teach the self-instructions.

During training, the therapist must ensure that the client not only learns to use the self-instructions in simulated settings but also transfers them effectively to real-life situations.

Self-Management

When an individual uses behavior modification techniques to change their own behavior, the process is called "self-management." Self-management occurs when an individual engages in one behavior at a particular time in order to control the occurrence of another behavior (the target behavior) at a later time. Self-management includes controlling behavior and controlled behavior. Controlling behavior involves implementing self-management strategies that change the antecedents and consequences of the target behavior or opposing behaviors. These strategies make the controlled behavior (the target behavior) more tolerable.

Self-management strategies. In self-management, the individual identifies and defines the target behavior and arranges one or more behavior modification techniques to influence the occurrence of that behavior. However, the steps of a self-management program include:

1) making the decision to engage in self-management
2) defining the target behavior
3) opposing behaviors
4) setting the goal
5) self-monitoring

6) action evaluation

7) Selecting appropriate self-management strategies

8) Assessing change

9) Reassessing self-management strategies

10) Implementing maintenance strategies

To achieve and fulfill the above steps, the following strategies can be used:

1) Antecedent manipulation

2) Behavioral contracts

3) Arranging conditions for reinforcement or punishment

4) Social support

5) Self-teaching and self-praise

6) Goal setting, and

7) Self-reliance

In this step, the possibility of using each of these strategies is explained by explaining them.

Antecedent manipulation. This strategy is used to increase or decrease the target behavior. In antecedent manipulation, the individual arranges the occurrence of an event before the target behavior in order to influence the subsequent occurrence of the target behavior. Six types of antecedent manipulations to increase the likelihood of target behavior are:

- Providing cues about the target behavior

- Removing cues from the opposite behavior

- Ordering the generated operations about the target behavior

- Removing the generated operations from the opposite behaviors

- Less effort to respond to the target behavior

- More effort to respond to the opposite behaviors

Behavioral contracts. A behavioral contract is a written document

in which an individual identifies a target behavior and arranges consequences for a specific amount of the target behavior over a specific period of time. The following four steps can be used in this contract:

1. Identify and describe the target behavior to change
2. Use data and information collection methods
3. Define the target behavior standard level to achieve within the contract timeframe
4. Implement conditions based on arranging conditions, considering a person to influence the target behavior

These behaviors are controlling behaviors that an individual implements in his management strategy based on a behavioral contract.

Arranging reinforcement or punishment conditions. In this strategy, the individual considers a reinforcement or punishment condition for himself. In addition to positive reinforcement conditions, the individual can also use punishment or negative reinforcement conditions. Typical punishment or negative reinforcement conditions include penalizing the use of annoying facts or their removal.

Social support. Social support occurs when important people in an individual's life provide natural context or cues for the occurrence of the target behavior, or they naturally create reinforcing consequences for the occurrence of the target behavior. When social support is specifically designed to influence the target behavior, it is a self-management strategy.

Self-talk and self-praise. Individuals can often improve their behavior by talking to themselves in specific ways (Malat, 1989). One can learn self-talk and self-praise by practicing them in role-playing situations that simulate real-life problem situations. To do this, one must identify the statements that one is saying to oneself; determine the most appropriate time and place to use them; practice them in role-playing or while imagining the problem situation; and use them only when the statements are well-learned.

Goal Setting and Self-Monitoring. An individual can increase the

likelihood of engaging in the target behavior by setting a goal for themselves. Goal setting involves noting the level of the target behavior and the time frame in which the behavior will occur. With self-monitoring, an individual can record each target behavior as it occurs so that progress toward the goal can be assessed. Self-monitoring is often reactive because it may lead to a change in the target behavior that is being recorded (Miltonberger, 2015, p. 12).

Conclusion

Organizations, before allocating new resources to implement fresh decisions, must carefully plan for the behavioral changes required to achieve their objectives. Many decisions fail at the implementation stage because of an inability to generate the necessary behavioral adjustments, resulting in incomplete or abandoned initiatives. Consequently, organizational and societal cultures often become saturated with decisions left unfinished, fostering norms of inefficiency, abandonment, and disengagement.

The remedy for these cultural dysfunctions and failures lies in a clear understanding and systematic application of behavior change strategies for employees.

The topics presented in this chapter are of such critical importance that they can serve as analytical tools for identifying the root causes of both the success and failure of organizational decisions, which in essence are strategic programs. To date, much of the decision-making literature has neglected the behavioral mechanisms and change strategies that underpin successful implementation.

This chapter has sought to:

- Define and analyze the basic characteristics of behavior;
- Provide applied examples of behavior change;
- Introduce strategies for increasing desirable behaviors, reducing undesirable ones, and managing fear and anxiety;
- Present approaches to cognitive behavior modification and self-management.

Ultimately, ignoring the behavioral antecedents and consequences necessary for decision success undermines both planning and execution. Integrating psychological and sociological principles of behavior change into decision-making processes provides not only assurance of implementation but also foresight into outcomes. This is especially critical in the field of cultural engineering, which entails identifying the roots of maladaptive behaviors and replacing them with adaptive, goal-consistent alternatives.

Exercises

Comprehensive Self-Assessment

In this section, essay-type questions with both comparative and analytical dimensions are presented. These questions are designed to enhance comprehension of the principles and issues of decision-making.

1. Why is the study of behavior and methods of behavior change essential for decision-making topics?
2. Define behavior and list its characteristics.
3. How can the dimensions of behavior be measured?
4. What is meant by saying that behavior is a lawful phenomenon? Explain.
5. Which types of behaviors are called private events?
6. Describe the relationship between behavior and environment.
7. Provide two examples of behavior, analyzing them through the defining characteristics of behavior.
8. What is meant by behavior change? Explain, and also define applied behavior analysis.
9. Present—preferably with a diagram—the features of behavior change procedures.
10. Explain each of the following terms:
    a) Autism (self-contained behavior label)

b) Problem behavior

c) Target behavior

d) Law of effect

e) Behavioral label

11. (a) Describe behavior-change methods grounded in behavioral principles with emphasis on current environmental events; (b) What is meant by rejecting hypothetical underlying causes of behavior?
12. Name the procedures for establishing and increasing desirable behavior.
13. Explain differential reinforcement in full.
14. What is shaping and what are its features?
15. Set out the guidelines for effective shaping.
16. Briefly describe modeling, instructions (training), rehearsal (practice), and feedback, and state their applications.
17. List the factors that influence the effectiveness of rehearsal/practice.
18. Name the methods for reducing undesirable behavior.
19. Explain the differential-reinforcement procedures used to decrease problem behavior.
20. In using time-out, what considerations must be observed?
21. What is response cost and under what conditions is it used?
22. State the difference between extinction and response cost.
23. Explain the ethical principles of punishment and their features.
24. What is meant by positive punishment procedures?
25. What are habit behaviors and what are some examples?
26. What are behavioral contracts and how do they operate?
27. Name the methods for reducing fear and anxiety.

28. What is cognitive behavior change and how does it operate?
29. Name the cognitive behavior-change procedures.
30. List the steps of cognitive restructuring.
31. What is meant by cognitive coping-skills training? Explain.
32. What is self-management? Explain.
33. What type of strategy are antecedent manipulations, and how many types are there? Describe them.
34. In which situations are the following employed:
    a) Social support;
    b) Self-instructions and self-praise.

Concise Self-Assessment

This section is intended for reviewing the topics addressed in the chapter. Statements are presented based on the intended concepts; please specify which statements are true and which are false. For validation, refer to the chapter.

1. What people do or say is called behavior and consists of the individual's actions.
2. The dimensions of behavior can be measured by frequency, duration, intensity, and physical effort.
3. Because behavior is an individual act with physical dimensions, its occurrence is observable.
4. Behavior is an act that unfolds in space and time and affects the environment in which it occurs.
5. Basic behavioral principles describe the functional relations between our behavior and environmental events.
6. By identifying environmental events that evoke behaviors, one can organize/model the environment accordingly.
7. Behavioral monitoring is a field that analyzes and changes human behavior.

8. Based on resource-mobilization models, one can provide advanced and graduated methods to help people modify their behavior.
9. In applied behavior analysis, the emphasis is on behavior change rather than on labels.
10. Behavior-change methods are applied to modify problem behaviors exhibited by high-functioning leaders.
11. The scientific study of behavior is termed experimental analysis of behavior (or simply behavior analysis), and the goal of behavior change is to identify environmental events that control behavior.
12. Behavioral labels are manifestations of the causes of behavior.
13. Behavior-change procedures entail specific changes that follow a decision; these changes appear in environmental events and are functionally related to behavior.
14. A conditioned reflex is the same as the law of effect.
15. Stimulus–response psychology is based on neutral stimuli and considers conditioning.
16. Hypothetical underlying causes of behavior are measurable and can be used to demonstrate functional relations they purport to explain.
17. Differential reinforcement uses reinforcement and extinction to increase desirable target behavior while decreasing behaviors that interfere with it.
18. Differential reinforcement may be used after procedures such as shaping or prompting have first established the behavior.
19. Shaping should be used when the individual does not yet exhibit the specific target behavior.
20. To begin shaping, the person's existing behavior that resembles the target must be identified.
21. The success of a behavior-change program is assessed primarily on the basis of modeling.
22. Reinforcing a given approximation too many times facilitates

moving to the next step.

23. Imitative skills are necessary for modeling to be effective.
24. The model's behavior should occur in an appropriate context—either in vivo or in a well-constructed role-play that simulates reality.
25. The model should be similar to the observers or hold higher status.
26. When observation is paired with increased capacity for learning the behavior, instructions should accompany modeling.
27. When providing corrective feedback, negativity is not acceptable.
28. If the learner has performed multiple components incorrectly, feedback should highlight all of them at once.
29. Differential reinforcement of other behavior (DRO) is used when the rate of behavior has already decreased to criterion.
30. Differential reinforcement of incompatible/alternative behavior (DRI/DRA) is used when a reinforcer follows a functionally equivalent, alternative response.
31. A consequence following behavior may involve the presentation of a stimulus (positive or negative punishment).
32. Non-aversive operant interventions include extinction, differential reinforcement, and antecedent manipulations.
33. For response cost to be effective, the change agent must control the reinforcer that will be removed.
34. In extinction, the person is removed from access to all reinforcement associated with the problem behavior.
35. In response cost, the problem behavior is no longer followed by the reinforcer that previously maintained it.
36. The Premack principle states that when a low-probability (aversive) activity is made contingent on the occurrence of a high-probability (problem) behavior, the high-probability behavior will decrease in the future.

37. In overcorrection—positive practice, after a problem behavior, the individual must repeatedly engage in the correct form of the behavior.
38. If a problem behavior is negatively reinforced by escape from a requested activity, then in guided compliance escape is prevented; extinction is combined with positive punishment and negative reinforcement of compliance.
39. Ethical principles of punishment include informed consent, problem severity, peer review, and recipient safety.
40. Habit-reversal procedures can be applied to change agents themselves.
41. Behavioral contracts can be used to increase or decrease the rate of desirable or undesirable target behaviors.
42. A specific eliciting stimulus produces autonomic arousal as a respondent reaction; in the presence of the fear-eliciting stimulus, the individual engages in escape or avoidance as operant behavior.
43. Cognitive behavior change emphasizes the analysis and modification of overt behaviors, whereas behavior change deals with a different class of covert behaviors.
44. Cognitive behavior-change procedures are used to modify specific behaviors that carry cognitive labels.
45. Cognitive behaviors target both behavioral excesses and behavioral deficits.
46. Distressing thoughts are cognitions that elicit emotional responses such as fear, anxiety, or anger.
47. In cognitive therapy, the individual contacts more reinforcing realities and replaces distorted self-talk with accurate, rational self-talk.
48. Controlling behavior includes implementing self-management strategies that alter the antecedents and consequences of target or alternative behaviors.

49. Cognitive coping-skills training includes self-instructional training, stress-inoculation, and problem-solving therapy.
50. Social support occurs when significant others in one's life provide natural contexts or cues for target behavior, or naturally deliver reinforcing consequences when the target behavior occurs.

Chapter 10
Challenges in Decision-Making

Objectives

- To become familiar with systematic and non-systematic errors in decision-making be identified
- Identify how use to ensure the soundness of decision-making
- To become familiar with the symptoms and sources of errors in decision-making
- To Identify the signs of an organization entering a decline, and saved from that decline
- To Identify cognitive leaps, variations do they have, and they shape biases in decision-making

Introduction

The purpose of this chapter is to explain the challenges of decision-making so that, based on these challenges, criteria can be established to recognize warning signs, risks, and the stage of entering the trap of mismanagement, decision-making biases, and ultimately, the brink of organizational decline. Another objective of this chapter is to provide scientific and practical solutions to strengthen and enhance the ability of managers and experts in recognizing errors and diagnosing organizational weaknesses. By identifying warning signs, symptoms, and components before an organization enters the cycle of decline, managers can take corrective actions.

This chapter provides analytical explanations regarding each warning sign within the framework of entry indicators and engagement indica-

tors, as well as multiple biases. It then presents conceptual and methodological tools to facilitate proper analysis of these factors and a return to the path of excellence and productivity. Recognizing warning signs and biases in decision-making clarifies the causes of organizational decline. Managers and experts must use these insights to assess the health of their organizations. They must leverage knowledge and information to address issues that, if unresolved, can disrupt long-term strategic success. Progress signifies persistence in solving challenges and indicates whether an organization's performance aligns with its trajectory of excellence.

Biases and Errors in Decision-Making

Among all indicators of bias and error leading to decision-making deficiencies, the lack of clear objectives holds the greatest significance. This deficiency is closely linked to other indicators of bias, error, and deficiencies in decision-making. An organization unaware of its core mission cannot effectively analyze or respond to long-term issues. Competitors are always prepared and eager to serve customers, potentially eliminating the organization from the market and driving it toward dissolution.

A crucial step in rescuing an organization from collapse is the continuous review of organizational decision-making. A clear and well-defined goal unites managers and establishes a foundation for organizational survival. Objectives serve as a justification for essential activities and help eliminate redundant efforts. However, while emphasizing objectives is a prerequisite for long-term success, it alone does not guarantee it. Managers must know how to strengthen and empower their organizations to achieve their goals.

Recognizing the presence and extent of other biases, along with the ability to diagnose their root causes and take corrective actions, is essential in establishing organizational stability and achieving success.

Table 1 Biases and Errors

Causes of Occurrence	Description
Lack of Awareness and Work Knowledge	Managers understand the philosophy of work but do not know where to start or what actions to take.
Fear	Change requires moving against conventional organizational practices, forcing individuals to leave their comfort zones, discontinue usual programs, and alter their approach to business and life
Self-Challenge	The belief that changing fundamental beliefs and actions implies that previous philosophies or decisions were incorrect
Neglecting Occupational Psychology	A lack of effective psychological knowledge makes it difficult to implement an employee-centered philosophy.

Errors: Dimensions and Epistemology

With established criteria, it can be stated that humans make mistakes. Errors manifest in two forms: 1) Systematic errors. Systematic errors indicate predictability; 2) Non-systematic errors. Non-systematic errors are unpredictable yet understandable and inferable.

Non-systematic errors are identified through heuristics or cognitive leaps. Avoiding repeated errors requires the ability to recognize them. Error recognition must cover eleven dimensions, including: Conceptual, Cognitive, Cognitive Leaps, Heuristic shortcuts, Structural, Frictional, Cyclical, Interactive, Decision-making, Behavioral, Performance-based, Consequential. Refer to Table 2 for further details.

Table 2: Dimensions and Characteristics of Error Recognition

	Error Dimension	Characteristics
1	Conceptual	Reflects cognitive weakness in skill-based and behavioral control methods
2	Cognitive	Utilization of heuristics (mental shortcuts).
3	Cognitive Leaps	Leaps in availability heuristics, representativeness, and emotional influences
4	Structural	Misalignment of organizational structure with goals, mechanisms, models, and expected efficiency
5	Frictional	Adaptation to conditions, capabilities, available resources (financial and temporal), and limitations
6	Cyclical	Manifestation in repetitive, irregular, systematic, and random patterns.
7	Interactive	Incomplete development of interdependent and intelligence-related skills
8	Decision-Making	Perception-based, solution-oriented problem definition, and recognizing symptoms as problems
9	Behavioral	Actions, verbal expressions, occurrence frequency, duration, intensity, environmental influence, regulatory nature, and visibility (overt/covert).
10	Performance-Based	Alignment with goals, resources, processes, mechanisms, and structures
11	Consequential	Direct and indirect consequences, visibility (overt/covert), and impact (positive/negative)

Symptoms of Decision-Making Errors

The signs of entering the threshold of errors are categorized into two groups:

1. Emergent Indicators
2. Embedded Indicators

Emergent Indicators originate from: Mission and vision, Attitude and behavior, Crises and decline, Economic downturns, Deterioration and collapse cycles, weakening of organizational immune systems, Warning signs, Obstacles to progress, forgotten objectives, Profit and stock price fluctuations, Diverging perspectives, Monetary pursuits, Investment processes, Cultural weaknesses.

Embedded Indicators include: Merging and intensification, Excessive expenditure traps, Contamination, Cultural weaknesses, Production as the primary goal. Systematic errors arise from three primary sources, as outlined in Table 3.

Table 3: Sources and Types of Systematic Errors

Source of Error	Type of Error
Mental leaps of agency - Availability Heuristic	-Ease of recall based on clarity and recency: Simplicity of remembering -Recallability based on memory structure: Ease of retrieval from memory -Assumed relationship: Presumed correlation
Mental leaps of agency - Rep-resentativeness Heuristic	- Base rate indifference: insensitivity to the base rate - Sample size insensitivity - Misperception of random events: misperception of chance - Mean reversion: reversion to the mean - Combination error (combination fallacy)
Anchoring	- Anchoring: Emphasis on estimation based on initial values - Bias towards related and unrelated events: Overestimating the probability of related events and underestimating the probability of unrelated events - Overconfidence: Relying on one's own judgments when answering relatively difficult questions - Confirmation bias: Going for confirming information and not going for disconfirming information - Hindsight and the trap knowing

Signs of Entering the Error Threshold and Organizational Decline

Mission and Vision Statement. Many organizations that enter the competitive arena establish specific mission statements and document their future vision for their business. However, instead of actively pursuing their mission and vision, they merely display these statements on walls without aligning their daily operations with them. They never clearly define their activities, whom they work with, how they operate, and who their customers are. Nor do they determine whether their business genuinely aims to serve its customers. Such mission and vision statements are merely a waste of time and paper. Error science indicates that a shared vision is a powerful tool for fostering cooperation, but it must be directed correctly. This is crucial for strategic success. Organizations on the brink of collapse often focus excessively on quantitative metrics while ignoring environmental changes. They remain unaware of gradual shifts and fail to consider their long-term effects.

These organizations suffer from long-term performance stagnation, market instability, declining profitability, poor customer service quality, failure of new products, and increased waste (such as excessive inventory, disputes, rework, etc.). Even when positive performance occurs, they fail to deeply analyze the underlying issues and changes. Instead of addressing the root causes of their long-term struggles, they take short-term actions—often opting for the quickest solution: firing employees. This is a short-sighted economic temptation that disregards long-term consequences.

Rather than making meaningful organizational improvements, they resort to hiring an external executive and continue their problematic practices. Often, numerical indicators highlight inefficiencies, but the real problem lies elsewhere. Error science reveals that when a small organization experiences rapid growth, its costs may rise while revenue declines, not due to failure but due to restructuring. To enhance long-term service quality and customer satisfaction, companies must fundamentally improve their processes and mechanisms.

Attitude and Behavior. Another sign of an organization's decline is

its attitude toward suppliers. Failing organizations typically engage with nearly all their suppliers on a short-term basis, prioritizing those with the lowest initial prices. However, when dealing with critical components, working with established and influential suppliers is vital. Strong marketing channels ensure higher long-term profitability.

Although lower initial prices provide short-term benefits, organizations must focus on long-term gains from high-quality suppliers. These benefits include faster market entry, overall cost efficiency due to unique product design, waste reduction, mutual trust, high product quality, and timely delivery.

Crisis and Decline. Organizations in crisis or decline are often identified by their executives. These leaders prioritize short-term profitability over long-term sustainability. They fail to attract, retain, and engage talented employees—who are the organization's long-term assets.

A short-term perspective on employees, coupled with poor market awareness, fosters mistrust toward management and increases inefficiencies. Managers should serve the organization's interests, not just occupy leadership positions without considering employee expectations.

One of the most reliable signs of an organization's impending collapse is its operational and visual state. In failing organizations, employees lack motivation, and the workplace is chaotic. Poor cooperation among employees results in isolated work groups rather than a cohesive system.

Working in a failing organization is frustrating due to declining productivity and widespread dissatisfaction. In contrast, being part of a healthy organization that consistently creates value for customers is fulfilling. Continuous efforts to identify and address warning signs help transform organizations into great workplaces.

Causes of Stagnation and Decline. A fascinating phenomenon in failing organizations is that even those with previous economic success can enter a downward spiral. Some organizations recognize warning signs but fail to analyze them properly or take corrective action.

In contrast, companies that consistently work to mitigate warning signs

and align them with organizational goals perform better. This situation resembles human health: someone with a weak immune system may appear healthy until exposed to bacteria, viruses, or other environmental factors. Those who proactively enhance their health have stronger immune systems.

Survival is a choice. No matter how large or successful an organization appears, there is no guarantee of its continued existence. Over the years, we have witnessed unfortunate examples of this reality.

Deterioration and Organizational Failure. Organizational decline is a slow process resulting from cumulative actions, decisions, and behaviors that ultimately lead to collapse. The complexity of organizations and markets makes it difficult to pinpoint specific causes of failure.

The bankruptcy process often begins long before a company shows visible signs of trouble. When downturns become apparent, managers often react without understanding the underlying causes. Instead of implementing strategic solutions, they adopt crisis measures that, despite their intentions, accelerate the organization's decline.

Leadership philosophies dictate an organization's strategies, decisions, and actions—ultimately determining its success or failure.

Fall cycle. Identifying organizations caught in a downward spiral is not difficult. Declining profits, shrinking market share, and mass executive layoffs are clear indicators. The list of companies trapped in this vicious cycle includes once-powerful industry giants that seemed unstoppable.

When an organization struggles, executives and analysts often blame economic downturns, natural disasters, political issues, or external factors. While these elements influence success or failure, it is unclear why some competitors in the same industry thrive despite facing identical challenges.

The descent into failure is a two-stage process. First, the organization's immune system weakens, leading to a cycle of declining executive cooperation. Initially, managers join organizations with high motivation and a willingness to contribute. However, under restrictive policies, management behaviors, and lack of action, their enthusiasm quickly fades.

This loss of motivation stems from management's distrust of employees. As employee morale declines, performance deteriorates, creativity diminishes, and projects stagnate—failing to meet managerial expectations. In response, management concludes that employees lack motivation and capability, tightening oversight. However, what they fail to realize is that they themselves created this toxic environment.

Weakening of the Immune System. The continuous repetition of the control cycle gradually weakens the organization's immune system, impairing its ability to withstand external pressures. If the market for the organization's products or services is strong, this immune system weakness may not immediately affect the management team. However, an organization suffering from a weakened immune system may still maintain profitability for a certain period, creating a false sense of security for managers and stakeholders.

Like the human body, an organization may appear healthy as long as it has not encountered an external stimulus or event that triggers a crisis. The problem becomes evident when one or more external factors negatively impact the organization's revenue, pushing management into crisis mode and leading to the second stage of the downward spiral. While the recession cycle in service organizations differs slightly, it follows the same pattern as in manufacturing firms. The impact of decline is more pronounced in-service industries, where a larger percentage of employees have direct contact with customers.

The downward spiral reflects both a weakened immune system and ineffective crisis management. When declining sales lead to reduced profitability, managers typically respond by implementing cost-cutting measures to maintain acceptable profit levels. The first step in this process is often reducing or eliminating expenditures that do not yield immediate and quantifiable results, such as employee training and long-term development projects.

If cost-cutting measures fail to sustain profitability, crisis-driven decisions escalate, often including pressuring suppliers to lower prices for goods and services or extending payment timelines. Layoffs are another common response, which invariably lowers the morale of the remain-

ing employees, negatively affecting productivity and customer interactions. Moreover, the remaining workforce often struggles to effectively meet customer expectations.

A fundamental shift in an organization's philosophy requires changes in beliefs—about leadership, business, and society. Such transformation can occur in response to specific events that prompt an individual to reevaluate their circumstances and reflect on their role in the broader world. A leader must recognize the necessity of change and continuously assess employee performance, organizational shifts, and the need for further adjustments. These initiatives require a supportive organizational culture encompassing the key elements outlined in Table 4.

Managers trapped in the death spiral of organizational decline fail to recognize the importance of these cultural elements, focusing solely on technical innovations for progress. Consequently, due to a severe deficiency in cultural support for improvement initiatives, their efforts ultimately fail. Ensuring a healthy organizational culture is as critical as maintaining an individual's physical health.

Warning Signs. For individuals working within an organization, recognizing that the company is caught in a downward spiral can be extremely challenging. Immersed in daily operations, employees gradually adapt to existing problems and obstacles, viewing them as normal rather than recognizing them as early warning signs of impending failure.

Table 4: Elements of an Advanced Supportive Culture

Elements of an Advanced Supportive Culture	Presence of trust throughout the organization
	The ability to take pride in the work accomplished
	A passion for progress and development
	Greater focus on performance and customer satisfaction rather than financial statements
	Continuous improvement of managers, leaders, and teams
	Clarity, alignment, and credibility of goals and values

Some managers become so accustomed to the ups and downs of business, workforce reductions, and budget cuts in various departments that when the organization enters a downward spiral, they fail to recognize these changes as critical issues. Even for those who regularly read business journals or have formal education in business management, layoffs and budget reductions may seem like natural components of business operations.

Without a clear understanding of an organization's overall performance, it is difficult for managers to assess the impact of actions in one department on the organization as a whole. One of the primary challenges arises from the fact that organizational decline is often separate from short-term performance. Managers who are accustomed to observing a seemingly successful organization tend to overlook emerging problems and fail to recognize early warning signs.

Key indicators of a declining organization include significant decreases in sales volume, profits, and stock value. Unfortunately, these warning signs often remain unnoticed until the organization has already entered the downward spiral, making recovery and progress much more difficult.

The key to preventing organizational failure is proactive intervention before visible symptoms arise and the situation worsens.

Barriers to Progress. Organizations that have successfully managed to avoid or escape from decline have generally been economically prosperous. The experiences and achievements of such organizations are well-documented for those interested in learning from them. However, many managers are more inclined to share their success stories rather than actively learn from the experiences of others. The number of managers willing or capable of embracing and sustaining such philosophies remains limited.

Forgotten Objectives." If you don't know where you're going, you'll never get there." Losing sight of an organization's purpose leads to fragmented managerial focus and conflicting definitions of success, often accompanied by high financial costs.

The first and most apparent warning sign of organizational stagnation is the absence of a clear and well-defined goal that is understood and embraced by all managers. Objectives are rooted in an organization's mission (why it exists in the first place) and vision (where it is headed). This concept forms the foundation of business management.

Without a clear goal, an organization cannot function effectively, especially when its leadership is divided into factions that prioritize their own needs and often conflict with one another.

Profit and Stock Prices. Managers who argue that profitability and financial metrics should not be the primary focus of an organization are often unfairly criticized for ignoring economic realities. In truth, profit is essential for business survival—without it, a company cannot exist. However, profit is not the sole reason for an organization's existence.

Profit in an organization is analogous to oxygen, food, water, and blood in the human body—necessary for survival but not the ultimate purpose of life. Managers who believe profit is the primary objective need to redefine its role within a broader strategic framework.

Organizations that frequently hire and fire employees in response to business cycles tend to focus excessively on annual profits without prioritizing long-term financial sustainability. The only way for a company to achieve lasting financial success is to establish a clear purpose within a well-defined service or product offering.

Differing Management Perspectives. A manager focused on profitability leads differently than one dedicated to customer service. A leader seeking immediate financial gains might cut training programs, product or service development, and technical support. Those who eliminate initiatives with no immediate economic impact fail to consider long-term implications.

Such short-sighted management creates numerous problems down the road—many of which may emerge long after these managers have moved on to other positions, leaving behind challenges for their successors.

Focusing on profit as an organizational goal creates tension between

shareholders and employees rather than uniting them as a cohesive team. Decision-making becomes dominated by short-term thinking, and employees—especially those whose efforts do not yield immediate financial returns—are often treated as expendable. In such an environment, both customers and shareholders ultimately suffer.

Conversely, managers who prioritize customer service understand the value of training, development, and quality improvements. They invest in the long-term success of the organization, leading to higher customer satisfaction, improved quality, and sustained profitability.

Revenue Generation and Business Philosophy. Western business culture has often shaped managers to believe that making money is the primary goal of an organization. Shareholders, who should ideally be long-term investors, have increasingly adopted short-term, high-frequency investment strategies. This shift in investor behavior has placed disproportionate emphasis on quarterly earnings reports rather than sustainable long-term growth.

The Investment Process. An individual starts a business because they have a vision for creating something meaningful. If the business succeeds, they will eventually need investment to expand and serve a growing customer base.

Seeing the company's success and growth potential, you decide to invest in it—not by lending money but by purchasing a stake in the business. Your investment is based on faith in the founder's mission, expecting that past success will continue into the future, leading to financial returns.

But what happens if the founder loses sight of their original mission and instead prioritizes profits and shareholder satisfaction over customer needs?

In such a scenario, the company's long-term success—and by extension, your financial return—is put at serious risk.

Error-prone signs

Mergers and Increased Complexity. Mergers and acquisitions add another layer of complexity to the challenge of maintaining an organi-

zation's mission. While mergers are not always beneficial for employees, customers, or stakeholders, they have become a common business practice. When a company acquires another organization, one of three scenarios typically unfolds:

1. Maintaining the Status Quo – The acquired company is allowed to operate independently as it did before the merger.

2. Dilution of the Acquired Organization – The acquired company loses its distinct identity and influence.

3. Contamination of the Parent Company – The acquired company negatively impacts the acquiring organization.

In the first scenario, the acquired organization remains largely unchanged. While rare, this is often the most logical approach, especially if the acquisition was based on the target company's unique expertise or technology.

Interfering with an acquired company's core mission or operational system can lead to an exodus of key managers and cultural disruption, ultimately resulting in widespread negative consequences.

The Cost Trap. Excessive costs within the parent company can lead to drastic cuts in product development, training, or quality improvement initiatives.

In such cases, short-term financial gains for executives and investors come at the long-term expense of employees and customers.

While a merger might initially appear successful due to a sudden boost in revenue, short-term thinking can eventually destroy the acquired company's future prospects.

Organizational Contamination. One of the most damaging merger scenarios occurs when the acquired company infects the parent company with its negative traits.

This happens when the weaker organization influences the stronger one, leading to a loss of purpose, mission, vision, and values.

Cultural Weakness. A culturally weak acquired organization can quickly spread dysfunction to the parent company. This often occurs

when executives become so consumed with the challenges of managing the acquisition that they neglect their core organization. As a result, the merged company experiences lower efficiency, higher turnover, and the departure of key technical and managerial talent.

Organizations that understand the impact of cultural complexity tend to promote internal leadership rather than relying on external managers to handle integration challenges.

Production as an End in Itself. When an organization shifts its focus from addressing customer needs to simply producing for the sake of production, it is a clear warning sign of deviation from its core purpose. An often-overlooked yet crucial aspect is how the organization serves its customers, as this is what enables the realization of production objectives. The goal defines the "what," while the product defines the "how" in achieving it.

The rapid pace of technological change makes it unrealistic to expect long-term sustainability without adapting to innovation. Many products become obsolete due to technological advancements, replaced by newer alternatives. However, replacement products are not necessarily cheaper. With innovation and technological shifts, customers may remain satisfied with existing products until they find a better solution that meets their needs more effectively.

The reason for product substitution lies in the fact that customers are not always fully aware of their actual needs when purchasing a product. The Need for Strong Passion and Commitment So, what defines a company's purpose?

Many organizations invest heavily in crafting mission statements. While some successfully achieve their goals, others fail. Why do so many efforts collapse before reaching their objectives?

One possible explanation is the passion and dedication of the founders. If leaders are not deeply committed to their organization's purpose, their decisions and actions will continuously veer off course. Aligning decisions with the organizational mission is easy when business is thriving, but sticking to the right course during difficult times is only

possible when personal interests are closely tied to the company's purpose.When there is a strong commitment to the mission, economic fluctuations become less influential. While external conditions affect decision-making, they do not necessarily lead to abandoning the organization's purpose.This argument assumes that the company's mission is aligned with real market needs. If an organization pursues a non-essential or economically unsustainable goal, success will remain elusive.

Recognizing and Escaping the Downward Spiral

There are several ways to successfully steer an organization and prevent it from falling into decline.

First, understanding and recognizing warning signs is crucial. By identifying issues early—before they significantly weaken the organization or compromise its internal resilience—leaders can take proactive measures to mitigate risks.

Second, when one or more warning signs become evident, addressing their root causes is far more important than resorting to short-term corrective actions that merely mask the symptoms. Sustainable solutions should focus on eliminating the underlying factors that contribute to the organization's decline.

Finally, continuous improvement of organizational culture and systems is essential for maintaining long-term health and resilience. By fostering a robust internal framework, an organization can strengthen its ability to withstand external pressures and avoid systemic failure.

An organization experiencing declining health will exhibit several internal warning signs. These indicators serve as critical markers of systemic weakness and organizational distress. If left unaddressed, they can lead to deteriorating economic performance, major operational setbacks, workforce reductions, budget cuts, and other serious challenges.

The key warning signs of organizational decline are as follows:

1. Recognizing early warning signs is crucial. This allows problems to be identified at an early stage before they become severe enough to damage or weaken the organization's immune system.

2. When warning signs emerge, addressing the root causes rather than implementing short-term fixes is essential.

3. Continuously improving organizational culture and systems ensures long-term resilience and success.

An organization suffering from declining health exhibits multiple warning signs, which serve as key indicators of systemic weakness. If left unaddressed, these issues can lead to poor financial performance, layoffs, budget cuts, and other major setbacks.

Warning signs of declining organizational health are as follows:

1. Loss of Central Focus. Employees lack awareness of the company's mission and their roles within it. This leads managers to rely on their own subjective definitions of success, often resulting in conflicting priorities and financial misalignment across departments.

2. Overemphasis on Financial Metrics. Leadership obsesses over financial indicators while neglecting intangible yet crucial business aspects such as morale, culture, and leadership development, which directly impact financial outcomes.

3. Pressure on Suppliers. Instead of fostering long-term relationships with suppliers to improve quality, cost efficiency, and delivery times, management prioritizes aggressive cost-cutting by forcing suppliers into the lowest possible pricing, often at the expense of overall value.

4. Devaluation of Employees. Managers fail to appreciate the contributions of employees, leading to a culture of fear and job insecurity. Employee efforts are judged solely on measurable performance, disregarding invaluable contributions that may not be quantifiable.

5. Workplace Deterioration. Unclean, cluttered, and poorly maintained work environments reflect organizational neglect. Facilities, assets, and equipment suffer from inadequate maintenance.

6.Excessive Operational Downsizing. Low levels of teamwork result in fragmented operations, with the company functioning as disjointed units rather than a cohesive system.

Steering an organization out of decline is challenging. Open dialogue

and critical reflection on whether existing strategies and systems contribute to stagnation are essential. Recognizing that many widely accepted business practices may, in fact, fuel stagnation is key. Achieving this requires stepping out of comfort zones and restructuring ineffective systems that limit leadership potential.

7. **Failure to Maintain Organizational Unity**. A clear and unwavering mission serves as the glue that holds an organization together. Some managers struggle to see beyond their own areas of expertise, viewing the company only through the lens of their own department—financial managers focus solely on numbers, sales managers on revenue, and so on. Unless the organization's mission is well-defined, managers will naturally focus only on their own areas rather than the bigger picture.

For the system to remain alive, the mission must evolve, or else employees will create their own personal objectives, which may not align with organizational goals.

8. Decline of Meaningful Goals. Managers, regardless of their position, spend a significant portion of their lives at work. Those who are passionate about their profession seek to feel that their contributions have a meaningful impact.

When an organization lacks a clear purpose, managers may look for fulfillment elsewhere. Consequently, their jobs become merely a means to cover expenses, with their true ambitions lying outside the workplace.

The longer an organization operates without a meaningful purpose, the harder it becomes to align its leaders with a shared mission.

Managers will only believe in the company's mission if leadership consistently demonstrates commitment to it—through both good and bad times.

9. Lack of Depth and Stability. To be truly impactful, organizational goals must be deeply rooted in long-term societal value. They must be clearly defined and sustainable over time.

Without these qualities, managers will neither be inspired by the mission nor feel compelled to uphold it. Mission statements form the foundation of many successful organizations, and leaders must continuously

reinforce their commitment to them.

10. Reviewing and Updating Organizational Goals. Goals must be periodically re-evaluated and adjusted to reflect external changes and the organization's progress in achieving its vision.

However, the organization's core mission should remain unchanged. While periodic revisions can be beneficial for adapting to market shifts, the fundamental purpose of the organization must remain intact—changing it too frequently can lead to organizational instability.

At times, an organization may lose touch with its mission, either due to a lack of awareness or failure to communicate it effectively. In such cases, a temporary shift in focus might be necessary to realign with the intended path.

11. Blurring of Organizational Goals. Having a well-defined purpose offers several advantages:

- It attracts managers who share similar values and ambitions.
- It provides clarity for potential employees, helping them assess whether the organization aligns with their career aspirations.
- It enables organizations to regularly reassess whether their goals are still creating value.

12. Failure to Recognize Lost Goals. If you work in an organization and struggle to identify its goals, encountering contradictory messages and actions that contradict its stated objectives, this is a sign that the company has lost sight of its fundamental mission.

If management solely prioritizes financial gains without a broader purpose, this is a warning sign of organizational decline.

How to address this issue depends on your position and influence within the company.

- If you have the ability to drive cultural change, it is your responsibility to help redefine the company's mission and guide leadership toward fulfilling it.
- Making work meaningful for employees and fostering a team dedi-

cated to a common goal is one of the most valuable responsibilities of a leader.

Red Flags to Watch for During Job Interviews. When interviewing with a company, pay close attention to how they respond to your questions. Be cautious if you observe the following:

1. Conflicting or inconsistent responses from different managers regarding the company's purpose.
2. Confusion or uncertainty when answering your questions about the organization.
3. A focus exclusively on financial performance, without any mention of broader objectives or values.

Judgment and Limitations in Decision-Making

Managers are often asked to make impartial decisions, yet their judgments unconsciously align with their personal interests. This bias occurs because humans process incomplete information, and personal interests strongly influence how managers analyze data. People often confuse what benefits them with what is ethical and fair. Decision-makers usually lack essential information needed to properly define problems and relevant criteria. Time and cost constraints limit the quantity and quality of available data. Moreover, decision-makers retain only a small portion of the information in their memory. The cognitive limitations of managers hinder their ability to accurately evaluate and select the optimal choice among the available options. These limitations prevent decision-makers from achieving the rational decisions outlined in classical decision-making models. Irrational decisions often stem from intuitive biases that disregard a wide range of possible consequences. Decision-makers overlook the best option in favor of one that appears acceptable or reasonable.

As a result, decision-makers become satisfied with their choices too soon, continuing their search only until they find an option that meets a minimum level of acceptability, rather than evaluating all possible alternatives. By recognizing biases in decision-making patterns and limiting

their influence, managers can make better decisions that protect themselves, their families, and their organizations from avoidable errors.

Mental leaps of judgment

Managers rely on mental shortcuts (heuristics) because the time savings outweigh the potential loss in decision quality. Heuristics provide a simplified way for busy managers and similar professionals to navigate complex environments. In many cases, heuristics lead to accurate or reasonably good judgments, but inappropriate use of these shortcuts in the wrong contexts can mislead managers.

Types of Mental leaps. There are three primary types of mental leaps: Availability Heuristic, Representativeness Heuristic, Affect Heuristic (Emotional Biases)

1. Availability Heuristic. Managers estimate the frequency, probability, and causes of an event based on how easily similar examples come to mind.

While this shortcut often results in accurate judgments, it can also be misleading because the availability of information is influenced by unrelated factors rather than the actual frequency of the event. Factors that can distort availability include:

- Unusual or extraordinary events that stand out in memory
- Recent events that are easier to recall
- Highly publicized events, which seem more common than they actually are

2. Representativeness Heuristic. When evaluating managers, objects, or events, people judge based on how similar they are to pre-existing mental stereotypes.

- In some cases, this is an effective way to make quick estimates.
- However, when information is insufficient, relying on stereotypes can lead to irrational behaviors and ethically questionable decisions.

3. Affect Heuristic (Emotional Biases). Many judgments are driven by emotions rather than logical reasoning.

- Emotional evaluations often occur before any conscious cognitive analysis takes place.
- People are often unaware that their emotions are influencing their decisions.
- When managers are under time pressure, they frequently rely on emotional heuristics to make judgments.

Common Cognitive Biases

Humans make mistakes in their judgments, but if these errors can be recognized, they can be avoided in the future. Mental leaps can lead managers to systematic errors and biases. Cognitive biases arise when a person uses leaps inappropriately in decision-making.

1. Biases due to simple mental jumps or inspiration: Ease of recall bias in terms of clarity and time lag. The causes of this bias are the availability and clarity of information, the probability and frequency of events that are easier to remember, the proximity of an event in terms of time.

2. Bias of recall based on memory structure in terms of letters and words, location and organizational structure.

3. Hypothetical relationship bias. When assessing the probability of two phenomena occurring simultaneously, humans suffer from a bias due to the (simple) mental leap of availability. In such a way that they imagine the connection or lack of connection between them in terms of available mental data. When the probability of two events occurring simultaneously is calculated in terms of the availability of the samples that are imagined. Usually, there is a tendency for their occurrence to be simultaneous in the future.

4. Indifference bias to basic information. Managers usually recognize the importance of basic information, but when personal information is also available to them, they tend to ignore basic information. Ignoring basic information has several negative consequences.

5. Insensitivity bias to sample size. Managers use the mental intuition of representativeness when dealing with sampling problems.

6. Bias of misperception of sudden events that leads to a misunderstanding of the events that occurred. Managers do not consider that the performance of each factor is independent of the performance of other factors. Managers expect a sequence of unknown consequences to appear random. They assume that sudden and systematic events will cancel each other out.

7. Bias of tendency to the mean. In completely unusual circumstances, one can expect that performances will tend to tend towards the mean.

8. Bias of combination error. A combination is seen by managers as more likely than its individual components if that combination appears to be more representative than its individual components. The occurrence of the combination error is more likely to occur when the combination is more accessible than its components. The combination error can lead to a departure from logical and rational analysis and severely weaken the ability to predict the future.

We have learned from experience that the probability of a particular event is influenced by the probability of the occurrence of the set of events that the particular event represents. Lack of awareness of the aforementioned trends can lead to systematic errors in managers' judgments.

9. Anchoring Bias. Most managers' judgments are influenced by irrelevant information. Reason: 1) People start their estimates from an initial support, and this support can be any type of information at will. Then they revise their estimates until they reach the correct answer. 2) The presence of a support leads managers to information that is consistent with it (similarities) and not information that is inconsistent (differences).

10. Anchoring bias. When the support/anchor is set at very exaggerated values, this reference biases the information search process in the direction of consistency with the reference value.

11. Bias towards related and unrelated events: Common fact: Why are there so many delays in projects that have to be completed in different stages? It is an underestimation of independent and unrelated events.

12. Overconfidence Bias. Due to individuals' unawareness of their own cognitive limitations, the overconfidence phenomenon intensifies as managers' self-assurance increases. People often fail to properly assess the difficulty of questions. When asked to answer difficult questions instead of easy ones, their overconfidence increases even further.

Inaccurate Performance Estimation:

- When performance is low, individuals tend to overestimate their actual capabilities.
- Groups may also experience overconfidence bias, similar to individual managers.

In uncertain situations, group judgments tend to be more accurate than individual managerial judgments, especially when diverse perspectives and serious disagreements exist within the group.

Two Strategies to Reduce Overconfidence Bias:

1. Providing feedback to managers about their overconfident judgments can significantly reduce this bias.
2. Asking managers to explain why their answers might be incorrect helps mitigate overconfidence. The mere act of questioning encourages managers to identify contradictions in their judgments.

However, overconfidence bias should be approached with caution. From a positive perspective, excessive confidence can give managers the courage to push themselves and maximize their potential. From a negative standpoint, it can hinder professional and effective decision-making.

13. Confirmation Trap: Consider the following sequence of three consecutive numbers. 6 - 4 – 2 What is the underlying rule?

Possible interpretations:1) The numbers increase by two! 2)The difference between the first two numbers equals the difference between the last two numbers! 3)A sequence of three increasing numbers!

Searching for challenging and contradictory evidence provides the most valuable insights.

However, humans tend to seek confirming information, even when contradictory evidence is stronger and more relevant.

14. Hindsight Bias & Illusion of Knowledge. Once a decision's outcome becomes known, people struggle to recall the original uncertainty and decision-making conditions.

- We often overestimate the accuracy of our initial predictions.
- Hindsight bias occurs when managers look back at their past judgments and those of others, believing they could have predicted the outcome all along.

Short-term benefits of hindsight bias:

- A person may believe their predictive ability is exceptionally strong, overestimating their actual forecasting skills.
- This leads to the easy dismissal of others' poor foresight while failing to learn valuable lessons from past mistakes.

To counteract hindsight bias, managers should be evaluated based on their decision-making process and reasoning, not just the final outcome.

15. Curse of Knowledge Bias. When evaluating others' understanding, we often fail to account for the fact that they lack the same information we possess.

- Product designers mistakenly assume that consumers will intuitively understand how to use advanced products.
- Providing directions to someone may seem clear to you, yet they still get lost.

This bias highlights the difficulty of separating personal knowledge from others' perspectives.

At this stage, we re-examine biases to better understand their influence on decision-making and improve judgment accuracy.

Biases Resulting from the Availability Heuristic

1. Ease of Recall. People tend to evaluate events that are easier to recall from memory—either due to clarity or temporal proximity—as being more frequent than events that have the same actual frequency but are

harder to remember.

2. Ease of Retrieval from Memory. People's evaluation of event frequency is influenced by how their memory structure affects the information retrieval process.

3. Assumed Correlation. Due to personal experience or social influence, people tend to overestimate the likelihood of two events occurring simultaneously, especially when they can easily recall multiple instances of such occurrences.

Biases Resulting from the Representativeness Heuristic

4. Insensitivity to Base Rates. When evaluating the probability of events, people often ignore base rate information if additional (even irrelevant) descriptive information is available.

5. Insensitivity to Sample Size. When assessing the reliability of a sample, people often ignore the impact of sample size on statistical validity.

6. Misinterpretation of Randomness. People expect sequences generated by random processes to appear perfectly random, even when the sample size is too small to be statistically meaningful.

7. Regression to the Mean. People often overlook the fact that extreme events tend to return to the average over time.

8. Conjunction Fallacy (Combination Bias). People mistakenly assume that the probability of two specific events occurring together is higher than that of a larger set of possibilities that includes both events.

Biases Unrelated to the Availability or Representativeness Heuristics

9. Anchoring Bias. Managers' estimates of various values are influenced by initial reference points, which may be derived from previous events, random values, or any available information. Adjustments made from these initial points are usually insufficient.

10. Overestimating Related Events & Underestimating Unrelated Events. People overestimate the probability of related events and underestimate the likelihood of unrelated events.

11. Overconfidence Bias. When answering relatively difficult questions, managers tend to overestimate the accuracy of their judgments.

Biases Unrelated to the Availability or Representativeness Heuristics

12. Confirmation Trap. People tend to seek information that supports their pre-existing beliefs while ignoring disconfirming evidence.

13. Hindsight Bias & Illusion of Knowledge

Once an event's outcome is known, people overestimate their ability to have predicted it beforehand. Additionally, when predicting others' behavior, people tend to ignore the fact that they possess information that others do not.

Conclusion

This chapter achieved two main objectives:

1. Explaining the challenges of identifying warning signs that indicate the risk of mismanagement, decision-making biases, and eventual organizational decline.
2. Providing scientific and practical strategies to enhance managers' and experts' understanding of error detection and prevention.

Among all the identified biases and decision-making errors, the lack of a clear goal was highlighted as a critical issue. This deficiency is closely linked to other biases, errors, and decision-making failures. The ability to recognize biases, diagnose their root causes, and take corrective actions is essential for stabilizing organizations and achieving success. Errors were categorized into systematic and non-systematic errors, with twelve key dimensions and their characteristics discussed. The warning signs of organizational failure were classified into two groups:

1. Indicators of the onset of errors
2. Indicators of an organization already suffering from errors

When discussing the warning signs of organizational failure, the following factors were identified:

1. Mission and visionary outcome
2. Attitude and behavior
3. Attitude and behavior towards suppliers
4. Crisis and decline
5. Conditions leading to stagnation and recession
6. Deterioration
7. The cycle of organizational collapse
8. Weakening of the organizational immune system

The early warning signs included:

1. Obstacles to progress
2. Forgotten goals
3. Profit and stock prices
4. Differences in perspectives
5. Revenue generation
6. Investment processes

Furthermore, decision-making errors and limitations were analyzed.

A key factor contributing to decision-making errors is the use of cognitive shortcuts and heuristics by decision-makers. These were classified as follows:

1. Biases resulting from the availability heuristic
2. Biases resulting from the representativeness heuristic
3. Biases unrelated to either availability or representativeness heuristics
4. Other cognitive biases impacting decision-making

Exercises

This section presents descriptive questions with comparative and analytical aspects, designed to deepen understanding of the chapter's principles.

1. What are biases and errors in decision-making, and how are they related? Explain.
2. Explain systematic and non-systematic errors.
3. List and describe the dimensions and characteristics of error analysis.
4. What are cognitive error indicators, and what types exist?
5. Describe the sources and types of systematic errors.
6. List the signs indicating the threshold of errors and organizational decline.
7. What do warning signs in the cycle of organizational decline mean? Explain.
8. What are the signs of errors within the cycle of organizational decline? Explain.
9. List the diagnostic factors for entering the downward spiral and explain ways to escape it.
10. What is meant by judgment and limitations in decision-making? Explain.
11. What are cognitive shortcuts in judgment? Explain.
12. List and explain the types of cognitive shortcuts.
13. Name and describe common decision-making biases.
14. List and explain biases unrelated to heuristics and cognitive shortcuts (representativeness and availability heuristics).
15. List and explain biases unrelated to heuristics and cognitive shortcuts (representativeness and availability heuristics).
16. List and explain biases stemming from the representativeness heuristic.
17. Name and describe the biases that arise from the availability bias.

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