
Tribhuvan University
Institute of Science and Technology
School of Mathematical Sciences

# Decision Analysis

## *Introduction to Decision Theory and Enterprise Risk Management*

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# Introduction

- History
- Introduction of decision analysis
- Decision making philosophy
- Elements of decision problems,

# History

**Early Roots (1940s-1950s):**

Decision analysis finds its roots in **operations research and game theory** during **World War II.** Early pioneers like Abraham Wald, John von Neumann, and Oskar Morgenstern laid the groundwork for decision-making under uncertainty and strategic thinking.

**Expected Utility Theory (1950s):**

The 1950s saw the development of expected utility theory by Leonard J. Savage and others. This theory provided a **formal framework for making decisions involving uncertain outcomes**, laying the foundation for later decision analysis techniques.

# History

**Decision Trees and Bayesian Analysis (1960s):**

In the 1960s, Howard Raiffa and Ronald A. Howard introduced decision trees as **a visual tool for decision analysis.** Bayesian statistics also became an integral part of decision analysis during this time, allowing for the **incorporation of prior beliefs and updating probabilities** based on new information.

**Normative Decision Analysis (1970s):**

During the 1970s, decision analysis began to be **formalized as a discipline**, with researchers like Howard Raiffa, Ronald A. Howard, and Detlof von Winterfeldt contributing to its theoretical development. This period saw the establishment of normative frameworks for rational decision-making.

# History

**Descriptive Decision Analysis:(1980)**

In the 1980s, researchers such as Daniel Kahneman and Amos Tversky challenged the assumptions of rational decision-making, highlighting the role of cognitive biases and heuristics in shaping human behavior.

This led to the development of descriptive decision analysis, which seeks to **understand how individuals actually make decisions rather than how they should make them.** Descriptive decision analysis incorporates insights from psychology and behavioral economics to improve the realism and accuracy of decision models.

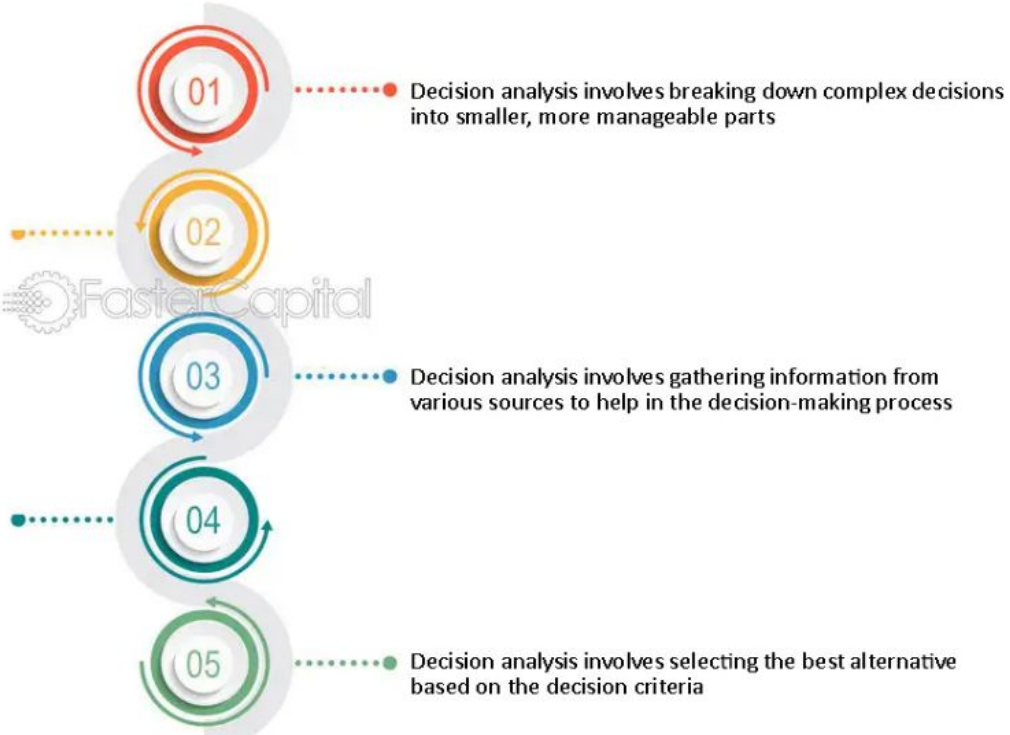
# History

1. **Software Development (1990s):** Proliferation of **decision analysis software** by companies like Decision Analysis, Inc. and Palisade Corporation.
2. **Multi-Criteria Decision Analysis (2000s):** Gained prominence for **evaluating alternatives across multiple criteria and objectives**
3. **Integration with Behavioral Economics (2010s):** The 2010s witnessed a growing integration of decision analysis with insights from behavioral economics. Researchers explored ways to incorporate behavioral biases and heuristics into decision models, leading to a more r**ealistic understanding of decision-making processes.**
4. **Continued Development and Application (Present):** Ongoing research focuses on decision-making under deep uncertainty, decision support systems, and interdisciplinary applications in various fields.

# Introduction of Decision Analysis

Decision analysis is a systematic approach to decision-making that involves **identifying, analyzing, and evaluating alternatives** in order to **make informed choices.**

# Introduction to Decision Analysis



# Decision Making Philosophy

Decision-making philosophy refers to the **principles, beliefs, and approaches** that guide individuals or organizations in making decisions.

These philosophies can vary widely **depending on factors** such as personal values, organizational culture, and situational context.

# Decision Making Philosophy

**Rational Decision Making:** This philosophy emphasizes making decisions that are based on **logical reasoning**, objective analysis, and careful evaluation of available information.

**Intuitive Decision Making:** In contrast to rational decision making, intuitive decision making **relies on instincts, and past experiences.**

**Ethical Decision Making:** Ethical decision-making philosophy prioritizes principles of **fairness, justice, and moral integrity.**

**Collaborative Decision Making:** This philosophy emphasizes involving **multiple stakeholders** or team members in the decision-making process.

# Decision Making Philosophy

**Data-Driven Decision Making:** Data-driven decision-making philosophy relies on empirical evidence, quantitative analysis, and **data-driven insights** to inform decision-making.

**Adaptive Decision Making:** Adaptive decision-making philosophy emphasizes on flexibility, agility, and the ability to **adapt strategies in response to changing circumstances.** This philosophy acknowledges that decision-making is an iterative process that requires continuous learning and adjustment.

**Risk-Taking:** Organization may **adopt a risk-taking approach**, embracing uncertainty and pursuing higher-risk, higher-reward opportunities.

# Elements of Decision Problems

- Decision Objectives or Goals
- Decision Alternatives
- Uncertainty and Risk
- Information and Data
- Preferences and Trade-offs
- Constraints and Limitations
- Stakeholders and Interests
- Decision Criteria and Evaluation Methods
- Decision-Making Process

# Elements of Decision Problems

**Decision Objectives or Goals:** These are the **desired outcomes or objectives** that the decision-maker aims to achieve. Clear identification and prioritization of objectives are essential for evaluating alternative courses of action.

**Decision Alternatives:** These are the different **options or actions** available to the decision-maker. Each alternative represents a possible course of action that can be taken to address the decision problem.

**Uncertainty and Risk:** Decision problems often involve **uncertainty regarding future events or outcomes.** Uncertainty arises from factors such as incomplete information, variability in external conditions, or unpredictability of human behavior. Assessing and managing uncertainty is crucial for making informed decisions.

# Elements of Decision Problems

**Information and Data:** The availability and quality of information play a critical role in decision-making. Decision-makers rely on **data, evidence, and expert knowledge** to assess the feasibility, effectiveness, and potential consequences of different alternatives.

**Preferences and Trade-offs:** Decision-makers typically have **preferences or criteria** that they use to evaluate and compare alternative courses of action. These preferences may include factors such as **cost, time, quality, risk**, and stakeholder interests. Trade-offs often need to be made between competing objectives or constraints.

**Constraints and Limitations**: Decision problems are often subject to various constraints or limitations that restrict the feasible set of alternatives or the resources available for decision-making. **Constraints may include budgetary constraints, time limitations, legal requirements, or technical constraints.**

# Elements of Decision Problems

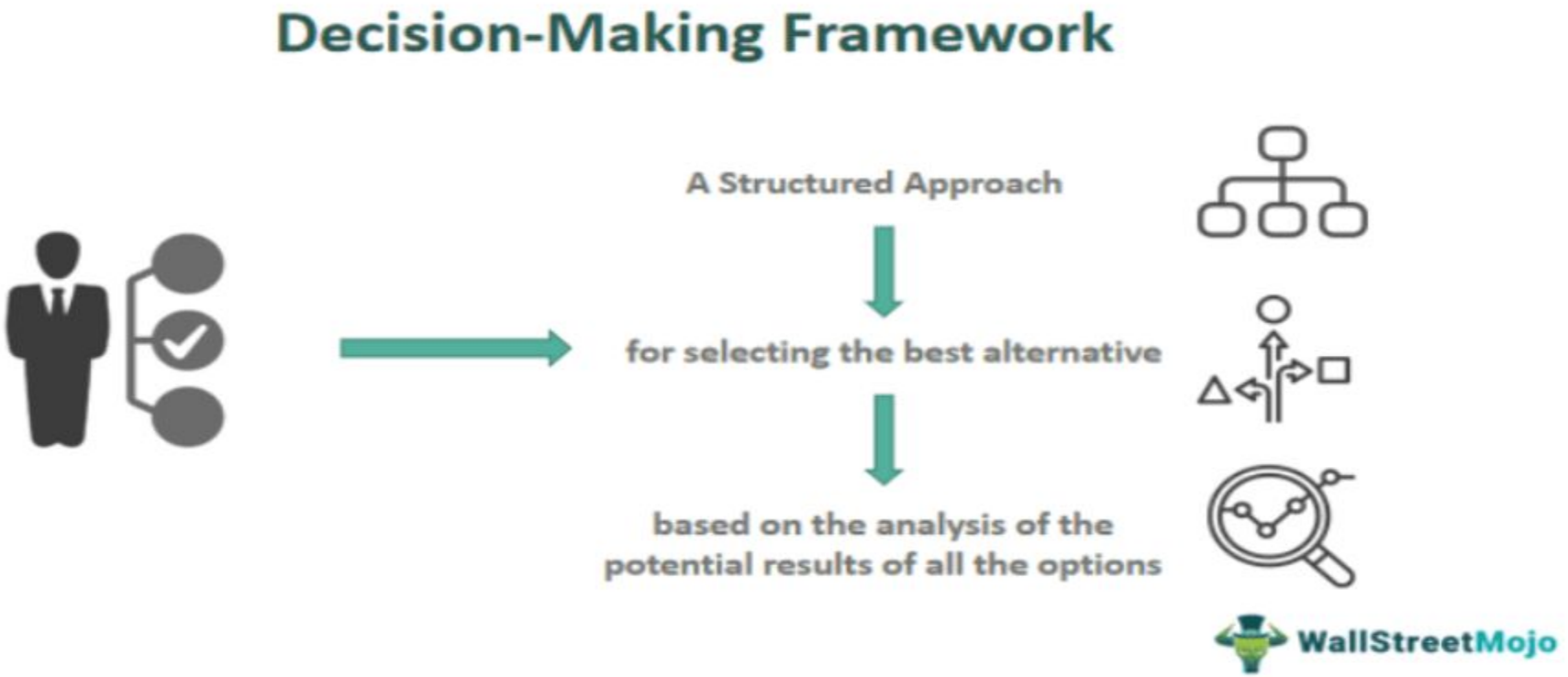
**Stakeholders and Interests:** Decision problems **involve stakeholders with diverse interests, perspectives, and preferences.** Identifying key stakeholders and understanding their interests is essential for ensuring that decisions are aligned with broader organizational or societal goals.

**Decision Criteria and Evaluation Methods:** Decision criteria are the specific **attributes or factors that decision-makers use to evaluate and compare alternative courses of action.** Evaluation methods, such as cost-benefit analysis, multi-criteria decision analysis, or scenario planning, provide systematic frameworks for assessing alternatives and making decisions.

**Decision-Making Process:** The **decision-making process involves a series of steps or stages**, including problem identification, information gathering, alternative generation, evaluation, selection, and implementation. Structured decision-making processes help ensure that decisions are made systematically and transparently.

- Framework of Decision Making
- Decision Making Process
- Problem Solving and Creative Thinking

# Framework of Decision Making



# Framework of Decision Making

- Provides structured approaches to making choices.

- Frameworks are dependent on
  - Nature of Decision(strategic-SWOT Analysis, operational-DMAIC(Define, Measure, Analyze, Improve, Control), tactical- Eisenhower Matrix)
  - Complexity of Problem (Decision Trees)
  - Oraganizational culture and values(Data Analytics Framework,Customer Journey Mapping)
  - Available information(Data Analytics Framework, Scenario Planning)
  - Time and resources constraints(Rapid Prototyping, Agile Methodology)
  - Nature of Organisation(Public, Private, Government, etc.)
  - Stakeholder Involvement
  - Domain specific

# Some Commonly Used Decision Making Frameworks

- **Rational Decision-Making Model:**
  - traditional approach of decision-making.
  - based on logic, analysis, and objective evaluation of alternatives.
  - Steps include defining problem, defining criteria and evaluating criteria, generating altenatives and evaluating alternatives.

  Key Characteristics of Rational Decision-Making Model:
  - Logical and Systematic approach.
  - Objective Evaluation of alternatives.
  - Optimizing benefits or utility.
  - Assumes perfect information regarding alternatives.

# Some Commonly Used Decision Making Frameworks

- **Normative Decision Theory:**
  - identifying the most rational decision based on mathematical models and principles of logic.
  - prescribes how decisions should ideally be made to achieve optimal outcomes.

  Key Characteristics of Normative Decision-Making Model:
  - Decisions are based on maximizing utility.
  - Expected utility of alternatives are weighted by their probability.
  - Decision criteria include maximising utility, minimizing cost and risk.
  - Decision-making under conditions of risk and uncertainty.
  - Developing formal mathematical models to represent decision problems and analyze decision-making processes.

# Some Commonly Used Decision Making Frameworks

- **SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats):**
  Strategic planning framework used to identify and analyze the internal strengths and weaknesses of an organization, as well as the external opportunities and threats it faces.

**Key steps of SWOT Analysis**:

1. **Identify the Objective:** Define the purpose and scope of the SWOT Analysis
2. **Gather Information:** Relevant data and information about the organization, its industry, market trends, competitors, and other external factors.
3. **Identify Strengths:** Identify internal attributes and resources that give the organization a competitive advantage like brand reputation, product quality, technological expertise, financial stability, and talented workforce.

- **Key steps of SWOT Analysis:**

4. **Identify Weaknesses:** Identify internal factors that puts the organization at a disabvantages and areas where it faces challenges or limitations like operational inefficiencies, outdated technology, skill gaps in the workforce, financial constraints, and poor brand perception.
5. **Identify Opportunities:** Emerging market trends, changes in consumer behavior, technological advancements, regulatory changes, or other opportunities in the industry.
6. **Identify Threats:** competitive threats, market volatility, economic downturns, technological disruptions, regulatory changes, or other potential threats.
7. **Prioritize Findings:** Focus on key areas relevant to organization's objectives and addressing its strategic challenges.
8. **Develop Strategies:**develop strategic initiatives and action plans to capitalize on strengths, address weaknesses, seize opportunities, and mitigate threats.
9. **Monitor and Review:** Regularly review and update the SWOT Analysis.

# Some Commonly Used Decision Making Frameworks

- **Ethical Decision Making Model:**
  Structured framework for individuals and organizations to navigate complex ethical dilemmas and make morally sound decisions.

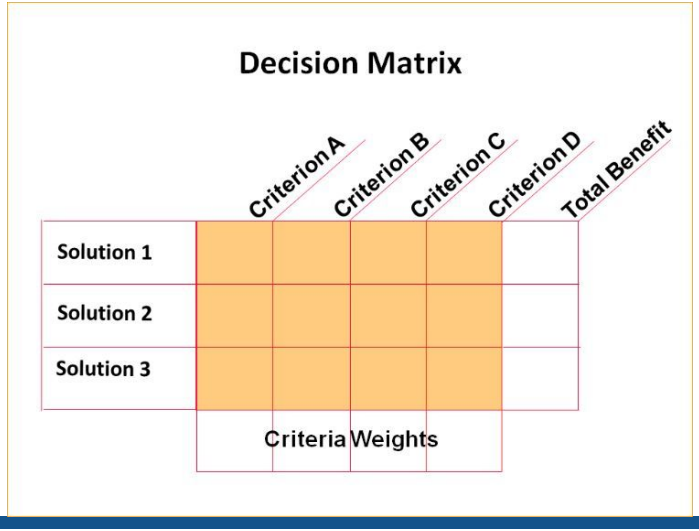
**Implemented in following Industries:**

- Healthcare
- Business and Corporate Governance
- Legal and Judicial Systems
- Education
- Research and Academia
- Nonprofit and Social Services
- Government and Public Policy

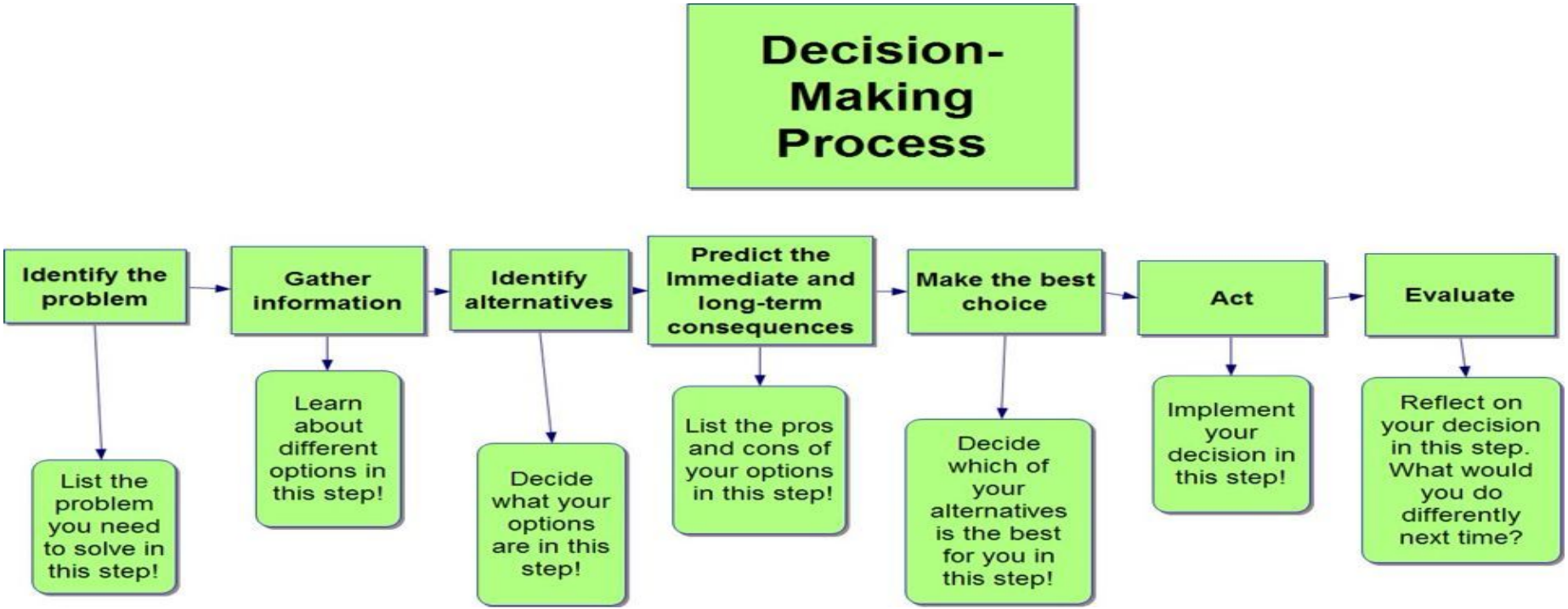
# Some Commonly Used Decision Making Frameworks

- **Decision Matrix:**
  - Systematically evaluate and compare alternatives based on multiple criteria or factors.
  - Helps to clarify decision-making criteria, prioritize factors, and assess the relative importance of different options.

    - Identify Alternatives
    - Identify Criteria
    - Weight the Criteria
    - Create decision matrix
    - Calculate Scores
    - Compare and Analyze
    - Make a Decision



# Decision Making Process



# Decision Making Process

1. **Identifying the problem:**
   Clearly define the issue or opportunity that requires a decision.

2. **Gathering relevant information:**
   Collect relevant data and information to understand the situation fully.

3. **Identifying the alternatives:**
   Brainstorm and create a list of possible solutions or courses of action.

4. **Evaluating the alternatives:**
   Assess the pros and cons of each alternative based on criteria such as feasibility, effectiveness, and alignment with goals.

# Decision Making Process

5. **Making Decision:**
   Select the best alternative based on the evaluation.

6. **Implementing the Decision:**
   Put the chosen solution into action.

7. **Evaluating the Decision:**
   Assess the outcomes of the decision to determine its effectiveness and learn from the process.

# Problem Solving and Creative Thinking

## Problem Solving

- **Identifying Problem:** Recognize and define the problem to be addressed.
- **Analysis:** Gather relevant information and understand underlying causes.
- **Generating Alternatives:** Brainstorm and explore multiple alternative solutions.
- **Evaluating Alternatives:** Assess each option based on predetermined criteria.

# Problem Solving and Creative Thinking

## Problem Solving

- **Selecting best alternative:** Choose the best solution aligned with objectives and values.
- **Implementation:** Develop an action plan and implement the chosen solution.
- **Monitoring:** Monitor outcomes and evaluate effectiveness.
- **Learning:** Reflect on past decisions and apply lessons learned for continuous improvement.

# Problem Solving and Creative Thinking

## Creative Thinking

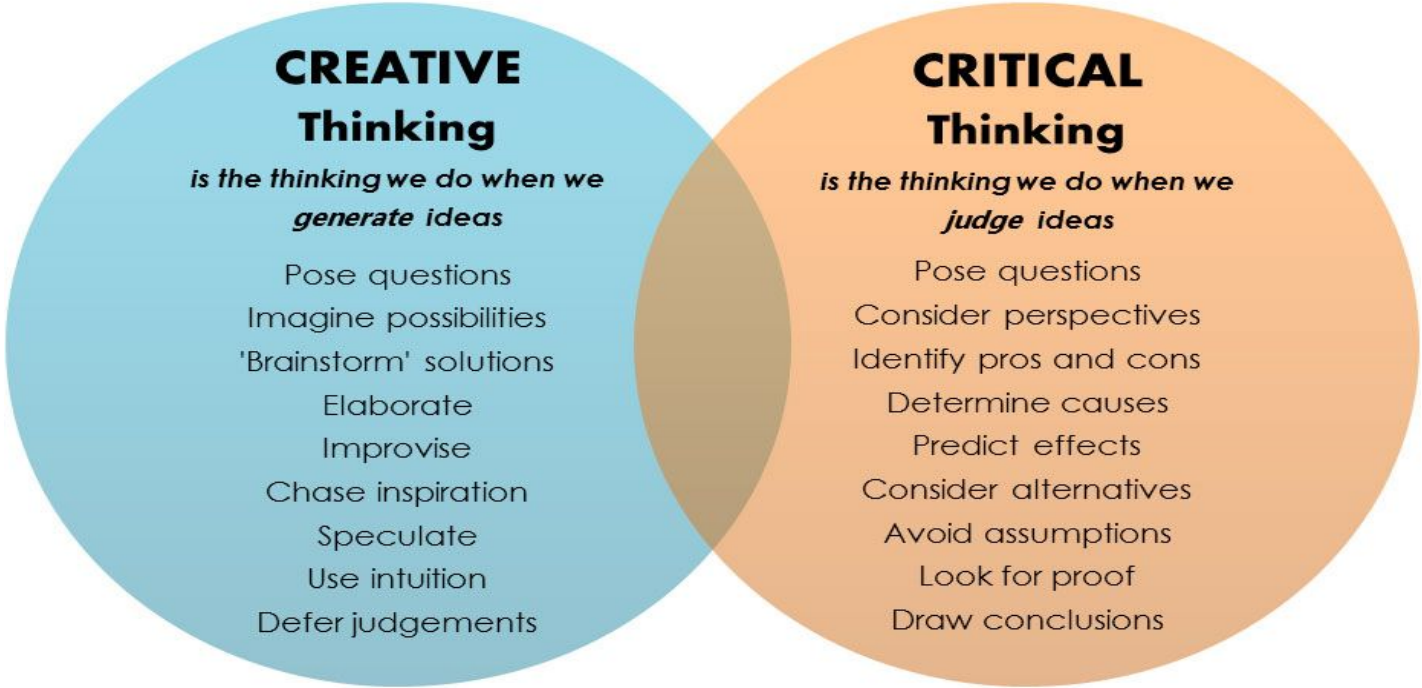
- **Generating Alternatives:** Creative thinking enables the generation of diverse alternative options or solutions, uncovering innovative ideas.
- **Breaking Conventional Patterns:**Challenges conventional wisdom, encourages questioning assumptions, and explores new possibilities.
- **Exploring Novel Perspectives:** Involves considering diverse viewpoints to gain fresh insights and identify hidden opportunities.
- **Embracing Ambiguity and Uncertainty:** Comfortably deals with ambiguity and takes calculated risks, seeing them as opportunities for exploration.

# Problem Solving and Creative Thinking

## Creative Thinking

- **Encouraging Experimentation:** Fosters experimentation, allowing for the testing of new ideas, learning from failures, and refining approaches.
- **Fostering Collaboration and Diversity:** Thrives in collaborative environments that encourage diverse perspectives and open communication.
- **Promoting Flexibility and Adaptability:** Embraces adaptability, willing to adjust strategies based on new information and changing circumstances.
- **Driving Innovation and Growth:** Acts as a catalyst for innovation, driving organizations to explore new markets and pioneer disruptive solutions.

# Problem Solving and Creative Thinking



- **Problem And Opportunity**
- **Types of decision**
- **Decision making Environment**
- **Cognitive biases**
- **Decision making styles**

# Problem And Opportunity

**Problems:** Situations where a desired outcome is hindered by obstacles or challenges.

**Opportunities**: Situations where a desirable outcome can be achieved with appropriate actions.

**Examples:**

Business: Market competition, product development.

Personal: Career choices, relationship decisions.

Societal: Policy making, environmental issues.

# Types of decision

| Basis for comparison | Programmed | Non-programmed |
|---|---|---|
| Meaning | Programmed decisions are the everyday decisions, which are taken within the periphery of the organization's rules and policies. | Non-programmed decisions are known for dealing with rare or unusual problems, which do not have predefined alternatives. |
| Problem | Well-structured and repetitive | Ill-structured and non-repetitive |
| How to take decisions? | Predefined rules, policies and standards | Top-level managers |
| Impact | Short term | Long term |

# Types of decision

| Basis for comparison | Programmed | Non-programmed |
|---|---|---|
| Judgement | Objective judgement | Subjective judgement |
| Example | **Reordering inventory, scheduling meetings.** | **Strategic planning, crisis management.** |

# Decision making Environment / conditions

1. Decision making under condition of certainty
2. Decision making under condition of uncertainty
3. Decision making under condition of risk

# Decision making Environment / conditions

## 1. Decision Making Under Condition Of Certainty

Such type of environment is very sure and certain by its nature. This means that all the information is available and at hand.

So the manager has all the information he may need to make an informed and well thought out decision. All the alternatives and their outcomes can also be analyzed and then the manager chooses the best alternative.

# Decision making Environment / conditions

## 2. Decision Making Under Condition Of Uncertainty

In the decision making environment of uncertainty, the information available to the manager is incomplete, insufficient and often unreliable.

There are five decision criteria are used to select the best decision

- Maximax criteria (Optimistic)
- Maximin criteria (Pessimistic)
- Minimax criteria
- Equally likelihood decision
- Criteria of realism (Neither completely optimistic nor pessimistic)

# Decision making Environment / conditions

## 3. Decision Making Under Condition Of Risk

Assign the probabilities of the each of the states of the nature on the basis of the historical data and past experience

Select decision alternative which has largest expected payoff value

There are two criteria of selecting the best decision alternatives

- EMV (Expected Monetary Value)
- EOL (Expected Opportunity Loss)

# Cognitive biases

- Cognitive bias is a systematic thought process caused by the tendency of the human brain to simplify information processing through a filter of personal experience and preferences.

- Essentially, cognitive biases help humans find mental shortcuts to assist in the navigation of daily life, but may often cause irrational interpretations and judgments.

## Anchoring bias:

This is the tendency to rely too heavily on the very first piece of information you learn.

For example, if you learn the average price for a car is a certain value, you will think any amount below that is a good deal, perhaps not searching for better deals. You can use this bias to set the expectations of others by putting the first information on the table for consideration.

## Attentional bias:

This is the tendency to pay attention to some things while simultaneously ignoring others.

For example, when making a decision on which car to buy, you may pay attention to the look and feel of the exterior and interior, but ignore the safety record and gas mileage.

## Confirmation Bias

Confirmation bias happens when you look for information that supports **your existing beliefs, and reject data that goes against** what you believe. This can lead you to make biased decisions, because you don't factor in all of the relevant information.

## Halo Effect

This is the tendency for a person's positive traits to "spill over" from one area of their personality to another in others' perception of them. **In other words, it's hard to believe that someone you like or trust in another context could be wrong now.**

## Fundamental Attribution Error

**This is the tendency to blame others when things go wrong, instead of looking objectively at the situation.** In particular, you may blame or judge someone based on a stereotype or a perceived personality flaw.

Fundamental attribution error is the tendency to place blame on external events.

## The Bandwagon effect

It refers to our habit of adopting certain behaviors or beliefs because many other people do the same.

# Consequences of Cognitive bias

- Misinterpretation of Information
- Increased Risk
- Financial Losses:
- Missed Opportunities

# Decision making styles

## Directive

Prefer simple , clear solution.

Make decision rapidly.

Donot consider many alternatives.

Rely on existing rules.

## Analytical

Prefer Complex problem.

data needs to be analyzed

Carefully analyze alternatives.

Willing to use innovative methods.

## Conceptual

Social oriented

Humanistic and artistic approach

Solve problems creatively.

## Behavioral

Concern for their organization.

Interest in helping others.

Open to suggestions.

Rely on meetings.

# Decision Theories

eg: we take the decision in daily life either we take bus or walk for college.
In business problem cost, profit,loss etc are occurs then we use decision theories to take decision.

- Decision theories provide frameworks for understanding the complexities of decision-making in various contexts.
- By using different decision theories gain different decision strategies to enhance decision-making effectiveness.
- Decision theories provide frameworks and models for understanding how individuals or groups make decisions

# Decision Theories

- Classical  Decision Theory
- Behaviorals Decision Theory
- Normative Decision Theory
- Descriptive Decision Theory

# Classical Decision Theory

- Identify the problem or decision
- Identify all possible alternatives
- Evaluate the consequences of each alternative
- Select the alternative with the best outcome

Example: A consumer deciding which car to purchase evaluates factors such as price, fuel efficiency, safety features, and brand reputation to maximize their satisfaction or utility.

# Behavioral Decision Theory

Behavioral decision theory that focus on how people actually make decision in practical, recognizes that human decision-making is often influenced by cognitive biases, emotions, and heuristics.It explores how people deviate from rational decision-making under uncertainty and complexity.

Example:You might focus on a few popular car or those heavily advertised, potentially missing out on valuable options..

# Normative Decision Theory

It establishes ideal decision-making processes and principles for making optimal choices. Normative decision theory provides guidelines for decision-makers to follow in order to reach the most favorable outcomes given the available information and preferences.

*Example*: let's take car example,normative decision theory might suggest that you carefully weigh the pros and cons of each car, consider long-term prospects, and make a decision based on maximizing your expected utility (satisfaction or benefit) over time, aiming for the most optimal outcome.

# Descriptive Decision Theory

Descriptive decision theory is a branch of decision theory that focuses on describing and understanding how people actually make decisions in real-world situations. Unlike normative decision theory, which prescribes how decisions should be made based on rational criteria, descriptive decision theory seeks to explain observed decision-making behavior without necessarily advocating for specific decision-making norms or principles.describing how decisions are made

.*Example*: In a negotiation, individuals may exhibit anchoring bias, where their decisions are influenced by the first piece of information presented to them. A seller setting a high initial asking price for a product may anchor the buyer's perception of its value, leading to a higher final sale price.

# Group Decision Making

Group decision making involves multiple individuals working together to reach a consensus or make a decision. It's a collaborative process that leverages the knowledge, perspectives, and expertise of group members to achieve better outcomes than individual decision-making alone.

Example: Business Meetings, Board of Directors Meetings.

# Techniques of Group Decision Making

- **Voting**
  Voting is a straightforward method where each member of the group casts a vote for their preferred option
- **Brainstoming**
  Imagine everyone in the group throwing out ideas like a big idea party. No judging, just sharing lots of thoughts to find good ones.
- **Consensu Building**
  Think of it as everyone working together like a team to find a choice that everyone can agree on. It's about talking it out until everyone feels good about the decision.

# Techniques of Group Decision Making

- **Nominal Group Technique(NGT)**
  Everyone writes down their ideas secretly, then they share them and talk about them as a group. Finally, they vote or rank them to see which ones are the most popular.
- **Delphi Method**
  It's like a group chat, but without names. People share their thoughts anonymously, then everyone discusses and revises their ideas until they all agree or find a common ground.
- **Multi-voting**
  Each person gets a few votes, like stickers, to put on the ideas they like best. The ones with the most stickers win.

Shreyansh Lodha

Introduction, History, Trends in ERM, Risk management standard and guidance

# Introduction, History &

# Trends in ERM

# Introduction to ERM

Enterprise Risk Management (ERM) is a comprehensive approach to identifying, assessing, and managing risks within an organization to achieve its objectives.

ERM is a company's approach to managing risk. It is the practices, policies, and framework for how a company handles a variety of risks its business faces.

It's a strategic framework that helps businesses understand, prioritize, and mitigate risks that could affect their ability to achieve their goals.

# Components in ERM

- Risk Identification
- Risk Assessment
- Risk Response
- Risk Monitoring and Reporting
- Integration with Strategic Planning
- Cultural and Organizational Considerations

# History of ERM

Enterprise Risk Management (ERM) has evolved over time in response to various challenges faced by organizations and changes in the business environment.

- Early Risk Management Practices
  - Before the formalization of ERM, organizations typically managed risks in silos within different departments

# History of ERM

- Financial Risk Management
  - The roots of modern ERM can be traced back to the development of financial risk management practices in the late 20th century.
  - This period saw the emergence of techniques such as **Value-at-Risk (VaR)** and derivatives to manage financial risks.
- Regulatory Changes
  - The late 20th and early 21st centuries saw the introduction of various regulatory frameworks aimed at enhancing risk management practices, particularly in banking and insurance.

# History of ERM

- Emergence of ERM Frameworks:
  - In the early 2000s, several frameworks and standards for ERM began to emerge, providing organizations with guidance on implementing ERM practices.
  - Examples: Committee of Sponsoring Organizations of the Treadway Commission (COSO) ERM Framework and the ISO 31000 Risk Management Standard.
- Global Financial Crisis:
  - Crisis of 2007-2008 highlighted the importance of effective risk management in mitigating systemic risks and protecting organizational value.
  - there was increased focus on enhancing risk governance, transparency, and accountability, driving further adoption of ERM practices.

# History of ERM

- Continued Evolution:
  - ERM continues to evolve in response to ongoing changes in the business landscape,
  - These include
    - technological advancements,
    - geopolitical uncertainties,
    - regulatory developments,
    - emerging risks such as cybersecurity threats and climate change.

# Trends in ERM

- Integration of Technology:
  - Technology plays a crucial role in modern ERM practices.
  - Organizations are increasingly leveraging,
    - advanced analytics,
    - artificial intelligence (AI),
    - machine learning, and big data analytics
- Integration with Strategic Planning
  - Instead of viewing risk management as a separate function, organizations are embedding it into their overall strategy formulation and execution.

# Trends in ERM

- Emphasis on ESG Risks:
  - Environmental, Social, and Governance (ESG) factors have gained prominence in ERM practices.
  - Companies are recognizing the importance of addressing ESG risks such as climate change, diversity and inclusion etc.
- Resilience Planning (Supply Chain Resilience)
  - identifying and mitigating systemic risks, enhancing supply chain robustness, and developing contingency plans to maintain operations during disruptions.

# Trends in ERM

- Stakeholder Engagement
  - ERM is increasingly involving stakeholders in the risk management process.
  - Engaging with stakeholders helps organizations gain valuable insights into emerging risks and fosters trust and transparency.
- Scenario Planning and Stress Testing:
  - By simulating various scenarios and assessing their potential impact on the organization, companies can better prepare for uncertainties and develop robust risk mitigation strategies.

# Risk Management Standard and Guidance

# Risk Management Standard

- Set of principles, guidelines, and practices designed to help organizations identify, assess, prioritize, and mitigate risks that could affect their objectives.

- Several risk management standards and guidance documents exist to provide organizations with frameworks and best practices for managing risks effectively.

- Developed by recognized bodies or organizations within specific industries or sectors.

# Risk Management Standard - Types

- ISO 31000: Risk Management Standard:
  - ISO 31000 is an international standard developed by the International Organization for Standardization (ISO) that provides principles, framework, and guidelines for risk management.
- COSO ERM Framework
  - Developed by The Committee of Sponsoring Organizations of the Treadway Commission
  - The COSO framework emphasizes the integration of risk management with strategic planning, internal control, and corporate governance.

# Risk Management Standard - Types

- NIST Risk Management Framework (RMF):
  - The National Institute of Standards and Technology (NIST) RMF provides guidance for federal agencies and contractors in the United States to manage information security risks.
- Basel Committee on Banking Supervision (BCBS) Standards:
  - The Basel Committee develops international standards and guidelines for banking supervision, including risk management standards such as Basel II and Basel III.
  - aim to strengthen the regulation, supervision, and risk management practices
  - focus on capital adequacy, liquidity risk, and operational risk management.

# Risk Management Standard

These standards and guidance documents provide organizations with valuable frameworks, principles, and best practices for managing risks effectively across various domains and industries.

Depending on their specific needs and requirements, organizations may adopt one or more of these standards as a basis for their risk management processes.

# Risk Management Guidance

Supplementary information or advice provided to help organizations implement the principles outlined in the standard effectively.

Include practical examples, tools, case studies, and recommendations tailored to the specific needs and circumstances of the organization.

# Risk Management and Guidance

Together they help develop:

- Robust risk management strategies to anticipate and respond to potential threats or opportunities
- Resilience, protect their assets, and achieve their objectives more effectively.

# Subash Khatiwada

Enterprise risk management integrated framework, Risk profile, Risk Appetite and Risk tolerance

# Enterprise risk management integrated framework

# ERM Integrated Framework

- The ERM Integrated Framework provides a structured approach for managing risks throughout an organization.
- It encompasses various components that work together to identify, assess, mitigate, and monitor risks.

# Components of an ERM Integrated Framework (COSO Framework)

- Internal Environment: This component considers the organization's culture, structure, and governance.
- Objective Setting: This component involves defining the organization's strategic objectives at all levels.
- Event Identification: It involves identifying internal and external events that could impact the organization's objectives.
- Risk Assessment: This component involves analyzing the likelihood and impact of potential events.

# Components of an ERM Integrated Framework (COSO Framework)

- Risk Response: This component involves developing strategies to address identified risks.
- Control Activities: It involves implementing policies and procedures to control or minimize risks.
- Information and Communication: This component involves ensuring effective communication of risk information throughout the organization.
- Monitoring: This component involves monitoring the effectiveness of the ERM program and making adjustments as needed.

# Risk Profile

- A summary of the types and levels of risk an organization faces.
- Helps organizations prioritize their risk management efforts.
- Considers both internal and external risks.
- Examples of Internal Risks: Inefficient processes, Employee turnover, Lack of innovation.
- Examples of External Risks: Economic downturns, Changes in regulations, Technological disruptions.

# Risk Appetite

- The amount of risk an organization is willing to take on to achieve its strategic objectives.
- Is set by the organization's senior management.
- Should be aligned with the organization's risk tolerance.
- Example: A startup with a high-growth strategy might have a higher risk appetite compared to a well-established company focused on stability.

# Risk Tolerance

- The acceptable level of variation around an organization's objectives.
- Is determined by factors such as the organization's industry, financial strength, and risk culture.
- Example: A bank with strict financial regulations might have a lower risk tolerance compared to a tech company with more flexibility.

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# Thank You