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DECISION THEORY

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DECISION THEORY

- ◆ Decision theory is a general approach to decision making when the outcomes associated with alternatives are often in doubt. It helps operations managers with decisions on process, capacity, location, and inventory because such decisions are about an uncertain future. Decision theory is theory about decisions. The subject is not a unified one. To the contrary, there are many different ways to theorize about decisions, and therefore also many different research traditions. This text attempts to reflect some of the diversity of the subject. Its emphasis lies on the less (mathematically) technical aspects of decision theory.

TYPES OF DECISIONS

◆ In general, decisions can be classified into three categories;

● Strategic Decision These decisions are concerned with external environment of the organization. For example, decision of selection of product-mix which a firm will produce and the markets to which it will sell are under this category

● Administrative Decision This is concerned with structuring and acquisition of the organization's resources so as to optimize the performance of the organization. Selection of distribution channels, location of facilities, etc., are some of the examples of such decisions.

● Operating Decision This is primarily concerned with day-to-day operations of the organization such as pricing, production scheduling, inventory levels, etc.

STEPS IN DECISION THEORY

- ◆ Step 1: Identify the decision that needs to be made.
- ◆ Step 2: Gather relevant information.
- ◆ Step 3: Identify alternative solutions.
- ◆ Step 4: Weigh the evidence.
- ◆ Step 5: Choose among the alternatives.
- ◆ Step 6: Take action.
- ◆ Step 7: Review your decision and its impact (both good and bad).

DECISION MAKING ENVIRONMENT

- ◆ The decision-making environment is often characterized by three states:
- ◆ certainty, uncertainty, risk, conflict.
- ◆ A decision made in safe conditions, certainty, is a condition for which you know which state of nature will occur in the future.
- ◆ We can think of security as a single case or an alternative.

ADVANTAGE OF DECISION THEORY

- ◆ Thirdly, decision theory helps understand how evolutionary and learning processes contribute to cognitive abilities that support decision-making . Additionally, decision theory allows for a more ethically weighted risk-benefit evaluation, enabling a balanced ethical justification in clinical trial assessments

DISADVANTAGE OF DECISION THEORY

- ◆ A Significant Amount of Time to Complete. Receive Irrelevant Opinions and Ideas. People Refuse to Share their Perspectives. Groups Can Have a Different Priority. The Final Choice Can go Against the Outcomes of an Organization. Groups Reduce the Amount of Accountability

DECISION-MAKING UNDER CERTAINTY

- ◆ When making a decision under certainty, all the information needed to make a decision is readily available and the outcome is known with absolute certainty. This is because there is no randomness or ambiguity involved in the decision-making process. In other words, the decision maker has complete knowledge about all the possible outcomes and the probabilities associated with each outcome. For example, a company may decide to invest in a new project only after conducting thorough research and analysis on the market, demand, competition, and other factors. The decision is made with complete certainty that the project will generate a positive return on investment.

STEPS IN DECISION-MAKING UNDER CERTAINTY

- ◆ 1. As a person who loves making decisions, I enjoy every step of the process. In decision making under certainty, the first thing to do is to identify the problem. It's important to clearly define and understand the problem at hand. Once the problem is identified, it's time to gather relevant information. This step involves collecting all the necessary information that will aid in making an informed decision.
- ◆ 2. After gathering information, the next step is to list all possible options. This step requires brainstorming and thinking outside the box. It's important to list all possible options, no matter how ridiculous they may seem. After listing all possible options, evaluate them based on their pros and cons and choose the best one. This step requires critical thinking and weighing all the options carefully.

ADVANTAGE & DISADVANTAGE OF DECISION MAKING UNDER CERTAINTY

◆ ADVANTAGE OF DECISION –MAKING UNDER CERTAINTY;

- ◆ 1. When it comes to decision making, certainty is a luxury that is often hard to come by. However, decision making under certainty is a process that allows for accurate prediction of outcomes, reduces risks and uncertainties, saves time and resources, and increases overall efficiency.
- ◆ 2. First and foremost, decision making under certainty allows for accurate prediction of outcomes. This is because all relevant information is known and accounted for, leaving no room for unexpected surprises. With a clear understanding of the situation at hand, decision makers can confidently choose the course of action that will yield the best result .

◆ DISADVANTAGE OF DECISION –MAKING UNDER CERTAINTY;

- ◆ When making decisions under certainty, there are some disadvantages that should be considered. One of the main disadvantages is limited creativity and innovation. Since there is no uncertainty, decisions are based solely on available information, which can limit the exploration of other possibilities and ideas.

DECISION MAKING UNDER UNCERTAINTY

- ◆ In making decisions under pure uncertainty, you do not have any information about the outcomes. There are many unknowns. Nobody knows what will happen. There is no possibility of knowing what could occur in the future to alter the outcome of your decision. You feel uncertainty about a situation.

STEPS INVOLVED IN DECISION-MAKING UNDER UNCERTAINTY

- ◆ List alternative course of action.
- ◆ Choices or actions.
- ◆ List uncertain events.
- ◆ Probability of occurrence of each action.
- ◆ Determine “payoffs”.
- ◆ Associate a payoff with each outcome/event combination.
- ◆ Adopt decision criteria.
- ◆ Evaluate criteria for selecting the best course of actions.

LIMITATIONS OF DECISION-MAKING UNDER UNCERTAINTY

- ◆ 1. When we are faced with making decisions under uncertainty, we are often limited by our knowledge and experience. We can never have all the information we need to make a perfect decision, but we can work to overcome these limitations. One way to do this is by gathering as much information as possible, including data, opinions, and feedback from others. By considering a range of perspectives and possibilities, we can improve the quality of our decisions.
- ◆ 2. Another way to overcome limitations is by developing our critical thinking skills. This involves analyzing information, questioning assumptions, and evaluating evidence. We can also use tools like decision trees and risk assessments to help us weigh the pros and cons of different choices. By taking a systematic approach to decision making, we can reduce the impact of uncertainty and make more informed choices.

DECISION-MAKING UNDER RISK

- ◆ Decision-making under risk refers to a situation in which the consequences of the adopted option and the probability of its occurrence are known. In addition, in decision-making research under risk, lottery selection tasks are often used to study their nature. For example, if you have to decide whether to invest in a project that has a 40% chance of success and a 60% chance of failure, you can draw a decision tree that shows the total cost, the possible revenues, and the EV or EU of each option.

STEPS IN DECISION MAKING UNDER RISK

- ◆ It is about identifying a problem or decision, gathering information, and assessing alternative and solutions. Using a step-by- step decision-making process can help you consistently make more deliberate, thoughtful decisions by organising relevant information and defining alternatives. The risk management process typically involves the following steps
- ◆ (1) Risk identification.
- ◆ (2) Risk assessment and qualification.
- ◆ (3) Implementing risk mitigation.
- ◆ (4) Monitoring and reviewing.

ADVANTAGE & DISADVANTAGE OF DECISION MAKING UNDER RISK

- ◆ *ADVANTAGES OF DECISION-MAKING UNDER RISK:*

- ◆ *Loss reduction*

- ◆ *One of the main goals of risk management is minimizing financial losses. By proactively identifying and mitigating risks, companies can avoid disastrous situations and protect their financial assets. This is particularly important in times of economic uncertainty.*

- ◆ *DISADVANTAGES OF DECISION-MAKING UNDER RISK:*

- ◆ *Personnel requirements*

- ◆ *Qualified and trained personnel are necessary to conduct effective risk management. Hiring and training risk management specialists can be expensive and time-consuming. The lack of skilled personnel can compromise the effectiveness of the process.*

DECISION TREE

- ◆ A decision tree is a graphic representation of the decision process indicating decision alternatives, states of nature, probabilities attached to the states of nature and conditional benefits or losses. It consists of a network of nodes and branches. There are two types of nodes. They are
 - ◆ (i) Decision nodes.
 - ◆ (ii) States of nature nodes.

RULES OF DRAWING A DECISION TREE

- ◆ 1. Identify all decision alternatives.
- ◆ 2. Identify all the states of nature. At each node (decision node or action node) draw straight lines to represent the different alternatives or risk events.
- ◆ 3. Develop a tree diagram showing the sequence of decision points and chance events. The tree is constructed from left to right. Denote the decision point by a square and the chance node by a circle.
- ◆ 4. Determine the probability estimate for different states of nature (action events).
- ◆ 5. Determine estimates for each event.
- ◆ 6. Determine the expected monetary value (EMV) at each node.
- ◆ 7. Determine the best action at decision point

ADVANTAGES OF THE DECISION TREE APPROACH

- ◆ 1. It structures the decision process and helps decision-making in an orderly, systematic and sequential manner.
- ◆ 2. It requires the decision-maker to examine all the possible outcomes, whether desirable or undesirable.
- ◆ 3. It communicates the decision-making process to others in an easy and clear manner, illustrating each assumption about the future.
- ◆ 4. It displays the logical relationship between the parts of a complex decision and identifies the time sequence in which various actions and subsequent events would occur.
- ◆ 5. It is especially useful in situations wherein the initial decision and its outcome affects the subsequent decisions. It can be applied in various fields such as introduction of a new product, marketing, make or buy decisions, investment decisions, etc.

CONCLUSION

- ◆ From this paper, we can see that operational research techniques are used to make the decision in the field of agriculture, production, life insurance, finance, and marketing, but it provides data to take the decision its depend upon human intellectual how to use this data to take the appropriate decision. In nutshell it is used in management. But its execution depends upon the mathematical models and calculations. In conclusion, the decision making impacts on organizational behavior considerably, make better decisions by recognizing perceptual biases and decision making errors we tend to commit. Adjust the decision-making approach by the organization's culture operating and the criteria of organizational values. Rationally, do not feel compelled to follow the decision-making model or to try to make your decisions appear rational. Adjust your decision approach to ensure compatibility with the organizational culture. However, maintain a good decision making create a healthy and positive relationship between the hierarchy and the employees. The decision maker knows the consequence of each alternative with certainty. Decision maker also knows the probability of occurrence of each outcome with risk. The decision maker does not know the probability of each outcome with uncertainty.