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**MANAGERIAL TOOLS AND TECHNIQUE USED IN DECISION MAKING**

BUSINESS FINANCE AND DECISION MAKING

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[Year]

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# ABSTRACT

The concept of decision making is a fundamental aspect of life as humans or animals. The ability to choose is inherent, whether a choice is made or not, a decision is made because not making a choice is a decision in itself. The purpose of this study is to investigate the various decision-making approaches, models, concepts, tools and techniques, including decision tree analysis, forecasting techniques, optimization methods, and the role of decision makers. The study will also explore the importance of managing risk and opportunities in environmental, social and governance criteria and the ethics of decision making. A qualitative research approach will be used, involving large amount of literature . The findings of this study will provide insight into the effectiveness of different decision-making tools and techniques that can be used by individuals and organization in making simple or complex decisions. The results of this research will be useful for decision makers in various industries, as well as for researchers in the field of decision making.

Keywords: Decision making, Managerial tools, Forecasting techniques, Optimization technique, Decision trees, Risk management, Environmental, Social, and Governance criteria, Ethics.

# INTRODUCTION

Decision making is an important skill used to solve ill structured problems called decisions, which can be complex or simple in which the problem solver weighs the alternative and picks an option. From a naturalistic perspective a problem solver picks the option that is in accordance with belief and experience while a rational problem solver will pick an option that has the highest utility (Jonassen, 2012).

According to Edwards (1954) social scientists such as psychologist and economist have investigated the concept of decision making and have produced a large body of literature which involves two states, A and B. Any of the states the individual chooses to be, the individual will surely have to make a preferred choice, either choose A over B or B over A. There is a constant struggle by people to make decisions regarding trivial issues such as where to eat and even more life changing decisions like where to go for college, where and who to marry and a career path to take (Balakrishnan, 2017). This decision can be thought about for long period before making them and when the wrong decision is made, the pain of regret may last for days or even years. Decision dilemma is not only faced by individuals but also by managers making major decisions for their various organizations. Different methods of decision-making exist and the best method to use depends on the unique situation and the nature of the decision being made. (Kahneman & Tversky, 1979). Having the capability to make sound decisions can influence an individual's or organization's prosperity and overall well-being (Gigerenzer & Gaissmaier, 2011). This decision may result in profit gain to the organization leading to promotion and bonuses or it can lead to sack letters due to loss or negative impact of the decision made to the company. These decisions are sometimes made by individuals and managers based on gut feeling, but why use gut feeling when decision tools and techniques can be used to make more informed decisions by illustrating the pros and cons of various alternatives (Balakrishnan et al, 2017).

# APPROACHES AND MODELS USED IN DECISION MAKING

According to Gigerenzer and Gaissmaier, (2011) rational decision making, bounded rationality, and intuitive are described approaches to decision making. While Jonassen, D. H. (2012) states normative and naturalistic as the two main approaches to decision making.

Rational decision-making process entails considering all the essential information and evaluating the consequences of different options to make the most favorable decision. (Simon, 1955; Gigerenzer and Gaissmaier in 2011). This approach was first proposed by economists such as John von Neumann and Oskar Morgenstern in the 1940s. It assumes that individuals have unlimited cognitive resources and can consider all relevant factors in a logical and objective manner.

In contrast, bounded rationality acknowledges that individuals and organizations frequently have limited cognitive resources and are required to make decisions within time and information constraints. (Simon, 1955). As a result, decision makers may use heuristics or rules of thumb to simplify the decision-making process (Gigerenzer & Gaissmaier, 2011). According to Simon's (1955) people's cognitive abilities and available time can limit their decision making, leading them to adopt a strategy of satisfaction rather than maximization. This approach is more practical than rational approach that propose individuals have infinite cognitive resources and time to evaluate every possibility. This approach is widely applied to decision making by managers in organizations, decision making in public policies and many others.

Intuitive decision making refers to the use of unconscious cognitive processes to arrive at a decision quickly without consciously analysing all the available information (Kahneman & Tversky, 1979). Intuitive decision making typically happens quickly and automatically and is commonly used when there is insufficient time or data to engage in a thorough and systematic thinking process. Intuitive decision making can result in biases and inaccuracies in judgement as it is based on past experiences and patterns that may not be applicable to the current situation. This can also lead to an unwarranted confidence in our choices and a failure to critically assess the information we have (Kahneman & Tversky, 1979). According to Kahneman (2011), our intuition can be enhanced through training and exposure to a wide range of experiences and viewpoints, resulting in a more precise and impartial comprehension of the world. He also advises being mindful of scenarios where intuition may be unreliable, such as when handling complex or unfamiliar situations.

Jonassen (2012) suggests that normative or rational approaches to decision making involve the use of tools such as decision matrices, SWOT analysis, and force field analyses. These tools are designed to assist in making rational decisions based on facts and data. Normative approaches offer a theoretical model for how decisions should be made according to logical reasoning and rationality. This approach assumes that individuals have all the necessary information and can make the best decisions with it. Theories such as expected utility theory are commonly used to gauge the quality of decisions made in real-world situations within the framework of normative approaches (von Neumann & Morgenstern, 1944).

According to Jonassen (2012), naturalistic approaches to decision making focus more on understanding the implications and meanings of different options related to a particular problem. These approaches also consider the role of unconscious emotions that may play a role in shaping our choices. Naturalistic approaches are geared towards understanding how decisions are made in real-world scenarios. It examines decision making in its natural context and without assuming that individuals have all the necessary information or the ability to make completely rational decisions. This approach commonly employs observational, experimental, or field methods to study decision making. (Klein, 1989, Orasanu & Connolly, 1993).

Decision modelling according to Balakrishnan is a scientific approach to managerial decision making that can also be described as a field that uses mathematical models and techniques to assist managers in making decisions. It is often called other names like operational research, quantitative analysis, and managerial science. He further classified decision modelling into two main types, called deterministic and probabilistic models.

1. Deterministic model - Is of the assumption that important input data are known with certainty, it is fixed and does not change (Balakrishnan, 2007). He proposed this model to assume that the outcome of a decision can be predicted with complete certainty, based on the values of the input variables
2. The probabilistic model – According to Balakrishnan (2007). It is a way to make decisions that considers the randomness and uncertainty of some variables and outcomes. Probability theory and statistical techniques are used in this model to estimate the likelihood of various outcomes and guide decisions. The both models are accepted and used in several fields, such as economics.

# TOOLS AND TECHNIQUES USED IN DECISION MAKING.

## Decision tree

A decision tree is a diagrammatic representation of an algorithm that makes predictions based on feature values using the structure of a tree. The data is divided into two or more subsets by a root node at the beginning of the process. The decision's potential outcomes are depicted by the tree's branches, while the prediction's final outcome is depicted by the tree's leaves. Classification and regression tasks both frequently employ decision trees. In a variety of fields, including machine learning, economics, and healthcare, they are a well-known and effective method for predicting outcomes and making decisions (Smith, 2018; Jones et al., 2017).

Interpretability is one of decision trees' main advantages. According to Smith (2018), the tree structure makes it simple to comprehend the reasoning behind the decision because it provides a clear representation of how the algorithm arrived at a particular prediction. This feature is especially useful in industries like healthcare and finance where clear explanations of decision-making processes are essential.

Decision trees are a good choice when data may not be complete or reliable because they are known to be resistant to noise and missing data (Jones et al., 2017). They are also popular for big data applications because they are able to handle large datasets and multi-dimensional data effectively (Smith, 2018).

Decision trees have their advantages and disadvantages. They can be prone to overfitting, which is a major drawback, especially when the tree is deep and has a lot of leaves (Jones et al., 2017). Poor generalization to new data and decreased predictive accuracy can result from this. To combat this issue and enhance decision tree performance, a variety of methods, including pruning, boosting, and bagging, can be employed (Smith, 2018).

## Forecasting techniques

Forecasting techniques are a widely used tool in decision making as they allow individuals and organizations to anticipate future events and plan accordingly (Makridakis, Wheelwright, & Hyndman, 1998). Different forecasting techniques can be used, and the most appropriate one will depend on the specific context and the type of data available (Makridakis et al., 1998).

Regression analysis is another frequently used forecasting technique, it involves utilizing a linear or nonlinear model to predict the value of a dependent variable based on one or more independent variables (Makridakis et al., 1998). This method can be used for forecasting a wide range of outcomes such as sales, demand, and financial performance.

A popular forecasting technique is time series analysis, which involves studying data collected over a period to identify patterns and trends that can be used to make predictions about future values (Makridakis et al., 1998). This technique can be applied to a variety of data types, including financial, economic, and meteorological data.

The Delphi method is another forecasting technique, which involves collecting and consolidating the opinions of a group of experts to make predictions about future events (Linstone & Turoff, 2002). This method is particularly useful in situations where data is scarce, or the subject is highly uncertain.

forecasting techniques is a valuable predictive tool that enables managers of organizations and individuals to anticipate future events and make plans accordingly.

## Optimization technique

When making decisions, optimization techniques are a common tool that can assist individuals and businesses in choosing the best course of action from a set of options (Konno & Kuno, 2009). These methods involve maximizing or minimizing an objective function within certain constraints to find the best solution to a problem. (Konno & Kuno, 2009).

1. linear programming- Finding the best solution to a problem involving linear relationships between variables is the goal of linear programming, which is one popular optimization technique (Konno & Kuno, 2009). Linear programming is extensively used in various fields, such as finance and operations research.
2. Integer programming- This is similar to linear programming but uses variables that can only have integer values, is another common optimization technique. (Konno & Kuno, 2009). Problems involving discrete variables, such as resource allocation or task scheduling, are frequently modeled using integer programming..
3. Nonlinear programming- Is another method of optimization in which the best solution to a problem involving nonlinear relationships between variables is found,. (Konno & Kuno, 2009). Nonlinear programming is used in various fields, including engineering, economics, and biology. Optimization technique can be useful for making decisions because they help people and businesses choose the best course of action from a list of alternatives.

## The role of decision makers in decision making

Identifying and evaluating alternative options is an essential part of decision-making.. Decision makers play a crucial role in this process as they are responsible for collecting and analysing information, creating and evaluating options, and ultimately choosing a course of action. Some scholars have argued that decision makers rely on a variety of cognitive biases and heuristics to make this process simpler (Kahneman & Tversky, 1979). Others have proposed that, depending on their personal characteristics and the context in which the decision is being made, decision-makers may adopt various decision-making styles (Brockner, 1988).

The implementation of the chosen course of action is yet another important aspect of decision-making. The decision-makers are accountable for communicating the decision to others, allocating resources, and monitoring progress. They may be influenced by external factors such as organizational culture, power dynamics, and stakeholder interests (Mintzberg, 1983). These factors can shape the decision-making process and the outcomes of decisions.

## Managing risk and opportunities in environmental, social and governance criteria

Environmental, social, and governance (ESG) criteria have received a lot of attention from researchers and practitioners in recent years.

Incorporating environmental, social, and governance (ESG) considerations into established risk management procedures is an essential component of incorporating ESG criteria into decision making. This might entail incorporating ESG data into risk assessments and strategies for potential outcomes, as well as developing strategies to deal with both the dangers and opportunities posed by these problems (Cordery, 2015). Some scholars have posited that incorporating Environmental, Social, and Governance (ESG) criteria into risk management can enhance decision-making and generate value for stakeholders. (Frooman, 1999).

Identifying new opportunities for growth and advancement is another crucial aspect of incorporating Environmental, Social, and Governance (ESG) criteria into decision-making. Companies that place a high value on sustainability may be able to stand out in the market and gain access to alternative funding sources. (Hart, 1995). Additionally, addressing ESG risks can create opportunities for long-term value creation, as companies that adopt sustainable business practices may be able to reduce costs, improve reputation, and access new markets (Glewwe, 2002). Moreover, utilizing ESG criteria in decision making can involve evaluating the potential impact of decisions on the environment, society, and governance, and aligning business goals with ESG values (Elkington, 1997). It has been debated by scholars that aligning decision-making with ESG criteria can create value for stakeholders affected by these issues and improve long-term performance. (Aguilera & Jackson, 2011).

When making decisions, managing risks and finding opportunities rely heavily on ESG criteria. ESG considerations can improve long-term performance and create value for stakeholders by being incorporated into traditional risk management procedures and used to direct strategic decision making.

## Ethical decision making

A significant factor that affects ethical decision making is an individual's personal values and beliefs. Studies have shown that individuals tend to make ethical decisions when their personal values align with the ethical values of the organization (Tenbrunsel & Messick, 2004). Furthermore, individuals who possess a strong sense of moral identity, or a clear understanding of their own ethical values and beliefs, are more likely to make ethical decisions (Aquino & Reed, 2002). Another important factor that affects ethical decision making is organizational culture and climate. Research has shown that organizations with a strong ethical culture, in which ethical values are emphasized and reinforced, tend to promote ethical decision making (Beauchamp & Bowie, 1988). Similarly, organizations with a positive ethical climate, in which employees feel supported in making ethical decisions, tend to foster ethical behaviour (Treviño, 1986).

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Other factors that can impact ethical decision making include leadership, peer influence, and external regulations and laws (Tenbrunsel & Messick, 2004). For instance, leaders who model ethical behaviour and encourage open communication may create an environment that supports ethical decision making (Bennis & Nanus, 1985). Similarly, peers can influence ethical decision making through social pressure and by providing guidance and support (Rest, 1986). Finally, external regulations and laws can provide guidance for ethical decision making and ensure that decisions are consistent with societal norms and values (Gini, 2011).

There are six ethical theories that are known in decision-making which include Egoism, Deontology, Virtue Ethics, Utilitarianism, Cultural Relativism, and Social Group Relativism.

1. Egoism theory holds that individuals should act in their own self-interest (Baumeister & Bushman, 2016).
2. Deontology theory holds that individuals should act according to a moral duty or rule, regardless of the consequences (Kant, 1785).
3. Virtue Ethics theory holds that individuals should aim to cultivate good character traits and act in accordance with them (Aristotle, 350 BCE).
4. Utilitarianism theory holds that individuals should act in a way that maximizes overall happiness or well-being (Mill, 1863).
5. Cultural Relativism theory holds that morality is relative to the norms of a particular culture (Hume, 1751).
6. Social Group Relativism theory holds that morality is relative to the norms of a particular social group (Harman, 1975). It is important for decision-makers to be aware of these different ethical theories and consider how they may influence decision-making.

James Rest in 1986 proposed an ethical model for decision making and it comprises of four sequential steps, which moral awareness, moral judgement, moral intention and moral action. In his study, He argues that moral awareness, behaviour, intention and action are all interconnected and play a role in shaping an individual's moral judgment.

1. Moral awareness- this is the first step in the ethical decision-making process, as it involves identifying and recognizing an ethical issue or problem.
2. Moral judgment- in which the individual evaluates the issue and determines its moral implications.
3. Moral intention is formed, which is the decision about how to act in relation to the issue.
4. Moral action is taken, which is the implementation of the decision made in the previous step.

In summary, ethical decision making is influenced by a complex interplay of personal values, organizational culture, leadership, peer influence, external regulations and laws, ethical theories and ethical models. Understanding these factors and using them can help not only managers of organizations but individuals make more ethical and informed decisions

# CONCLUSION

Decision making is a fundamental aspect of life, and there are various approaches, models, concepts and tools available to help individuals or organizations make better decisions. This research has explored decision trees, forecasting techniques optimization techniques, the role of decision makers, the importance of managing risk and opportunities in environmental social governance criteria as well as ethical considerations when it comes to decision-making. In conclusion, these tools and techniques can help individuals and managers of organizations make informed decisions, anticipate future events and identify the best course of action. However, it is vital to choose the appropriate tool or technique for the right context or situation

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