

Chapter -1

Introduction

1.1 INTRODUCTION

Multi-criteria decision making (MCDM), also known as multi-criteria decision analysis (MCDA) or multiple criteria decision making (MCDM), is a field of study and a set of methods used to evaluate and rank alternatives or options when faced with complex, often conflicting, criteria or objectives. It is widely used in various disciplines, including economics, engineering, management, and environmental sciences, to support decision-making processes involving multiple and often conflicting criteria.

One of the earliest instances of research on multi-criteria decision-making can be attributed to Benjamin Franklin, who introduced the concept of moral algebra. Since the 1950s, numerous empirical and theoretical researchers have focused on developing and refining MCDM methods. Their goal has been to create a framework that effectively structures decision-making problems and derives preferences from alternative options through mathematical modelling.

The key concepts in MCDM include criteria, alternatives, weights and rankings. Criteria are the factors that help to make decisions and rank the alternatives. It includes both quantitative and qualitative. Alternatives are the different options available for decision-making. Weights are entities attached to the importance of a particular criteria. Ranking is the core concept in which we rank the options/prospects.



Fig 1.1 Basics of MCDM

Each algorithm in Multi-criteria decision-making (MCDM) traditionally begins with plotting a decision matrix with alternatives and criteria as the rows and columns respectively. Each cell in it represents the performance of an alternative on a criterion.