

Chapter 2 Multi Criteria Decision Making Springer

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at each level Key Features Uses subjective judgments based on pairwise comparisons Allows for the incorporation of both quantitative and qualitative criteria Provides a consistent and comprehensive ranking of alternatives 252 ELECTRE Elimination et Choix Traduisant la Ralit Concept A method based on the concept of outranking where an alternative is considered better than another if it outperforms it on a significant number of criteria Key Features Employs a concordance and discordance index to assess the relative strengths and weaknesses of alternatives Provides a ranking of alternatives based on their overall outranking relationships Suitable for situations with a high number of criteria and alternatives 253 TOPSIS Technique for Order Preference by Similarity to Ideal Solution Concept Identifies the ideal and antiideal solutions based on the criteria then ranks alternatives based on their proximity to the ideal solution Key Features Simple and intuitive approach that considers both positive and negative aspects of alternatives Suitable for situations with a mix of quantitative and qualitative criteria Provides a clear ranking of alternatives based on their overall performance 26 Application of MCDM MCDM finds applications in a diverse range of fields including Business and Management Supplier selection investment decisions strategic planning resource allocation Engineering Design optimization product development project selection 3 Environmental Management Site selection waste management pollution control Health Care Treatment planning resource allocation patient prioritization Public Policy Policy evaluation resource allocation decisionmaking under uncertainty 27 Case Study Selecting a New Software System Imagine a company seeking to implement a new software system to manage its operations The decision involves multiple criteria such as cost functionality ease of use vendor support and security MCDM can be employed to systematically evaluate different software systems based on these criteria and select the optimal option 28 Challenges and Limitations While powerful MCDM approaches also have some limitations Subjectivity The weights and judgments used in MCDM often rely on subjective opinions which can introduce bias Data Availability Acquiring accurate and complete data for all criteria and alternatives can be challenging Complexity For complex problems with numerous criteria and alternatives the implementation of MCDM can become computationally intensive 29 Conclusion MCDM provides a valuable framework for addressing complex decision problems involving multiple criteria By systematically analyzing the criteria alternatives and their relative importance MCDM helps decisionmakers arrive at informed and robust solutions As technology evolves and decisionmaking environments become increasingly intricate the application of MCDM will undoubtedly continue to grow in significance

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the book covers the domain of multi criteria decision making a topic which has gained significant attention of researchers and practitioners spanning a variety of

disciplines for enhancing their decision making in real life situation the topics in this volume help readers understand the techniques in the model building and analysis stage the chapters cover a variety of techniques and their applications for interesting problems this book will be of interest to readers in diverse disciplines such as engineering business management humanities psychology and law

this book seeks to answer why when and how are real options used in strategic technology venturing this work tests for the role of real options in decision making involving three types of firms in decreasing order of technology dependence technology driven td where the profit is fully dependent on new technology creation and leveraging technology based tb where the profit is enabled and supported by technology and technology neutral tn where the profit is almost independent of technology it also deals with strategic and non strategic types of decisions driven by real options this analysis shows that an environment presenting co opetitive simultaneous competition and collaboration conditions triggers the use of real options why that serve to transform the position posture and propensity of businesses to innovate and thus they co evolve when into more effective and efficient forms of businesses co specialization how the authors demonstrate that embracing risk and uncertainty can increase levels and probability of new venture formation however their simulation also shows that it should be adapted to the risk profile of the firm and that timing is also a factor to be considered although engaging the concepts of real options this analysis does not focus on a specific investment valuation methodology but highlights the relationship between knowledge and risk and rather addresses the management of mindsets as moving towards a systematic conceptualization of real options represents a different paradigm in decision making

this mono graph is intended for an advanced undergraduate or graduate course as weil as for the researchers who want a compilation of developments in this rapidly growing field of operations research this is a sequel to our previous work entitled multiple objective decision making methods and applications a state of the art survey no 164 of the lecture notes the literature on methods and applications of multiple attribute decision making madm has been reviewed and classified systematically this study provides readers with a capsule look into the existing methods their char acteristics and applicability to analysis of madm problems the basic madm concepts are

defined and a standard notation is introduced in part 11 also introduced are foundations such as models for madm transformation of attributes fuzzy decision rules and methods for assessing weight a system of classifying seventeen major madm methods is presented these methods have been proposed by researchers in diversified disciplines half of them are classical ones but the other half have appeared recently the basic concept the computational procedure and the characteristics of each of these methods are presented concisely in part 111 the computational procedure of each method is illustrated by solving a simple numerical example part iv of the survey deals with the applications of these madm methods

data and its processed state information have become an indispensable resource for virtually all aspects of business education etc consequently decisions regarding the handling of this data transforming it into meaningful information and ultimately arriving at the best course of action have taken on a new importance this book highlights a selection of cutting edge research on decision making presented at the 25th international conference on multiple criteria decision making mcdm 2019 held in istanbul turkey

this book consists of various contributions in conjunction with the keywords oc reasoningoco and oc intelligent systemsoco which widely covers theoretical to practical aspects of intelligent systems therefore it is suitable for researchers or graduate students who want to study intelligent systems generally

this book presents tdf tactics development framework a practical methodology for eliciting and engineering models of expert decision making in dynamic domains the authors apply the bdi beliefs desires intentions paradigm to the elicitation and modelling of dynamic decision making expertise including team behaviour and map it to a diagrammatic representation that is intuitive to domain experts the book will be of value to researchers and practitioners engaged in dynamic decision making

this book develops a general theory of managerial decision making on the basis of a few elementary postulates it employs logic as the method of reasoning systems science in general and the systemic yoyo model in particular as the intuitive playground by doing so the authors take individually background based guesswork out of

processes of decision making all established conclusions are expected to be generally employable in real life applications at the same time the book is user friendly to a wide range of audience coincides with people's intuition and provides applicable results and insights for practical purposes

the book focuses on smart computing for crowdfunding usage looking at the crowdfunding landscape e.g. reward donation equity p2p based and the crowdfunding ecosystem e.g. regulator asker backer investor and operator the increased complexity of fund raising scenario driven by the broad economic environment as well as the need for using alternative funding sources has sparked research in smart computing techniques covering a wide range of detailed topics the authors of this book offer an outstanding overview of the current state of the art providing deep insights into smart computing methods tools and their applications in crowdfunding exploring the importance of smart analysis prediction and decision making within the fintech industry this book is intended to be an authoritative and valuable resource for professional practitioners and researchers alike as well as finance engineering and computer science students who are interested in crowdfunding and other emerging fintech topics

this handbook is an endeavour to cover many current relevant and essential topics related to decision sciences in a scientific manner using this handbook graduate students researchers as well as practitioners from engineering statistics sociology economics etc will find a new and refreshing paradigm shift as to how these topics can be put to use beneficially starting from the basics to advanced concepts authors hope to make the readers well aware of the different theoretical and practical ideas which are the focus of study in decision sciences nowadays it includes an excellent bibliography reference journal list information about a variety of datasets illustrated pseudo codes and discussion of future trends in research covering topics ranging from optimization networks and games multi objective optimization inventory theory statistical methods artificial neural networks times series analysis simulation modeling decision support system data envelopment analysis queueing theory etc this reference book is an attempt to make this area more meaningful for varied readers noteworthy features of this handbook are in depth coverage of different topics solved practical examples unique datasets for a variety of examples in the areas of decision sciences in depth analysis of problems through colored charts 3d diagrams and discussions about software

in decision making and problem solving a practical guide for applied research the author utilizes traditional approaches tools and techniques adopted to solve current day to day real life problems the book offers guidance in identifying and applying accurate methods for designing a strategy as well as implementing these strategies in the real world the book includes realistic case studies and practical approaches that should help readers understand how the decision making occurs and can be applied to problem solving under deep uncertainty

this book discusses critical thinking as a tool for more compassionate leadership presenting tried and tested methods for managing disagreement for anticipating and solving problems and for enhancing empathy employing a lighter tone of voice than most management books it also shows how and when less than rational mechanisms such as intuition and heuristics may be efficient decision making tools in any manager s toolbox critical thinking is useful for analyzing incoming information in the context of decision making and is crucial for structuring outgoing information in the context of persuasion when trying to convince a client to buy a service an executive board to fund a project or a colleague to change a procedure managers can use the simple step by step guides provided here to prepare for successful meetings and effective pitches managerial thinking can be steadily improved using a structured process especially if we learn to think about our thinking this book guides current and would be managers through this process of improving and metathinking in connection with decision making and persuasion using examples from business together with research insights from behavioral economics and from management and organizational cognition the author illustrates common pitfalls like hidden assumptions and cognitive biases and provides easy to use solutions for testing hypotheses and resolving dilemmas

one of the most important tasks faced by decision makers in business and government is that of selection selection problems are challenging in that they require the balancing of multiple often conflicting criteria in recent years a number of interesting decision aids have become available to assist in such decisions the aim of this book is to provide a comparative survey of many of the decision aids currently available the first chapters present general ideas which underpin the methodologies used to design these aids subsequent chapters then focus on specific decision aids and demonstrate some of the software which implement these ideas a final chapter provides

a comparative analysis of their strengths and weaknesses

fourteen contributors from six countries present recent research results in the study of decision making processes they address cognitive and evaluative issues involved in human choice and judgement several studies model how decision makers represent and structure information involved in making choices others discuss theory methods or group decision making

this book contains international perspectives that unifies the themes of strategic management decision theory and data science it contains thought provoking presentations of case studies backed by adequate analysis adding significance to the discussions most of the decision making models in use do take due advantage of collection and processing of relevant data using appropriate analytics oriented to provide inputs into effective decision making the book showcases applications in diverse fields including banking and insurance portfolio management inventory analysis performance assessment of comparable economic agents managing utilities in a health care facility reducing traffic snarls on highways monitoring achievement of some of the sustainable development goals in a country or state and similar other areas that showcase policy implications it holds immense value for researchers as well as professionals responsible for organizational decisions

this book presents different techniques and methodologies that used to help improve the decision making process and increase the likelihood of success in sector as follows agriculture financial services logistics energy services health and others this book collects and consolidates innovative and high quality research contributions regarding the implementation techniques and methodologies applied in different industrial sectors the scope is to disseminate current trends knowledge in the implementation of artificial intelligence techniques and methodologies in different fields as follows supply chain business intelligence e commerce social media and others the book contents are useful for ph d ph d students master and undergraduate students and professional and students in industrial engineering computer science information systems data analytics and others

this book presents a broad range of innovative applications and case studies in all areas of management and engineering including public administration finance marketing engineering transportation and energy systems it addresses issues related to problem structuring preference modeling and model construction presenting a framework that provides clear decision making support in practice in addition it includes hybrid and integrated techniques combining multiple criteria decision making mcdm with other analytical methods the book reflects the growing impact of mcdm in the field of management science and operations research building on recent and established theoretical advances and presenting their applications in specific domains it offers a comprehensive resource for researchers graduate students and professionals alike

whether we like it or not we all feel that the world is uncertain from choosing a new technology to selecting a job we rarely know in advance what outcome will result from our decisions unfortunately the standard theory of choice under uncertainty developed in the early forties and fifties turns out to be too rigid to take many tricky issues of choice under uncertainty into account the good news is that we have now moved away from the early descriptively inadequate modeling of behavior this book brings the reader into contact with the accomplished progress in individual decision making through the most recent contributions to uncertainty modeling and behavioral decision making it also introduces the reader into the many subtle issues to be resolved for rational choice under uncertainty

in a context where schools are held more and more accountable for the education they provide data based decision making has become increasingly important this book brings together scholars from several countries to examine data based decision making data based decision making in this book refers to making decisions based on a broad range of evidence such as scores on students assessments classroom observations etc this book supports policy makers people working with schools researchers and school leaders and teachers in the use of data by bringing together the current research conducted on data use across multiple countries into a single volume some of these studies are best practice studies where effective data use has led to improvements in student learning others provide insight into challenges in both policy and practice environments each of them draws on research and literature in the field

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Introduction

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