

Managing Sustainable Energy Decisions: A Prospect – Theory Perspective

Pedro Guedes¹, Paulo Santos², Ricardo São João^{3,4,5,6}

1.Santarem Polytechnic University, Santarem, Portugal, pedro.guedes@uepsantarem.pt
 2.Santarem Polytechnic University, Santarem, Portugal, pedro.santos@uepsantarem.pt
 3.Santarem Polytechnic University, Santarem, Portugal, ricardo.saojoao@uepsantarem.pt
 4.Integrated Researcher at CEAU: Centro de Estatística e Aplicações, Faculdade de Ciências, Universidade de Lisboa, Lisboa, Portugal.
 5.CDNUR - Center for Research, Innovation and Development in Nursing, Nursing School of Lisbon, Lisbon, Portugal.
 6.Center for Global Studies (CEG-UAB), Aberta University, Portugal.

Abstract:

The survival of humanity increasingly depends on its own actions. Sustainability is a pressing issue that must be systematically integrated into all decision-making processes. In management, multiple factors often influence the selection of decisions at the expense of more sustainable alternatives.

Multi-Criteria Decision Analysis (MCDA) methods are used to objectify, support, and enhance the transparency of complex decisions involving multiple criteria. Research shows that applying MCDA in group decision-making increases satisfaction levels and the perception of fairness. These methods foster group commitment and facilitate negotiation toward a collectively supported solution.

This communication aims to contribute to future research by replicating the studies of Leoneti & Gomes (2021). In the field of group multicriteria decision, specifically, it proposes replacing Case 3 — "Selection of the New President of a Company" — with two new case studies whose criteria and alternatives are explicitly related to sustainability (energy production sources). These cases will engage specialists and vocational education students in constructing a value tree, including the selection of criteria, alternatives, and performance descriptors. In both case studies Two case studies concerning energy production sources will be developed, and MCDA models will be applied to select the preferred option.

Keywords:

Multi-Criteria Decision Analysis, Sustainability, Prospect Theory, Energy

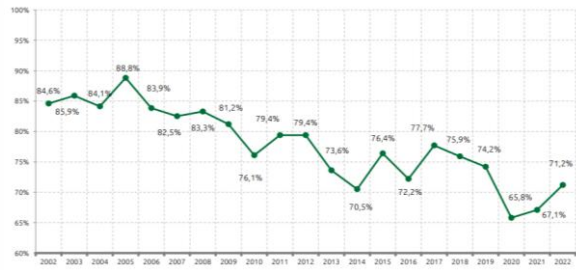
Hypothesis:

Was there commitment to the decision?
 Method and negotiation present the same decision?

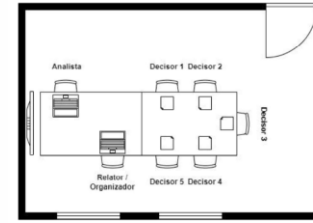
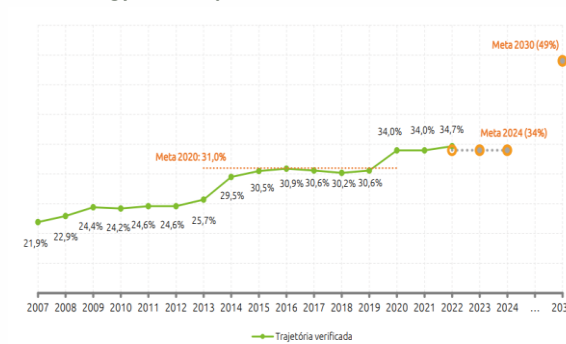
Objectives:

Choose between two case studies which best, using Prospect Theory, explains and predicts decision patterns related to sustainable energy choices, identifying risk factors, loss aversion, and gain perceptions, with the aim of supporting senior management more effectively.

Evolution of Portugal's energy dependence



Evolution of the incorporation of renewables in gross final energy consumption



Target audience of the study:

15 vocational education students.

Methodology:

1. Arrangement of students as per the image above
2. Initial Presentation of the Dynamic
 - i. General Information
 - ii. Study Instructions and Rules
3. Individual Phase
 - i. Case Presentation
 - ii. Ordering of Criteria and Alternatives According to Your Preferences
4. Group Phase
 - i. Presentation of Each Participant's Choices
 - ii. 15 Minutes of Negotiation, with Both Researchers Describing the Negotiation Process
 - iii. Presentation of the Group's Results and Comparison with the Model's Results
5. Individual Phase
 - i. Final Decision by Each Participant, Secretly Voted
6. Commitment Verification
 - i. Unanimity Verification
7. Comparison as a Model

Case example:

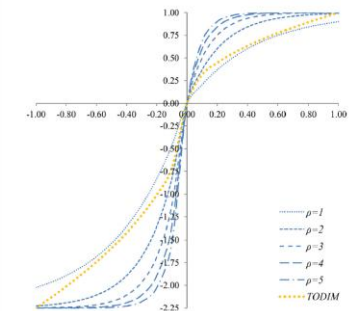
Alternatives	Criteria							
	Durability / Return on investment	Installation cost	Average Installation Time	Supply Disruption	Production cost	Availability	Degree of Decarbonization	Safety for the community during operation
Energy A	6	6	6	8	4	4	7	8
Energy B	6	7	6	4	7	7	5	6
Energy C	5	7	4	5	7	7	5	6
Energy D	5	4	4	4	5	7	2	4
Energy E	8	7	7	1	5	9	6	2

Expected Outcomes:

1. Degree of Satisfaction with the Decision
 Does not only evaluate the results, but also considers the means used to achieve them.
2. Sense of Justice
 Assessment of students' perceptions of the fairness of management decisions and actions.
 This perception, in turn, can influence students' attitudes toward management (YEAN; YUSOF, 2016, p. 798-799).
 For Griffin and Moorhead (2015), organizational justice is related to individuals' perceptions of fairness within an organization.

Author's results:

This new version demonstrated low complexity for implementation and high predictive power, proving more assertive in predicting the alternative chosen by the decision maker. The mathematical model adopted by the method is based on an exponential function that demonstrated greater adherence to the theory of choice presented by prospect theory.



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