Review of: "Refrigerant Selection in Air Conditioning Systems Considering Thermodynamic, Environmental, and Economic Performance Using the BHARAT-II Multi-Attribute Decision-Making Method"

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Potential competing interests: No potential competing interests to declare.

The paper proposes a simple and effective multi-attribute decision-making method called "Best Holistic Adaptable Ranking of Attributes Technique (BHARAT)-II" for selecting the best refrigerant for air conditioning systems.

1. The method considers the thermodynamic properties of refrigerants, as well as their environmental and economic performance.

2. The paper presents two case studies:

Case study 1: Selecting the best refrigerant for residential split air conditioners from 15 alternatives and 12 selection attributes.

Case study 2: Selecting the best refrigerant for automobile air conditioning systems from 14 alternatives and 13 selection attributes.

The results of the BHARAT-II method are compared with other well-known MCDM methods like EDAS, TOPSIS, and MOORA.

1. The key advantages of the BHARAT-II method are that it is simple to implement, provides a logical way to assign weights to selection attributes, and is useful for solving refrigerant selection problems in both residential and industrial applications.

2. The paper emphasizes the need for a systematic and effective decision-making approach to address the challenges in refrigerant selection due to the large number of alternatives and the multiple, often conflicting, criteria involved.

3. The open peer review highlights that the proposed BHARAT-II method addresses the limitations of other MCDM techniques and provides a reliable way to determine the weights of selection attributes compared to methods like AHP and BWM.

The open peer review did not highlight any major limitations of the proposed BHARAT-II method in the paper. However, some minor points that could be considered as potential areas for improvement or further research are:

1. Validation of the method: While the paper presents two case studies to demonstrate the application of BHARAT-II, additional validation of the method using real-world data or benchmarking against more MCDM techniques could

further strengthen the conclusions.

2. Sensitivity analysis: Conducting sensitivity analyses to understand the robustness of the BHARAT-II method to changes in attribute weights or other input parameters could provide more insights into the reliability of the results.

3. Comparison with other weight assignment techniques: The paper focuses on the BHARAT-II method, but a comparison of the results with other weight determination approaches, such as the Entropy method or Analytical Hierarchy Process (AHP), could further highlight the relative advantages of the proposed method.

4. Computational complexity: While the paper claims the BHARAT-II method is simple to implement, a more detailed analysis of the computational requirements and scalability of the method as the number of alternatives and attributes increases could be useful.

5. Practical implementation considerations: The paper discusses the theoretical aspects of the BHARAT-II method, but additional insights into the practical challenges and steps involved in implementing the method in real-world refrigerant selection scenarios could be valuable.

Based on the feedback from the open peer review, here are some suggestions on how the authors could modify or enhance the paper:

1. Expand the validation and benchmarking:

  - Include additional case studies or real-world applications to further validate the BHARAT-II method.

  - Conduct a more comprehensive comparison with other prominent MCDM techniques, such as TOPSIS, VIKOR, and MOORA, to better highlight the relative strengths and weaknesses of the proposed method.

  - Perform sensitivity analyses to examine the robustness of the BHARAT-II method to changes in attribute weights or other input parameters.

2. Comparative analysis of weight assignment techniques:

  - Provide a more detailed comparison of the BHARAT-II method for weight assignment with other approaches like the Entropy method and AHP.

  - Discuss the advantages and disadvantages of the different weight determination techniques and how they impact the final refrigerant selection.

  - Consider incorporating a hybrid approach that combines the strengths of multiple weight assignment methods.

3. Computational complexity and scalability:

  - Include a more thorough analysis of the computational requirements and time complexity of the BHARAT-II method, especially as the number of alternatives and attributes increases.

  - Discuss strategies or modifications to the method that could improve its scalability and make it suitable for larger-scale refrigerant selection problems.

4. Practical implementation considerations:

  - Provide more insights into the step-by-step process of implementing the BHARAT-II method in real-world refrigerant selection scenarios.

  - Discuss potential challenges, data sources, and best practices for gathering the necessary information (e.g., refrigerant properties, environmental and economic data).

  - Include guidelines or recommendations for decision-makers on how to effectively utilize the BHARAT-II method in their refrigerant selection process.

5. Addressing uncertainty and imprecision:

  - Explore ways to incorporate fuzzy logic or other techniques to handle uncertainties and imprecisions in the input data.

  - Discuss how the BHARAT-II method can be adapted to deal with incomplete, vague, or subjective information about the refrigerant alternatives and their performance.

6. Enhance the presentation and organization:

  - Improve the overall structure and flow of the paper to make it more reader-friendly.

  - Provide clearer explanations and examples to help the audience better understand the BHARAT-II method and its application.

  - Ensure that the paper adheres to the journal's formatting and presentation guidelines.

Finally; By addressing these points, the authors can further strengthen the paper, demonstrate the robustness and practical applicability of the BHARAT-II method, and provide a more comprehensive and valuable contribution to the field of refrigerant selection in air conditioning systems.