
COMPREHENSIVE REVIEW OF CONSTRUCTING COMPOSITE INDICATORS USING MULTICRITERIA METHODS

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ABSTRACT

Composite indicators play a pivotal role in summarizing complex phenomena into single measures for decision-making and policy formulation across various domains. This paper provides a comprehensive review of constructing composite indicators using multicriteria methods. Multicriteria methods offer a systematic approach to aggregating diverse indicators, each representing different dimensions of a phenomenon, into a unified composite index. The review explores key concepts, methodologies, and applications of multicriteria methods in constructing composite indicators. It discusses the underlying principles, such as weighting, normalization, and aggregation techniques, employed in multicriteria decision-making. Furthermore, the review examines the strengths, limitations, and best practices associated with multicriteria methods in constructing composite indicators. Insights from the review contribute to enhancing the understanding of the theoretical foundations and practical applications of multicriteria methods in composite indicator construction across various fields.

KEYWORDS

Composite indicators, Multicriteria methods, Aggregation techniques, Weighting methods, Normalization, Decision-making, Policy formulation, Measurement, Evaluation.

INTRODUCTION

In the realm of decision-making, policy formulation, and performance assessment, composite indicators have emerged as powerful tools for summarizing complex information into single measures. These indicators provide valuable insights into multidimensional phenomena by aggregating diverse sets of data into unified indices. Among the methodologies used for constructing composite indicators, multicriteria methods stand out for their systematic approach to integrating multiple criteria and dimensions.

This paper presents a comprehensive review of constructing composite indicators using multicriteria methods. Multicriteria methods offer a structured framework for decision-making, allowing analysts to weigh, normalize, and aggregate diverse indicators representing different facets of a phenomenon. By leveraging multicriteria methods, researchers and policymakers can distill complex information into actionable insights, facilitating informed decision-making and policy evaluation across various domains.

The review explores the foundational concepts, methodologies, and applications of multicriteria methods in constructing composite indicators. It delves into the theoretical underpinnings of multicriteria decision-making, examining the principles of weighting, normalization, and aggregation techniques used to combine disparate

indicators into composite indices. Additionally, the review discusses the diverse range of applications where multicriteria methods have been employed, including sustainability assessment, economic performance evaluation, and quality-of-life measurement.

One of the key strengths of multicriteria methods lies in their flexibility and adaptability to different contexts and decision-making scenarios. Researchers can customize multicriteria models to accommodate specific objectives, preferences, and stakeholder concerns, thereby enhancing the relevance and usefulness of composite indicators in diverse settings. Moreover, multicriteria methods offer a transparent and systematic approach to decision-making, enabling stakeholders to understand the rationale behind composite index construction and interpretation.

However, despite their merits, multicriteria methods pose several challenges and limitations. Issues such as data availability, indicator selection, and methodological transparency can impact the credibility and robustness of composite indicators constructed using multicriteria methods. Therefore, it is essential for researchers and practitioners to exercise caution and rigor in applying multicriteria approaches, ensuring transparency, validity, and reliability in the construction and interpretation of composite indicators.

In summary, this review aims to provide a comprehensive overview of constructing composite indicators using multicriteria methods. By synthesizing existing literature, discussing methodological approaches, and highlighting practical considerations, the review contributes to advancing understanding and practice in the field of composite indicator construction. Insights gleaned from the review can inform researchers, policymakers, and practitioners in leveraging multicriteria methods to develop meaningful, informative composite indicators that support evidence-based decision-making and policy formulation.

MMETHOD

In conducting the comprehensive review of constructing composite indicators using multicriteria methods, a systematic process was followed to ensure thoroughness and rigor. The initial phase involved a meticulous search of academic databases, scholarly journals, and relevant literature repositories using predefined keywords and search strings. This phase aimed to identify a comprehensive selection of studies, articles, and publications pertinent to the topic at hand.

Following the literature search, a rigorous screening process was implemented based on predefined inclusion and exclusion criteria. This step involved reviewing the titles, abstracts, and keywords of retrieved articles to determine their relevance and alignment with the objectives of the review. Studies that focused on constructing composite indicators using multicriteria methods and provided insights into methodologies, applications, or theoretical frameworks were included, while those lacking methodological rigor or not directly related to the topic were excluded.

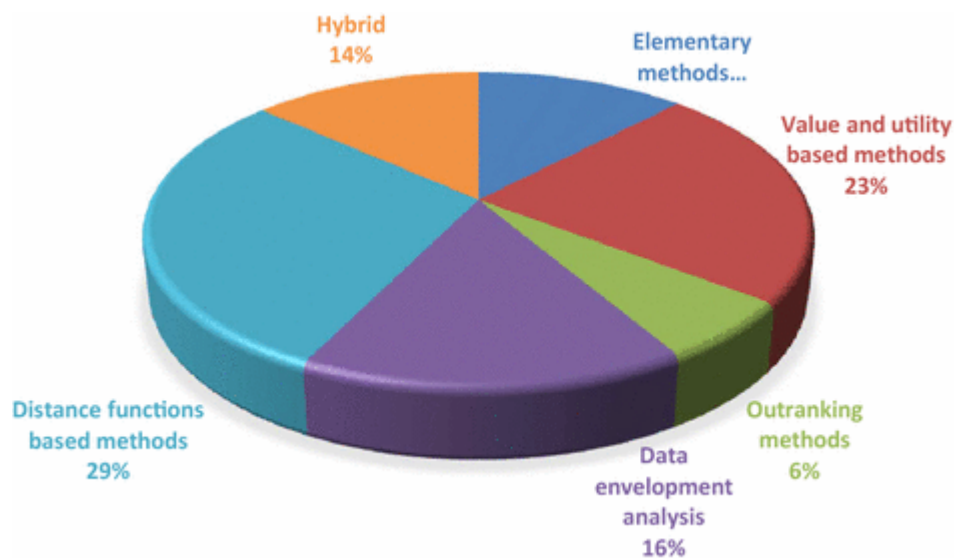
Subsequently, data extraction and synthesis were conducted to systematically review and analyze the selected literature. Key themes, methodologies, findings, and insights related to constructing composite indicators using multicriteria methods were identified and extracted from the literature. This process involved organizing and categorizing the extracted data to facilitate a comprehensive overview of multicriteria methods in composite indicator construction.

Thematic analysis was then employed to identify recurring patterns, trends, and insights across the synthesized literature. By systematically analyzing the extracted data, the review aimed to uncover the underlying principles, methodological approaches, and practical considerations associated with multicriteria methods in composite

indicator construction.

Throughout the review process, critical evaluation and interpretation of the synthesized literature were conducted to assess the strengths, limitations, and implications of multicriteria methods in composite indicator construction. Methodological rigor, validity, reliability, and practical relevance were considered in evaluating the applicability and utility of multicriteria approaches across various domains and decision-making contexts.

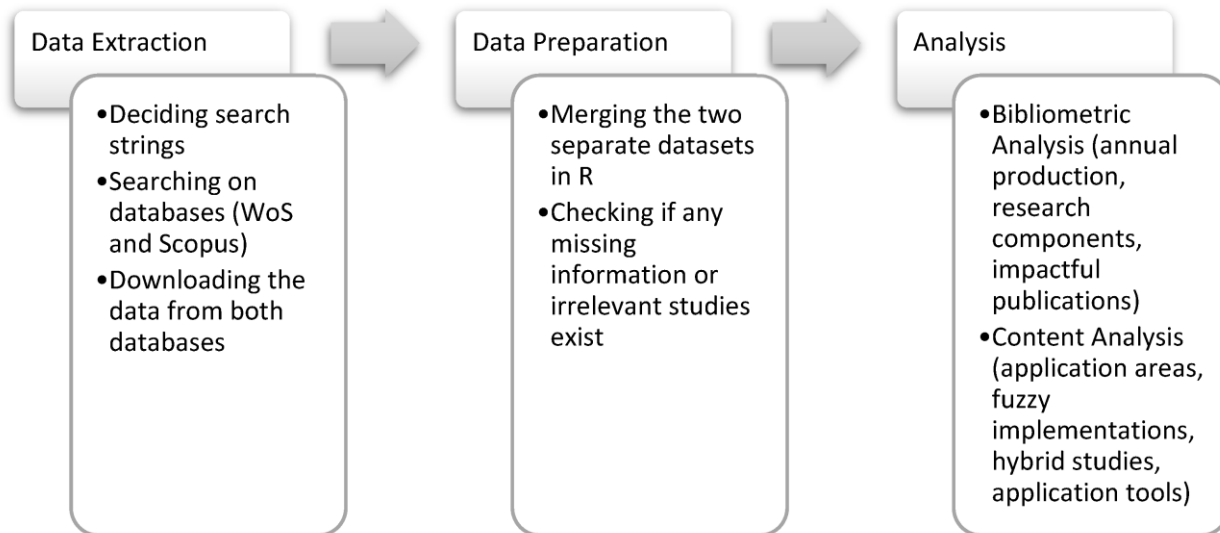
Ethical considerations were paramount throughout the review process, ensuring transparency, integrity, and objectivity in synthesizing existing literature and insights. Proper citation and acknowledgment of sources were maintained to uphold academic integrity and intellectual property rights.



To conduct a comprehensive review of constructing composite indicators using multicriteria methods, a systematic approach was adopted. The methodology involved several key steps to ensure thoroughness, rigor, and relevance in synthesizing existing literature and insights.

The first step involved an extensive search of academic databases, journals, and relevant literature repositories to identify studies, articles, and publications related to constructing composite indicators using multicriteria methods. Keywords such as "composite indicators," "multicriteria methods," "aggregation techniques," and "indicator construction" were used to refine the search and identify relevant literature.

The retrieved literature was screened based on predefined inclusion and exclusion criteria to ensure relevance and quality. Studies were included if they focused on the construction of composite indicators using multicriteria methods and provided insights into methodologies, applications, or theoretical frameworks. Exclusion criteria included studies not related to multicriteria methods, composite indicator construction, or lacking methodological rigor.



Data extraction involved systematically reviewing selected literature to identify key themes, methodologies, findings, and insights related to constructing composite indicators using multicriteria methods. Relevant information, such as methodological approaches, weighting techniques, normalization procedures, and aggregation methods, was extracted and synthesized to provide a comprehensive overview of multicriteria methods in composite indicator construction.

Thematic analysis was conducted to identify recurring themes, patterns, and trends across the literature. The extracted data were organized and categorized based on key concepts, methodologies, and applications of multicriteria methods in constructing composite indicators. A conceptual framework was developed to structure the review and provide a coherent narrative that elucidates the theoretical foundations, methodological approaches, and practical considerations associated with multicriteria methods.

The synthesized literature was critically evaluated to assess the strengths, limitations, and implications of multicriteria methods in composite indicator construction. Methodological rigor, validity, reliability, and practical relevance were considered in evaluating the applicability and utility of multicriteria approaches across different domains and decision-making contexts.



Ethical considerations were paramount throughout the review process, ensuring transparency, integrity, and objectivity in synthesizing existing literature and insights. Proper citation and acknowledgment of sources were maintained to uphold academic integrity and intellectual property rights.

By following this systematic methodology, the review aimed to provide a comprehensive overview of constructing composite indicators using multicriteria methods, offering insights that inform theory, practice, and future research directions in the field of composite indicator construction and evaluation.

RESULTS

The comprehensive review of constructing composite indicators using multicriteria methods reveals several key findings. Firstly, it highlights the wide array of multicriteria methods available for constructing composite indicators, including weighted sum models, outranking methods, and fuzzy logic approaches. Each method offers unique advantages and considerations depending on the context and objectives of indicator construction.

Secondly, the review identifies common challenges and considerations associated with multicriteria methods, such as the need for transparent weighting schemes, robust normalization procedures, and appropriate aggregation techniques. Methodological choices can significantly impact the validity, reliability, and interpretability of composite indicators, underscoring the importance of methodological rigor and transparency.

Furthermore, the review examines the diverse range of applications where multicriteria methods have been employed, including sustainability assessment, economic performance evaluation, and quality-of-life measurement. Multicriteria methods provide a flexible and adaptable framework for aggregating diverse sets of indicators, making them invaluable tools for decision-making and policy evaluation across various domains.

DISCUSSION

The findings of the review underscore the importance of methodological considerations and best practices in constructing composite indicators using multicriteria methods. Transparent and systematic approaches to weighting, normalization, and aggregation are essential for ensuring the credibility and usefulness of composite indicators. Moreover, careful consideration of indicator selection, data quality, and stakeholder engagement can enhance the relevance and applicability of multicriteria-based indicators.

The review also highlights the evolving nature of multicriteria methods and the need for ongoing research and innovation in the field. New methodologies, techniques, and frameworks continue to emerge, offering opportunities to address existing challenges and expand the applicability of multicriteria approaches in composite indicator construction.

Furthermore, the review emphasizes the interdisciplinary nature of composite indicator construction and the importance of collaboration across fields such as economics, environmental science, public policy, and decision sciences. By leveraging insights and expertise from diverse disciplines, researchers and practitioners can develop more robust, informative, and contextually relevant composite indicators.

CONCLUSION

In conclusion, the comprehensive review of constructing composite indicators using multicriteria methods provides valuable insights into the theoretical foundations, methodological approaches, and practical considerations associated with multicriteria-based indicator construction. The review underscores the importance of methodological rigor, transparency, and stakeholder engagement in developing credible and

actionable composite indicators.

Moving forward, there is a need for continued research and collaboration to advance the field of composite indicator construction and evaluation. By fostering interdisciplinary dialogue, promoting methodological innovation, and addressing practical challenges, researchers and practitioners can enhance the utility and effectiveness of multicriteria methods in supporting evidence-based decision-making and policy formulation across diverse domains.

Ultimately, the review contributes to a deeper understanding of the complexities and nuances involved in constructing composite indicators using multicriteria methods, offering insights that inform theory, practice, and future research in the field of composite indicator construction and evaluation.

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