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Cost Measurement Research Trends: A Bibliometric Analysis

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ABSTRACT

This study examines the development and intellectual structure of cost measurement research using a bibliometric approach. Cost measurement has long been a fundamental component of accounting and managerial decision-making, yet its evolution reflects increasing complexity driven by technological advancements and interdisciplinary integration. This research analyzes a collection of scientific publications retrieved from major academic databases, employing bibliometric techniques such as co-occurrence analysis, network visualization, and thematic mapping using VOSviewer. The results reveal that cost effectiveness remains the central theme connecting diverse research streams, including traditional cost analysis, healthcare evaluation, and scientific measurement practices. Over time, the field has shifted toward incorporating advanced analytical approaches such as machine learning, optimization, and uncertainty analysis, indicating a transition toward more data-driven and predictive models. Furthermore, the findings highlight strong interdisciplinary linkages across accounting, engineering, and health sciences, as well as growing attention to methodological rigor through concepts such as reliability, calibration, and reproducibility. This study contributes by providing a structured overview of research trends and identifying emerging directions, offering valuable insights for future studies in cost measurement and decision-support systems.

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1. INTRODUCTION

Cost measurement has long been a fundamental aspect of accounting and management practices, serving as a critical tool for decision-making, performance evaluation, and strategic planning in organizations. Accurate cost measurement enables firms to determine product pricing, control operational efficiency, and assess profitability. Over time, the evolution of business environments—characterized by globalization, technological advancement, and increasing competition—has significantly influenced the development of cost measurement techniques. Traditional cost accounting systems have gradually shifted toward more sophisticated approaches, such as activity-based costing and strategic cost management, reflecting the growing need for more precise and relevant cost information in complex organizational settings [1], [2].

In parallel with these developments, academic research on cost measurement has expanded considerably, encompassing

various perspectives such as managerial accounting, financial reporting, and sustainability accounting. The increasing volume of scholarly publications indicates that cost measurement is not only a practical concern but also an evolving academic discipline. This growth is driven by the necessity to address emerging challenges, including digital transformation, environmental accountability, and the integration of financial and non-financial information. As a result, understanding the trajectory and structure of research in this field has become essential for scholars and practitioners alike [3].

One effective method to explore the development of a research field is bibliometric analysis. Bibliometric analysis applies statistical and quantitative techniques to evaluate patterns in scientific publications, including authorship, citation networks, and thematic evolution. It enables researchers to identify influential studies, key contributors, and emerging research trends within a specific domain. By examining large datasets from databases such as Scopus or Web of Science, bibliometric studies provide a systematic overview of how knowledge in a particular field has developed over time. This approach has gained prominence due to its ability to offer objective and reproducible insights into academic literature [4].

In the field of accounting, bibliometric analysis has been widely utilized to investigate various sub-disciplines, including financial accounting, forensic accounting, and accounting information systems. Previous studies have demonstrated that bibliometric techniques can reveal thematic clusters, collaboration networks, and shifts in research focus across time. For instance, bibliometric studies in accounting have identified key themes such as transparency, disclosure, and technological integration, reflecting the dynamic nature of the discipline. These findings highlight the usefulness of bibliometric analysis in uncovering both established and emerging areas of research [5].

Despite the growing body of bibliometric studies in accounting, research specifically focusing on cost measurement trends remains relatively limited. While some studies have examined related topics such as cost of capital or financial reporting, a comprehensive bibliometric analysis dedicated to cost measurement is still lacking. Existing research indicates that bibliometric analysis can effectively map research evolution, identify dominant themes, and suggest future research directions. Therefore, conducting a bibliometric analysis of cost measurement research is crucial to fill this gap and provide a clearer understanding of how the field has evolved and where it is heading.

Although cost measurement plays a vital role in both theory and practice, there is still a lack of systematic understanding regarding the development, trends, and intellectual structure of research in this area. The increasing number of publications has made it difficult for researchers to identify key contributions, dominant themes, and emerging topics within the field. Moreover, the absence of comprehensive mapping limits the ability to recognize research gaps and potential areas for future investigation. Without a structured bibliometric analysis, the existing literature on cost measurement remains fragmented and less accessible for academic advancement and practical application. This study aims to analyze the trends and development of cost measurement research through a bibliometric approach.

2. METHODS

This study employs a quantitative bibliometric approach to analyze the development and trends of research in cost measurement. Bibliometric analysis is chosen because it provides a systematic and objective method for evaluating large volumes of academic literature through statistical and mapping techniques. The study focuses on identifying publication patterns, citation structures, and thematic evolution within the field of cost measurement. By using this approach, the research is able to capture both the historical development and emerging directions of the topic in a comprehensive manner.

The data for this study are collected from reputable academic databases, primarily Scopus and Web of Science, which are widely recognized for their extensive coverage of peer-reviewed journals. The search process is conducted using specific keywords such as "cost measurement," "cost accounting," and related terms to ensure the relevance of the dataset. Inclusion criteria are applied to select articles published in English, within a defined time period, and categorized under relevant subject areas such as accounting, business, and management. After the initial search, the data are refined by removing duplicates and irrelevant documents to ensure accuracy and consistency in the analysis.

3. RESULTS AND DISCUSSION

3.1 Keyword Co-Occurrence Network

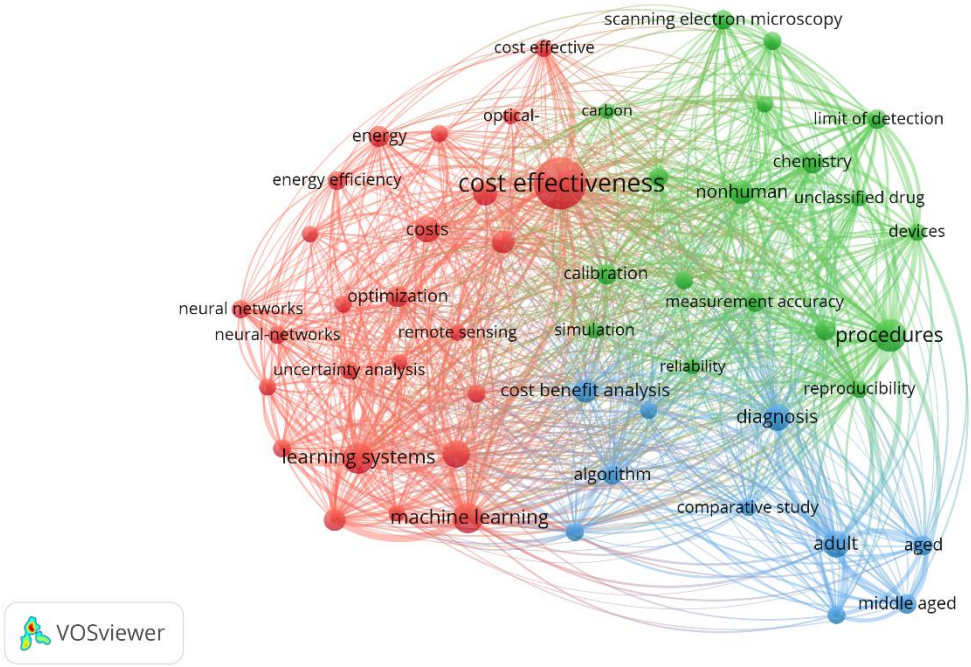

Figure 1. Network Visualization
Source: Data Analysis Result, 2026

Figure 1 reveals the intellectual structure of cost measurement research through clustered keyword relationships. The most prominent node, "cost effectiveness," occupies a central position, indicating that it serves as the core theme connecting various streams of research. Its large size and dense connections suggest that cost effectiveness is not only widely studied but also acts as a bridge between methodological, technological, and applied domains within the literature.

The red cluster represents a strong concentration of studies related to analytical and computational approaches, including keywords such as machine learning, optimization, neural networks, and uncertainty analysis. This cluster indicates a growing trend toward integrating advanced analytical tools into cost measurement. The presence of terms like energy efficiency and remote sensing also suggests that cost measurement is increasingly being applied in technical and engineering contexts, where predictive modeling and optimization are essential.

The green cluster reflects a focus on measurement techniques and scientific validation, with keywords such as procedures, calibration, measurement accuracy, reliability, and reproducibility. This cluster highlights the methodological rigor

required in cost-related studies, especially in laboratory, healthcare, and scientific environments. The inclusion of terms like devices, chemistry, and scanning electron microscopy suggests that cost measurement is not limited to accounting but extends into experimental and applied sciences where precision and standardization are critical.

The blue cluster appears to emphasize applied and empirical contexts, particularly in healthcare and demographic-based studies. Keywords such as diagnosis, comparative study, adult, aged, and middle aged indicate that cost measurement is widely used in evaluating medical treatments, interventions, and health outcomes. This suggests that cost effectiveness analysis plays a crucial role in decision-making within healthcare systems, especially when assessing the value of treatments across different population groups.

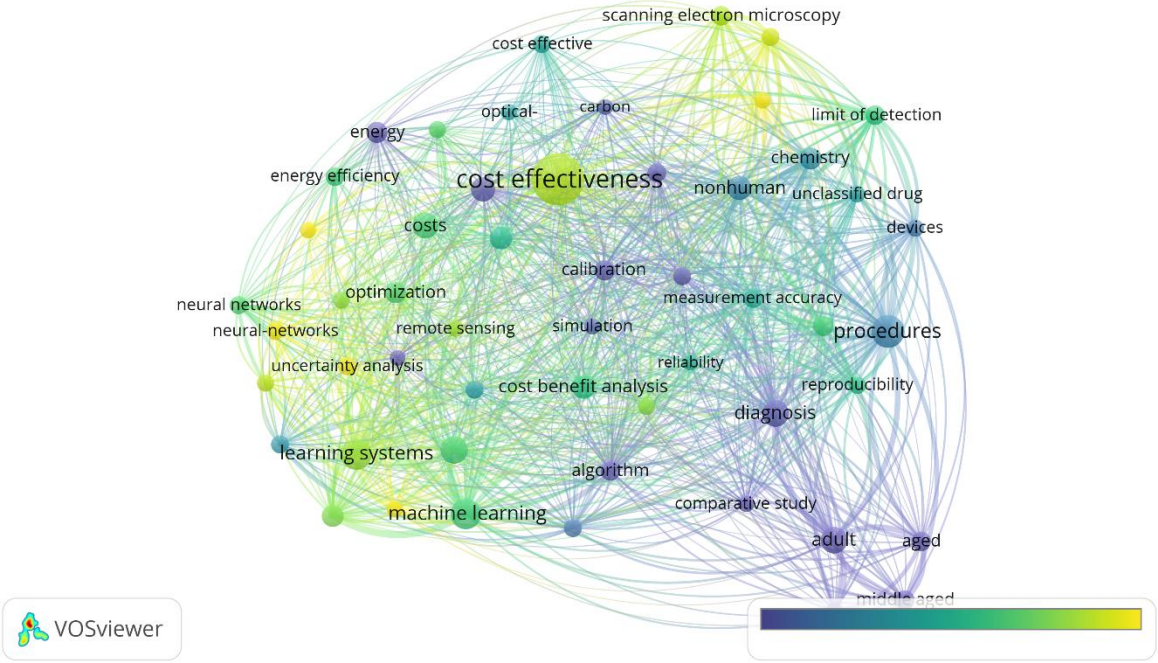

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2026

Figure 2 highlights the temporal evolution of research themes in cost measurement studies. The color gradient, ranging from blue (earlier studies) to yellow (more recent studies), shows that "cost effectiveness" remains the central and continuously relevant topic across time. Its position in the middle with mixed colors indicates that it has been consistently studied while also adapting to newer research contexts. This suggests that cost effectiveness serves as a stable foundation upon which new methodological and applied developments are built.

Earlier research, represented by blue and purple tones, is concentrated around keywords such as diagnosis, comparative study, adult, aged, and procedures. This indicates that initial developments in cost measurement were strongly rooted in healthcare and clinical evaluation contexts, where cost-benefit considerations were used to assess treatments and interventions across different demographic groups. These studies emphasize standardized procedures and empirical validation, reflecting a more traditional and application-focused phase of research.

More recent trends, shown in green to yellow colors, demonstrate a clear shift toward technology-driven and analytical approaches. Keywords such as machine

learning, neural networks, optimization, uncertainty analysis, and energy efficiency appear more prominently in newer studies. This indicates that cost measurement research is increasingly integrating advanced computational methods and is expanding into areas such as engineering, environmental analysis, and data science. The emergence of these topics signals a transition toward more predictive, data-intensive, and interdisciplinary frameworks, opening new directions for future research that combine cost analysis with intelligent systems and sustainability considerations.

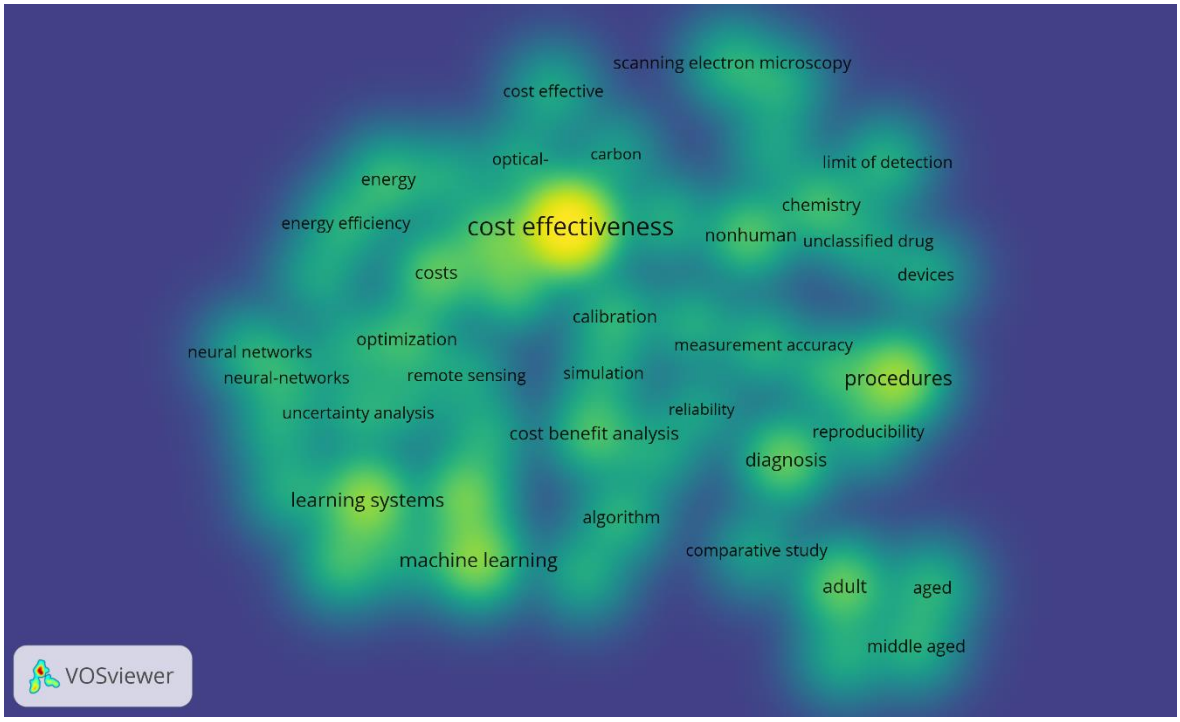

Figure 3. Density Visualization
Source: Data Analysis Result, 2026

Figure 3 highlights the intensity and concentration of research themes within cost measurement studies. The brightest (yellow) area is centered on "cost effectiveness," confirming its position as the most dominant and frequently studied topic in the field. This central hotspot is surrounded by related terms such as costs, cost benefit analysis, and calibration, indicating that much of the literature converges around evaluating efficiency and value in decision-making processes. The relatively dense connections in this area suggest a mature and well-established research core that continues to attract significant scholarly attention.

Beyond the central theme, several moderately dense regions (green) emerge around topics such as procedures, diagnosis, machine learning, and learning systems. This indicates that cost measurement research is expanding into both applied domains (especially healthcare) and technology-driven approaches, though these areas are still less concentrated compared to the core theme. Peripheral and less dense areas (blue) reflect more specialized or emerging topics, such as demographic-based studies (adult, aged) and advanced technical methods.

3.2 Citation Analysis

Table 1. Top Cited Research

Citations	Authors and year	Title
12426	[6]	K/DOQI clinical practice guidelines for chronic kidney disease: Evaluation, classification, and stratification
11231	[7]	Cooperative diversity in wireless networks: Efficient protocols and outage behavior
10441	[8]	Sarcopenia: Revised European consensus on definition and diagnosis
9822	[9]	Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: A systematic analysis for the Global Burden of Disease Study 2013
7273	[10]	Epidemiology of severe sepsis in the United States: Analysis of incidence, outcome, and associated costs of care
5817	[11]	Markers of inflammation and cardiovascular disease: Application to clinical and public health practice: A statement for healthcare professionals from the centers for disease control and prevention and the American Heart Association
5716	[12]	Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda
5384	[13]	High-thermoelectric performance of nanostructured bismuth antimony telluride bulk alloys
5160	[14]	Bounding the role of black carbon in the climate system: A scientific assessment
4790	[15]	EQ-5D: A measure of health status from the EuroQol Group

Source: Scopus, 2026

Discussion

The findings of this bibliometric analysis demonstrate that cost measurement research is anchored in the concept of cost effectiveness, which functions as the central node connecting various thematic areas. The consistent prominence of this keyword across network, overlay, and density visualizations indicates that the evaluation of efficiency and value remains the primary concern in the literature. Over time, this core theme has expanded beyond traditional cost accounting practices toward broader applications, reflecting the increasing complexity of decision-making environments in both public and private sectors.

A notable development identified in this study is the shift from conventional costing approaches toward more advanced analytical and computational methods. The emergence of keywords such as machine learning, neural networks, optimization, and uncertainty analysis suggests that researchers are increasingly adopting data-driven techniques to enhance the accuracy and predictive capability of cost measurement. This transition signals a movement away from static cost evaluation toward more dynamic and forward-looking models that can support strategic decision-making under conditions of uncertainty.

The analysis also reveals that cost measurement research is deeply embedded in applied contexts, particularly within the healthcare domain. The presence of terms such as diagnosis, procedures, comparative study, and demographic indicators indicates that cost effectiveness analysis is widely used to assess medical interventions and healthcare policies. This reflects the critical role of cost measurement in resource allocation and policy evaluation, where balancing cost efficiency with outcome effectiveness becomes a central challenge.

The integration of methodological rigor and interdisciplinary perspectives emerges as a key characteristic of the field. Keywords related to measurement accuracy, reliability, reproducibility, and calibration highlight the importance of ensuring validity in cost-related studies, especially in scientific and technical applications. At the same time, the convergence of accounting, engineering, and data science perspectives suggests that

future research will continue to explore hybrid approaches. This creates opportunities to develop more comprehensive frameworks that incorporate technological innovation, empirical validation, and sustainability considerations in cost measurement practices

4. CONCLUSION

This study provides a comprehensive bibliometric overview of cost measurement research, highlighting its evolution from traditional cost accounting approaches toward more advanced, data-driven, and interdisciplinary frameworks. The findings confirm that cost effectiveness remains the central foundation of the field, while emerging themes such as machine learning, optimization, and measurement accuracy reflect a shift toward more dynamic and technologically integrated methodologies. In addition, the strong presence of applied contexts, particularly in healthcare and scientific research, underscores the practical relevance of cost measurement in supporting decision-making and resource allocation.

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