International Journal of Teaching and Learning (INJOTEL) e-ISSN: 3025-8308
Vol. 2 No. 7, July 2024, pages: 1929~1951

GLOBAL TRENDS IN BALANCED SCORECARD ADOPTION WITHIN THE EDUCATIONAL SECTOR: A BIBLIOMETRIC ANALYSIS

[1] Ida Tejawiani, [2] Wan Faizal, W.I. [3] Dani Wardani,* [4] Dian Ekawati, [5] Lilis Sakuroh, [6] Alias, Nor Azlina

[1,3,4,5] Universitas Islam Nusantara, Bandung, Indonesia
[2] University Malaysia Kelantan, Bachok, Malaysia
[6] University Putra Malaysia, Selangor, Malaysia

Correspondence author email:
d4n1w4rd4n1@gmail.com

Abstract

The adoption of the Balanced Scorecard (BSC) in the educational sector has grown significantly, yet global trends and implementation remain underexplored. This study aims to conduct a comprehensive bibliometric analysis to map these trends, identify influential works, and highlight regional variations in BSC research within education. The objective is to understand how educational institutions worldwide integrate BSC into their strategic management processes. Using bibliometric methods, we analyzed peer-reviewed journals from the Scopus database, focusing on BSC in education. Initially, 350 datasets were identified, refined to 192 after applying inclusion criteria, and further narrowed to 135 datasets based on relevance. The study examines publication trends, key authors, subject areas, productive countries, and influential articles. Cluster analysis identified the main research topics and emerging themes. Findings reveal significant expansion in BSC research in education over the past 26 years, with notable contributions from the United States, the United Kingdom, and Taiwan. High-impact studies focus on performance evaluation, quality management, and strategic alignment. Despite this growth, BSC research in education has not reached maturity, indicating potential for further exploration. This study fills a critical gap in bibliometric analyses of BSC in education, especially post-2018, and demonstrates the effective use of VOSviewer for mapping and visualizing data, offering insights for future research and practical applications.

Keywords: *Balanced Scorecard, bibliometric analysis, the education sector, strategic management, global trends*.

INTRODUCTION

The Balanced Scorecard (BSC), introduced by Kaplan and Norton in the early 1990s, is a strategic management system that combines financial and non-financial performance indicators for a completely visible balance of organizational performance (Kaplan & Norton, 1992). BSC was first conceptualized for the corporate sector to harmonize their business strategies with resources and has since been acknowledged as an instrument that converts

the mission and vision of an organization into workable strategies (Kaplan & Norton, 2007). In the academic sector, BSC has been tailored to overcome issues like better performance, strategic resource focus, and reinforced accountability (Eftimov et al., 2016). Unlike businesses, educational institutions have their mission foci, typically student results, research output, and community service that are part of their purpose as portrayed in customized scorecards (Goetsch & Davis, 2022).

The adoption of BSC in educational institutions is reported across various countries, indicating a growing trend in its use for educational management and strategy formulation. Studies document its use from primary to higher education, highlighting its versatility and adaptability (David et al., 2020). The global spread of BSC in education suggests its perceived effectiveness in improving performance and strategic decision-making (Chavan, 2009). However, despite this widespread adoption, there remains a fragmented understanding of its global implementation, which necessitates a comprehensive review to uncover adoption patterns, thematic emphases, and regional variances.

Several studies have examined the implementation of BSC in educational institutions. Umashankar & Dutta (2007) proposed that implementing BSC in educational institutions shifts the focus from monitoring to actively managing performance, emphasizing effective management. Nejati (2008) highlighted that BSC can enhance education quality by balancing financial and non-financial aspects, supporting institutional success. Rahayu et al. (2023) discussed how BSC implementation improves transparency and accountability in educational institutions, crucial for enhancing performance measurement.

Studies by Bravo et al. (2022) and Fijałkowska & Oliveira (2018) contribute to understanding BSC implementation in higher education, guiding effectively utilizing BSC. They explored the benefits, obstacles, and challenges of BSC adoption in non-higher education schools, shedding light on potential advantages and difficulties (Pereira & Melão, 2012); (Alolah et al., 2014); and (Gündüzalp & Arabacı, 2017). BSC implementation in universities and schools is associated with improvements in behavior, climate, and overall performance (Karathanos & Karathanos, 2005); (Papenhausen & Einstein, 2006); and (Beard, 2009). By planning strategies, cascading them throughout institutions, and selecting indicators, BSC ensures higher education quality (Eftimov et al., 2016). BSC's application in various educational contexts worldwide demonstrates its versatility and effectiveness in enhancing performance and accountability (Yu et al., 2009).

Bibliometric analysis offers a framework for reviewing extensive academic literature and revealing research activity patterns, publication trends, and thematic concentrations (Ellegaard & Wallin, 2015). Applying bibliometric techniques to study BSC adoption in education identifies core themes, influential studies, and regional variations, useful in rapidly evolving disciplines like education (Zupic & Cater, 2015). This study aims to fill the gap in the literature by conducting a comprehensive bibliometric analysis to provide a global

perspective on BSC research in education. It seeks to map how educational institutions worldwide have integrated BSC into their strategic management processes, assess its impact, and determine practical implications for management practices.

Current literature often presents static snapshots of BSC implementation, lacking longitudinal insights into evolutionary trends and dynamic changes in adoption. Longitudinal insights are crucial for understanding how educational institutions evolve in strategic management practices and BSC's role in driving changes (H. Thomas Johnson & Kaplan, 1987).

The Balanced Scorecard (BSC) is a strategic management tool used in education, but there is a lack of comprehensive research on its adoption across different contexts and cultures. This study aims to bridge this gap by providing a unified, data-driven view of the research landscape, uncovering global patterns, thematic concentrations, and regional variations. By analyzing publication patterns, citation networks, and thematic evolutions, the study aims to inform future research directions, highlight opportunities for international collaboration, and guide the effective adaptation and implementation of BSC in diverse educational contexts. This bibliometric analysis will advance the theoretical and practical understanding of BSC in education.

By providing a detailed and comprehensive analysis of past and current trends, this study will help shape future strategic directions for educational institutions globally. It will enhance the understanding of BSC's role in education and offer a benchmark for future studies exploring management innovations in the educational sector.

RESEARCH METHOD

Bibliometric analysis is a quantitative approach used to map the scientific landscape by analyzing various bibliographic data such as publications, citations, and co-authorship patterns (Donthu et al., 2021). This method provides insights into the structure, dynamics, and trends of scientific fields, offering a comprehensive overview of research activities and their impacts over time (Ellegaard & Wallin, 2015). This study employs bibliometric analysis to explore the Balanced Scorecard (BSC) in the educational sector, detailing the steps involved, from defining aims and scope to collecting data and employing bibliometric techniques as follows:

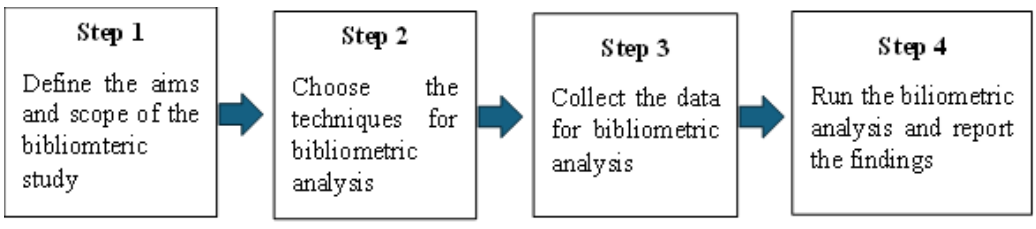

Figure 1. Four Step of Bibliometric Analysis Procedure (Donthu et al., 2021)

Aims and Scope of BSC in Education

This bibliometric study aims to identify the most influential studies, journals, citations, and authors related to the Balanced Scorecard (BSC) in education. Additionally, it seeks to map the geographical distribution and thematic evolution of BSC usage in education. The scope of BSC research includes management strategies, key performance indicators, performance assessment, school management, and university management. The education scope covers institutional education, schools, e-learning systems, vocational education, public and private education, universities, higher education, formal and non-formal education, teaching, and academic staff.

Techniques for Bibliometric Analysis

To achieve the study's aims, appropriate bibliometric analysis techniques such as science mapping will be used. Science mapping and bibliometric analysis are complementary; bibliometrics analyzes research publications to uncover trends and influential authors, forming the foundation for science mapping. Techniques like co-citation analysis, create maps that show how research topics connect, help researchers identify knowledge gaps, and emerging trends, and measure research impact. Tools like VOSviewer facilitate informed decisions about research focus (Donthu et al., 2021).

Data Collection

The decision to use Scopus as the primary data source for this bibliometric analysis is based on its extensive coverage, reliable indexing, and widespread recognition as a premier source for bibliometric and citation data.

Scopus is the largest abstract and citation database of peer-reviewed literature, encompassing over 77 million records from more than 24,600 peer-reviewed journals, book series, and conference proceedings across various disciplines, including science, technology, medicine, social sciences, arts, and humanities (*Scopus Content | Elsevier*, n.d.). Its comprehensive coverage ensures that a substantial portion of relevant literature on the Balanced Scorecard in education is captured, minimizing the risk of missing influential publications or research trends.

Furthermore, Scopus is widely recognized for its rigorous content selection and indexing processes, ensuring high-quality data and accurate citation metrics. This reliability is crucial for bibliometric studies, as it ensures that the analysis is based on accurate and consistent information, leading to valid and meaningful insights.

Scopus has been extensively used in numerous bibliometric studies across various fields, attesting to its suitability and acceptance as a reliable data source for such analyses (Falagas et al., 2008); (Mongeon & Paul-Hus, 2016). Its comprehensive coverage, rigorous indexing practices, and widespread recognition in the academic community make Scopus a

trusted and appropriate choice for conducting a comprehensive bibliometric analysis of the global trends in Balanced Scorecard adoption within the educational sector.

A carefully constructed search strategy with specific keywords will be employed to retrieve literature on the BSC in education. The search terms will include "Balanced Scorecard" AND/OR "Education," used in various combinations to maximize relevant document retrieval. Boolean operators will refine the search queries to ensure relevant results.

Inclusion criteria will specify that only document-type articles, source-type journals, and all open-access, and English-language publications will be considered. Exclusion criteria will remove duplicates, non-peer-reviewed articles, and publications not specifically related to BSC in educational institutions.

Bibliometric Toolbox and Techniques

Bibliometric methods provide quantitative tools to analyze patterns in scientific literature, identifying trends, key concepts, and core contributors in the field of BSC adoption in education. Specific methods include:

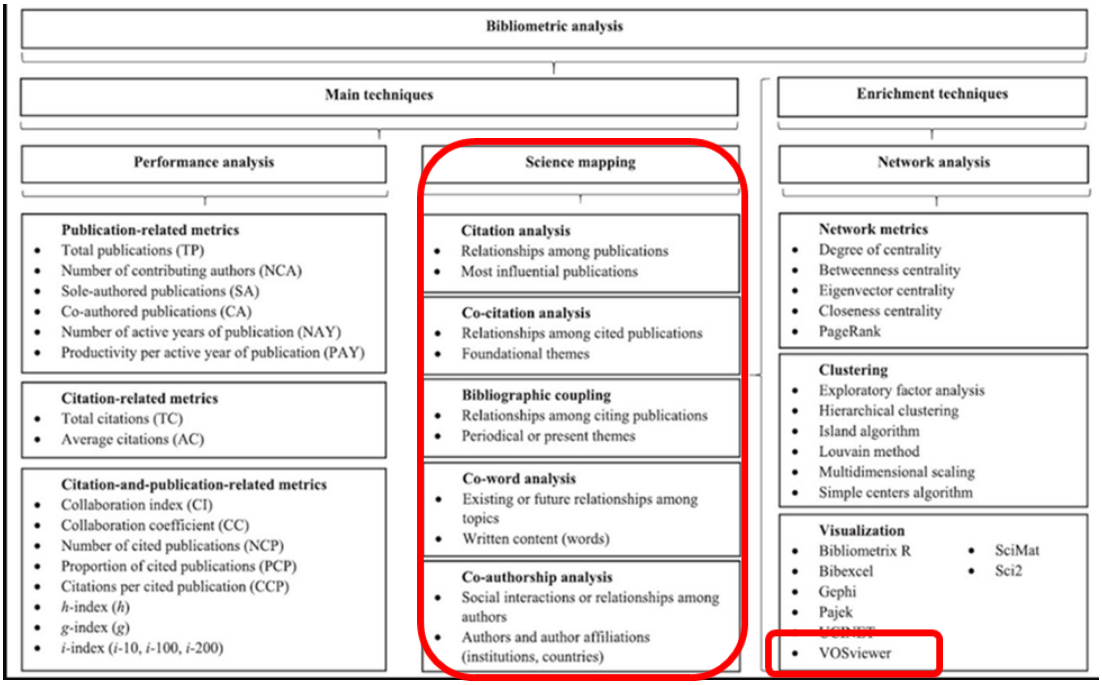

Figure 2. Science Mapping of Bibliometric Toolbox (Donthu et al., 2021)

Citation analysis examines the frequency and patterns of citations in articles, identifying the impact of specific works, authors, or journals (Garfield, 1972). This method helps understand influential papers and track research trend development over time.

Co-citation analysis examines how often two documents are cited together by subsequent papers, identifying the relationship between documents and the intellectual structure of a research field. It reveals clusters of related documents frequently cited together (Small, 1973).

Bibliographic coupling occurs when two documents reference the same third document in their bibliographies, measuring the similarity between documents based on shared references. This technique identifies related documents and establishes the network of research literature (Kessler, 1963).

Co-authorship analysis examines the patterns of authorship among researchers to identify collaboration networks. This method maps networks of researchers and institutions involved in BSC research within education, understanding knowledge sharing, and collaborative community structures (Newman, 2001).

Co-word analysis examines the co-occurrence of keywords within documents, identifying main themes and trends within a research field. This technique maps the conceptual structure and identifies emerging topics (He, 1999). Software tools like VOSviewer facilitate the visualization of keyword co-occurrences and thematic trends (van Eck & Waltman, 2010).

The findings from citation analysis, co-authorship analysis, and co-word analysis will be integrated to provide a comprehensive overview of BSC research in the educational sector. This integrated analysis will offer insights into the intellectual structure, collaborative patterns, and the thematic evolution of the field, informing future research directions and policy decisions.

VOSviewer is a software tool for constructing and visualizing bibliometric networks, including journals, researchers, or publications, built on citation, bibliographic coupling, co-citation, or co-authorship relations. VOSviewer offers an easy-to-use interface and powerful visualization capabilities for network analysis (van Eck & Waltman, 2010).

This methodology outlines a systematic approach for conducting a bibliometric analysis of the Balanced Scorecard in the educational sector. By defining clear aims and scope, employing rigorous data collection methods, and utilizing advanced bibliometric tools and techniques, this study aims to provide a detailed and comprehensive understanding of BSC's impact on education. The use of VOSviewer will enhance the visualization of complex bibliometric networks, aiding in the interpretation and dissemination of findings. This methodological framework not only advances the field of bibliometric research but also offers valuable insights for educational policymakers and practitioners seeking to enhance strategic management practices through the Balanced Scorecard.

RESULT AND DISCUSSION

This bibliometric analysis reveals significant trends and patterns in the Balanced Scorecard (BSC) research in education. It guides future research agendas by identifying prominent themes and underexplored areas, facilitating international collaboration and knowledge sharing. The analysis also informs policy and strategic decisions by providing evidence-based frameworks for integrating BSC into institutional management and strategic planning processes. The analysis of subject areas contributing to BSC research in education informs interdisciplinary approaches and the integration of diverse perspectives in adapting BSC to unique challenges and objectives of educational institutions. The identification of potential future research topics and underexplored areas encourages innovation and encourages researchers and practitioners to explore novel applications, adaptations, and extensions of the BSC framework within educational contexts. This analysis lays the foundation for a more strategic and evidence-based approach to enhancing educational management practices and aligning strategic objectives with operational activities, ultimately contributing to improved performance and the overall quality of the educational sector.

Publication Trends in Balanced Scorecard in Education Research

Figure 3 illustrates the publication trend over the years for Balanced Scorecard (BSC) research in education, based on the number of articles published annually. The research in this field began in 1998 and showed a significant upward trend starting around 2000. Notably, the number of publications peaked in 2018 with a total of 10 publications. However, this peak was followed by a decline in 2020. Despite this drop, the overall trend indicates continuing advancements in the number of publications, although there has been a slight decrease in the most recent years.

This trend aligns with findings by De Jesus Alvares Mendes Junior and Do Céu Alves (2023), which highlight an increased penetration of BSC in education research starting in 2018. It is important to note that the analysis only includes data up to 2023, as 2024 is still ongoing and not fully accounted for in the publication records.

The fluctuations in publication numbers suggest varying degrees of research activity and interest over time, possibly influenced by emerging trends, funding availability, and evolving educational priorities. For example, the peak in 2018 could be attributed to a growing recognition of the BSC's potential benefits in strategic management within education. The subsequent decline might reflect shifts in research funding or the prioritization of other emerging topics within educational management. These insights into publication trends provide a valuable perspective on the research landscape and its development, indicating areas where further investigation and sustained effort may be necessary.

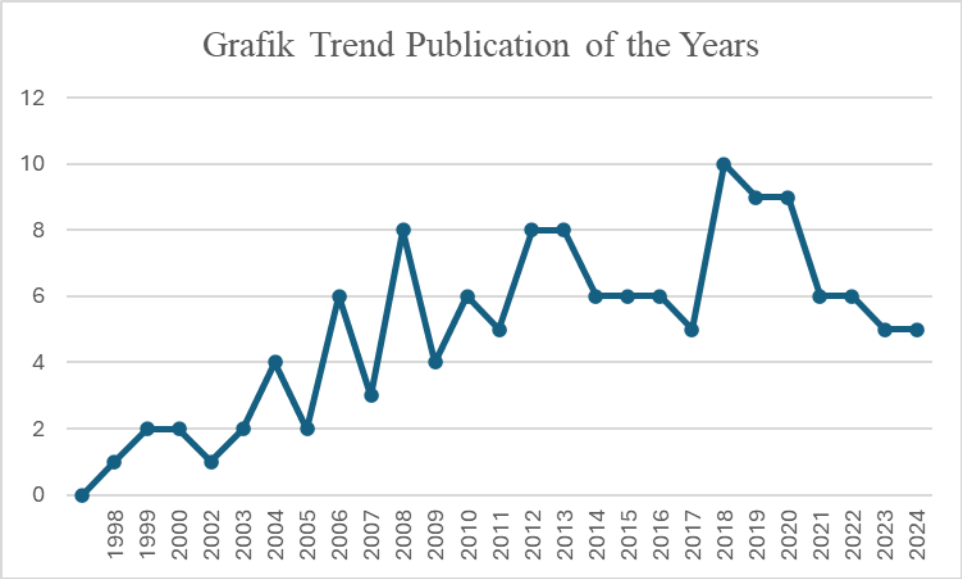

Figure 3. The Trend of Balanced Scorecard in Education Research Publication worldwide

Most Papers Published in BSC in the Education Research Area

Figure 4 shows the top journals and publishers with the most publications in the Balanced Scorecard (BSC) in Education research, contributing roughly 135 articles out of the total 350 articles over approximately 26 years (1998-2024). The leading journal based on the number of publications is the **International Journal of Educational Management**, with a total of 8 articles. This journal is published by Emerald Group Publishing Ltd. Following this, the **Journal of Education for Business**, published by Taylor and Francis Ltd., contributes a total of 5 articles. The **Accounting Education** journal, published by Routledge, is also a significant contributor with 3 articles.

These findings highlight the key journals that have been instrumental in disseminating research on the application and impact of the Balanced Scorecard in the educational sector. The prominence of these journals underscores their role in advancing scholarly dialogue and providing platforms for sharing innovative research and practical applications in educational management. This analysis of publication venues provides valuable insights for researchers seeking to publish their work and for institutions aiming to stay abreast of the latest developments in BSC in education. For policymakers and educational leaders, recognizing these leading journals can help in identifying credible sources for the latest research and best practices in BSC implementation.

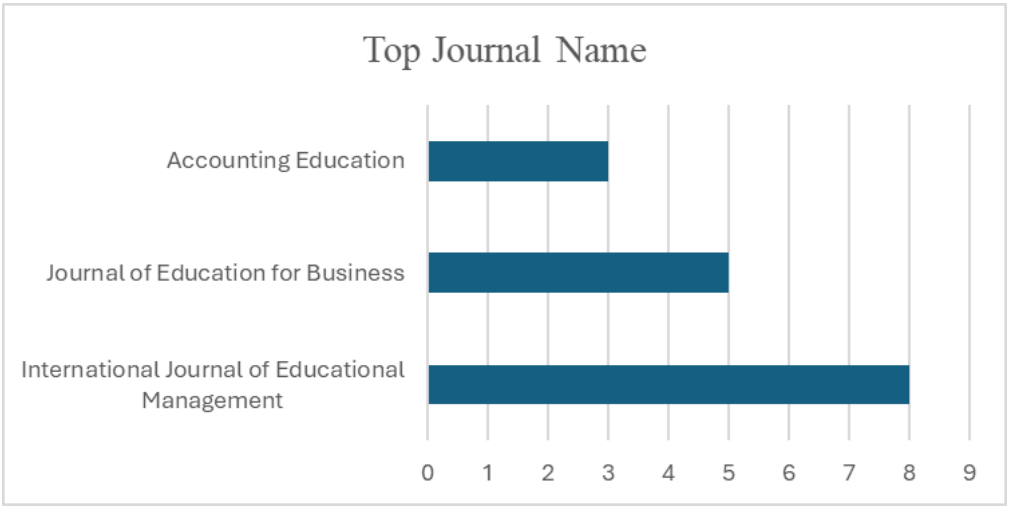

Figure 4. Top Journal Has Most Papers Published in The Area of Balanced Scorecard in Education Research

Top Contributing Authors in Balanced Scorecard in Education Research

Figure 5 showcases the top contributing authors with published articles in peer-reviewed journals on the Balanced Scorecard (BSC) in education. Kettunen J. emerges as the most productive author, having authored around 9 articles. This prolific output underscores Kettunen's significant role in advancing BSC research within the educational sector.

Following Kettunen, Lee S.F., Chen S., Beard D.F., and Al-Hosaini F.F. each have authored 2 articles. These authors also contribute notably to the field, though their output is considerably less than that of Kettunen.

The distribution of these contributions highlights a concentration of research efforts among a few key individuals. This pattern suggests that while several researchers are actively engaged in BSC research in education, a small group of authors, led by Kettunen, drives the majority of scholarly discourse and development. Understanding these contributions helps in identifying influential researchers and potential collaboration opportunities within this field. For academic institutions and funding bodies, supporting these prolific researchers could lead to further advancements and deeper exploration of BSC applications in education.

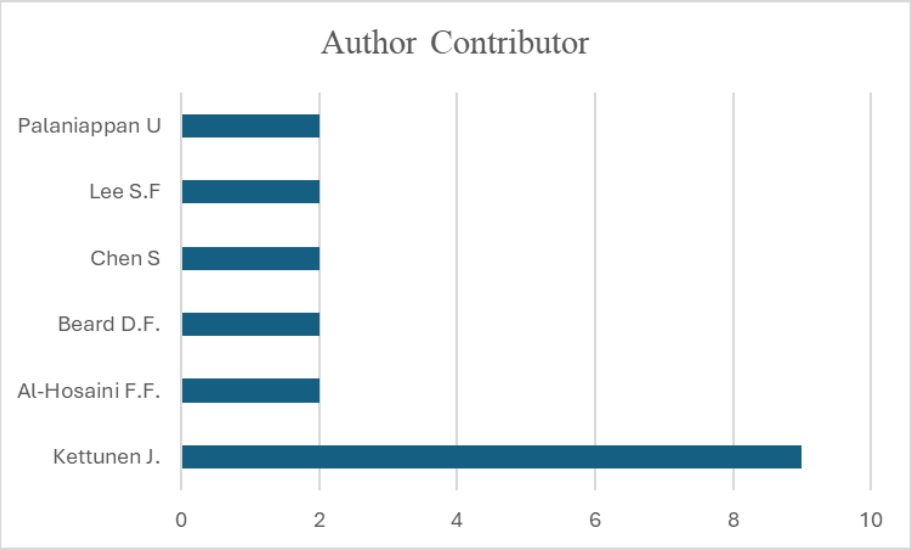

Figure 5. Top Journal Has Most Papers Published in The Area of Balanced Scorecard in Education Research

Distribution of Research Subject Areas in Balanced Scorecard in Education

Figure 6 highlights the diverse subject areas contributing to research on the Balanced Scorecard (BSC) in education. The dominant fields are Social Science; and Business, Management, and Accounting, which collectively account for 44% of the total research articles. Social Science alone comprises 22% of the articles, with 30 publications, while Business, Management, and Accounting contribute 13%, with 18 articles. Additionally, the combined category of Social Science and Business, Management, and Accounting contributes another 13%, with 17 articles.

These three areas lead in terms of publication volume, reflecting their strong focus on integrating BSC principles into educational contexts. The remaining subject areas, although less prolific, still contribute significantly to the overall body of research on the BSC in education. This distribution underscores the interdisciplinary approach to BSC research, with substantial input from both business and social science perspectives. Understanding these contributions helps identify key areas of focus and potential gaps in the literature, guiding future research directions in the application of the Balanced Scorecard within educational settings.

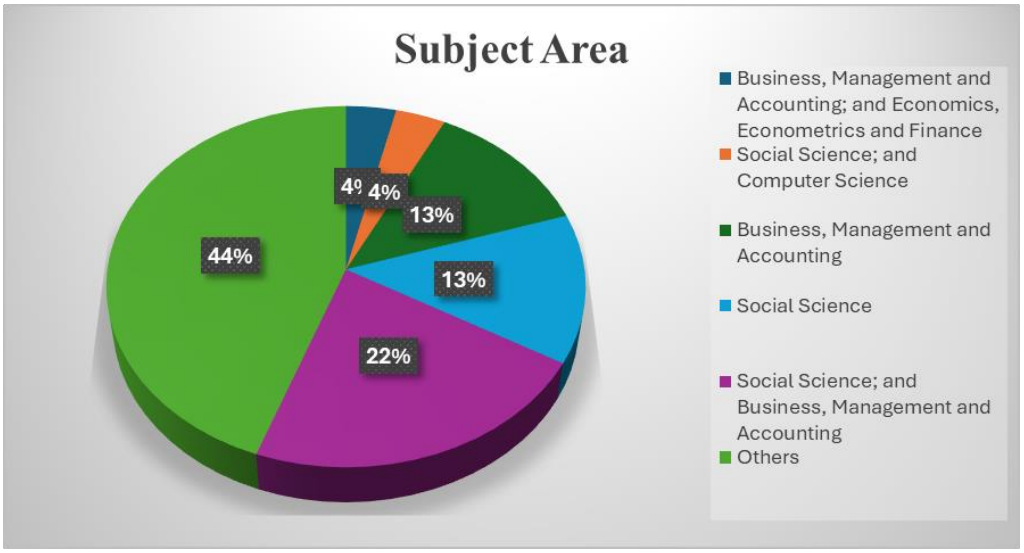

Figure 6. Several subject areas of Balanced Scorecard in Education research Topic Area Visualization Using Vosviewer

The implications for policy and practice are significant. Policymakers and educational leaders can draw on insights from these interdisciplinary studies to inform strategic planning and resource allocation. For researchers, identifying the dominant subject areas and understanding the interdisciplinary nature of BSC research can help in formulating new research questions that address existing gaps and explore the integration of BSC in different educational contexts. This can ultimately lead to more effective and innovative approaches to educational management and improved outcomes for educational institutions globally.

Bibliometric Analysis of Keyword Occurrences

In this section, a bibliometric analysis was performed to visualize the results based on frequently occurring keywords using VOSviewer. VOSviewer is a clustering tool that uses a weighted and parameterized variant of the modular value-based clustering technique to identify clusters of closely related items based on their co-occurrence or citation patterns. The algorithm involves constructing a similarity matrix, mapping, and clustering, incorporating a resolution parameter, and using a smart local moving algorithm to optimize the modular value function. The number of clusters is determined by the data and the chosen resolution parameter, with no definitive criterion. VOSviewer offers several indicators to guide the selection of an appropriate number of clusters, including the silhouette score, visual inspection, cluster size, and stability analysis. The choice of the optimal number of clusters often involves a trade-off between granularity and interpretability. The clustering solution should be interpreted in conjunction with domain

knowledge and research objectives, as it is a data-driven technique that may require manual adjustments or refinements based on the study's context.

This approach is beneficial as it highlights the topics that have been researched over a span of 26 years (1998-2024). The study has mapped the bibliometric analysis through three distinct visualizations: (1) data overlay visualization of keyword co-occurrence, as depicted in Figure 7; (2) overlay relationship visualization of keywords, shown in Figure 8; and (3) overlay collaboration visualization of authors by the country, presented in Figure 9. These visualizations provide a comprehensive overview of the research landscape, showcasing the thematic focus and collaborative efforts within the field.

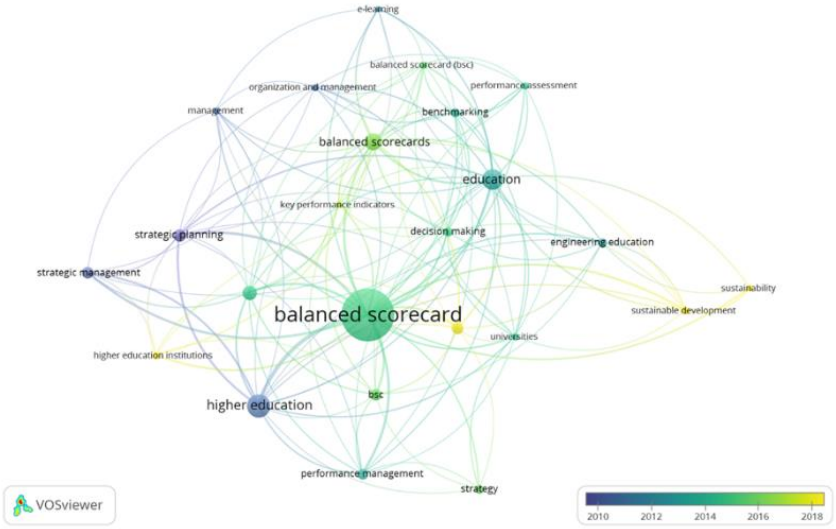

Figure 7. Overlay Visualization of Co-Occurrence (Keyword)

Keyword Co-occurrence Network in Balanced Scorecard in Education Research

Figure 7 visualizes the overlay of items (keywords) related to the Balanced Scorecard (BSC) in education research topics, represented by circles in VOSviewer. The importance of a keyword is indicated by the size of its circle—the more frequently a keyword appears, the larger its circle. As expected, the keyword "balanced scorecard" is the most prominent research topic due to its highest frequency of occurrence.

Each circle is assigned a different color based on its cluster, illustrating the relationships between keywords (van Eck & Waltman, 2010). The data was extracted from the frequency of author keywords using bibliographic data with VOSviewer. A minimum occurrence threshold of 5 was set, resulting in 661 keywords. Out of these, 27 keywords met the threshold, while common words not indicating specific topics, such as "article," “human,” and "humans," were excluded.

The analysis identified a total of 4 clusters, each representing research topic trends in the BSC in the education field. These clusters are indicated by different colors, providing a clear visual representation of the interconnectedness and prominence of various research themes.

This visualization aids in understanding the main areas of focus within BSC research in education, highlighting key topics and their relationships. It also assists in identifying emerging trends and potential gaps for future research.

The Main Topics and Research Streams in the Area of BSC in Education Research

Figure 7 provides a network visualization that illustrates four clusters and their interrelationships within the studied topic areas. Each cluster consists of keywords that show strong connections with each other, forming a cohesive structure on the map.

Within each cluster, certain high-frequency keywords stand out, representing the primary research focus areas in previous studies. For example, the first cluster features the following terms: "Balanced scorecard (BSC)" with 6 occurrences, "Balanced scorecards" with 17 occurrences, "Benchmarking" with 7 occurrences, "Decision making" with 7 occurrences, "E-learning" with 5 occurrences, "Education" with 22 occurrences, "Key performance indicators" with 5 occurrences, "Management" with 6 occurrences, "Organization and management" with 6 occurrences, and "Performance assessment" with 6 occurrences.

These keywords highlight the core topics that have been extensively studied and discussed in the context of BSC in education. Clusters and their interconnectedness help in understanding how different research themes are related and where the primary focus has been. This visualization also aids in identifying emerging trends and potential areas for future research, providing a comprehensive overview of the intellectual landscape in BSC research within the educational field. For simplicity in this research, there are keywords with the most frequency of occurrence, as reported in Table 1.

Table 1. Cluster Items and Keywords of BSC in Education Research

No	Cluster Items and Keywords			
	1 (Red)	**2 (Green)**	**3 (Blue)**	**4 (Orange)**
1	balanced scorecard (bsc) (6)	balanced scorecard (81)	bsc (10)	engineering education (7)
2	balanced scorecards (17)	higher education (26)	performance (11)	sustainability (5)
3	benchmarking (7)	higher education institutions (6)	performance management (9)	sustainable development (6)
4	decision making (7)	performance	strategy (7)	

		measurement (14)	
5	e-learning (5)	strategic management (10)	universities (6)
6	education (22)	strategic planning (12)	
7	key performance indicators (5)		
8	management (6)		
9	organization and management (6)		
10	performance assessment (6)		

Cluster Analysis and Potential Topics for Future Research in BSC in Education

Each cluster in Table 1 highlights a distinct research direction within the field of Balanced Scorecard (BSC) in education, based on the unique association of keywords within each cluster. These keywords represent various research streams. For instance, the first cluster reveals that the main research topics in BSC in education revolve around its adoption and trust issues in developing countries. This data helps pinpoint the primary research topics and streams in BSC in the education field. In this research, clusters are not named to avoid mislabeling, as there are overlapping keywords among them.

Potential Topics for Future Research in BSC in Education

Table 1 also identifies keywords with less frequent occurrences, indicating potential topics for future research. These include: "key performance indicators (5)," "e-learning (5)," "higher education institutions (6)," "strategic management (10)," "universities (6)," "strategy (7)," "sustainability (5)," and "sustainable development (6)." For simplicity, we limit only two less frequently used keywords for each cluster.

These less frequently used keywords suggest areas that are ripe for further exploration. By focusing on these topics, future research can fill existing gaps and contribute to a deeper understanding of BSC applications in education. Identifying and investigating these potential topics will enhance academic discourse and the practical implementation of the Balanced Scorecard in educational settings.

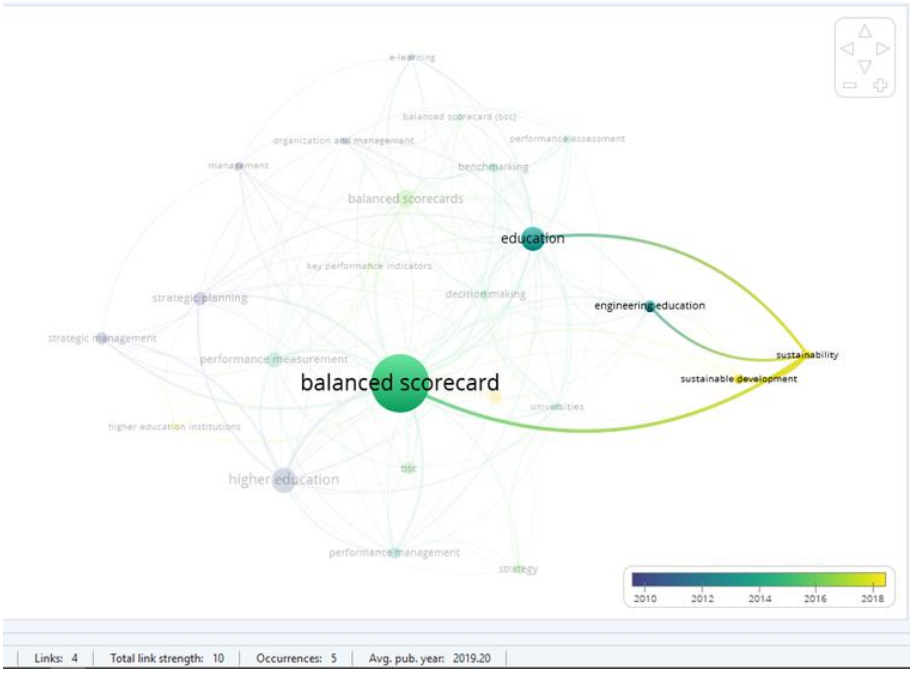

Figure 8. Relationship visualization keyword the new research using VOSviewer

Figure 8 visualizes the research topics over the years, with most keywords appearing frequently between 2010 and 2018. This network visualization, created using VOSviewer, highlights emerging research trends from 2019/20. It shows the relationships among keywords, indicating areas of new research in the Balanced Scorecard (BSC) within education. One highlighted keyword is "sustainability" (5 occurrences), which is connected to "balanced scorecard," "education," "engineering education," and "sustainable development." This indicates a growing interest in integrating sustainability within the BSC framework in educational contexts.

Keyword Density and Research Trends

The appearance of keywords is determined by their density, represented by colors. Keywords with higher occurrences appear more frequently, while those with lower occurrences are marked in yellow, indicating newer research topics. These yellow-colored keywords suggest areas that require more investigation, presenting potential topics for future research. Examples of these keywords include "benchmarking" (7 occurrences), "decision making" (7 occurrences), "e-learning" (5 occurrences), "key performance indicators" (5 occurrences), "management" (6 occurrences), "organization and management" (6 occurrences), and "performance assessment" (6 occurrences).

These keywords represent research areas that are still developing and offer opportunities for novel contributions. By focusing on these topics, researchers can explore

new dimensions and applications of the Balanced Scorecard in education, contributing to the field's advancement.

Potential Research Opportunities

Visualization indicates that topics like sustainability and sustainable development are gaining traction but still need more exploration within the context of BSC in education. Similarly, keywords like e-learning and performance assessment highlight evolving areas that require further study.

This analysis provides a roadmap for researchers to identify and delve into potential topics, paving the way for innovative and impactful contributions to the Balanced Scorecard in education research. By targeting these less explored areas, future studies can enrich the understanding and application of BSC, addressing contemporary educational challenges and opportunities.

The potential topics in the area of BSC in education research need more investigation in the future. Table 1, along with Figures 7 and 8, provide opportunities for researchers to identify potential topics as novel contributions in the area of BSC in education research. For example, the keyword "sustainability" (5 occurrences) in the context of BSC in education has relationships with "balanced scorecard," "education," "engineering education," and "sustainable development." This keyword, and others like it, suggests possible new research topics for researchers to explore based on the combination of terms.

Country Contributions to Balanced Scorecard in Education Research

This section presents a bibliometric analysis to identify and visualize the countries significantly contributing to Balanced Scorecard (BSC) research in education. A total of 47 countries were identified, but only 12 met the threshold set in VOSviewer, with a minimum of five documents. Table 2 displays the top countries with the highest number of publications.

Table 2. Top Countries with Highest Publications

Country	Documents	Citations
Australia	5	75
Finland	9	172
Germany	5	111
India	7	120
Indonesia	7	32
Iran	6	102
Malaysia	7	98
Portugal	5	24

Saudi Arabia	6	64
Taiwan	10	452
United Kingdom	13	587
United States	27	519

Research funding, institutional support, and educational policies play a crucial role in the adoption of the Balanced Scorecard (BSC) in education. Countries with robust research funding mechanisms, such as government grants, industry collaborations, or international partnerships, may have higher levels of BSC research activity and successful implementation. Institutional support and leadership from educational institutions also significantly influence BSC adoption. Countries with strategic management, performance measurement, and continuous improvement may be more receptive to BSC adoption. Educational policies and regulatory frameworks can either facilitate or hinder BSC implementation. Cross-cultural perspectives and societal factors can also influence BSC adoption. Countries with a strong emphasis on performance, efficiency, and accountability may be more receptive to BSC adoption. Analyzing these factors and observed trends in BSC research and adoption can provide valuable insights for policymakers, educational leaders, and researchers. This analysis can inform strategies for fostering a supportive environment, allocating resources effectively, and tailoring BSC implementation approaches to specific cultural and societal contexts.

The United States: With 27 publications and 519 citations, the US demonstrates a strong output and influence in BSC in education research. United Kingdom: The UK shows a high impact with 13 publications and 587 citations. Taiwan: Notable for its 10 documents and 452 citations, indicating impactful research contributions. Finland and India: Both countries show active research involvement with 9 and 7 publications, respectively. Indonesia: Leading in Southeast Asia with 7 publications, reflecting the growing research activity in the region. Malaysia and Iran: Both countries also contribute significantly with 7 and 6 publications, respectively. Saudi Arabia, Australia, and Germany: Each with 5 to 6 publications, showing steady research outputs. Portugal: Emerging with 5 publications, contributing to the growing body of BSC research.

Figure 9 shows the collaboration of the country's authors in BSC in education research areas. The circle connected to the other indicates the collaboration between the countries. The bigger size of the circle indicates the greater the country's publication number. We can see that the USA has the most prominent circle among other countries, which means they dominate studies. They are the central point for BSC in education studies where other countries conducting e-government studies have a network with the USA.

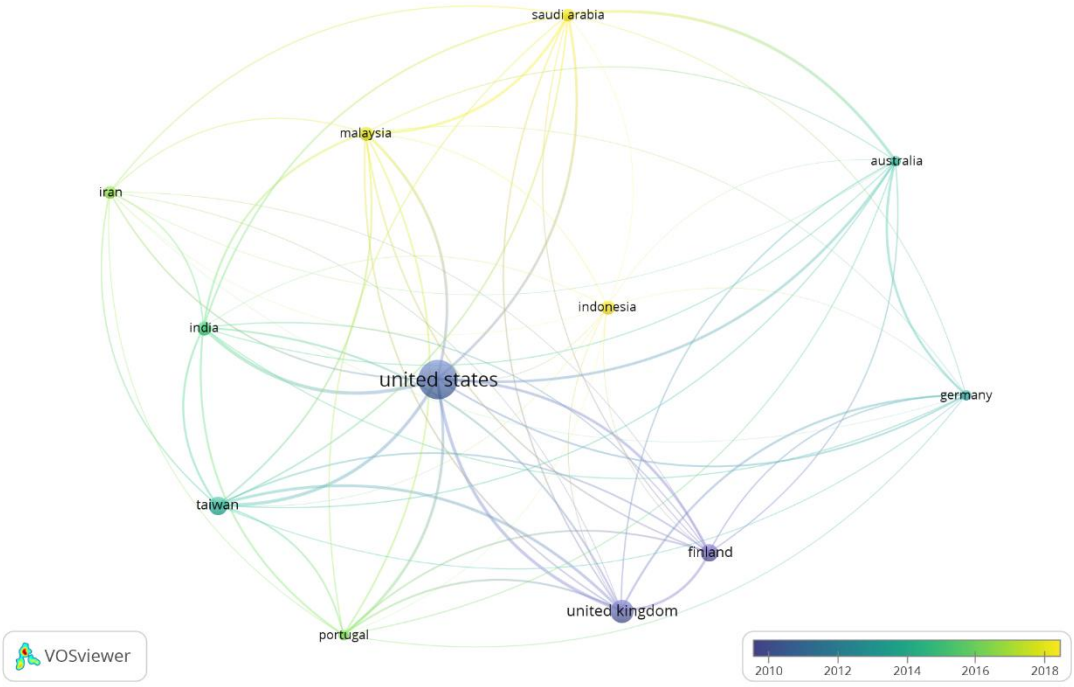

Figure 9. Overlay visualization of the collaboration of the country's authors

This analysis highlights the geographical distribution of research contributions, showcasing where significant activities are concentrated. The United States and the United Kingdom lead in both the quantity and impact of research, followed by Taiwan, Finland, and India. Indonesia's notable presence in Southeast Asia indicates a rising interest and effort in BSC research within the region.

By understanding these trends, future research can leverage international insights, foster collaborations, and expand efforts in less-represented regions. Identifying these key contributors provides a roadmap for enhancing the global impact of Balanced Scorecard research in education. This geographical analysis not only reveals the current landscape but also points to potential areas for growth and international cooperation.

Most Cited Articles in BSC in Education Research

Our study reveals the significant impact of Scopus-indexed journals on citation metrics in Balanced Scorecard (BSC) research in education. Table 3 highlights the top five most cited articles in this field, showcasing their influence based on total citation counts.

Table 3. The Most Citations Articles of BSC in Education Research

Author	Years	Title	citations	links
Wu, Hung-Yi; Lin, Yi-Kuei;	2011	Performance evaluation of extension education	139	5

Chang, Chi-Hsiang		centers in universities based on the balanced scorecard		
Cullen, John; Joyce, John; Hassall, Trevor; Broadbent, Mick	2003	Quality in higher education: From monitoring to management	116	4
Palmer, Timothy B.; Short, Jeremy C.	2008	Mission statements in U.S. colleges of business: An empirical examination of their content with linkages to configurations and performance	114	0
Chen, Shun-Hsing; Yang, Ching-Chow; Shiau, Jiun-Yan	2006	The application of a balanced scorecard in the performance evaluation of higher education	99	9
Umashankar, Venkatesh; Dutta, Kirti	2007	Balanced scorecards in managing higher education institutions: An Indian perspective	91	10

Wu, Hung-Yi; Lin, Yi-Kuei; Chang, Chi-Hsiang (2011): With 139 citations, this article is the most cited, focusing on performance evaluation of extension education centers using the balanced scorecard. Its influence is notable in the literature on BSC in education. Cullen, John, et al. (2003): This article, cited 116 times, examines quality management in higher education, transitioning from monitoring to management. Palmer, Timothy B., and Short, Jeremy C. (2008): Despite having 114 citations, this study, which analyzes mission statements in U.S. colleges of business, shows no links to other works in this dataset. Chen, Shun-Hsing, et al. (2006): With 99 citations, this research discusses the application of the balanced scorecard in evaluating higher education performance. Umashankar, Venkatesh, and Dutta, Kirti (2007): This article, cited 91 times, explores the management of higher education institutions using balanced scorecards from an Indian perspective.

For key insights, we have three words **Influential Works**: The articles listed are highly influential, providing key insights and advancing the understanding of BSC applications in education. **Diverse Topics**: The themes range from performance evaluation and quality management to strategic alignment, reflecting the broad applicability of the balanced scorecard. **Citation Impact**: High citation counts indicate these articles' significant impact on subsequent research in the field.

This bibliometric analysis highlights influential articles that have laid a solid foundation for the adoption and implementation of the Balanced Scorecard (BSC) in the educational sector. These studies have advanced the theoretical understanding of BSC and provided practical insights for educational institutions to effectively integrate this strategic management tool into their operations. Future research directions include expanding the scope of BSC to other educational contexts, incorporating emerging trends and technologies, and focusing on cross-cultural and international collaborations. Longitudinal and impact studies are needed to assess the long-term impact and sustainability of BSC adoption in educational institutions. Practical applications include developing tailored BSC

frameworks, investing in training and capacity-building programs for administrators, faculty, and staff, and fostering a culture of accountability and continuous improvement. By leveraging these foundational studies, educational institutions can enhance their strategic management practices, optimize resource allocation, and ultimately improve educational outcomes and institutional performance. The significance of these foundational studies lies in their potential to catalyze positive change and drive continuous improvement in the education sector worldwide. Future research can build on these influential works to explore new applications and dimensions of the balanced scorecard in various educational contexts.

CONCLUSION

The study on the Balanced Scorecard (BSC) in education has several limitations, including a data source limitation based on the Scopus database, language bias, disciplinary bias, time frame limitation, and methodological limitations. The study focused on English-language publications, excluding non-English speaking countries or regions. It also overlooked contributions from other disciplines, such as management, psychology, or sociology. The study covered publications from 1998 to 2024, potentially skewing the analysis. The methodological approach may not capture the nuances and qualitative aspects of individual studies. Future research could include expanded data sources, multilingual analysis, an interdisciplinary approach, longitudinal analysis, qualitative exploration, cross-cultural and regional comparisons, and integration with emerging technologies. By acknowledging these limitations, scholars can advance the understanding of BSC's role in educational institutions, contribute to effective strategic management practices, and improve educational outcomes worldwide.

REFERENCES

Alolah, T., Stewart, R. A., Panuwatwanich, K., & Mohamed, S. (2014). Determining the causal relationships among balanced scorecard perspectives on school safety performance: Case of Saudi Arabia. *Accident Analysis and Prevention*, *68*, 57–74. https://doi.org/10.1016/J.AAP.2014.02.002

Beard, D. F. (2009). Successful Applications of the Balanced Scorecard in Higher Education. *Journal of Education for Business*, *84*(5), 275–282. https://doi.org/10.3200/JOEB.84.5.275-282

Bravo, J. C. M., Bravo, M. A. M., & Piedrahita, C. J. B. (2022). The Balanced Scorecard and Performance Measurement in Higher Education Institutions. *Universidad Ciencia y Tecnología*, *26*(113), 148–157. https://doi.org/10.47460/UCT.V26I113.580

Chavan, M. (2009). The balanced scorecard: A new challenge. *Journal of Management Development*, *28*(5), 393–406. https://doi.org/10.1108/02621710910955930/FULL/XML

David, F. R., David, F. R., & David, M. E. (2020). Strategic Management Concepts and Cases: A Competitive Advantage Approach Seventeenth Edition. In *Strategic Management* (Vol. 16).

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to Conduct a Bibliometric Analysis: An Overview and Guidelines. *Journal of Business Research*, *133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Eftimov, L., Trpeski, P., Gockov, G., & Vasileva, V. (2016). Designing a balanced scorecard as a strategic management system for higher education institutions: A case study in Macedonia. *Ekonomika*, *62*(2), 29–48. https://doi.org/10.5937/EKONOMIKA1602029E

Ellegaard, O., & Wallin, J. A. (2015). The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics*, *105*(3), 1809–1831. https://doi.org/10.1007/S11192-015-1645-Z/TABLES/9

Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *The FASEB Journal*, *22*(2), 338–342. https://doi.org/10.1096/FJ.07-9492LSF

Fijałkowska, J., & Oliveira, C. (2018). Balanced Scorecard in Universities. *Journal of Intercultural Management*, *10*(4), 57–83. https://doi.org/10.2478/JOIM-2018-0025

Garfield, E. (1972). Citation analysis as a tool in journal evaluation. *Science*, *178*(4060), 471–479. https://doi.org/10.1126/SCIENCE.178.4060.471/ASSET/C5BEC9D0-12EF-4BE9-85B4-3A5B124D6F0D/ASSETS/SCIENCE.178.4060.471.FP.PNG

Goetsch, D. L., & Davis, S. B. (2022). *Quality Management for Organizational Excellence: Introduction to Total Quality*. Pearson.

Gündüzalp, S., & Arabacı, İ. B. (2017). European Journal of Education Studies APPLICABILITY OF BALANCED SCORECARD SYSTEM IN PRIMARY SCHOOLS ACCORDING TO OPINIONS OF EDUCATION INSPECTORS, MANAGERS AND TEACHERS i. *İmam Bakır Arabacı APPLICABILITY OF BALANCED SCORECARD SYSTEM IN PRIMARY SCHOOLS ACCORDING TO OPINIONS OF EDUCATION INSPECTORS, MANAGERS AND TEACHERS European Journal of Education Studies*, *3*, 162. https://doi.org/10.5281/ZENODO.321419

H. Thomas Johnson, & Kaplan, R. S. (1987). Relevance Lost: The Rise and Fall of Management Accounting. *Journal of Accountancy*, *164*(2).

He, Q. (1999). Knowledge Discovery Through Co-Word Analysis. *Library Trends*, *48*(1).

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard--measures that drive performance. *Harvard Business Review*, *70*(1).

Kaplan, R. S., & Norton, D. P. (2007). Using the balanced scorecard as a strategic management system. In *Harvard Business Review* (Vol. 85, Issues 7–8).

Karathanos, D., & Karathanos, P. (2005). Applying the Balanced Scorecard to Education. *Journal of Education for Business*, *80*(4), 222–230. https://doi.org/10.3200/JOEB.80.4.222-230

Kessler, M. M. (1963). Bibliographic coupling between scientific papers. *American Documentation*, *14*(1). https://doi.org/10.1002/asi.5090140103

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: a comparative analysis. *Scientometrics*, *106*(1), 213–228. https://doi.org/10.1007/S11192-015-1765-5/METRICS

Nejati, M. (2008). PRIORITIZING HIGHER EDUCATION BALANCED SCORECARD PERFORMANCE INDICATORS USING FUZZY. *Prioritizing Higher Education Balanced Scorecard Performance Indicators Using Fuzzy Approach in an Iranian Context*, *15*(2).

Newman, M. E. J. (2001). The structure of scientific collaboration networks. *Proceedings of the National Academy of Sciences of the United States of America*, *98*(2), 404–409. https://doi.org/10.1073/PNAS.98.2.404/ASSET/5C194F64-49CD-4325-AE28-2BB7D008A3F2/ASSETS/GRAPHIC/PQ0215448003.JPEG

Papenhausen, C., & Einstein, W. (2006). Implementing the Balanced scorecard at a college of business. *Measuring Business Excellence*, *10*(3), 15–22. https://doi.org/10.1108/13683040610685757

Pereira, M. M., & Melão, N. F. (2012). The implementation of the balanced scorecard in a school district: Lessons learned from an action research study. *International Journal of Productivity and Performance Management*, *61*(8), 919–939. https://doi.org/10.1108/17410401211277156/FULL/XML

Rahayu, S., Yudi, Y., Rahayu, R., & Luthfi, M. (2023). The relationship of balanced scorecard perspectives and government organization performance measurement. *International Journal of Productivity and Performance Management*, *72*(7), 1881–1902. https://doi.org/10.1108/IJPPM-05-2021-0308/FULL/XML

Scopus content | Elsevier. (n.d.). Retrieved June 18, 2024, from https://www.elsevier.com/products/scopus/content

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science*, *24*(4). https://doi.org/10.1002/asi.4630240406

Umashankar, V., & Dutta, K. (2007). Balanced scorecards in managing higher education institutions: An Indian perspective. *International Journal of Educational Management*, *21*(1), 54–67. https://doi.org/10.1108/09513540710716821/FULL/XML

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Yu, M. L., Hamid, S., Ijab, M. T., & Soo, H. P. (2009). The e-balanced scorecard (e-BSC) for measuring academic staff performance excellence. *Higher Education*, *57*(6), 813–828. https://doi.org/10.1007/S10734-009-9197-X/METRICS

Zupic, I., & Cater, T. (2015). Bibliometric methods in management and organization. Organizational Research Methods. *Goldsmiths Research Online*, *18*(3).