

Tracing the footprints of sustainable leadership: a bibliometric exploration to uncover trends, influences, and research frontiers

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ABSTRACT

Introduction: In order to combat climate change and accomplish the Sustainable Development Goals (SDGs) of the UN, the article emphasizes the growing significance of sustainable leadership. It highlights the necessity for companies to include environmental, social, and economic factors into their operations. One transformative strategy that promotes long-term value, organizational flexibility, and stakeholder trust is sustainable leadership. Scholars strongly support its beneficial effects, although the literature noticeably lacks bibliometric analysis. A thorough bibliometric analysis is suggested to close this gap by examining the evolution and present emphasis of sustainable leadership research, which will direct future scholarly and applied endeavours.

Objective: This study aims to perform a bibliometric analysis of scientific literature focusing on sustainable leadership. The goal is to identify prominent themes, authors, sources, and highly cited articles in this field. Additionally, it seeks to discern trends over time in the publication of articles related to sustainable leadership.

Design/Methodology/Approach: Utilizing bibliometric analysis, this paper examines articles gathered from the Scopus database using various keywords "Sustainable leadership", "Sustainability Leadership", and "Sustainable Leaders". A total of 87 papers were subjected to computerized search methods. Graphical visualization of the bibliographic data was achieved through VOSviewer software and Scopus data analysis functions.

Results: The paper conducts detailed research on sustainable leadership using bibliometric analysis that facilitates visualizing the publication evolution within the domain and delineates present research trends and potential future directions. It uncovers diverse themes, significant journals, influential articles, and key contributors. The study reveals evolving trends, prominent countries, and prolific authors, offering insights into sustainable leadership research dynamics.

Conclusion: This research yields significant outcomes, contributing to both theoretical advancements and practical benefits for researchers, leaders, and practitioners. Beyond identifying influential figures, it furnishes a valuable tool for newcomers, facilitating collaboration, source discovery, and a deeper understanding of the scholarly landscape in sustainable leadership. This study stands out as one of the few to conduct a literature review or scientific mapping on sustainable leadership. Moreover, it distinguishes itself by meticulously selecting publications that strictly adhere to the sustainability criteria outlined by Avery (2006).

Keywords: Sustainable leadership, Sustainability Leadership, Scopus, Bibliometrics, Science mapping

INTRODUCTION

In a rapidly changing global landscape, the spotlight is increasingly on sustainability. The insights shared in the "The Future of Sustainable Business" document from Business for Social Responsibility (BSR) shed light on the inevitable

challenges that businesses worldwide will face due to the far-reaching impacts of climate change (Charter, M. 2017). The urgency of addressing climate change within organizations is crystal clear. This calls for effective leadership capable of navigating the complexities associated with this critical matter, demanding a thorough examination of local and global implications (Boiral et al., 2014).

To grapple with the diverse challenges posed by climate change, the United Nations has introduced "sustainable development goals" (SDGs), extending their relevance to companies globally, regardless of their specific industry focus (Biermann et al., 2017). Iqbal et al. (2020) emphasize that achieving sustainable development requires companies to integrate social, economic, and environmental goals seamlessly into their operations. This involves consciously preserving resources and striking a delicate balance that meets present needs while ensuring resource conservation for future generations.

However, businesses face significant hurdles in fulfilling their comprehensive obligations (Suriyankietkaew & Avery, 2016). Selecting the most fitting sustainability initiatives is a challenge, impacting overall operational success. Scholars emphasize the need for leadership strategies to absorb sustainable development concepts, ensuring continuous organizational sustainability and fostering positive transformation (Gerard et al., 2017).

"Sustainable Leadership" emerges as a guiding philosophy in management and leadership initiatives. It aims not only to meet partners' needs but also to advance critical business goals, creating long-term value for all stakeholders involved in the project (Avery & Bergsteiner, 2011b). Integrating sustainable development ideas into leadership practices gives rise to the ethos of sustainable leadership. This approach emphasizes transformational leadership that is both morally and ecologically sensitive, highlighting progress in the economy, society, and environment as a whole.

Sustainable leadership entails a profound transformation in management and leadership behavior, benefiting all associates over the long run and aligning with stakeholder needs and core business priorities. It encourages the effective linkage of environmental, social, and economic considerations. Scholars, including Avery and Bergsteiner (2011b), Suriyankietkaew and Avery (2014), Dalati et al. (2017), Kantabutra, Burawat (2019), and Iqbal et al. (2020a, b), have provided robust support for the positive outcomes of sustainable leadership on economic performance, organizational adaptability, fulfillment of obligations, trust-building, and job satisfaction. The collective evidence underscores the transformative potential of sustainable leadership in shaping a resilient and responsible organizational future.

Prior studies underscore the growing eminence of sustainable leadership within the academic domain, particularly concerning sustainability. However, a noticeable dearth of literature on this topic persists. Existing studies primarily take the form of literature reviews or conceptual explorations, leaving a void in contemporary bibliometric analyses to grasp the evolutionary significance of sustainable leadership. To address this research gap, a meticulous bibliometric study has been initiated to unveil historical patterns and current research focal points, providing in-depth perspectives for future research (Sarango-Lalangui et al., 2018). The following research questions will guide the study:

- RQ1: What are the temporal distribution patterns of journal articles related to sustainable leadership, and how have these patterns evolved?
- RQ2: What are the prominent sources in sustainable leadership research, and what are their respective contributions?
- RQ3: Which are the prominent articles in sustainable leadership research, and what are their respective contributions?
- RQ4: Which keywords are most frequently associated with research hotspots in Sustainable Leadership, and what insights do they provide into the thematic areas that have gained significant attention?
- RQ5: Which countries lead in sustainable leadership research, and how do they contribute to the field?
- RQ6: Who are the potential and impactful authors in sustainable leadership research, how are collaborations among authors distributed, and what institutions are most influential in sustainable leadership research?

1. Literature review

Influential leaders of sustainability not only persist and broaden their influence but do so in a manner that avoids draining human or financial resources, and they unfailingly demonstrate a genuine dedication to the welfare of all stakeholders (Hargreaves & Fink, 2012). The Sustainable Leadership (SL) model is rooted in the principles of transformational leadership. In this approach, leaders intellectually challenge their employees and play a pivotal role in fostering a culture of innovation by providing guidance and support (Christensen et al., 2014). Sustainable leaders perform various activities so that the organization continues to do well for a long time, such as sharing their vision, valuing their employees, paying attention to social responsibilities, and being gracious towards industrial relations (Avery & Bergsteiner, 2011). Hargreaves and Fink (2004) first illustrate the concept of sustainable leadership in the educational organization. After that, Avery (2005) commences on enterprise management, collaborates on sustainable development with leadership, and advances sustainable leadership. For sustainability, leaders must do sustainable practices in their organization and society and arouse economic affluence (Metcalf & Benn, 2013). Sustainable leadership embodies three pivotal components: sustainable management, sustainable initiatives, and sustainable actions, and the study findings indicate that factors including college affiliation, gender, rank, and experience demonstrated no noticeable impact on the degree of sustainable leadership (Al-Zawahreh et al., 2018). Sustainable leadership is strengthened by being mindful of social and environmental issues, directly influenced by adopting sustainable practices, and subtly guided by ethical and moral values (Cabana et al., 2022). The organization's sustainable leadership is fortified through prioritizing employee well-being, fostering a strong commitment to the company, and investing in comprehensive training and development programs (Bulmer et al., 2021). The organization's pursuit of sustainability needs to focus on using resources efficiently, managing health and safety, engaging stakeholders, ensuring quality, and handling waste effectively. As a result, they witness reduced environmental impact, steady business growth, a safe and pleasant workplace, an enhanced company reputation, and improved employee creativity, motivation, and efficiency (Tan et al., 2019). Sustainable leaders should vigorously promote and incorporate value-based approaches and potentialities, including strategic thinking, comprehensive systems understanding, effective interpersonal skills, forward-thinking, and ethical competencies, within their business endeavors (Suriyankietkaew et al., 2022). Integrating sustainable leadership as a strategic management approach empowers organizations to execute environmental innovation strategies (Hu et al., 2023). However, the investigation of sustainable leadership is still in its earliest days, and there are few thorough assessments in this field. Given the numerous requests for study and development in sustainable leadership, this disparity is especially noticeable (Liao., 2022). This descriptive paper aims to offer a broad perspective by conducting a bibliometric analysis of sustainable leadership publications. Examining key features provides valuable insights into the advancements made in sustainable leadership research. The findings of the current paper offer a comprehensive understanding of the field's development, aiding researchers and practitioners in recognizing significant contributors, influential journals, prominent countries, institutions, references, and research themes.

2. METHODS

The current study employs bibliometric analysis, a quantitative methodology widely embraced in business research, in the current case, to enhance our understanding of sustainable leadership. Bibliometric analysis is instrumental in summarizing prior research, uncovering ongoing developments, assessing journal and article performance, and exploring the intellectual structure of specific fields (Donthu et al., 2021). The next part of the section deals with collecting and preparing datasets for the analysis part.

3.1 Search strategy

The initial step involved an advanced search using keywords related to sustainable leadership on the Scopus database. The keywords used for the search were "sustainable leadership," "sustainability leadership," and "sustainable leader." Researchers have highlighted the comprehensive and broad coverage of the Scopus database over the other databases, making it the first choice in the current study (Veloutsou & Ruiz Mafe, 2020). The search initially yielded 567 articles, reflecting the broad scope of exploration. Subsequent refinement focused only on English-language journals that had already been published, excluding all other articles like case studies and conference proceedings

published in non-English languages or even under any stage of publishing. Our current criteria resulted in 313 articles aligned with the emergence of sustainable leadership.

3.2 Data cleaning and formatting

To ensure the relevance of our chosen articles, we conducted thorough data cleaning. Each article's title and abstract were manually reviewed, excluding 226 publications that lacked a meaningful connection to sustainable leadership. The current study employs Avery's (2005) definition of sustainable leadership, emphasizing long-term decision-making that prioritizes employee well-being and delivers high-quality products and services. This definition underscores the importance of promoting a balance among people, profits, and the earth while establishing sustainability across all three dimensions: social, economic, and environmental. Consequently, the study selects research articles that align with this definition and address sustainability comprehensively. This meticulous shortlisting process led to a final dataset of 87 published journal articles. The results were stored in CSV format, capturing essential details like titles, authors' names, affiliations, abstracts, keywords, and references.

3. DATA ANALYSIS

Data analysis in this phase embraced a comprehensive approach, employing statistical tools such as MS Excel and VOSViewer programs. The study encompasses both Descriptive Statistics and bibliometric data analysis, with Descriptive statistics providing an overarching view of critical metrics, including the evolution trend in sustainable leadership, publication per year, geographical distribution, and source. The outcomes are visually presented through tables and graphs. Moreover, the bibliometric analysis involved citation, co-citation, and co-occurrence analysis, with results presented in tables and network analysis formats. The citation trend analyses illuminated the evolving impact of publications over time, while co-citation analyses identified closely associated works and influential authors, enriching our understanding of the intellectual landscape (Donthu et al., 2021).

Additionally, co-occurrence analysis revealed patterns related to specific themes within the dataset. Visualization techniques, such as network maps and clusters, were instrumental in intuitively representing intricate relationships among research elements. These diverse data analysis methods facilitated a comprehensive examination of the dataset, offering visually compelling insights into the intricate relationships within the scholarly exploration of sustainable leadership.

4. RESULTS

This section provides findings on the research question introduced after the introductory segment.

5.1 Temporal distribution patterns of articles

Figure 1 unveils the dynamic trajectory of research trends in Scopus publications spanning the past two decades. The concept of "sustainable leadership" dates back to 2004, credited to (Hargreaves and Fink., 2004). However, due to its absence from the Scopus list, it remained unaccounted for in our analysis. The inaugural publication featuring 'sustainable leadership' emerged in Scopus only in 2007. Notably, the term 'sustainable leadership' was highlighted in the titles/keywords of some articles published in Scopus before 2007. However, they diverge from the contemporary definition of 'sustainable leadership,' which emphasizes sustainability across all three dimensions. Hence, these articles were excluded from our dataset.

Our analysis reveals a notable dearth of sustainable leadership publications from 2007 to 2010, potentially attributed to the term's limited recognition. Subsequently, between 2011 and 2019, there was a discernible surge in publications. However, the trend exhibited an erratic pattern, suggesting that research on sustainable leadership was evolving but had yet to reach maturity.

It was not until 2020 that research about "sustainable leadership" underwent substantial expansion, witnessing continuous growth that culminated in 19 publications by 2023. It reaffirms the increasing popularity and acceptance of the concept among academicians.

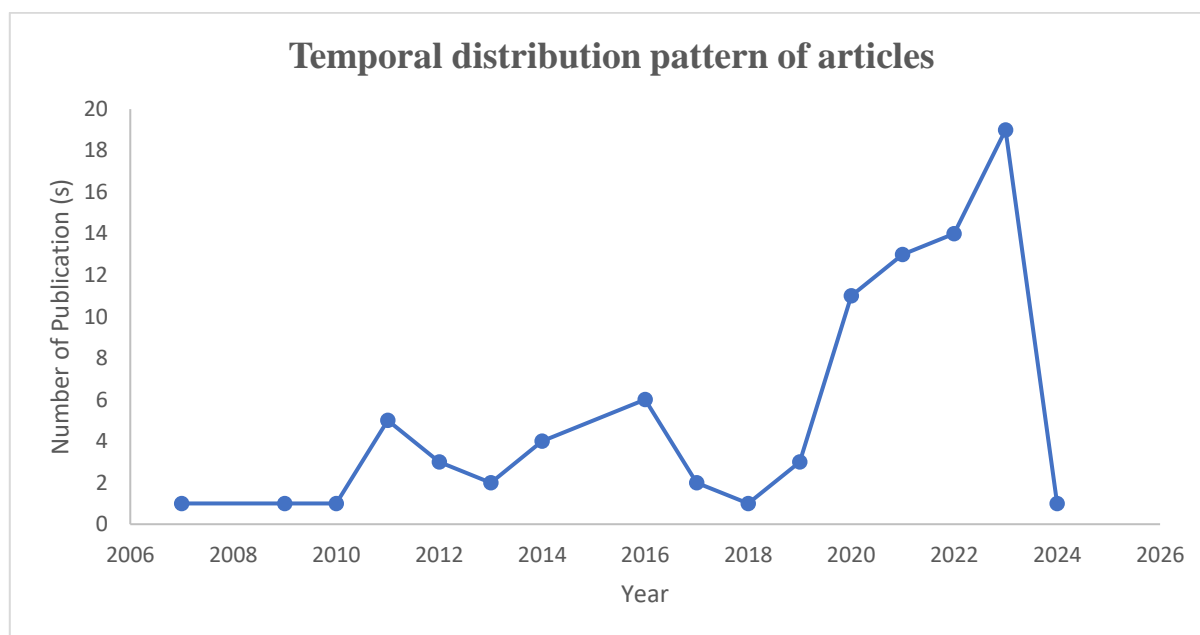


Figure 1: Temporal distribution pattern of articles

5.2 Leading, influential and impactful sources

Table 1 highlights critical insights into prominent journals specializing in articles related to sustainable leadership. With a criterion of more than one paper per journal, the top ten journals were automatically detected, collectively contributing to 52 percent of the total publications within the study. The identified journals include Sustainability (Switzerland), Frontiers in Psychology, Journal of Cleaner Production, International Journal of Sustainability in Higher Education, Journal of Business Ethics, Asia-Pacific Journal of Business Administration, Global Business and Organizational Excellence, leadership and Organization Development Journal, Sage Open, and Sustainable Development.

In terms of publication volume, "Sustainability (Switzerland)" takes the lead with 19 publications, followed by "Frontiers in Psychology" with six, followed by "Journal of Cleaner Production" with four publications. International Journal of Sustainability in Higher Education and Journal of Business Ethics appear in fourth position on the tally with three publications each, while the others on the list feature two publications each. Results suggest that the top five journals in the list account for 40% of the total publications considered under the study. However, there is a subtle shift regarding the number of citations in the scenario. "Sustainability (Switzerland)" maintains its lead with an impressive 419 citations, followed by "Journal of Cleaner Production" with 365 citations, and "Journal of Business Ethics" securing the third spot with a total of 337 citations.

However, exploring citations per publication provides a more detailed perspective. "Journal of Business Ethics" stands out as the most impactful, averaging 112 citations per publication, followed by "Journal of Cleaner Production" with 91 citations per document, signaling a qualitative emphasis in the research published within this journal. "Sustainable Development" holds the third position in the tally with an average citation of 47 per article. Another important fact is that despite 19 publications, the highest in the tally, the Sustainability (Switzerland) journal has only 22 citations per article. These findings suggest a deeper understanding of each journal's scholarly impact and qualitative contributions to sustainable leadership research. This information can serve as a lighthouse to new academicians in the field, aiding them in selecting journals for the publication of their future research endeavors.

Table1. Journal distribution along with the number of papers and citations

	Journal	Publisher	No. of Publications	Citations	Citation/ Document
1	Sustainability (Switzerland)	MDPI	19	419	22

2	Frontiers in Psychology	Frontiers Media S.A.	6	30	5
3	Journal of Cleaner Production	Elsevier Ltd	4	365	91
4	International Journal of Sustainability in Higher Education	Emerald Group Holdings Ltd.	3	44	15
5	Journal of Business Ethics	Springer Science and Business Media B.V.	3	337	112
6	Asia-Pacific Journal of Business Administration	Emerald Group Publishing Ltd.	2	42	21
7	Global business and organizational excellence	John Wiley and Sons Inc	2	37	19
8	Leadership and organization development journal	Emerald Group Holdings Ltd.	2	67	34
9	Sage open	SAGE Publications Inc.	2	48	24
10	Sustainable Development	John Wiley and Sons Ltd	2	94	47

Source: Author's compilation

5.3 Most prominent articles in the field

Determining influential articles relies on citation counts, with higher numbers indicating prominence (Baier Fuentes et al., 2019). Highly cited articles are the foundation of a research field, influencing the main and sub-domains. Their frequent citations lead to longer cycles, establishing them as reliable and widely referenced literature. Table 2 details the top ten most influential articles, including their publication years, authors, source information, and total citations based on citation analysis.

Macke and Genari's (2019) "Systematic literature review on sustainable human resource management" stands out in this collection and is recognized as a leading research paper with the highest citation count at 224. Following is Avery and Bergsteiner's (2011) "Sustainable Leadership Practices for Enhancing Business Resilience and Performance," with citations of 187. Empirical Evidence of the Value of DJSI Membership by Robinson et al. (2021) stands in third position with 159 citations, followed by Lourenco et al.'s (2014) article titled "The Value Relevance of Reputation for Sustainability Leadership" with 139 citations.

'Human capital sustainability leadership in promoting sustainable development and healthy organizations: A new scale' by Fabio & Peiro (2018) with 120 citations and Iqbal et al.'s (2020) article, 'A moderated-mediation analysis of psychological empowerment: Sustainable leadership and sustainable performance,' with 110 citations are some other prominent articles. Additional details on other noteworthy articles can be found in Table 2.

Table 2. Prominent articles on Sustainable leadership

S. No.	Title	Year	Citation	Journal
1	Systematic literature review on sustainable human resource management (Macke & Genari, 2019)	2019	224	Journal of Cleaner Production
2	Sustainable leadership practices for enhancing business resilience and performance (Avery & Bergsteiner, 2011)	2011	187	Strategy & Leadership
3	Signaling Sustainability Leadership: Empirical Evidence of the Value of DJSI Membership (Robinson et al., 2021)	2021	159	Journal of Business Ethics
4	The Value Relevance of Reputation for Sustainability Leadership (Lourenco et al., 2014)	2014	139	Journal of Business Ethics
5	Human capital sustainability leadership to promote sustainable development and healthy organizations: A new scale (Di Fabio & Peiro, 2018)	2018	120	Sustainability (Switzerland)

6	A moderated-mediation analysis of psychological empowerment: Sustainable leadership and sustainable performance (Iqbal et al.,2020a)	2020	110	Journal of Cleaner Production
7	The relationships among transformational leadership, sustainable leadership, lean manufacturing and sustainability performance in Thai SMEs manufacturing industry (Burawat, 2019)	2019	79	International Journal of Quality and Reliability Management
8	Sustainable leadership: Management control systems and organizational culture in Novo Nordisk A/S (Morsing & Oswald, 2009)	2009	75	Corporate Governance
9	Sustainable development: The colors of sustainable leadership in learning organization (Iqbal et al.,2021)	2021	73	Sustainable Development
10	Sustainability leadership in higher education institutions: An overview of challenges (Filho et al.,2020)	2020	71	Sustainability (Switzerland)

Source: Author's compilation

5.4 Word Dynamics of Sustainable Leadership

Keywords are a critical component of search engines, and selecting the right ones is essential for increasing citations. In the current study, we have employed co-occurrence analysis to answer our research question RQ4. The co-occurrence, indicating how often a keyword appears alongside others, is crucial in this context. *Keyword co-occurrence analysis* is a powerful method that explores the complex relationships between keywords in a given dataset, shedding light on prevailing themes and trends within a specific domain. Co-occurrence analysis commonly extracts terms from 'author keywords,' it can also gather critical terms from 'abstracts,' 'article titles,' and 'full texts' (Donthu et al., 2021). The keywords co-occurrence networks examinations combine the unified approach to clustering and mapping bibliometric networks. This approach allows for identifying central themes and facilitates the tracking of keyword evolution, contributing to a deeper understanding of the domain's intellectual landscape. In our study, utilizing VOSviewer, we constructed a visually informative keyword co-occurrence network. Figure 2 shows the author's keyword co-occurrence network, wherein the proximity of terms reflects the strength of their relationship. The line connecting two keywords shows that they appear together, and a shorter distance indicates a stronger connection between them, as Liao et al. (2018) explained. Applying a minimum occurrence threshold of 2, we identified 38 keywords out of 284 that met the criteria, providing a robust foundation for our analysis.

Table 3 below shows keywords with a maximum occurrence of three times in the data sample. Notably, the central keywords in the network are "Sustainable Leadership" (f = 41) followed by "Leadership" (f = 18) in the second position, "Sustainable development" (f = 15), and "Sustainability" (f = 14) in the third and fourth position respectively, which serves as essential nodes, fostering the exploration of sustainable leadership across diverse research streams.

Table 3. Maximum occurring keywords

S.no.	Keyword	Occurrences (f)	Total link strength
1	Sustainable leadership	41	68
2	Leadership	18	50
3	Sustainable development	15	37
4	Sustainability	14	40
5	Sustainability leadership	9	14
6	Corporate sustainability	8	27
7	Thailand	6	19

8	Environmental sustainability	4	4
9	SMEs	4	11
10	Transformational leadership	4	12
11	Corporate social responsibility	3	6
12	Higher education	3	5
13	Human capital sustainability leadership	3	2
14	Rhineland principles	3	13
15	Sustainable development goals	3	7
16	Sustainable performance	3	2
17	University	3	8

Source: Author's Compilation

However, a more insightful revelation is made if we add a chronological perspective to keyword co-occurrence analysis. It helps understand the keywords' temporal distribution and identify the black-and-white or grey region in the subject field. Figure 2, below, suggests that "Anglo/US leadership," "financial crisis," "leadership," "Rhineland principles," and Thailand were some of the keywords most used till 2016. It reaffirms that "Anglo/US leadership" and "Rhineland principles" were the prominent words around which the concept of sustainable leadership developed. The terms "sustainable leadership," "corporate sustainability," "SMEs," and "sustainable development" took center stage between 2018 and 2020. Meanwhile, "SDGs," "Social exchange theory," "higher education," "human capital sustainability," and "Sustainable performance" represent the contemporary dimensions and grey areas in the research related to sustainable leadership. These findings will guide scholars in selecting dimensions for future research.

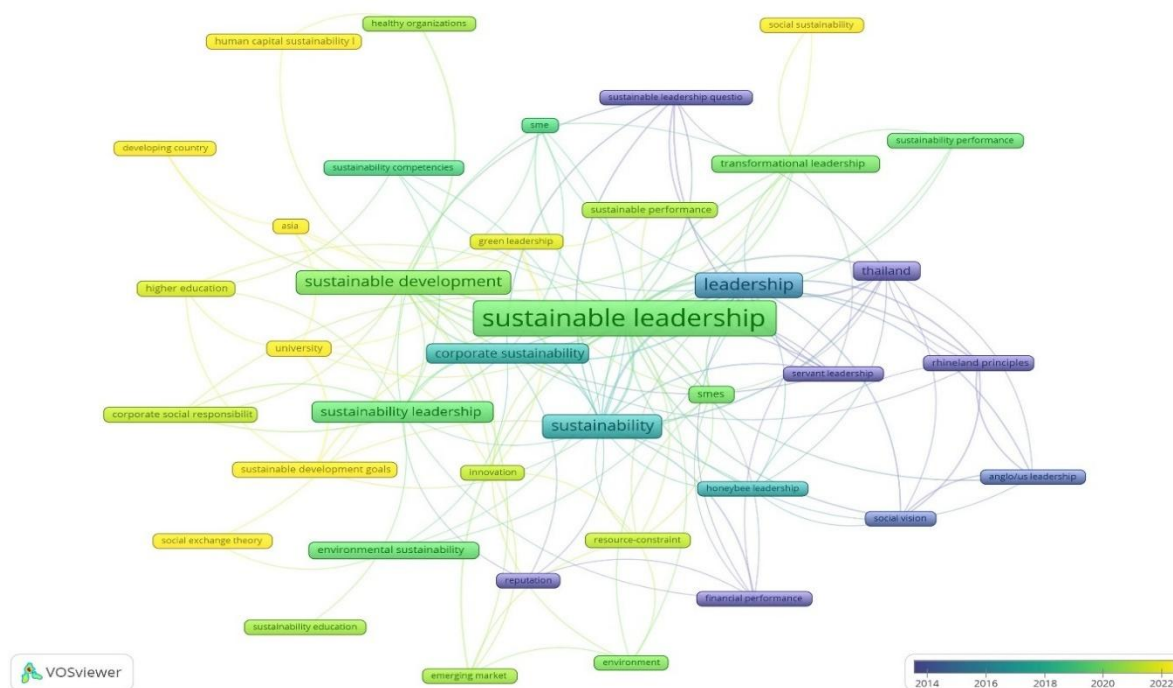


Figure 2: Keyword Co-Occurrence analysis

5.5 Contribution and collaboration of prominent countries

As a worldwide concern, many countries have prioritized sustainable development in their national policies. Table 4 shows how different countries contribute to research on sustainable leadership. It shows the major countries which are the main contributors to the development of the field. Papers in this study belong to the authors' country of origin.

A total of 44 countries contribute to the development of the field, out of which countries have at least three papers, which are included in the table, resulting in 17 countries meeting the threshold. The main contributors are Thailand and China, with 13 papers. Similarly, Australia and Malaysia stand in second place with 11 papers each, followed by Poland and the United Kingdom in third and fourth place with nine and seven publications, respectively. The analysis highlights an important aspect: not the developed countries from the West but the Asian countries that are excelling in the research of sustainable leadership.

Table 4. Top countries with the total publications, citations and average citation

Country	Documents	Citations	Citations/document
China	13	305	23
Thailand	13	418	32
Australia	11	439	40
Malaysia	11	394	36
United States	11	285	26
Poland	9	170	19
United Kingdom	7	105	15
Brazil	6	313	52
Spain	5	135	27
Canada	4	413	103
Italy	4	128	32
Saudi Arabia	4	48	12
South Africa	4	43	11
Germany	3	76	25
Indonesia	3	23	8
Pakistan	3	17	6
South Korea	3	52	17

Source: Author's Compilation

However, considering the number of citations, results highlight that Australia, along with its collaborated countries, tops this list with a total citation of 439, followed by Thailand, and it has collaborated countries with a total citation of 418. Canada and its collaborated countries published articles with total citations of 413, standing in third position, followed by Malaysia and Brazil in fourth and fifth position with total citations of 394 and 313, respectively. It suggests that Australia and its research partners publish the most impactful research in sustainable leadership.

For further insights, the co-authorship network between countries publishing on sustainable leadership was conducted with VOSviewer. The network diagram shows inter-country co-authorship among different countries. Big and small circles in the network diagram are connected through lines. Bigger circles in the figure represent countries with a higher number of collaborations. Different colors indicate the cluster to which a particular country belongs. The lines with which they are connected represent the links and their strength. This network visualization is done to determine countries with maximum collaborations. The countries with at least three publications on the topic are considered for the present study. The result of the cooperation network between countries and territories is presented in Figure 3.

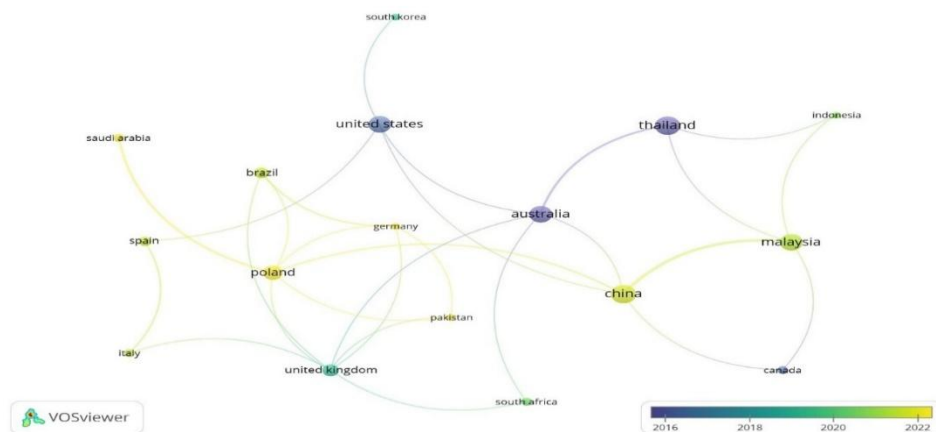


Figure 3: Network Collaborations of Countries

Analysis of the network diagram suggests that the United Kingdom is collaborating with the maximum number of countries and has seven links with a total link strength of 7. Poland stands in second position with six collaborations; however, its link strength is ten. Australia and China hold the third rank with five links each. However, China was the most significant influencer, with a total link strength of 12. Australia has a total link strength of 18. Germany, Malaysia, and the USA are in fourth place with four collaborations each and a total link strength of five, ten, and four countries, respectively. For details on other countries, table 5 can be referred.

Table 5. Collaborations network of countries

Country	No. of collaborations	Total link strength
United Kingdom	7	7
Poland	6	10
Australia	5	8
China	5	12
Germany	4	5
Malaysia	4	10
United States	4	4
Brazil	3	4
Pakistan	3	3
Thailand	3	6
Canada	2	2
Indonesia	2	2
Italy	2	3
South Africa	2	2
Spain	2	3
Saudi Arabia	1	4
South Korea	1	1

Source: Author's compilation

5.6 Most prominent authors of the field

The current study employs citation and co-authorship analysis to identify the prominent and influential authors in sustainable leadership worldwide. Citation analysis is a powerful tool in academia. Examining citation patterns reveals the acceptance and influence of scholarly works. Researchers rely on citation analysis to assess the trustworthiness of published works. Moreover, it helps us understand authors' contributions to specific research

topics. In essence, the main goal of citation analysis is to understand and evaluate what authors contribute to a particular topic of study based on the recognition their work receives from others.

The table highlights 16 eminent authors within the field of sustainable leadership, presenting comprehensive data such as the authors' total publications, citations, affiliations with countries and organizations, and overall link strength. This curated list is derived from a dataset featuring 204 authors contributing to 53 sample articles, applying a minimum threshold of two publications per author for inclusion. Considering several publications, Iqbal Qaisar is the most well-known researcher, with 14 papers. Ahmad, N.H. A & Kantabutra, Sooksan stand as the second most well-known researchers, with seven publications each in this field, followed by Avery, Gayle C, and Piowar-Sulej K, who have six publications each. However, if we consider total citations against their publications, Iqbal Qaisar, with 481 citations, has emerged as an influential figure in sustainable leadership, followed by Avery, Gayle C, with a total citation of 382. Ahmad, N.H. holds the third position with total citations of 378. However, if we consider average citations, the picture drastically changes. Macke, J emerges as the most impactful author with 224 citations from only two publications, followed by Bergsteiner, H with an average citation of 109. Details of other prominent authors are summarized in Table 6.

Table 6. Most Prominent Authors

S.no.	Author	Author's Affiliation	Documents	Citations	citations/ document
1	Iqbal, Qaisar	King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia	14	481	34
2	Ahmad, Noor Hazlina	Universiti Sains Malaysia, Malaysia	7	378	54
3	Kantabutra, Sooksan	Mahidol University, Thailand	7	185	26
4	Avery, Gayle C.	Australian Catholic University, Australia	6	382	64
5	Piowar-Sulej, Katarzyna	Wroclaw University of Economics and Business, POLAND	6	97	16
6	Suriyankietkaew, Suparak	Mahidol University, Thailand	5	171	34
7	Di Fabio, Annamaria	Department of Education, Italy	3	123	41
8	Bergsteiner, Harald	Australian Catholic University, Australia	2	218	109
9	Caldana, Adriana Cristina Ferreira	University of Sao Paulo, Brazil	2	75	38
10	Eustachio, João Henrique Paulino Pires	University of Sao Paulo, Brazil	2	75	38
11	Halim, Hasliza Abdul	Universiti Sains Malaysia, Malaysia	2	90	45
12	Khan, Syed Abdul Rehman	Xuzhou University of Technology, China	2	117	59
13	Li, Yongmei	Sichuan University of Science and Engineering, China	2	53	27
14	Li, Zeyun	Universiti Sains Malaysia, Malaysia	2	79	40
15	Macke, Janaina	University of Caxias do Sul (UCS), Brazil	2	224	112
16	Svicher, Andrea	University of Florence, Italy	2	3	2

Source: Author's Contribution

*As per (Iqbal Q.; Piwowar-Sulej K., 2023) Iqbal, Qaiser is affiliated with King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

*As per (Usama Awan¹, Syed Abdul Rehman Khan., 2021) Khan, Syed Abdul Rehman is affiliated with Xuzhou University of Technology, China

To better understand the prominent authors in a field, analyzing their collaborations in the same domain is essential. A high number of co-authored publications indicates a closer relationship among authors within the field and a more significant opportunity for future collaboration (Wang et al., 2014). Collaboration among researchers is a common practice globally, facilitating research in areas of mutual interest. Through collaboration, researchers can address complex challenges, conduct interdisciplinary studies, and fill gaps in understanding, ultimately contributing to their respective fields' collective growth and progress. This trend is on the rise, as co-authorship is an established method for researchers to engage intellectually (Cisneros et al., 2018). Therefore, it is crucial to recognize that researchers collaborate to explore specific fields.

The cooperation pattern, represented by co-authorship among authors publishing on sustainable leadership, was analyzed using VOSviewer. Only authors who had published at least two papers on the topic were included. The resulting authors' cooperation network is depicted in Fig. 4. Within this network, the dimensions of the frames correlate with the volume of publications. In contrast, the connections between authors are depicted by lines, illustrating their collaborative efforts. Different colors indicate distinct collaboration clusters. Within the cooperation network, four significant clusters of authors can be distinguished, comprising the primary researchers in the network.

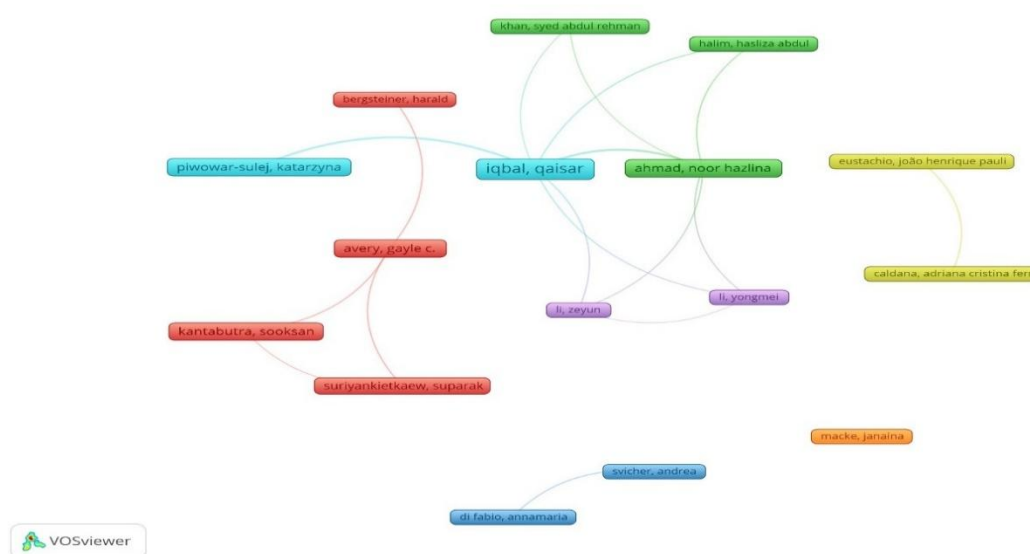


Figure 4: Network Collaborations of Authors

5. DISCUSSION

This paper undertakes an in-depth bibliometric analysis, uncovering the intricate structures and advancements in sustainable leadership. Reviewing the information obtained from Scopus revealed the extensive diversity within sustainable leadership, showcasing a range of thematic clusters. The analysis was conducted using bibliometric techniques and the VOSviewer software, providing an in-depth exploration aligned with the research queries in the present study. The descriptive analysis brings to light the current state of sustainable leadership research (RQ1), indicating an ongoing evolution that is particularly noticeable in publications post-2020. In addressing (RQ2), primary contributions emanate from the 'Sustainability (Switzerland)' journal by MDPI. Remarkably, Springer's 'Journal of Business Ethics' stands out for its impact, accumulating 337 citations from only three publications. Macke & Genari's 2019 article on systematic literature review on sustainable human resource management also emerges as the most cited, with 224 citations (RQ3). Keyword co-occurrence analysis (RQ4) identifies 17 keywords grouped into seven clusters, spotlighting the evolving dimensions of 'Sustainable performance' and 'corporate social

responsibility.' The study delves into citation analysis (RQ5), revealing China and Thailand's prominence in publications and collaborative efforts, while Australia commands maximum citations. Finally, citation and co-authorship analyses (RQ6) pinpoint Iqbal, Qaisar, as a prolific author with the most publications and a robust global collaborative network.

To sum up, our detailed bibliometric analysis of sustainable leadership offers valuable insights into the current state and prospects of the field. The study's exploration of thematic clusters, influential journals, prolific authors, and emerging keywords enhances our understanding of sustainable leadership's evolution. The findings indicate a dynamic and diverse landscape, with a notable shift towards sustainable performance and corporate social responsibility. The study identifies Thailand as a key contributor, emphasizing global collaboration in addressing leadership challenges. The study's theoretical contributions enrich the sustainable leadership literature, pinpointing gaps for future exploration. Beyond academic implications, our findings provide practical insights for leaders and practitioners, guiding effective strategies. This research is an indispensable resource, steering forthcoming studies, encouraging worldwide collaboration, and offering pragmatic insights into sustainable leadership approaches across varied contexts.

6. IMPLICATIONS

The implications of our study are multifaceted, encompassing theoretical advancements in sustainable leadership studies and practical applications for researchers, leaders, and practitioners. Our study holds critical theoretical implications, particularly in enriching the literature on sustainable leadership. By conducting a scientific mapping of the field, our research not only adds depth and breadth to the current knowledge base but also uncovers gaps and opportunities for further exploration. This contribution enhances the theoretical foundation for future studies in sustainable leadership. Furthermore, our research provides researchers with a comprehensive overview of existing literature on sustainable leadership. This overarching snapshot aids in understanding the historical context, current trends, and potential future directions of the field, offering a roadmap for navigating the complexities of sustainable leadership studies. Additionally, our study employs scientific mapping techniques, including bibliometric analysis, to identify key contributors, reputable publication outlets, and influential institutions in sustainable leadership research. Beyond recognizing leading figures, this is a valuable resource for upcoming researchers, helping them form collaborations, find references, and gain a deeper understanding of the academic landscape in sustainable leadership.

Outside of academia, our findings are helpful for leaders and practitioners. We emphasize that sustainable leadership is vital across different fields and situations, providing practical advice for creating effective organizational strategies. Additionally, our research highlights the need for people worldwide to work together on studying and practicing sustainable leadership due to the global nature of leadership challenges. Further, using scientific mapping techniques like bibliometric analysis, our study goes on to identify key contributors, trustworthy places where information is published, and influential institutions in sustainable leadership research. This recognizes important figures and acts as a helpful resource for new researchers, assisting them in forming collaborations, finding relevant references, and understanding the academic landscape.

Moreover, our analysis reveals significant themes in the literature on sustainable leadership, giving a comprehensive understanding of the challenges and opportunities in this area. These understanding guides researchers and stakeholder, pointing them towards promising areas of investigation and helping create effective strategies.

7. LIMITATIONS AND FUTURE DIRECTIONS

Similar to any other study, the current investigation has its limitations. These limitations pave the way for the future scope of study. Firstly, while our review is comprehensive, it falls short of exhaustive. Relying on the Scopus database does not encompass the entirety of research papers about sustainable leadership. We propose that forthcoming researchers broaden their scope by incorporating the Web of Science (WOS) and other databases to facilitate a more comparative and exhaustive analysis.

Secondly, our study selectively focused on documents published in scholarly journals, neglecting dissertations, book chapters, and books. A more comprehensive understanding could be achieved by integrating additional reliable

sources. Despite our efforts to ensure reliability and comprehensiveness, a future review might adopt a theory-driven approach for further refinement.

Thirdly, the current study limited its examination to papers published in English, potentially excluding some qualitative contributions. Subsequent investigations should consider including papers in other languages to ensure a more holistic perspective. Furthermore, using VOSviewer for data visualization and interpretations in the present study introduces inherent limitations associated with the tool. Future studies could employ different analysis techniques, leveraging statistical tools such as Gephi, Biblioshiny, and others for a more nuanced exploration.

Lastly, we recommend that future studies incorporate systematic literature reviews (SLR) or meta-analyses alongside bibliometric analyses to enhance our comprehension of sustainable leadership, its antecedents, and consequences. This multifaceted approach would enhance the depth and breadth of comprehension regarding the topic.

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