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**THE EMERGING TRENDS OF SUSTAINABLE LEADERSHIP
IN HIGHER EDUCATION RESEARCH**

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Abstract:

Sustainable leadership in higher education has become a critical area of inquiry as universities worldwide face the dual challenge of ensuring institutional excellence while addressing long-term social and environmental responsibilities. Yet, the research landscape remains scattered, requiring systematic synthesis. This study conducts a bibliometric analysis of 1,100 publications indexed in Scopus between 2015 and 2025, retrieved using the keywords “leadership,” “sustainable,” “higher,” and “education.” Data were refined using OpenRefine to ensure consistency, statistical trends were analyzed through the Scopus Analyzer, and VOSviewer software was applied to visualize citation patterns, keyword networks, and co-authorship collaborations. The results indicate a steady growth in publications from 2015, with a marked acceleration from 2019 onwards, peaking between 2023 and 2025. The United States, China, and Malaysia emerged as the most productive contributors, while the most-cited works highlighted themes linking leadership practices with sustainability performance, innovation, and organizational resilience. Co-authorship analysis revealed dense collaborative clusters across Asia, Europe, and North America, underscoring the global nature of the discourse. Overall, the findings demonstrate that sustainable leadership in higher education is an expanding, interdisciplinary field characterized by growing international collaboration and thematic convergence. This study contributes to the literature by consolidating fragmented evidence and providing a comprehensive overview that can inform future research agendas and policymaking in higher education leadership.

Keywords:

Sustainable Leadership; Higher Education; Research; Bibliometric; Leadership

Introduction

Sustainable leadership in higher education has emerged as a critical area of focus, reflecting the strategic role universities play in addressing environmental, social, and economic challenges. The concept of sustainability leadership encompasses the processes and practices that leaders, policymakers, and academics undertake to implement sustainable development policies and initiatives within their institutions (Filho et al., 2020). Higher education institutions (HEIs) are uniquely positioned to contribute to sustainable development through education, research, community engagement, and policy influence (Leal Filho et al., 2025) (Aung & Hallinger, 2022). This paper aims to explore the evolving landscape of sustainable leadership in higher education, examining its theoretical foundations, practical applications, and the challenges and opportunities it presents.

The literature on sustainable leadership in higher education is still developing, with several studies highlighting the need for more comprehensive and empirical research. A scoping review identified four dominant schools of thought within this field: sustainability leadership, managing campus greening, managing change and system integration, and education for sustainable development (Hallinger & Suriyankietkaew, 2018). These themes underscore the multifaceted nature of sustainability leadership, which requires a holistic approach to integrate sustainability into all aspects of university operations and culture.

One of the key aspects of sustainable leadership is its potential to transform university practices through reorientation and stewardship of the institutional mission, strengthening stakeholder commitment, and creating a positive effect on performance indicators (Aung & Hallinger, 2023). This transformation is essential for enhancing the reputation of higher education institutions and increasing their public value (Cabana et al., 2022). Moreover, sustainable leadership practices are crucial for the digital transformation of campuses, ensuring that environmental performance and engagement in green activities are aligned with change orientation (Winarno et al., 2025).

The role of sustainable leadership in higher education is further emphasized by its ability to foster a culture of collaboration, commitment to sustainability, and continuous education. These competencies are essential for preparing graduates with the skills needed to address complex global challenges (Portuguez-Castro & Castillo-Martínez, 2025). Additionally, the integration of sustainability into curricula and the promotion of interdisciplinary educational programs are key strategies for effective stakeholder engagement and advancing sustainability initiatives (Leal Filho et al., 2025). The importance of self-care and the inner work of sustainability leadership is also highlighted, as it helps educators and students manage the stress and overcommitment often associated with this work (Burns, 2016).

Despite the growing recognition of the importance of sustainable leadership, several challenges remain. These include a lack of interest and expertise among university administration and some members of the academic community, as well as insufficient resources and materials (Filho et al., 2020). To address these challenges, it is essential to adopt a structured, holistic approach to campus sustainability, which can inform policy development and enhance decision-making (Oliveira & Proença, 2025). Furthermore, the development of robust tools to assess leadership competencies and the implementation of targeted training programs are necessary to cultivate these competencies in future leaders (Portuguez-Castro & Castillo-Martínez, 2025).

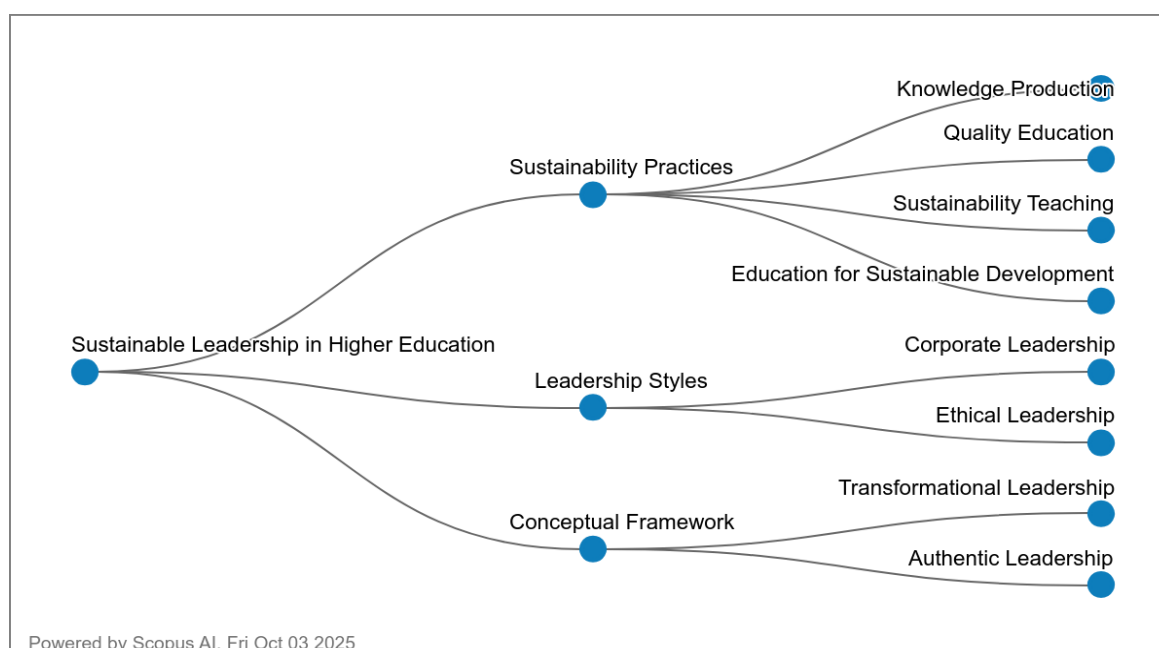


Figure 1: Concept Map of Sustainable Leadership in Higher Education

The concept map in Figure 1 illustrates the interconnected dimensions of sustainable leadership in higher education, highlighting three primary domains: sustainability practices, leadership styles, and conceptual frameworks. Sustainability practices emphasize the integration of quality education, sustainability teaching, knowledge production, and education for sustainable development as essential pathways for embedding sustainability within academic institutions. Leadership styles further reinforce this agenda through corporate, ethical, and transformational leadership approaches, which promote integrity, responsibility, and systemic change in guiding institutions toward long-term sustainability goals. Meanwhile, conceptual frameworks, including authentic and transformational leadership, provide theoretical grounding to understand how sustainable leadership can be operationalized in complex higher education contexts. Collectively, these domains suggest that sustainable leadership in higher education is multidimensional, requiring not only effective leadership models but also pedagogical innovation and institutional practices aligned with global sustainability imperatives. The synthesis underscores that sustainable leadership is not confined to administrative functions but extends to teaching, research, and ethical decision-making, thereby shaping higher education as a transformative force for advancing sustainability in society.

In conclusion, sustainable leadership in higher education is a vital and urgent issue that requires a comprehensive and integrated approach. By fostering a culture of sustainability, engaging diverse stakeholders, and addressing the challenges and opportunities associated with this work, higher education institutions can play a critical role in advancing sustainable development and preparing the next generation of environmental leaders. The literature underscores the need for continued research and practical implementation of sustainable leadership practices to ensure long-term success and competitive advantage for higher education institutions.

Research Question

To provide a comprehensive understanding of the intellectual landscape, this study is structured around five guiding research questions as follows.

1. What are the research trends in sustainable leadership in higher education research according to the year of publication?
2. What are the most cited articles?
3. Which are the top 10 countries based on the number of publications?
4. What are the most frequently occurring keywords to uncover prevailing research priorities and conceptual emphases within the field?
5. What is the co-authorship by country?

Together, these questions not only map the current state of knowledge but also point to gaps and opportunities for future inquiry.

Methodology

Bibliometrics serves as a systematic approach to gathering, organizing, and analyzing bibliographic data from scientific publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002). Beyond generating descriptive statistics—such as identifying leading journals, publication years, and prolific authors—bibliometric techniques extend to more advanced analyses, including document co-citation mapping. A rigorous literature review depends on an iterative process of refining keywords, conducting comprehensive searches, and performing in-depth analyses to ensure both breadth and reliability. Such a method not only enables the construction of a robust bibliography but also ensures credible outcomes (Fahimnia et al., 2015)]. Guided by this principle, the present study emphasized high-impact publications, as they provide deeper insights into the theoretical foundations shaping the research domain. Scopus was chosen as the primary data source to guarantee precision and consistency in data collection (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste & Paithankar, 2017). To uphold academic quality, only peer-reviewed journal articles were included, while books and lecture notes were excluded (Gu et al., 2019). Relevant publications from 2015 through October 2025 were systematically retrieved for analysis using Elsevier's Scopus database, which is recognized for its extensive coverage.

Data Search Strategy

To ensure a systematic and reliable dataset, this study employed the Scopus database, using its advanced search function to identify relevant literature. The search string applied was: **TITLE (leadership AND sustainable) AND PUBYEAR > 2009 AND PUBYEAR < 2026 AND (LIMIT-TO (LANGUAGE, "English"))**, with the final access date in 2025. This query was designed to capture publications at the intersection of leadership and sustainability across a 16-year span, thus reflecting both historical and contemporary scholarly discourse. A structured screening process was then conducted to refine the data set using explicit inclusion and exclusion criteria (refer to Table 2). Only articles written in English were retained, while non-English publications were excluded to ensure linguistic consistency in analysis. In terms of timeline, studies published between 2010 and October 2025 (refer to Table 1) were prioritized to reflect the most recent and relevant insights, with earlier works excluded to maintain focus on contemporary research developments. Furthermore, only peer-reviewed journal articles were included to ensure academic rigor and quality, while other forms of publications, such as conference proceedings, books, and reviews, were excluded. To avoid preliminary or incomplete findings, only articles at the final publication stage were considered, whereas those still in press were excluded. Following this rigorous filtering process, a total of 1,100 articles were identified as the final dataset. This carefully structured search and screening strategy ensured that the dataset was both comprehensive and of high quality, providing a robust foundation for subsequent bibliometric and thematic analyses.

Table 1: The Search String

Scopus	TITLE (leadership AND sustainable) AND PUBYEAR > 2009 AND PUBYEAR < 2026 AND (LIMIT-TO (LANGUAGE , "English"))
	Access date: October 3, 2025

Table 2: The Selection Criterion

Criterion	Inclusion	Exclusion
Language	English	Non-English
Timeline	2010 – 2025	< 2010
Literature type	Journal (Article)	Conference, Book, Review
Publication Stage	Final	In Press

Data Analysis

VOSviewer is a widely recognized bibliometric software developed by Nees Jan van Eck and Ludo Waltman at Leiden University, the Netherlands (van Eck & Waltman, 2010, 2017). Celebrated for its intuitive interface and powerful visualization capabilities, the tool has

become indispensable in mapping and analyzing scientific knowledge domains. Its strengths lie in constructing network visualizations, clustering related items, and generating density maps that capture the underlying structure of research landscapes. Researchers across disciplines employ VOSviewer to examine co-authorship, co-citation, and keyword co-occurrence networks, enabling both a macro-level understanding of scholarly ecosystems and micro-level insights into emerging research niches.

A defining feature of VOSviewer is its ability to transform large and complex bibliometric datasets into visually interpretable maps and charts. By clustering interconnected items and revealing keyword co-occurrence patterns, the software offers an accessible yet sophisticated entry point for both novice and expert researchers. Its continuous updates and customizability ensure it remains at the cutting edge of bibliometric analysis, with compatibility across a wide range of data sources. This adaptability positions VOSviewer as a pivotal tool for advancing knowledge discovery, particularly in fields grappling with vast and fast-growing bodies of literature.

For the present study, datasets were extracted from the Scopus database covering the period 2010 to October 2025. The data—comprising publication year, titles, author names, journal sources, citations, and keywords in PlainText format—were processed using VOSviewer software version 1.6.20. VOS clustering and mapping techniques were applied to generate visual maps of the research landscape. Unlike traditional Multidimensional Scaling (MDS), which emphasizes similarity computations (e.g., cosine or Jaccard indices), VOSviewer situates items in a low-dimensional space where distance reflects relatedness [26], (Appio et al., 2014).. Importantly, it employs the association strength (AS_{ij}) as a normalization method, defined as:

$$AS_{ij} = \frac{C_{ij}}{w_i w_j}$$

where C_{ij} denotes the observed co-occurrences of items i and j , while w_i and w_j represent their respective weights. This measure captures the ratio of observed to expected co-occurrences under statistical independence, providing a robust foundation for analyzing bibliometric networks (Van Eck & Waltman, 2007).

Findings and Discussion

What Are the Research Trends in Sustainable Leadership in Higher Education Research According to The Year of Publication?

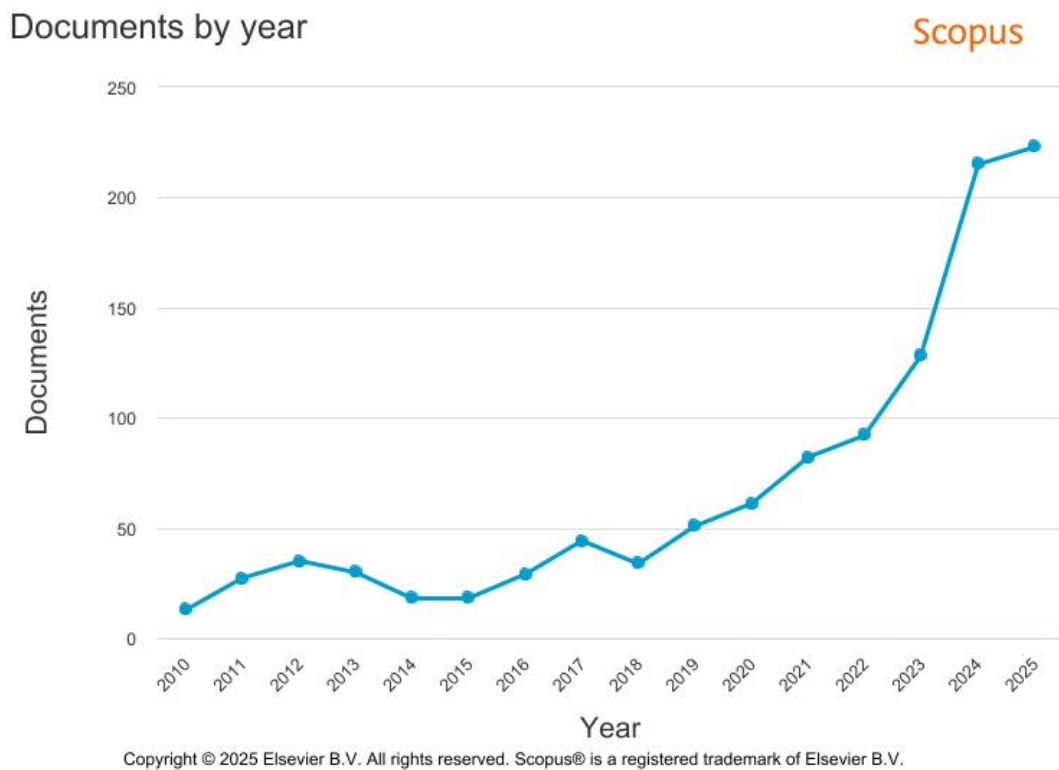


Figure 2: Research Trends in Sustainable Leadership in Higher Education Research According to the Year of Publication

The publication trend from 2010 to 2025 reveals a clear trajectory of growing scholarly interest in the intersection of leadership and sustainability. In the early years (2010–2015), the number of publications remained relatively modest, ranging between 13 and 18 articles annually. This suggests that the topic had not yet gained widespread traction in the academic community, likely because sustainability was still emerging as a key agenda in leadership and organizational research. A gradual increase can be seen from 2016 to 2019, where publications rose steadily from 29 to 51. This upward trend coincides with the global policy emphasis on sustainability following the launch of the United Nations Sustainable Development Goals (SDGs) in 2015, which acted as a catalyst for researchers to explore leadership’s role in advancing sustainable practices.

The sharp growth becomes particularly notable from 2020 onward, with publications rising from 61 in 2020 to 223 in 2025. Several factors may explain this surge. First, the COVID-19 pandemic in 2020 amplified the urgency for resilient and sustainable leadership across sectors, sparking renewed academic attention. Second, the increasing integration of sustainability into corporate strategies, higher education, and public governance has created a fertile ground for research that bridges leadership theories with sustainability practices. The dramatic rise between 2022 and 2025, particularly the leap from 92 articles in 2022 to 223 in 2025, suggests

that sustainability leadership has become a mainstream research area. This momentum reflects not only global socio-economic shifts but also the maturation of sustainability as a cross-disciplinary research priority, where leadership is increasingly viewed as a critical driver of long-term organizational and societal transformation.

What Are the Most Cited Articles?

Table 3: Research Trends in Sustainable Leadership in Higher Education Research According to the Year of Publication

Authors	Year	Source title	Cited by
Aftab et al., (2022)	2022	Journal of Cleaner Production	199
Borah et al. (2022)	2022	Technology in Society	201
Iqbal & Ahmad (2021)	2021	Sustainable Development	160
Iqbal et al., (2020)	2020	Journal of Cleaner Production	202
Burawat (2019)	2019	International Journal of Quality and Reliability Management	154
Li et al., (2019)	2019	Sustainability (Switzerland)	157
Hallinger & Suriyankietkaew (2018)	2018	Sustainability (Switzerland)	161
Jansson et al.(2017)	2017	Journal of Cleaner Production	231
Banker et al.(2014)	2014	Management Decision	220
Avery & Bergsteiner (2011)	2011	Strategy and Leadership	287

The analysis of the most cited articles reveals that highly influential works on sustainable leadership are spread across diverse contexts, ranging from environmental management to organizational innovation and strategic leadership. The most cited article, Avery and Bergsteiner (2011), with 287 citations, underscores the enduring impact of early conceptual contributions linking sustainable leadership practices to business resilience and performance. Its high citation count can be attributed to its pioneering role in framing sustainable leadership as a critical dimension of long-term organizational success, making it a foundational reference in subsequent scholarship. Similarly, Banker et al. (2014) (220 citations) and Jansson et al. (2017) (231 citations) demonstrate the influence of sustainability research that integrates leadership with financial strategies and consumer behavior, respectively. Their strong citation performance reflects both the longevity of earlier publications and the growing academic appetite for cross-disciplinary studies connecting leadership with sustainability outcomes in business and society.

More recent contributions, such as Iqbal et al. (2020, 2021), Borah et al. (2022), and Aftab et al. (2022), also achieved high citation counts within a short timeframe (ranging from 160 to 201 citations). This rapid uptake highlights the urgency of sustainability debates in the post-2015 era, particularly after the adoption of the United Nations Sustainable Development Goals (SDGs) and the global disruptions caused by the COVID-19 pandemic. These articles focus on emerging themes such as environmental ethics, digital leadership, psychological empowerment, and learning organizations, all of which align with contemporary research

frontiers. Their rapid citation growth suggests that sustainability leadership research is not only maturing but also adapting to new socio-economic realities, technological transformations, and environmental imperatives. The mixture of older foundational works with newer high-impact studies indicates that the field is both historically anchored and dynamically evolving, making sustainable leadership a critical and expanding area of scholarly inquiry.

Where Are the Top 10 Countries Based on the Number of Publications?

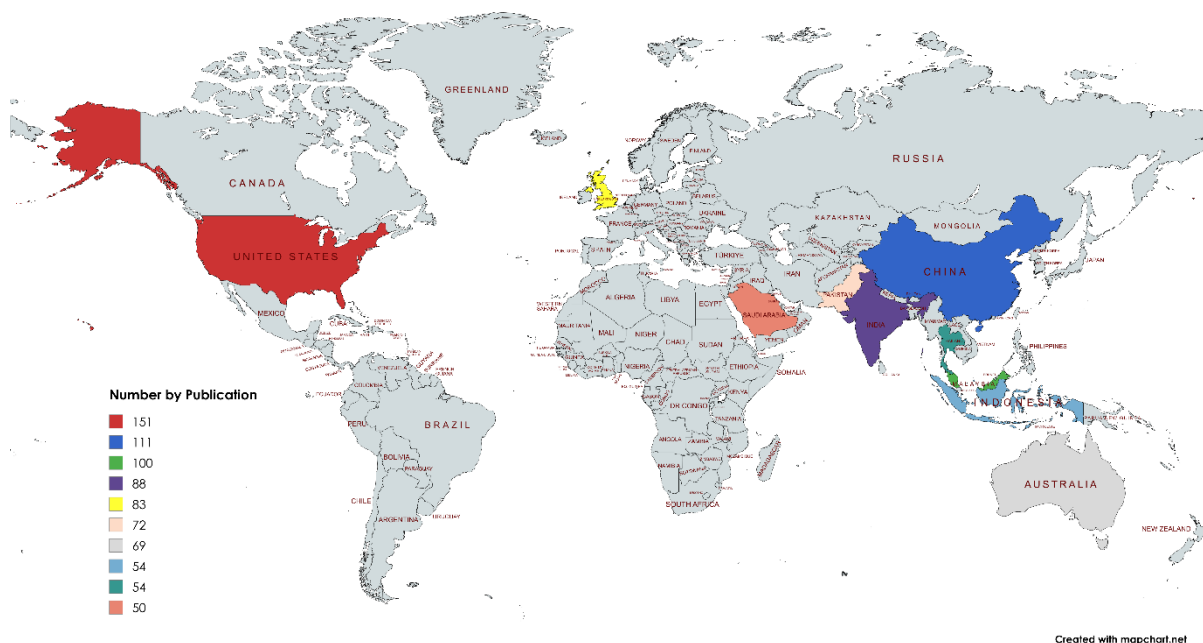


Figure 3: World Map of the Top 10 Countries based on the Number of Publications

The distribution of publications across countries highlights both the dominance of established research hubs and the rising contributions of emerging economies. The United States leads with 151 publications, reflecting its longstanding academic infrastructure, availability of research funding, and global influence in shaping leadership and sustainability discourses. China follows closely with 111 publications, signaling its rapid growth in research output driven by strong government investment in higher education and sustainability-related initiatives. Interestingly, Malaysia ranks third with 100 publications, which is remarkable considering its smaller population and research base compared to the U.S. and China. This demonstrates Malaysia's strategic focus on sustainability in national policies and higher education, where leadership in sustainable practices has become a priority for academic inquiry. Other Asian countries, such as India (86) and Pakistan (72), also appear prominently, indicating the increasing academic engagement of South Asia in addressing leadership and sustainability challenges.

Meanwhile, contributions from traditional research powerhouses such as the United Kingdom (83) and Australia (69) remain significant, reinforcing their continued role in global academic discourse. The presence of Indonesia (54), Thailand (54), and Saudi Arabia (50) signals the growing regional emphasis on sustainability research within Southeast Asia and the Middle East. These results may be attributed to several factors: the global recognition of sustainability

as a cross-disciplinary imperative, the alignment of research funding with the UN Sustainable Development Goals (SDGs), and regional socio-economic priorities that necessitate sustainable leadership approaches. The prominence of countries from Asia, particularly Malaysia, Indonesia, and Thailand, suggests a shift in research landscapes where developing nations are increasingly contributing to global knowledge production, thereby diversifying perspectives on leadership in sustainable contexts.

What Are the Most Frequently Occurring Keywords to Uncover Prevailing Research Priorities and Conceptual Emphases Within the Field?

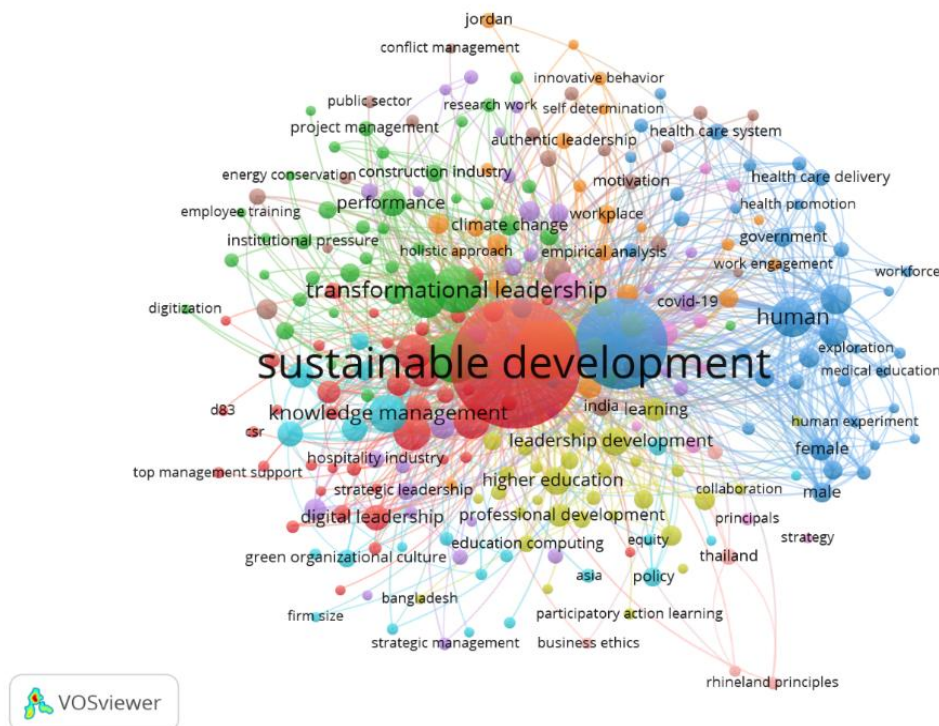


Figure 4: The Most Frequently Occurring Keywords in the Field of Sustainable Leadership in Higher Education

Co-occurrence analysis of author keywords in VOSviewer highlights how frequently terms appear together in publications, revealing conceptual linkages and dominant research themes. Keywords that co-occur often signal thematic or intellectual relatedness, which the software visualizes as nodes and clusters. In this study, the full counting method was used, with a minimum threshold of five occurrences to ensure the inclusion of only significant terms. Out of 2,224 keywords, 268 met this threshold and were grouped into 10 clusters, each representing a thematic concentration. This approach provides a reliable map of the intellectual structure of the field while filtering out noise from sparsely used terms.

The results show that “sustainable development” (672 occurrences, link strength 2,903) and “leadership” (338 occurrences, link strength 1,997) dominate the field, acting as intellectual anchors of sustainable leadership research. Supporting clusters, including organizational culture, environmental management, transformational leadership, corporate social responsibility, and innovation, reflect the multidimensional scope of the discourse. The

prominence of terms such as green innovation, digital leadership, and higher education highlights the growing influence of technology and institutional settings, while country-specific terms like China, Malaysia, and Pakistan point to active contributions from diverse regions. Emerging themes such as SDGs, climate change, and digital transformation suggest evolving frontiers that align with global socio-environmental challenges, reinforcing the dynamic and expanding nature of sustainable leadership research.

What Is the Co-Authorship by Country?

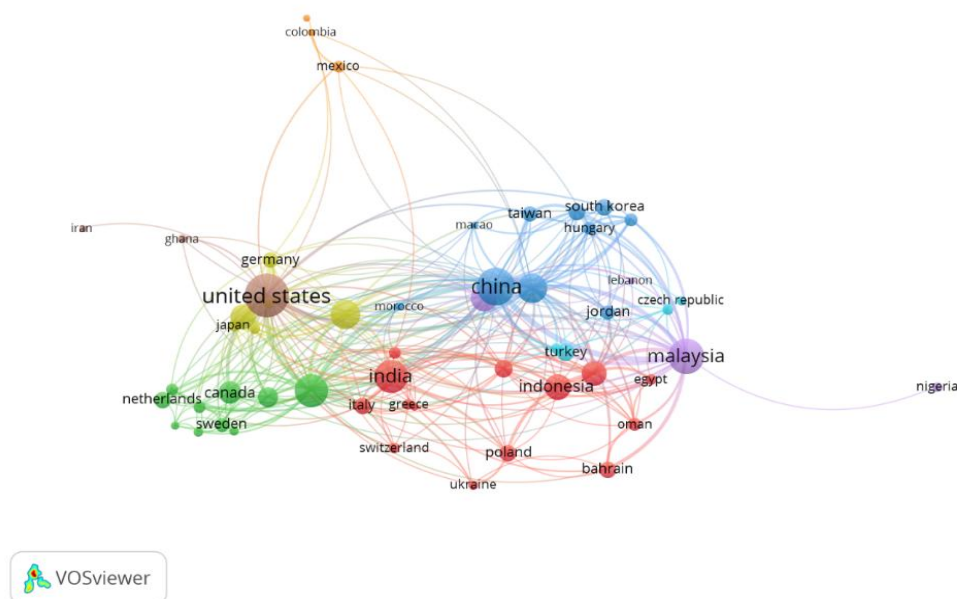


Figure 5: Co-Authorship by Country in the Field of Sustainable Leadership in Higher Education

The co-authorship analysis of countries provides valuable insights into the collaborative structures that underpin global research productivity. Using VOSviewer, each country is represented as a node, with links denoting the frequency and strength of co-authored publications. The findings reveal that while the United States leads in the number of publications (149), its total link strength (89) is relatively lower compared to countries like China (127) and Malaysia (108), which indicates that U.S. research output is less reliant on international partnerships. Conversely, countries such as Pakistan (103) and Saudi Arabia (56) demonstrate high levels of collaboration relative to their publication counts, underscoring the role of cross-border partnerships in enhancing visibility and scholarly impact.

These results show that research influence is shaped not only by volume but also by the extent of collaboration within international networks. China and Malaysia, for instance, emerge as key hubs in fostering regional and global cooperation, reflecting deliberate national strategies to expand research ecosystems through partnerships. The generation of 10 clusters from the 54 qualifying countries illustrates how global scholarship is organized into interconnected but distinct collaborative communities. Such insights contribute to the body of knowledge by

highlighting that international co-authorship is a critical driver of citation impact, knowledge dissemination, and the advancement of emerging research hubs, particularly in Asia and the Middle East.

Conclusion

This bibliometric analysis systematically mapped the burgeoning intellectual landscape of sustainable leadership in higher education. Based on 1,100 publications from the Scopus database between 2010 and 2025, the study successfully addressed its guiding research questions, providing a consolidated overview of the field's trajectory and structure. The key findings confirm that scholarly interest has rapidly accelerated since 2019, peaking in 2025, signifying the field's transition into a mainstream research area. Geographically, the United States, China, and Malaysia emerged as the most prolific contributors, with China and Malaysia demonstrating greater engagement in international co-authorship, positioning them as critical global hubs for collaborative knowledge production. The intellectual core is anchored by "sustainable development" and "leadership," surrounded by clusters emphasizing themes such as transformational leadership, green innovation, and the crucial role of institutional settings. The persistent relevance of foundational works on business resilience alongside newer, high-impact studies focusing on digital leadership highlights that the field is both historically grounded and dynamically adapting to new socio-economic realities.

This research makes a vital contribution by providing a robust, synthesized map of the field's structure, which was previously scattered. The analysis clarifies research priorities, informs the development of future research agendas, and offers actionable insights for policymakers and institutional leaders. Specifically, the findings underscore the need for a holistic approach to leadership, emphasizing the integration of ethical and transformational practices with pedagogical innovation, to fulfill the university's role in advancing sustainability goals. While limited by its focus on Scopus-indexed, English-language articles, this study lays a necessary foundation for future research, which should expand coverage to non-English works and other databases for a more exhaustive global perspective. Ultimately, this systematic overview confirms that sustainable leadership is a critical, multidimensional, and expanding area of scholarly inquiry that is essential for both long-term organizational success and societal transformation.

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