Please cite the Published Version

Additional Information: This is an open access article published in Sustainable Development, by Wiley.

REVIEW ARTICLE

Sustainable Development WILEY

Enhancing the contribution of higher education institutions to sustainable development research: A focus on post-2015 SDGs

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Abstract

Sustainable development (SD) research is vital in providing a basis for progress in this rapidly growing field of inquiry. In this context, higher education institutions (HEIs) and leading top researchers belonging to them are playing a key role. Despite this being widely acknowledged by the academy, it is largely unclear how individual HEIs, and their researchers contribute to sustainability research efforts. Based on the need to unveil this landscape, our article reports on a study that identified the leading HEIs and researchers involved in sustainability research and how they contribute to moving the field forward. A bibliometric assessment of the literature (performance analysis) was conducted to identify the number of publications of leading authors and institutions. The results reveal some interesting trends. First, the co-occurrence analysis technique revealed what the top 10 authors in SD are exploring. Also, the study identifies diverse thematic clusters, covering areas like technology, sustainability assessment, integrative education, and corporate practices. The paper advances SD theory by illustrating how these themes interconnect and complement each other. The article concludes with suggestions of how universities may engage further in sustainability research. The theoretical and practical implications of the research, as well as its limitations, are also addressed.

KEYWORDS
bibliometric analysis, collaboration and engagement, evaluation, higher education institutions, publications, sustainable development research

1 | INTRODUCTION

Increasing amounts of waste and pollution, food shortages, energy crises, and environmental disasters have intensified global concerns about compromising economies and the livelihood of future generations (Shi et al., 2019). To deal with these complex problems, the United Nations proposed 17 sustainable development goals (SDGs) as templates for achieving economic prosperity in harmony with nature (United Nations, 2015). According to Mensah (2019), sustainable development (SD) research requires agendas for balancing economic growth, social well-being, and environmental protection. Leaders at some higher education institutions (HEIs) are making significant contributions to SD research, advancing knowledge in this multidisciplinary field (To & Yu, 2020). However, the current landscape of sustainability research remains unstructured, highlighting the necessity for a comprehensive study that maps out key institutions, leading researchers, and their specific focus areas. Such a study is essential to better delineate current trends and provide a clearer understanding of the direction and impact of SD research. By identifying the main contributors and their areas of expertise, we can gain valuable insights into the progress and gaps within this critical field.

Hence, the purpose of this article is three-fold. First, it seeks to identify the top 10 researchers in SD based on the number of Scopus-indexed publications while unveiling their research fields. Second, it aims to highlight the top 10 leading journals that have made significant contributions to SD in terms of number of publications. Third, it strives to recognise leading institutions associated with the top 10 journals and book series dedicated to SD.

To achieve these objectives, the authors conducted a bibliometric analysis of the literature to understand the research strands of the SD research field (van Eck & Waltman, 2014; Waltman & van Eck, 2013), as well as performance analysis of journals, researchers, and HEIs, focusing on the number of publications in Scopus-indexed journals from 2015, the year the SDGs were introduced, and the starting point of this study, to March 2024.

This study complements and advances the theory of SD research by building on the findings of prior studies, such as those by Singh et al. (2024) and Kassahun et al. (2024). While Singh et al. focused on a scientometric evaluation to identify cutting-edge research trends in SD and highlighted the need for interdisciplinary approaches, this study extends the discussion by specifically addressing the role of HEIs as central to advancing SDGs. Moreover, Kassahun et al. uncovered research priorities within SD, emphasising gaps in policy and practical implementations, whereas the findings of this paper provide a necessary bridge by mapping the contributions of HEIs and top researchers, thus offering a more detailed understanding of how these institutions address the identified gaps through targeted research initiatives. By using bibliometric analysis, it enriches the ongoing discourse on SD by identifying key thematic clusters and suggesting pathways for further integration of sustainability practices into higher education. This focus on the role of HEIs not only aligns with but also moves the theory forward by demonstrating practical ways in which academic institutions can contribute to achieving global sustainability goals.

In addition, this study builds on the results established by prior studies and expands the understanding of SD monitoring and implementation strategies across various regions and contexts. For example, the study by D'Adamo et al. (2024) employs a multicriteria decision analysis and cluster analysis to assess regional sustainability performance in Italy, revealing geographic disparities and the importance of local specificities in achieving the SDGs. Our research, in turn, complements this by offering a broader perspective that considers not only regional performance but also the role of HEIs in fostering sustainable practices. Additionally, Ozili's (2022) work highlights the global challenges and regional differences in SD efforts, which our study addresses by focusing on the educational sector's capacity to bridge these gaps. Finally, the systematic literature review by Trane et al. (2023) on achieving the SDGs in the EU is furthered by our analysis of how HEIs contribute to this goal through research, thus providing a more comprehensive understanding of the role of academic institutions in SD.

In this sense, the insights provided by this study underscore the significant role that HEIs play in advancing SD, both theoretically and practically. By mapping the landscape of sustainability research through bibliometric analysis, this study has revealed the centrality of HEIs in driving forward the knowledge and application of sustainable practices across multiple sectors. The diverse thematic clusters identified demonstrate the contributions that HEIs make toward addressing global sustainability challenges.

To achieve the goals of this study, this article is organised into five sections. The introduction sets the stage by providing an overview of the current state of SD research, introducing the research goals, and briefly presenting the methodologies employed to obtain the results. The second section, in turpresents the contributions of HEIs to sustainability research, their role in advancing the SDGs, and their achievements to date. The methodology section details methods and techniques deployed for data collection and analysis. The fourth section presents and discusses the results, while the concluding section summarises the findings, explores how this research contributes to theory and practice in sustainability, addresses the study's limitations, and suggests directions for future research.

1.1 | Sustainability research: The state of the art

Research in SD is often multidisciplinary. It can vary widely and include environmental, social, economic sustainability, policy and governance, urban development, including consumption and production. Within environmental sustainability, domain researchers explore strategies to mitigate human impacts and develop sustainable practices in energy, waste management, or water and land use (Nishant et al., 2020). Within the context of social sustainability researchers focus on approaches to promote social equity, justice, poverty alleviation, education, healthcare, and community development, to foster inclusivity among societies, while improving their well-being (Dempsey et al., 2011; Fahy & Rau, 2013). Economic sustainability explores optimising economic growth and development while minimising negative environmental

impacts and promoting social well-being. It investigates business practices, green technologies, circular economy models, and the role of finance and investment in supporting sustainability goals (Ranjbari et al., 2021; Schöggl et al., 2020). The policy and governance focus of sustainable economies assesses the effectiveness of existing guidelines, proposing new approaches, and exploring ways to enhance collaborations among stakeholders (Bennett & Alexandridis, 2021). Then, urban development examines sustainable urban planning and design, transportation systems, infrastructures, and smart city initiatives, aiming at creating livable, resilient, and environmentally friendly cities (Artmann et al., 2019). In addition, sustainable consumption and production investigate these patterns, including strategies for sustainable lifestyles, while reducing resource consumption, waste, and environmental impacts (Coderoni & Perito, 2020).

Consequently, sharing research data focused on SD enables stakeholders to make long-term decisions based on practical evidence and science . Ecological data are the basis for developing ecological accounts and indicators that can be employed in framing public policies (Huan & Zhu, 2023). Thus, sustainability research provides evidence-based insights to policymakers, allowing them to design effective laws and regulations, helping to identify best practices, assess policy outcomes, and guide local, national, and international decision-making (Bennett & Alexandridis, 2021).

Considering the above context, SD research is crucial in generating knowledge and shaping policies and practices for a sustainable future. It involves multidisciplinary collaboration and engages researchers from diverse fields who may help more effectively, to resolve different challenges and uncertainties (Mensah, 2019; Ranjbari et al., 2021). According to Rosen (2019), recent progress in sustainability has primarily been driven by research in several key areas. These include the development of low-carbon energy resources, improvements in environmental and climate management practices, innovations in supply chain operations, and advancements in urban planning. Each of these fields has contributed significantly to the overall advancement of sustainable practices and solutions.

Concurrently, a rise in weather extreme events is posing global threats to SD thus, requiring new approaches to collecting data, analysing impacts, implementing viable solutions, and overcoming existing gaps related to the sustainability of human activities (Donkor et al., 2022). Worldwide, a full decarbonisation of the global industry is essential to achieving climate stabilisation and is a critical component of SD research. Zero net greenhouse gas emissions can be achieved through various feasible approaches such as energy use efficiency, carbon capture, electrification, and the use of zero-carbon hydrogen as a source of heat and chemical feedstock (Rissman et al., 2020). These strategies are integral to reducing atmospheric carbon levels and advancing the goals of SD.

Accordingly, research in SD contributes to education and raising public awareness about environmental issues, social responsibility, and sustainable lifestyles. It supports the development of educational programs, training initiatives, and public campaigns that foster sustainable practices and behavior change (Hallinger & Chatpinyakoop, 2019; Kopnina, 2020). The scenario described is evidence of how research

on SD is being conducted, making it possible to realise the multifaceted nature of SD (Colapinto et al., 2020). Sustainability research is rich and diverse, reflecting the complexity of addressing environmental, economic, and social issues in an integrated manner (Gain et al., 2020). Also, it is characterised by multi-methodological approaches, utilising a variety of research methods to capture the nuances of sustainability issues (Bottero, 2015; de Araujo et al., 2021). It is transdisciplinary, transcending traditional disciplinary boundaries that draw from various fields thus fostering a more holistic understanding of sustainability challenges (Craps, 2019; Klein, 2014). This integrative nature of sustainability research ensures that its diverse perspectives and dimensions are considered, enhancing the comprehensiveness of the research. Engagement is a key feature, involving stakeholders from various sectors to ensure that the research is grounded in real-world contexts and needs, thereby increasing its relevance and impact (Bell et al., 2012; Leal Filho & Schwarz, 2008; Leal Filho, Wall, et al., 2022). Furthermore, SD research is transformative, aiming at understanding sustainability challenges but also driving change toward improved practices and policies (Grin et al., 2010; Leal Filho, Brandli, et al., 2023; Romero Goyeneche et al., 2022; Visseren-Hamakers et al., 2021). Lastly, SD is grounded in systematic observation and analysis to generate robust and actionable insights. Collectively, these characteristics underscore the depth and breadth of SD research, highlighting its critical role in advancing sustainable practices and policies (Fien, 2002; McCormick et al., 2016; Solecki et al., 2021). Figure 1 shows key characteristics of sustainability research.

1.2 | Higher education and SD research

HEIs possess significant potential and play a distinctive role in enhancing research teaching and learning, boosting awareness of sustainability while assisting with the implementation of the SDGs (Borsari & Kunnas, 2022; Žalėnienė & Pereira, 2021). Typically, a diverse variety of objectives, resource availability, policy enactment, development of curricula, and governance will shape the scaffold of commitment necessary to support and manage SD practices at various levels within each university (Filho et al., 2023).

In this perspective, research in sustainability plays a priority role for any academic institution, although this may not be true for liberal arts colleges and/or universities dedicated primarily to undergraduate education. Nonetheless, vibrant research agendas provide a sound basis for developing a campus-wide culture for sustainability, innovation, and excellence in education, which is vital for the intellectual growth of the whole campus community and the preparation of graduates in leading efforts in sustainability. According to Sedlacek (2013), universities can guide society toward sustainability through education while engaging in decision-making at various levels of governance.

In order to yield the expected benefits, research on SD should be inclusive and widely implemented at any HEI since it provides a valuable complement to teaching on sustainability (Borsari, 2016). For these reasons, research agendas in SD should be as diverse and as
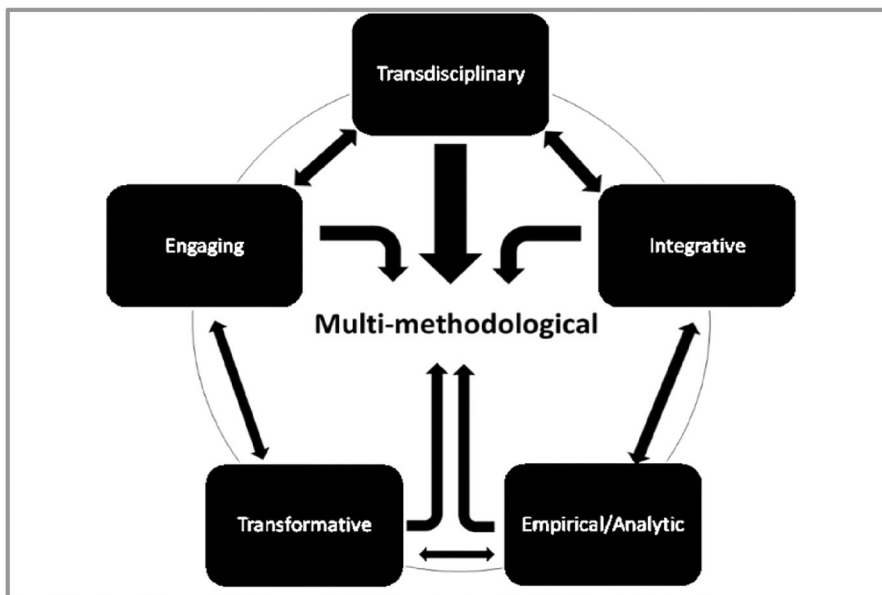
interdisciplinary as possible, adjusting to the needs and vision of a specific campus culture. Their variations in specific emphases of SD have the potential to make every university truly distinctive and notable for students to want to enroll in its study programs, making curricula the vehicles for students' recruitment and retention. Hence, thriving pedagogies and academic sustainability programs foster learning in this complex, multidisciplinary field, yielding creative, and effective research. Moreover, engagements in sustainability studies that focus on connecting learning with enhancing students' skills, as Lozano et al. (2017) explained, can become the most fertile substrate for developing a culture for SD and research on a university campus. It does not matter whether learners are freshmen undergraduates or graduate students. Under the guidance of passionate and highly motivated professors, distinctive research programs can be developed and maintained in any realm of human knowledge and even for the most modest departmental budgets.

In this context, the academic community agrees that HEIs are crucial in advancing SD research in several ways. One of them, for example, is by actively participating in interdisciplinary sustainability research, generating and transferring valuable knowledge, and influencing policies and practices (Zhou et al., 2020; Leal Filho, Brandli, et al., 2023). Through their efforts, HEIs aim to address SD challenges such as climate change, diseases, poverty, hunger, and inequalities, devise innovative solutions toward addressing them, and assess the efficacy of sustainable solutions and practices (Berchin et al., 2021). The dissemination of research findings through journal publications, conferences, and community outreach is vital as it facilitates knowledge transfer among academics, offers solutions to societal problems, and fosters the growth of knowledge while sparking stimulating discussions on the subject matter (Aleixo et al., 2018). Such research outputs help address community-specific needs, challenges, and aspirations. Sustainability research also integrates sustainability across disciplines, ensuring graduates are well-

prepared to address sustainability challenges in their respective fields. Also, HEIs initiate and spearhead international and interdisciplinary collaborative research endeavors to tackle complex global sustainability challenges, including the SDGs. By bringing together experts from diverse academic departments and research centers, including environmental science, engineering, social sciences, economics, and policy studies, HEIs can foster comprehensive and integrated research efforts (Chankseliani & McCowan, 2021).

Research conducted at HEIs plays a vital role in shaping policies, influencing society, fostering co-creation, and informing business practices. The socioeconomic impacts of funded research are substantial, particularly through establishing spin-off companies and licencing research inventions to industries (Findler et al., 2019). These activities contribute significantly to the national economy by fostering the growth of gross domestic product (GDP) and generating employment opportunities. Research works in engineering, medicine, social sciences, and natural sciences have more direct uptake by policymakers and practitioners in various sectors. However, it is worth noting that research articles with high citation metrics are more likely to be cited by practitioners and policymakers, indicating their influence and relevance in shaping decision-making processes (Findler et al., 2019).

Furthermore, HEIs actively partner with external stakeholders, including government agencies, the private sector, nonprofit organisations, and local communities. These collaborations serve multiple purposes, including attracting international funding to support research on sustainability. Such research endeavors aim to stimulate technical and technological innovations that have practical applications in the market (Elmassah et al., 2021). By working with these stakeholders, HEIs access valuable insights, resources, and real-world contexts that enhance their study of sustainability challenges (Ketlhoilwe et al., 2020). Recent studies by Elmassah et al. (2021) and Ketlhoilwe et al. (2020) highlight the significance of these partnerships and their contributions to advancing sustainability research

by tapping into diverse sources of expertise, funding, and resources beyond the academic sphere.

2 | METHODS

This research follows a bibliometric analysis approach. The authors selected bibliometrics because it is a rigorous statistical analysis tool that allows exploring and probing into considerable amounts of scientific data (Donthu et al., 2021) to reveal trends and obtain interesting quantitative information (Bellis, 2009). This study incorporates two types of bibliometric analysis: (i) performance analysis and (ii) scientific mapping and network analysis, following the procedures of Donthu et al. (2021). Furthermore, these techniques have been selected as they are suggested to analyse trends in scientific fields (Eustachio et al., 2023; Orivel et al., 2000). Sections 2.1 and 2.2 outline the data collection and data analysis techniques deployed.

2.1 | Data collection

To collect data that may support the achievement of the goals mentioned in the Section 1, the authors created a search string containing the main terms related to SD research, such as "sustainable development," "sustainability," "sustainable development goals," and possible variations. It is worth noting that the search string was revised by the authors in the process of moving back and forth till general agreement and terms related to HEIs were decided to be not included since the goal was to understand the SD research field, and the search would naturally bring be papers connected to the research promoted by HEIs. Another aspect of the search string is that authors considered only publications in journals and books that explicitly bring the term sustainability in the title since this decision would bring documents directly related to the goals of this research. The authors are aware that other terms related to sustainability could be used; however, in order to maintain this research feasible and specific, they agreed with this set of terms.

The SCOPUS database is considered more wide-scoped because it includes indexed articles, book chapters, reviews, and editorials that were used to search publications about SD. The time frame used was January 2015 since this was the milestone of the launching of the SDGs to March 2024 (the last closed month, considering the date of completing this study). The final number of publications found that tackle SD in a direct way, written in the English Language, was 74,700 documents. A summary of the approach used is presented in Table 1.

After obtaining the 74,700 papers mentioned before, the authors exported and organised them in an Excel spreadsheet, which further supported the analysis. Section 2.2 provides more details on how the data was analysed.

2.2 | Data analysis

A bibliometric analysis was carried out, aiming to establish the connections more focused by the authors publishing on SD. The VOSviewer software version 1.6.19 (van Eck & Waltman, 2014; VOSviewer, 2024; Waltman & van Eck, 2013) was used to analyse the data obtained through the adoption of the search string presented in Table 1.

The co-occurrence technique was used to understand the research landscape of the top 10 leading authors about SD has been publishing. The outcome of this technique is the co-occurrence network map, where the node's size represents the frequency in which a specific term appears in the literature. The closer one term is to another, the higher the frequency of co-occurrence of both terms. Thus, the number of terms together indicates a thematic cluster (Figure 2, Section 3.1).

Apart from the co-occurrence analysis, the authors also relied on performance analysis based on the number of publications, as suggested by Donthu et al. (2021). This technique was important in identifying the leading journals, HEIs, and authors publishing on SD matters in terms of the number of publications.

The analysis of leading authors (Table 2) involved a screening and data cleansing process of databases extracted from Scopus by using Microsoft Excel to eliminate duplicates, identify the number of publications, and the top journal and book series represented in the overall SD with its corresponding research field. Finally, authors with distinct variations of their names from the Scopus search were checked and merged into their correct last names, therefore combining their number of publications.

Table 3, in turn, refers to the analysis of the leading institutions that chose to publish in the top 10 journals in terms of publication ranking. The results from both bibliographic mapping and performance analysis can be seen in Section 3.

3 | RESULTS AND DISCUSSIONS

The search string (Table 1) was carried out in the SCOPUS database to assess the contribution of HEIs in sustainable research yielded the results reported herein.

TABLE 1 Literature search strategy (2015–2024).

Database	Search string of main terms	Time frame	Publication type	Number of documents
SCOPUS	Title ("sustainable development" or "sustainability" or "sustainable development goal*" or "SDG*")	From January 2015 to: March 2024	Articles, books, book chapters, reviews, and editorial	74,700

FIGURE 2 Research strands of the top 10 authors on sustainable development.

TABLE 2 Top 10 leading authors researching issues related to SD from January 2015 to March 2024.

Author	Institution	Publications
Leal Filho, W.	Hamburg University of Applied Sciences/Manchester Metropolitan	158
Ren, J.	The Hong Kong Polytechnic University	92
Adebayo, T.S.	Cyprus International University	64
Schaltegger, S.	Leuphana Universität Lüneburg	57
Anholon, R.	State University of Campinas	52
Azapagic, A.	The University of Manchester	50
Streimikiene, D.	Lithuanian Energy Institute	48
Svensson, G.	Kristiania University	46
Duić, N.	University of Zagreb	46
Klemeš, J.J.	Brno University of Technology	45

Source: Scopus database.

3.1 | Top 10 leading authors on SD

Publication data between 2015 and March 2024 illustrate the volume of publications per author in SD associated with HEIs (Table 2). At the

top, Leal Filho, W. is affiliated with the Hamburg University of Applied Sciences and Manchester Metropolitan University (Hamburg, 2024; Manchester Metropolitan University, 2024), having published 158 articles. This researcher's scholarly work indicates a significant European contribution to sustainability research, particularly from Germany and the UK.

Ren, J. from The Hong Kong Polytechnic University follows with 92 publications, highlighting the focus on sustainability in Asia. Urban development and resource management are key topics in this region as reflected by the substantial number of publications (PolyU, 2024). Adebayo, T.S. from Cyprus International University (2024) also shows notable activity with 64 publications, illustrating the engagement of smaller, perhaps less traditionally prominent institutions in sustainability research.

Also, the list includes Schaltegger, S. from Leuphana Universität Lüneburg and Anholon, R. from the State University of Campinas, who account for 57 and 52 publications, respectively (Leuphana University Lüneburg, 2024; Unicamp, 2024). These numbers point to a diverse range of academic approaches to sustainability across different geographic regions.

Additional contributors such as Azapagic, A. from The University of Manchester, Streimikiene, D. from the Lithuanian Energy Institute, Svensson, G. from Kristiania University College, Duić, N. from the

TABLE 3 Leading institutions publishing in the top 10 journals and book series on sustainable development (2015–March 2024, SCOPUS source).

Journal	Number of documents (n)	Accounting of the total (%)	Publishing leading institution (n)
Sustainability (MDPI)	8046	1.06	1. Chinese Academy of Sciences (254)
Journal of cleaner production	2345	0.31	2. The Hong Kong Polytechnic University (109)
Sustainable development	738	0.10	3. University of Sao Paulo (101)
Environment, development and sustainability	613	0.08	4. Beijing Normal University (100)
World sustainability series	602	0.08	5. University of Lisboa (96)
Environmental science and pollution research	602	0.08	6. Manchester Metropolitan University (93)
International journal and sustainability in higher education	557	0.07	7. Leuphana Universität Lüneburg (90)
			8. Universitat Politècnica de València (88)
Business strategy and the environment	530	0.07	9. Ministry of Education of the People's Republic of China (82)*
Energies	377	0.05	10. Zhejiang University (82)*
Resources policy	358	0.05	11. Bucharest University of Economic Studies (82)*
Other sustainability journals	747,371	98.06%	

*The last three HEIs occupy the 10th position as they have published the same number of documents in the journals listed.

University of Zagreb, and Klemeš, J.J. from the Brno University of Technology are also recorded, each contributing with between 45 and 50 publications. Their research involvement shows that institutions in both Western and Eastern Europe, including those in Scandinavia and the Balkans regions, are actively participating in the global sustainability discourse (Brno University of Technology, 2024; Kristiania University, 2024; Lithuanian Energy Institute, 2024; The University of Manchester, 2024; University of Zagreb, 2024). This spread of publications demonstrates a wide engagement with sustainability challenges and underscores the potential for collaborative efforts to tackle complex issues on a global scale.

In exploring the landscape of SD research, five distinct clusters emerge, each characterised by a specific thematic focus as depicted in the results from 10 leading scholars in the field. These clusters differentiated by color in Figure 2, present a nuanced picture of the current academic research in SD.

The red cluster delves deeply into the integration of technology and strategies for achieving global environmental sustainability. Central to this cluster is the examination of energy production and consumption, particularly through renewable sources such as solar energy and biomass, and the utilisation of natural gas (Eweade et al., 2024; Mehmood et al., 2023; Nadiri et al., 2024; Wang et al., 2024). The emphasis is on reducing the environmental impact through innovative approaches such as life cycle assessment, which evaluates the environmental repercussions of products from creation to disposal (Ren, 2018; Ren et al., 2015; Ren & Toniolo, 2018). Additionally, this cluster addresses the management of greenhouse gases and the promotion of a circular economy (Leal Filho, Abubakar, et al., 2021; Pukšec et al., 2019), aiming to minimise waste and enhance resource efficiency (Ren & Toniolo, 2020). This focus underscores the critical need to balance energy demands with sustainable practices to mitigate climate change effects (Astiaso Garcia et al., 2023).

Transitioning to the blue cluster, the research shifts toward the metrics and methodologies for assessing sustainability. This cluster incorporates advanced analytical tools such as fuzzy sets, TOPSIS (Technique for Order Preference by Similarity to Ideal Solution), and multicriteria decision-making processes to evaluate and enhance sustainability performance (Pompilio et al., 2023; Santos et al., 2023; Tietz Cazeri et al., 2024). Themes like energy efficiency and water treatment are pivotal, highlighting the practical applications of sustainability assessments (Santos et al., 2023). The integration of social aspects (Leal Filho, Salvia, et al., 2022) ensures that the sustainability measures are inclusive and beneficial on a societal level, offering a comprehensive approach to understanding and improving sustainability indices across various sectors (Cooper et al., 2018).

The green cluster represents a dynamic intersection of environmental protection and economic development, anchored by the sustainable management of natural resources. This cluster explores the implications of renewable energy adoption, energy consumption, and ecological footprints within the framework of environmental economics (Shayanmehr et al., 2023; Xu et al., 2020; Zang et al., 2023). The strategic use of spatiotemporal analysis aids in understanding the changes and trends over time and space, enhancing the effectiveness of energy policies. This cluster also emphasises the role of innovation in promoting economic growth while adhering to the SDGs, illustrating the dual imperatives of ecological sustainability and economic viability (Adebayo et al., 2021; Hübel et al., 2022; Leal Filho, Frankenberger, et al., 2021; Zang et al., 2023).

In the purple cluster, the focus shifts to the realm of higher education and its role in fostering sustainability through teaching, planning, and curriculum development (Eustachio et al., 2024; Leal Filho, Weissenberger, et al., 2023). This cluster explores how educational institutions can serve as catalysts for sustainable change by integrating sustainability concepts into the academic fabric and preparing students to become informed global citizens who can tackle

sustainability challenges effectively (Leal Filho, Salvia, et al., 2023; Leal Filho, Weissenberger, et al., 2023; Leal Filho, Ribeiro, et al., 2024; Mokski et al., 2022; Viera Trevisan et al., 2024).

Lastly, the yellow cluster addresses corporate responsibility in the context of sustainability. It incorporates discussions on corporate social responsibility (CSR), the triple bottom line, and sustainability management within businesses (Eustachio et al., 2023). The impact of global challenges such as COVID-19 (Anholon et al., 2021; Begum et al., 2021; Mikulčić et al., 2021) on supply chains and corporate sustainability practices is critically examined, highlighting the need for resilient and adaptable business strategies that align with SD principles (Guimarães et al., 2022).

These five clusters not only reflect the current state of SD research but also suggest pathways for future inquiry and action. By further integrating these areas, researchers and practitioners can create more robust strategies for SD that are scientifically sound, economically feasible, and socially responsible. The intersectionality among these clusters offers promising prospects for collaborations in achieving global sustainability goals, underscoring the importance of continued interdisciplinary research and the implementation of comprehensive sustainability practices.

3.2 | Leading journals and institutions in SD research

Table 3 refers to data emphasising the ranking of sustainability-focused journals and book series. It underscores the leading top 10 journals contributing to SD research over nearly a decade. At the forefront, "Sustainability Switzerland" leads with 8046 publications, accounting for 1.06% of the total, showcasing its wide-reaching impact in the field. Close behind is the "Journal of Cleaner Production" with 2345 documents. Other prominent journals include "Sustainable Development," "Environment Development and Sustainability," "World Sustainability Series," and "Environmental Science and Pollution Research," each contributing to specialised discussions on global sustainability issues, with document counts ranging from 602 to 738. In sequence, the "International Journal and Sustainability in Higher Education" highlight the role of educational institutions and corporate strategies in promoting sustainability, and "Business Strategy and The Environment." "Energies" and "Resources Policy" focus on sustainable energy practices and resource management, respectively. These journals represent 1.94% of the research produced in the field, with the remaining of 98.06% disseminated through other journals. This diversity indicates a robust and widespread academic interest in sustainability, reflecting its interdisciplinary nature (Klein, 2014, 2014; McCormick et al., 2016) and the global commitment to addressing sustainability challenges.

Several institutions globally are leading the research on SD, which could influence both local and international policies. The Chinese Academy of Sciences, for instance, integrates sustainability in agriculture, energy, and urban development, tailoring SDGs to the Chinese context. Similarly, the Hong Kong Polytechnic University explores sustainability with corporate and urban systems, applying their research practically, especially in fashion and construction. The University of São Paulo is pivotal in incorporating sustainability in education and local community initiatives in Brazil, while the University of Lisboa focuses on sustainability in higher education, real estate, and public sector operations through both quantitative and qualitative measures.

Beijing Normal University, in turn, explores the environmental and educational dimensions of sustainability within China, examining the impacts of policy and technology. Manchester Metropolitan University extends its research to include social dimensions, engaging communities directly in SD. Leuphana Universität Lüneburg emphasises transdisciplinary teaching and transformational education in sustainability. Universitat Politècnica de València adopts innovative technologies in sustainability education and urban planning, focusing on digitalization and the circular economy. Both the Ministry of Education of China and Zhejiang University address sustainability in agriculture and urban development, adapting to the evolving Chinese landscape. Bucharest University of Economic Studies in Europe delves into the economic aspects of sustainability, highlighting the role of digital transformation in sustainable economic practices.

In terms of synergies, these institutions collectively contribute to a global understanding of SD (Leal Filho, Dibbern, et al., 2024; Leal Filho, Wall, et al., 2022). While each has its specific focal areas—such as corporate sustainability, urban planning, or educational frameworks—they all contribute to a comprehensive, interconnected framework of research that supports the global pursuit of SDGs (Smith et al., 2018). These collaborations and shared goals highlight the importance of international partnerships and the global nature of sustainability challenges (Cairns et al., 2020; Leal Filho, Dibbern, et al., 2024; Leal Filho, Wall, et al., 2022). Each institution, with its unique strengths, plays a vital role in the broader narrative of SD, influencing policies, education, and practices worldwide.

Despite their shared commitment to SD, the research foci and methodologies of these leading institutions exhibit notable differences. For example, the Chinese Academy of Sciences delves into broad scientific inquiries, utilising advanced technologies to address ecological and agricultural sustainability within a national context. In contrast, the Hong Kong Polytechnic University emphasises the role of sustainability in the corporate sector, particularly focusing on ethical practices within the fashion and construction industries. The University of São Paulo integrates sustainability into education and local communities, providing a more localised approach that emphasises the role of education in SD. Meanwhile, the University of Lisboa tends to blend intellectual capital with environmental sustainability, offering unique insights into how knowledge management impacts sustainable practices across sectors. The Beijing Normal University focuses extensively on the environmental impacts of policies and urban development, providing a more urban-centric view of sustainability. The Manchester Metropolitan University explores sustainability through a social lens, highlighting education, community engagement, and policy integration. The Leuphana Universität Lüneburg adopts a transformative educational approach, fostering sustainability through innovative

teaching and transdisciplinary research. The Universitat Politècnica de València focuses on technological advancements and their application in sustainable urban planning and the circular economy. The Ministry of Education of the People's Republic of China and Zhejiang University both focus on integrating sustainability into a broad range of domains but with a significant emphasis on technology and infrastructural development reflective of China's rapid urbanisation and growth. The Bucharest University of Economic Studies concentrates on the economic aspects of sustainability, exploring how economic systems can adapt to and promote sustainable practices. These differences not only highlight the diverse approaches to addressing sustainability challenges but also illustrate the variety of academic and practical contributions (Fadeeva & Mochizuki, 2010) these institutions make to the global sustainability agenda.

The findings of this study underscore the significant role of HEIs in advancing SD, as reflected in the various thematic areas explored in existing literature. D'Adamo et al. (2024) emphasise the importance of regional performance and local strategies in achieving sustainability goals, which aligns with our findings on the crucial role of HEIs in local and global contexts. This study adds depth to the discussion by illustrating how HEIs can serve as catalysts for SD, particularly through interdisciplinary research and collaboration that transcend regional limitations highlighted in Ozili's (2022) work.

Finally, it is worth noting that apart from the list presented in Table 2, the scenario concerning the top 10 authors in the field might change in the upcoming year. To understand this, a search was conducted using the same search string but considering papers accepted to be published in 2024 and 2025 (results gathered on 19th August 2024). The findings suggest the possibility of a new scenario, where only authors such as Leal Filho, with 19 publications (Hamburg/Manchester Metropolitan) and Adebayo, with 15 publications (Cyprus International University) stay in the top-10 authors publishing in the field. New authors in the field, such as Opoku, A. from the University of Sharjah (20 publications), Sharifi, A. from the Hiroshima University (15 publications), Hussainey, K. from the Bangor Business School (13 publications) and Ahmed, Z. from the Adnan Kassar School of Business (12 publications) might integrate the top 10 authors if they maintain the level of publications in the following years.

4 | CONCLUSIONS AND RECOMMENDATIONS

This study has provided critical insights into the contributions of HEIs to SD research. By employing bibliometric analysis, this study maps the research landscape, identifies leading researchers and institutions, and elucidates the main research fields within the domain of SD. The theoretical implications of this research highlight the integral role that HEIs play in advancing the knowledge and application of sustainable practices. This understanding is crucial for developing a more systematic approach to integrating sustainability into curricula and institutional policies.

The main findings of this research reveal a diverse array of thematic clusters that encapsulate current priorities and approaches within SD research published by the 10 authors that most publish in the field, considering the search string adopted. These clusters range from technological innovations and sustainability assessments to integrating sustainability in higher education and corporate practices. Notably, the study contributes to moving the theory of SD forward by providing a nuanced understanding of how these thematic areas interact and complement each other. This interconnected framework enhances our ability to address the multifaceted challenges of SD effectively.

From a practical perspective, our findings offer valuable guidance for universities aiming to enhance their research contributions toward SD. The identification of leading researchers and their thematic foci serve as benchmarks for other institutions seeking to elevate their contributions to sustainability. Furthermore, this study underscores the importance of fostering interdisciplinary collaborations to tackle the complex challenges of SD.

Moreover, the HEIs, as hubs of knowledge creation, interdisciplinary collaboration, and innovation, are uniquely positioned to foster sustainable communities that can generate real-world impact. By integrating sustainability into educational curricula, institutional policies, and research agendas, HEIs contribute to a more systematic and comprehensive approach to sustainability. The findings of this study highlight how these institutions not only advance academic understanding but also provide practical guidance that can influence policymaking and the implementation of sustainable practices. For sustainable communities within HEIs to fully realise their potential in improving the world, it is crucial to address existing limitations in institutional inclusivity. Thus, while there are challenges to be addressed, the contributions of sustainable communities within HEIs are already making significant strides in advancing global sustainability. By continuing to build on these efforts, HEIs have the potential to drive transformative change, ultimately improving the world through their commitment to SD.

In spite of its merits, this study has limitations. The reliance on bibliometric analysis, while robust in identifying publication trends and major contributors, may not have captured the full depth of qualitative impacts that these research contributions have on policymaking and practical applications. Additionally, the focus on leading researchers and institutions from well-established universities may have overlooked significant contributions from smaller or less recognised entities that are also pivotal in advancing sustainability research.

The results of this field of research have undergone a remarkable evolution, reflecting changes in global concerns and scientific advances. However, for research in SD to advance in a more critical and comprehensive way, it is essential to overcome the limitations affecting this study. To this end, some recommendations may be made, to address some of the gaps seen in respect of sustainability research in HEIs:

1. To undertake further research using more qualitative methodologies, in addition to bibliometric analysis, to assess not only the

frequency of publications but also the quality and impact of research contributions on policy formulation and implementation of sustainable practices.

2. To perform additional studies aiming at including a broader range of institutions, possibly integrating more qualitative methodologies to assess the impact of research on actual sustainability practices and policies.

3. To explore the role of emerging technologies and innovative educational strategies in enhancing the effectiveness of sustainability education.

Finally, examining the barriers to greater integration of sustainability in higher education could provide deeper insights into how these challenges might be overcome to foster a more sustainable future.

In summary, this study highlights the dynamic contributions of higher education to SD research. By mapping out the key players and their research focuses, this study serves the purpose of enhancing our theoretical understanding of SD research, outlining some areas where further studies are needed.

ACKNOWLEDGMENTS

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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