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Original Article

Scientific production on Environmental, Social, and Governance issues and the Sustainable Development Goals in universities

Produção científica sobre as temáticas Ambiental, Social e de Governança e os Objetivos de Desenvolvimento Sustentável em universidades

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ABSTRACT

Purpose: This article analyzes the academic production related to sustainable development and governance initiatives for sustainability in universities, focusing on environmental, social, and governance (ESG) issues and the sustainable development goals (SDGs).
Methodology: A systematic literature review was conducted using the Web of Science database, covering publications from the last five years (2019-2024). The search utilized terms related to ESG and SDGs as keywords.
Results: The article offers insights into the most current approaches and research agendas concerning ESG and SDGs in universities. Additionally, it examines the integration of Brazilian research within the global context, highlighting the main trends and theoretical contributions on this subject.
Social and practical implications: The study can guide the formulation of policies and strategies in universities aiming to integrate ESG and SDGs into their operations and research activities.
Originality: It contributes to the conceptual and theoretical field by mapping publications on ESG and SDGs in universities, employing a systematic approach to understanding trends and gaps in current literature. It underscores the position of Brazilian research in the international scenario of sustainable development within the academic context.

Keywords: Environmental, Social and Governance; Sustainable Development Goals; Universities

RESUMO

Finalidade: Este artigo analisa a produção acadêmica relacionada às iniciativas de desenvolvimento sustentável e de governança para a sustentabilidade em universidades, com foco nos temas Ambientais, Sociais e de Governança (ASG) e nos Objetivos de Desenvolvimento Sustentável (ODS).
Metodologia: Foi realizada uma Revisão Sistemática da Literatura (RSL) por meio de uma pesquisa na base de dados Web of Science (WoS), abrangendo publicações dos últimos cinco anos (2019-2024). A busca utilizou como palavras-chave termos relacionados a ASG e ODS.
Resultados: O artigo oferece informações sobre as abordagens e agendas de pesquisa mais atuais em ASG e ODS em universidades. Além disso, analisa a inserção das pesquisas brasileiras no contexto global, destacando as principais tendências e contribuições teóricas sobre o tema.
Implicações sociais e práticas: O estudo pode orientar a formulação de políticas e estratégias nas universidades que buscam integrar ASG e ODS em suas operações e pesquisas.
Originalidade: Contribui para o campo conceitual e teórico ao mapear as publicações sobre ASG e ODS em universidades, utilizando uma abordagem sistemática que permite compreensão das tendências e lacunas na literatura atual. Destacando a posição das pesquisas brasileiras no cenário internacional, sobre o desenvolvimento sustentável no contexto acadêmico.

Palavras-chave: Ambientais, Sociais e Governança (ASG); Objetivos de Desenvolvimento Sustentável (ODS); Universidades

1 INTRODUCTION

Universities can contribute to the transformation of society toward more sustainable development through leadership and by reorienting education systems and structures. This involves broadening existing curricula and teaching practices to include new configurations that reach formal, non-formal, and informal contexts, as well as the workplace, adult education, and public awareness (UNESCO, 2019).

The Universal Agenda 2030 presented 17 Sustainable Development Goals (SDGs) and 169 targets addressing human rights for all, gender equality, and women's empowerment. These goals aim to stimulate integrated and balanced action over the coming years, covering economic, social, and environmental dimensions (Nações Unidas Brasil, 2024).

The establishment of global networks and partnerships has been central to implementing the SDGs. An example of this is the United Nations Academic Impact Initiative, which, since 2010, has connected a global network of over 1,600 institutions in more than

150 countries, serving as hubs for the SDGs and engaging academic communities through courses and research projects related to these goals (Nações Unidas Brasil, 2025).

In Brazil, there is no general legal obligation to adhere to the SDGs and ESG. However, universities adopting sustainable practices in operations and curricula demonstrate an alignment of their management with the global context and a voluntary commitment to the 2030 Agenda for Sustainable Development, an international agreement signed by the UN in 2015.

Brazil has legal frameworks that contribute to accelerating the adoption of practices aligned with the Global Agenda, such as the 1988 Federal Constitution, Constitutional Amendments, Complementary Laws, Ordinary Laws, Delegated Laws, Provisional Measures, Legislative Decrees, and Resolutions. Examples include Law No. 9.795/1999, which establishes the National Policy on Environmental Education; Law No. 12.305/2010, the National Policy on Solid Waste; Law No. 13.303/2016, which addresses the responsibility of state-owned enterprises; and Law No. 14.133/2021, the New Public Procurement and Contracting Law, which replaced Law No. 8.666/1993.

The 2030 Agenda and other global initiatives influence the recommendation and revision of public policies and regulations. To contribute to achieving global goals and make progress measurable and practical, some sectors use environmental, social, and governance (ESG) principles to promote sustainable and ethical development; ESG factors have been incorporated into the United Nations Agenda, gaining relevance in the global academic and business contexts. The International Organization for Standardization and its national members have sought to disseminate guidelines for this new context.

At the national level, the Brazilian Association of Technical Standards (ABNT) has launched ABNT PR 2030 - ESG Recommended Practice: Concepts, Guidelines, and Evaluation and Guidance Model for Organizations. This standard aims to encompass different dimensions of ESG, from companies in the stock market to other private and public companies. It also suggests using these guidelines for government entities and non-profit organizations, regardless of size and sector (ABNT, 2022).

Given this scenario, some educational institutions have recognized the potential of campuses as laboratories for practicing ESG initiatives and implementing the SDGs. Universities can be seen as laboratories for practicing sustainability initiatives and fostering a sustainable ethos (Thomashow, 2014).

Various authors have explored the inclusion of these themes in research, showing a greater concentration of output in developed countries. For instance, research by Mishra, Desul, and Santos (2024) found that 31% of SDG-related research productivity originated in the USA, China, and the UK, with Australia and Spain also among the countries with the highest publication numbers. Topics explored in the analyzed articles included the SDGs, climate change, the 2030 Agenda, the circular economy, poverty, global health, governance, food security, sub-Saharan Africa, the Millennium Development Goals, universal health coverage, indicators, gender, and inequality.

The SDGs are global and address worldwide challenges, as ratified in the Global Compact by countries, companies, institutions, and civil society to adopt sustainable and ethical principles. Simultaneously, the use of ESG provides a broad approach to sustainability within business and organizational practices. To contribute to this context, this study seeks to analyze academic production on ESG issues and the SDGs in universities, based on a systematic literature review (SLR).

2 THEORETICAL FRAMEWORK

Universities are increasingly required to contribute to the sustainability debate because they are more than just production environments such as industry and other sectors; they are learning environments with the potential to foster new collective attitudes. This shift depends on changes in consciousness, new knowledge, and a balance of dialogue with society. Such plural organizations have objectives, goals, and a broader mission beyond economic profit. Universities are no longer merely regulatory or moralizing environments; they now encompass dimensions related to societal well-being. Beyond their operational responsibilities, they generate models transferable to the community (Müller-Christ, Sterling, van Dam-Mieras, Adomßent, Fischer & Rieckmann et al., 2014).

Higher education institutions (HEIs) play a fundamental role in advancing the concept of sustainability and sustainable development by promoting events and initiatives that foster a gradual process of greening and the adoption of sustainable practices within their institutional environment. This movement, known as the greening of universities, reflects an ongoing effort to integrate sustainability principles into both academic and administrative activities, as well as the organizational culture of these institutions. According to Leal Filho (2011), while the discussion on sustainable development is not new, significant challenges remain, such as the abundance of publications on the subject and the difficulty of fully implementing the proposed agreements and guidelines over the years. The author introduces the concept of applied sustainability, which is a practical approach based on concrete projects that implement sustainable development principles in real contexts, aiming for tangible impacts.

In recent years, sustainability has gained even more prominence due to its essential role in mitigating the environmental, economic, and social challenges faced by the global community (Leal Filho, Viera Trevisan, Simon Rampasso, Anholon, Pimenta Dinis, Londero Brandli, Sierra, Lange Salvia, Pretorius, Nicolau, Paulino Pires Eustachio & Mazutti, 2023). This growing relevance underscores the need for more effective commitment from HEIs in training professionals, developing research, and implementing institutional policies that promote sustainability in an integrated and structured way.

The notion of sustainability originated from concerns about the risks to the environment and their impact on social, economic, and urban development. In this study, the concept of sustainability postulated by Freitas (2019) will be adopted as a constitutional principle of direct and immediate effectiveness that mandates the responsibility of the State and society for the collective realization of socially inclusive, enduring and equitable, environmentally clean, innovative, ethical, and efficient development with the aim of ensuring the right to well-being in the present and in the future.

In this context, at the United Nations headquarters in New York from September 25 to 27, 2015, heads of state, government officials, and senior representatives outlined

the evolution of the Millennium Development Goals into the 2030 Agenda. This agenda established seventeen SDGs aimed at guiding actions for global sustainable development (United Nations Brazil, 2024). Leal Filho, Azeiteiro, Alves, Pace, Mifsud, Brandli, Caeiro & Disterheft (2017) note that the SDGs represent an opportunity to reformulate sustainability research since the principles and actions of sustainable development are based not only on a political approach but also on the well-being of communities and businesses worldwide. According to the authors, sustainable development is a long-term demand that involves preserving the physical environment, ensuring economic efficiency, and promoting social equity. By rethinking sustainability research, they also seek to integrate it into existing policies, contributing to the achievement of the SDGs.

In both academic and business contexts, sustainability has become a highly relevant topic, providing essential tools and approaches for creating long-term value. Sustainability not only boosts economic prosperity but also promotes societal well-being and environmental preservation, making it a strategic element for organizations seeking a positive and lasting impact (Shayan, Kalejahi, Alavi & Zahed, 2022). Although sustainability actions may initially appear as high-cost investments, it is critical to adopt a medium- and long-term perspective. Strategies that are well-planned and implemented not only reduce environmental impacts but also strengthen institutional and corporate identity, generating visibility and consolidating a positive legacy for future generations (Claro & Claro, 2014).

In addition, science and technology play an essential role in advancing sustainability, ensuring development aligns with sustainable principles. As Costa, Régis Costa and Wandelli (2018, p. 18) pointed out, “science and its constant evolution have become a fundamental resource for generating wealth, reducing social inequalities, and improving the quality of life in all its dimensions.” Thus, scientific and technological innovation is crucial for addressing socio-environmental challenges and driving significant societal transformations.

As the SDGs extend across numerous areas, various themes in studies employ this overarching framework. Menezes and Minillo (2017) emphasized the role of universities

in implementing the SDGs through research and outreach, highlighting that universities have enormous potential to contribute to and ensure the conditions for appropriating the agenda, formulating policies, and developing social technologies to implement the SDGs (Menezes & Minillo, 2017). According to the authors, universities exert transformative power in three ways: i) transforming society through knowledge, education, and skill development; ii) promoting sustainable development through science, technology, and innovation; iii) monitoring and evaluating progress in pursuing the SDGs.

Similarly, Alves (2019) examined how the Federal University of Paraíba implements the SDGs in its outreach projects, stating that universities are committed to achieving the SDGs because they are spaces for creating and disseminating qualified and useful knowledge, drivers of technological innovation and development (Alves, 2019). They can propose creative and effective resources to help meet challenges and create opportunities and actions to actualize the 2030 Agenda.

Albareda-Tiana, Vidal-Raméntol, and Fernández-Morilla (2018) analyzed principles and practices of sustainable development related to the SDGs in a university curriculum at the International University of Catalonia, emphasizing challenges and opportunities for students and the university community concerning the SDGs. The authors note that universities are institutions committed to respecting human beings and defending human rights. Therefore, to foster a culture of sustainability and integral human development, institutions must incorporate the SDGs into university curricula. Implementing such curricula can generate synergies between university sectors and between the university and society.

According to Dyer and Dyer (2015), higher education significantly influences shaping the mental models of many professionals in society, making the training of leaders a critical leverage point in creating a sustainable society. The logics emerging and legitimized in the private sector become part of the organizational agendas and public policies. Bergue (2011) posited that it is possible to explore how a public organization assimilates the essential concepts informing these privatized practices. In this context, reflection on the process of managerial reduction and the nature of cultural objects in transition is

essential, identifying the assumptions that underpin this process and its reinterpretation for deployment and operationalization in management tools in the public sector.

One example in the public sector occurred in 1999 when the Brazilian Ministry of the Environment developed a project aimed at reviewing production and consumption patterns and adopting new environmental sustainability benchmarks in public administration institutions. This program was formally instituted in 2000 with the Environmental Agenda in Public Administration as a public policy initiative, and in 2002, it received the "best example" award for sustainable practice from the United Nations Educational, Scientific and Cultural Organization (Brasil, 2025).

Environmental, social, and governance factors began to be incorporated into the United Nations agenda, which in 2004 referred to these factors as ESG. These factors gained relevance within the global academic and business context. By incorporating elements of environmental care, social responsibility, and corporate governance into their sustainability reports, companies listed on stock exchanges demonstrated benefits in terms of valuation and profitability (Gillan, Koch & Starks, 2021).

The global standardization system, through the International Organization for Standardization and its national members, has sought to disseminate guidelines for this new context. At the national level, the ABNT launched ABNT PR 2030 - ESG Recommended Practice - Concepts, Guidelines, and Evaluation and Guidance Model for Organizations. This standard aims to encompass the different dimensions of ESG from companies in the stock market to other companies, both private and public, suggesting the use of these guidelines for government entities and non-profit organizations, regardless of size and sector of activity (ABNT, 2022).

Enhancing reputation, optimizing risk management, seeking regulatory compliance, creating competitive advantages, refining corporate purpose, and addressing stakeholder priorities by creating value for stakeholders are some benefits achieved through practicing ESG. The definition of ESG proposed by ABNT PR 2030 addresses a set of environmental, social, and governance criteria to be considered when assessing risks, opportunities, and their respective impacts, with the aim of guiding sustainable activities, businesses, and investments (ABNT, 2022).

Building on an already consolidated reference, this study aims to contribute to the development of knowledge on the subject by applying the method outlined in the next section.

3 METHOD

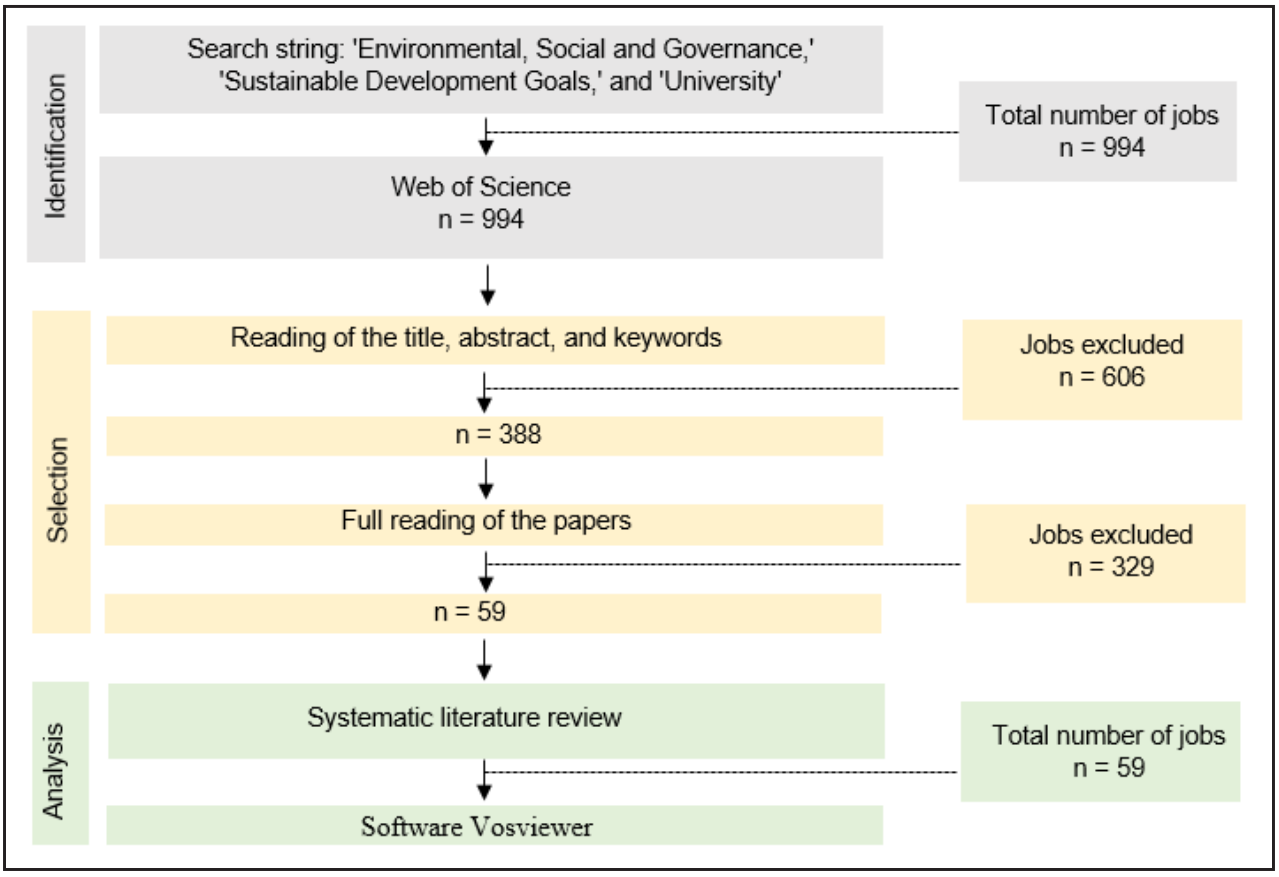
The first stage of the qualitative study involved an SLR, aimed at identifying existing knowledge within the chosen study area. This analysis facilitated the examination of elements such as the progression of studies, countries of origin, and the most frequently cited authors (Felizardo, Ferreira, Falbo, Vijaykumar, Mendes & Nakagawa, 2017).

This method enabled the identification of key studies in the field by selecting articles from the Web of Science (WoS) database (previously Institute for Scientific Information, Thomson Reuters), focusing on publications from the past five years (2019–2024). Data collection took place in February 2024. In defining the keywords for the database, queries and tests were conducted, concentrating on ESG themes, and SDGs within the university context. The selected keywords were: "Environmental, Social and Governance," "Sustainable Development Goals," and "University." Thematic filters were applied to further refine results, ensuring precision in article selection. Boolean connectors such as AND were used for a more specific and targeted keyword combination.

The study selection followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PRISMA offers checklists designed to ensure all significant methodological aspects are evaluated. This includes criteria for the inclusion and exclusion of studies, methodologies for data search, and detailed verification practices (Page, McKenzie, Bossuyt, Boutron, Hoffmann, Mulrow, Shamseer, Tetzlaff, Akl, Brennan, Chou, Glanville, Grimshaw, Hróbjartsson, Lalu, Li, Loder, Mayo-Wilson, McDonald & McGuinness, 2021). The files were organized using Zotero software. Subsequently, VOSviewer and Bibliometrix software were employed to identify relationships between the works. During the analysis in the VOSviewer software, only papers with a minimum of eight citations were included to highlight articles that were prominently cited by peers within the selected pool. Additionally,

the six most globally cited articles were analyzed based on Biblioshiny data. Figure 1 illustrates the stages undertaken in this research.

Figure 1 – The stages undertaken in this systematic literature review



Source: prepared by the authors, 2024

Initially, 994 articles were identified in the WoS database using the chosen keywords. To refine this selection, a screening was conducted by reviewing the titles, keywords, and abstracts, excluding those not aligned with the proposed theme. For example, studies addressing ESG and SDGs in the business context were excluded, since this work focuses on universities.

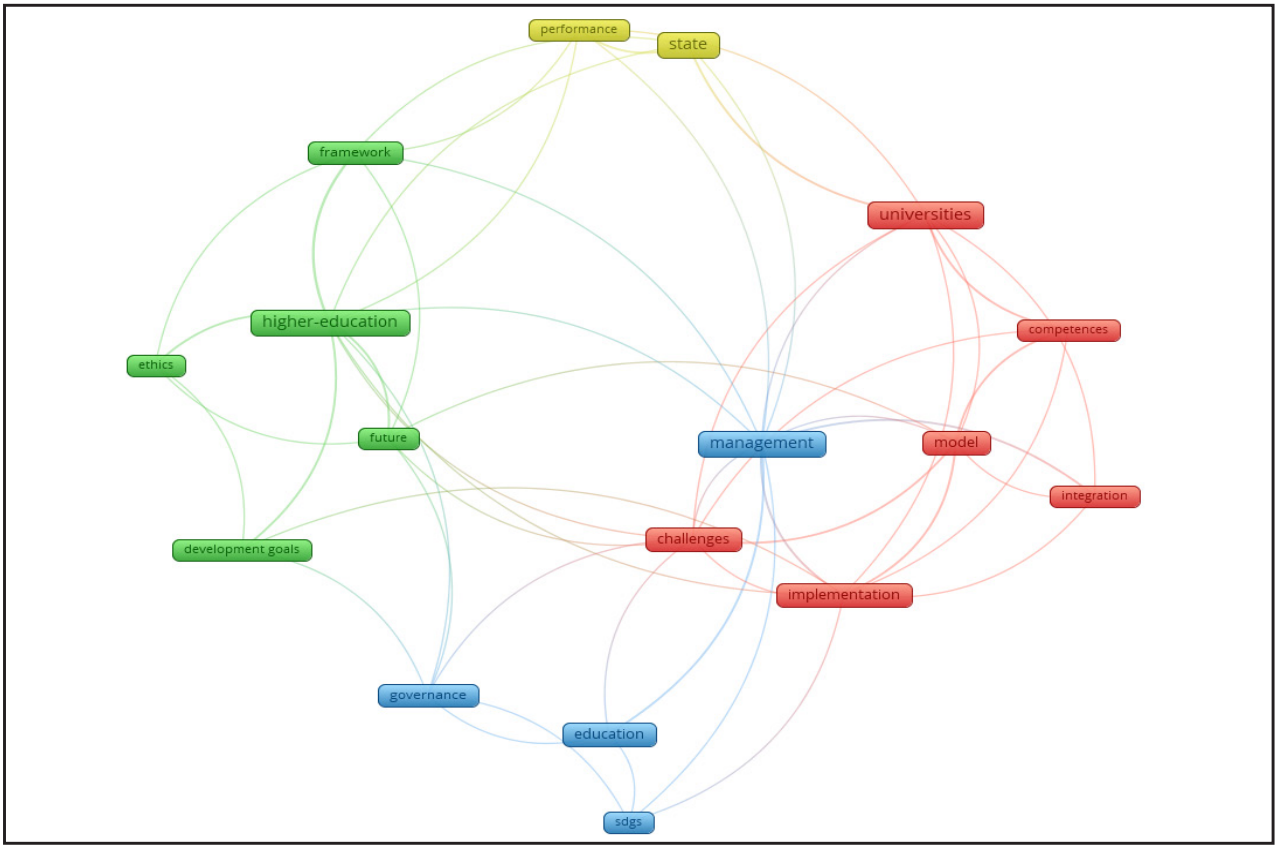
After this initial screening stage, the articles retained for analysis were read in full to ensure alignment with the research scope. As a result of this filtering and evaluation process, 59 final articles were selected. Furthermore, five studies from previous years were included in the analysis due to their high number of co-citations in related research, indicating their relevance to the area. This approach enabled mapping the evolution

of the field of study between 2019 and 2024, identifying major academic works and trends at the intersection of ESG, SDGs, and the university environment. The following section presents the results obtained and a detailed analysis of the research findings.

4 RESULTS

To understand the position of the literature on this topic in the international context, an SLR was conducted using the Web of Science database. This allowed for the identification of the main information in the field from 2019 to 2024. Figure 2 highlights the most frequently used terms related to the topic, showing the clustering of these terms into four groups, distinguished by line color. The terms concentrated in the red cluster are related to implementation, challenges, and integration in universities.

Figure 2 – The most frequently used keywords found

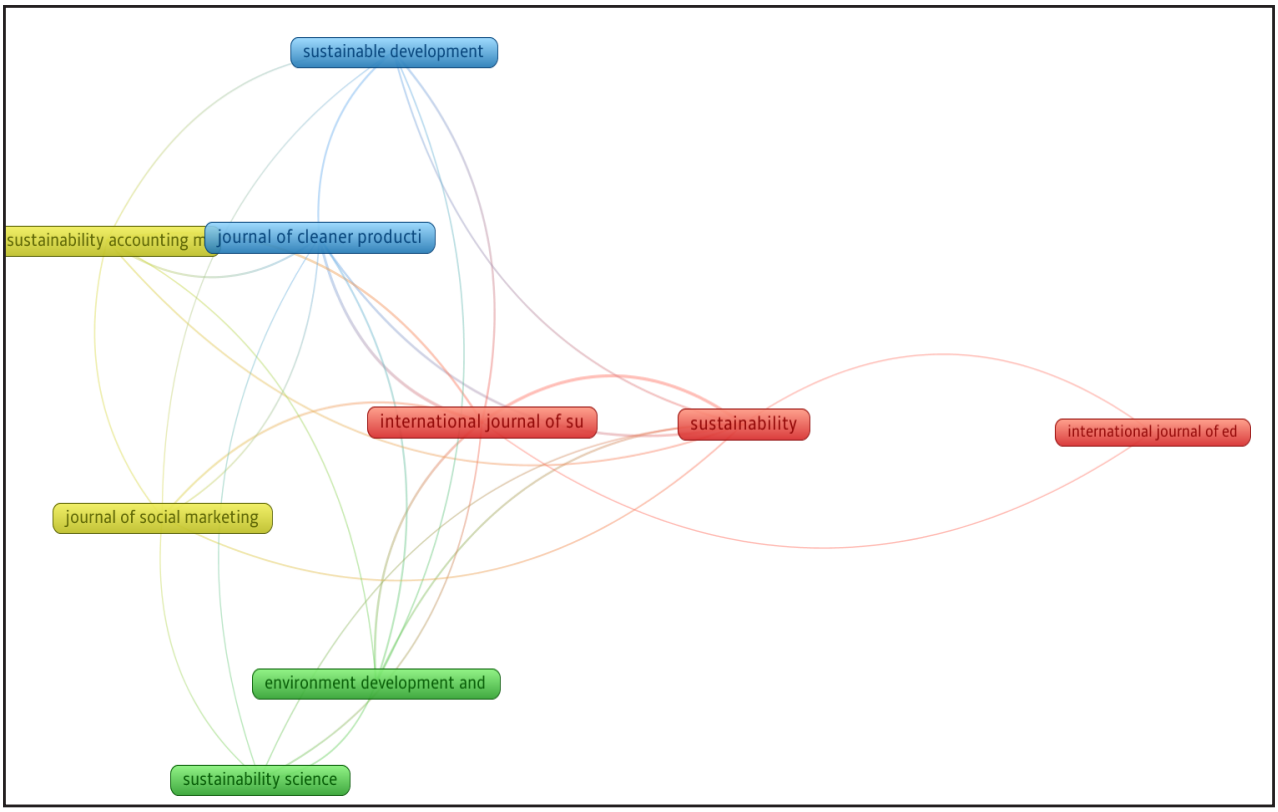


Source: prepared by the authors, 2024

The blue cluster highlights management, education, and governance in the implementation of the SDGs. The green cluster illustrates the use of frameworks for structuring development goals. The yellow cluster represents the state of progress in this area, emphasizing that studies are related to sustainable development in universities, both through the use of the SDGs and ESG.

Through analysis conducted using VOSviewer software, it was possible to identify the journals with the highest number of publications on the subject. In this context, the "International Journal of Sustainability in Higher Education," the "Journal of Cleaner Production," and "Sustainability" stand out, underscoring the significance of the research published in these journals.

Figure 3 – Journals with the most significant impact on the topic

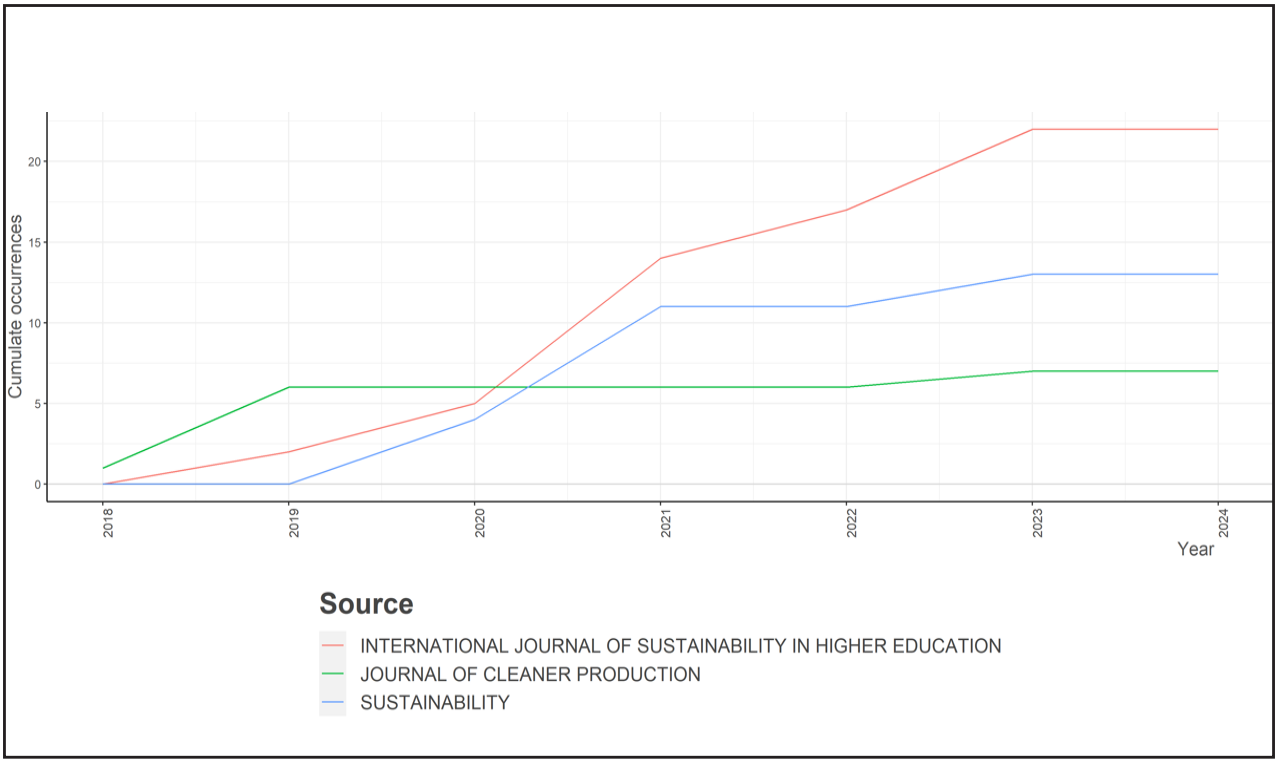


Source: prepared by the authors, 2024

Figure 3 shows the coupling of journals, resulting in three distinct clusters. The three primary journals mentioned earlier are grouped within the red cluster.

Using the bibliometrix package, we analyzed these leading journals, which have the highest number of publications on the topic, to visualize their production from 2019 to 2024. The analysis revealed that the years 2021 and 2022 had the highest number of publications (Figure 4).

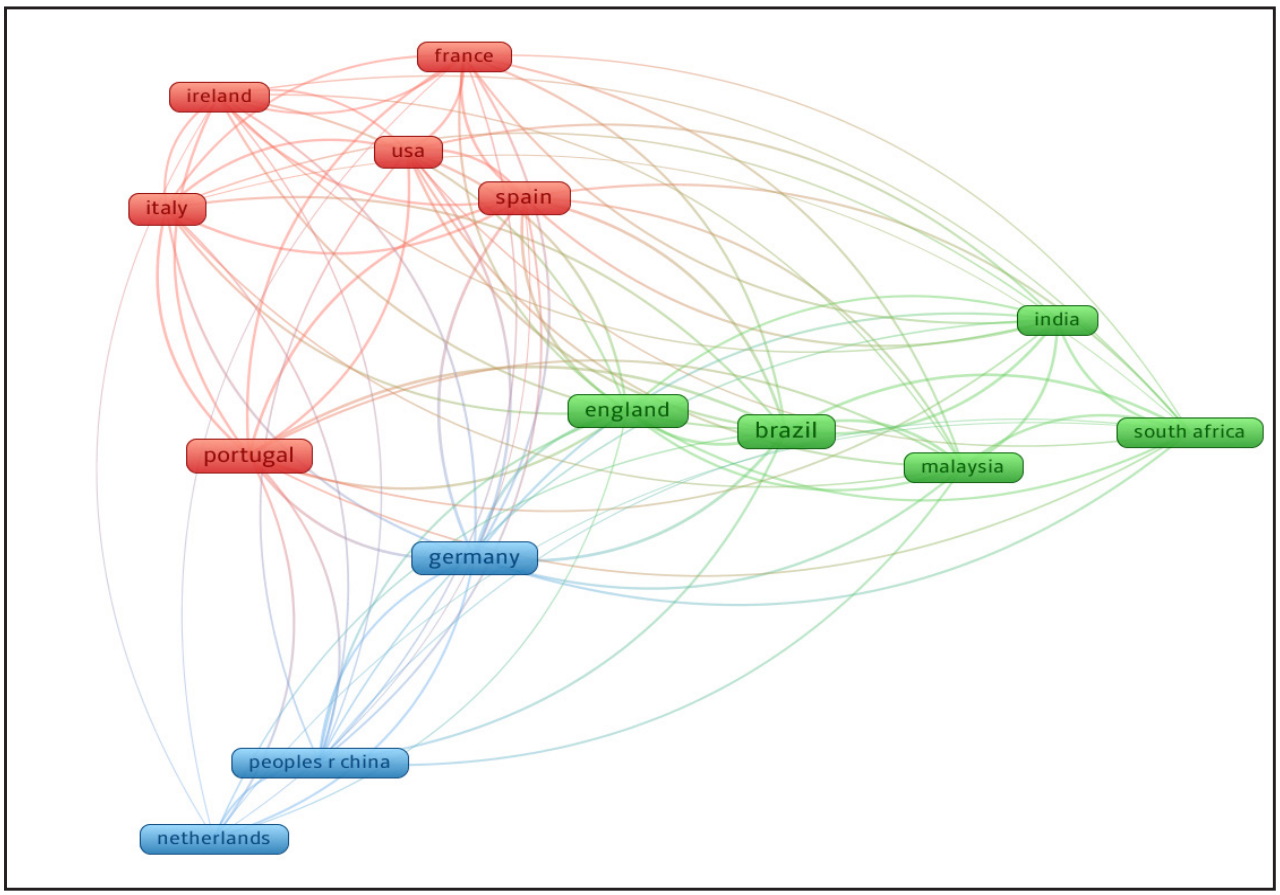
Figure 4 – The top three journals in terms of number of publications



Source: prepared by the authors, 2024

Based on the grouping conducted, three clusters were identified, allowing us to observe the main countries involved in research on the subject (Figure 5). The cluster represented by the color green included data from five countries, with Brazil standing out as the country with the highest volume of publications. Meanwhile, the red cluster encompassed a total of six countries, with Portugal emerging as the country with the greatest representation in terms of publications. The blue cluster grouped three countries, with Germany being the most prominent.

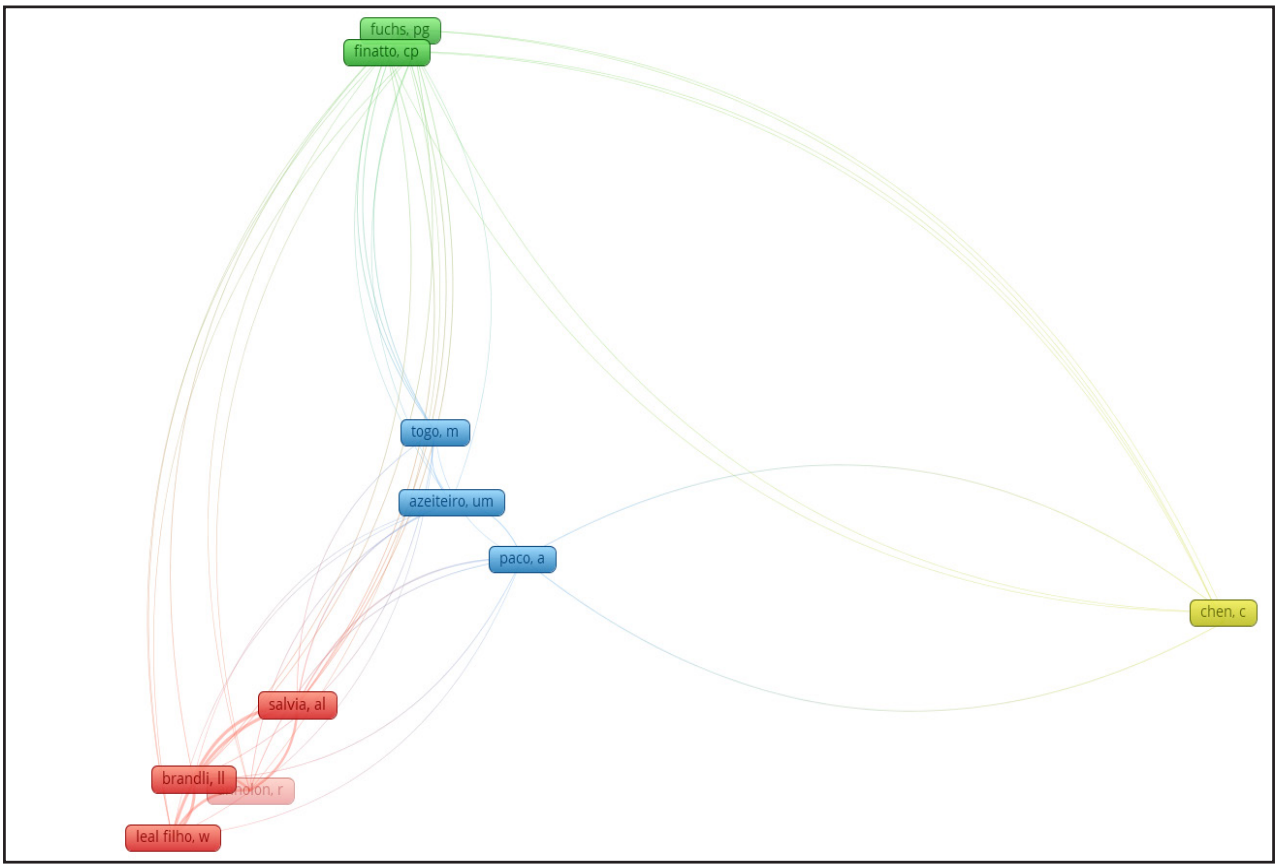
Figure 5 – Countries with the highest number of publications on the topic



Source: prepared by the authors, 2024

After acquiring the country data, an analysis of the authors was conducted using the VOSviewer tool. This analysis facilitated the identification of the leading researchers in the field, categorizing them into four distinct clusters. Each cluster represents a group of authors connected by co-authorship or thematic similarity. In Figure 6, the red cluster represents the authors Brandli, L. L., Leal Filho, W., Salvia, A.L., Anholon, R., blue cluster is for Togo, M., Azeiteiro, U. M., Paco, A., the green cluster comprises Fuchs, P.G., Finatto, C.P., and the yellow cluster presents: Chen, C.

Figure 6 – The main authors on the topic



Source: prepared by the authors, 2024

Salvia, Leal Filho, Brandli & Griebeler (2019) evaluated research trends related to the SDGs with the aim of identifying the primary SDGs addressed by experts from various geographical regions. This evaluation was based on their experience and area of research and discussed the relationship between these SDGs and the main local issues and challenges in each region. The survey employed snowball sampling to gather information from 266 experts from North America, Latin America/Caribbean, Africa, Asia, Europe, and Oceania. The sample comprised professors, researchers, foundation/private sector representatives, students, university representatives, and non-governmental organizations representatives. Given that the SDGs are global and implemented by numerous countries, the study sought to advance understanding of the relationship between the priority assigned to specific SDGs in different countries and regions, determined by local sustainability challenges.

The authors significantly contribute to the literature, as highlighted by the VOSviewer analyses. Subsequently, an analysis was conducted using data from Biblioshiny, selecting six papers as a parameter. This approach enabled the identification of the most widely cited papers globally, which are presented in Table 1.

Table 1 – The most cited papers globally

Reference	Title	Journal	Total citations
Salvia *et al*. (2019)	Assessing research trends related to Sustainable Development Goals: local and global issues	Journal of Cleaner Production	**266**
Parvez; Agrawal (2019)	Assessment of sustainable development in technical higher education institutes of India.	Journal of Cleaner Production	**37**
Drahein; Lima e Costa (2019)	Sustainability assessment of the service operations at seven higher education institutions in Brazil.	Journal of Cleaner Production	**34**
Leal Filho et al. (2021)	Governance and sustainable development at higher education institutions.	Environment Development and Sustainability	**19**
Sanchez-Carrillo; Cadarso; Tobarra (2021)	Embracing higher education leadership in sustainability: A systematic review.	Journal of Cleaner Production	**15**
Chen; Vanclay (2020)	University social responsibility in the context of economic displacement from the proposed upgrading of a higher education institution: The case of the University of Groningen Yantai campus.	International Journal of Educational Development	**12**

Source: Developed by the authors using data from Biblioshiny, 2024

Salvia, Leal Filho, Brandli & Griebeler (2019) confirmed the relationship between local problems or challenges in some regions and the research interests of the experts. The results highlighted SDG 4 (ensure inclusive and equitable quality education and

promote lifelong learning opportunities for all), SDG 11 (make cities and human settlements inclusive, safe, resilient, and sustainable), and SDG 13 (take urgent action to combat climate change and its impacts) as the primary areas of interest for the experts involved in the study. This international study allows for advances in proposing theories related to the connections between regional challenges worldwide, suggesting a greater need for practical implementation in developing nations and increased involvement of the academic community in providing technical support for SDG implementation. The contributions include a call for research into the implementation of specific SDGs in geographical regions, analyses comparing issues that hinder SDG progress, and investigations into resource allocation in countries for implementing the SDGs. The authorship of Brazilian researchers in the study is also noteworthy.

Parvez and Agrawall (2019) assessed sustainable development in HEIs in India, using the parameters and indicators from the Sustainability Tracking, Assessment and Rating System (STARS) and the GreenMetric World University Ranking of the University of Indonesia (UI GreenMetric WUR). The study involved a qualitative assessment of nine Indian HEIs based on these reference frameworks, utilizing surveys, documents, direct observations, and interviews with professors, researchers, students, and staff as sources of evidence.

Parvez and Agrawall (2019) emphasized that while Indian campuses are adopting sustainable development strategies, the approach is neither comprehensive nor systematic, with almost 50% of the STARS framework and UI GreenMetric parameters unmet. The authors suggest the development of a contextualized rating system to assess Indian HEIs to drive sustainable development, using the study as a guide for other developing countries seeking similar progress.

Parvez and Agrawall (2019) presented five recommendations for advancing sustainable development in Indian institutions, which include the necessity of formally developing sustainable campuses and parameters with limited support measures, such as planning and management, innovation, and operational sustainability

indicators (e.g., waste, water, and transportation). Other recommendations involve the necessity of continuous government encouragement, policy formulation, and the provision of governmental and institutional incentives to formalize campus sustainable development policies. Additionally, the development of monitoring, verification, and reporting mechanisms aimed at campus performance improvement and incorporating more relevant parameters from the UI GreenMetric WUR for India are advised, as this framework proved particularly pertinent for the studied institutions.

Drahein, Lima and Costa (2019) examined the sustainability of service operations in seven Brazilian HEIs to test a procedure for assessing the adoption of sustainable practices in technological higher education institutions, specifically Institutes of Technology and Polytechnical Universities. The authors utilized the model proposed by Drahein (2016) for Sustainability Assessment for Higher Technological Education (SAHTE), which facilitates the identification of sustainable practices in HEI service operations. The assessment applies 134 criteria organized into five axes: 1) Governance/Policies, 2) People, 3) Food, 4) Energy/Water, and 5) Waste/Environment. This model is based on international frameworks and standards such as GRI, AISHE, SAQ, GreenMetric, Green Report Card, and Campus Ecology.

Drahein, Lima and Costa (2019) employed a multiple case study research strategy to implement the sustainability assessment protocol. Data from HEIs were collected between March and November 2016, involving more than 170 individuals including professors, staff, students, and community members. Interviews were conducted with staff and students from various faculties within the institutions. The model's criteria were addressed by multiple respondents from diverse groups (faculty, students, and staff). The feedback regarding whether the criteria were met by the HEIs was generally consistent, with minimal contradictions among respondents. Content analysis of the interviews constituted the initial research stage. Subsequently, institutional documents and publications were analyzed, forming the research's second stage. The third stage involved technical visits to the institutions to observe the criteria proposed in the SAHTE model.

Among the findings of Drahein , Lima and Costa (2019), noteworthy issues include the lack of governmental incentives for sustainability in higher education observed in five HEIs, which impedes the establishment of green offices; the strategic implementation of monitoring hydraulic and electrical devices as an operational solution; and the challenges faced by managers in integrating the curriculum with service operations, complicating the implementation of selective waste collection. The authors highlight that although the SAHTE model was created to assess sustainable practices in service operations within the Brazilian context of HEIs focused on technological education, it is also applicable to broader national and international contexts, thereby contributing to evaluating best sustainability practices.

Leal Filho, Salvia, Frankenberger, Sen, Sivapalan, Emblen-Perry (2021) examined the influence of governance on sustainability perceptions and practices within the higher education context. The study provides insights into governance's role in regulation, institutional actions, and management decisions concerning sustainable development implementation. It analyzed policies on sustainable development, certification, organizational structure, budget, reporting, sustainability teams, staff training, and challenges in integrating sustainability with governance. The research aimed to collect experiences from a sample of universities in the international governance and sustainability context. The data collection instrument, developed by the authors and tested at the origin institutions, was based on literature and the main challenges of integrating governance and sustainable development in HEIs. An online survey followed, involving all members of the Interuniversity Program for Sustainable Development Research.

Leal Filho, Salvia, Frankenberger, Sen, Sivapalan, Emblen-Perry (2021) acknowledged the limited number of responses (46 universities) but present contributions from institutions across Latin America, North America, Europe, Africa, and the Asia-Pacific region, allowing for insight into current trends and disparities. The authors emphasize that many HEIs lack plans to implement sustainable development policies as governance tools and lack sustainability certification. Budgetary constraints, reporting, and staff training remain significant challenges.

Leal Filho, Salvia, Frankenberger, Sen, Sivapalan, Emblen-Perry (2021) further indicated that despite varied perspectives on governance's role, formal documents and commitments are essential to supporting senior management in devising strategies and governance tools for sustainable development, as well as for budget allocation, personnel availability, and utilizing sustainability reports. The study underscores governance as a factor influencing sustainability emphasis within institutions and suggests future research to elucidate how rules and standards influence individual behaviors within organizations. Notably, the study included contributions from Brazilian authors.

Sanchez-Carrillo, Cadarso and Tobarra (2021) conducted an SLR to identify the primary concerns and proposed strategies regarding leadership in sustainability within higher education. The study aimed to elucidate how to bridge the gap between the actions and desires of international institutions and stakeholders. They analyzed five years of publications (2015–2019) following the PRISMA guidelines proposed by Moher et al. (2009), utilizing the Science Direct database for its convenience and extensive range of publications in the Social Sciences. Hence, the five main topics were identified: the economic effects of higher education, social impacts, issues related to pedagogy, the environmental behavior of HEIs, and structural challenges in implementing sustainability.

Sanchez-Carrillo, Cadarso and Tobarra (2021) considered a total of 887 articles during their search. They used keywords from titles, resulting in 708 articles for manual abstract examination (after excluding the duplicates). Among these, 583 articles (66%) addressed the environmental dimension proposed, 88 articles (10%) focused on the economic pillar, and 216 articles (24%) covered the social dimension. The results indicate an increasing relevance in research concerning sustainability in higher education. The limitations pertain to the inclusion of sustainability in curricula for teaching sustainable practices. Only a few courses manage to address all pillars in a contextualized manner, and institutions still struggle to develop sustainability-oriented competencies in graduate students.

Among the limitations identified by Sanchez-Carrillo, Cadarso and Tobarra (2021) are the adoption of sustainability in operations related to the knowledge of

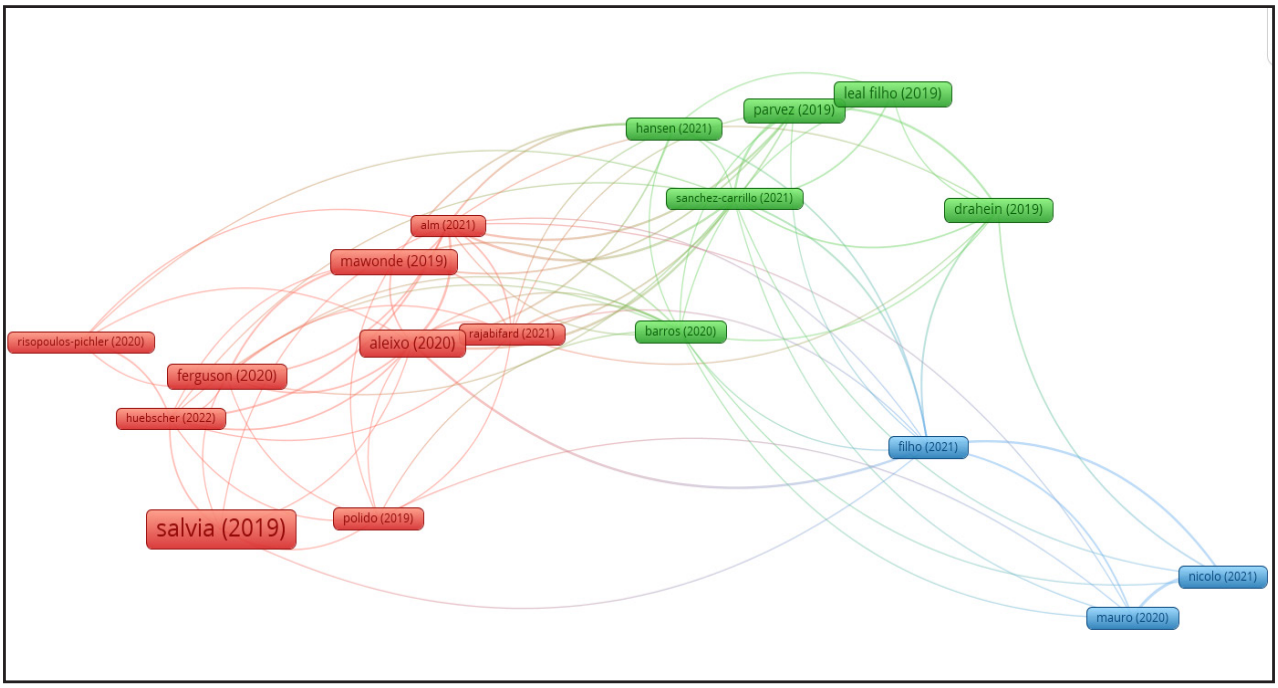
the subject, internal barriers, mandates, and political opinions. These factors can be observed independently or in combination. The study also highlighted a gap in the literature regarding the engagement of HEIs with the communities in which they are situated. The findings suggested five strategies to address the issues related to the adoption of sustainability in higher education and HEIs: innovation in management, planning, openness, stakeholder training in sustainability, and the negotiation and building of multiple partnership networks.

Chen and Vanclay (2020) conducted a case study at the Yantai campus of the University of Groningen, focusing on university social responsibility in the context of economic displacement associated with the modernization proposal of HEIs in China. They discussed the strategy of establishing new universities by upgrading existing lower-level institutions, a trend adopted for modernization. The case study was used to enhance the understanding of impacts generated from before the creation of the campus until its cancellation in 2018. A multi-method approach was employed for data collection, including document analysis, reviews of media reports, interviews with key informants, and field observations.

The evidence provided by Chen and Vanclay (2020) suggested that the modernization of HEIs can create economic displacements and other social impacts on existing staff. This includes potential reductions in income, declines in social status, impacts on health and well-being, and family conflicts, among others. Such impacts influence the quality of life of staff and affect obligations related to social and environmental responsibility, as well as compliance with ESG requirements and the social license to operate. The authors suggest that proper management of this modernization process could mitigate the negative social impacts caused by economic displacement and enhance the benefits of such projects. Conversely, inadequate management could result in social impacts on local populations, posing risks of violating human rights, international standards, and ESG and corporate social responsibility obligations. These aspects need to be addressed to minimize harm to local communities and staff.

Based on analyses conducted in VOSviewer regarding the most cited documents, the articles were grouped into three distinct clusters. The work by Salvia, Leal Filho, Brandli & Griebeler (2019) is grouped in the red cluster. In the blue cluster, authors Leal Filho, Salvia, Frankenberger, Sen, Sivapalan, Emblen-Perry (2021) are highlighted, while the green cluster includes Sanchez-Carrillo, Cadarso & Tobarra (2019). These clusters indicate different groups of researchers or works that are frequently cited together, suggesting networks of collaboration within the topic in question.

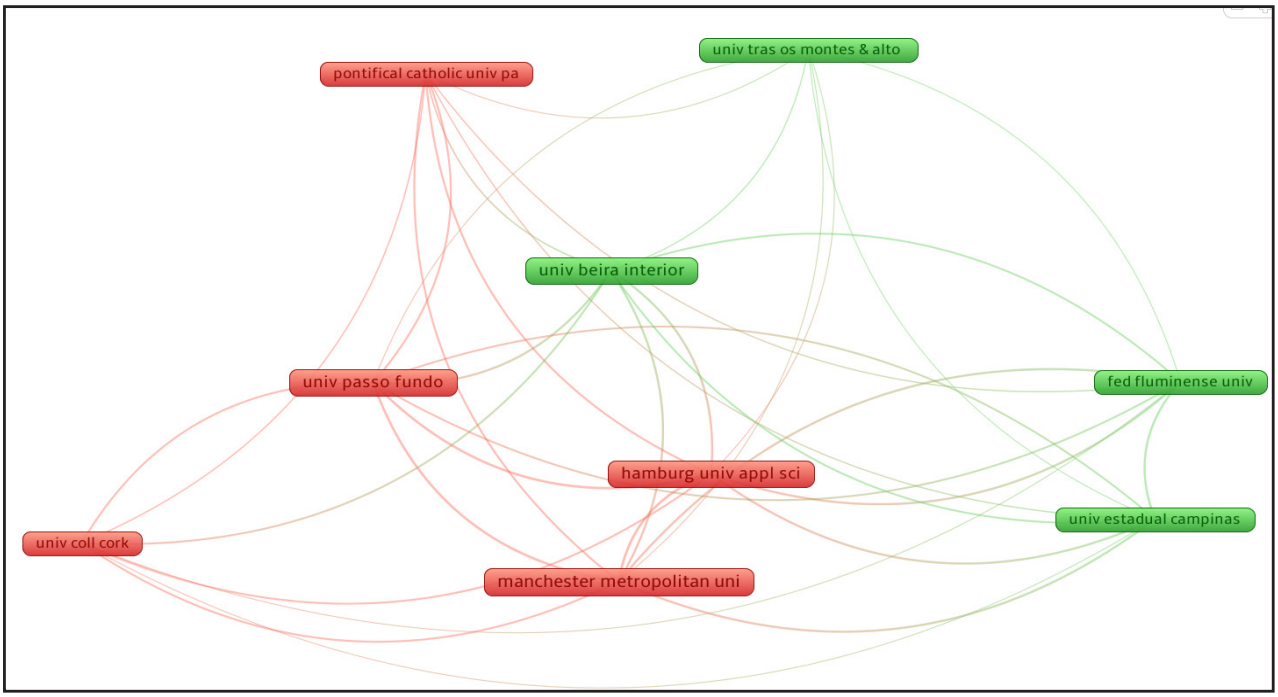
Figure 7 – Key studies by authors on the topic



Source: prepared by the authors, 2024

Figure 8 highlights the main institutions associated with authors the conducting research on the topic, illustrating their grouping into two clusters. Notably, there is a significant presence of Brazilian universities, including the University of Passo Fundo, Fluminense Federal University, and the University of Campina.

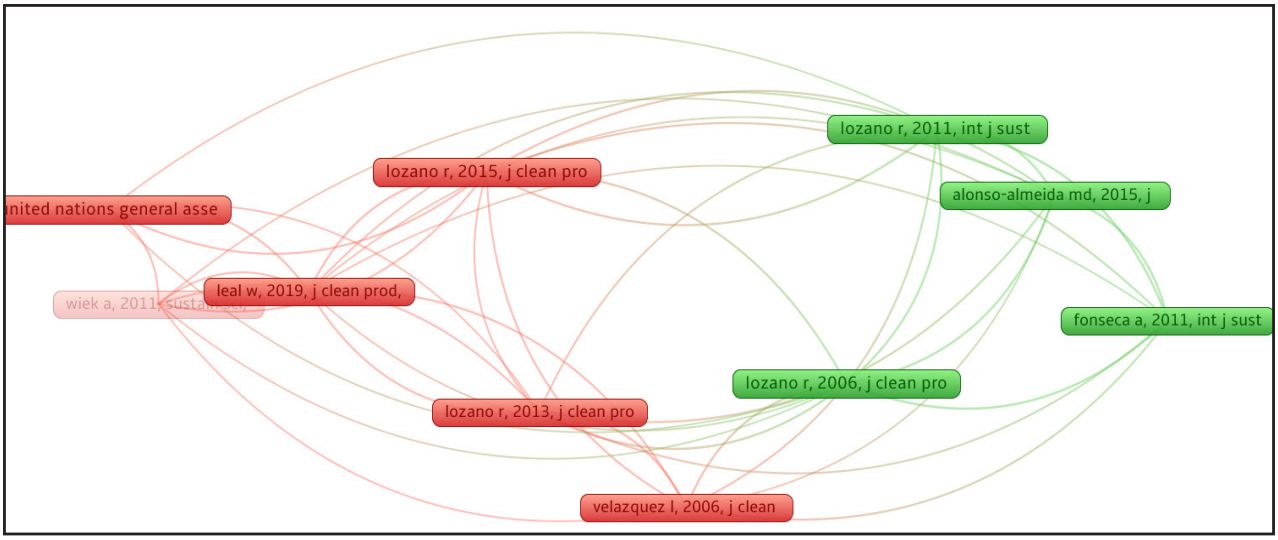
Figure 8 – Key institutions on the topic



Source: prepared by the authors, 2024

Figure 9 illustrates the co-citation network cited by the authors on the subject, considering a minimum of 8 citations. This resulted in two clusters, which were grouped according to the number of citations and the strength of the connections. The red cluster comprises 6 citations, while the green cluster includes a total of 4 citation.

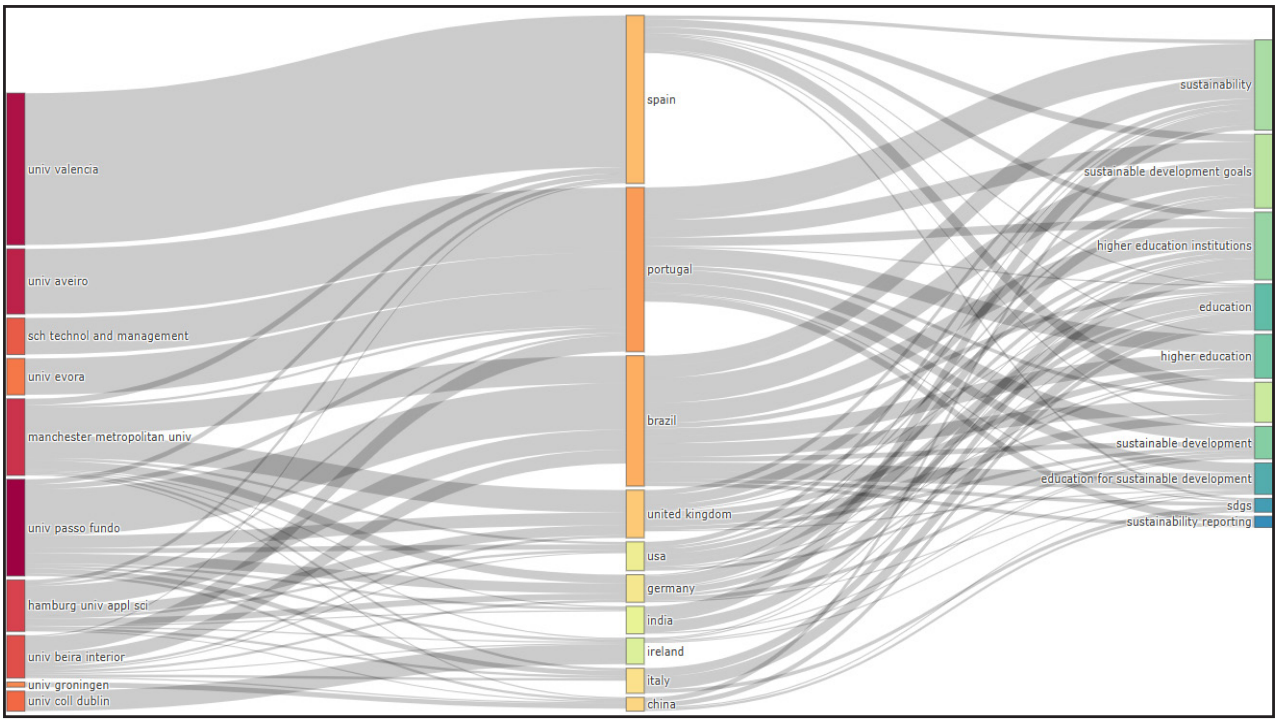
Figure 9 – Co-citation network for studies cited on the topic



Source: prepared by the authors, 2024

In the red cluster, significant attention is given to the work by Leal Filho, Salvia, Paço, Anholon, Gonçalves Quelhas, Rampasso, Balogun, Kondev & Brandli (2019), titled 'Sustainable Development Goals and Sustainability Teaching at Universities: Falling Behind or Getting Ahead of the Pack?'. It aimed to collect data on the SDGs and sustainability teaching at universities. The research seeks to assess the progress of higher education institutions in integrating SDGs and sustainability teaching. Conversely, in the green cluster, Lozano's work (2006), titled 'A Tool for a Graphical Assessment of Sustainability in Universities (GASU),' is highlighted. This study proposes a tool for the graphical assessment of sustainability in universities, offering a comprehensive method for evaluating and monitoring the progress of higher education institutions towards sustainability. For a joint analysis of the factors, a Three-Field Plot was utilized, which provides various types of diagnostics. Figure 10 illustrates the configuration of the research information intersection, highlighting the 10 countries with the most publications, the institutions with the most research on the topic, and the most frequently used keywords.

Figure 10 – Three-field plot of institutions, countries, and keywords



Source: prepared by the authors, 2024

The size of each rectangle in the chart represents the number of publications associated with that area, facilitating the visualization of existing connections through gray lines. In the chart (Figure 10), the central area highlights the 10 countries with the highest number of publications, where Spain, Portugal, and Brazil are particularly prominent. On the left side of the chart, the 10 leading institutions with the most publications are shown, with the University of Valencia being especially notable. The most frequently used keyword was 'sustainability.'

5 CONCLUSIONS

This study conducted a global analysis of scientific production on environmental, social, and governance topics and the sustainable development goals at universities, employing a systematic literature review from the Web of Science database. By analyzing the evolution of knowledge in this area, it was evident that Brazilian research and researchers have increased their presence in the global arena, supporting the 2030 Agenda and reinforcing universities' commitment to sustainability. The International Journal of Sustainability in Higher Education, the Journal of Cleaner Production, and Sustainability emerged as the most pertinent journals, containing the most cited and referenced research in this field.

This study identified key institutions contributing to research in this area, notably Brazilian universities such as the University of Passo Fundo, Fluminense Federal University, and the University of Campinas. The findings indicate Brazil is among the top 10 countries for publication volume, with Spain, Portugal, and Brazil being particularly prominent in this group.

The research revealed prominent terms clustered into four groups: the red cluster, which encompasses terms related to implementation, challenges, and integration in universities; the blue cluster, emphasizing management, education, and governance in implementing the SDGs; the green cluster, focusing on the use of frameworks for defining development objectives; and the yellow cluster, illustrating

the performance state on this topic, underscoring connections between sustainable development in universities through SDGs and ESG.

Aiming to contribute to the conceptual and theoretical field, the study sought to provide a comprehensive review of publications on this topic. The anticipated outcome was to generate academic contributions to knowledge production, presenting new insights for actions and strategies concerning policies and internal practices at HEIs. The objective is to derive practical conclusions for enhancing institutional actions and achieving better outcomes, given the limited adoption of ESG reports and the systematic disclosure of practices by universities and HEIs.

In this regard, It is essential to note that this research faced limitations due to the selected analysis period, the availability of texts in indexed databases, and the analytical tools used. Although the SLR has inherent methodological limitations, it remains a valid research approach for studying advancements related to the SDG and ESG agendas within the examined institutions. Future research agendas could explore primary terms associated with SDGs and ESG in HEIs and analyze the application of emerging models from both global and national literature.

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1. Definition of research problem	√	√	√	√
2. Development of hypotheses or research questions (empirical studies)	√	√		
3. Development of theoretical propositions (theoretical work)	√			
4. Theoretical foundation / Literature review	√	√		
5. Definition of methodological procedures	√	√	√	√
6. Data collection	√		√	
7. Statistical analysis	√		√	
8. Analysis and interpretation of data	√	√	√	√
9. Critical revision of the manuscript	√	√	√	√
10. Manuscript writing	√	√		
11. Other (please specify)				

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