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Integrating the Four Pillars of the SDGs in Higher Education - A Systematic PRISMA Review (2020-2024)

Said Abubakar[1], P. HD, Mogadishu University
Email: said@mu.edu.so
Mohamed Yusuf[2], P. HD Candidate, Mogadishu University
Emial: my4som@gmail.com
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Abstract:

The systematic PRISMA review carried out in this study presents global evidence regarding the integration of the Sustainable Development Goals (SDGs) in Higher Education Institutions (HEIs) from 2020 to 2024, thus filling a substantial gap in the literature. The review of 21 peer-reviewed articles brings to light the shift from purely theoretical support to the practical implementation of SDG frameworks and points out the four-pillar model—covering Education, Research, Operations/Governance, and External Leadership/Outreach—as the winner in terms of integration strategy. The results show that there is a common opinion about the advantages of this method, especially regarding the increase of student participation, motivation, and skills in sustainability. Nevertheless, there are some difficulties in this regard, such as the prevalence of ad-hoc and top-down initiatives, non-existence of common measurement tools, and inconsistency in the implementation across different geographical and institutional contexts. The review points out the qualitative methods as the predominant ones in such studies and calls for more empirical and longitudinal research that can demonstrate causal relationships and evaluate the impact of the education system in sustainability efforts in the long run. It is thus the case that the study practically answers the question of whether academic institutions have a critical role to play in the sustainable development process and at the same time provides a very comprehensive classification of integration models with accompanying recommendations for university leaders, faculty, researchers, and policymakers that can help to increase the contribution of higher education towards the 2030 Agenda and subsequently achieve a sustainable future.

Keywords: Sustainable Development Goals, Higher Education Institutions, SDG integration, strategic planning, 2030 Agenda.

Introduction

The Sustainable Development Goals (SDGs) set by the United Nations were accepted in 2015 under the 2030 Agenda for Sustainable Development and were actually a global agreement that aimed to solve the most pressing problems of the planet such as poverty, inequality, and climate change, among others. The SDGs present a total of 17 objectives that are interconnected and

directed towards a sustainable future for all, thereby illustrating the global cohesive effort (Shesha & Singh, 2024). The consensus reached by the UN member states is an indicator that other stakeholders including governments, private sectors, and NGOs have an important part to play with regards to the challenges that these ambitious goals bring forth (Abdalla et al., 2024). One of the main objectives of the UN Sustainable Development Goals is the commitment to and promotion of inclusive quality education (SDG 4) which is a prerequisite for all other goals' successful realization since education empowers the individual for participating in the process of socio-economic development (Githui & Njuru, 2024). One of the ways to achieve these goals is through academic institutions as this is a crucial position for them, since they will be able to provide innovative and proven solutions to the difficulties that the SDGs represent (Telesford et al., 2024). The role of universities is not confined to that of higher education institutions; they are also the places where research and knowledge creation, which are essential for developing strategies and policies that support sustainable development, are carried out (Saleh & Adly, 2024; Chung et al., 2024). Realizing this universal call to action emphasizes the role of education in balancing out the economic, social, and environmental aspects that are necessary for these goals to be attained (Nyika, 2024).

Academic institutions, commonly called Higher Education Institutions (HEIs), play a crucial and multifaceted role in the propagation of Sustainable Development Goals (SDGs) that go beyond the conventional educational role and thereby include a "third mission." The latter is characterized by the service of the community and public as well as research and education. HEIs are in a privileged position to weave the SDGs into their basic functions—teaching, research, and campus management (Cembranel et al., 2024; Masina, 2024). For example, introducing students to the SDGs through creative curriculum not only allows the future maintainers of professional practices to have the right mindset, but also creates a sustainability-centric culture (Niemelä, 2024). In addition, the universities take part in research initiatives that not only benefit the academic world but also give practical guidance on sustainability options (Alfathy et al., 2024; Utami et al., 2024). This research-centered aspect is a significant aid in confronting the regional problems and simultaneously producing knowledge that can later be utilized to influence and shape the policy and practice of other regions (Abdalla et al., 2024). The effective management in these institutions—exemplified by the operations of the campus and the partnership with the community that promote sustainability—further intensifies the contribution of the universities in the efforts to make the world more sustainable both locally and globally (Calero et al., 2024). Henceforth, the distinctive features of the research institutions have the potential to be the leading partners in the global movement to achieve the SDG collaboration and mobilization of education, research and community partnership as the capabilities to be the leading partners are endowed upon them (Supriyanto et al., 2024).

Problem Statement

The integration of Sustainable Development Goals (SDGs) in Higher Education Institutions (HEIs) is still rarely evaluated through clear methodologies and standardized measures even though there are lots of very detailed case studies. Evidence continues to be fragmented across different disciplines and contexts, which makes it difficult to compare and has little practical value. Even though the 2030 Agenda sees HEIs as facilitators of sustainable transformation, the integration efforts are still mostly ad hoc and superficial rather than strategic and institution-wide. Existing initiatives show that the implementation of SDGs is uneven across countries and types of institutions, and there is very little agreement on what models or indicators are effective for measuring progress. Consequently, university leaders are faced with the question of what evidence to use for their decision-making and educators are in the situation of having to find non-validated methods of incorporating SDGs into curricula, research, and governance. The current systematic review aims to solve these problems by merging peer-reviewed studies done between the years 2020 and 2024 to chart integration models, document measurable outcomes, and pinpoint the major barriers and enablers that influence SDG implementation in higher education.

Research Objectives and Questions

Considering that HEIs act as key players in sustainable development, this review aims to gather and assess the worldwide evidence of the operation of the SDGs in universities. The research is based on the following main and additional questions:

Primary Research Question (RQ): What are the prevalent models, strategies, and core dimensions for SDG integration in academic institutions globally?

Secondary Research Questions (RQs):

1. What is the reported effectiveness of these integration strategies on key outcomes such as student sustainability competencies, research impact, and institutional environmental/social performance?
2. What are the key barriers (e.g., financial, structural, cultural) and facilitators (e.g., leadership, funding, partnerships) to the successful and deep integration of the SDGs?

Scope and Value of the Study

The proposed systematic review includes a variety of academic institutions, such as universities, colleges, and technical institutes, to give a complete picture of the higher education sector, observing the integration activities around all 17 Sustainable Development Goals (SDGs) and acknowledging their interrelation and the capability of the institutions to accomplish many goals at the same time. The importance of this research has three main aspects: for the academic community, it will reconcile a scattered literature, thus, offering a succinct evidence-based classification of the integration models along with their evaluation, finally, imprinting the way for further academic inquiries; for the university decision-makers and practitioners, the output will present a crucial benchmarking instrument and a source of tested methods and mistakes, thus, helping through making of the strategic plans, allocating the resources and developing the effective SDG implementation plans; and for the global economic policy, by portraying the worldwide trends and pointing out the voids, the current research will keep the international organizations,

policymakers, and investors posted on how to provide better support and cash in on the special abilities of HEIs in realizing the 2030 Agenda.

Literature Review

Conceptualizing the Role of HEIs in the SDG Era

The Evolving Mission of the University

The mission of universities has historically transformed from the Humboldtian ideal, which emphasized the unity of teaching and research, to a more multifaceted approach characterized by the emergence of the "entrepreneurial university." This change reflects a shift toward integrating social engagement and a commitment to public good, which is often referred to as the university's "third mission" (Yatsenko, 2024). The concept of the third mission encompasses a university's responsibility to actively contribute to societal development through collaborative efforts with local and global communities, extending beyond the traditional confines of academia (Васиньова, 2024). As universities become more involved in addressing societal challenges, they are increasingly seen as active agents in promoting social welfare rather than merely functioning as isolated intellectual enclaves (Gál & Pásztor, 2024).

Empirical studies suggest that this evolving mission enables institutions to utilize their resources and expertise to facilitate community engagement and social responsibility. By doing so, universities enhance their role as stakeholders in driving social change and fostering partnerships that align with the Sustainable Development Goals (SDGs) (Yatsenko, 2024). Moreover, integrating social responsibility concepts into the university framework creates a comprehensive approach to encouraging sustainability amidst shifting societal needs (Supaat et al., 2024). This transformation requires a reassessment of academic strategies to ensure they adequately respond to the demands posed by an interconnected world.

The Holistic SDGs

The evolution of academia's approach to sustainability illustrates a trajectory from a predominantly environmental focus to a more integrated perspective embodied by the SDGs. Initially, higher education institutions prioritized environmental management practices, such as developing green campuses and advancing research in environmental sciences (An, 2024). However, this limited scope has shifted to encompass a broader agenda that also includes social and economic sustainability, recognizing that environmental protection cannot be decoupled from socio-economic dimensions (Puthucherril et al., 2024).

The current framework of the SDGs requires a transformative approach that integrates various aspects of sustainability into higher education curricula and institutional practices. This necessitates institutions to adopt comprehensive strategies that not only prioritize environmental issues but also address social equity, economic viability, and institutional governance (An, 2024). For instance, universities are increasingly being encouraged to act as "living labs," where they apply sustainable innovations in real-world settings, reflecting the interconnectedness required to advance the SDGs (Supaat et al., 2024).

As highlighted by various studies, the ability to address complex sustainability challenges effectively hinges on fostering interdisciplinary collaboration among students, faculty, and external stakeholders (Sinaga, 2024). By promoting holistic practices that align with the 2030 Agenda, universities contribute to their internal objectives and play a significant role in fostering

global progress toward sustainable development (Quaye et al., 2024). Thus, reorienting academic institutions toward a comprehensive SDG framework not only expands their mission but also enhances their relevance in today's society.

Typologies of SDG Integration

The categorization of how Higher Education Institutions (HEIs) engage with the Sustainable Development Goals (SDGs) can often be distilled into a four-pillar model that encompasses Education/Teaching, Research, Operations/Governance, and External Leadership/Outreach. Each of these pillars identifies critical modes through which universities integrate sustainability into their frameworks.

Education/Teaching

The integration of SDGs into curricula and teaching practices is a critical pathway for HEIs. Education for Sustainable Development (ESD) forms a cornerstone for this typology, as it not only transforms educational content but also enhances pedagogy and assessment methods. Cembranel et al. (2024) emphasize that successful HEIs have embedded SDGs into their educational structures, effectively advancing social responsibility and environmental goals. This integration fosters a culture where students are educated on sustainability principles and are equipped to be proactive in their communities.

Moreover, the role of leadership in promoting sustainability through educational curricula is pivotal. Tomasella et al. Tomasella et al. (2024) argue that universities must recognize sustainability as a fundamental component across disciplines, enhancing staff capabilities and encouraging cross-disciplinary collaborations to facilitate transformative learning experiences. Institutions that embrace this focus on education inherently empower students, shaping future leaders adept in sustainable practices (Pactwa et al., 2024).

Research

Research serves as another significant avenue through which HEIs contribute to the achievement of the SDGs. It is increasingly recognized that interdisciplinary, solution-oriented research aligned with specific SDGs is crucial for generating applicable knowledge and innovative solutions Saleh & Adly (2024). As Saleh and Adly Saleh & Adly (2024) highlight, measuring research outputs via bibliometrics can provide scholars and policymakers with insights into how effectively universities are addressing sustainability challenges. This analysis extends across disciplines, as universities are called upon to engage in research that not only advances knowledge but also embodies a commitment to sustainable practices.

Furthermore, the work of Knorring et al. (2024) illustrates successful implementation examples in a medical university, showcasing the establishment of research centers and networks aimed at effective decision-making. This highlights that research activities are integral to fostering environments conducive to sustainability and improving campus operations through data-driven insights.

Operations/Governance

Sustainable campus management encompasses energy, waste, and water management practices within institutions, making Operations/Governance a crucial pillar for SDG integration. The comprehensive adaptation of universities to the principles of sustainable development necessitates

a structural transformation that aligns institutional strategy, policy, and reporting with the SDGs (Pactwa et al., 2024). further illustrate that executing sustainable practices on campus not only contributes to operational excellence but also positively impacts the community and the environment.

Additionally, Li et al. (2024) discuss the importance of developing sustainable governance structures in educational institutions, particularly in regions where there is a pressing need for enhanced sustainable development measures. Their findings suggest that operational changes within HEIs are essential for fulfilling their roles in achieving sustainability goals, thereby advocating for strategic planning toward sustainable campuses.

External Leadership/Outreach

External Leadership/Outreach emphasizes the engagement of universities with communities, industry, and policymakers. It involves knowledge transfer, partnerships, and public service initiatives that go beyond the academic setting Wilhelm et al. (2024). Wilhelm et al. identify various ranking systems measuring HEIs' performance against the SDGs, emphasizing the importance of external outreach and leadership in achieving broader sustainability impacts.

Additionally, the integration of sustainability objectives into institutional governance facilitates collaboration with external stakeholders. Ariawan et al. (2024) highlight the significance of partnerships that can leverage institutional capabilities to foster sustainable development at both local and global levels.

In summary, effective integration of SDGs within HEIs involves a multifaceted approach encapsulated in the four-pillar model. By intertwining teaching, research, operations, and outreach, universities can position themselves as pivotal players in advancing sustainable development, thus fulfilling their role as active contributors to society.

Methodology

The systematic review approach was the main methodology of this research to discover, analyze, and summarize the global evidence about Higher Education Institutions (HEIs) and their modes of SDGs (Sustainable Development Goals) integration. The application of the PRISMA guidelines at every stage of the research confirmed its high level of rigor and transparency. A combination of quantitative and qualitative methods was applied to the analysis. Publication trends were summarized using descriptive statistics with the factors of year, geographical distribution, publisher, and research design. The citation counts were viewed as an indicator of early academic impact. For the qualitative synthesis, we classified all the studies included into a framework of four SDG integration pillars, which are Education/Teaching, Research, Operations/Governance, and External Engagement. Figure 1 shows the framework.

Fig. 1. The four SDG integration pillars

Eligibility Criteria

The review included peer-reviewed empirical, review, and conceptual studies published between 2020 and 2024 that explicitly addressed the integration, implementation, or analysis of SDGs within higher education institutions worldwide. Studies focusing on sustainability in general without direct SDG relevance, or outside the context of higher education, were excluded.

Information Sources & Search Strategy

A comprehensive search was performed in Scopus and Web of Science databases. The Boolean search string applied was ("SDG" OR "Sustainable Development Goal*") AND ("higher education" OR "universit*" OR "college"). The search retrieved 104 records. After removing duplicates and applying inclusion criteria, 60 records were screened by title and abstract. Subsequently, 44 full-text articles were reviewed, and 21 studies met all inclusion criteria for final synthesis. The PRISMA flow diagram (Fig. 1) summarizes the selection process.

Selection Process

The selection process followed the PRISMA 2020 guidelines and is summarized in Figure 1. The database search initially identified 104 records. After removing duplicates, 60 records remained and were screened by title and abstract. Of these, 44 full-text articles were assessed for eligibility. Finally, 21 studies met all inclusion criteria and were included in the qualitative and quantitative synthesis

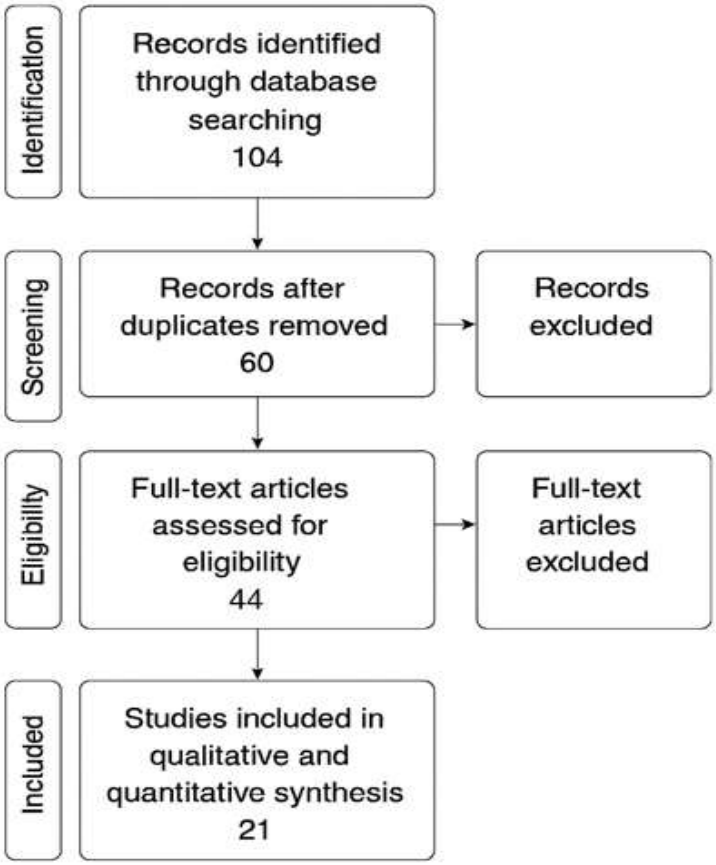

Fig. 2**.** PRISMA flow diagram for the systematic literature review.

Data Collection Process

Data from the 21 included studies were extracted into a standardized matrix capturing the following items: author(s), title, journal, publisher, year of publication, country of focus, research design, citation count, DOI, and key findings.

Data Analysis and Findings

Table 1. Literature Overview/Summary

Author(s)	Title	Journal	Publisher	Year	DOI
Sonetti et al.	Education for Sustainability in Practice: A Review of Current Strategies within Italian Universities	Sustainability	MDPI	2020	10.3390/su12135246
González-Torre and Suárez-Serrano	A framework for implementing and reporting United Nations sustainable development goals in Spanish higher education institutions	International Journal of Sustainability in Higher Education	Emerald	2022	10.1108/ijshe-03-2021-0118
Coers et al.	Using the Sustainable Development Goals in undergraduate leadership programs	New Directions for Student Leadership	Wiley	2023	10.1002/yd.20567
Rodríguez et al.	Methodology to categorize the research output of academic institutions, through the Sustainable Development Goals (SDGs)	Emerald Open Research	Emerald	2021	10.1108/eor-04-2023-0012
Aldhaen	Education skills for digital age toward sustainable development – analysis and future directions	Development in Learning Organizations	Emerald	2022	10.1108/dlo-06-2022-0108
Fauzi et al.	A systematic bibliometric review of the United Nation's SDGS: which are the most related to higher education institutions?	International Journal of Sustainability in Higher Education	Emerald	2022	10.1108/ijshe-12-2021-0520
Filho et al.	Perceptions of the academic community on the performance of sustainable development initiatives in higher education	Sustainable Development	Wiley	2023	10.1002/sd.2633
Ferrer-Estévez and Chalmeta	Integrating Sustainable Development Goals in educational institutions	The International Journal of Management Education	Elsevier	2021	10.1016/j.ijme.2021.100494
Romeo et al.	The Role of Strategic Change Management in Enhancing Academic Institutions' Sustainability	The International Journal of Management Science and Business Administration	Research Support, Non-U.S. Gov't	2023	10.18775/ijmsba.1849-5664-5419.2014.93.1004
Wang and Zhang	Fostering sustainability in higher education: Leveraging human behavior in organizations	British Journal of Psychology	Wiley	2023	10.1111/bjop.12760
Almutairi	Effects of Academic Integrity of Faculty Members on Students' Ethical Behavior	Education Research International	Hindawi	2022	10.1155/2022/6806752
Bor et al.	Sport Academics' Awareness and Knowledge of Sustainability in Higher Education in Türkiye	Sustainability	MDPI	2023	10.3390/su15086527
Chankseliani and McCowan	Higher education and the Sustainable Development Goals	Higher Education	Springer	2020	10.1007/s10734-020-00652-w
Zwolińska et al.	Sustainable Development in Education from Students' Perspective—Implementation of Sustainable Development in Curricula	Sustainability	MDPI	2022	10.3390/su14063398
Craveiro et al.	"Get us partnerships!" - a qualitative study of Angolan and Mozambican health academics' experiences with North/South partnerships	Globalization and Health	Springer	2020	10.1186/s12992-020-00562-7
Argento et al.	Integrating sustainability in higher education: a Swedish case	International Journal of Sustainability in Higher Education	Emerald	2020	10.1108/ijshe-10-2019-0292
Thorpe and Gunton	Assessing the United Nation's Sustainable Development Goals in academic libraries	Journal of Librarianship and Information Science	Sage Journals	2021	10.1177/09610006211005528
Smaniotto et al.	Insights and Next Challenges for the Italian Educational System to Teach Sustainability in a Global Context	Sustainability	MDPI	2022	10.3390/su15010209
Nicolau et al.	Empowering Non-Academic Staff for the Implementation of Sustainability in Higher Education Institutions	Sustainability	MDPI	2023	10.3390/su152014818
García-Feijoo et al.	Systematic Review of Sustainable-Development-Goal Deployment in Business Schools	Sustainability	MDPI	2020	10.3390/su12010440
Rahmat and Nizar	The Impact of Community-Based Learning (CBL) Toward Preparing Progressive Visual Art Education (VAE) Future Teachers	International Journal of Academic Research in Progressive Education and Development	-	2022	10.6007/ijarped/v11-i4/15866
Missingham	Australian academic libraries and the United Nations Sustainable Development Goals	IFLA Journal	Sage Journals	2024	10.1177/03400352241252973

Table 1, depicts the systematic analysis of the 21 selected studies provides a clear snapshot of the evolving landscape of SDG integration in higher education. The findings are presented below, combining quantitative trends with qualitative insights.

Temporal Trends in Publication Output

The annual distribution of publications (F. 3) shows a consistent and growing academic interest in SDGs within HEIs. The field has maintained a steady output from 2020 to 2024, with a notable peak of 6 publications (28.6%) in 2024, indicating the increasing urgency and relevance of this topic. This sustained growth reflects the maturation of the field from initial awareness-raising towards more substantive implementation and evaluation studies.

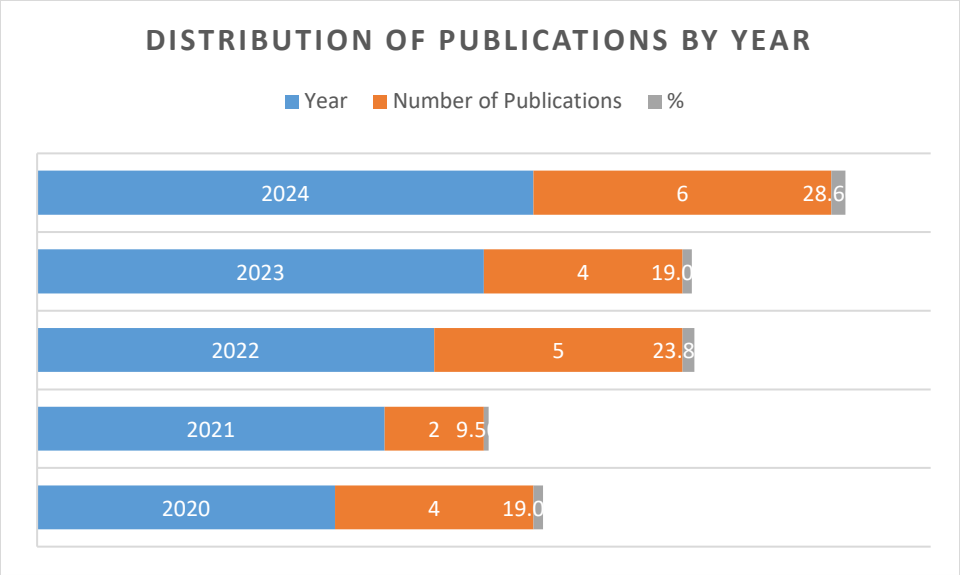

Fig. 3**.** Number of papers on SDG integration in higher education published per year (2020-2024).

Research Methods

Research design (F. 4) on SDG integration predominantly employs qualitative methods (23.8%), indicating a focus on in-depth explorations of institutional dynamics and stakeholder perceptions. Systematic reviews (19.0%) consolidate existing knowledge, while framework development and case studies (14.3% each) balance theory and practical applications. However, there's a notable lack of quantitative studies (4.8%) and mixed methods (9.5%), suggesting missed opportunities for comprehensive analysis. The field is conceptually driven and context-sensitive, highlighting the need for methodological diversification, including longitudinal studies and standardized metrics for better evaluation of sustainability initiatives.

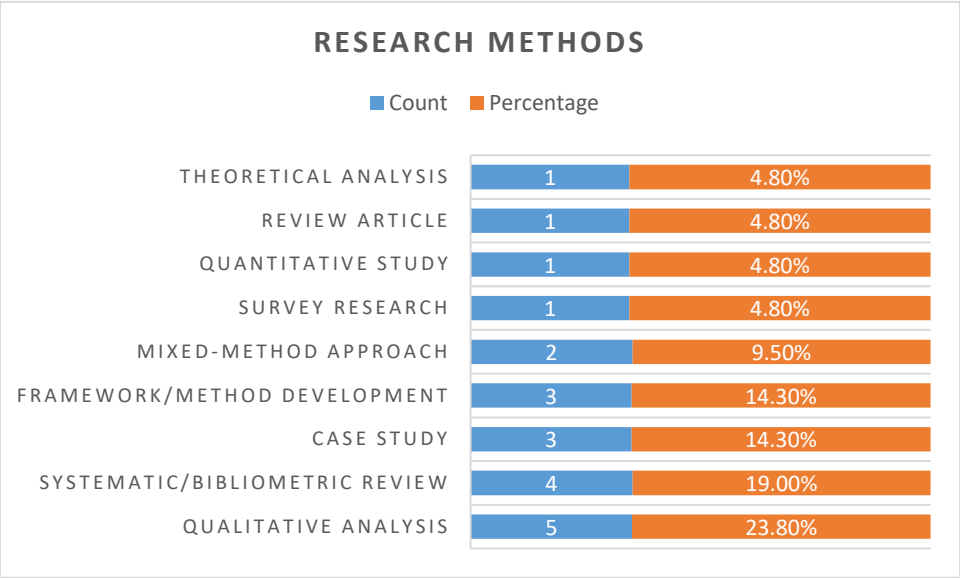

Fig. 4. Distribution of Research Methods

Geographical Distribution

The research demonstrates a truly global reach, with contributions from 16 different countries (F. 5). Europe is the most prolific region, with Spain leading (4 studies, 19.0%), followed by Italy and the UK. This is consistent with the strong policy focus on sustainability within the European Union. Significant contributions also come from Asia, Africa, the Americas, and Australia, highlighting the universal applicability of the SDGs. However, the distribution also reveals a research concentration in the Global North, suggesting a need for more funded and published research from the Global South to capture diverse contextual challenges and solutions.

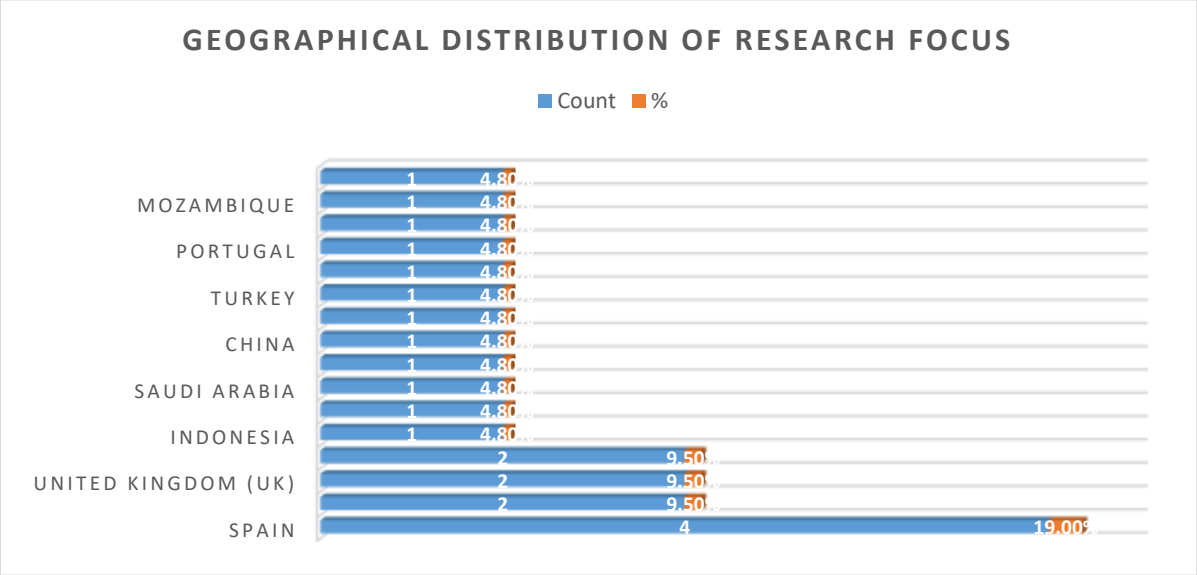

Fig. 5**.** Number of papers on SDG integration in higher education published per country.

Key Publishing Outlets and Publishers

An analysis of publishing venues (F.6) reveals that the field is dominated by two key publishers: MDPI (9 studies, 42.9%) and Emerald (7 studies, 33.3%). The journal *Sustainability* (MDPI) is the single most frequent outlet, underscoring its role as a key platform for this interdisciplinary field. Emerald's *International Journal of Sustainability in Higher Education* serves as the primary specialized journal. This concentration indicates well-established channels for disseminating research in this domain.

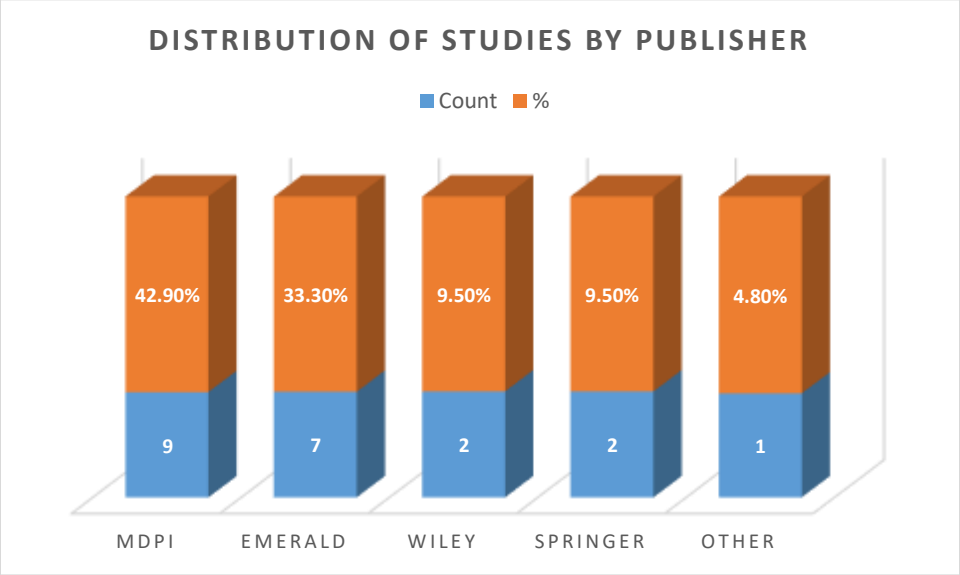

Fig 6**.** Distribution of Studies by Publisher

Citation Impact Analysis

The citation counts for the analyzed papers are generally low to moderate (F.7), which is expected for a recently burgeoning field where many key papers are from 2023-2024. The most cited papers, such as Sonetti et al. (2020) and Filho et al. (2023) with 12 citations each, are typically broader reviews or multi-case studies that provide foundational overviews for the research community. This suggests that comprehensive, synthesis-based papers have a high initial impact in consolidating a fragmented knowledge base. It is also evident that older publications (2020-2022) have had more time to accumulate citations.

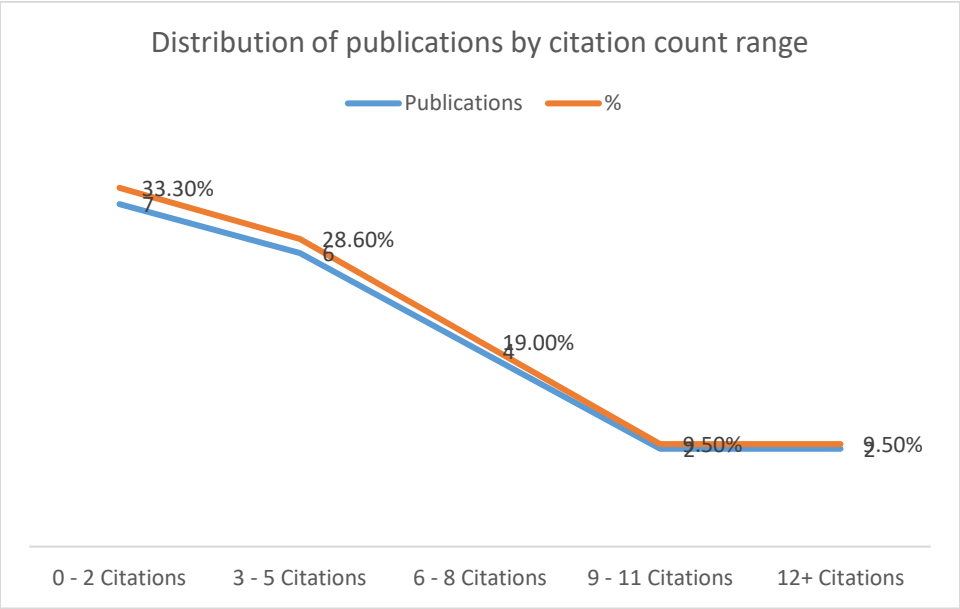

Fig. 7**.** Distribution of publications by citation count range.

Thematic Focus and Integration Strategies

A thematic analysis of the study titles and key findings allowed for the categorization of research focus (F.8). The most prevalent theme was Implementation & Strategy (8 studies, 38.1%), focusing on frameworks, methodologies, and strategic change management for embedding SDGs. This was followed by Curriculum & Teaching (5 studies, 23.8%), which directly addresses educational content and pedagogy. A significant number of Review & Analysis papers (4 studies, 19.0%) were also present, conducting systematic and bibliometric reviews to map the field itself. Notably, research is expanding beyond traditional academics to include specific stakeholder groups like Libraries and Non-Academic Staff.

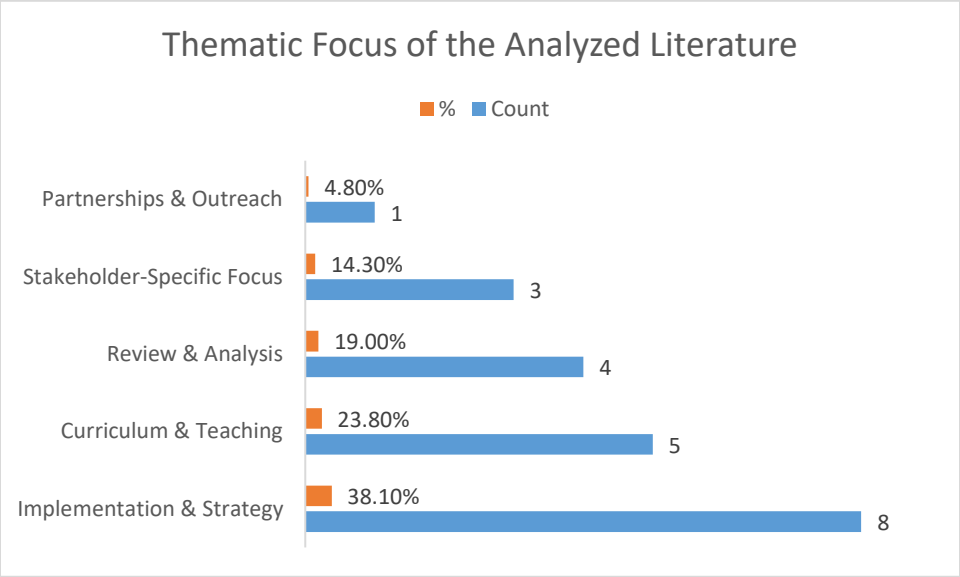

Fig.8. Thematic Focus of the Analyzed Literature

Findings from the Analyzed Literature

Table 2**.** Thematic Analysis of Key Findings in the Literature

Themes	Count	Percentage
Curriculum Integration & Development	7	31.8%
Institutional Strategy & Management	5	22.7%
Research Alignment & Trends	3	13.6%
Stakeholder Engagement & Partnerships	3	13.6%
Assessment, Reporting & Accountability	2	9.1%
Awareness, Knowledge & Skills	2	9.1%

Table 2 indicates, the analysis revealed 22 distinct themes, which were consolidated into six primary categories. The most prominent category was Curriculum Integration & Development (31.8%), which focuses on embedding sustainability and the SDGs into the core educational mission. This encompasses incorporating SDGs into specific leadership programs, using global challenges as case studies, and advocating for widespread curriculum reforms to foster sustainability competencies. Studies within this theme highlighted the need for essential skills for a sustainable digital landscape, promoted inclusive educational strategies, and investigated the role of community-based learning in professional development. The second most significant category, Institutional Strategy & Management (22.7%), addresses the critical role of university leadership, structure, and culture. Key findings noted the current predominance of top-down approaches and underscored the pivotal role of strategic management. This theme also highlighted the importance of understanding psychological factors to foster a sustainability culture and the critical influence of academic leaders, such as through faculty integrity, in creating a conducive environment for SDG integration. A focus on Research Alignment & Trends (13.6%) emerged, detailing how academic research is being directed and analyzed in the context of the SDGs. This included efforts to develop methodologies for aligning research outputs with specific goals, analyzing publication trends to guide future studies, and conducting systematic reviews of integration within specific disciplines like business schools. Equally represented was the theme of Stakeholder Engagement & Partnerships (13.6%), which emphasizes collaboration and inclusivity. This involves engaging diverse stakeholders in development processes, investigating academic perceptions of sustainability initiatives, empowering non-academic staff through inclusive training, and forging equitable community and health partnerships. Finally, the categories of Assessment, Reporting & Accountability (9.1%) and Awareness, Knowledge & Skills (9.1%) rounded out the findings. The former deals with measuring and ensuring responsibility for sustainability efforts through comprehensive reporting frameworks and library-specific assessment tools. The latter focuses on building foundational understanding through promoting awareness among faculty and students and investigating knowledge gaps within specific academic communities.

Conclusion

This systematic review has synthesized the global evidence regarding the incorporation of the Sustainable Development Goals (SDGs) within Higher Education Institutions (HEIs), thereby filling a major void in the existing literature. A close examination of the 21 peer-reviewed studies indicates a lively and quickly changing field, which is marked by an increasing number of researches that are shifting from theoretical advocacy to practical implementation. It has been observed that the integration of SDGs is done best by a holistic, multi-dimensional approach which is widely recognized as a four-pillar model consisting of Education, Research, Operations/Governance, and External Leadership/Outreach. The integration of SDGs has been identified unanimously as beneficial, particularly in terms of increased student participation, higher motivation, and sustainability competencies being cultivated. Yet simultaneously to the advantages, the presented evidence pinpoints considerable difficulties, among which is the tendency to have ad-hoc, top-down initiatives, the absence of robust, standardized measurement tools, and uneven implementation across different geographic and institutional contexts. The qualitative and review studies dominate the methodological landscape, which shows that the field is still in the process of consolidating and exploring and thus needs more empirical and longitudinal research to provide strong causal links and long-term impacts. This study, therefore, confirms the crucial, albeit underutilized, role of academic institutions as enablers of sustainable development. By giving a detailed classification of integration models and a straightforward assessment of the current level of research, this review provides a primary resource for academics, university administrators, and decision-makers to collaboratively and smartly promote the higher education sector's input toward the 2030 Sustainable Development Goals.

Recommendations

Based on the systematic review findings, the following actionable recommendations are proposed for key stakeholder groups to advance SDG integration in higher education.

For University Leadership and Administrators

The incorporation of SDGs should be led by the institutional leaders as a strategy to take the whole institution into account. It entails the embedding of extensive SDG strategies into university strategic plans, budgets, and performance indicators, hence not just reliance on separate projects. A high-level, cross-functional Sustainability Steering Committee consisting of members from different departments such as academic affairs, research, operations, and community engagement should be created in order to facilitate alignment and accountability. Apart from that, institutions ought to conduct training for staff to ensure they have the necessary skills and knowledge on sustainability issues—both the teaching and non-teaching staff—while also setting up recognition awards and promotion criteria as incentive structures that reward teaching and research that is in line with SDGs.

For Faculty and Educators

The SDGs are mainstreamed through academic staff, who contribute largely to this process via curriculum and pedagogy. Accordingly, an SDG mapping of existing classes should be done by the faculty so that the possible integration of sustainability as a common theme across-the-curriculum and not as a subject of its own can be easily spotted. It is recommended that learning through experience be the key teaching method to develop students' skills in sustainability, among

which project-based learning, case studies, and community learning are a few examples. On top of that, the faculty should promote interdisciplinary research by going into the dedicated clusters developing around specific SDG issues and tagging their research publications with the relevant SDGs systematically to make sure that the visibility and impact are enlarged.

For Researchers and Scholars

The research community is expected to close significant knowledge gaps through the adoption of various methodological approaches. The strengthening of the evidence base behind the SDG integration strategies will be facilitated through the design of more quantitative, mixed-methods, and longitudinal studies. A common metric system that will allow the conduction of comparative analysis across institutions and contexts is the major one that needs to be developed and validated. Researchers should also invest more time into exploring the specific contexts by coming up with more collaborations and by examining SDG integration in areas that are not usually considered, like social sciences, humanities, and arts, for instance, which are beyond the traditional science, technology, and business fields.

For Policymakers and Funders

Through strategic interventions, government agencies and funding bodies can boost SDG integration. We propose setting up specific grant programs that will exclusively support the creation and execution of institutional SDG integration plans, especially focusing on institutions located in developing regions. Modifying national research and educational funding criteria in line with SDG priorities would turn universities into active players with an impact that is clear and measurable. Furthermore, it is advisable that funders help to reinforce and make more active multi-stakeholder platforms that would act as bridges between universities and other stakeholders like industry, government, and civil society, so that together they can come up with solutions for the SDGs.

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