Sustainable entrepreneurship in higher education: implementation factors, student impacts, institutional barriers and internal management practice

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ABSTRACT:
This study examines how universities have been integrating sustainability and entrepreneurship into their institutional strategies, exploring the emergence of the sustainable entrepreneurial university within higher education. The objective is to identify, in the international literature, how these initiatives are structured, which dimensions are most frequently addressed, and what impacts are reported for institutions, students, and society. The study adopts a systematic literature review based on international scientific databases, applying defined selection criteria and thematic analysis to examine empirical studies related to the topic. The findings indicate that most initiatives focus on integrating sustainability into curricula, developing innovation ecosystems, and strengthening partnerships with multiple stakeholders. These initiatives also contribute to the development of entrepreneurial competencies, the generation of socio-environmental impact, and the promotion of more sustainable development models. However, the literature still presents gaps regarding the longitudinal assessment of these initiatives and comparative analyses across different institutional contexts. The study contributes by synthesizing current evidence and highlighting directions for universities seeking to align sustainability, innovation, and entrepreneurship in their institutional strategies.

KEYWORDS: sustainability, entrepreneurial university, higher education, innovation, entrepreneurship.

1. Introduction

The search for educational models more aligned with the social, economic, and environmental demands of the 21st century has driven the debate on transforming universities into more entrepreneurial and sustainable institutions. In this context, the concept of sustainable entrepreneurship in higher education has gained prominence for integrating the generation of economic value, socio-environmental responsibility, and academic innovation.

Universities, traditionally focused on technical training and scientific production, are being urged to reconfigure their institutional practices, curricula, and management methods to incorporate principles of sustainability and entrepreneurship (Etzkowitz & Leydesdorff, 2000; Fini et al., 2018). This transformation is not only desirable: it has become necessary in the face of the challenges posed by the UN's 2030 Agenda and the global climate, social, and economic crises.

The studies analyzed in this systematic review reveal that the notion of a sustainable entrepreneurial university is still plural and under construction. Some approaches emphasize the integration between the university's traditional missions and the generation of socio-environmental impact (Zhou & Alves, 2019), while others highlight the need for innovative institutional practices that connect teaching, research, and outreach to sustainable territorial development strategies (Bortolaso et al., 2021). This conceptual diversity reflects the complexity of the ongoing transition and indicates that there is no single model to follow, but rather specific institutional trajectories shaped by local contexts, organizational capacities, and governance arrangements.

Institutional sustainability is not limited to discourse or the adoption of isolated projects but involves structural changes in how universities teach, manage, and interact with society (Guerra et al., 2022). Several studies indicate that this transformation requires the articulation of pedagogical, cultural, and institutional dimensions, including interdisciplinary curricula, active learning methodologies, and strategic planning oriented toward sustainability (Fini et al., 2018; Duque et al., 2020; Guerra et al., 2022).

In terms of governance, the literature highlights the fundamental role of institutional leadership, the involvement of multiple actors (faculty, administrators, students), and the creation of internal mechanisms that encourage experimentation, entrepreneurship, and cross-disciplinary approaches (Santos & Ribeiro, 2021; Lopes et al., 2023). These changes challenge the traditional logic of universities and demand new indicators for evaluation and funding.

Despite the growing number of initiatives and programs aimed at promoting sustainable entrepreneurship in higher education institutions, studies show great heterogeneity in terms of conceptions, implementation, and effectiveness (Duque et al., 2020; Zhang & Wong, 2021). Systematic analyses are lacking that would allow us to understand which factors favor or hinder this type of institutional transformation, as well as its real effects on students and university culture.

This systematic review seeks to fill this gap by synthesizing the findings of empirical studies that investigate concrete experiences of sustainable entrepreneurship in universities, focusing on five axes: (1) implementation factors; (2) institutional barriers; (3) impacts on students; (4) internal management practices; and (5) organizational change processes.

By bringing together evidence from different countries, methodologies, and approaches, this review aims to contribute to the consolidation of a theoretical and practical basis that supports universities, managers, and public policy makers in advancing towards more innovative, inclusive, and sustainability-committed institutions.

This study contributes to the literature in three main ways. First, it provides a systematic synthesis of empirical research on sustainable entrepreneurship in higher education, identifying five key analytical dimensions: implementation factors, institutional barriers, impacts on students, internal management practices, and organizational change. Second, it integrates findings from diverse geographical and methodological contexts to reveal patterns in how universities operationalize sustainability-oriented entrepreneurship. Third, the review advances the conceptual discussion on sustainable entrepreneurial universities by proposing an integrated analytical framework derived from empirical evidence.

2. Literature review

2.1 Sustainable Entrepreneurship and the Entrepreneurial University

The concept of the entrepreneurial university has evolved significantly in recent decades, moving from a purely economic perspective to incorporate social and environmental elements. Models such as the triple helix (Etzkowitz & Leydesdorff, 2000) have been expanded to the quadruple and quintuple helix, the latter including the environment as an essential actor in the articulation between university, government, the productive sector, and civil society (Carayannis & Campbell, 2010). This approach reinforces the role of the university as an active agent in sustainable territorial development, capable of producing innovations that not only generate economic value but also contribute to the ecological transition and collective well-being. Recent studies (Awasthy et al., 2022; Zhang & Wong, 2025) emphasize that the integration between sustainability and university entrepreneurship requires profound institutional reconfigurations, going beyond the simple creation of green *startups* .

Furthermore, there is a growing appreciation for social innovation, incorporated into the mission of universities through interdisciplinary curricula, active methodologies, and spaces for co-creation with the community (Fini et al., 2018; Duque et al., 2020). Sustainable entrepreneurship in higher education, therefore, goes beyond the focus on creating ecological companies, assuming a strategic role in building sustainable futures, especially in developing countries (Pereira et al., 2021; Oliveira et al., 2020). The contemporary entrepreneurial university, from this perspective, expands its traditional mission by including sustainability as a guiding principle for its academic and innovation activities.

Literature has reinforced the idea that the concept of entrepreneurial universities, initially focused on generating *spin-offs* , licensing, and patents, needs to expand to incorporate a sustainability dimension (economic, environmental, and social). For example, the study " *Entrepreneurialism Meets Sustainability* " by Cai & Ahmad (2025) analyzes cases in Brazil and China and shows that the organizational structures and governance modes of higher education institutions influence the transition from entrepreneurial universities to " *Sustainable Entrepreneurial Universities* " (SEUs).

In parallel, the review " *Innovative and Entrepreneurial Universities in Latin America* " (OECD/IDB, 2022) shows that Latin American institutions are already promoting entrepreneurship, incubation, and community engagement, impacting local innovation and sustainable development. This evidence reinforces the need for not only structural but also cultural change, considering leadership committed to sustainability, multi-sectoral partnerships, and metrics that assess social and environmental impact, in addition to financial return.

Additionally, recent studies show that sustainable entrepreneurship in higher education should be understood as part of an innovation ecosystem. For example, research on digital entrepreneurship ecosystems in Latin America (Pigola, Fischer & Moraes, 2024) reveals that

elements such as digital technology transfer, cooperation networks, and digital infrastructure have a significant socio-environmental and economic impact. Thus, universities act as connectors of actors (government, market, civil society, environment), promoting flows of knowledge, resources, and value that transcend the innovative product or service itself, contributing to sustainable socio-territorial changes.

In the context of developing countries, the role of the sustainable entrepreneurial university takes on increased relevance, since these institutions face challenges such as resource scarcity, weak regulation, and limited infrastructure. The research " *Factors influencing the sustainable entrepreneurial intentions of university students in Medellín, Colombia* " (Valencia-Arias et al., 2025) indicates that factors such as perceived control over entrepreneurial behavior, social norms, and intrinsic or extrinsic rewards significantly influence the intention to undertake sustainable entrepreneurship.

From this perspective, Latin American and Brazilian universities are called upon to align their teaching, research, and outreach missions not only with the creation of new businesses, but also with the strengthening of local production chains, the circular economy, social impact, and the mitigation of environmental externalities. Adopting this approach broadens the role of higher education as a catalyst for the transition to more sustainable societies.

Overall, the literature suggests that the transition toward sustainable entrepreneurial universities involves the integration of entrepreneurial activities with broader sustainability goals. This transition requires institutional alignment across governance structures, pedagogical approaches, and innovation ecosystems, reinforcing the role of universities as agents of socio-environmental transformation.

2.2 The Sustainable University: Conceptual Frameworks and Practical Challenges

The concept of a Sustainable Entrepreneurial University *(* SEU) emerges from the need to align the essential functions of higher education—teaching, research, and outreach—with the **Sustainable Development Goals (SDGs) .** This paradigm presupposes the cross-cutting incorporation of sustainability into the administrative, pedagogical, and strategic structures of institutions (Lozano et al., 2013). This alignment redefines the role of universities in the 21st century, shifting the focus from the simple transmission of knowledge to the **formation of citizens and organizations committed to sustainable development** .

The SEU is not limited to environmental practices, but involves a systemic approach encompassing **participatory governance, collaborative networks, organizational culture, and engagement of internal and external stakeholders** (Martínez et al., 2018; Santos et al., 2022). Studies such as those by Costa et al. (2017) and Ruiz et al. (2021) show that universities with more open structures, distributed leadership, and innovative organizational culture integrate sustainability principles more effectively into their institutional models. This integration translates into coherent institutional policies, investments in pedagogical innovation, and... **Mechanisms for evaluating sustainable performance** allow sustainability to become a core management principle and not just institutional rhetoric.

In recent years, the concept of a sustainable university has been strengthened by comparative analyses conducted in different regions of the world. Generally, this concept involves integrating sustainability into the strategic, academic, and operational dimensions of higher education institutions, including institutional planning oriented towards the Sustainable Development Goals, participatory governance, environmental management of the campus, incorporation of sustainability into curricula, and promotion of research and innovation focused on sustainable development. In this context, Lozano et al. (2023), in a study involving 76

European higher education institutions, identified that institutional sustainability is strongly associated with the presence of integrated strategic plans, environmental and social governance systems, and faculty training programs focused on sustainable development. Similarly, Wu, Hu, and Chang (2024) demonstrate that Asian universities have invested in green infrastructure, ESG indicators, and certified environmental management systems, which strengthens their legitimacy with society and public and private investors.

In the Latin American context, the challenges are more complex and multifaceted. Pereira et al. (2021) and López et al. (2020) indicate that institutional barriers such as political instability, budget constraints, and internal cultural resistance hinder the consolidation of long-term sustainability practices. In this context, Vargas-Merino et al. (2025) argue that universities in the region need to adopt adaptive organizational learning models that involve stronger collaboration with external stakeholders and continuous feedback mechanisms. This implies rethinking the role of university management and academic leadership in fostering an institutional culture capable of balancing innovation, transparency, and social responsibility.

Furthermore, recent studies emphasize the importance of **inter-institutional partnerships and global networks** for the consolidation of sustainable universities. Schaltegger, Hörisch, and Freeman (2022) highlight that the advancement of sustainability initiatives depends on the ability of universities to integrate into **collaborative learning networks** and regional innovation ecosystems. Examples such as the *Green Office Movement* and the *Global Universities Partnership on Environment and Sustainability (GUPES) network* show how the exchange of best practices and the internationalization of strategies contribute to accelerating the transition towards more sustainable institutions. In Brazil, research conducted by Martins and Jabbour (2023) and Barcellos et al. (2024) shows that universities that adopt **Mechanisms that incorporate participatory governance** and link their institutional indicators to the SDGs show more consistent progress in implementing the 2030 Agenda.

The discussion on sustainable entrepreneurial universities has also been deepened by studies that seek to systematize its structuring elements, articulating entrepreneurship, sustainability, and institutional transformation in the context of higher education. In this sense, the proposition of a set of basic elements stands out, highlighting the need for alignment between governance, pedagogical practices, innovation, university extension, and institutional commitment to sustainability, contributing to the conceptual consolidation of the field (Lara et al., 2025).

Finally, the consolidation of a sustainable university depends on the **internalization of sustainability as an organizational value** , which requires profound and continuous cultural changes. The training of committed leaders, the creation of transparent institutional policies, and the integration of research, teaching, and outreach are interdependent dimensions that determine the effectiveness of this transformation. The transition to a sustainable university, therefore, is not merely a technical process, but... an **institutional and social movement** that redefines the mission and impact of higher education on human and planetary development (Figueiró et al., 2024; Karahan et al., 2024).

It is important to highlight that the empirical studies mentioned in this section are used for conceptual and contextual purposes, contributing to the delimitation of the theoretical field of sustainable entrepreneurship in higher education. The systematic empirical analysis of these studies, as well as the synthesis of the findings, is developed in sections 4.2 and 4.3.

3. Methods

3.1 Type and design of the view

This systematic review was conducted based on the methodological guidelines of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2019) and the **PRISMA 2020 reporting protocol** (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Page et al., 2021). The approach adopted was qualitative, focusing on empirical evidence applied to the social sciences. The complete protocol was developed on the* **Parsifal** platform .

The review adopts a qualitative systematic review approach focused on thematic synthesis of empirical studies .

Empirical studies (qualitative, quantitative, or mixed) addressing experiences in universities or higher education institutions focusing on sustainable entrepreneurship were included . Studies should address at least one of the following themes: (i) implementation factors, (ii) institutional barriers, (iii) impacts on students, (iv) management practices, and (v) organizational change. Peer-reviewed articles published between 2005 and 2025 were considered, with no language restrictions. Theoretical articles, grey literature, reviews, and texts outside the context of higher education were excluded.

3.2 Information sources and search strategy

The search was conducted in October 2025 in the Web of Science – Core Collection and Scopus (Elsevier) databases . English descriptors with Boolean operators and truncations were used.

Web of Science: TS=((entrepreneur* NEAR/3 sustainab*) AND (universit* OR "higher education" OR "higher education institution*" OR "academic institution*") AND ("implementation factor*" OR barrier* OR challenge* OR "impact on students" OR "student outcome*" OR "institutional practice*" OR "organizational change" OR "institutional change"))

Scopus: TITLE-ABS-KEY((entrepreneur* W/3 sustainab*) AND (universit* OR "higher education" OR "higher education institution*" OR "academic institution*") AND ("implementation factor*" OR barrier* OR challenge* OR "impact on students" OR "student outcome*" OR "institutional practice*" OR "organizational change" OR "institutional change"))

Filters: document type (articles); subject areas (Social Sciences, Education, Administration); period (2004–2025).

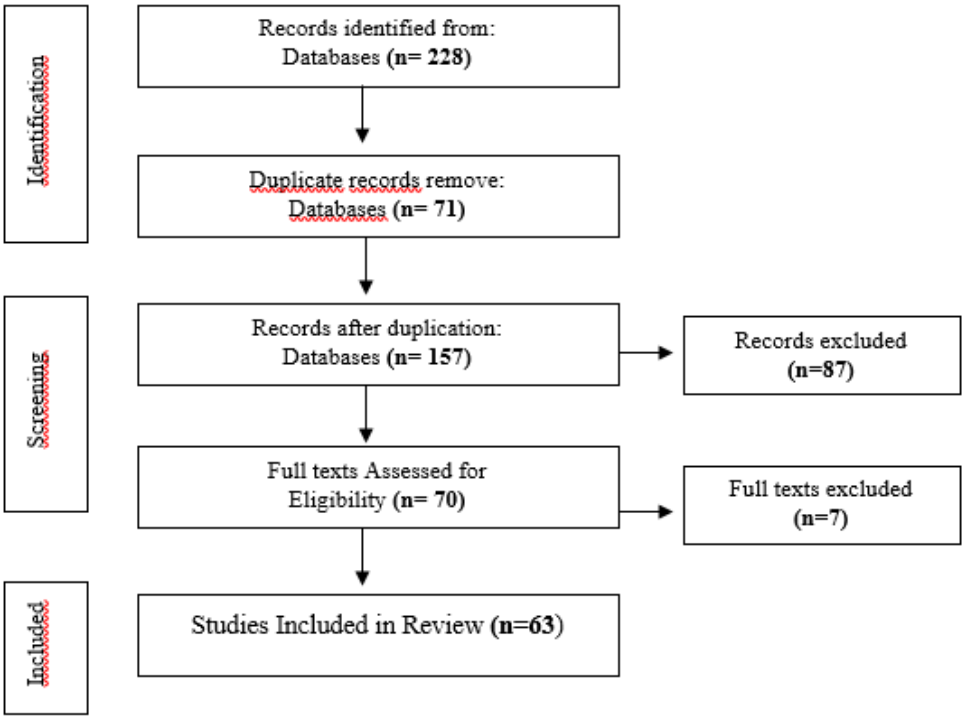
3.3 Study selection process

The screening of records was carried out in Parsifal by two independent reviewers. The process followed these steps:

Records identified in the databases: 228
Duplicates removed: 71
Records after duplication: 157
Records screened by title and abstract: 157
Records excluded in this phase: 87
Full texts evaluated for eligibility: 70
Full texts excluded: 7
Studies included in the qualitative synthesis: 63

Figure 1 presents the PRISMA 2020 flowchart relating to the selection process.

Figure 1 - PRISMA flow diagram of the study selection process



Source: Developed by the authors.

3.4 Data extraction and analysis

Data extraction from the 63 studies was performed by two independent reviewers using a structured spreadsheet adapted from Table 7.3.a of the Cochrane Handbook (2019). Although the complete instrument includes detailed fields such as country, study type, participants, analytical categories, limitations, and risk of bias, only the essential information for the initial characterization of the studies (author(s)/year and journal) is presented in Table 1, in order to ensure clarity and avoid excessive complexity in the body of the article. The remaining extracted items are described in full in Appendix 1.

The thematic synthesis followed an inductive coding process. In the first stage, key findings from each study were extracted and coded according to their main contributions. Subsequently, similar codes were grouped into broader analytical categories. Through iterative comparison and discussion between the reviewers, five thematic axes emerged: implementation factors, institutional barriers, impacts on students, internal management practices, and organizational change. Discrepancies in coding were discussed among the reviewers until consensus was reached.

Data analysis was conducted through qualitative thematic synthesis, allowing the studies to be grouped according to the five analytical axes identified during the coding process: (1) implementation factors; (2) institutional barriers; (3) impacts on students; (4) internal management practices; and (5) organizational change.

Table 1 - Summary of studies included in the review (n = 63)

Code	Autor(es)	Journal
A1	Fernandez-Jimenez, M.-A.; Aranda, L.; Mena-Rodriguez, E. (2025)	Cogent Education
A2	Alimehmeti, G.; Ndoka, E.; Paletta, A. (2025)	International Journal Of Sustainability In Higher Education
A3	Amin, S. et al. (2025)	Entrepreneurship Education
A4	Burden, H.; Sprei, F. (2025)	Irish Journal Of Management
A5	Dağlı, G. et al. (2025)	Asian Development Policy Review
A6	Ly-Baro, F. et al. (2025)	Journal Of The International Council For Small Business
A7	Asad, M. et al. (2025)	Sustainability
A8	Elafqih, B.; Messaoudi, A. (2025)	Journal Of Education Culture And Society
A9	Klucznik-Toro, A.; Kippenberg, K. (2025)	International Journal Of Sustainability In Higher Education
A10	Bhagyani, A. A. B. et al. (2025)	Journal Of Applied Research In Higher Education
A11	Minhas, W. et al. (2025)	Journal Of Applied Research In Higher Education
A12	Dixit, Agrawal & Agarwal (2025)	Management Decision
A13	Buzzao et al.(2025)	Business Strategy And The Environment
A14	McQuillan, D.; Gavigan, S. (2025)	Irish Journal of Management
A15	Tomasi et al. (2024)	Triple Helix
A16	Thanapornsangsuth (2024)	Entreprneurship Education
A17	Librado-Gonzalez et al. (2024)	Visions For Sustainability
A18	Barrera-Verdugo et al. (2024)	Plos One
A19	Mishra et al. (2024)	Cogent Business \& Management
A20	Paredes-Chacín, A. J.; Flórez-Ortega, R. (2024)	Revista de Ciencias Sociales
A21	Okuogume, A.; Toledano, N (2024)	Sustainability (Switzerland)
A22	Torres-Sanchez, P. et al. (2024)	Frontiers In Education
A23	Diepolder, C. S. et al. (2024)	Sustainability
A24	Zaidan, E. et al. (2024)	Humanities \& Social Sciences Communications
A25	Blankesteijn, M. L. et al. (2024)	Journal Of Innovation \& Knowledge
A26	Cobo, J. (2024)	Sustainable Technology And Entrepreneurship
A27	Okyere, G. A. et al. (2024)	Journal Of Entrepreneurship
A28	Walther, S. et al. (2024)	Education Sciences
A29	Pepin, M. et al. (2024)	International Journal Of Sustainability In Higher Education
A30	Meslem, A. et al. (2024)	Economics And Culture
A31	Paiva, L. E. B. et al. (2023)	Contaduria y Administracion
A32	Isac, C. et al. (2023)	Sustainability
A33	Sharma, R.; Singh, A. (2023)	Dynamic Relationships Management Journal
A34	Gimenez-Jimenez, D.; Harc, M. (2023)	Education Research International
A35	Kotla, B.; Bosman, L. B. (2023)	Trends in Higher Education
A36	Jebsen, S. et al. (2023)	International Journal Of Management Education

A37	El-Gohary, H. et al. (2023)	Sustainability
A38	Okyere, G. A. et al. (2023)	Education Research International
A39	Andruk & Altinay (2022)	Journal Of Small Business And Enterprise Development
A40	Cai, X. et al. (2022)	Sustainability
A41	Lopez-Leyva, J. A. et al. (2022)	Sustainability
A42	Karahan, M. et al. (2022)	Journal Of Cleaner Production
A43	Hermann, R. R. et al. (2022)	Educational Action Research
A44	Burden, H.; Sprei, F. (2022)	Sustainability
A45	Siriteerawasu, W.; Niramitchainont, P. (2022)	Kasetsart Journal Of Social Sciences
A46	Zhong, Z. et al. (2022)	Asia Pacific Education Review
A47	Karlsson-Bengtsson, A., Enelund, M. & Bingerud, M. (2021)	Advances in Engineering Education
A48	Tunio, M. N. et al. (2021)	Sustainability
A49	Mead, M. et al. (2021)	Sustainability
A50	Friberg, C.; Thomassen, M. L. (2021)	Global Business Engineering
A51	Del Vecchio, P. et al. (2021)	International Journal Of Entrepreneurial Behavior \& Research
A52	Klucznik-Törő, A. (2021)	Sustainability (Switzerland)
A53	Morris, M. H. et al. (2021)	International Journal Of Sustainability In Higher Education
A54	Butkouskaya, V. et al. (2020)	Sustainability
A55	Voldsund, K. H. et al. (2020)	Procedia Computer Science
A56	Munoz, R. M. et al. (2020)	Sustainability
A57	Daub, C.-H. et al. (2020)	International Journal Of Sustainability In Higher Education
A58	Wakkee, I. et al. (2019)	Technological Forecasting And Social Change
A59	Nave, A.; Franco, M. (2019)	Journal Of Cleaner Production
A60	Tiemann, I. et al. (2018)	International Journal Of Entrepreneurial Venturing
A61	Sandoval, F.; Garcia, F. (2016)	2nd International Conference On University Social Responsibility
A62	Badulescu, D. Et Al. (2015)	Journal Of Environmental Protection And Ecology
A63	Brezet, H. C.; Silvester, S. (2004)	Environmental Engineering and Management Journal

Table 1 presents a descriptive summary of the 63 included studies, offering an overview of their temporal and editorial distribution. Each study was identified by an alphanumeric code (A1–A63), which was used in the analysis, thematic synthesis, and discussion of results stages. Even in a condensed format, this systematization facilitates the traceability of the studies and helps identify initial patterns in the literature on sustainable entrepreneurial universities.

The full references for the studies included in the systematic review (A1–A63) are presented in Appendix A.

3.6 Evaluation of methodological quality

The methodological quality of the included studies was assessed by two independent reviewers, with cross-checking procedures to ensure consistency in the evaluation process.

Due to the methodological heterogeneity of the included studies (qualitative, quantitative and mixed methods), a formal standardized appraisal tool was not applied. Instead, the methodological robustness of the studies was assessed using descriptive criteria commonly adopted in social science systematic reviews, including clarity of research objectives, methodological consistency, and alignment between results and conclusions.

In addition, potential institutional, cultural, and contextual biases were considered when explicitly identified in the studies.

4. Results and Discussion

This section presents the findings of the systematic review conducted based on the 63 selected studies, organized into two complementary stages: (i) general descriptive analysis and (ii) thematic synthesis by axes. The systematization sought to identify methodological, geographical, and thematic patterns in the scientific production on sustainable entrepreneurship in higher education, with a view to constructing a critical overview of the advances, gaps, and challenges faced by universities in the process of institutional transformation.

4.1 General Characterization of the Studies

Of the 228 studies initially identified in the Web of Science and Scopus databases, 157 were considered eligible after removing duplicates (n = 71). After screening by title and abstract, 70 studies were selected for full-text reading. In the end, 63 fully met the established inclusion criteria.

4.2 Descriptive Analysis of the Included Studies

The 63 studies included in the systematic review were published between 2004 and 2025, demonstrating a progressive growth in academic interest in sustainable entrepreneurship in higher education over the last two decades. The highest concentration of publications is observed from 2019 onwards, indicating the recent consolidation of the topic as a relevant research agenda in the university context.

The articles analyzed were published in scientific journals from different areas of knowledge, highlighting the multidisciplinary nature of the field of sustainable entrepreneurship in higher education. The studies are mainly distributed among journals in the areas of education, management, sustainability, and innovation, with particular emphasis on journals specializing in sustainability and higher education, such as * *International Journal of Sustainability in Higher Education** , * *Sustainability** , and * *Journal of Cleaner Production* *. This concentration suggests that the debate has been conducted primarily from an institutional and educational perspective, rather than a strictly entrepreneurial or economic one. At the same time, the presence of journals focused on management and innovation indicates a movement towards closer ties between organizational studies and higher education, reinforcing the hybrid and emergent character of the field.

Regarding the methodological approach, a predominance of qualitative studies was observed **(n=29; 46%) ,** followed by **quantitative (n=23; 36.5%)** and **mixed (n=11; 17.5%) studies .** This methodological diversity contributes to a richer and more contextualized analysis, by articulating empirical data, qualitative interpretations, and integrated analyses. This methodological balance indicates that the field combines interpretive approaches, statistical analyses, and integrated models, allowing for the understanding of complex institutional phenomena from multiple perspectives.

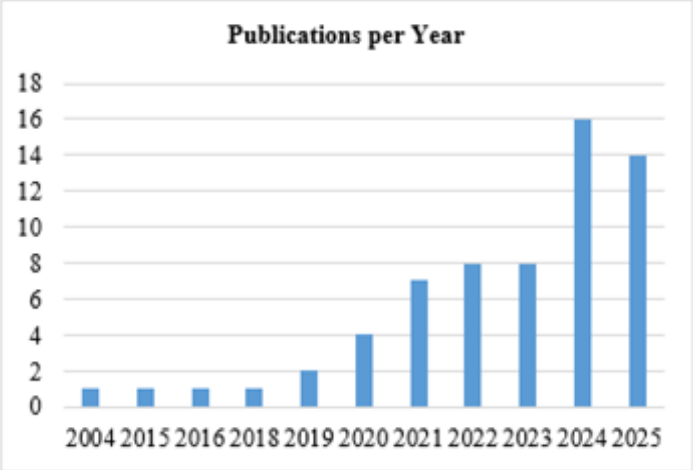
The geographical distribution of the studies reveals broad international diversity. Europe concentrates the majority of the research (27 studies; 42.9%), followed by Asia, including the Middle East (16 studies; 25.4%), and Latin and South America (14 studies; 22.2%). Regions such as North America, Oceania, and Africa appear in smaller proportions (6 studies; 9.5%), highlighting a production more concentrated in European contexts, but with gradual expansion to other regions.

Regarding the institutional context, the studies focus mainly on public universities, although they also include experiences in private institutions, inter-institutional consortia, and community initiatives. Among the arrangements analyzed, sustainable entrepreneurship programs, academic incubators, green innovation centers, university-community partnerships, and curricula integrated with sustainability stand out.

Regarding the five thematic areas, a higher incidence of studies focused on internal management practices was observed (57.8%), followed by impacts on students (46.9%), institutional barriers (45.3%), organizational change (39.1%), and implementation factors (34.4%). For analytical purposes, the areas are discussed in the sequence presented in Table 2.

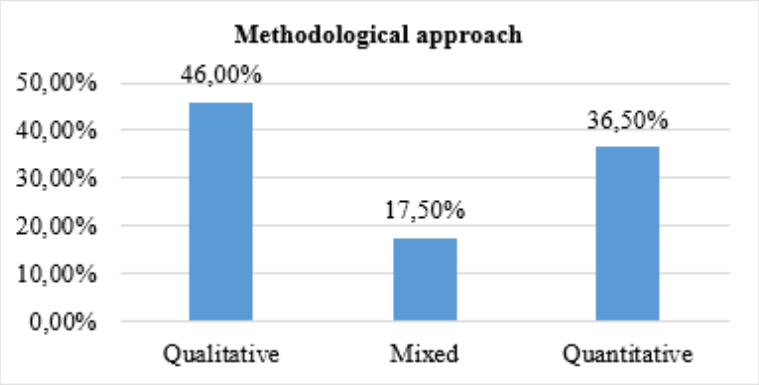
Figures 2 to 5 graphically illustrate the temporal distribution of publications, the research methods adopted, the geographical scope of the studies, and the frequency of the thematic axes analyzed.

Figure 2 - Distribution of publications per year.



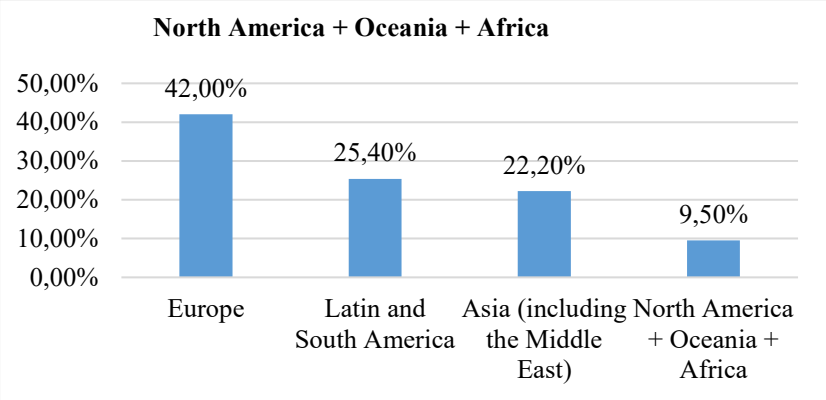
Source: Developed by the authors.

Figure 3 - Distribution of methodological approaches



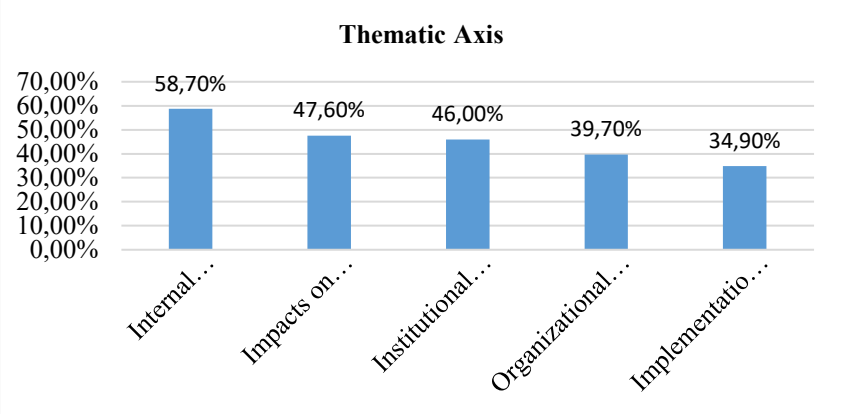
Source: Developed by the authors.

Figure 4 - Geographic distribution of studies



Source: Developed by the authors.

Figure 5 - Thematic Axis



Source: Developed by the authors.

Overall, the descriptive results indicate a consistent advancement in research on sustainable entrepreneurial universities, highlighting qualitative approaches that explore

diverse institutional contexts. The predominance of case studies and contextualized empirical research reflects the literature's interest in understanding implementation processes, organizational challenges, and educational impacts, rather than measuring isolated quantitative effects. These findings provide the necessary background for the next stage, which deepens the analysis of the five thematic axes identified in this review.

4.2 Thematic Summary of Results

The qualitative analysis of the 63 studies included in this review was structured based on the five thematic axes defined in the methodological protocol. The articles frequently address multiple axes simultaneously, highlighting the interconnected nature of the factors involved in sustainable entrepreneurship in the university context. Table 2 presents a consolidated view of these axes, summarizing the main findings and relating the studies that support them.

Table 2 - Thematic Areas, Main Findings and Corresponding Studies

Thematic Axis	Main Findings	Corresponding Studies
Axis 1: Implementation Factors	Support and commitment from senior management. Formal institutional sustainability policies Alignment between mission, strategy, and academic practices. - External partnerships with government, businesses, and the community. - Teacher training and skills development for ESD - Institutional infrastructure (incubators, living labs, hubs) - Integration between teaching, research and outreach - Availability of financial and institutional resources	A1–A16; A18–A25; A27–A33; A35–A38; A40–A48; **A49–A60** ; A61–A63
Axis 2: Institutional Barriers	Internal cultural resistance and low faculty participation. Lack of or instability of funding. -Rigid curriculum and traditional academic structures Organizational fragmentation between sectors and departments -Absence of socio-environmental impact indicators Institutional overload and lack of formal incentives - Dependence on individual leaders (risk of discontinuity)	A4; A7; A10; A13; A18; A22; A23; A25; A29; A31; A34; A39; A41; A44; A47; A52; A54; A56; A57; A59
Axis 3: Impacts on Students	-Development of entrepreneurial skills and *soft skills* -Increased sustainable entrepreneurial intent Greater social and environmental engagement and a stronger sense of purpose. Active and experiential learning (PBL, real-world projects, living labs) -Development of critical and systemic thinking -Expanding collaborative networks (students, alumni, community) -Improved employability and civic engagement	A1–A7; A9–A12; A15–A21; A24; A26–A30; A32–A37; A40–A46; A48; A50–A55; A58; A61; A62
Axis 4: Internal Management Practices	Integrated environmental management and cross-cutting institutional policies -Creation of sustainability centers, commissions or offices -Inclusion of socio-environmental criteria in institutional evaluation	A8; A10; A11; A13; A14; A16; A18; A22; A24; A31; A33; A35; A38; A39; A41; A44; A47; A48; A49; A50;

Thematic Axis	Main Findings	Corresponding Studies
	Formal incentives for innovation and sustainable entrepreneurship. Environmental certifications and sustainability reports. -Participatory governance involving multiple stakeholders -Use of ESG indicators and alignment with the SDGs -Implementation through pilot projects with subsequent scaling up.	A52; A56; A57; A58; A59; A60; A63
Axis 5: Organizational Change	Gradual and incremental processes of institutional change. Organizational learning and institutionalization of practices. -Coherence (or tension) between institutional discourse and practice The importance of distributed leadership and participatory governance. -Dependence on the institutional and territorial context Sustainability as an ongoing process, not as a final state.	A9; A11; A13; A14; A16; A18; A22; A23; A31; A35; A39; A41; A44; A47; A48; A49; A52; A56; A57; A59; A63

Codes A1–A63 correspond to the studies listed in Table 1. A single study may encompass more than one thematic axis, reflecting the interconnected nature of the dimensions analyzed in sustainable entrepreneurship in higher education.

The organization of the results by thematic axis shows that sustainable entrepreneurship initiatives in universities are addressed in a multidimensional way in the literature, simultaneously involving institutional, pedagogical, and cultural aspects. The diversity of geographical, institutional, and methodological contexts of the studies analyzed contributes to a more comprehensive understanding of the dynamics associated with promoting sustainability in higher education.

These findings provide the analytical basis for the integrated discussion presented in the following section, in which the five thematic axes are explored in depth in light of the literature and empirical evidence identified.

4.3 Integrated Discussion of the Findings

The results of this systematic review indicate that sustainable entrepreneurship in higher education has been progressively incorporated in different institutional contexts, although still marked by significant heterogeneity. The studies analyzed converge in demonstrating that such initiatives are not limited to the one-off creation of startups or environmental projects, but are configured as broader processes of institutional transformation, involving pedagogical, organizational and governance dimensions (A8; A11; A13; A22; A31; A35; A41; A47; A52; **A56; A57; A60; A63).**

Regarding the factors that favor the implementation of these practices, the empirical literature recurrently highlights the role of senior management commitment and the existence of formalized institutional sustainability policies (A1–A6; A10; A11; A13; A14; A22; A24; A31; A35; A38; A41; A47; A52; A57). These elements contribute to the alignment between institutional mission, strategic planning, and academic practices, favoring the integration of sustainability into teaching, research, and outreach activities. Studies suggest that this alignment reduces organizational fragmentation and increases the internal legitimacy of sustainable entrepreneurship initiatives. These dynamics are consistent with the perspectives of the triple and quintuple helix models, which emphasize the role of universities as key actors in

collaborative innovation ecosystems involving government, industry, society, and the environment.

Despite these advances, institutional barriers persist that compromise the effectiveness of the implemented actions. Internal cultural resistance, especially associated with traditional academic structures and low faculty participation, appears consistently in the analyzed studies (A23; A29; A39; A41; A47; A54; A56; A57). Additionally, insufficient or unstable funding, curricular rigidity, and the absence of systematic indicators for evaluating socio-environmental impacts are frequently mentioned, challenges that are more evident in institutional contexts characterized by budgetary constraints and lower administrative capacity (A4; A18; A22; A25; A31; A34; A44; A52; A59).

The impacts on students constitute one of the most explored aspects in the included studies. Evidence indicates that sustainable entrepreneurship initiatives are associated with the development of entrepreneurial skills, socio-emotional abilities, and greater engagement with socio-environmental issues (A1–A7; A9–A12; A15–A21; A26–A30; A32–A37; A40–A46; A50–A55). Pedagogical approaches based on active learning methodologies tend to generate more consistent outcomes, such as interdisciplinary projects, problem-based learning, and co-creation experiences with the community, tend to generate more consistent effects, especially when articulated with real challenges and specific territorial contexts.

In the context of university management, studies indicate progress related to the institutionalization of sustainability through the creation of formal structures, such as sustainability centers or commissions, integrated environmental management policies, and mechanisms to encourage sustainability-oriented innovation (A8; A10; A11; A13; A16; A22; A24; A31; A35; A38; A41; A44; A47; A49; A52; A56; A57; A59; A60; A63). However, the literature suggests that these practices are more effective when accompanied by participatory governance models and institutional evaluation criteria that explicitly recognize social and environmental impacts.

Organizational change associated with sustainable entrepreneurship is described as a gradual process dependent on the institutional context. The studies analyzed indicate that successful initiatives tend to begin as pilot projects, later expanded and incorporated into institutional routines through organizational learning processes (A9; A11; A13; A14; A22; A31; A35; A39; A41; A47; A49; A52; A56; A57; A59; A60; A63). These findings reinforce perspectives from institutional change theory, suggesting that sustainability-oriented entrepreneurship in universities tends to emerge through gradual processes of organizational learning rather than through abrupt structural transformations.

In this sense, sustainable entrepreneurship initiatives can be interpreted as mechanisms of organizational learning, through which universities progressively adapt their structures, practices, and strategic priorities to sustainability-oriented innovation. In this process, the alignment between institutional discourse and actual practices becomes critical for consolidating an organizational culture oriented toward sustainability.

A comparative analysis of geographical contexts reveals relevant differences in the institutional maturity of the practices analyzed. Universities located in European countries and in more developed Asian economies tend to have more consolidated organizational structures and more stable sustainability policies, while institutions located in Latin America and Africa face additional challenges related to resource scarcity, political instability, and dependence on individual leadership for the continuity of initiatives (A14; A22; A31; A35; A41; A47; A52; A57; A59).

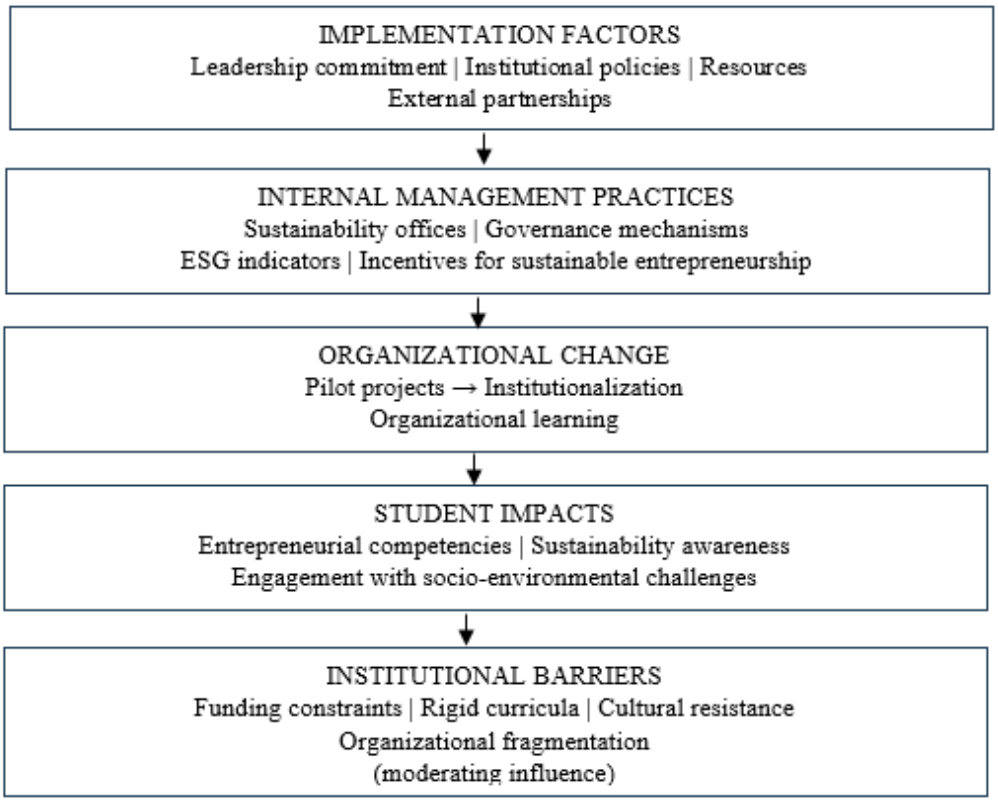
More established studies in the literature, although less recent, reinforce the understanding of sustainable entrepreneurship as a cumulative process of institutional construction, based on support systems, organizational learning, and the progressive integration of sustainability into university structures (A56; A60; A63).

In an integrated manner, the findings of this review indicate that sustainable entrepreneurship in higher education constitutes a complex and multi-scalar phenomenon, whose effectiveness depends on the articulation between institutional structures, pedagogical practices, and organizational culture. The consolidation of these initiatives requires strategic alignment, adequate governance mechanisms, and institutional capacity for continuous learning, respecting the specificities of the contexts in which universities are embedded.

Taken together, the findings suggest that sustainable entrepreneurship should not be interpreted as a peripheral activity within universities, but rather as part of a broader institutional transformation in which sustainability becomes embedded in governance structures, educational practices, and innovation ecosystems.

Based on the synthesis of the reviewed studies, Figure X presents a conceptual framework that integrates the main dimensions identified in the literature. The framework suggests that sustainable entrepreneurial initiatives in universities tend to emerge from a combination of implementation factors, such as leadership commitment, institutional policies and external partnerships. These factors influence the development of internal management practices that support sustainability-oriented entrepreneurship. Over time, such practices contribute to processes of organizational change, which are reflected in pedagogical innovations and institutional learning. Ultimately, these transformations generate impacts on students, particularly in terms of entrepreneurial competencies and sustainability engagement. Institutional barriers operate as contextual constraints that may limit or moderate the implementation of these initiatives.

Figure 6. Conceptual framework of sustainable entrepreneurial universities derived from the systematic review



Source: Developed by the authors.

The framework illustrates the relationships among the main dimensions identified in the systematic review. Implementation factors, such as leadership commitment, institutional policies, availability of resources, and external partnerships, act as initial drivers that enable the development of sustainability-oriented practices within universities. These factors influence the establishment of internal management practices, including governance mechanisms, sustainability offices, and incentive structures that support entrepreneurial initiatives aligned with sustainability principles. Over time, these practices contribute to processes of organizational change, often beginning with pilot initiatives that gradually become institutionalized through organizational learning. As these transformations occur, universities generate impacts on students, particularly in the development of entrepreneurial competencies, sustainability awareness, and engagement with socio-environmental challenges. At the same time, institutional barriers such as funding constraints, rigid curricular structures, and cultural resistance may moderate or limit the implementation and consolidation of these initiatives.

5. Final Considerations

This systematic review analyzed 63 empirical studies that investigate the integration of sustainable entrepreneurship in higher education, bringing together evidence produced in different institutional and geographical contexts. The synthesis shows that sustainable entrepreneurship in universities goes beyond the isolated promotion of environmentally oriented businesses and involves broader transformations in organizational structures, pedagogical practices, and governance mechanisms within higher education institutions. In this sense, the initiatives identified in the literature indicate a gradual process through which sustainability is incorporated into the traditional missions of universities, particularly when aligned with teaching, research, and extension activities.

The analysis of the five thematic axes indicates that the successful implementation of sustainable entrepreneurship initiatives is frequently associated with the presence of committed institutional leadership, formalized organizational policies, and the availability of institutional resources. In addition, the active participation of different university actors, including managers, faculty members, and students, appears as an important element in consolidating sustainability-oriented entrepreneurial practices. At the same time, the studies reviewed reveal that institutional barriers remain significant, especially those related to rigid curricular structures, organizational fragmentation, and limited financial resources. These barriers tend to be more pronounced in institutional contexts characterized by political instability or reduced administrative capacity.

The findings also suggest that educational initiatives based on active learning methodologies, experiential approaches, and projects connected to real socio-environmental challenges tend to produce more consistent outcomes in student development. In particular, these initiatives contribute to strengthening entrepreneurial competencies, socio-emotional skills, and students' engagement with sustainability issues. These results reinforce the importance of pedagogical approaches that connect entrepreneurial learning with broader societal and environmental challenges.

From a theoretical perspective, this review contributes to the consolidation of the debate on sustainable entrepreneurial universities by integrating dispersed empirical evidence and organizing it into five interconnected analytical dimensions: implementation factors, institutional barriers, impacts on students, internal management practices, and organizational change. This analytical structure allows sustainable entrepreneurship in higher education to be understood as a complex institutional phenomenon whose effectiveness depends on the alignment between organizational structures, pedagogical practices, and the specific institutional contexts in which universities operate.

Despite these contributions, some limitations should be acknowledged. The methodological heterogeneity of the studies included in the review limits direct comparisons across findings. In addition, the focus on articles published in scientific journals may have restricted the inclusion of relevant experiences reported in institutional documents or other sources of gray literature. Furthermore, the geographical concentration of studies, particularly in Europe and Latin America, limits the generalizability of the findings to regions that remain underrepresented in the international literature.

Future research may advance this field by developing more robust indicators to assess the impacts of sustainable entrepreneurship initiatives in higher education institutions and by conducting longitudinal studies capable of examining the continuity and effectiveness of these initiatives over time. Comparative analyses across different higher education systems, as well as investigations into the role of public policies and interinstitutional networks, may further

contribute to a deeper understanding of the factors that support or constrain the development of sustainable entrepreneurial universities.

These findings also highlight the importance for university leaders and policymakers to design institutional strategies that integrate sustainability, entrepreneurship, and educational innovation as mutually reinforcing dimensions.

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APPENDIX A – Studies included in the systematic review (A1 - A63)

A1
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A2
Alimehmeti, G., Ndoka, E., & Paletta, A. (2025). Cultivating green pioneers: Examining the antecedents of sustainable entrepreneurial intent in higher education. *International Journal of Sustainability in Higher Education*.

A3
Amin, S., et al. (2025). Exploring the sustainable development of entrepreneurial businesses among Indonesian college students. *Entrepreneurship Education*.

A4
Burden, H., & Sprei, F. (2025). The impact of climate entrepreneurship education in higher education institutions: A university-wide climate entrepreneurship programme. *Irish Journal of Management*.

A5
Dağlı, G., et al. (2025). Developing social entrepreneurship skills in community projects for sustainable development goals. *Asian Development Policy Review*.

A6
Ly-Baro, F., et al. (2025). Seeking for effectiveness of sustainability entrepreneurial education programs: A multiple case analysis. *Journal of the International Council for Small Business*.

A7
Asad, M., et al. (2025). Sustainable entrepreneurial intention among university students: Synergetic moderation of entrepreneurial fear and use of artificial intelligence in teaching. *Sustainability*.

A8
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A9
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to sustainability and climate action through social entrepreneurship. *International Journal of Sustainability in Higher Education*.

A10
Bhagyani, A. A. B., et al. (2025). Universities as change agents for green entrepreneurship: Role of support systems and self-efficacy in fostering sustainable ventures in Sri Lanka. *Journal of Applied Research in Higher Education*.

A11
Minhas, W., et al. (2025). The sustainable university: Creating societal impact, the next step! *Journal of Applied Research in Higher Education*.

A12
Dixit, J. K., Agrawal, V., & Agarwal, S. (2025). Sustainable entrepreneurship: Exploring the intention–behavior gap. *Management Decision*.

A13
Buzzao, G., et al. (2025). Sustainable entrepreneurship support programs in nature-protected areas: How universities' third mission aids sustainability transitions. *Business Strategy and the Environment*.

A14
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A16
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A20
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A49
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A52
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A54
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