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Exploring Entrepreneurial Sustainability: Trends, Drivers, and Future Directions

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Abstract

Introduction: Entrepreneurial sustainability has emerged as an important research domain that integrates entrepreneurship with environmental, social, and economic sustainability objectives. Despite the growing number of publications, previous bibliometric studies remain fragmented, limited in temporal coverage, and provide insufficient understanding of the intellectual structure, thematic evolution, and future research directions of entrepreneurial sustainability. **Methods:** This study employed a Systematic Literature Review (SLR) combined with bibliometric analysis following the PRISMA framework. Data were collected from the Scopus database, yielding 1,932 publications, which were systematically screened to obtain 876 eligible articles. Bibliometric mapping was conducted using VOSviewer through keyword co-occurrence, overlay visualization, and density visualization to identify research themes, intellectual structures, and emerging trends. **Results:** The bibliometric analysis identified 8 major thematic clusters representing the intellectual structure of entrepreneurial sustainability research. Sustainability, circular economy, digital transformation, and supply chain management emerged as the dominant research themes. Overlay visualization revealed a significant shift from conceptual sustainability toward digital transformation, sustainable, and business performance in recent years, particularly in developing countries. Density visualization further indicated that sustainable finance, eco-tourism, international entrepreneurship, and creative industries remain underexplored research areas, presenting opportunities for future investigation. **Conclusion:** Entrepreneurial sustainability has evolved into an increasingly interdisciplinary research field driven by digitalization and sustainability transitions. This study contributes by providing a comprehensive bibliometric overview of research evolution over three decades and identifying emerging themes and research gaps. The findings offer valuable guidance for researchers, policymakers, and practitioners in developing evidence based strategies and future research agendas to promote sustainable entrepreneurship.

KEYWORDS

Entrepreneurial sustainability; bibliometric analysis; vosviewer; prisma; digital transformation.

Introduction

Sustainability challenges have become a significant focus in global discussions, driven by heightened awareness of environmental problems, social inequity, and finite natural resources (Hariram et al., 2023) (Hariram et al., 2023). Climate change, environmental degradation, and demands for social justice are compelling diverse sectors to implement sustainable development strategies (Brunelli, 2020; De Silva-Lokuwaduge et al., 2022). The global economy is transitioning from an exploitative growth model to an inclusive, long-term paradigm, as evidenced by the Sustainable Development Goals (SDGs) initiative introduced by the United Nations (Shabbir, 2023, 2024).

This paradigm shift influences the evolution of entrepreneurship's role in the global economic system. Entrepreneurship is now regarded as a catalyst for economic value

creation and a facilitator of social and environmental transformation. It led to the

Table 1. Comparison of Previous Bibliometric Studies and the Present Study

Authors	Research Focus	Scope	Main Limitation	Contribution of the Present Study
Klarin (2021)	Social entrepreneurship	Social entrepreneurship	Limited to one entrepreneurship domain	Covers entrepreneurial sustainability as an integrated field
Klarin & Suseno (2023)	Social entrepreneurship	Recent developments	Does not examine sustainability transitions and digitalization comprehensively	Identifies thematic evolution and emerging sustainability trends
Hajikhani & Suominen (2022)	Sustainable innovation	Innovation research	Focuses on innovation rather than entrepreneurial sustainability	Maps the intellectual structure of entrepreneurial sustainability
Kurek et al. (2023)	Sustainable innovation	Innovation studies	Limited thematic coverage	Examines interdisciplinary relationships among entrepreneurship, sustainability, and digitalization
Pangarso et al. (2022)	Circular economy in MSMEs	MSMEs	Narrow industrial scope	Covers multiple sectors and entrepreneurial contexts
Calabrò et al. (2021)	Family entrepreneurship	Family business	Limited organizational context	Provides comprehensive bibliometric mapping across entrepreneurial sustainability literature
Present Study	Entrepreneurial Sustainability	Scopus (1993–2024), 876 articles	—	Integrates PRISMA, keyword co-occurrence, overlay visualization, and density visualization to identify intellectual structure, thematic evolution, research gaps, and future research directions.

emergence of entrepreneurial sustainability, a method that incorporates economic, social, and environmental goals into its business model (Challoumis, 2024; Ferlito & Faraci, 2022; Rosário et al., 2022). This paradigm prioritizes sustainability in innovation, decision-making, and value development. The Global Entrepreneurship Monitor study (Israel, 2025) indicates a growing interest among the younger generation in company concepts founded on sustainability principles.

Despite the growing significance of entrepreneurial sustainability, the scientific understanding of its intellectual evolution, thematic structure, and developmental trajectory remains incomplete. The current literature is fragmented, exhibiting a dispersed emphasis on subjects like green entrepreneurship (Odeyemi et al., 2024), social entrepreneurship (Praszkier & Munnik, 2023), and sustainable innovation (Fauzi et al., 2025), lacking a cohesive endeavor to delineate the interconnections among these concepts systematically. The disjunction among studies creates a deficiency in establishing a complete theoretical foundation for sustainable entrepreneurship

The studies employed thus far are predominantly characterized by localized narrative or case-based studies with restricted temporal scope. Few studies have systematically employed bibliometric tools to chart conceptual and collaborative advancements in sustainable business longitudinally. Nonetheless, numerous preliminary studies have endeavored to implement bibliometric analysis in pertinent fields, including the examination of social entrepreneurship research trends (Klarin, 2021; Klarin & Suseno, 2023), the mapping of sustainable innovation subjects (Hajikhani & Suominen, 2022; Kurek et al., 2023), and bibliometric reviews concerning the circular economy within the framework of micro, small, and medium enterprises (MSMEs) (Pangarso et al., 2022). (Calabrò et al., 2021) empirically examine the interplay between family entrepreneurial literature and sustainability concerns. Nonetheless, these studies have not thoroughly and precisely reviewed the issue of entrepreneurial sustainability in an integrative and cross-decade context. Consequently, a more thorough bibliometric methodology is required to address the literature gap and strategically delineate future research

trajectories. Table 1 summarizes the characteristics and limitations of previous bibliometric studies and highlights the distinctive contribution of the present study.

Consequently, there remains a significant research gap in providing a comprehensive longitudinal mapping of entrepreneurial sustainability literature that integrates systematic article selection with multiple bibliometric analyses. Addressing this gap requires a rigorous methodological approach capable of identifying the intellectual structure, thematic development, collaboration patterns, and future research directions of entrepreneurial sustainability. Bibliometric analysis offers an appropriate approach because it enables the statistical and visual exploration of scientific knowledge networks and their evolution over time (Donthu et al., 2021).

Moreover, previous bibliometric reviews differ considerably in their temporal coverage, analytical focus, and methodological approaches. Most studies analyzed relatively short publication periods or concentrated on particular themes, limiting their ability to capture the long-term evolution of entrepreneurial sustainability research. Furthermore, they generally relied on a limited range of bibliometric indicators and did not simultaneously examine thematic evolution, intellectual structure, emerging research trends, and research gaps through integrated bibliometric visualization techniques. Table 1 summarizes the characteristics and limitations of previous bibliometric studies and highlights the distinctive contribution of the present study.

This work seeks to address this gap utilizing the systematic literature review (SLR) methodology (Donthu et al., 2021) in conjunction with the PRISMA protocol and bibliometric analysis facilitated by VOSviewer software. Data were sourced from the Scopus database, encompassing 1993 to 2024. This method will delineate the thematic evolution, primary themes, and conceptual frameworks within the literature on entrepreneurial sustainability. This mapping will reveal the primary clusters, collaborations among authors or institutions, and existing research gaps.

Using 876 Scopus-indexed publications published between 1993 and 2024, this study maps the intellectual structure, thematic evolution, research clusters, and emerging trends of

entrepreneurial sustainability. Unlike previous studies, this research integrates keyword co-occurrence, overlay visualization, and density visualization within a single bibliometric framework, providing a more comprehensive understanding of the field and identifying future research opportunities for scholars, practitioners, and policymakers.

To achieve the objectives of this bibliometric study, three research questions were formulated to guide the analysis. The first research question examines how the entrepreneurial sustainability literature has evolved in terms of publication trends, thematic development, and intellectual structure over the period 1993–2024. The second research question investigates the major research themes, collaboration patterns, and knowledge clusters that characterize the field of entrepreneurial sustainability. Finally, the third research question explores the emerging research trends, underexplored topics, and future research directions that can be identified through bibliometric mapping. These research questions are intended to provide a comprehensive understanding of the intellectual development of entrepreneurial sustainability literature while identifying opportunities for future scholarly contributions.

Methods

This study employs a hybrid methodology integrating Systematic Literature Review (SLR) with bibliometric analysis. Both are acknowledged as quantitative and statistical methodologies for elucidating research patterns on a specific topic over a defined timeframe (Marzi et al., 2025). This methodology is extensively employed to examine and visualize literature methodically.

The initial method involves scalar approaches that examine documents in their entirety or their attributes, such as citation analysis, keyword analysis, document production, and author identification (Iqbal et al., 2021; A. Kumar & Agrawal, 2024). This technique elucidates the evolution and trends of research while quantifying the contributions of diverse entities, such as individuals, nations, or organizations.

The second approach involves analytical tools that examine the co-existence of literary features, including co-authorship, co-citation, and keyword co-occurrence (A. Kumar & Agrawal, 2024; Rana & Daultani, 2023). This method effectively identifies ties and connections among scientific works through co-occurrence and thematic associations. The fundamental premise of co-word analysis is to comprehensively comprehend the content and its connections to other scientific literature and subjects (V. Kumar & Srivastava, 2023).

Both methodologies yield quantitative data about publications, sources, authors, organizations, nations, keywords, subjects, and trends in sustainable entrepreneurship (Bocconcelli, 2018; Ekawarti et al., 2024; Mota et al., 2021; Pritchard, 1969). To comprehend the evolution of sustainable entrepreneurship from 1993 to 2024 and to encapsulate the driving variables and consequences of its acceptance, researchers executed an SLR utilizing the Elsevier Scopus database, complemented by meta-analytical bibliometric mapping. A systematic literature review SLR is essential for methodically assessing the literature framework and serves as a complete, structured, and analytical instrument for precise review management (Paul & Barari, 2022; Ritterbusch & Teichmann, 2023). SLR is a practical approach for pinpointing prospective research opportunities (Ammirato et al., 2023).

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) procedure was employed to build a systematic review, ensuring traceability and transparency in the literature selection process (Badaru, 2024). The used technique adheres to the PRISMA standards for systematic

article screening, ensuring methodological openness and reproducibility of research findings (Mohammadi et al., 2023; Nofel et al., 2024; Orošnjak et al., 2021). The SPAR-4-SLR methodology served as a reference, highlighting the processes of assembling, organizing, and evaluating the literature within a comprehensive review framework (Paul et al., 2024; Rotimi et al., 2024).

This study's visualization was conducted using VOSviewer software, which enables bibliometric mapping by intuitively illustrating links across literature items (Arruda et al., 2022; Muktiarni et al., 2023; van Eck & Waltman, 2013). This application facilitates the generation of maps derived from co-authorship, co-citation, and keyword co-occurrence, yielding a comprehensive comprehension of the knowledge framework within the study subject.

Data

This research employs data from Elsevier Scopus and uses Vosviewer for analysis. The objective of bibliometric analysis using VOSviewer is to condense extensive bibliometric data to delineate the intellectual framework and emerging trends within a specific topic or research domain.

The search was conducted directly on the Scopus platform at www.scopus.com to guarantee reliable and high-quality data collecting. This study employed the Scopus database because it is widely recognized as one of the most comprehensive and reliable multidisciplinary databases for bibliometric research, offering extensive coverage of peer-reviewed publications and standardized bibliographic metadata. To maximize the retrieval of relevant literature, the search strategy was designed to capture the diverse terminology used to describe entrepreneurial sustainability in previous studies.

The keyword selection was based on an initial review of the entrepreneurial sustainability literature and commonly used terminology in prior bibliometric studies. In addition to the core terms "entrepreneurial sustainability" and "sustainable entrepreneurship", several synonymous and closely related concepts, including "sustainability-driven entrepreneurship", "green entrepreneurship", and "ecopreneurship", were considered to broaden the search coverage and reduce the possibility of omitting relevant publications. However, preliminary screening indicated that these broader terms frequently retrieved articles focusing exclusively on environmental management or green business without addressing entrepreneurial sustainability as the central research domain. Therefore, the final search strategy prioritized keywords that directly represented entrepreneurial sustainability while maintaining an appropriate balance between comprehensiveness and relevance. To improve the transparency and reproducibility of the bibliometric procedure, this study explicitly reports the complete search strategy employed to retrieve relevant publications from the Scopus database. The search protocol includes the database selection, search fields, Boolean search query, publication period, document type, language restrictions, export format, and bibliometric analysis software. Reporting these parameters enables other researchers to replicate the search process and assess the robustness of the literature retrieval. The detailed search strategy is summarized in [Table 2](#).

The search was conducted in January 2025, and all retrieved records were exported in RIS format, including bibliographic information, abstracts, author keywords, indexed keywords, citation data, affiliations, and references. The retrieved publications were subsequently screened using the PRISMA 2020 protocol before being analyzed using VOSviewer. Reporting the complete search query enhances the transparency, reproducibility, and methodological rigor of the bibliometric analysis.

The data will undergo a screening procedure utilizing the PRISMA (Preferred Reporting Items for Systematic Reviews and

Table 2. Search Strategy

Item	Description
Database	Scopus
Search Field	TITLE-ABS-KEY
Search Terms	"entrepreneurial sustainability" OR "sustainable entrepreneurship" OR "SME sustainability"
Publication Years	1993–2024
Document Type	Article
Language	English
Export Format	RIS
Analysis Software	VOSviewer 1.6
Screening Method	PRISMA 2020
Final Articles	876

Meta-Analyses) protocol to guarantee transparency and rigor in the article selection process (Mohammadi et al., 2023; Nofel et al., 2024; Orošnjak et al., 2021). The PRISMA flowchart comprises four primary stages: identification, screening, eligibility, and inclusion.

Figure 1 presents the PRISMA flowchart, illustrating the screening process initiated by the Scopus search results, which were assessed to remove duplicates. The remaining articles underwent screening through title and abstract review (Badaru, 2024). Subsequently, eligible articles were subjected to comprehensive analysis to confirm adherence to the inclusion/exclusion criteria, culminating in selecting articles that satisfied the final criteria for bibliometric analysis (Badaru, 2024; Mohammadi et al., 2023). The PRISMA 2020 protocol was employed to evaluate articles in four stages: the initial stage involved the removal of duplicate articles, followed by a screening phase where titles and abstracts were reviewed to exclude irrelevant or inaccessible articles (Mohammadi et al., 2023; Nofel et al., 2024; Orošnjak et al., 2021). The third stage involves assessing the eligibility of articles by analyzing the complete text according to inclusion criteria, culminating in the final selection of articles for subsequent analysis.

Analysis

Bibliometric analysis is conducted in multiple stages, including descriptive analysis, to comprehend the literature's contribution to a specific scientific domain via science mapping with VOSviewer. Science mapping encompasses a range of methodologies and strategies that facilitate the creation of visual representations of scientific maps, elucidating both structural and dynamic dimensions of scientific knowledge.

This study employs VOSviewer, grounded in scientific principles, to generate valuable maps, networks, and data. Science mapping is a crucial instrument in research as it visually depicts links and interactions within the scientific field (Passas, 2024; Pessin et al., 2022). The method for examining it involves considering the subsequent elements:

- Co-occurrence analysis detects the most frequently utilized keywords and emerging topics (Narong & Hallinger, 2023).
- Co-citation analysis examines the most prominent writers and literature (Song et al., 2023; Tan Luc et al., 2022).
- Bibliographic coupling is a data processing phase that categorizes research according to shared references (Song et al., 2023; Zang, 2021).
- Overlay, network, and density visualization involve chronologically tracing the evolution of study themes and emphasizing research patterns (Cho et al., 2022; Li et al., 2022).

Each of these techniques contributes to understanding sustainable entrepreneurship's intellectual landscape by revealing interrelationships between research, geographic

trends, and emerging research gaps. Thus, the SLR approach documents the literature and provides strategic direction for future research agendas.

Result and Discussion

Literature Selection Results (PRISMA)

The article selection procedure adheres to the PRISMA flow, comprising four systematic stages: identification, screening, eligibility evaluation, and inclusion. From the Scopus database spanning 1993-2024, 1,932 articles were found, and the findings were then evaluated using PRISMA, as illustrated in Figure 1. Utilizing the PRISMA during the identification phase, the author discerned pertinent scientific papers by a Boolean combination of the terms "entrepreneurial sustainability" OR ("sustainable entrepreneurship") OR ("SME sustainability"). The search results yielded 1,932 articles from 1993 to 2024. After the identification phase, a filtering procedure was implemented to exclude irrelevant items. A total of 289 articles were eliminated due to duplication, as the same article appeared multiple times in the Scopus database search results. The author first filtered the remaining 1,643 publications based on their titles and abstracts. During the screening stage, the remaining 1,643 records were evaluated based on predefined inclusion and exclusion criteria to ensure an objective and transparent selection process. The inclusion criteria comprised Table 3: (1) peer-reviewed journal articles, (2) publications written in English, (3) studies published between 1993 and 2024, (4) articles indexed in the Scopus database, and (5) publications focusing on entrepreneurial sustainability or closely related concepts within the fields of business, management, entrepreneurship, sustainability, economics, and environmental studies. The exclusion criteria included conference papers, book chapters, review notes, editorials, non-English publications, duplicate records, studies outside the scope of entrepreneurial sustainability, and publications with inaccessible full texts. Based on these criteria, 492 records were excluded because they did not satisfy the predefined eligibility requirements, primarily due to thematic irrelevance, publication type, language restrictions, or the unavailability of complete full-text documents.

Visualization Results and Bibliometric Findings

A bibliometric study was performed to ascertain theme linkages, research dynamics, and prospective trends in sustainable entrepreneurship. The employed visualizations comprise keyword co-occurrence, overlay visualization, and density visualization utilizing VOSviewer software.

Keyword co-occurrence network visualization

Network visualization demonstrates the visualization of keyword networks that illustrate the conceptual framework of sustainable entrepreneurship literature. Each node signifies a keyword, while the lines connecting nodes indicate the frequency of association or co-occurrence of keywords inside the same article. Figure 2 presents the outcomes of the keyword network visualization, which depicts the interconnections among essential themes in the literature on entrepreneurial sustainability.

Alongside visual mapping via term networks, bibliometric analysis was performed to categorize keywords into clusters that signify theme concentrations in sustainable entrepreneurship literature.

The keyword co-occurrence analysis generated eight thematic clusters, representing the intellectual structure of entrepreneurial sustainability research. The relative significance of each cluster was assessed using three bibliometric indicators: the number of keywords, total keyword occurrences, and Total Link Strength (TLS). Higher occurrence frequencies and TLS values indicate stronger conceptual

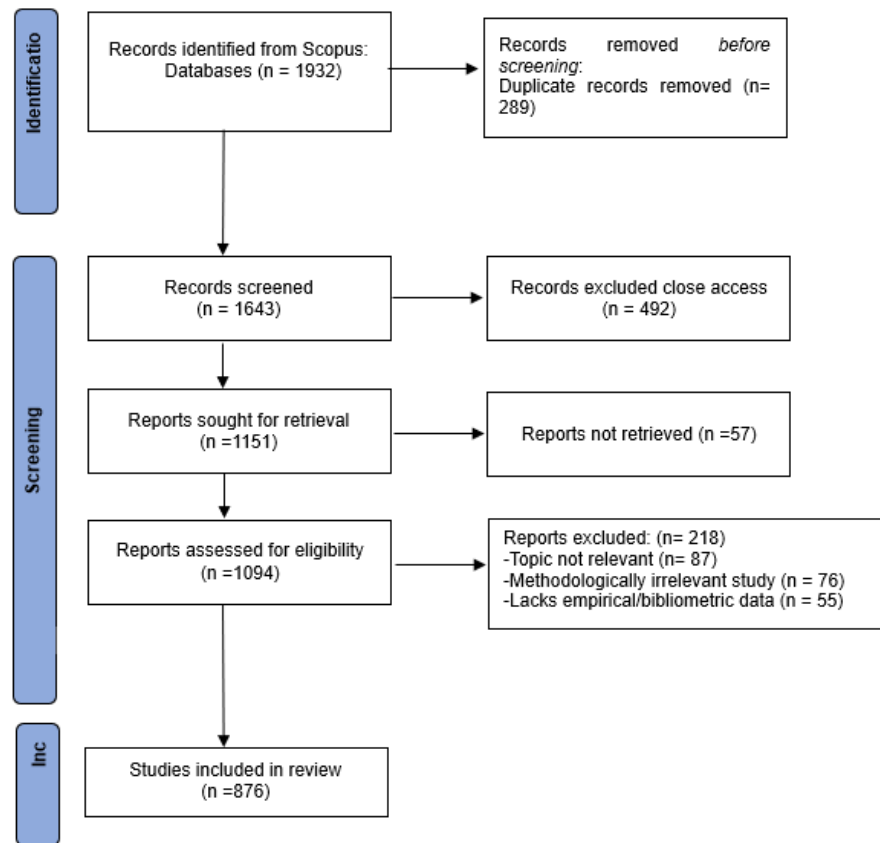


Figure 1. Article selection process using PRISMA

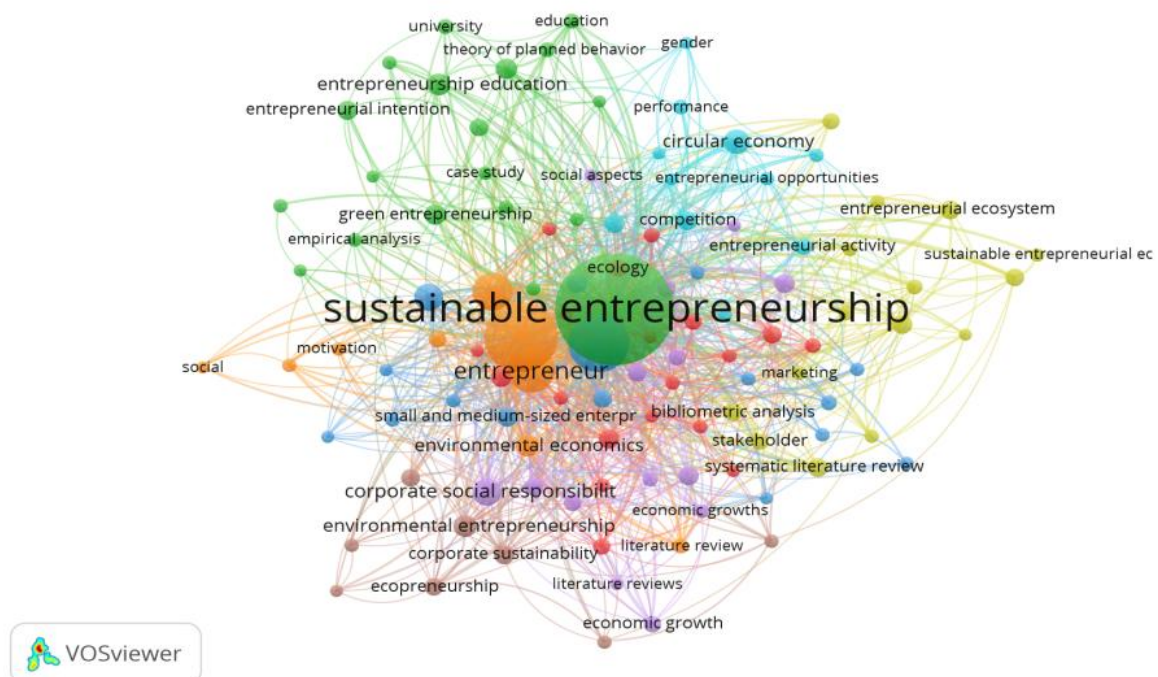


Figure 2. Network visualization of entrepreneur sustainability

relationships and greater influence within the knowledge network. The bibliometric characteristics of each cluster are presented in Table 4.

The results demonstrate that Cluster 2 is the most influential thematic group, containing 19 keywords, 556 total occurrences, and the highest Total Link Strength (TLS = 1,223). This indicates that *sustainable entrepreneurship*

constitutes the dominant intellectual foundation of the research field and maintains the strongest conceptual relationships with other topics. Cluster 7 also exhibits a substantial influence (TLS = 998), emphasizing sustainability, entrepreneurship, and innovation as the core conceptual pillars of entrepreneurial sustainability. In contrast, Clusters 6 and 8 show lower connectivity, suggesting that themes related to

Table 3. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication type	Peer-reviewed journal articles	Conference papers, book chapters, editorials, notes, reviews
Language	English	Non-English publications
Publication period	1993–2024	Outside the study period
Database	Scopus	Non-Scopus sources
Subject area	Business, Management, Entrepreneurship, Sustainability, Economics, Environmental Studies	Unrelated subject areas
Research topic	Entrepreneurial sustainability and closely related concepts	Studies unrelated to entrepreneurial sustainability
Document quality	Full-text accessible, complete bibliographic information	Inaccessible full text or incomplete bibliographic information

circular economy, environmental entrepreneurship, and ecopreneurship remain relatively specialized and offer promising opportunities for future research. These findings collectively indicate that entrepreneurial sustainability has evolved from a sustainability-oriented perspective toward broader interdisciplinary domain integrating entrepreneurship, innovation, ecosystems, and sustainable development.

Overlay visualization (Keyword temporal trends)

The overlay visualization provides insights into the temporal evolution of entrepreneurial sustainability research by assigning colors according to the average publication year of each keyword. Earlier research themes are represented by blue and purple nodes, whereas more recent topics are shown in green to yellow. This visualization enables the identification of emerging research trends and reveals how the intellectual focus of entrepreneurial sustainability has shifted over time. As presented in [Table 5](#), the literature has gradually evolved from foundational topics such as environmental entrepreneurship and corporate sustainability toward entrepreneurial ecosystems, circular economy, stakeholder engagement, and systematic evidence synthesis.

This method enables the author to discern both the conceptual connections among keywords and the temporal evolution of scientific trends. Identifying novel subjects, emerging domains, and prospective trajectories in sustainable entrepreneurship research is crucial. [Table 5](#) indicates a novel trend in studies connecting digitization with corporate resilience and sustainability, particularly within developing nations over the past 3-5 years.

The overlay visualization reveals a clear temporal transition in entrepreneurial sustainability research. Earlier studies (2018–2019) primarily focused on environmental entrepreneurship, corporate sustainability, ecopreneurship, and entrepreneurship education, reflecting the foundational stage of sustainability-oriented entrepreneurship. Between 2020 and 2022, the research focus gradually shifted toward broader and more integrated themes, including circular economy, entrepreneurial ecosystems, stakeholder

engagement, organizational performance, and economic growth. The emergence of bibliometric analysis and systematic literature review as recent keywords also indicates that entrepreneurial sustainability has evolved into a mature research domain requiring systematic evidence synthesis and intellectual mapping. These findings suggest that future research is likely to emphasize ecosystem-based entrepreneurship, collaborative governance, and sustainable value creation rather than solely environmental management.

Density visualization (Keyword temporal trends)

The density visualization illustrates the concentration and frequency of keyword occurrences within the entrepreneurial sustainability literature published between 1993 and 2024. In the density map presented in [Figure 4](#), brighter yellow areas indicate keywords with the highest occurrence frequencies and strongest conceptual influence, representing the core knowledge base of the field. Green areas denote moderately developed research themes with substantial scholarly attention, whereas blue areas represent relatively less explored topics that remain peripheral within the current literature. Consequently, the density visualization not only identifies the dominant concepts but also highlights potential directions for future research.

[Table 6](#) summarizes the interpretation of the density visualization by classifying keywords according to their concentration within the bibliometric network and discussing their implications for future entrepreneurial sustainability research.

According to [Figure 4](#) and [Table 6](#), sustainable entrepreneurship constitutes the principal knowledge hub within the literature, supported by the strong prominence of the keyword entrepreneur. The density visualization demonstrates that the research field has progressively evolved from its traditional emphasis on environmental entrepreneurship and corporate sustainability toward broader interdisciplinary perspectives encompassing entrepreneurial ecosystems, stakeholder engagement, circular economy, and systematic evidence synthesis. Although themes such as entrepreneurship education, university involvement, gender, and behavioral approaches have received increasing scholarly attention, they remain relatively less developed than the core sustainability themes. These findings suggest that future research should further investigate the integration of sustainability education, entrepreneurial ecosystems, inclusive entrepreneurship, and institutional support to advance sustainable entrepreneurial development across different regional and industrial contexts.

Evolution of Entrepreneurial Sustainability Research

The bibliometric analysis demonstrates that entrepreneurial sustainability has evolved into an increasingly multidisciplinary research field integrating entrepreneurship, sustainability, innovation, and ecosystem development. As indicated by the keyword co-occurrence network ([Figure 2](#) and [Table 4](#)), sustainable entrepreneurship occupies the central position within the intellectual structure of the literature, confirming that sustainability has become the dominant paradigm underpinning entrepreneurial research perspective. This finding is consistent with (Castro Oliveira et al., 2022; Genoveva & Tanardi, 2022; Gupta et al., 2023), who argue that sustainability has become an essential strategic orientation for entrepreneurial development. However, compared with previous bibliometric studies rather than merely a complementary environmental focusing on specific sustainability-related domains, the present study demonstrates a broader integration of entrepreneurship with institutional, educational, environmental, and ecosystem perspectives over a longer observation period.

The network visualization also indicates that entrepreneurial sustainability is increasingly connected with

Table 4. Bibliometric Characteristics of the Identified Clusters

Cluster	Number of Keywords	Total Occurrences	Total Link Strength (TLS)	Representative Keywords	Theoretical Interpretation
1	19	142	550	Business model, business models, ecology, value creation, decision making	Resource-Based View (RBV)
2	19	556	1,223	Sustainable entrepreneurship, entrepreneurship education, green entrepreneurship, students	Entrepreneurial Ecosystem and Human Capital Theory
3	16	233	654	Entrepreneurship, SMEs, start-ups, environment, SDGs	Triple Bottom Line (TBL) Theory
4	15	127	386	Entrepreneurial ecosystem, ecosystems, bibliometric analysis, systematic literature review	Entrepreneurial Ecosystem Theory
5	14	136	503	Corporate social responsibility, sustainable entrepreneurs, crowdfunding, triple bottom line	Stakeholder Theory and Triple Bottom Line Theory
6	11	97	274	Circular economy, sustainable innovation, entrepreneurial activity, performance	Circular Economy and Innovation Theory
7	9	314	998	Sustainability, innovation, environmental economics, entrepreneur, entrepreneurship	Sustainability Transition Theory
8	8	73	206	Environmental entrepreneurship, corporate sustainability, ecopreneurship	Environmental Entrepreneurship Theory

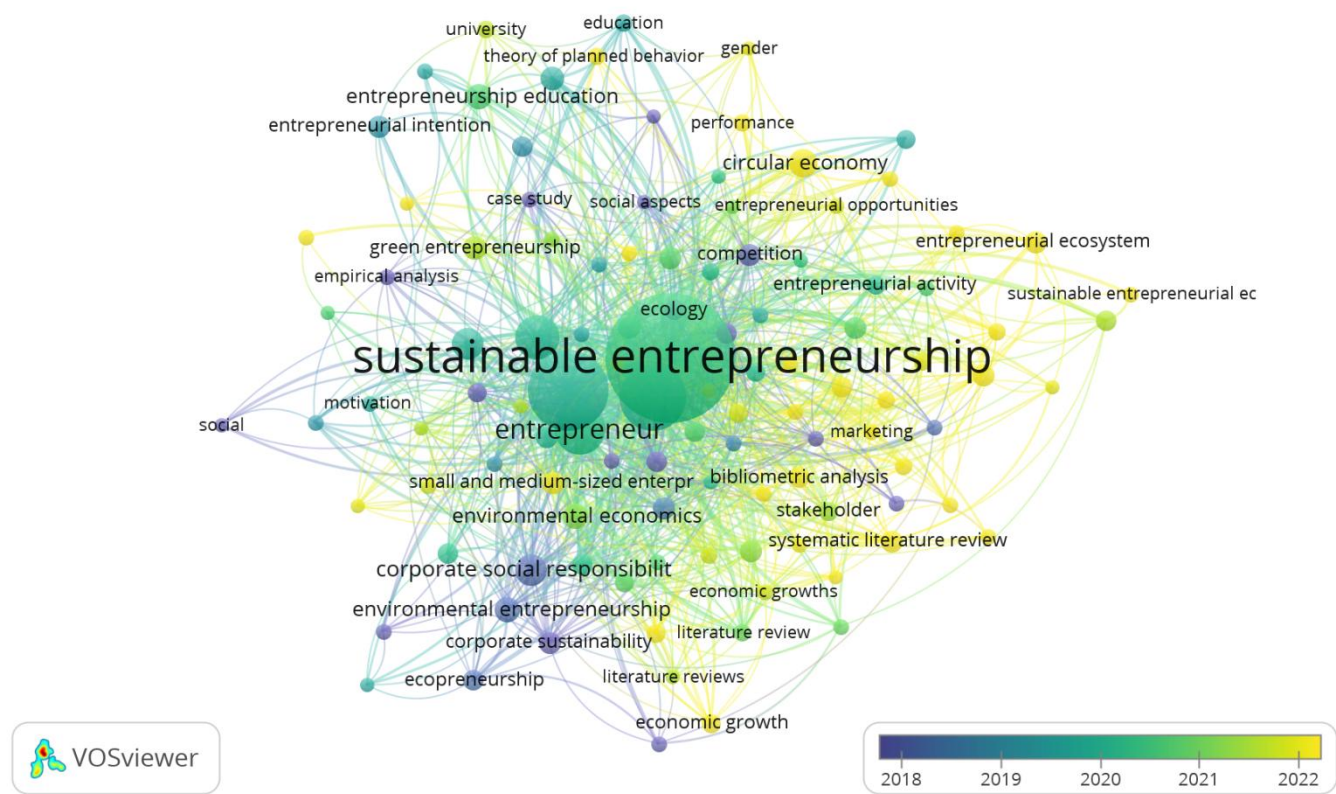


Figure 3. Overlay visualization of entrepreneur sustainability

entrepreneurial ecosystems, circular economy, stakeholder engagement, entrepreneurship education, and organizational capabilities. These findings suggest that the field has expanded beyond environmental management toward a comprehensive framework encompassing sustainable value creation and collaborative governance (Karahan, 2024; Ratajczak-Mrozek et al., 2025; Tyshchenko et al., 2024).

Temporal Evolution of Research Themes

The overlay visualization (Figure 3 and Table 5) reveals a

gradual transition in entrepreneurial sustainability research. Earlier publications were primarily concerned with environmental entrepreneurship, corporate sustainability, entrepreneurship education, and entrepreneurial intention, representing the foundational stage of sustainability-oriented entrepreneurship. More recent studies increasingly emphasize entrepreneurial ecosystems, circular economy, stakeholder engagement, bibliometric analysis, and systematic literature review, indicating the maturation of entrepreneurial sustainability into an independent and interdisciplinary

Table 5. Overlay Visualization of Entrepreneurial Sustainability Research Trends

Keyword	Dominant Period	Interpretation
Sustainable Entrepreneurship	2019–2021	Represents the core concept connecting entrepreneurship with sustainability and serves as the central intellectual foundation of the research field.
Entrepreneurship	2019–2020	Early studies primarily examined entrepreneurial activities and innovation as drivers of sustainable development.
Environmental Entrepreneurship	2018–2019	Initial research emphasized environmentally oriented entrepreneurial practices and ecological responsibility.
Corporate Sustainability	2018–2019	Early publications focused on integrating sustainability principles into corporate management and strategic decision-making.
Ecopreneurship	2018–2019	Research explored environmentally responsible entrepreneurial behavior and green business practices.
Entrepreneurship Education	2019–2020	Growing attention was given to developing sustainability competencies through entrepreneurship education.
Circular Economy	2021–2022	Increasingly recognized as a strategic approach for achieving sustainable business models through resource efficiency and waste reduction.
Entrepreneurial Ecosystem	2021–2022	Emerging research emphasizes the importance of institutional support, collaboration, and innovation ecosystems in fostering sustainable entrepreneurship.
Sustainable Entrepreneurial Ecosystem	2021–2022	Recent studies extend ecosystem perspectives by integrating sustainability objectives into entrepreneurial support systems.
Stakeholder	2021–2022	Research increasingly highlights stakeholder collaboration as a key mechanism for sustainable value creation.
Bibliometric Analysis	2021–2022	The increasing number of bibliometric studies reflects the maturation of entrepreneurial sustainability as an independent research field.
Systematic Literature Review	2021–2022	Demonstrates a growing emphasis on evidence synthesis and comprehensive mapping of entrepreneurial sustainability literature.
Economic Growth	2021–2022	Recent studies increasingly investigate the contribution of sustainable entrepreneurship to inclusive economic development.
Performance	2021–2022	Emerging literature evaluates sustainability initiatives in relation to organizational and entrepreneurial performance outcomes.

research domain (Halim et al., 2021; Khurana et al., 2022; Yáñez-Valdés et al., 2023). A further study by (Liang et al., 2025) demonstrates that implementing digital technology has expedited the shift toward more sustainable, efficient, and scalable company operations.

These findings differ from earlier bibliometric studies that emphasized digital transformation as the dominant emerging theme. Instead, the present analysis suggests that recent scholarly attention has shifted toward ecosystem-based entrepreneurship and collaborative sustainability governance. This transition reflects the increasing recognition that sustainable entrepreneurial success depends not only on technological innovation but also on institutional support, stakeholder collaboration, and knowledge integration (Nosike et al., 2024).

The Research Gaps and Future Research Opportunities

The density visualization (Figure 4 and Table 6) identifies several themes that remain relatively underexplored despite their growing importance. Topics such as entrepreneurship education, gender, university engagement, corporate sustainability, environmental entrepreneurship, ecopreneurship, and economic growth appear in peripheral areas of the bibliometric network, indicating relatively limited scholarly attention.

These findings provide important opportunities for future research. First, greater attention should be devoted to investigating how entrepreneurship education develops sustainability competencies among future entrepreneurs. Second, universities should be examined as key actors within entrepreneurial ecosystems supporting sustainable innovation. Third, future studies should explore gender-inclusive entrepreneurship and environmentally oriented entrepreneurial behavior, particularly in emerging economies where entrepreneurial ecosystems continue to evolve (Azmat

et al., 2023; Raman et al., 2024). Finally, empirical studies integrating bibliometric findings with longitudinal or comparative research designs would further strengthen theoretical development within entrepreneurial sustainability research

Theoretical Contributions

The density visualization outcomes from VOSviewer indicate that some significant subjects, like "international entrepreneurship," "eco-tourism," and "entrepreneurship in the creative industry," remain in the peripheral zone. It suggests that, while pertinent and strategic, these subjects have not been thoroughly explored in academic literature.

According to prior studies by (Firman et al., 2023; Raman et al., 2024), the tourism and creative economy sectors have significant potential to facilitate the attainment of sustainable development goals, particularly in tropical and archipelagic nations like Indonesia. Incorporating sustainability measures in this sector presents a novel domain for transdisciplinary study encompassing entrepreneurship, sustainable tourism, and community development (Pereira et al., 2023).

Similarly, the literature on international entrepreneurship remains confined to export-import activities and market expansion (Nosike et al., 2024; Ojo & Adelakun, 2025). Simultaneously, aspects such as business diplomacy, international collaboration in green innovation, and the adaption of sustainability policies among nations remain underexplored.

The Integration of Technology, Social Dimension, and Inclusivity in Sustainable Entrepreneurship

The results reveal three predominant themes that consistently emerge in sustainable entrepreneurship research: digital technology, socio-environmental sustainability, and inclusion.

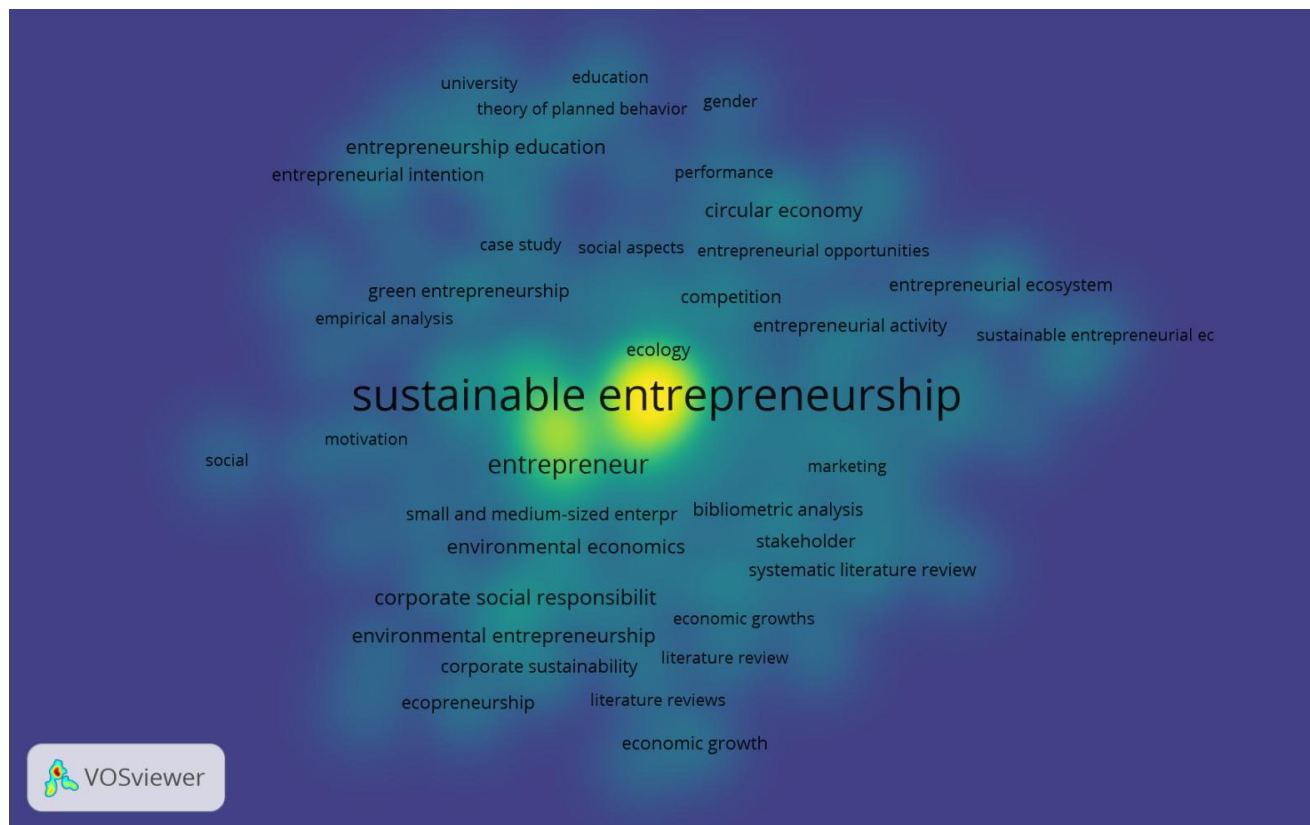


Figure 4. Density visualization

Table 6. Interpretation of density visualization

Color Zone	Main Keywords	Interpretation	Analysis
Bright Yellow (Core Area)	Sustainable entrepreneurship, Entrepreneur	These keywords represent the intellectual core of the research field, exhibiting the highest occurrence frequency and the strongest conceptual influence within the bibliometric network.	The findings indicate that entrepreneurial sustainability research is primarily centered on sustainable entrepreneurship and entrepreneurial activities as the fundamental concepts integrating environmental, social, and economic sustainability.
Green (Well-developed Themes)	Ecology, Circular economy, Entrepreneurial activity, Entrepreneurial ecosystem, Bibliometric analysis, Stakeholder, Marketing, Systematic literature review	These keywords demonstrate considerable research attention and strong conceptual relationships with the core theme.	The literature has expanded beyond traditional sustainability issues toward ecosystem development, stakeholder engagement, circular economy practices, and evidence-based knowledge synthesis, indicating increasing interdisciplinary integration.
Blue (Emerging or Underexplored Themes)	Entrepreneurship education, Entrepreneurial intention, Theory of Planned Behavior, University, Education, Gender, Corporate sustainability, Environmental entrepreneurship, Ecopreneurship, Economic growth, Social	These topics remain relatively peripheral within the bibliometric network despite their growing relevance.	These themes represent promising future research opportunities, particularly regarding entrepreneurship education, behavioral perspectives, university engagement, gender issues, and the contribution of sustainable entrepreneurship to inclusive economic growth and sustainable development.

Initially, digital technology has evolved from a mere manufacturing tool to a support system for sustainability monitoring, optimizing eco-friendly supplier chains, and engaging consumers in transparent production processes (Ning & Yao, 2023). Secondly, aspects of social sustainability, including economic justice, the creation of green jobs, and the mitigation of inequality, are the primary catalysts for inclusive entrepreneurship (Duncan-Horner et al., 2022; Prasetyo & Kistanti, 2022). Third, inclusion is the primary premise in engaging marginalized groups, including women, youth, indigenous communities, and informal business participants

(Aman et al., 2024; Bakker & McMullen, 2023).

By adopting these three pillars, entrepreneurship studies enhance the economy and serve as a holistic instrument for social and ecological transformation (Daraojimba et al., 2023; Vedula et al., 2022). It underscores that the future trajectory of entrepreneurship must promote multidimensional integration rather than solely profit attainment.

Theoretical Contributions and Practical Implications

This study offers a comprehensive review of sustainable entrepreneurship trends and facilitates the advancement of

theory and policy initiatives. From a theoretical standpoint, our findings enhance the entrepreneurial ecosystem framework by incorporating factors of sustainability and technology (Zhou & Cen, 2024). The findings contribute to several theoretical perspectives. First, the dominance of sustainable entrepreneurship and circular economy reinforces the Triple Bottom Line (TBL) framework by demonstrating that entrepreneurial success increasingly depends on simultaneously creating economic, environmental, and social value.

Second, the strong relationships among entrepreneurial ecosystem, stakeholder, and entrepreneurial activity support Entrepreneurial Ecosystem Theory, suggesting that sustainable entrepreneurship emerges through interactions among entrepreneurs, universities, governments, investors, and supporting institutions rather than individual entrepreneurial capability alone. This corroborates the findings of (Donthu, 2020; Donthu et al., 2021) in enhancing the quantitative methodology inside systematic literature reviews to achieve more comprehensive and organized insights.

Third, the growing importance of knowledge-related themes, including entrepreneurship education and organizational capability development, complements the Resource-Based View (RBV) by highlighting sustainability-oriented knowledge, innovation capability, and organizational learning as valuable strategic resources for long-term competitive advantage.

Practical Implication

The practical implications derived from the bibliometric findings are more specific than those reported in previous bibliometric reviews. For researchers, the density visualization identifies entrepreneurship education, university engagement, gender, corporate sustainability, and environmental entrepreneurship as promising research areas that remain insufficiently explored. These topics provide opportunities for interdisciplinary collaboration and comparative studies across different institutional contexts. For higher education institutions, the increasing prominence of entrepreneurship education and entrepreneurial ecosystems highlights the need to redesign entrepreneurship curricula by integrating sustainability competencies, experiential learning, and cross-sector collaboration with industry and government. For policymakers, the emergence of entrepreneurial ecosystems and stakeholder collaboration indicates that entrepreneurship policies should extend beyond financial assistance toward ecosystem development. Governments should strengthen innovation hubs, sustainability incubators, university-industry partnerships, and institutional support mechanisms that facilitate sustainable entrepreneurial activities. For entrepreneurs and business practitioners, the findings suggest that sustainable competitive advantage increasingly depends on integrating circular economy principles, stakeholder engagement, and sustainability-oriented business models rather than focusing exclusively on financial performance. Organizations should therefore invest in sustainability capabilities, collaborative innovation, and ecosystem participation to enhance long-term resilience and value creation.

Conclusion

This study provides a comprehensive bibliometric analysis of 876 Scopus-indexed publications on entrepreneurial sustainability published between 1993 and 2024, offering a systematic overview of the field's intellectual structure, thematic evolution, and emerging research directions. The findings indicate that sustainable entrepreneurship constitutes the central knowledge hub within the literature,

while entrepreneurial ecosystems, circular economy, stakeholder engagement, and entrepreneurship education have emerged as increasingly important research themes. The overlay and density visualizations further demonstrate that entrepreneurial sustainability has evolved from a predominantly environmental perspective toward a broader interdisciplinary field integrating entrepreneurship, sustainability, organizational capability, and ecosystem development.

From a theoretical perspective, this study contributes to the entrepreneurship literature by demonstrating that sustainable entrepreneurship has developed into an integrated research domain rather than a collection of isolated sustainability-related topics. The findings reinforce the complementary roles of the Triple Bottom Line (TBL), Resource-Based View (RBV), and Entrepreneurial Ecosystem Theory in explaining how entrepreneurs create sustainable value through the interaction of organizational capabilities, stakeholder collaboration, institutional support, and sustainability-oriented innovation. Furthermore, this study extends previous bibliometric reviews by providing a comprehensive longitudinal mapping of entrepreneurial sustainability over more than three decades using an integrated PRISMA-guided bibliometric approach.

The bibliometric findings also provide several practical implications. For researchers, the identification of underexplored themes including entrepreneurship education, university engagement, gender, corporate sustainability, environmental entrepreneurship, and economic growth offers clear directions for future empirical and interdisciplinary research. For higher education institutions, the growing prominence of entrepreneurship education highlights the need to integrate sustainability competencies, experiential learning, and ecosystem collaboration into entrepreneurship curricula. For policymakers, the increasing importance of entrepreneurial ecosystems and stakeholder collaboration suggests that entrepreneurship policies should prioritize ecosystem development through university industry partnerships, sustainability incubators, innovation hubs, and institutional support mechanisms rather than relying solely on financial incentives. For entrepreneurs and business practitioners, the findings emphasize that sustainable competitive advantage increasingly depends on integrating circular economy principles, stakeholder engagement, and sustainability-oriented business models into entrepreneurial strategies.

Despite these contributions, this study has several limitations. First, the analysis was restricted to Scopus-indexed journal articles published in English, potentially excluding relevant publications indexed in other databases or written in different languages. Second, the bibliometric analysis relied on keyword co-occurrence and visualization techniques, which reveal intellectual relationships but do not evaluate causal relationships among variables. Third, the findings are based on bibliographic metadata and therefore should be complemented by empirical investigations.

Future research should expand the bibliometric analysis by incorporating multiple databases such as Web of Science and Dimensions, while also integrating bibliometric techniques with systematic qualitative reviews or empirical investigations. Particular attention should be devoted to relatively underexplored themes identified in this study, including entrepreneurship education, university-based entrepreneurial ecosystems, gender-inclusive entrepreneurship, environmental entrepreneurship, and sustainability-oriented entrepreneurial capability development across different institutional contexts.

Overall, this study contributes to the growing body of entrepreneurial sustainability literature by providing a comprehensive bibliometric mapping of its intellectual evolution, identifying emerging research opportunities, and offering evidence-based recommendations that support future theoretical development, policymaking, entrepreneurship

education, and sustainable business practice.

Author contributions

Yuni Ekawarti: Conceptualization, research design, formulation of research questions, methodology development, data collection from Scopus database, bibliometric analysis using VOSviewer, interpretation of results, manuscript drafting, and final manuscript approval. Kristian Chandra: Literature review development, PRISMA screening process, data validation, visualization preparation, interpretation of thematic clusters and bibliometric findings, manuscript review, and editing. Lisa Hermawati: Methodological supervision, critical revision of theoretical framework, interpretation of sustainability and entrepreneurship perspectives, manuscript refinement, and final approval of the submitted version. ling Lukman: Statistical and bibliometric consultation, quality assurance of data analysis, language editing, manuscript proofreading, and publication administration.

All authors contributed substantially to the conception and

development of the study, participated in manuscript preparation and revision, reviewed the final version of the manuscript, and agreed to be accountable for all aspects of the work.

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