Charting Path: Sustainable Startups and Their Role in Global Sustainability Transitions

*Ms. Meenakshi Yadav, **Dr. Seema Malik

ABSTRACT

This study investigates research trends on sustainable startups and their alignment with SDGs, emphasizing dominant themes, influential contributors, and knowledge gaps. A bibliometric analysis of 509 articles (2015–2025) from Scopus and Web of Science using RStudio Biblioshiny and advanced mapping techniques. Results reveal rapid growth, fragmented collaborations, European and Asian leadership, and thematic clusters on innovation, circular economy, digital transformation, and social inclusion.Innovative business models, cross-sector partnerships, and policy environments that encourage green innovation and market growth are some of the things that help sustainable startups succeed. But they still have to deal with big problems, like not being able to get enough funding, not knowing what the rules will be, and the high cost of sustainable technologies that make it hard to use them on a large scale and have a long-lasting effect. Offers one of the first integrated bibliometric mappings of sustainable startups and SDGs, consolidating fragmented scholarship and suggesting future research directions. Restricted to English-language articles indexed in Scopus and Web of Science, potentially excluding relevant regional or non-indexed contributions. Provides actionable insights for policymakers, investors, and entrepreneurs to strengthen collaboration, inclusivity, and digital transformation in sustainable startup ecosystems. Underscores sustainable startups as transformative agents tackling inequality, climate change, and digital exclusion while advancing systemic progress toward the SDGs.

KEYWORDS

Sustainable Startups; Sustainable Development Goals (SDGs); Agenda 2030; Research Trends

*Research Scholar, Department of Commerce, Bhagat Phool Singh Mahila Vishwavidalaya, Khanpur Kalan, India
**Associate Professor, Department of Commerce, Bhagat Phool Singh Mahila Vishwavidalaya, Khanpur Kalan, India

INTRODUCTION

Sustainability has become a central concern in contemporary business and policy debates, driven by global challenges such as climate change, resource depletion, and widening social inequality (Elkington, 1997; Rockström et al., 2009). Within this context, sustainable startups represent a new generation of entrepreneurial ventures that embed environmental and social responsibility at the very heart of their business models. Unlike traditional startups, which are primarily focused on rapid growth and profit maximization, sustainable startups strive to balance profitability with a positive social and environmental impact (Cohen & Winn, 2007; Schaltegger & Wagner, 2011). They often leverage innovation, technology, and circular business practices to develop solutions that address urgent global issues while maintaining economic viability (Bocken et al., 2014).

The importance of sustainable startups lies in their agility and transformative capacity. In 2025, the global ecosystem has witnessed over 16,400 sustainability startups, with increasing activity in regions like the US, Europe, and India (Startups Insights, 2025). These ventures pioneer sustainable products, services, and business models that larger, more established firms may hesitate to adopt (Dean & McMullen, 2007). For instance, in India, a major shift towards sustainability-first startups is evident, with innovators like Desolenator using solar-powered desalination to provide clean water, and Loopworm revolutionizing agriculture through insect- based protein for animal feed (NetZero India, 2025). Globally, venture funding for sustainable technology startups reached approximately $314 billion in 2024, growing steadily from previous years as investors prioritize ventures that demonstrate both environmental impact and financial viability (Souza et al., 2024).

Beyond economic growth and job creation, sustainable startups act as catalysts for systemic change in consumption patterns, industry practices, and community well-being (Hall et al., 2010). Their activities contribute directly and indirectly to multiple United Nations Sustainable Development Goals (SDGs) (United Nations, 2015). Examples include startups advancing renewable energy (SDG 7), zero hunger through sustainable agriculture (SDG 2), good health and well-being (SDG 3), quality education (SDG 4), and responsible consumption and directly to multiple United Nations Sustainable Development Goals (SDGs) (United Nations, 2015). Examples include startups advancing renewable energy (SDG 7), zero hunger through sustainable agriculture (SDG 2), good health and well-being (SDG 3), quality education (SDG 4), and responsible consumption and production (SDG 12) (Muñoz & Cohen, 2018). The European Institute of Innovation and Technology-supported startups alone are collectively valued over EUR 71 billion due to their impact on sustainability, reflecting the rising economic and societal relevance of these ventures (EIT, 2025). In addressing global interest in this topic, we are seeking answers to these research questions.

Research Questions

1. Which authors, institutions, countries, and journals are the most prolific and influential in contributing to the field of sustainable startups and their alignment with the Sustainable Development Goals (SDGs), as measured by bibliometric performance indicators such as publication output, citation impact, and collaboration networks?

2. How can the intellectual foundations, thematic structures, and evolving research fronts of the literature on sustainable startups and SDGs be analyzed through advanced bibliometric techniques, including co-citation analysis, keyword co-occurrence, and thematic clustering, in order to map current knowledge and highlight future research directions?

3. What are the success factors and challenges faced by sustainable startups?

Despite this growing recognition, current research on sustainable startups and their role in the SDGs remains fragmented across entrepreneurship, sustainability science, and innovation management disciplines (Klewitz & Hansen, 2014). There is a pressing need to consolidate this literature, identify dominant research streams, and uncover underexplored areas. Bibliometric analysis provides a valuable method to systematically map research trends, influential authors, networks, and knowledge gaps in this field (Donthu et al., 2021). This study on bibliometric insights into sustainable startups and the SDGs is thus highly relevant, offering valuable guidance to academics, policymakers, investors, and entrepreneurs who aim to leverage innovation ecosystems for sustainable development impact.

DEVELOPMENT IN THE CONCEPTUAL FRAMEWORK

Sustainable Startups

A startup is a company incorporated within the last 10 years, with a turnover below Rs. 100 crores, not formed by splitting an existing business. It focuses on innovation and scalable growth to create wealth and employment. However, sustainable startups have attracted increasing attention in the global economy, highlighting a growing concern with sustainable development and the search for innovative solutions to tackle environmental challenges. Sustainable startups are those that integrate environmental, social, and governance (ESG) practices into their business models, seeking not only profit but also a positive impact on society and the environment (Martins de Souza, Puglieri, and de Francisco, 2024; Butkouskaya, et.al 2020; Tunçalp and Yıldırım, 2022). Startups known for their creativity, agility, and ability to disturbance have thus become indispensable in accelerating the change to sustainability (Veleva, 2021; Bocken, 2015). Startups usually lead in creative ideas to solve difficult social and environmental problems in development and implementation. Their main drivers of sustainable innovation are their ability to test creative technologies, resource management strategies, and business plans. Fields including social impact, sustainable agriculture, renewable energy, and the circular economy (Silvestre and Ĕîrcă, 2019) especially clearly show that Startups in these sectors are developing and implementing innovative business ideas and technologies directly supporting some SDGs to be achieved. Startups in the renewable energy sector, for example, are developing innovative forms of energy storage systems, wind turbines, and solar panels in accumulation to come up with creative business plans for financing and distribution renewable energy, known as sustainable startups (Cordova & Celone, 2019). These developments improve the availability of reasonably priced, environmentally friendly energy sources, so benefiting SDG 7 (Affordable and Clean Energy). Sustainable startups are demonstrating that economic growth and sustainability can coexist and help one another by including the SDGs in their corporate plans (Romero et al., 2022).

Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs), adopted by all United Nations member states in 2015 as part of the 2030 Agenda for Sustainable Development, represent a significant evolution in global development paradigms. The SDGs grew from the earlier Millennium Development Goals (MDGs), which were launched in 2000 with a target deadline of 2015 (Sorooshian, 2024). While the MDGs served as a pioneering global framework focused primarily on poverty reduction and basic human development, they were limited in scope and often critiqued for their focus on developing countries without sufficient consideration of environmental sustainability or post-2015 challenges (Hezri, 2013; Ruhil, 2015). Subsequently, a broader global consensus emerged recognizing the need for a more comprehensive and universally applicable agenda that addressed not only poverty and health but also economic growth, environmental protection, and social inclusion.

This consensus culminated in the 2030 Agenda,

which substantially expanded the agenda from eight MDGs to 17 SDGs. The range, ambition, and integrated nature of the SDGs mark a paradigm shift towards a holistic understanding of sustainability that incorporates economic,social, and environmental dimensions (Costanza et al., 2016). Crucially, the SDGs attempt to balance these dimensions with the recognition that sustainable development requires simultaneous progress on multiple fronts and across all countries, not just the developing world. This ambitious agenda is indicative of the global community's recognition that fragmented approaches are inadequate, necessitating a framework that promotes integrated development strategies and international cooperation to address complex, interrelated challenges (Pedersen et al., 2023). The evolution from the MDGs to the SDGs thus reflects an important transition from a developmental agenda focused on poverty reduction to a universal, inclusive call for transformative change.

Sustainable Startups and Sustainable Development Goals (SDGs)

Sustainable startups are vital actors in achieving the SDGs because they contribute innovative solutions that can be scaled rapidly to meet diverse development needs (Cordova & Celone, 2019; Eichler & Schwarz, 2019). Their entrepreneurial nature equips them with the flexibility to experiment with novel technologies, business models, and social approaches that address multiple SDG targets simultaneously. For instance, a sustainable startup developing affordable solar-powered water purification systems can simultaneously contribute to SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), and SDG 13 (Climate Action) (Küfeoğlu, 2022; Rumbayan et al., 2025). The ability of startups to adapt and iterate on their products and services enables them to respond agilely to complex local and global sustainability challenges.

Furthermore, sustainable startups often catalyze systemic change by demonstrating viable business models that integrate social and environmental responsibility with profitability. This can inspire and influence larger corporations and policy frameworks to adopt sustainability principles more broadly (Souza et al., 2024; Voinea et al., 2019). Their embeddedness in local ecosystems allows them to promote social inclusion and community empowerment, directly supporting goals related to poverty eradication, gender equality, and quality education (Eang et al., 2022; Ghauri, 2022). Hence, sustainable startups not only drive innovation but also embody the practical enactment of SDG aspirations through entrepreneurship, positioning them as indispensable agents in the global sustainability transition.

Evolution of theories

Theory evolution provides a solid foundation for understanding how sustainable startups align with SDGs. Since Rogers' Innovation Diffusion Theory (1962), new ideas have spread and been adopted, explaining how startups scale long-term solutions across markets and societies. Startups increasingly collaborate with governments, investors, and communities to solve problems, which aligns with SDG 17 on partnerships and Stakeholder Theory (Freeman, 1984). Startups that prioritize profitability, inclusivity, and environmental responsibility follow the Triple Bottom Line (Elkington, 1997), which integrates economic, social, and environmental performance. Sustainability Transitions Theory and the Multi-Level Perspective (Geels, 2002) view startups as niche innovators disrupting established systems to accelerate sustainability, while Social Entrepreneurship Theory (2000s) views startups as mission-driven enterprises addressing social and environmental issues, particularly poverty reduction (SDG 1) and gender equality (SDG 5). According to Ecological Modernization Theory (2000s), economic growth and environmental protection can coexist, encouraging startups to adopt eco-innovations and circular business models. Finally, the Resource-Based View (Barney, 1991) and Dynamic Capabilities Theory (Teece, 2007) explain how startups adapt to institutional pressures and global sustainability norms to gain a

competitive advantage and achieve sustainability goals. These interconnected theories explain how sustainable startups emerge, innovate, and scale to drive SDG-aligned systemic change.

RESEARCH METHODOLOGY

This paper uses RStudio (Biblioshiny) (version 4.4.2) to perform bibliometric analyses using the Scopus and Web of Science databases. Grijalva et al. (2019) propose that the methodological process is comprised of four phases: Planning, Selection, Extraction, and Execution, with the goal of achieving transparency and clarity (Rashid L. 2019).

Planning

According to Valverde and Llorens (2019), the first phase, which corresponds to planning, is the most pertinent activity. Selecting the primary international scientific databases is an integral part of the planning process. We selected the databases Scopus and Web of Science due to the high level of research and quality there (Pranckutė, R., 2021; Singh et al., 2021).

Selection

Selection is the subsequent step after planning. It is made by the following search string was employed in both databases to conduct a thorough search:

TITLE-ABS-KEY ("sustainable startups" OR "sustainable entrepreneurship" OR "sustainable business" OR "green startups" OR "eco-start-ups" OR "sustainability-oriented enterprises" OR "MSMEs" OR "SMEs" OR "Small and Medium Enterprises" OR "entrepreneurship" OR "new ventures") AND ("SDG" OR "Sustainable Development Goals" OR "Agenda 2030") AND ("success factors" OR "factors of success" OR "enablers" OR "drivers" OR "barriers" OR "challenges")

Extraction

Inclusion criteria were implemented during phase 2, which encompassed the following:

1. Data is searched on 22 August 2025, temporal range between 2015 and 2025

2. Subject areas selected in Scopus and Web of Science: - Business, Management and Accounting, Social Sciences, Economics, Econometrics and Finance, Environmental Science, Environmental Sciences Ecology, Business Economics, Social Sciences Other.

3. Only Articles that are in the English language

Figure 1 illustrates the flow chart of the research methodology.

Execution

The fourth and final phase entails carrying out the findings from the 509 relevant potential primary studies. The analysis is done through RStudio, which offers the most prolific and influential authors, institutions, countries, and journals contributing to the field of co-citation analysis, keyword co-occurrence, and thematic clustering, in order to map current knowledge of sustainable startups and their alignment with the Sustainable Develop ment Goals.

FINDINGS

Annual Scientific Production

Figure 1 shows the annual scientific production. It is evident from the growing scholarly output between 2015 and 2025 that scholars are becoming more interested in the intersection of sustainability, startups, and the Sustainable Development Goals (SDGs). Research output was limited in the early years, suggesting that sustainability-led entrepreneurship was still developing as a research focus. Nonetheless, there has been a consistent increase in publications since 2018, indicating that academics have started to acknowledge startups as important forces behind accomplishing SDG targets through innovation, green business models, and equitable economic growth. Sustainability has emerged as a fundamental lens for researching entrepreneurial

ecosystems, particularly in connection with climate action, responsible consumerism, and sustainable sector development, as seen by the apparent peak in recent years. This increasing tendency demonstrates that sustainability-focused businesses are now regarded as essential tools for implementing the SDGs locally and globally, which is why this sector of study and business is growing quickly.

Most Relevant Sources

The figure 2 highlight the most important sources for business practices and sustainability studies, which is essential for comprehending sustainable startups. Sustainability has the most papers (85), followed by Journal of Cleaner Production (23) and Sustainability (Switzerland) (18). In addition, Cogent Business and Management (12), Business Strategy and the Environment (10), Corporate Social Responsibility and Environmental Management (8), Sustainable Development (7), Technological Forecasting and Social Change (6), Emerald Emerging Markets Case Studies (6) are important sources. The interdisciplinary character of sustainable startups research is highlighted by this distribution, which connects corporate strategy, innovation and sustainability science The interdisciplinary character of sustainable startups research is highlighted by this distribution, which connects corporate strategy, innovation, and sustainability science while emphasizing how startups can act as catalysts for systemic change in line with the UN Sustainable Development Goals.

Most Cited Articles

Table 1 presents the most cited articles in the dataset, highlighting influential contributions that shape the discourse on sustainability, innovation, and business models. The most cited work is by Schot et al. (2018) in Research Policy with 1,183 citations, which shows frames of innovation include Di Vaio et al. (2020) on artificial intelligence and sustainable business models (769 citations) and Bican et al. (2020) on digital transformation in the sustainability context (299 citations). Several articles published in the Journal of Cleaner Production and Sustainability (Switzerland) also feature strongly, underscoring journals as central outlets in the field. Collectively, the most cited papers emphasize themes of innovation systems, digitalization, circular bioeconomy, entrepreneurship, and the role of business models in advancing the Sustainable Development Goals, reflecting the multidimensional nature and global relevance of the research domain.

Primary Information

Table 2 provides the primary bibliometric information extracted from the selected databases. The dataset covers the period from 2015 to 2025 and includes 509 documents published across 261 different sources. The field demonstrates a strong growth trajectory with an annual growth rate of 43.25%, and the average age of documents (2.17 years) indicates that research is relatively recent and contemporary. On average, each document has received 18.86 citations, reflecting a moderate impact in the academic community. The thematic scope of the literature is wide, as reflected in 1,884 author-provided keywords and 1,035 Keywords Plus. Authorship patterns reveal significant collaboration, with 1,640 contributing authors, an average of 3.39 co-authors per document, and only 52 single-authored papers. Moreover, international collaboration is evident, with 22.2% of documents co-authored across countries. Collectively, these indicators highlight the rapid growth, diversity, and collaborative nature of research in this field.

Average Citation per year

Figure 3 shows the average citation from 2016 to 2025. It demonstrates how research on sustainable startups and their connections to the SDGs has evolved. Between 2016 and 2017, citations increased steadily, indicating that academics are becoming more interested in corporate sustainability. In 2018 citations above 16 indicate a significant increase in interest, which is likely due to policy talks and new sustainable startups models. Citations decreased after 2019, with variations continuing into 2020-2021, indicating that early

Table 1. Most Cited Articles

Authors	Journals	Titles	Citations
Schot J, et al. (2018)	Research Policy	Three Frames For Innovation Policy: R&D, Systems of Innovation and Transformative Change	1183
Di Vaio A, et al. (2020)	Journal of Business Research	Artificial Intelligence And Business models in the Sustainable Development Goals Perspective: A Systematic Systematic Literature review	769
Bican Pm, et al. (2020)	Sustainability (Switzerland)	Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is there a Sustainable "Digital"?	299
D'amato D, et al. (2020)	Forest Policy and Economics	Towards Sustainability? Forest-Based Circular Bioeconomy Business Models in Finnish SMEs	265
Rahdari A, et al. (2016)	Journal of Cleaner Production	Achieving Sustainability Through Schumpeterian Social Entrepreneurship: The Role of Social Enterprises	210
Govindan K, et al. (2020)	International Journal of Producion Economics	Achieving Sustainable Development Goals Through Identifying and Analyzing Barriers to Industrial Sharing Economy: A Framework Development	198
Morioka Sn, et al. (2017)	Journal of Cleaner Production	Transforming Sustainability Challenges Intocompetitive Advantage: Multiple Case Studies Kaleidoscope Converging Into Sustainable Business Models	196
Horne J, et al. (2020)	Journal of Cleaner Production	Exploring Entrepreneurship Related to the Sustainable Development Goals Mapping New Venture Activities With Semi-Automated Content Analysis	135
Schaltegger S, et al. (2018)	International Journal of Entrepreneurial Venturing	Collaborative Entrepreneurship for Sustainability Creating Light of the Un Sustainable Development goals	132
Surana K, et al. (2020)	Technological Forecasting and Social Change	Strengthening Science, Technology, and Innovation-Based Incubators to Help Achieve Sustainable Development Goals: Lessons From India	115

Note: compiled by the author

Table 2: Primary information from the Databases.

Description		Description	
Main information	**Results**	**Authors**	**Results**
Timespan	2015:2025	Authors	1640
Sources(Journals,Books, etc)	261	Authors of single - authored docs	52
Documents	509	Single-authored docs	52
Annual Growth Rate %	43.25	Co-Authors per Doc	3.39
Document Average Age	2.17	International co-authorships %	22.2
Average citations per doc	18.86	Articles	509
References	0		
Keywords Plus (ID)	1035		
Author's Keywords (DE)	1884		

Note: compiled by authors using RStudio

themes had reached saturation or that the focus has changed. After 2022, the trend levels out, and by 2025 it has reached its lowest point. This trend demonstrates how sustainability discussions have broadened into other research areas by integrating sustainable startups into bigger discussions on innovation, the circular economy and the global SDGs. This reflects initial enthusiasm followed by academic diversity.

Bradford's Law

Bradford's Law Fig. 4, which groups journals according to output, demonstrated that the majority of research on sustainable startups comes from a small number of extremely productive sources. In this figure, a long, flat tail follows the Bradford plot's steep beginning curve, showing that the majority of articles are produced by a small group of journals. The primary journal, Sustainability, followed by the Journal of Cleaner Production and Sustainability (Switzerland), serves as the main academic hub. Journals such as Cogent Business and Management and Business Strategy and the Environment do contribute, though not as often. This distribution shows that a small number of core sources are home to the majority of influential research on sustainable startups, making them important venues for expanding our understanding of sustainability-driven innovation and creativity.

Most relevant Authors

With evident relevance to the study of sustainable startups, Figure 5. showcases the most active and relevant authors who have contributed to sustainability and sustainable business practices. The leading authors with four publications each, like Abdelwahed N, Lim W, and Wang S, shows that they are actively engaged and influencing this field. They are followed by Abbas A, Fuentes-Moraleda L, García-Muiña F, Günzel-Jensen F, Kim E, Korsgaard S, and Kratzer J, each of whom has three papers that shows a constant level of intellectual engagement. The existence of several authors with comparable contributions highlights the growing scholarly interest in entrepreneurship, sustainability and innovation in business practices and indicates a lively and cooperative research community.

Authors Productivity

Lotka's Law Figure 6 examines patterns of authors' productivity in scientific publishing, indicating that a tiny percentage of authors contribute several works, whereas the majority only contribute one publication. The graph in this figure shows that most authors in this dataset, which accounts for a large percentage of all contributors, have only submitted one document. On the other hand, very few authors published two or more works, and even fewer produced four or five documents. The dashed line depicts the theoretical Lotka distribution, whereas the solid line reflects

the observed data. Both lines have a similar downward tendency. This reinforces the relevance of Lotka's principle in this area, emphasizing that a small number of highly productive researchers propel the majority of research output while the majority only sometimes participate. In the field of sustainability and business study, this pattern is common across disciplines and aids in identifying important scholars and contributions.

Most Cited Countries

In the field of sustainability and SDG goals in business startups, the most referenced nations are shown in Figure 7. The United Kingdom is the most prominent contributor, with 1373 citations, and Italy comes in second with 1199 citations. Significant academic impact is also shown by China (695 citations) and Germany (784 citations), demonstrating considerable European and Asian interest in this topic. With a wide geographic distribution, the USA (606 citations), Finland (434 citations), and Spain (424 citations) all make significant contributions to scholarly influence. The global relevance of this field of study is further demonstrated by the inclusion of nations such as India (377 citations), Malaysia (111 citations), and Australia (118 citations) in the citation landscape. These trends demonstrate how sustainability and SDG goals in new business startups have garnered significant scholarly interest worldwide, with Europe emerging as a particularly potent centre of influential study.

Thematic Map

The thematic map in Figure 8 illustrates how research on sustainable startups and SDGs is organized into four clusters. Motor themes (challenges, performance, management) are both well-developed and central, highlighting their role as the driving forces of the field, with strong implications for measuring sustainability outcomes and improving managerial practices. Basic themes (sustainability, sustainable development, sustainable development goals) represent the conceptual backbone of the literature, widely used across studies but still requiring more theoretical and empirical depth. Niche themes (women, benefits, experience) indicate specialized discussions, such as gender perspectives and contextual benefits, which are well- structured but remain peripheral to the mainstream debate. Finally, emerging or declining themes (entrepreneur, SMEs, SDGs) show limited maturity and weaker connections, suggesting either an early-stage research trajectory with high growth potential or areas that need renewed scholarly attention. Together, the map demonstrates both the established core and the evolving frontiers of research on sustainable startups in relation to the SDGs.

Countries Collaboration Map

The national collaboration map places the US, India, China, and Europe as key centres for sustainability and startup research by highlighting their close research ties in Figure 9. In order to promote cooperation with both developed and Asian countries, India has become a crucial link. Dense links between the US and Europe demonstrate their leadership in international research networks, while regional alliances also allow Australia and Latin America to contribute. Moreover, the growing participation of emerging economies signals an expanding and inclusive research landscape. After considering all things,

Most Relevant Affiliations

The affiliation analysis demonstrates that the Indian Institute of Technology System (13 articles) and the Ukrainian Ministry of Education and Science (15 articles) lead research on sustainable startups and SDGs. It highlights the roles of both technology-driven universities and policy entities. Strong contributions from interdisciplinary and management domains are indicated by a second group of universities, which include University of Southern Denmark, Swinburne University of Technology, Universidad Rey Juan Carlos, Universiti Teknologi MARA, and College of Management Academic Studies (8 papers each). Furthermore, the University of Belgrade, King

Faisal University, and Politehnica Bucharest each have seven pieces that demonstrate the expanding involvement of Eastern Europe and the Middle East. With many locations promoting sustainable entrepreneurship in the direction of the SDGs, the connections collectively show worldwide and cooperative research efforts.

Keywords Occurrence

The figure 11. highlights the dominance of keywords such as sustainability, sustainable development goals, and sustainable development which emerge as central nodes, reflecting their foundational role in this field. Surrounding these are clusters that reveal diverse research directions. One prominent cluster emphasizes innovation, social entrepreneurship, and business models, showcasing the integration of entrepreneurial solutions with sustainable practices. Another cluster connects management, CSR, performance, and circular economy, underscoring the importance of organizational responsibility and strategic approaches in advancing sustainability. A distinct cluster centres on digital transformation, artificial intelligence, SMEs, higher education, and COVID-19, pointing toward the growing interplay between technological shifts, education, and global challenges in shaping sustainability discourse. Additionally, themes such as entrepreneurship, empowerment, and India represent region-specific and inclusive dimensions of sustainable development. Together, these interconnections highlight not only the breadth of sustainability research but also its evolving interdisciplinarity, suggesting that future studies are likely to deepen at the nexus of technology, entrepreneurship, and socio-environmental transformation.

Author Collaboration Network

The author collaboration network in Figure 12. shows multiple small clusters with a few dominant nodes. The most notable partnership is that of Abdelwahed N and Soomro B, demonstrating their pivotal role in promoting co-authored research in the field. Other strong but smaller pairs that consistently contribute jointly on specialized issues include Park J. Montiel I with Husted B, and Rubio-Mozos E with Fuentes-Moraleda L. A few isolated two- author partnerships, like Bar M & Gidron B, Gomes S & Ferreira J, Castro R & Ferreira F, and Chen Y & Li X, also suggest brief, incorporation into the larger research community. Overall, there is still little cross-group connection, and the network is still fractured, which emphasizes that academic activity in this field is still scattered and developing through isolated pockets of cooperation rather than a unified and integrated international research community.

Three-field layout

The three-field layout in Figure 13 illustrates the connections between influential writers, foundational works, and recurring topics in studies on entrepreneurship, sustainability, and the SDGs. Intellectual anchors on the left include seminal works like Transforming Our World: The 2030 Agenda for Sustainable Development and Our Common Future (1987), which show how the global conversation on sustainability and SDGs shapes subsequent research. Prominent writers like Soomro, Gómez-Zermeño, Al Doghan, and Kratzer stand out in the centre as intermediaries between theory and practice, especially when it comes to tying sustainability ideas to enterprise ecosystems. The field's thematic focus is reflected in the main keywords on the right, which include entrepreneurship, SMEs, innovation, business models, sustainable development goals, and circular economy. In addition to tackling entrepreneurship, innovation, and business models for SMEs, this suggests that research on sustainable startups is intricately linked to the larger sustainability and SDG framework. Overall, the storyline demonstrates how scholarly works come together to create a business-driven understanding of how startups might serve as a means of accomplishing the SDGs.

anchored in seminal works on sustainability transitions, circular economy, and entrepreneurial approaches to the SDGs. Keyword co-occurrence mapping identified four major thematic clusters: i) Entrepreneurship and Innovation for Sustainability – linking startups, SDGs, and social entrepreneurship. ii) Circular Economy and Respon-

Table 3: Key Dimensions Influencing the Success of Sustainable Startups

Dimensions	Key Element	Expected Impact on Startup Success	References
Strategic	Sustainability-Centered Business Models	Developing business models that embed environmental and social objectives alongside economic goals enhances organizational resilience, adaptability, and competitiveness in the long run.	Benz (2022); Bocken (2015); Geissdoerfer et al. (2023); Mondal et al. (2023a); Veleva (2021)
Financial	Green Financing and Investment Access	Availability of capital through sustainable finance, venture funding, and government programs accelerates innovation and enables startups to commercialize eco-friendly technologies.	Munyasya & Chileshe (2018); Thompson & Eijkemans (2018); Bocken (2015)
Leadership	Transformational and Ethical Leadership	Leaders who demonstrate a commitment to sustainability inspire employees, encourage responsible innovation, and embed environmental ethics into decision making.	Provasnek et al. (2017); Suriyankietkaew et al. (2022); Thompson & Eijkemans (2018)
Market	Sustainability-Driven Market Insight	Understanding consumer expectations for green products allows startups to position their offerings strategically and build stronger relationships with environmentally aware customers.	Bergmann & Utikal (2021); Hofmann et al. (2022); Stefan et al. (2021); Jolink & Niesten (2015)
Collaborative	Cross-Sector Collaboration and Knowledge Sharing	Partnerships with research institutions, industry networks, and supply chain actors strengthen innovation capacity and foster shared sustainability outcomes.	Chaudhary et al. (2023); Gray et al. (2018); Riegler et al. (2023); Hofmann et al. (2022)
Institutional	Regulatory Support and Policy Alignment	A transparent, incentive-based policy environment supports the scaling of sustainable business models and enhances institutional trust for green entrepreneurship.	Raposo et al. (2020); Zhao et al. (2018); Pricopoaia et al. (2024)

Table 4: Key Challenges Faced by Sustainable Startups

Dimension	Key Challenge	Description / Impact on Startups	References (APA 7th)
Strategic	Balancing Profitability with Sustainability Goals	Sustainable startups often face difficulty in maintaining financial growth while adhering to environmental and social objectives, limiting scalability and long-term competitiveness.	Bocken (2015); Geissdoerfer et al. (2023); Veleva (2021)
Financial	Limited Access to Green Funding and Investment	Obtaining sufficient funding remains a major barrier, as investors often view sustainable ventures as high-risk with delayed financial returns.	Munyasya & Chileshe (2018); Thompson & Eijkemans (2018); Benz (2022)
Market	Low Consumer Awareness and Price Sensitivity	Limited consumer understanding of sustainability and sensitivity to higher prices make market penetration challenging for green startups.	Hofmann et al. (2022); Stefan et al. (2021); Bergmann & Utikal (2021)
Technological	High Cost and Complexity of Sustainable Technologies	The need for advanced, resource- intensive technologies increases operational costs and slows the pace of innovation for small startups.	Mondal et al. (2023a); Dressler (2023); Gray et al. (2018)
Operational	Resource and Skill Constraints	Shortages of skilled labor, sustainable raw materials, and efficient processes make it difficult for startups to implement green innovations effectively.	Provasnek et al. (2017); Suriyankietkaew et al. (2022); Chaudhary et al. (2023)
Institutional	Regulatory Uncertainty and Bureaucratic Barriers	Inconsistent government policies, lack of clarity in sustainability regulations, and administrative hurdles slow down startup development and discourage investment.	Raposo et al. (2020); Zhao et al. (2018); Pricopoaia et al. (2024)

sible Business Practices – connecting business models, CSR, and organizational frameworks. iii) Digital Transformation and Technological Drivers – including artificial intelligence, SMEs, higher education, and COVID 19 disruptions. iv) Regional and Social Dimensions – highlighting gender, empowerment, and contextually embedded entrepreneurial models. The thematic evolution map illustrates the transition from early explorations of sustainable entrepreneurship to current emphases on digitalization and global collaboration, while gender and inclusivity remain emerging but underdeveloped themes. The co-authorship networks reveal internationally dispersed but fragmented clusters, with some strong dyads (e.g., Abdelwahed and Soomro) but limited cross group integration. Collaboration maps further reveal robust ties across Europe, the USA, China, and India, underscoring the global yet uneven research landscape.

CONCLUSION

This bibliometric analysis highlights the rapidly emerging link between sustainable startups and the United Nations Sustainable Development Goals (SDGs). The study reveals a dynamic and intellectually robust field characterized by increased publication output, international collaboration, and interdisciplinary participation in innovation, entrepreneurship, and sustainability science. The main thematic areas are digital transformation, circular economy, inclusive business models, and region-specific entrepreneurship, which demonstrate the complex relationships between sustainable business innovation and systemic societal challenges. The study conducts a comprehensive bibliometric mapping, combining disparate research streams to identify intellectual foundations, thematic clusters, and emerging research frontiers. It also highlights regional disparities, particularly the underrepresentation of developing economies, emphasizing the need for greater inclusivity and global research capabilities. Furthermore, it identifies key facilitators of sustainable startup ecosystems, such as sustainability-focused business models, intersectoral collaborations, and supportive policy frameworks, as well as long-term structural impediments. Policy and managerial implications highlight the importance of improving regulatory frameworks, increasing access to green finance, developing digital and entrepreneurial skills, and strengthening international knowledge networks, particularly in the Global South. Despite limitations in linguistic range and database selection, the findings highlight the importance of incorporating bibliometric and network methodologies into qualitative research. Future research should promote cross- regional collaboration, inclusive and equitable theoretical frameworks, and a greater emphasis on digital and AI-driven sustainability innovations. Sustainable startups act as critical catalysts for global sustainability transitions, emphasizing the importance of integrated, interdisciplinary, and inclusive strategies to advance the SDG agenda.

REFERENCES

i. Abdelwahed, N. A. A., & Soomro, B. A. (2024). Enhancing organizational behaviour through corporate governance: The crucial role of organizational culture and sustainability. Corporate Governance and Organizational Behavior Review, 8(1), 94- 104.

ii. Al Doghan, M. A., Channa, A., Abdelwahed, N. A. A., & Soomro, B. A. (2023). The predictive power of human resource practices in developing social entrepreneurship performance and sustainable business. Journal of Law and Sustainable Development, 11(12), e2206-e2206.

iii. Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99–120. https://doi.org/10.1177/014920639101700108

iv. Benz, L. (2022). Business model innovation for sustainability: A systematic review and future research agenda. Journal of Cleaner Production, 356, 131866.

v. Bergmann, M., & Utikal, H. (2021). Green consumer behavior and startup success: A sustainability marketing perspective. Sustainability, 13(4), 2178.

vi. Bican, P. M., & Brem, A. (2020). Digital business model, digital transformation, digital entrepreneurship: Is there a sustainable "digital"?. Sustainability, 12(13), 5239

vii. Bocken, N. M. P. (2015). Sustainable business models: A review. Journal of Cleaner Production, 96, 42–56.

viii. Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. Journal of Cleaner Production, 65, 42–56.

ix. Butkouskaya, V., Romagosa, F., & Noguera, M. (2020). Obstacles to sustainable entrepreneurship amongst tourism students: A gender comparison. Sustainability, 12(5), Article 1812.

x. Chaudhary, S., Sinha, S., & Tripathi, R. (2023). Collaborative innovation networks for sustainable entrepreneurship. Journal of Sustainable Business and Innovation, 5(2), 134–149.

xi. Cohen, B., & Winn, M. I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. Journal of Business Venturing, 22(1), 29–49.

xii. Comin, L. C., Aguiar, C. C., Sehnem, S., Yusliza, M. Y., Cazella, C. F., & Julkovski, D. J. (2020). Sustainable business models: a literature review. Benchmarking: An International Journal, 27(7), 2028-2047.

xiii. Cordova, M. F., & Celone, A. (2019). SDGs and innovation in the business context literature re view. Sustainability, 11(24), 7043. https://doi.org/10.3390/su11247043

xiv. Costanza, R., Daly, L., Fioramonti, L., Giovannini, E., Kubiszewski, I., Mortensen, L. F., ... & Wilkinson, R. (2016). Modelling and measuring sustainable wellbeing in connection with the UN Sustainable Development Goals. Ecological economics, 130, 350-355.

xv. D'Amato, D., Veijonaho, S., & Toppinen, A. (2020). Towards sustainability? Forest- based circular bioeconomy business models in Finnish SMEs. Forest policy and economics, 110, 101848.

xvi. Dean, T., & McMullen, J. (2007). Toward a theory of sustainable entrepreneurship: Reducing envi ronmental degradation through entrepreneurial action. Journal of Business Venturing, 22, 50–76.

xvii. Dees, J. G. (1998). The meaning of social entrepreneurship. Kauffman Center for Entrepreneurial Leadership.

xviii. Di Vaio, A., Palladino, R., Hassan, R., & Escobar, O. (2020). Artificial intelligence and business models in the sustainable development goals perspective: A systematic literature review. Journal of Business Research, 121, 283-314.

xix. Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a biblio metric analysis: An overview and guidelines. Journal of Business Research, 133, 285–296.

xx. Dressler, M. (2023). Business model patterns for sustainable startups: Insights from green entrepre neurship. Sustainability, 15(6), 5123.

xxi. Eang, M., Clarke, A., & Ordonez-Ponce, E. (2023). The roles of multinational enterprises in imple menting the United Nations Sustainable Development Goals at the local level. BRQ Business Re search Quarterly, 26(1), 79-97.

xxii. Elkington, J. (1997). Cannibals with forks: The triple bottom line of 21st century business. Cap stone.

xxiii. Freeman, R. E. (1984). Strategic management: A stakeholder approach. Pitman.

xxiv. Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. Research Policy, 31(8–9), 1257– 1274. https://doi. org/10.1016/ S0048-7333(02)00062-8

xxv. Geissdoerfer, M., Vladimirova, D., & Evans, S. (2023). Sustainable business model innovation: Conceptual foundations and practical insights. Business Strategy and the Environment, 32(1), 245–260.

xxvi. Ghauri, P. N. (2022). The role of multinational enterprises in achieving sustainable development goals. Aib Insights, 22(1), 1-5.

xxvii. Gorowara, N., Yadav, S., & Kumar, V. (2024). Sustainable future: Government initiatives in the adoption of emerging sustainable technologies by startups in india. In Fostering innovation in venture capital and startup ecosystems (pp. 286-305). IGI Global Scientific Publishing.

xxviii. Govindan, K., Shankar, K. M., & Kannan, D. (2020). Achieving sustainable development goals through identifying and analyzing barriers to industrial sharing economy: A framework development. International journal of production economics, 227, 107575.

xxix. Gray, R., Adams, C. A., & Owen, D. (2018). Accountability, social responsibility, and sustainability: Accounting for society and the environment. Routledge.

xxx. Grijalva, P., Cornejo, G., Gómez, R., Real, K., & Fernandez, A. (2019). Collaborative tools for systematic revisions. Revista Espacios, 40, 9–15.

xxxi. Hall, J., Daneke, G., & Lenox, M. (2010). Sustainable development and entrepreneurship: Past contributions and future directions. Journal of Business Venturing, 25(5), 439–448.

xxxii. Hezri, A. A. (2013). Broadening the Environmental Dimension in the Post-2015 Development Agenda. IDS Bulletin, 44(5-6), 81-88.

xxxiii. Hofmann, A., Gerlach, S., & Pinske, J. (2022). Consumer demand and sustainability transitions in entrepreneurial ventures. Journal of Small Business Management, 60(2), 372–389.

xxxiv. Horne, J., Recker, M., Michelfelder, I., Jay, J., & Kratzer, J. (2020). Exploring entrepreneurship related to the sustainable development goals-mapping new venture activities with semi-automated content analysis. Journal of Cleaner Production, 242, 118052. https://doi.org/10.1016/j.respol.2018.08.011

xxxv. Jolink, A., & Niesten, E. (2015). Sustainable development and business model innovation: A comparison of sustainability-oriented companies. Business Strategy and the Environment, 24(5), 386–399.

xxxvi. Klewitz, J., & Hansen, E. G. (2014). Sustainability-oriented innovation of SMEs: A systematic review. Journal of Cleaner Production, 65, 57–75.

xxxvii. Küfeoğlu, S. (2022). SDG-7 affordable and clean energy. In Emerging technologies: Value creation for sustainable development (pp. 305-330). Cham: Springer International Publishing.

xxxviii. Lee, K., Roh, T., Kim, J., Park, S., & Bae, Y. (2025). Unpacking sustainability in start- ups: a systematic review and research agenda. Discover Sustainability, 6(1), 1-24.

xxxix. Mol, A. P. J., & Spaargaren, G. (2000). Ecological modernization theory in debate: A review. Environmental Politics, 9(1), 17–49. https://doi.org/10.1080/09644010008414511

xl. Mondal, P., Sinha, S., & Gupta, N. (2023a). Sustainability-driven innovation in green startups: Challenges and growth strategies. Environmental Innovation and Societal Transitions, 48, 100824.

xli. Morioka, S. N., Bolis, I., Evans, S., & Carvalho, M. M. (2017). Transforming sustainability challenges into competitive advantage: Multiple case studies kaleidoscope converging into sustainable business models. Journal of cleaner production, 167, 723-738.

xlii. Muñoz, P., & Cohen, B. (2018). Sustainable entrepreneurship research: Taking stock and looking ahead. Business Strategy and the Environment, 27(3), 300–322.

xliii. Munyasya, B. M., & Chileshe, N. (2018). Access to finance for green startups: An emerging market perspective. International Journal of Sustainable Development & World Ecology, 25(7),

650–662.

xliv. Pedersen, A. B., Hickmann, T., Renn, O., Eckert, N., Jax, K., Lepenies, R., ... & Rusch, G. (2023). SDGs at the halfway point: How the 17 global goals address risks and wicked problems. Ambio, 52(4), 679-682.

xlv. Pinkse, J., & Groot, K. (2015). Sustainable entrepreneurship and corporate political activity: Overcoming market barriers in the clean energy sector. Entrepreneurship Theory and Practice, 39(3), 633-654.

xlvi. Pranckutė, R. (2021). Web of Science (WoS) and Scopus: The titans of bibliographic information in today's academic world. Publications, 9(12). https://doi.org/10.3390/publications9010012

xlvii. Pricopoaia, O., Brinza, G., & Lazar, M. (2024). Policy frameworks for green entrepreneurship: European perspectives and practices. Journal of Environmental Policy and Management, 12(1), 22–39.

xlviii. Provasnek, A. K., Schmid, E., Geissler, B., & Steiner, G. (2017). Sustainable corporate entrepreneurship: Performance and innovation drivers in green organizations. Sustainability, 9(12), 2306.

xlix. Rahdari, A., Sepasi, S., & Moradi, M. (2016). Achieving sustainability through Schumpeterian social entrepreneurship: The role of social enterprises. Journal of cleaner production, 137, 347-360.

l. Raposo, M., Ferreira, J., & Fernandes, C. (2020). The role of government policies in promoting green entrepreneurship. Journal of Entrepreneurship and Public Policy, 9(3), 421–440.

li. Rashid, L. (2019). Entrepreneurship education and sustainable development goals: A literature review and a closer look at fragile states and technology-enabled approaches. Sustainability. https://doi.org/10.3390/su11195343

lii. Riegler, V., Bergmann, M., & Utikal, H. (2023). Collaborative partnerships for sustainability-oriented innovation. Sustainability, 15(8), 6645.

liii. Rockström, J., et al. (2009). A safe operating space for humanity. Nature, 461(7263), 472–475.

liv. Rogers, E. M. (1962). Diffusion of innovations (1st ed.). Free Press.

lv. Romero Goyeneche, O. Y., Ramirez, M., Schot, J., & Arroyave, F. (2022). Mobilizing the transformative power of research for achieving the Sustainable DevelopmentGoals. ResearchPolicy.

lvi. Rubio-Mozos, E., García-Muiña, F. E., & Fuentes-Moraleda, L. (2020). Sustainable strategic management model for hotel companies: A multi-stakeholder proposal to "walk the talk" toward SDGS. Sustainability, 12(20), 8652.

lvii. Ruhil, R. (2015). Millennium development goals to sustainable development goals: challenges in the health sector. International Studies, 52(1-4), 118-135

lviii. Rumbayan, M., Pundoko, I., Sompie, S. R., & Ruindungan, D. G. (2025). Integration of smart water management and photovoltaic pumping system to supply domestic water for rural communities. Results in Engineering, 25, 103966.

lix. Sarma, S., Attaran, S., & Attaran, M. (2024). Sustainable entrepreneurship: Factors influencing opportunity recognition and exploitation. The International Journal of Entrepreneurship and Innovation, 25(1), 56-69.

lx. Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. Business Strategy and the Environment, 20(4), 222–237.

Beckmann, M., & Hockerts, K. (2018). Collaborative entrepreneurship for sustainability. Creating solutions in light of the UN sustainable development goals. International Journal of Entrepreneurial Venturing, 10(2), 131-152.

lxii. Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2016). Business models for sustainability: A co-evolutionary analysis of sustainable entrepreneurship, innovation, and transformation. Organization & environment, 29(3), 264-289.

lxiii. Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. Research policy, 47(9), 1554-1567.

lxiv. Shah, N., Bhatti, M. K., Saraih, U. N., Abdelwahed, N. A. A., & Soomro, B. A. (2024). The achievement of sustainable development and business success through rational management decision-making in a circular economy. International Journal of Innovation Science, 16(5), 956-980.

lxvi. Silvestre, B. S., & Ţîrcă, D. M. (2019). Innovations for sustainable development: Moving toward a sustainable future. JournalCleaner Production, 208,325-332.

lxvii. Singh, V. K., Singh, P., Karmakar, M., Leta, J., & Mayr, P. (2021). The journal coverage of Web of Science, Scopus and Dimensions: A comparative analysis. Scientometrics, 126(5113-5142). https://doi.org/10.1007/s11192-021-03984-3

lxviii. Soomro, B. A., & Shah, N. (2015). Developing attitudes and intentions among potential entrepreneurs. Journal of Enterprise Information Management, 28(2), 304-322.

lxix. Soomro, B. A., K. Almahdi, H., & Shah, N. (2021). Perceptions of young entrepreneurial aspirants towards sustainable entrepreneurship in Pakistan. Kybernetes, 50(7), 2134-2154.

lxx. Soomro, B. A., Lakhan, G. R., Mangi, S., & Shah, N. (2020). Predicting entrepreneurial intention among business students of public sector universities of Pakistan: an application of the entrepreneurial event model. World Journal of Entrepreneurship, Management and Sustainable Development, 16(3), 219-230.

lxxi. Soomro, B. A., Moawad, N. F., Saraih, U. N., Abedelwahed, N. A. A., & Shah, N. (2024). Going green with the green market and green innovation: building the connection between green entrepreneurship and sustainable development. Kybernetes, 53(4), 1484-1504.

lxxii. Sorooshian, S. (2024). The sustainable development goals of the United Nations: A comparative midterm research review. Journal of Cleaner Production, 453, 142272.

lxxiii. Stefan, I., Popescu, D., & Stoica, A. (2021). Consumer perception and sustainable product success in emerging markets. Journal of Sustainable Marketing, 3(2), 112–127.

lxxiv. Surana, K., Singh, A., & Sagar, A. D. (2020). Strengthening science, technology, and innovation-based incubators to help achieve Sustainable Development Goals: Lessons from India. Technological Forecasting and Social Change, 157, 120057

lxxi. Soomro, B. A., Moawad, N. F., Saraih, U. N., Abedelwahed, N. A. A., & Shah, N. (2024). Going green with the green market and green innovation: building the connection between green entrepreneurship and sustainable development. Kybernetes, 53(4), 1484-1504.

lxxii. Sorooshian, S. (2024). The sustainable development goals of the United Nations: A comparative midterm research review. Journal of Cleaner Production, 453, 142272.

lxxiii. Stefan, I., Popescu, D., & Stoica, A. (2021). Consumer perception and sustainable product success in emerging markets. Journal of Sustainable Marketing, 3(2), 112–127.

lxxiv. Surana, K., Singh, A., & Sagar, A. D. (2020). Strengthening science, technology, and innovation-based incubators to help achieve Sustainable Development Goals: Lessons from India. Technological Forecasting and Social Change, 157, 120057

lxxv. Suriyankietkaew, S. (2019). Sustainable leadership and entrepreneurship for corporate sustainability in small enterprises: An empirical analysis. World review of entrepreneurship, management and sustainable development, 15(1-2), 256-275.

lxxvi. Suriyankietkaew, S., Petison, P., & Avery, G. C. (2022). Sustainable leadership practices and firm performance in emerging economies. Asia Pacific Business Review, 28(3), 415–438.

lxxvii. Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319– 1350. https://doi.org/10.1002/smj.640

lxxviii. Theodoraki, C., Dana, L. P., & Caputo, A. (2022). Building sustainable entrepreneurial ecosystems: A holistic approach. Journal of Business Research, 140, 346-360.

lxxix. Thompson, N., & Eijkemans, R. (2018). Leadership, innovation, and sustainability in entrepreneurial ventures. International Journal of Innovation Management, 22(6), 1850054

lxxx. Tunçalp, D., & Yıldırım, N. (2022). Sustainable Entrepreneurship: Mapping the Business Landscape for the Last 20 Years. Sustainability (Switzerland), 14(7). https://doi.org/10.3390/su14073864

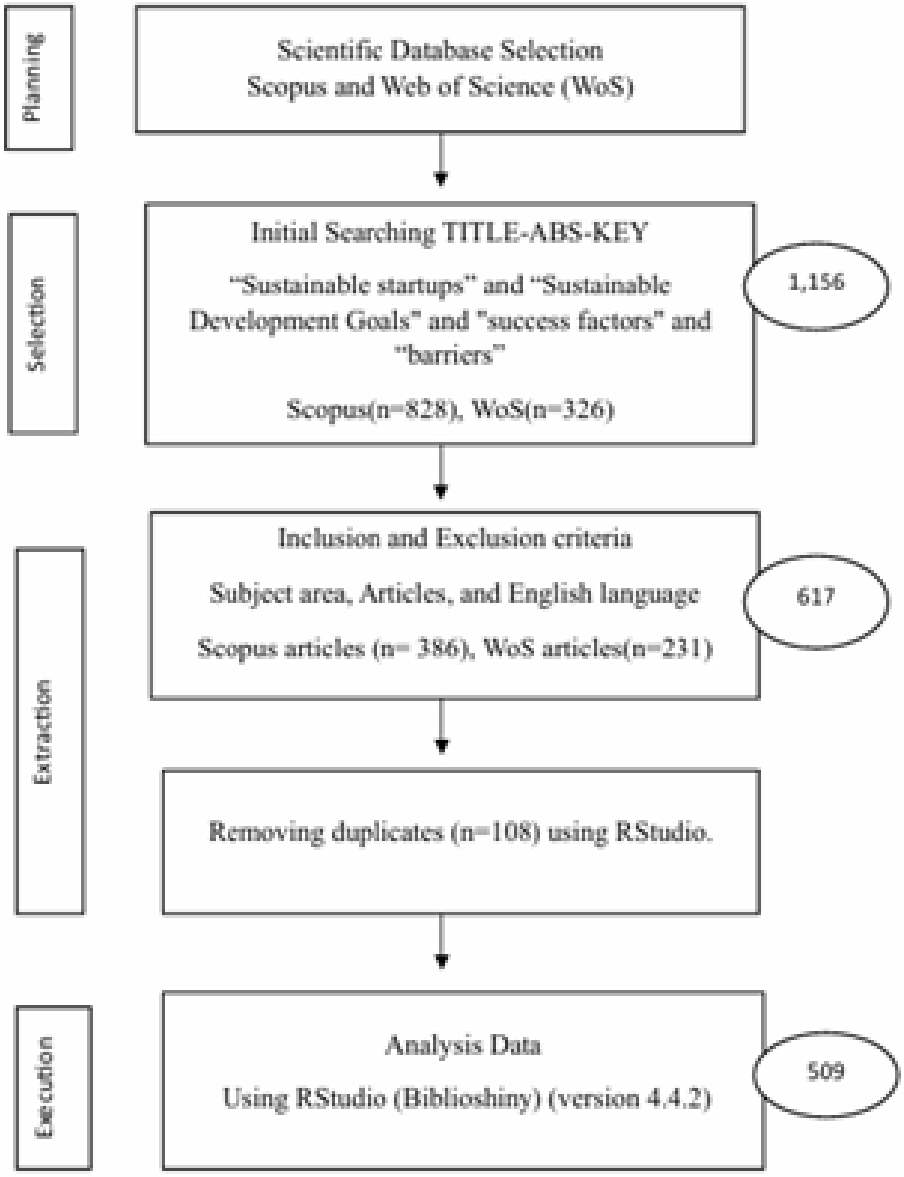
lxxxi. United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development.

lxxxii. Valverde, F., & Llorens, F. (2019). Strategic portfolio of IT projects at universities: A systematic and non-conventional literature review. Ingeniería e Investigación. https://doi.org/10.15446/ing.investig.v39n2.72431

lxxxiii. Veleva, V. (2021). Business model innovation for sustainability transitions: Lessons from startups and SMEs. Sustainability, 13(12), 6713.

ANNEXURES

Fig 1: Flow Chart (Research methodology)



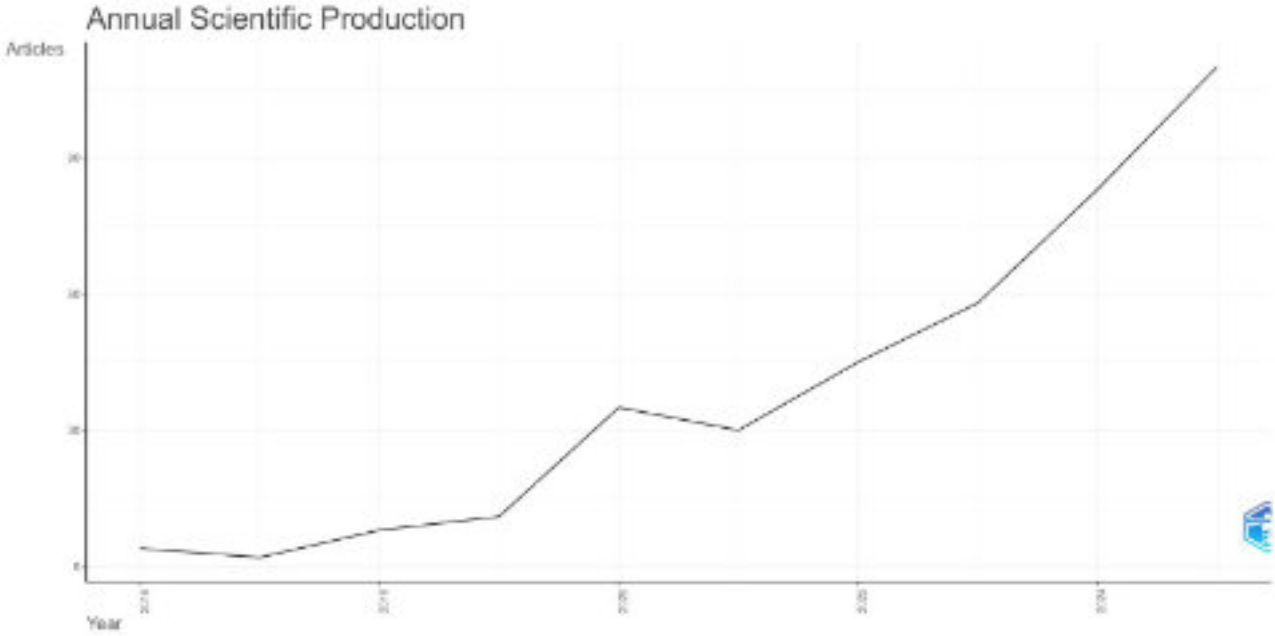


Figure 1 shows annual Scientific production. Using Biblioshiny

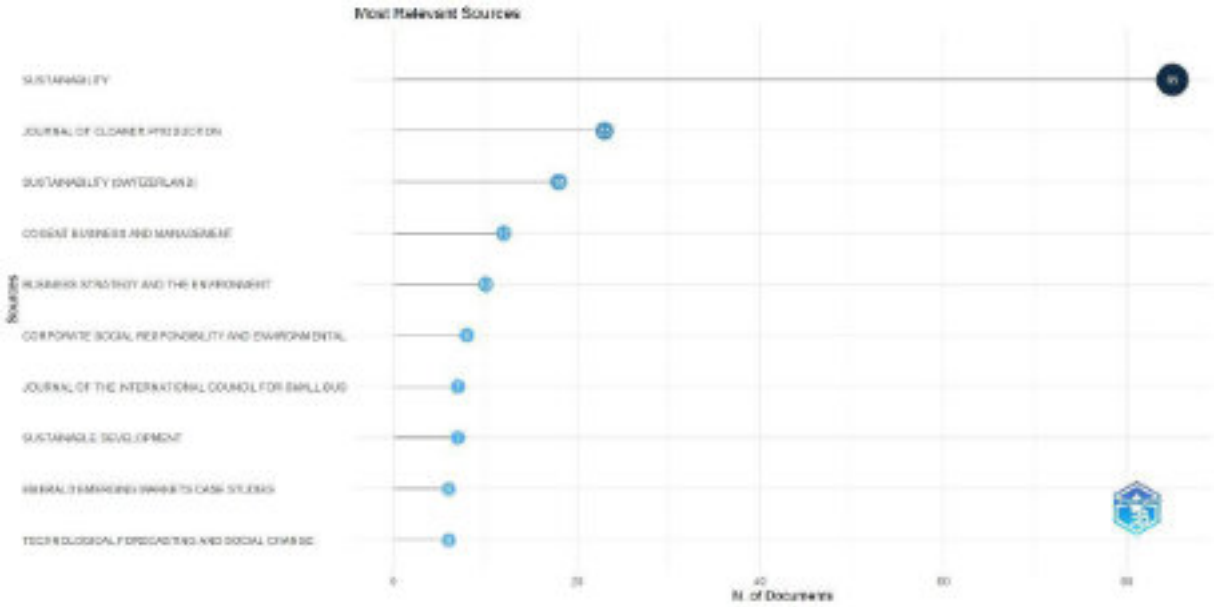


Figure 2. The most relevant source using Biblioshiny

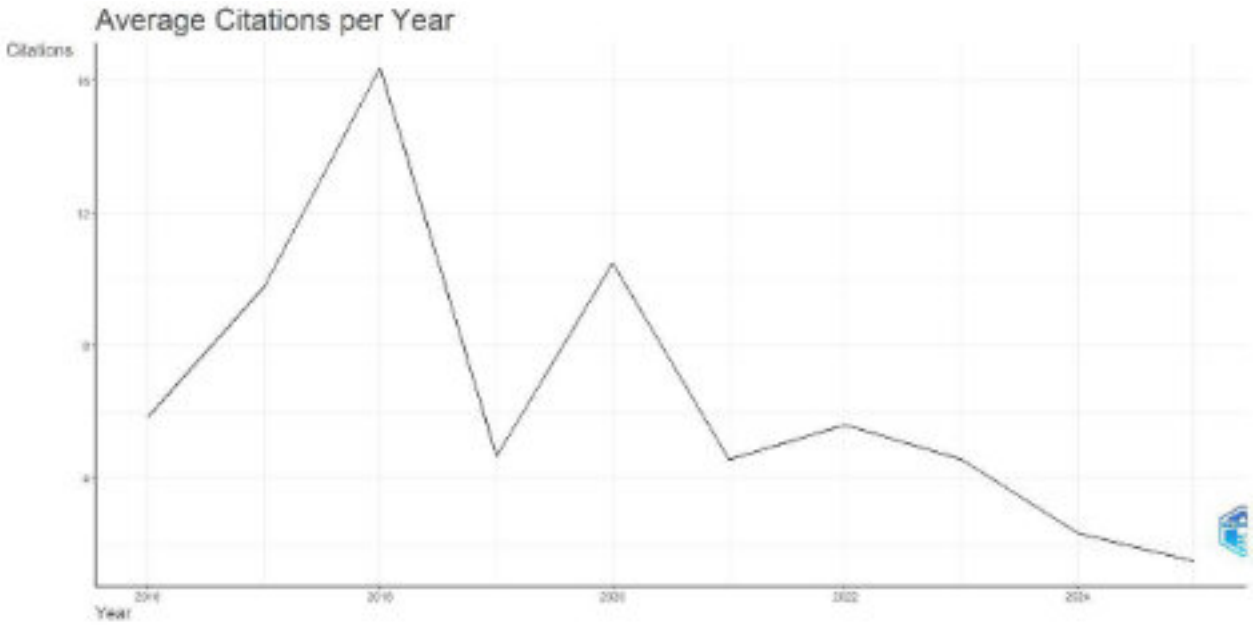


Figure 3. Average Citation per year using Biblioshiny

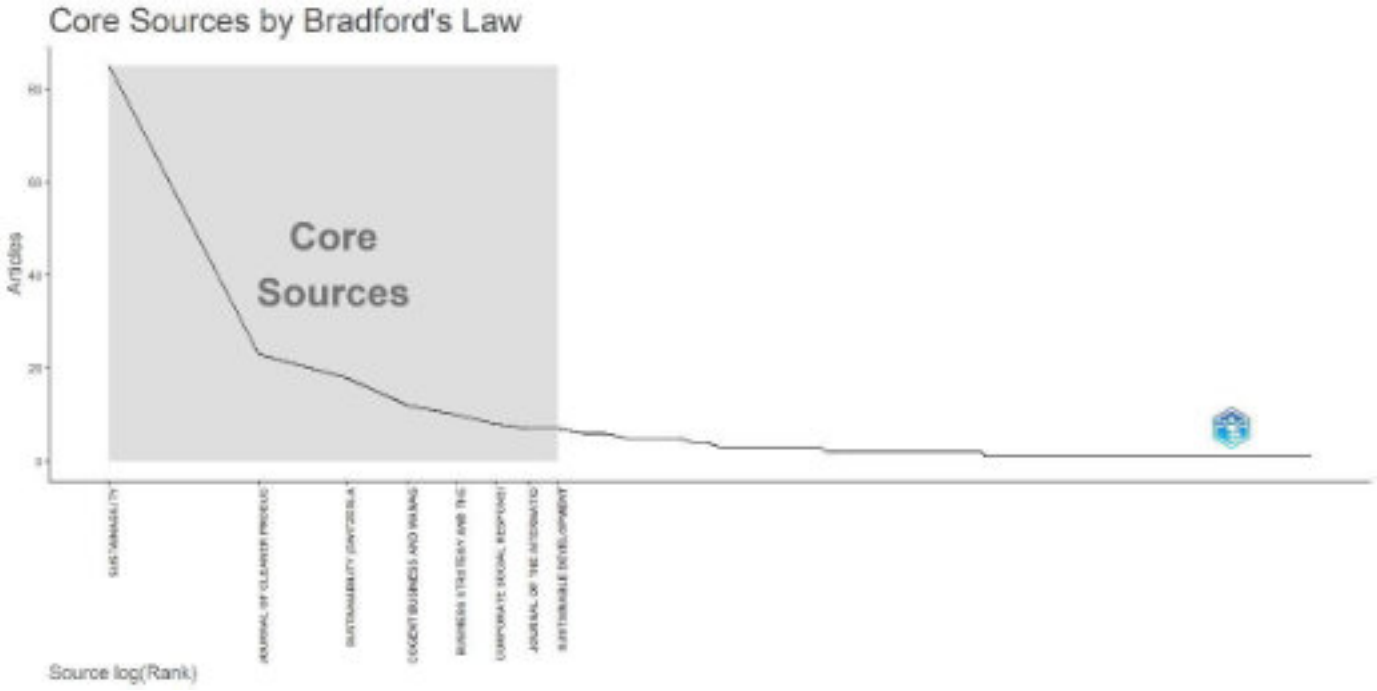


Figure 4. The Bradford Law using Biblioshiny

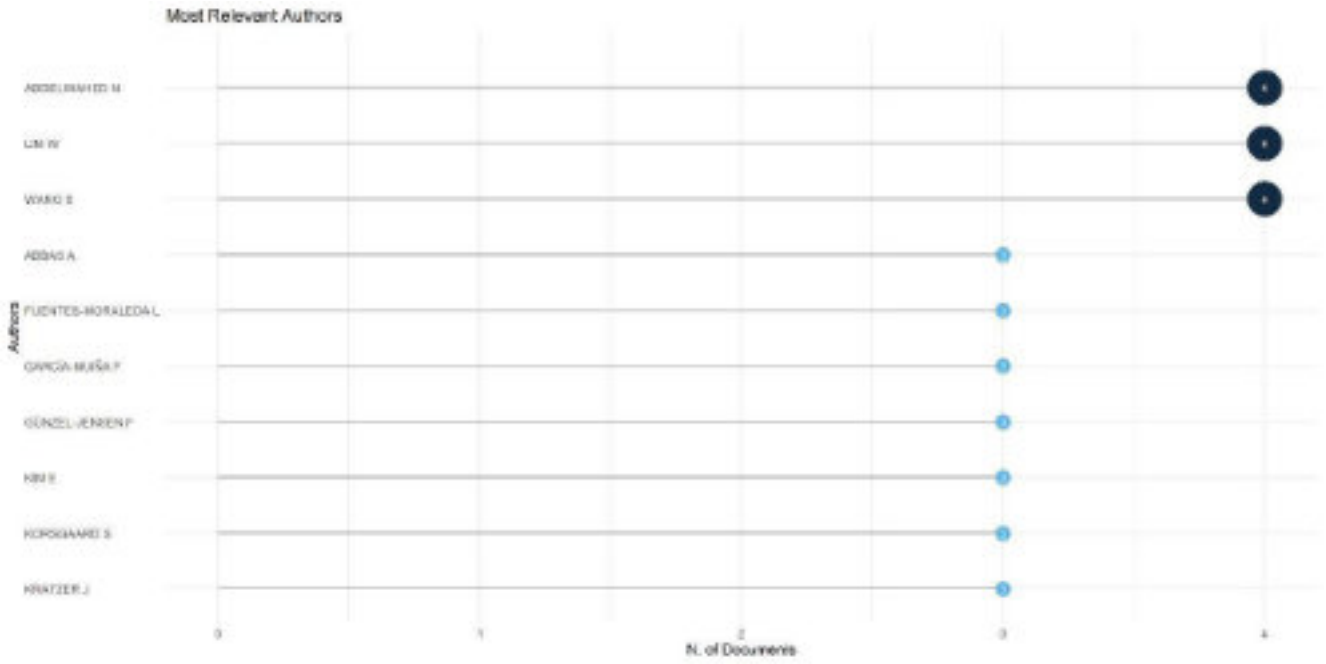


Figure 5. The Most Relevant Authors using Biblioshiny

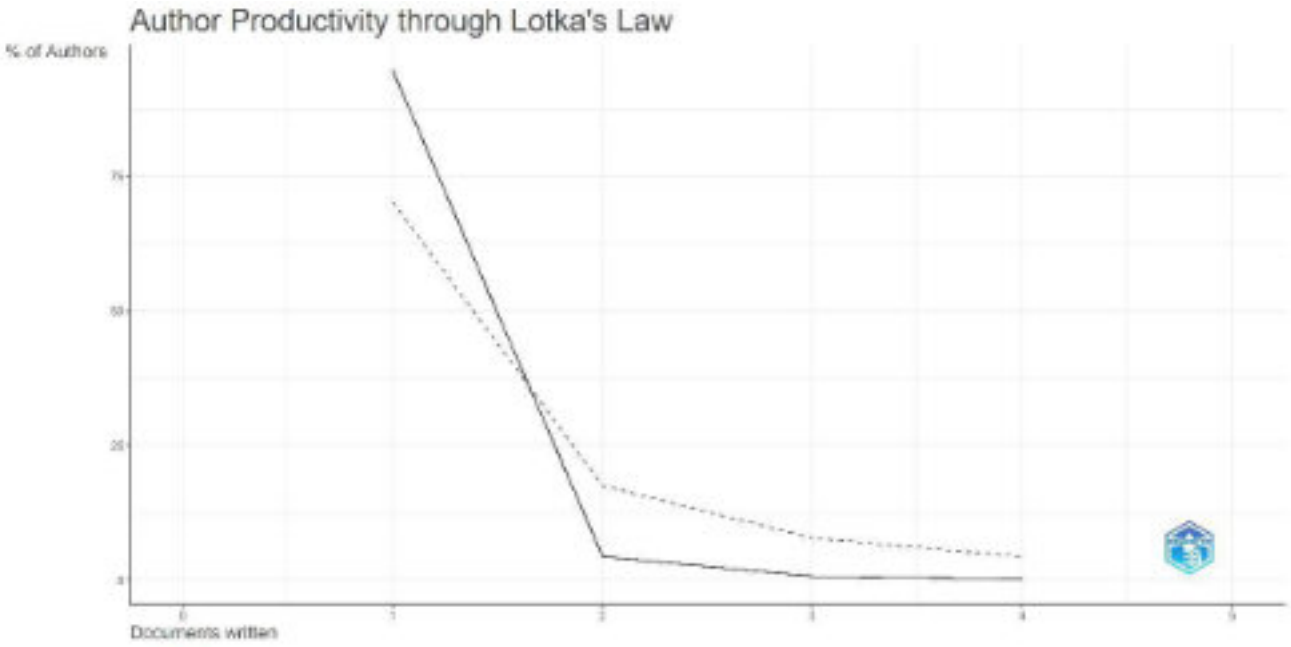


Figure 6. Author Productivity through Lotka's Law using Biblioshiny

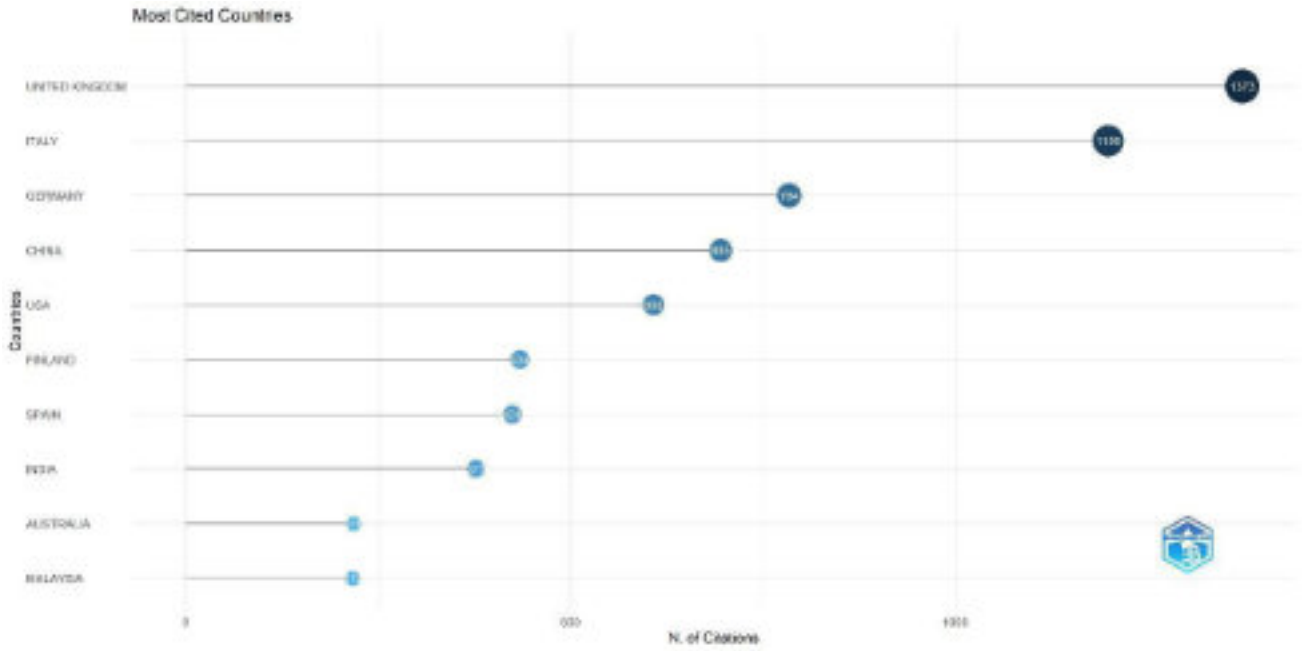


Figure 7. Most cited countries using Biblioshin

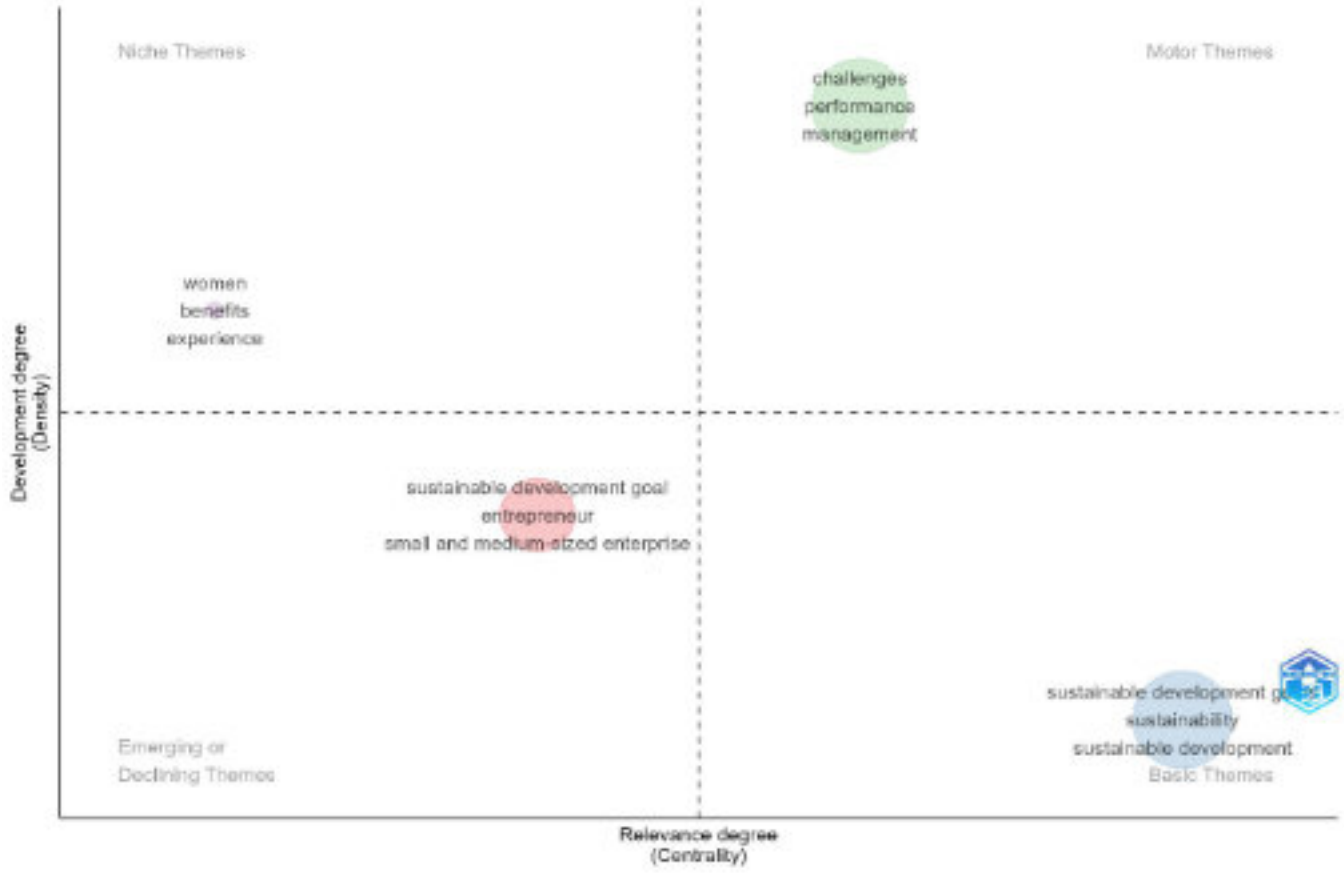


Figure 8. Thematic map using Biblioshiny

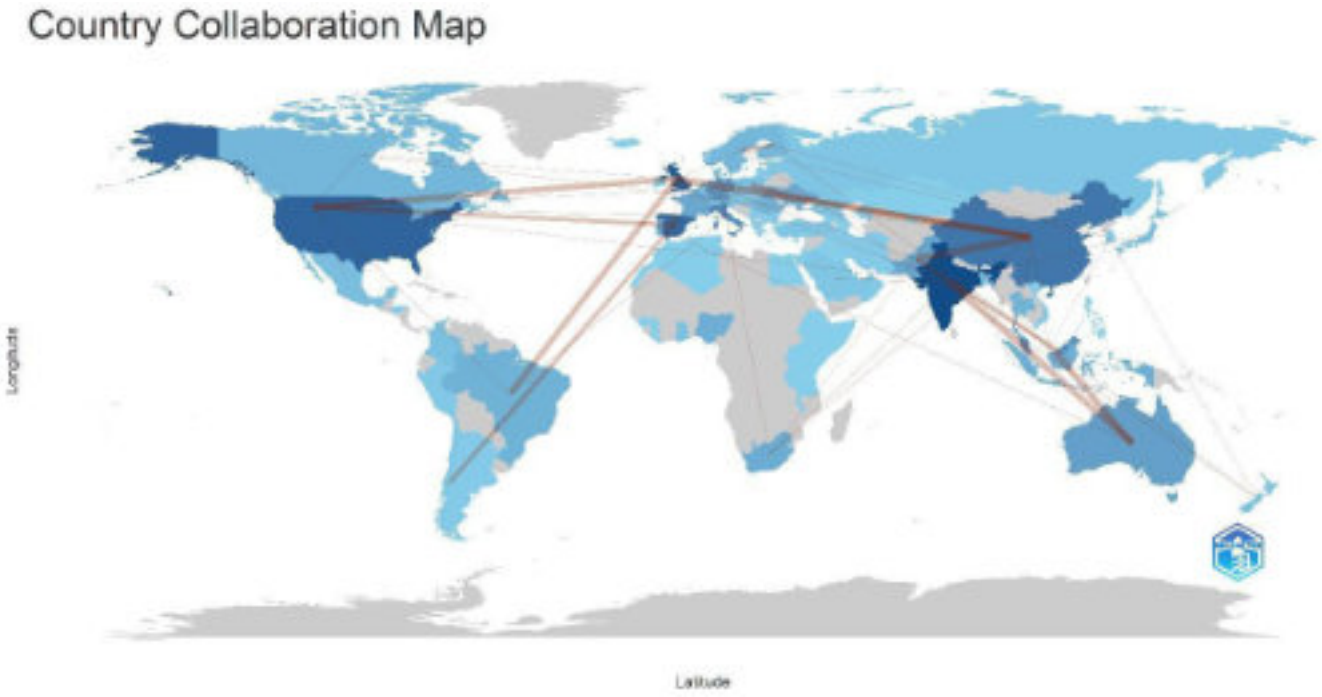


Figure 9. Countries' collaboration map using Biblioshiny

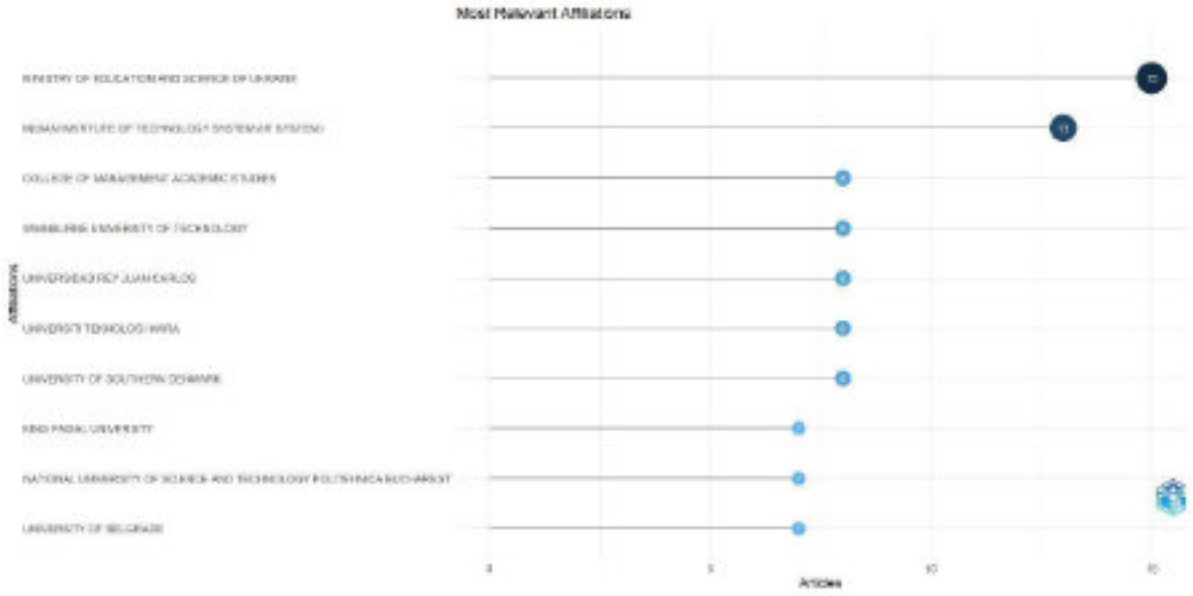


Figure 10. Most Relevant Affiliations using Biblioshiny

Figure 11. Keywords occurrence using Biblioshiny

Figure 12. Author collaboration network using Biblioshiny

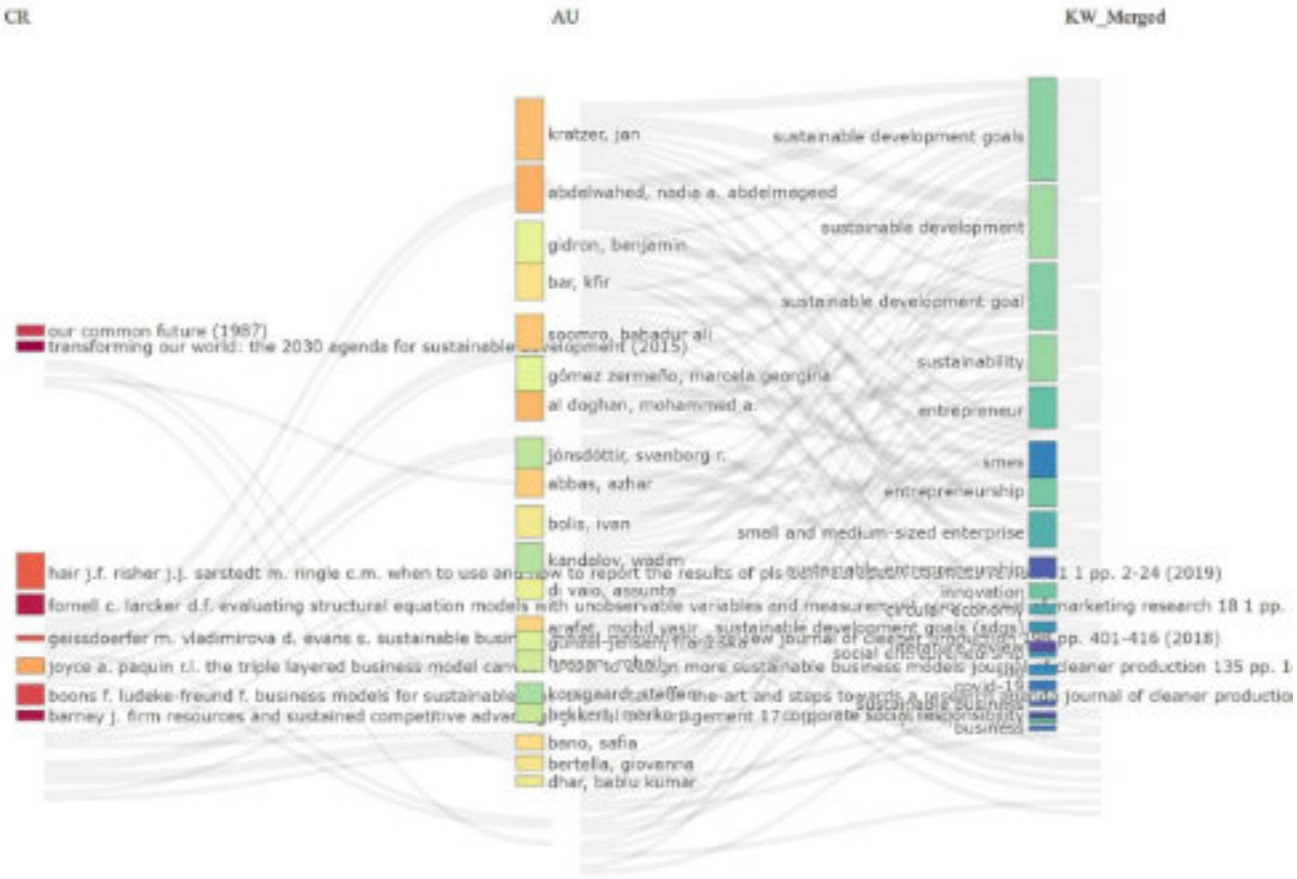


Figure 13. Three-field layout using Biblioshiny