Sustainable Business and The Role of Enabler: A Systematic Literature Review

Wiwiek Rabiatul Adawiyah[1], Ridha Rayan Furqan[1], Ratno Purnomo[1]
"[1] Department Management, Faculty of Economics and Business, Universitas Jenderal Soedirman, Indonesia"
Corresponding email: wiwiek.adawiyah@unsoed.ac.id

Abstract

This study systematically reviews the emerging literature on institutional enablers of sustainable entrepreneurship, focusing on the roles of incubators, accelerators, and aggregators within entrepreneurial ecosystems. Using bibliometric and qualitative content analysis, the study examines 50 peer-reviewed articles indexed in Scopus up to August 2025. The analysis maps research profiles, including publication trends, journal quality, and author contributions, and identifies thematic clusters through keyword co-occurrence analysis using VOSviewer.

The findings reveal a notable increase in scholarly attention after 2018, with most publications appearing in high-impact Q1 journals. The literature is dominated by research on business incubators, while accelerators receive moderate attention and aggregators remain significantly underexplored. The thematic mapping identifies five clusters: incubator-driven sustainability performance, accelerator and ecosystem development, universities and innovation intermediaries, incubation challenges in developing countries, and SDG-oriented university incubators.

The results indicate a shift from firm-centric incubation models toward ecosystem-oriented perspectives integrating sustainability and multi-actor collaboration. To address conceptual fragmentation, this study proposes the Sustainable Enabler Map (SEM), an integrative framework linking institutional configurations and sustainability impact domains within entrepreneurial ecosystems.

Keywords: business incubator; entrepreneurial ecosystem; institutional enablers; literature review; sustainable entrepreneurship

I. INTRODUCTION

Sustainable businesses have emerged as pivotal actors in addressing pressing global challenges such as climate change, environmental degradation and resource scarcity. By integrating ecological considerations into their operations, products and services, these businesses contribute to environmental sustainability while also driving economic development and social well-being (Hendry & Vesilind, 2005). Their presence is increasingly vital as economies worldwide shift towards low-carbon growth, circular economy models and sustainable innovation pathways (Andreopoulou et al., 2014; Saha et al., 2024).

Despite their significance, the growth of sustainable businesses remains hindered by limited financial access, weak industry policy, technological gaps, and fragmented support systems (Achmad & Wiratmadja, 2024; Basmantra et al., 2024; Hakim et al., 2024; Leone, 2025; Li et al., 2025). Their success depends not only on entrepreneurial capacity but also on the effectiveness of institutional enablers and ecosystem structures that facilitate access to resources, knowledge, and innovation (Hakim et al., 2024). Recent research highlights the strategic roles of institutional enablers, particularly incubators, accelerators, and aggregators, in connecting sustainability driven ventures with relevant networks, resources, and policy frameworks (Bank Indonesia, 2025).

Over the past decade, the conceptualisation of entrepreneurial support mechanisms has evolved significantly. Earlier models treated incubation as a linear process of technology transfer and business assistance. However, reviews of entrepreneurship reveal a shift towards

ecosystem-based and adaptive frameworks characterised by multidirectional knowledge flows, digital integration and sustainability orientation (Yovera et al., 2025). Within this evolution, incubators have expanded beyond physical infrastructure providers to become platforms for mentorship, capability-building and triple-helix collaboration between universities, industry and government (Bhattacharjee, 2024; Etzkowitz, 2003; Gonsalves & Rogerson, 2019). Accelerators have advanced this model by emphasising rapid growth, investor readiness and market validation with social and ecological purpose (Bhatli et al., 2015; Butz & Mrożewski, 2021).

Aggregators are emerging as boundary-spanning entities connecting industrial actors and other stakeholders with innovation intermediaries such as incubators and accelerators. They bridge structural gaps between policy frameworks, industrial capabilities and academic knowledge systems in sustainability-driven ecosystems. As Hakim et al. (2024) suggest that future research should examine how the evolving roles of business incubators interact with complementary support structures, including accelerators, investors, and aggregators, to generate broader systemic impacts on entrepreneurial ecosystems.

Existing studies often analyse incubators, accelerators or aggregators in isolation, overlooking their interdependent functions within sustainable entrepreneurship ecosystems. While aggregators are recognised in energy and mobility systems (Comi & Idone, 2024), and are beginning to be conceptualised as systemic intermediaries in sustainability transitions (Bank Indonesia, 2025), their role in mobilising industrial partnerships and coordinating stakeholder engagement for sustainable innovation remains underdeveloped. Moreover, no prior systematic review has synthesised how these three enablers collectively contribute to scaling environmentally sustainable enterprises, signalling a research gap this study addresses.

Building upon prior theoretical and empirical insights, this study conducts a systematic and bibliometric review to map, classify and integrate the roles of incubators, accelerators and aggregators in fostering sustainable businesses and entrepreneurship ecosystems. By consolidating fragmented literature, this study advances understanding of how these enablers co-evolve within sustainability-oriented innovation systems. Specifically, it introduces the notion of a Sustainable Enabler Map (SEM), a dynamic configuration aligning entrepreneurial support functions with the Sustainable Development Goals through interconnected mechanisms of innovation intermediation and ecosystem orchestration.

In line with established bibliometric review traditions (Amelia et al., 2025; Chopra et al., 2021; Yépez et al., 2020), this study aims to address the following research questions:

RQ1. What are the research profiles – in terms of research trends, keyword trends, top journals, top author, and top enabler roles focus– in the literature on incubators, accelerators, and aggregators supporting sustainable business ecosystems?

RQ2. How is the mapping of the thematic clusters and the future research recommendations that characterise the current body of knowledge on these enablers?

RQ3. How can an integrative conceptual map synthesise existing insights to provide a structured understanding of how sustainable enablers are positioned within entrepreneurial ecosystems?

By systematically synthesising findings across multiple streams of research, this review offers a consolidated analytical map of the sustainable enabler literature. This review organises fragmented empirical and conceptual contributions into a coherent framework that clarifies institutional configurations, recurring impact domains, and emerging research directions. In doing so, the study provides a state-of-the-art intellectual overview and a structured research agenda for scholars, policymakers, and practitioners interested in the design and coordination of sustainability-oriented entrepreneurial support systems.

II. METHOD

This study adopts a systematic literature review (SLR) approach following the procedural outline of Anggadwita & Indarti (2023), encompassing review planning, definition of inclusion and exclusion criteria, data retrieval and selection, and data analysis and synthesis. Both quantitative and qualitative techniques were employed. The quantitative component mapped the profile of reviewed articles through descriptive statistics, while the qualitative component involved comprehensive thematic analysis. The planning phase, regarded as a critical stage in SLR design (Peñalvo, 2022; Priyadarshi et al., 2021; Suchek et al., 2021), guided the formulation of three research objectives: to identify the research profile of literature on incubators, accelerators, and aggregators supporting sustainable business ecosystems; to examine the thematic clusters characterising this body of knowledge; and to identify emerging opportunities for enhancing the effectiveness of these enablers.

Inclusion and exclusion criteria were established in accordance with recommended SLR practice (Indarti et al., 2020; Okoli, 2015; Paul et al., 2021; Suhartanti et al., 2025) and applied through researcher judgement, as summarised in Table 1. Eligible studies addressed incubators, accelerators, or aggregators explicitly oriented toward green or sustainability-driven businesses, published as peer-reviewed English-language journal articles in management, business, or accounting outlets, and indexed in sources excluded from Beall's List of predatory publishers. Studies lacking sustainability orientation, non-English publications, non-peer-reviewed or grey literature, and articles from predatory or inaccessible sources were excluded to preserve conceptual clarity and quality control.

Table 1. Inclusion and Exclusion Criteria

Inclusion	Exclusion
Articles involving incubators, accelerators, or aggregators that enable green or sustainability-oriented businesses	Studies that discuss these institutions without a sustainability or green-business orientation
Written in English	Non-English publications
Peer-reviewed journal articles in management, business, or accounting	Non-peer-reviewed works or grey literature
Published in credible journals not listed in Beall's List	Predatory or inaccessible sources

Source: Authors' own work

Article retrieval was conducted through the Scopus database, chosen for its recognised rigour and reliability in social science research (Baas et al., 2020; Mongeon & Hus, 2016), consistent with its application in the bibliometric study of Sitalaksmi et al. (2024). The search string combined incubator, accelerator, aggregator, "enabler institution," or "support institution" with green, sustainable, or sustainability. The review prioritised peer-reviewed journal articles, given their greater scholarly influence relative to other publication types (Podsakoff et al., 2005), and restricted the corpus to English-language publications up to 26 August 2025 within the business, management, and accounting subject areas, without imposing a fixed starting year in order to capture the topic's earliest emergence. This search yielded 266 articles. Screening of titles and abstracts against the research keywords reduced the sample to 128 articles, and further exclusion of studies with insufficient thematic relevance, such as those addressing applied sciences, chemical reaction accelerators, or business continuity framed as sustainability, narrowed the corpus to 59 articles. After confirming accessibility of full texts, 50 articles constituted the final dataset, as illustrated in Figure 1.

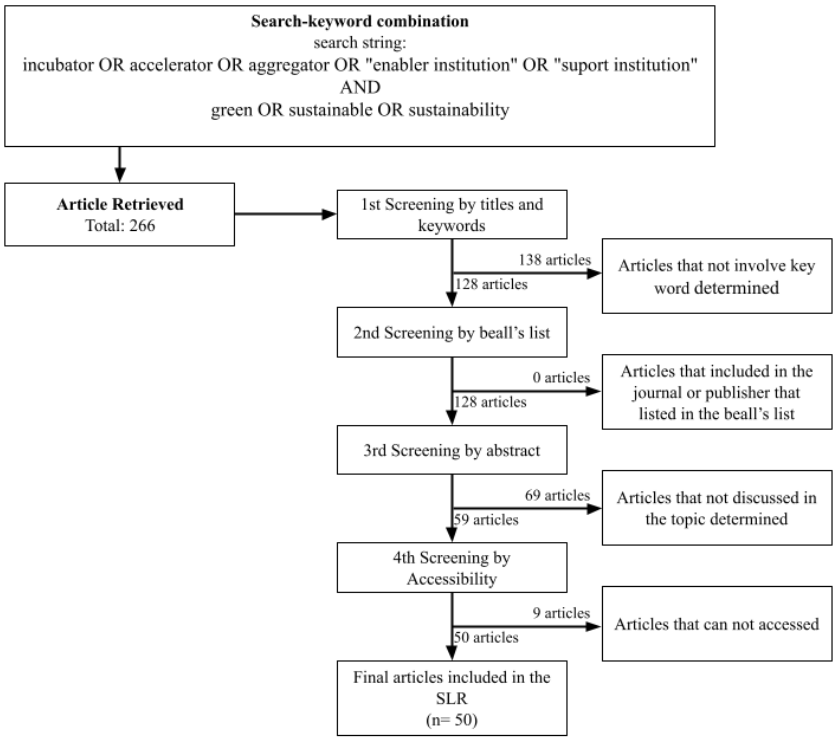

Figure 1. Data Selection Process.

Data analysis and synthesis proceeded in two complementary stages. First, each article was profiled according to publication year, journal source, publisher, ranking, and unit of analysis to establish temporal trends and identify leading outlets. A qualitative content analysis then examined research findings, methodological approaches, and thematic concerns to surface dominant themes and underexplored gaps informing future research directions. Second, a bibliometric analysis was performed using VOSviewer, consistent with established SLR practice (Fauzi et al., 2022), generating co-authorship, co-citation, and keyword co-occurrence networks (Sofiyanti & Adawiyah, 2023). A co-word analysis of titles and abstracts, applying a co-occurrence threshold of five and the frequency calculation proposed by Donohue (1974), identified 61 high-frequency terms, from which a network map was generated to visualise thematic relationships and the intellectual structure of the field.

III. RESULTS AND DISCUSSIONS

A. Result

Investigation of Reviewed Articles

The analysis began by examining research trends across time, publication outlets, journal quality, authorship patterns, and the distribution of enabler roles within the literature. Although the initial Scopus search using the predefined keyword string yielded 266 articles, only 50 were found to specifically address the role of enablers in sustainable business.

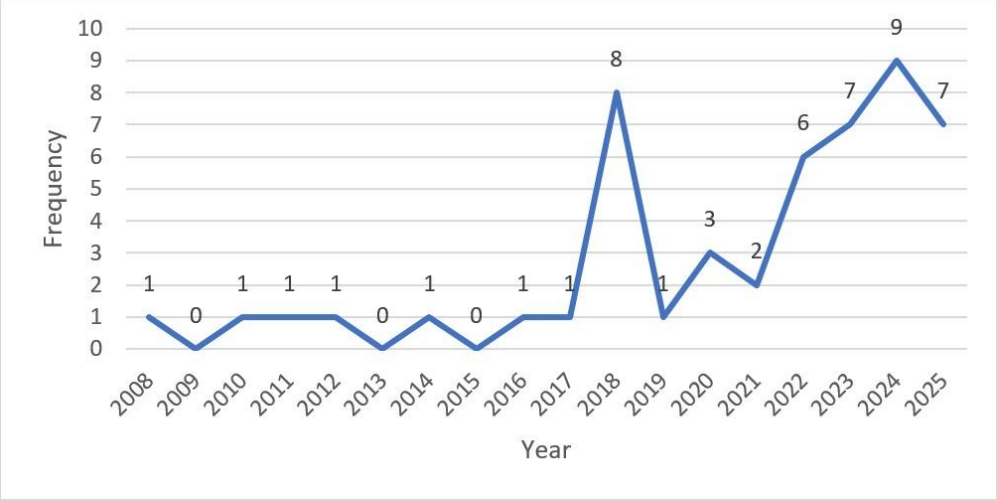

Figure 2. Research Trend.

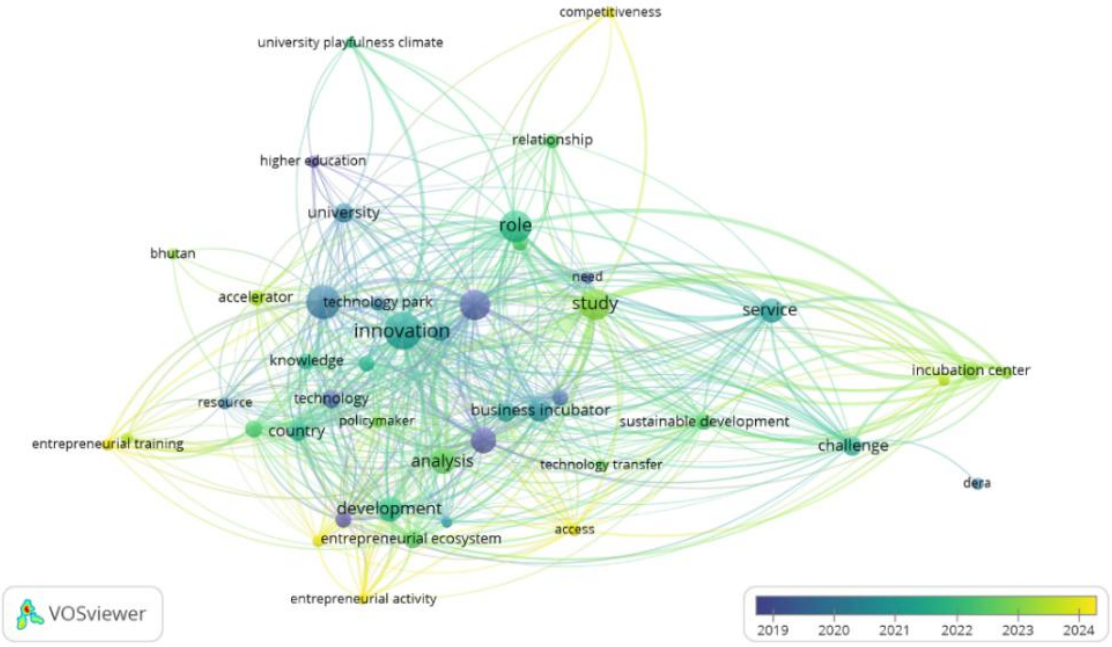

Figure 3. Overlay Visualisation.

As shown in Figure 2, publication activity on enablers in sustainable business grew slowly during 2008–2017, with only sporadic single-article years, before a marked surge to eight publications in 2018 and a temporary decline in 2019. Since 2020, the field has gained sustained momentum, peaking at nine articles in 2024 and remaining strong with seven publications in 2025, signalling growing scholarly interest, particularly over the past five years. Overlay and density visualisations in Figure 3 and Figure 4 further trace the evolution and intensity of research keywords, with node colour indicating temporal progression from earlier studies around 2019 (dark blue) through 2020–2021 (green) to the most recent contributions in 2022–2023 (bright yellow), while brightness in the density map reflects the relative concentration of scholarly attention. Earlier research centred on foundational constructs such as innovation, development, knowledge, and business incubators, anchoring the field's baseline discourse on conceptualisation and the role of incubation in entrepreneurship and economic development. By 2020, attention expanded toward relational

dimensions, including role, relationship, service, entrepreneurial ecosystem, and SDGs, reflecting growing concern with the functional dynamics of incubation systems and sustainability integration, although the density map suggests the SDG theme remains comparatively underdeveloped. Most recently, research has turned toward applied and context-specific themes such as incubation centre, challenge, entrepreneurial training, Bhutan, and competitiveness, indicating stronger emphasis on outcomes and impact, yet these too remain underdeveloped in volume, pointing to clear opportunities for future investigation. Collectively, the overlay and density analyses reveal a trajectory from foundational definitions and innovation processes toward a more practice-oriented, context-sensitive, and sustainability-driven research agenda, opening avenues for future work on reorienting incubators and accelerators to address challenges in developing countries, advance the SDGs, and integrate more effectively within broader sustainable business ecosystems.

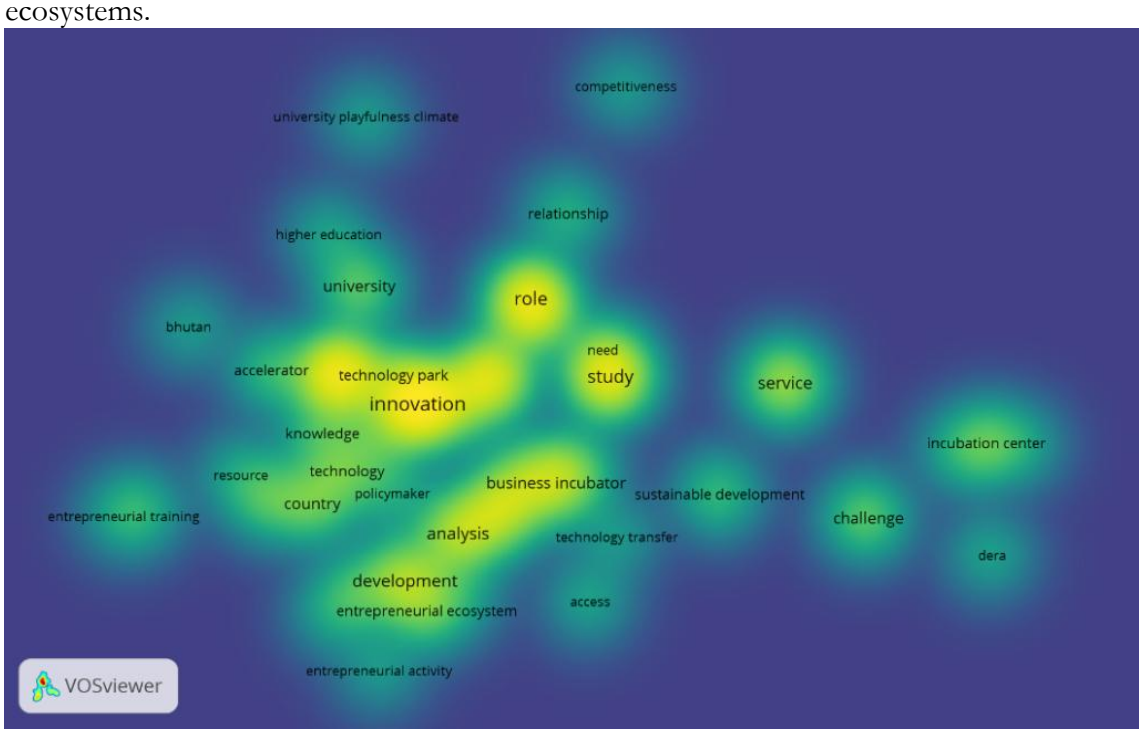

Figure 4. Density Visualisation.

In terms of publication outlets, Figure 5 identifies the Journal of Cleaner Production as the most influential platform with six articles, followed by Technological Forecasting and Social Change with four and Small Business Economics with three. Technovation, the Journal of the International Council for Small Business, and the Journal of Technology Transfer each contributed two articles, as did the International Journal of Management Education, the International Journal of Entrepreneurial Behaviour and Research, and Industry and Higher Education, while the remaining 25 journals each published only one article, reflecting the interdisciplinary and dispersed nature of the domain. Assessment of journal quality shows that most studies, 34 articles, appeared in Q1 outlets, underscoring the strong credibility and top-tier attention this topic commands in management, sustainability, and innovation research, followed by 8 articles in Q2 journals, 6 in Q3, and only 2 in Q4, indicating limited contribution from lower-ranked outlets. Leading Q1 venues, including the Journal of Cleaner Production, Technological Forecasting and Social Change, Journal of Technology Transfer, Technovation, the International Journal of Entrepreneurial Behaviour and Research, Small Business Economics, and the Journal of Business Research, collectively reinforce the field's positioning within high-quality management and entrepreneurship

scholarship, whereas contributions in lower-ranked outlets such as the Academic Journal of Interdisciplinary Studies (Q3), Tourism and Hospitality Management (Q3), and Emerald Emerging Markets Case Studies (Q4) remain fragmented, niche contributions rather than mainstream discourse.

Authorship analysis reveals a highly fragmented research community: eight scholars, Fayolle A., Klofsten M., Mian S., Mion G., Vigolo V., Bank N., Bonfanti A., and Karahan M., each contributed two publications, while the remaining 156 authors contributed only one article apiece, underscoring the dispersed and exploratory character of the field and suggesting an opportunity for scholars to establish thought leadership. Finally, examination of enabler roles shows an uneven distribution of scholarly attention: incubators dominate with 39 articles, reflecting their prominence as mechanisms for nurturing early-stage sustainable start-ups through financial support, mentorship, and infrastructure; accelerators appear in 11 articles, contributing to the scaling of sustainable ventures through market access, networking, and validation mechanisms; and aggregators receive minimal attention with only 3 articles, despite their potential to bridge producers, consumers, and markets by pooling resources and fostering stakeholder collaboration. This imbalance signals a clear research gap, with future inquiry needed into how aggregators might enhance commercialisation, streamline sustainable supply chains, and accelerate the adoption of eco-innovations across industries.

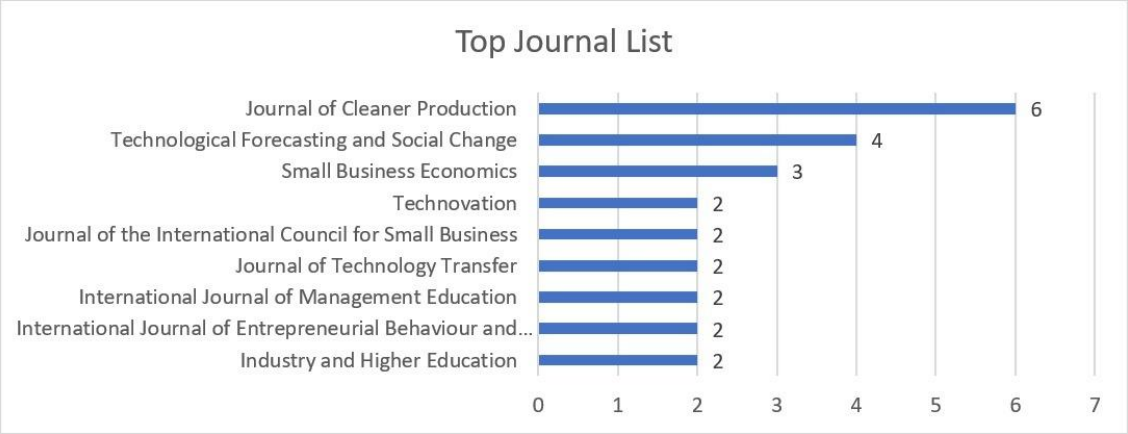

Figure 5. Top Journal List.

Mapping The Current State of Research

As shown in Figure 6 and Table 2, the bibliometric and thematic analyses reveal five major clusters that collectively illustrate how scholarly discourse on sustainable business enablers has evolved, ranging from foundational studies on business incubation to emerging discussions on accelerators, policy integration, higher education institutions, and SDG-aligned innovation ecosystems.

Cluster 1, labelled Impact of Incubation on Startups and Sustainability, examines business incubators as foundational enablers of sustainable entrepreneurship, with dominant keywords such as analysis, case study, competitiveness, entrepreneurship, impact, relationship, sustainability, and technology transfer reflecting an emphasis on measurable impacts on start-up development. Empirical studies (Bank et al., 2017; Lamperti et al., 2025) show that sustainability-oriented incubators function as gatekeepers, managing tenant inflow and pre-incubation processes while leveraging reputation and networks. Fonseca & Jabbour 2012) developed a sustainable performance assessment framework for Brazilian incubators, while Ahmed et al. (2022) and Karahan et al. (2022) provide quantitative evidence that incubators enhance start-ups' contributions to the SDGs through training, capital access, networking, and technology transfer. Bonfanti et al. (2024) show that benefit corporation

business incubators embed sustainability into technology transfer strategies, and Petrucci et al. (2025) distinguish between local scouts and trendy scouts in how incubators leverage networks, suggesting external relations are as critical as internal services in shaping incubation outcomes. Methodologically, the cluster is dominated by qualitative case studies (Bank et al., 2017; Rodrigues & Franco, 2018), complemented by quantitative surveys (Ahmed et al., 2022; Karahan et al., 2022) and systematic reviews (Hakim et al., 2024), though theoretical grounding remains limited and uneven, with only scattered use of institutional theory, Theory of Change, the social resource-based view, incubation development theory, or grounded theory, and coercive, normative, and mimetic institutional pressures noted by (Mubanga et al., 2025) as shaping sustainability adoption. Overall, incubators emerge as mediating institutions bridging start-up needs with the wider ecosystem rather than mere physical infrastructure, and future research should adopt multi-level, comparative, and longitudinal designs (Bonfanti et al., 2024; Karahan et al., 2022; Lamperti et al., 2025; Rodrigues & Franco, 2018), pursue quantitative validation and social network analysis of relational and technology transfer mechanisms (Bonfanti et al., 2024; Rodrigues & Franco, 2018), and refine measurement frameworks such as environmental maturity models and SDG-based indicators to distinguish symbolic from substantive sustainability orientation (Karahan et al., 2022; Lamperti et al., 2025).

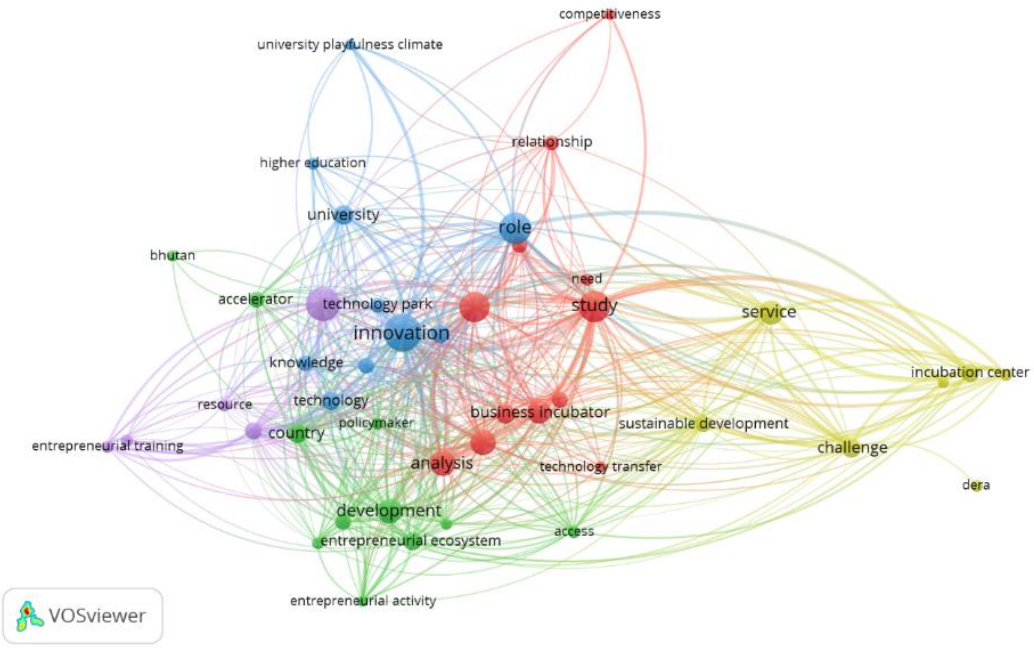

Figure 6. Network Visualisation.

Cluster 2, labelled Policy, Ecosystem, and Stakeholder Dynamics, centres on accelerators and entrepreneurial ecosystems in emerging and transitional economies, with keywords including accelerator, access, Bhutan, country, development, entrepreneurial activity, entrepreneurial ecosystem, India, infrastructure, and policymaker. Liu et al. (2025) provide quantitative evidence that accelerator participation improves cleantech firms' financing access, revenue generation, and patenting activity, though high capital intensity and long commercialisation timelines constrain long-term profitability, implying that complementary policy remains essential. Eghbali et al. (2024) use an evolutionary game-theoretic approach to show that government support confined to either upstream or downstream actors weakens the innovation system, whereas holistic interventions supporting start-ups, accelerators, and tech firms simultaneously generate synergistic effects.

Geographically, accelerators in Bhutan are embedded within public sector reforms such as the Nurturing Leadership Programme (Allen & Ulrich, 2023), while in India, STI-based incubators and accelerators align entrepreneurial activity with the SDGs (Surana et al., 2020); cross-country analysis by (Kamysbayev et al., 2025) further finds that access to finance and state support most strongly stimulate eco-innovation, with a one-point funding increase linked to a 12.6% rise in eco-innovation performance. Glinik et al. (2021) show that accelerator programmes imprint sustainability onto early-stage business models, though integration often remains partial, while the Free Electrons Programme (Taufiq & Pionka, 2022) illustrates accelerators as international co-creation platforms linking clean energy start-ups with global utilities. Building on Pierrakis et al. (2024), Theodoraki et al. (2018), and Surana et al. (2020), scholars are encouraged to examine public–private funding models, social capital formation, and long-term firm performance, and to integrate system dynamics and game-theoretic modelling following Eghbali et al. (2024). Theoretical grounding remains selective, drawing occasionally on entrepreneurial ecosystem theory, resource-based view, evolutionary game theory, imprinting theory, or social capital theory, but mostly relying on empirical modelling and case-based analysis, leaving accelerators' causal mechanisms under-theorized despite their portrayal as legitimacy enhancers and coordination mechanisms. Overall, Cluster 2 advances an ecosystem-contingent view in which accelerator effectiveness depends on alignment with public policy, financial systems, and broader ecosystem structures rather than accelerator intervention alone.

Table 2. Cluster Label

Cluster	Keywords	Label
Cluster 1 Red	analysis, business incubator, case study, competitiveness, entrepreneurship, impact, need, relationship, start up, study, sustainability, technology transfer	Impact of Incubation on Startups and Sustainability
Cluster 2 Green	accelerator, access, bhutan, country, development, entrepreneurial activity, entrepreneurial ecosystem, india, infrastructure, policymaker	Policy, ecosystem, and stakeholder dynamics
Cluster 3 Blue	article, higher education, innovation, knowledge, role, science, technology, technology park, university, university playfulness climate	Universities, Knowledge Intermediaries, and Innovation Spaces
Cluster 4 Yellow	Challenge, dera, incubatee, incubation center, nigeria, service, sustainable development	Incubation Challenges in Developing and Resource-Constrained Contexts
Cluster 5 Purple	entrepreneurial training, incubator, resource, sdgs, university business incubator	SDG-Aligned University Business Incubators

Source: Authors' own work

Cluster 3, labelled Universities, Knowledge Intermediaries, and Innovation Spaces, highlights the entrepreneurial turn in higher education institutions. Sieg et al. (2023) connect academic entrepreneurship to sustainable development innovation, and Guerrero et al.

(2024) frame universities as natural incubators and knowledge producers, while science and technology parks extend this role as advisors and innovation promoters (Caloffi et al., 2023; Salvador et al., 2019). Redondo et al. (2022) show university business incubators serve as protected environments for peer-to-peer learning, Zhou et al. (2022) find that a university playfulness climate enhances faculty engagement in sustainable teaching innovation, and Collins & Gannon (2014) conceptualise HEIs as "sustainability incubators" through curriculum, governance, and campus initiatives. A second stream addresses innovation intermediaries: Caloffi et al. (2023) map the diversity of incubators, accelerators, and science parks; Chancé et al. (2018) examine "Third Places" such as co-working spaces and hubs alongside measurement challenges; Mineiro et al. (2021) apply the quadruple and quintuple helix framework to multi-actor collaboration; and Salvador et al. (2019) show technology parks enabling integrated food-energy-water systems for urban sustainability. Future research should pursue comparative, longitudinal analyses of institutional, cultural, and regional influences on knowledge exchange (Redondo et al., 2022; Zhou et al., 2022), empirically test multi-level frameworks linking university climate and innovation outcomes while exploring AI and virtual reality applications (Eustachio et al., 2025; Zhou et al., 2022), theoretically reconfigure fragmented models such as the Quadruple and Quintuple Helix and "Third Places" (Chancé et al., 2018; Mineiro et al., 2021), investigate grassroots activism linking academic entrepreneurship with societal transformation (Caloffi et al., 2023; Horwitch & Mulloth, 2010), and develop integrated toolsets and open databases capturing university–industry knowledge flows (Kapitulčinová et al., 2018; Sieg et al., 2023). Theoretical articulation remains largely absent, with concepts such as the entrepreneurial university and innovation intermediaries serving as descriptive rather than explanatory lenses, leaving the mechanisms linking university structures to systemic sustainability outcomes under-theorized despite the cluster's rich ecosystem narrative.

Cluster 4, labelled Incubation Challenges in Developing and Resource-Constrained Contexts, examines structural, financial, and socio-cultural barriers facing incubators and incubatees in Nigeria and rural Africa. Mavuri et al. (2023) find that Nigerian incubatees face persistent challenges in accessing finance, preparing business plans, developing prototypes, and acquiring training, with effectiveness often contingent on managerial quality rather than institutional robustness, warranting periodic external evaluation. Derdabi & Dvouletý (2024) show, through cases in Nigeria and Tanzania, that entrepreneurs rely on networks and opinion leaders for legitimacy, though political and cultural complexities slow diffusion, making grassroots trust-building essential to sustainability. Future research should adopt quantitative approaches capturing how political conditions, cultural embeddedness, and local partnerships shape incubation effectiveness (Mavuri et al., 2023), and examine the intersection of digital inclusion and grassroots innovation in African contexts (Derdabi & Dvouletý, 2024). The cluster lacks explicitly articulated theoretical frameworks, relying instead on context-driven, problem-oriented analyses of structural constraints and socio-cultural barriers, which limits cumulative conceptual development despite valuable context-sensitive insight. Overall, incubation in these settings reflects a dual constraint of internal organisational weakness and external socio-political embeddedness, reframing incubation as a gradual capacity-building process rather than an acceleration mechanism.

Cluster 5, labelled SDG-Aligned University Business Incubators, positions university business incubators (UBIs) as strategic agents of sustainability transformation. Almansour (2024) demonstrates that incubator effectiveness depends on resource access, managerial capacity, and alignment with SDGs 4, 9, 11, and 12, with SDG-integrating UBIs better preparing entrepreneurs to contribute to the global sustainability agenda. Karahan (2024) introduces the Sustainable Entrepreneurial University (SEU) concept, identifying six stages of sustainability transformation across German UBIs in which leadership commitment and strategic partnerships are decisive. Building on these studies, future research should

investigate how SDG alignment translates into measurable entrepreneurial competencies and institutional transformation trajectories, employ longitudinal designs to capture how leadership and partnerships shape transition pace, and empirically test how AI-driven mentoring, digital marketing, and data analytics enhance SDG awareness (Almansour, 2024; Karahan, 2024). The cluster lacks explicit theoretical grounding, with SDG-aligned incubation and the SEU concept developed through empirical case analysis and normative argumentation rather than systematic theory building, leaving the causal mechanisms linking organisational practices to institutional change largely implicit. As such, Cluster 5 offers a forward-looking, practice-oriented narrative of UBI transformation while leaving open the need for stronger theoretical grounding in institutional, organisational change, or capability-based theory.

B. Discussion

Synsthesis: Sustainable Enabler Map

Drawing upon the clustering analysis and thematic synthesis, this study proposes the Sustainable Enabler Map (SEM) as an integrative conceptual representation that organises the fragmented literature on incubators, accelerators, and aggregators within sustainable entrepreneurship. Rather than offering a causal theory, the SEM synthesises recurring patterns identified across clusters into a structured analytical configuration shown in Figure 7.

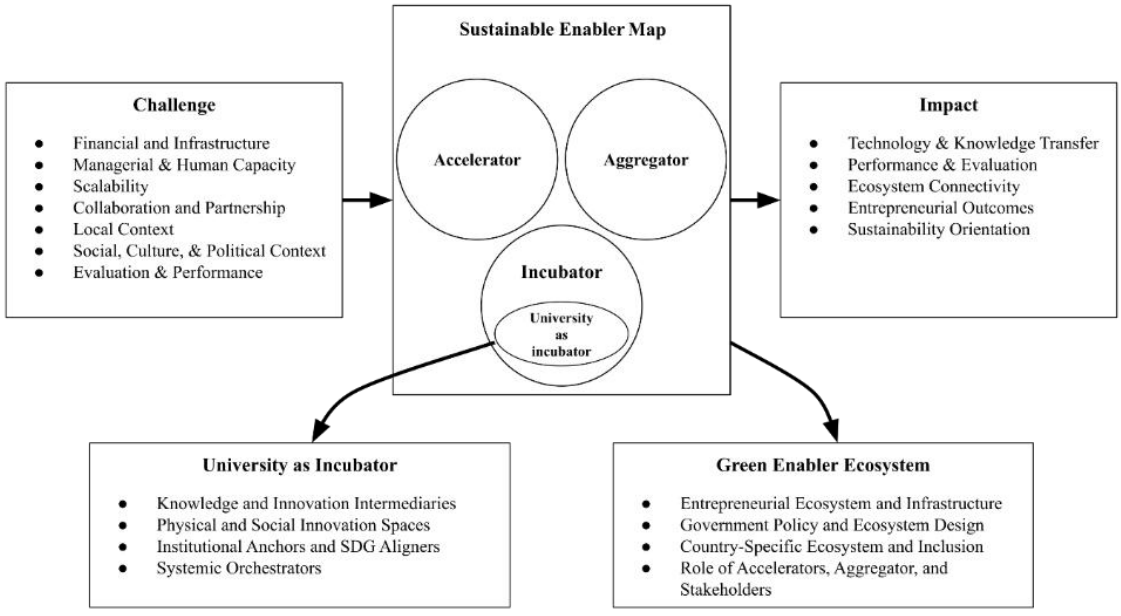

Figure 7. Sustainability Enabler Ecosystem.

The map is organised around two interrelated dimensions. The first, the institutional configuration dimension, depicts how incubators, accelerators, and aggregators are portrayed in the literature as interacting and complementary actors within entrepreneurial ecosystems. This dimension highlights their relative positioning and functional distinctions without presuming fixed causal hierarchies. The second, the impact dimension, consolidates the various outcome domains reported in prior studies, including knowledge and technology transfer, performance measurement, ecosystem connectivity, entrepreneurial development, and sustainability orientation.

By juxtaposing these dimensions, the SEM provides a structured overview of how the literature collectively associates institutional support mechanisms with sustainability-related

outcomes. It does not assert linear causality but maps the relational patterns through which sustainable business support systems are conceptualised.

Building on the systematic and bibliometric findings, the SEM synthesises the literature into three interconnected analytical components: contextual challenges, structural enablers, and reported impact domains. The structural component highlights the differentiated yet complementary roles attributed to incubators, accelerators, and aggregators. The contextual layer captures recurring constraints such as financial limitations, managerial capacity gaps, institutional fragility, and socio-political dynamics. The impact layer consolidates the outcome categories most frequently discussed in the reviewed studies.

Within this synthesis, the university-as-incubator concept appears as a recurring institutional anchor, while policy environments are consistently portrayed as shaping ecosystem coordination. These elements are mapped as contextual and relational features rather than deterministic drivers.

Overall, the SEM contributes by reducing conceptual fragmentation and offering a higher-order analytical map of how sustainable enablers are positioned in the literature. It serves as a heuristic device that can guide future empirical research to examine specific relationships, boundary conditions, and dynamic interactions across different ecosystem contexts

Policymakers should strengthen the institutional ecosystem connecting incubators, accelerators, universities, and industry actors, with capacity-building programmes and improved infrastructure essential to mentoring, technology transfer, and entrepreneurial training, particularly in developing economies facing financial and institutional constraints. Practitioners, including incubator and accelerator managers, universities, and innovation intermediaries, should adopt a more collaborative, ecosystem-oriented approach emphasising mentorship, market validation, SDG-oriented training, and cross-sector partnerships, while expanding cooperation and exploring emerging coordination mechanisms such as aggregators to strengthen resource mobilisation and ecosystem connectivity.

Consistent with prior review-based scholarship, the SEM serves as both a synthesis tool and a platform for future inquiry into interaction patterns among enabler types, the contextual conditions shaping their collaboration, and the longitudinal evolution of sustainable entrepreneurial ecosystems, particularly through empirical research in developing economies. This study is limited to Scopus-indexed journal articles and may therefore omit relevant insights from conference proceedings and practitioner-oriented publications; future reviews may expand database coverage or adopt meta-analytical approaches to assess the magnitude and consistency of reported outcomes. Despite these limitations, this research contributes to the literature by reducing conceptual fragmentation and offering a coherent analytical map of how sustainable business enablers are positioned within contemporary ecosystem discourse.

IV. CONCLUSION

This systematic and bibliometric review set out to map, classify, and integrate the roles of incubators, accelerators, and aggregators as institutional enablers of sustainable entrepreneurship, and the synthesis of 50 Scopus-indexed articles fulfils that objective. The evidence shows that scholarly attention to these enablers has intensified since 2018, concentrated in high-impact outlets such as the Journal of Cleaner Production and Technological Forecasting and Social Change, and organised around five thematic clusters spanning incubation impact, policy and ecosystem dynamics, university knowledge intermediation, resource-constrained contexts, and SDG-aligned incubation, while aggregators remain markedly underexplored relative to incubators and accelerators. Building on this synthesis, the study introduces the Sustainable Enabler Map (SEM), an integrative

framework that organises institutional configurations and sustainability impact domains to reduce the conceptual fragmentation that has characterised prior research; bounded by its reliance on Scopus-indexed journal articles, the review nonetheless contributes a coherent analytical map of the sustainable enabler literature and a structured agenda for future theoretical and empirical inquiry, particularly into the coordinating role of aggregators.

ACKNOWLEDGEMENT

This research received no dedicated external funding.

REFERENCES

2

Achmad, F., & Wiratmadja, I. I. (2024). Driving Sustainable Performance in SMEs Through Frugal Innovation: The Nexus of Sustainable Leadership, Knowledge Management, and Dynamic Capabilities. *IEEE Access*, *12*, 103329–103347. https://doi.org/10.1109/ACCESS.2024.3433474

Ahmed, N., Li, C., Qalati, S. A., Rehman, H. U., Khan, A., & Rana, F. (2022). Impact of Business Incubators on Sustainable Entrepreneurship Growth with Mediation Effect. *Entrepreneurship Research Journal*, *12*(2), 137–160. https://doi.org/10.1515/erj-2019-0116

Allen, J. N., & Ulrich, D. (2023). Developing Human Capability to Believe in Bhutan. *South Asian Journal of Human Resources Management*, *10*(2), 256–272. https://doi.org/10.1177/23220937231201041

Almansour, M. (2024). Business Incubators and Entrepreneurial Training: Leveraging Technological Innovations and Digital Marketing. *IEEE Transactions on Engineering Management*, *71*, 13586–13597. https://doi.org/10.1109/TEM.2022.3180212

Amelia, W. A., Indarti, N., & Anggadwita, G. (2025). Uncovering innovation patterns in cooperative organizations: A bibliometric study. *Journal of Enterprising Communities: People and Places in the Global Economy*, *19*(5), 1103–1131. https://doi.org/10.1108/JEC-10-2024-0218

Andreopoulou, Z., Misso, R., & Cesaretti, G. P. (2014). Using the internet to Support green business For rural development and environmental Protection. *Journal of Environmental Protection and Ecology*, *15*(No 2), 726–732.

Anggadwita, G., & Indarti, N. (2023). Women entrepreneurship in the internationalization of SMEs: A bibliometric analysis for future research directions. *European Business Review*, *35*(5), 763–796. https://doi.org/10.1108/EBR-01-2023-0006

Baas, J., Schotten, M., Plume, A., Côté, G., & Karimi, R. (2020). Scopus as a curated, high-quality bibliometric data source for academic research in quantitative science studies. *Quantitative Science Studies*, *1*(1), 377–386. https://doi.org/10.1162/qss_a_00019

Bank Indonesia. (2025). *Kajian Ekosistem Pembiayaan Hijau Kepada UMKM: Perspektif Supply dan Demand*. Bank Indonesia. https://www.bi.go.id/id/publikasi/kajian/Documents/Kajian-Ekosistem-Pembayaran-Hijau-Kepada-UMKM-Perspektif-Suply-dan-Demand.pdf

Bank, N., Fichter, K., & Klofsten, M. (2017). Sustainability-profiled incubators and securing the inflow of tenants – The case of Green Garage Berlin. *Journal of Cleaner Production*, *157*, 76–83. https://doi.org/10.1016/j.jclepro.2017.04.123

Basmantra, I. N., Apsari, I. A. K. W., Gama, A. W. O., Baykal, E., & Gorda, A. A. A. N. S. R. (2024). Exploring the Factors Leading to the Failure of Millennial Entrepreneurs: Challenges in Green Business. In B. Alareeni & A. Hamdan (Eds.), *Technology and Business Model Innovation: Challenges and Opportunities* (Vol. 924, pp. 498–505). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-53998-5_45

Bhatli, D., Borella, P., Jelassi, T., & Saillant, N. (2015). Startup Accelerators: Entrepreneurial Match Makers. In K. Kubacki (Ed.), *Ideas in Marketing: Finding the New and Polishing the Old* (pp. 259–259). Springer International Publishing. https://doi.org/10.1007/978-3-319-10951-0_92

Bhattacharjee, A. (2024). Green Business Incubation: Fostering Green Entrepreneurship and Innovation. In L. Indiran & R. Yanamandra (Eds.), *Advances in Business Strategy and Competitive Advantage* (pp. 231–268). IGI Global. https://doi.org/10.4018/979-8-3693-4302-9.ch009

Bonfanti, A., De Crescenzo, V., Simeoni, F., & Loza Adaui, C. R. (2024). Convergences and divergences in sustainable entrepreneurship and social entrepreneurship research: A systematic review and research agenda. *Journal of Business Research*, *170*, 114336. https://doi.org/10.1016/j.jbusres.2023.114336

Butz, H., & Mrożewski, M. J. (2021). The Selection Process and Criteria of Impact Accelerators. An Exploratory Study. *Sustainability*, *13*(12), 6617. https://doi.org/10.3390/su13126617

Caloffi, A., Colovic, A., Rizzoli, V., & Rossi, F. (2023). Innovation intermediaries' types and functions: A computational analysis of the literature. *Technological Forecasting and Social Change*, *189*, 122351. https://doi.org/10.1016/j.techfore.2023.122351

Chancé, E., Derrible, S., & Ashton, W. S. (2018). The need to adapt sustainability audits to atypical business models. *Clean Technologies and Environmental Policy*, *20*(5), 1113–1118. https://doi.org/10.1007/s10098-018-1522-6

Chopra, M., Saini, N., Kumar, S., Varma, A., Mangla, S. K., & Lim, W. M. (2021). Past, present, and future of knowledge management for business sustainability. *Journal of Cleaner Production*, *328*, 129592. https://doi.org/10.1016/j.jclepro.2021.129592

Collins, D., & Gannon, A. (2014). Walking the Eco-Talk Movement: Higher Education Institutions as Sustainability Incubators. *Organization & Environment*, *27*(1), 16–24. https://doi.org/10.1177/1086026614521629

Comi, A., & Idone, I. (2024). The Use of Electric Vehicles to Support the Needs of the Electricity Grid: A Systematic Literature Review. *Applied Sciences*, *14*(18), 8197. https://doi.org/10.3390/app14188197

Derdabi, A., & Dvouletý, O. (2024). Sustainable innovations for rural Africa: Case studies from Nigeria and Tanzania. *Journal of the International Council for Small Business*, *5*(4), 345–371. https://doi.org/10.1080/26437015.2024.2369568

Donohue, J. C. (1974). *Understanding scientific literatures: A bibliometric approach*. MIT Press.

Eghbali, M.-A., Rasti-Barzoki, M., & Altmann, J. (2024). An evolutionary game-theoretic approach to analysis the green innovation chain dynamics under government policies. *Technology in Society*, *77*, 102568. https://doi.org/10.1016/j.techsoc.2024.102568

Etzkowitz, H. (2003). Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. *Social Science Information*, *42*(3), 293–337. https://doi.org/10.1177/05390184030423002

Eustachio, J. H. P. P., David, M. L. S., Goi, H. C., Lourenção, M., Oliveira, J. E. P. D., Carreira, L. L. D., Salvia, A. L., Silva, D. R., Oliveira, M. S. B. D., Baars, C., & Caldana, A. C. (2025). Towards student-centric learning approaches for responsible management education: The relevance of PRME business schools. *The International Journal of Management Education*, *23*(3), 101194. https://doi.org/10.1016/j.ijme.2025.101194

Fauzi, M. A., Muhamad Tamyez, P. F., & Kumar, S. (2022). Social Entrepreneurship and Social Innovation in ASEAN: Past, Present, and Future Trends. *Journal of Social Entrepreneurship*, 1–23. https://doi.org/10.1080/19420676.2022.2143870

Fonseca, S. A., & Jabbour, C. J. C. (2012). Assessment of business incubators' green performance: A framework and its application to Brazilian cases. *Technovation*, *32*(2), 122–132. https://doi.org/10.1016/j.technovation.2011.10.006

Glinik, M., Rachinger, M., Müller, C., Ratz, F., & Rauter, R. (2021). Exploring Sustainability in Business Models of Early Phase Start-ups. *Journal of Business Models*, 22-43 Pages. https://doi.org/10.5278/JBM.V9I2.3557

Gonsalves, M., & Rogerson, J. M. (2019). Business incubators and green technology: The Gauteng Climate Innovation Centre, South Africa. *Urbani Izziv*, *Supplement*(30), 212–228. https://doi.org/10.5379/urbani-izziv-en-2019-30-supplement-014

Guerrero, M., Fayolle, A., Di Guardo, M. C., Lamine, W., & Mian, S. (2024). Re-viewing the entrepreneurial university: Strategic challenges and theory building opportunities. *Small Business Economics*, *63*(2), 527–548. https://doi.org/10.1007/s11187-023-00858-z

Hakim, A. I., Sukimi, M. F., & Ab Rahman, A. H. (2024). Exploring the Role of Business Incubators to Sustainable Startups: A Systematic Literature Review. *PaperASIA*, *40*(5b), 307–320. https://doi.org/10.59953/paperasia.v40i5b.250

Hendry, J. R., & Vesilind, P. A. (2005). Ethical motivations for green business and engineering. *Clean Technologies and Environmental Policy*, *7*(4), 252–258. https://doi.org/10.1007/s10098-005-0013-8

Horwitch, M., & Mulloth, B. (2010). The interlinking of entrepreneurs, grassroots movements, public policy and hubs of innovation: The rise of Cleantech in New York City. *The Journal of High Technology Management Research*, *21*(1), 23–30. https://doi.org/10.1016/j.hitech.2010.02.004

Indarti, N., Lukito-Budi, A. S., & Islam, A. M. (2020). A systematic review of halal supply chain research: To where shall we go? *Journal of Islamic Marketing*, *12*(9), 1930–1949. https://doi.org/10.1108/JIMA-05-2020-0161

Kamysbayev, M., Talassov, G., Orazgalieva, A., Nursultanov, S., Moldashev, A., & Kaliev, G. (2025). Forming an Innovative Start-Up Ecosystem to Increase the Entrepreneurial Activity of Companies (As Exemplified by Asian Countries). *Qubahan Academic Journal*, *5*(2), 100–115. https://doi.org/10.48161/qaj.v5n2a1435

Kapitulčinová, D., AtKisson, A., Perdue, J., & Will, M. (2018). Towards integrated sustainability in higher education – Mapping the use of the Accelerator toolset in all dimensions of university practice. *Journal of Cleaner Production*, *172*, 4367–4382. https://doi.org/10.1016/j.jclepro.2017.05.050

Karahan, M. (2024). Advancing sustainable entrepreneurial universities: Sustainability transformations of university business incubators in Germany. *Small Business Economics*, *63*(2), 575–609. https://doi.org/10.1007/s11187-023-00860-5

Karahan, M., Rashid, L., & Kratzer, J. (2022). Gearing-up for purpose: The relationship between entrepreneurs' usage of incubation support services and sustainable impacts. *Journal of Cleaner Production*, *377*, 134315. https://doi.org/10.1016/j.jclepro.2022.134315

Lamperti, S., Courrent, J.-M., & Sammut, S. (2025). Sustainability orientation in business Incubators: Empirical Evidence from France. *Journal of Business Research*, *194*, 115377. https://doi.org/10.1016/j.jbusres.2025.115377

Leone, D. (Ed.). (2025). *Strategic approaches to managing technological change in sustainable business models*. IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-3466-0

Li, Q., Abdul Ghani Azmi, I. B., & Norman, A. A. B. (2025). Enhancing sustainable innovation through workplace well-being and digital capability: A systematic literature review toward responsible and cleaner consumption. *Cleaner and Responsible Consumption*, *18*, 100305. https://doi.org/10.1016/j.clrc.2025.100305

Liu, Z., O'Reilly, S., & Hanly, J. (2025). The role of accelerators in the success of cleantech firms. *Technovation*, *148*, 103331. https://doi.org/10.1016/j.technovation.2025.103331

Mavuri, S., Chavali, K., & Vadakkiveetil, A. K. (2023). Role of Incubation Centers in Promoting Sustainable Development in Nigeria. *Academic Journal of Interdisciplinary Studies*, *12*(1), 67. https://doi.org/10.36941/ajis-2023-0006

Mineiro, A. A. D. C., Assis De Souza, T., & Carvalho De Castro, C. (2021). The quadruple and quintuple helix in innovation environments (incubators and science and technology parks). *Innovation & Management Review*, *18*(3), 292–307. https://doi.org/10.1108/INMR-08-2019-0098

Mongeon, P., & Hus, A. P. (2016). The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics*, *106*(1), 213–228. https://doi.org/10.1007/s11192-015-1765-5

Mubanga, L. C., John, B., & Katongo, K. J. (2025). Institutional Enablers of ESG Adoption in Sub-Saharan Africa: A Systematic Review of Sustainable Corporate Governance and Firm Performance. *Management of Sustainable Development*, *17*(2), 105–118. https://doi.org/10.54989/msd-2025-0015

Okoli, C. (2015). A Guide to Conducting a Standalone Systematic Literature Review. *Communications of the Association for Information Systems*, *37*. https://doi.org/10.17705/1CAIS.03743

Paul, J., Lim, W. M., O'Cass, A., Hao, A. W., & Bresciani, S. (2021). Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR). *International Journal of Consumer Studies*, *45*(4). https://doi.org/10.1111/ijcs.12695

Peñalvo, F. J. G. (2022). Desarrollo de estados de la cuestión robustos: Revisiones Sistemáticas de Literatura. *Education in the Knowledge Society (EKS)*, *23*, e28600. https://doi.org/10.14201/eks.28600

Petrucci, F., Mutignani, F., & Santos, J. N. (2025). Sustainability–driven changes in the business incubation industry. *Journal of Business & Industrial Marketing*, *40*(6), 1376–1388. https://doi.org/10.1108/JBIM-04-2024-0295

Pierrakis, Y., Ivanova, A., & Chawdhary, R. (2024). Cleantech incubators within the sustainable entrepreneurial ecosystem: Fundraising sources, income generation strategies, and the role of public support. *Strategic Change*, *33*(6), 479–495. https://doi.org/10.1002/jsc.2598

Podsakoff, P. M., MacKenzie, S. B., Bachrach, D. G., & Podsakoff, N. P. (2005). The influence of management journals in the 1980s and 1990s. *Strategic Management Journal*, *26*(5), 473–488. https://doi.org/10.1002/smj.454

Priyadarshi, R., Routroy, S., & Garg, G. K. (2021). Postharvest supply chain losses: A state-of-the-art literature review and bibliometric analysis. *Journal of Advances in Management Research*, *18*(3), 443–467. https://doi.org/10.1108/JAMR-03-2020-0040

Redondo, M., Camarero, C., & Van Der Sijde, P. (2022). Exchange of knowledge in protected environments. The case of university business incubators. *European Journal of Innovation Management*, *25*(3), 838–859. https://doi.org/10.1108/EJIM-08-2020-0341

Rodrigues, M., & Franco, M. (2018). Importance of living labs in urban Entrepreneurship:A Portuguese case study. *Journal of Cleaner Production*, *180*, 780–789. https://doi.org/10.1016/j.jclepro.2018.01.150

Saha, S., Alrasheedi, A. F., Khan, Md. A.-A., & Manna, A. K. (2024). Optimal strategies for green investment, sharing contract and advertisement effort in a supply chain coordination problem. *Ain Shams Engineering Journal*, *15*(4), 102595. https://doi.org/10.1016/j.asej.2023.102595

Salvador, D. S., Toboso-Chavero, S., Nadal, A., Gabarrell, X., Rieradevall, J., & Da Silva, R. S. (2019). Potential of technology parks to implement Roof Mosaic in Brazil. *Journal of Cleaner Production*, *235*, 166–177. https://doi.org/10.1016/j.jclepro.2019.06.214

Sieg, P., Posadzińska, I., & Jóźwiak, M. (2023). Academic entrepreneurship as a source of innovation for sustainable development. *Technological Forecasting and Social Change*, *194*, 122695. https://doi.org/10.1016/j.techfore.2023.122695

Sitalaksmi, S., Indarti, N., Anggadwita, G., & Sambudi, A. D. (2024). Knowledge leakage and collaborative innovation: A systematic literature review. *Knowledge Management Research & Practice*, 1–17. https://doi.org/10.1080/14778238.2024.2431111

Sofiyanti, N., & Adawiyah, W. R. (2023). Bibliometric Analysis of Social Entrepreneurship and Leadership. *West Science Journal Economic and Entrepreneurship*, *1*(03), 196–208. https://doi.org/10.58812/wsjee.v1i03.155

Suchek, N., Fernandes, C. I., Kraus, S., Filser, M., & Sjögrén, H. (2021). Innovation and the circular economy: A systematic literature review. *Business Strategy and the Environment*, *30*(8), 3686–3702. https://doi.org/10.1002/bse.2834

Suhartanti, P. D., Rosari, R., & Nastiti, T. (2025). *The bright side of sharing mistakes: A systematic literature review for future research direction*. *16*(2), 117–153.

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. https://doi.org/10.1016/j.techfore.2020.120057

Taufiq, A., & Pionka, M. Y. (2022). Future of clean energy: Free Electrons — Global accelerator program for start-ups. *Journal of the International Council for Small Business*, *3*(1), 24–28. https://doi.org/10.1080/26437015.2021.1943053

Theodoraki, C., Messeghem, K., & Rice, M. P. (2018). A social capital approach to the development of sustainable entrepreneurial ecosystems: An explorative study. *Small Business Economics*, *51*(1), 153–170. https://doi.org/10.1007/s11187-017-9924-0

Yépez, E. T., Marín-Carrillo, G. M., Casado-Belmonte, M. D. P., & Capobianco-Uriarte, M. D. L. M. (2020). Sustainable entrepreneurship: Review of its evolution and new trends. *Journal of Cleaner Production*, *252*, 119742. https://doi.org/10.1016/j.jclepro.2019.119742

Yovera, V. R. R., Farroñán, E. V. R., Ballesteros, M. A. A., Calmet, V. G. V., Armas, H. M. A., Deza, J. M. S., Redolfo, R. L., Acosta, R. M., & Pérez, M. D. R. (2025). Academic Entrepreneurship Evolution: A Systematic Review of University Incubators and Startup Development (2018–2024). *Sustainability*, *17*(12), 5365. https://doi.org/10.3390/su17125365

Zhou, F., Zhang, N., & Mou, J. (2022). Universities as incubators of innovation: The role of a university playfulness climate in teachers' sustainable teaching innovation. *The International Journal of Management Education*, *20*(3), 100693. https://doi.org/10.1016/j.ijme.2022.100693