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ECOPRENEURSHIP IN ASIA: A BIBLIOMETRIC ANALYSIS OF SUSTAINABLE INNOVATION RESEARCH TREN

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ABSTRACT
The accelerating environmental crisis has driven the emergence of Ecopreneurship as a transformative approach that integrates business innovation with environmental responsibility and social sustainability. Asia, as the world's fastest-growing economic region, faces critical environmental challenges while simultaneously fostering a new generation of sustainable entrepreneurs. This study aims to map scientific research trends and identify future directions in Ecopreneurship studies in Asian countries through a bibliometric analysis based on the Scopus database, covering the period from 2002 to August 2025. Using the PRISMA method for systematic screening, 561 articles were analyzed and visualized using VOSviewer to identify thematic clusters, publication trends, and research collaborations. The results reveal a significant surge in publications since 2014, coinciding with the implementation of the Sustainable Development Goals (SDGs) and the Paris Agreement. China and India dominate publication output, followed by Malaysia and Indonesia, reflecting Southeast Asia's growing academic engagement in sustainable entrepreneurship. Seven major keyword clusters were identified, spanning individual-level factors (e.g., motivation, self-efficacy), organizational strategies (e.g., green innovation, sustainability orientation), and macro-level issues (e.g., policy, social entrepreneurship). The findings indicate that Ecopreneurship research in Asia is increasingly multidisciplinary, incorporating digital technologies such as artificial intelligence (AI) and the Internet of Things (IoT) to advance the green economy. This study contributes by providing a comprehensive overview of research evolution, identifying key gaps, and outlining future research directions. In particular, it highlights the need for deeper investigation into digital integration, policy frameworks, and multi-level interactions among individual, organizational, and ecosystem factors to strengthen sustainable entrepreneurship in Asia.

Keywords: ecopreneurship; sustainable entrepreneurship; green innovation; bibliometric analysis; asia; VOSviewer; scopus database

ECOPRENEURSHIP DI ASIA: ANALISIS BIBLIOMETRIK TERHADAP TREN PENELITIAN INOVASI BERKELANJUTAN

ABSTRAK
Krisis lingkungan yang semakin meningkat telah mendorong munculnya Ecopreneurship sebagai pendekatan transformatif yang mengintegrasikan inovasi bisnis dengan tanggung jawab lingkungan dan keberlanjutan sosial. Asia, sebagai kawasan dengan pertumbuhan ekonomi tercepat di dunia, menghadapi tantangan lingkungan yang signifikan sekaligus mendorong lahirnya generasi baru wirausaha berkelanjutan. Penelitian ini bertujuan untuk memetakan tren penelitian ilmiah serta mengidentifikasi arah penelitian masa depan terkait Ecopreneurship di negara-negara Asia melalui analisis bibliometrik berbasis data Scopus periode 2002 hingga Agustus 2025. Dengan menggunakan metode PRISMA untuk penyaringan sistematis, sebanyak 561 artikel dianalisis dan divisualisasikan menggunakan VOSviewer untuk mengidentifikasi klaster tematik, tren publikasi, serta kolaborasi penelitian. Hasil penelitian menunjukkan adanya peningkatan signifikan jumlah publikasi sejak tahun 2014, yang bertepatan dengan implementasi Sustainable Development Goals (SDGs) dan Paris Agreement. China dan India mendominasi jumlah publikasi, diikuti oleh Malaysia dan Indonesia, yang mencerminkan meningkatnya keterlibatan akademik Asia Tenggara dalam kewirausahaan berkelanjutan. Tujuh klaster kata kunci utama berhasil diidentifikasi, yang mencakup faktor pada tingkat individu (motivasi, self-efficacy), strategi organisasi (inovasi hijau, orientasi keberlanjutan), hingga isu makro (kebijakan, kewirausahaan sosial). Temuan ini menunjukkan bahwa penelitian Ecopreneurship di Asia semakin bersifat multidisipliner, dengan integrasi teknologi digital seperti AI dan IoT dalam mendorong ekonomi hijau. Penelitian ini memberikan kontribusi melalui pemetaan komprehensif terhadap evolusi riset serta identifikasi kesenjangan penelitian, sekaligus merumuskan arah penelitian masa depan, khususnya perlunya kajian lebih mendalam terkait integrasi digital, kerangka kebijakan, serta interaksi lintas level antara faktor individu, organisasi, dan ekosistem dalam memperkuat kewirausahaan berkelanjutan di Asia.

Kata kunci: ecopreneurship; kewirausahaan berkelanjutan; inovasi hijau; analisis bibliometrik; asia; VOSviewer; basis data scopus

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INTRODUCTION

Global climate change and the worsening ecological crisis have created an urgent need for a more sustainable and inclusive economic development model (IPCC, 2023; UNEP, 2024). Countries are now facing pressure to balance economic growth with environmental conservation and social well-being. In this context, Ecopreneurship, or ecologically oriented entrepreneurship, has become a strategic concept that connects business innovation, environmental responsibility, and social values (González-Sánchez et al., 2024). Ecopreneurship is not merely a business activity but also an instrument of social change that guides economic transformation towards a green and circular economy (Bican et al., 2023).

In Asia, issues of economic and environmental sustainability are becoming increasingly relevant as rapid industrialization and urbanization place significant pressure on ecosystems. Asia is the world's largest energy consumer and carbon emitter, while also home to a vibrant young population and a growing entrepreneurial boom (OECD, 2024). Countries such as China, India, Indonesia, and Malaysia are striving to promote sustainable business practices through policies such as the Circular Economy Roadmap, the Low Carbon Development Initiative, and the National Green Technology Policy (Khan et al., 2023; Zhao et al., 2024). This makes Asia an important laboratory for studying how public policy, business innovation, and entrepreneurial behavior can contribute to sustainable development.

The concept of Ecopreneurship has evolved from the conventional entrepreneurial paradigm to a more multidisciplinary model. Theoretically, Ecopreneurship integrates economic, social, and environmental approaches through frameworks such as the Triple Bottom Line (People, Planet, Profit) and the Theory of Planned Behavior, which explain how entrepreneurial intentions and behavior are formed (Mishra et al., 2024; Wijaya et al., 2023). Furthermore, the Dynamic Capabilities theory highlights an organization's ability to absorb, adapt, and transform green innovations as a source of competitive advantage. Thus, Ecopreneurship is seen not only as a response to the environmental crisis but also as a business strategy capable of creating economic value and socio-environmental sustainability.

The development of digital technology has been increasingly recognized as an emerging area within Ecopreneurship research. Innovations such as artificial intelligence (AI), the Internet of Things (IoT), blockchain, and big data analytics have the potential to support green supply chains, intelligent waste management, and carbon emission monitoring (Xi et al., 2024). However, based on the bibliometric findings, digital technology remains a relatively underexplored theme in the literature, indicating the need for further research to better understand its role in advancing sustainable entrepreneurship in Asia. These technologies are also accelerating the emergence of green business models based on digital platforms, such as green marketplaces, eco-labeling apps, and low-carbon logistics systems. In many Asian countries, digitalization is driving the emergence of digital ecopreneurs who combine environmental orientation with technological innovation. This integration has significant potential to strengthen sustainable entrepreneurial ecosystems in the era of digital transformation. However, despite a significant increase in academic publications on Ecopreneurship since 2014, research in the Asian region remains relatively fragmented. Most previous studies have focused on the European and North American contexts, while research in Asia has not addressed local dimensions such as the role of culture, gender, or the characteristics of MSMEs that dominate the region's economic structure (Ahmad et al., 2023). This creates a literature gap in understanding how Asian socio-cultural values influence Ecopreneurship intentions, orientations, and practices.

To address this gap, Scopus-based bibliometric analysis is a relevant approach for systematically mapping the development of Ecopreneurship research in the Asian region. Bibliometric analysis provides the ability to identify publication trends, scientific collaboration networks, and thematic evolution over time (Nurvianie & Sundari, 2024). With the help of software such as VOSviewer, relationships between authors, affiliations, and keywords can be visualized in the form of thematic clusters that represent the scientific dynamics of this field. This approach is not only descriptive but also analytical, capable of indicating research gaps and potential future research directions for development in Asia. Therefore, this study aims to uncover trends in scientific output and future research directions related to Ecopreneurship in

Asian countries. Using a Scopus-based bibliometric approach, this study analyzes publication patterns, collaborations, and dominant themes that shape the research ecosystem in the field of Ecopreneurship. The results of the analysis are expected to provide conceptual contributions to strengthening the academic literature and strategic guidance for policymakers, universities, and business actors in strengthening the sustainable entrepreneurship ecosystem in Asia. Thus, this research not only serves as a scientific mapping, but also as an effort to strengthen Asia's role in the global transition towards a green and environmentally sustainable economy.

RESEARCH METHODS

This study aims to uncover trends in scientific output and future research directions related to Ecopreneurship in Asian countries. For this purpose, bibliometric analysis was chosen because it can effectively assess scientific communication patterns, research output, and thematic trends across (Nurvianie & Sundari, 2024). This quantitative method analyzes scientific literature by focusing on published entities such as articles and conference proceedings (Barra et al., 2024). The research data are sourced from scientific articles indexed in the Scopus database. Scopus provides an extensive repository covering articles, journals, conference proceedings, and patents, allowing researchers to access a wide range of studies. Furthermore, Scopus has sophisticated bibliometric tools that help identify research trends, emerging themes, and international collaborations, which are crucial for a comprehensive literature review (Núñez et al., 2024). This database is also regularly updated, ensuring the availability of the latest developments that are crucial in a rapidly evolving field such as digital technology (Xi et al., 2024). However, despite its advantages, significant limitations exist when relying solely on Scopus for literature reviews. While Scopus may include a large volume of articles, the quality of the included studies can vary significantly, affecting the overall reliability of findings derived from such reviews (Moya-Salazar et al., 2024). Additionally, even though Scopus has been used extensively for meta-analyses in fields like geomatics, the analysis often fails to account for the full landscape of available literature due to its indexing biases (Αγαπίου & Skarlatos, 2023).

Data were retrieved from the Scopus database, with August 23, 2025 set as the final date of data extraction. This study followed the PRISMA guidelines for study identification and selection. Articles were retrieved from the Scopus database using the search string:

("Ecopreneurship" OR "green entrepreneurship" OR "environmental entrepreneurship" OR "sustainable entrepreneurship" OR "eco-entrepreneurship") AND ("creative business" OR "creative economy" OR "cultural industry" OR "creative sector").

A total of 2,075 records were identified and screened, with no duplicates removed. Studies were included if they were peer-reviewed journal articles, written in English, and focused on Asian countries. Studies were excluded if they focused on non-Asian countries, were non-article or conference paper types, or were published in languages other than English. After applying these criteria, 561 studies were included in the final systematic review.

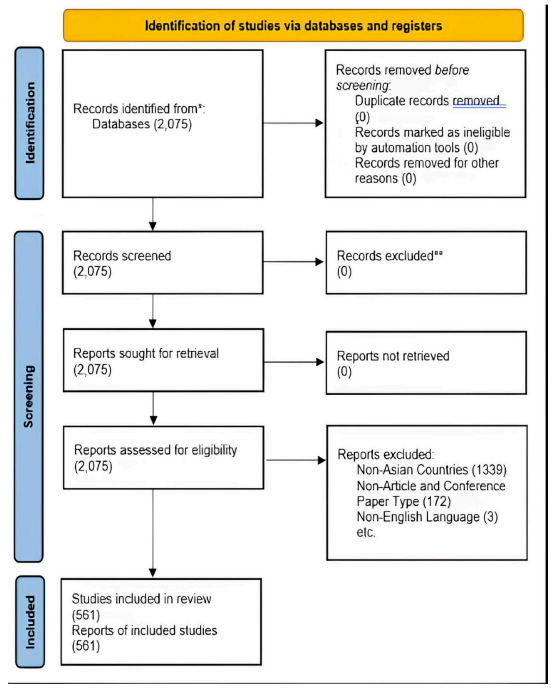

Figure 1. Literature Screening Process
Source : Adapted from PRISMA 2020 flow diagram guidelines (Page et al., 2021), data processed by the authors.

The selected data was then imported into VOSviewer, a specialized software for building and visualizing bibliometric networks. VOSviewer facilitates the understanding of bibliometric relationships by visualizing keyword connections, author collaborations, and

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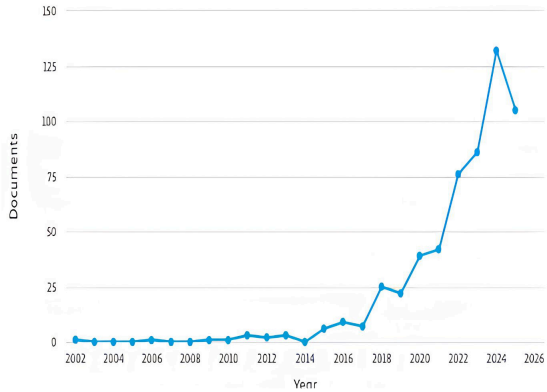
journal impact, providing a comprehensive overview of the development of a research field (Barra et al., 2024). By examining publication trends over time, this tool helps detect emerging research directions and open research gaps, thus guiding further studies (Adrian & Muntazimah, 2023). In this study, network visualization, overlay visualization, and density visualization generated by VOSviewer based on selected keywords facilitated the interpretation of complex bibliometric data from Scopus (Listya et al., 2024).

RESULTS AND DISCUSSION

Research Trends by Year

Figure 2. Publication Trends by Year



Source: Authors' elaboration based on Scopus database; data processed by the authors.

The publication trend graph shows that publications on Ecopreneurship were relatively low and stable from 2002 to approximately 2013–2014, followed by a sharp increase after 2014–2015, peaking around 2024 with 132 articles, and reaching 105 articles by August 2025. The surge in publications post-2014/2015 is consistent with the increased academic and policy attention to the Sustainable Development Goals (SDGs) (Mondal & Singh, 2025). Furthermore, policy initiatives and regional initiatives in Southeast Asia and East Asia have also strengthened scientific production in this field (OECD, 2024).

Research Trends by Author

Table 1. 10 Authors with the Most Publications

	Name	Article
1	Mondal, S.	7
2	Gaurav, A.	6
3	Gupta, BB	6
4	Gupta, H.	6
5	Makhloufi, L.	6
6	Singh, S.	6
7	Ahmad, NH	5
8	Rahman, SA	5
9	Soomro, BA	5
10	Abdelwahed, NAA	4

Source: Authors' elaboration based on Scopus database; data processed by the authors.

Based on Scopus data, Mondal, S. emerges as the most productive author, contributing a total of 7 publications. Several other authors, namely Gaurav, A., Gupta, B.B., Gupta, H., Makhloufi, L., and Singh, S., each have 6 publications, indicating a relatively comparable level of contribution among leading scholars. Ahmad, N.H., Rahman, S.A., and Soomro, B.A. follow with 5 publications each, while Abdelwahed, N.A.A. ranks tenth with 4 publications. Mondal, S. is influential in advancing green leadership and sustainability-oriented entrepreneurial business models, while Gaurav, A., contributes significantly to policy-driven and institution-based sustainability frameworks. Gupta, B.B. shapes the literature on sustainability governance and institutional drivers of sustainability, and Gupta, H. is recognized for contributions to green entrepreneurship within circular economy systems. Makhlouf, L. plays a key role in developing knowledge on sustainable and circular supply chain management, whereas Singh, S. focuses on sustainability-oriented green entrepreneurial ventures. Ahmad, N.H. advances research on green and sustainable innovation, and Rahman, S.A. contributes to understanding digital transformation and sustainability performance. Soomro, B.A. is influential in the area of corporate sustainability and environmental performance, while Abdelwahed, N.A.A. contributes prominently to green human resource management and organizational performance.

The difference in the number of publications between the first-place (7 publications) and the tenth-place (4 publications) is not significant,

indicating that this topic is still in its infancy, with collective contributions from various authors. Furthermore, the presence of several authors from different countries demonstrates that Ecopreneurship is a cross-border research issue, in line with the growing global attention to sustainable entrepreneurship and environmentally friendly practices in the Asian region.

When scholars from different countries share ideas, data, and experiences, they not only expand the scope of Ecopreneurship studies but also create a shared understanding of how sustainability can be achieved in different contexts. These academic exchanges contribute to building a stronger foundation for future innovation and policy development, showing that knowledge, when shared, becomes a powerful tool for collective progress.

Research Trends by Affiliation

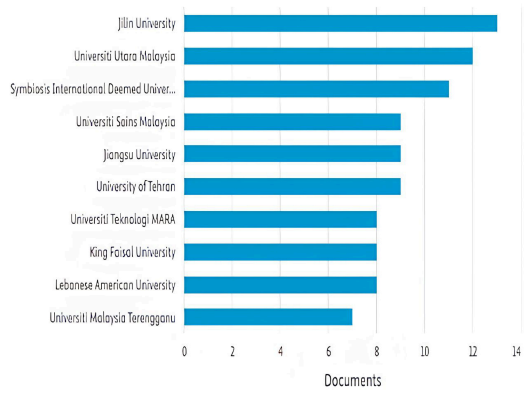


Figure 3. 10 Affiliates with the Most Publications

Source: Authors' elaboration based on Scopus database; data processed by the authors.

Based on the data shown in Figure 3, Jilin University ranks first with 13 publications, followed by Universiti Utara Malaysia with 12 publications, and Symbiosis International Deemed University with 11 publications. The next positions are occupied by Universiti Sains Malaysia, Jiangsu University, and the University of Tehran, each with 9 publications. Meanwhile, Universiti Teknologi MARA, King Faisal University, and Lebanese American University each contributed 8 publications, and Universiti Malaysia Terengganu is ranked 10th with 7 publications.

Analysis of this data shows that research on Ecopreneurship in Asia is dominated by higher education institutions from China, Malaysia, India, Iran, Saudi Arabia, and Lebanon. Malaysia stands out with four universities on the list (UUM, USM, UiTM, and UMT), indicating the country's strong focus on ecologically based entrepreneurship. The dominance of universities from these countries also reflects that Ecopreneurship is a topic of concern across Asia, both in large economies like China and India, and in developing countries like Malaysia and Lebanon. These findings could indicate opportunities for cross-country research collaboration to strengthen the sustainable entrepreneurship ecosystem in the Asian region

Table 2. 10 Countries with the Most Publications

Country	Article
China	161
India	124
Malaysia	70
Indonesia	66
Pakistan	54
Saudi Arabia	44
Turkey	29
Iran	25
South Korea	20
Taiwan	20

Source: Authors' elaboration based on Scopus database; data processed by the authors.

Data shows that China leads the Asian region with the highest number of articles, with 161 publications, followed by India with over 120. Malaysia and Indonesia are in third and fourth place, with relatively close publication counts of 70 and 66 articles, respectively. This difference may be explained by the distribution of publications across multiple institutions, where countries such as Indonesia contribute a relatively high number of publications at the national level, but these outputs are dispersed across various universities rather than concentrated in a few leading affiliations. Following are Pakistan with around 50 publications, and Saudi Arabia with over 40. Turkey, Iran, South Korea, and Taiwan each record around 20–30 publications.

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Analysis of this data shows that Ecopreneurship has received significant attention in countries with large economies and large populations, such as China and India. These two countries are major centers of research, likely influenced by significant environmental challenges and government policies promoting sustainable entrepreneurial practices. Meanwhile, the dominance of Malaysia and Indonesia underscores Southeast Asia's important role in promoting Ecopreneurship research, with contributions significantly higher than those of other countries. The presence of countries such as Saudi Arabia, Turkey, and Iran also demonstrates that interest in this issue is broad and cross-regional in Asia, although the number of publications remains lower than those of China and India.

When we look at these differences more closely, it becomes clear that each country's progress is shaped by its own priorities and conditions. China's rapid development and strong government support have made sustainability a national agenda (Wang & Paavola, 2023), while India's academic and startup ecosystems are increasingly linking innovation with social impact (Chaparro et al., 2022). Malaysia and Indonesia, with their growing awareness of green business (Ong et al., 2022; Sarasi et al., 2023), are showing how developing countries can move toward a more balanced future one that values both economic growth and environmental care. At the same time, other regions in Asia are still catching up, often due to limited research facilities or policy support. These differences actually present opportunities for collaboration, where countries can learn from each other's successes and challenges to build a stronger regional network for sustainable entrepreneurship.

Ecopreneurship in Asia has particular characteristics. It emphasizes relational, identity-based and tradition-informed motives, however, cultural effects can also constrain private entrepreneurship in contexts where legacy norms devalue private enterprise, as observed in some country-level analyses (Prasetyo et al., 2023). Asian ecopreneurs display heterogeneous balances between profit and sustainability, Empirical work in South and West Asian samples indicates entrepreneurs' values and beliefs (including environmental consciousness) drive sustainability-oriented actions, pointing to broader stakeholder considerations beyond shareholder profit in many ventures (Jaiswal, 2025). Based on practices strategies and networking, Asian ecopreneurs often leverage localized innovation (Prasetyo et al., 2023), family-and community-based resource pooling (Alfarizi, 2024), and networked informal institutions (Saleem et al., 2018).

Network Visualization

Table 1. Table Name

Cluster	Keywords
Cluster 1 (Red)	*Self-Efficacy, Entrepreneurship Education, Entrepreneurial Motivation, Green Entrepreneurial Intention, University Support*
Cluster 2 (Green)	*Sustainability, Entrepreneurship, Innovation, Developing Countries, Sustainable Entrepreneurship*
Cluster 3 (Blue)	*Green Entrepreneurship, Ecopreneurship, Circular Economy, Environment, Environmental Entrepreneurship, Eco-Innovation, Renewable Energy*
Cluster 4 (Yellow)	*Green Innovation, Sustainable Performance, Environmental Performance, Green Absorptive Capacity*
Cluster 5 (Purple)	*Entrepreneurial Intention, Triple Bottom Line, Theory of Planned Behavior, Sustainable Entrepreneurial*

Cluster	Keywords
Cluster 6 (Light Blue)	*SMEs, Green Economy, Entrepreneurial Orientation, Sustainability Orientation*
Cluster 7 (Orange)	*Sustainable Development, Social Entrepreneurship, Social Enterprise*

Source: Authors' elaboration based on VOSviewer analysis, data processed by the authors.

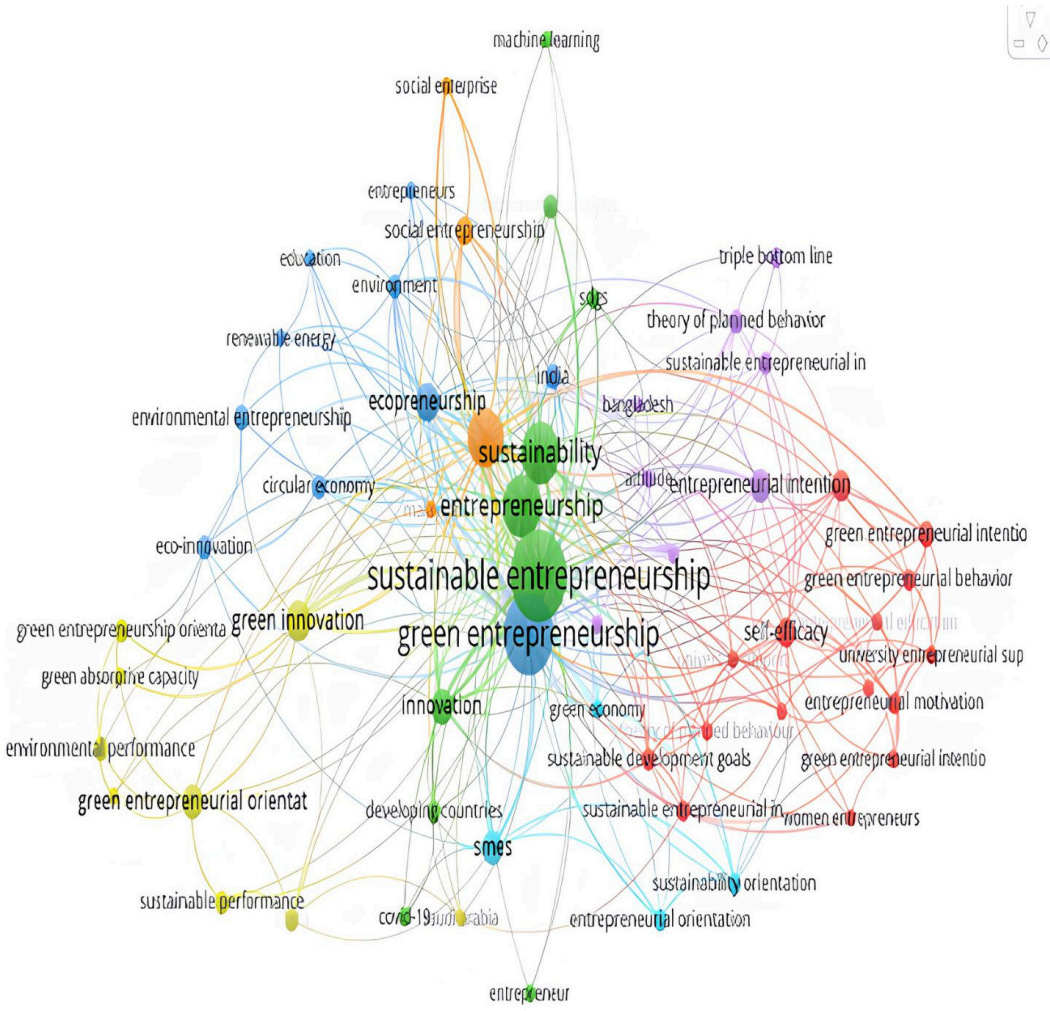

Figure 4. Keyword Co-occurrence Network Visualization
Source: Authors' elaboration based on VOSviewer analysis, data processed by the authors.

Network visualization and cluster analysis revealed a rich and multidimensional research landscape in Ecopreneurship studies in Asian countries. The identification of seven distinct clusters (Table 3), each characterized by dominant keywords, helped map key areas of academic focus and their interrelationships.Overall, the network visualization shows that sustainable entrepreneurship and green entrepreneurship are central keywords connecting all clusters. Keywords such as sustainability, entrepreneurship, and innovation act as bridges between thematic clusters, demonstrating that Ecopreneurship is a multidisciplinary field that lies at the intersection of entrepreneurship, management, environmental science, and sustainable development.

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The interconnectedness pattern between clusters reveals three main levels of study. First, the individual level (red and purple clusters), which emphasizes green entrepreneurial motivation, intentions, and behavior. Second, the organizational level (yellow, blue, and light blue), which highlights strategy, business orientation, innovation, and environmental performance. Third, the macro level (green and orange), which emphasizes sustainable development, the green economy, and the role of social entrepreneurship in the wider community.

The significance of clusters in network visualization lies in their ability to highlight distinct yet interconnected thematic areas within Ecopreneurship research. Each cluster represents a specific focus that makes a unique contribution to understanding this complex field. The following is a description of each cluster:

Cluster 1 (Red) focuses on self-efficacy, entrepreneurial motivation, entrepreneurial education, and university support, demonstrating that psychological and educational dimensions play a significant role in driving green entrepreneurial intention. This means that the intention to pursue green entrepreneurship stems not only from external opportunities but also from internal factors such as self-confidence, motivation, and support from the higher education environment. This demonstrates that universities are a crucial ecosystem for fostering a generation of environmentally conscious ecopreneurs. The psychological and educational dimensions of green entrepreneurial intention are essential for building an ecosystem that supports environmentally conscious entrepreneurs in universities. Psychological factors such as self-confidence, motivation, and perceived behavioral control significantly shape entrepreneurial intention, in line with the Theory of Planned Behavior, where attitudes, social norms, and perceived control influence entrepreneurial actions (Nuringsih & Nuryasman, 2021). Complementing this, the university environment plays a pivotal role through green entrepreneurship education that equips students with inspiration, knowledge, and sustainability-oriented skills (Cai et al., 2022), while also raising awareness of social and environmental impacts (Ammer & Elshaer, 2023). Integrating environmental values into the curriculum further strengthens students' ability to identify green opportunities and enhances their commitment to sustainable business ventures (Santika et al., 2022).

Cluster 2 (Green) features key keywords such as sustainability, entrepreneurship, innovation, and developing countries. This cluster primarily emphasizes the role of entrepreneurial innovation in advancing sustainability. Developing countries are highlighted as key contexts where such innovation is particularly relevant due to pressing economic and environmental challenges. This cluster represents the macro dimension of Ecopreneurship, where sustainable entrepreneurial practices serve as solutions for more inclusive and environmentally friendly development. Entrepreneurial activity is vital for advancing the Sustainable Development Goals (SDGs), with foreign direct investment serving as critical external finance for sustainable ventures (Venâncio & Pinto, 2020), while local entrepreneurs increasingly integrate sustainability under resource and market constraints (Almhamad, 2022). Ecopreneurship embeds ecological considerations into business models, supported by institutional backing and resource access, enabling ventures to contribute to ecological performance amid markets that do not inherently achieve sustainability (Nikolaou et al., 2018). Innovation plays a key role in strengthening sustainable competitiveness, particularly in regions navigating industrial transformation such as ASEAN (Aisyah & Saputra, 2021) and entrepreneurial activity has been shown to bolster economic, social, and environmental pillars of development (Dhahri & Omri, 2018). Linking entrepreneurship to sustainability, innovation remains fundamental to achieving long-term ecological and societal goals (Schaltegger & Wagner, 2011), while gender-inclusive entrepreneurship enhances community development and SDG outcomes (Yadav et al., 2022).

Cluster 3 (Blue) illustrates the core concept of green entrepreneurship, focusing on the circular economy, eco-innovation, environmental entrepreneurship, and renewable energy. These keywords demonstrate how Ecopreneurship operates in the practical realm, providing practical solution such as circular economy business models, environmentally friendly technological innovations, and renewable energy utilization. This cluster reflects the shift from concept to practical implementation on the ground. Ecopreneurship transforms sustainability concepts into actionable business practices by integrating circular economy principles, green technologies, and renewable energy solutions across various sectors. It embeds environmental

goals within business strategies, with green entrepreneurship delivering sustainable innovation that balances ecological welfare and profitability; for instance, sustainable practices can improve air quality in urban environments (Cojoianu et al., 2023). The circular economy framework further strengthens Ecopreneurship by promoting resource efficiency and waste reduction, supported by digital transformation and advanced technologies that drive sustainable organizational practices (Ilić et al., 2022). Technological innovation also plays a critical role, as green technologies—from pathogen detection in forestry to emerging eco-solutions—enhance competitiveness while addressing environmental issues (Hall et al., 2017; Tekala et al., 2024). Additionally, renewable energy markets foster green entrepreneurship and sustainable development, emphasizing the importance of clean energy adoption within ecopreneurial initiatives (Lotfi et al., 2018).

Cluster 4 (Yellow) emphasizes green innovation, sustainable performance, environmental performance, and green absorptive capacity. The focus is on how organizations can absorb green knowledge (absorptive capacity) and integrate it into strategies to improve environmental performance and sustainability. This means this cluster highlights performance as a critical outcome of Ecopreneurship practices. Organizations aiming to improve sustainability through Ecopreneurship benefit greatly from strong absorptive capacity the ability to recognize, assimilate, and apply external knowledge which enhances innovation and environmental performance (Silva et al., 2024; Vega-Jurado et al., 2008). High absorptive capacity supports organizational learning and the development of green innovations aligned with dynamic capabilities and continuous adaptation (Chen et al., 2014; Roberts, 2015; Tsai, 2001), enabling firms to integrate environmental insights into strategies and improve competitiveness (Briel et al., 2018; Chen et al., 2019). However, while knowledge integration boosts absorptive capacity in stable environments, rapidly changing contexts can challenge firms to capture emerging opportunities, underscoring the importance of agility and collaborative knowledge sharing (Ding et al., 2023; H. et al., 2022; Jansen et al., 2005; Shubham et al., 2018; Tang, 2023). In Ecopreneurship, strong absorptive capacity drives eco-innovation and sustainable resource practices, resulting in improved environmental performance and sustainability outcomes (Chen et al., 2014; Mao et al., 2021; Sánchez et al., 2018).

Cluster 5 (Purple) focuses on behavioral and theoretical aspects, dominated by keywords such as entrepreneurial intention, theory of planned behavior, triple bottom line, and sustainable entrepreneurship. This cluster demonstrates a theoretical approach to explaining why individuals choose Ecopreneurship. The theory of planned behavior explains behavioral intention through attitudes, subjective norms, and behavioral control, while the triple bottom line emphasizes the balance between profit, people, and the planet.

Cluster 6 (Light Blue) focuses on SMEs, the green economy, entrepreneurial orientation, and sustainability. This emphasizes the crucial role of SMEs as the backbone of the Asian economy in adopting a sustainable entrepreneurial orientation. With limited resources, SMEs often face challenges, yet they are key actors in realizing the transformation towards a green economy.

Cluster 7 (Orange) is closely related to social entrepreneurship, social enterprise, and sustainable development. This cluster demonstrates that Ecopreneurship is not only about financial gain but also carries a social dimension. The role of social entrepreneurship is becoming increasingly important in addressing issues of inequality and social sustainability, as well as environmental issues.

Overlay visualization

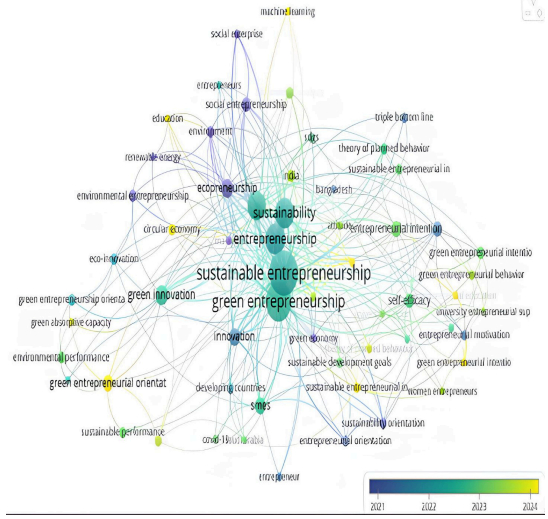

Figure 5. Overlay Visualization of Keyword Trends

Source: Authors' elaboration based on VOSviewer analysis, data processed by the authors.

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The image above is a bibliometric overlay visualization using VOSviewer that displays the relationships The image above presents a bibliometric overlay visualization generated using VOSviewer, illustrating the relationships among keywords derived from the analyzed articles, rather than the initial search terms.. The circle size indicates the frequency of keyword occurrence, while the color reflects the topic trending over time (from 2021 in bluish-purple to 2024 in greenish-yellow). Core keywords such as sustainable entrepreneurship and green entrepreneurship dominate as research centers with numerous connections to other terms, indicating that these topics serve as the main foundation. Supporting themes such as sustainability, entrepreneurship, green innovation, entrepreneurial intention, and sustainable development goals (SDGs) also occupy strategic positions with high connectivity. In terms of time development, keywords in yellow-green (2023–2024) such as green entrepreneurial orientation, entrepreneurial motivation, self-efficacy, and women entrepreneurs indicate the latest research trends, while keywords in purplish-blue (2021–2022) such as environmental entrepreneurship, eco-innovation, social entrepreneurship, and renewable energy represent earlier research focuses. Thus, this overlay not only maps the conceptual structure of the field of study, but also shows the shift in research focus from macro issues such as environmental entrepreneurship and eco-innovation to micro issues related to the behavior, motivation, and orientation of green entrepreneurship in the context of sustainability.

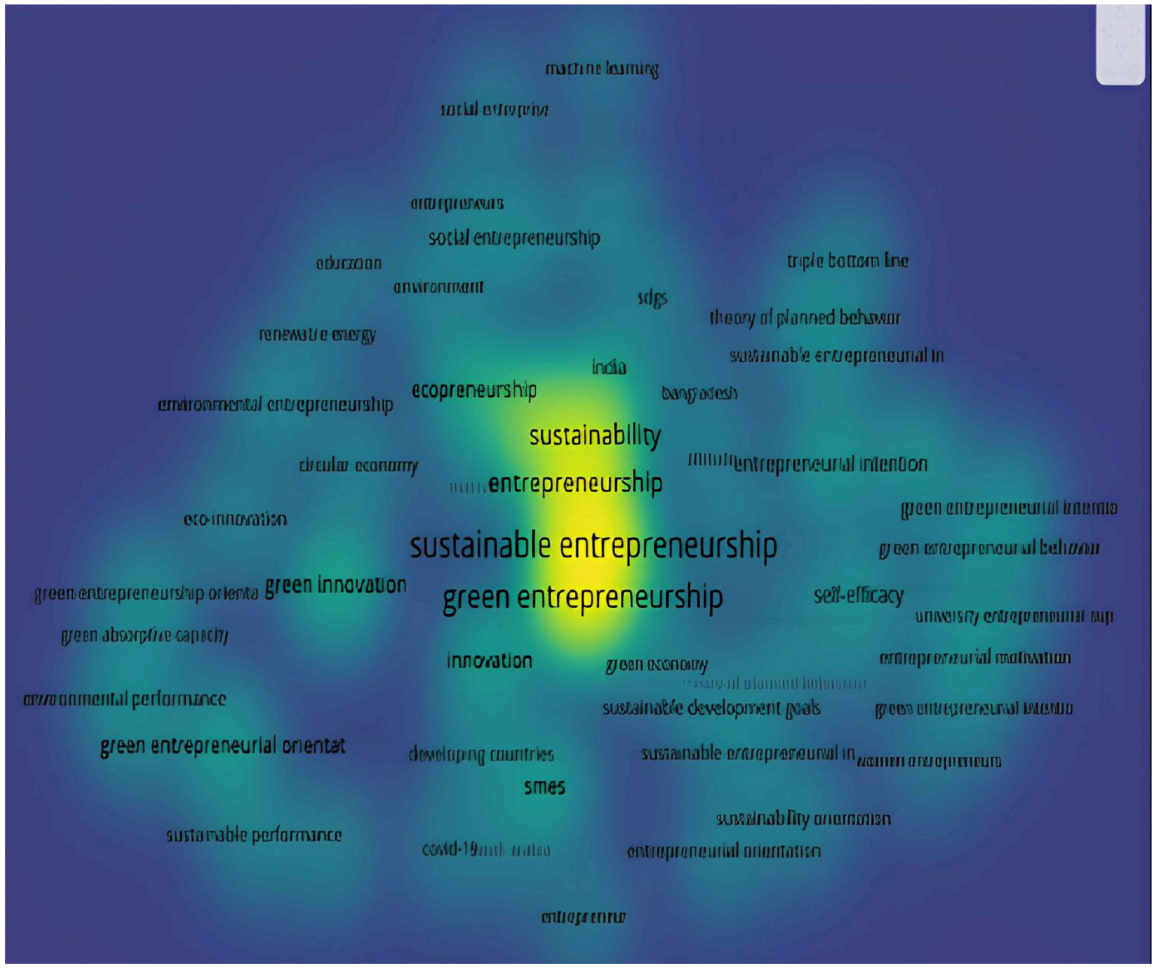

Figure 6. Density Visualization of Keyword Co-occurrence

Source: Authors' elaboration based on VOSviewer analysis, data processed by the authors.

Density visualization

The density visualization above displays the level of research intensity based on interrelated keywords in the fields of sustainable entrepreneurship and green entrepreneurship. Brighter colors (yellow) indicate keywords

with high frequency and are the primary focus of research, while dimmer colors (green to dark blue) represent keywords with lower intensity. The terms sustainable entrepreneurship, green entrepreneurship, entrepreneurship, sustainability, and innovation are at the center of the map with the highest brightness, indicating the dominance and consistency of academic attention on the topic. Meanwhile, keywords such as green entrepreneurial orientation, green innovation, entrepreneurial intention, self-efficacy, environmental entrepreneurship, and eco-innovation are at a medium level, indicating that these issues are beginning to receive attention as derivatives of the main concept. Keywords located in darker areas, such as machine learning, social enterprise, renewable energy, circular economy, and developing countries, indicate that, although relevant, research on these themes is still relatively limited. Thus, this density map emphasizes that the main focus of studies remains centered on the core of sustainable entrepreneurship, while other specific issues are emerging as potential areas for further research.

Future Research Directions

As the field continues to grow, future studies are expected to move from describing what Ecopreneurship is toward exploring how it works in practice. As the field continues to evolve, future research is expected to move beyond descriptive definitions of Ecopreneurship toward examining its underlying mechanisms and practical implementation, particularly by integrating individual, organizational, and ecosystem-level perspectives identified in this study. Researchers now have the opportunity to connect individual behavior, organizational strategy, and policy design to see how they jointly shape sustainable business ecosystems in Asia. The following approaches outline potential directions that can guide this academic development:

1. Micro Approach: Individual Factors. Future research can delve deeper into the psychological and behavioral aspects of Ecopreneurship, particularly regarding self-efficacy, entrepreneurial motivation, and green entrepreneurial intention. Empirical studies in various Asian countries need to explore the role of gender (e.g., female ecopreneurs), generational differences (millennials vs. Gen Z), and the influence of local culture on shaping green entrepreneurial intentions.
2. Organizational Approach: Strategy and Innovation. There is still a research gap in understanding how companies, especially SMEs, adopt green innovation and sustainability. Comparative studies across industries (e.g., manufacturing, agriculture, and digital technology) can be conducted to identify drivers and barriers to green economy implementation at the organizational level.
3. Macro Approach: Policy and Ecosystem. Given the significant contributions of countries such as China, India, Malaysia, and Indonesia, further research could explore the role of public policy, environmental regulations, and regional initiatives (e.g., the ASEAN Green Economy Framework). Cross-national studies are also needed to examine how differences in political, economic, and legal systems influence the development of Ecopreneurship ecosystems in Asia.
4. Integration of Digital Technology and Ecopreneurship. The density visualization results show that keywords such as machine learning and digital innovation are still relatively under-researched. This opens up opportunities for research on how digital technologies (AI, blockchain, IoT) can support Ecopreneurship, for example, by increasing the efficiency of green supply chains, monitoring carbon footprints, or building data-driven business models.
5. Social Entrepreneurship and the Triple Bottom Line. Future studies need to more closely link the dimensions of social entrepreneurship with Ecopreneurship, given that both emphasize socio-environmental impact. Research based on the triple bottom line (people, planet, profit) can examine the extent to which Ecopreneurship in Asia is capable of creating sustainable shared value.

CONCLUSION

This bibliometric study maps the development of Ecopreneurship research in Asia and

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demonstrates that the field is not only expanding but also exhibits contextual characteristics that distinguish it from other regions. The findings reveal that Ecopreneurship in Asia is strongly shaped by collectivist socio-cultural values, SME-dominated business structures, and development-oriented sustainability priorities, which place greater emphasis on entrepreneurial intention, self-efficacy, education, and social embeddedness rather than purely market-driven or regulation-led green innovation commonly observed in Western contexts. At the organizational and macro levels, Asian Ecopreneurship reflects a pragmatic sustainability orientation, where environmental initiatives are integrated with economic resilience, inclusivity, and gradual policy transitions, particularly in developing-country settings. The increasing role of digital transformation further highlights Asia's adaptive pathway, enabling green entrepreneurial practices to scale despite institutional diversity. Theoretically, this study contributes by extending sustainable entrepreneurship literature through a context-sensitive bibliometric framework that positions Asian Ecopreneurship as a hybrid model shaped by socio-cultural embeddedness, adaptive business orientation, and ecosystem-driven sustainability, offering a nuanced understanding of green entrepreneurship beyond dominant Western-centric perspectives.

Practical and Policy Implications

The findings of this bibliometric study offer several practical and policy implications for strengthening Ecopreneurship ecosystems in Asia. For practitioners, particularly SMEs, the results highlight the importance of integrating sustainability with entrepreneurial orientation, digital capabilities, and innovation to enhance long-term competitiveness under resource constraints. For policymakers, the prominence of macro-level themes such as sustainable development, green economy, and social entrepreneurship suggests that supportive policies such as incentives for green innovation, digital infrastructure development, and entrepreneurship education play a crucial role in fostering Ecopreneurial activities. Universities and support institutions are also positioned as key actors in nurturing green entrepreneurial intentions through education, incubation programs, and ecosystem collaboration.

Limitations

Despite its contributions, this study has several limitations. First, the analysis is based solely on Scopus-indexed publications, which may exclude relevant studies published in other databases or regional journals. Second, as a bibliometric study, the findings rely on publication metadata and keyword co-occurrence, which limits deeper interpretation of contextual or causal relationships. Third, the focus on the Asian region as a whole may overlook intra-regional differences among countries with diverse socio-cultural, economic, and policy environments. Future research could address these limitations by incorporating multiple databases, employing mixed-method approaches, and conducting country-specific or comparative empirical studies.

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