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A Bibliometric Analysis of Global Research for Mapping the Green Entrepreneurial Intentions

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Abstract: A Bibliometric Analysis of Global Research for Mapping the Green Entrepreneurial Intentions. The discussion is carried out through publication trends, influential authors, and thematic developments in the context of green entrepreneurial intention. This research aims to explain the increasing importance of environmental sustainability and the role of green entrepreneurship in overcoming social problems, combating climate change, and encouraging environmental conservation. Although interest in the topic of green entrepreneurial intention research is increasing, there is a need for a comprehensive understanding of the factors influencing green entrepreneurial intention, as well as the evolution of research in this area. We used bibliometric analysis methods to examine bibliographic information quantitatively, concentrating on collecting data from the Scopus database, covering the years 2000–2024. The analysis has revealed a significant increase in research on green entrepreneurial intention, especially post-COVID-19, indicating increased awareness of environmental sustainability. The study also highlights the most cited articles and their impact on the field, emphasizing the importance of green entrepreneurial orientation and green knowledge management in driving green innovation. Findings suggest that green entrepreneurial intentions are an important area of research that has implications for policy, education, and business practice, as well as contributing to global efforts toward sustainable development. The original value of the article comes from its systematic approach in analyzing the green entrepreneurial intention research landscape, providing theoretical understanding and practical guidance for research and applications in this field.

Keywords: sustainable entrepreneurship, entrepreneurship education, bibliometric analysis, green entrepreneurial intention.

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■ INTRODUCTION

Environmental awareness is needed to overcome the challenges arising from increasingly widespread entrepreneurship (Alsmadi & Alzoubi, 2022; Ilonen, 2021). Climate change is usually the cause of disasters that occur in Indonesia (Fahrudin et al., 2022; Yulianto et al., 2021). Academics are very concerned about global environmental protection through green entrepreneurship, which has been proposed as a solution to social problems, climate change, and environmental sustainability (Li, 2023; Yi, 2021). Green entrepreneurship emerged because of limited natural resources, an increasing global population, and decreasing biodiversity (Genoveva & Tanardi, 2022; Perez-Luyo, 2023). The primary objective of green business is to promote sustainable development by fostering green entrepreneurs who want to establish commercially viable business models that are

ecologically sustainable and generate social value (Alwakid et al., 2021; Zevender & Muziburrohman, 2024).

Green entrepreneurship originates from a combination of entrepreneurial traits such as innovation, risk, business ideas, ecological, and social, then develops into a new type of entrepreneurship that focuses on building businesses and preserving the environment (Gevrenova, 2015; J. Wang, 2020). Green business can have many benefits, such as maintaining organizational sustainability, providing benefits to the environment, helping people live better, and encouraging economic growth (Ediagbonya et al., 2024; Hameed et al., 2021). By implementing green entrepreneurship, someone can achieve synergy and balance between three goals. The first is economic goals, which mean profitability and company growth; the second is social goals, which mean the welfare and prosperity of society; and the third is environmental goals, which mean maintaining the environment in the long term (Sulastiningsih et al., 2023).

Green entrepreneurship combines the "triple bottom line," namely environmental, social, and economic, to achieve sustainable development (Baeshen et al., 2021; Gu et al., 2022). A deeper comprehension of green business can be achieved by examining the Triple Bottom Line of Business, a concept introduced by John Elkington. According to this framework, the fundamental pillars of business sustainability encompass the natural environment (the planet), society (people), and firm profits (profit). (Kanchanavibhu et al., 2020). By implementing these measures, economic sustainability and prosperity can be attained, as they are bolstered by sustainable business profitability (sustainability profit), the enduring preservation of the universe (sustainability planner), and the sustainable welfare and social justice of the community (people's wellbeing and equity) (Jiang, 2020).

The need for green businesses is increasing due to increasing awareness of environmental sustainability (Nguyen, 2024; Qazi et al., 2020). BPS data has shown that the Indonesian population is interested in becoming an environmentally friendly entrepreneur, namely an average of 0.30% in 2020, 0.34% in 2021, 0.30% in 2022, and 0.41% in 2023 calculated based on the total workforce working in the main industry and showing interest in working in the areas of Waste Water Treatment, Waste Material Recovery, and Remediation Activities divided by the total workforce (Badan Pusat Statistik, 2023). This has shown that the Indonesian population's green entrepreneurial intention is still relatively low. Intention is an important component of self-regulation, which is motivated by a person's desire to act (Ajzen, 1991; Bandura, 1986). Intention refers to the resolve or determination to carry out a specific action or bring about a particular condition at a later time (Amankwah & Sesen, 2021; Liñán, 2004; Peng et al., 2021). People who can start a business will be more prepared and advanced in their business compared to people who do not have the ability to start a business (Alshebami et al., 2023).

Green entrepreneurial intention is a person's desire or willingness to create a new business using attention, experience, and action to achieve certain goals to gain profits, respect the environment, or face socio-cultural problems (Nuringsih & Nuryasman, 2022; Stankoviæ & Džoljiæ, 2022). Green Entrepreneurial Intention (GEI) is the process by which entrepreneurs become aware of their intention to establish a business while considering the sustainability of the business (Robayo-Acuña, 2023; W. Wang et al., 2021). This process is organised in such a way that several aspects, including economic, social, and ecological, can be addressed (Alvarez-Risco, 2021; Elsawalhy, 2023).

The limited presence of young entrepreneurs in Indonesia who are dedicated to green

entrepreneurship can be attributed to the formidable challenges associated with initiating such ventures, including the absence of institutional backing and public ignorance regarding green entrepreneurship offerings, processes, and services (J. Gunawan & Fraser, 2016; Sulastiningsih et al., 2023). Educational institutions are expected to implement challenging programs for students to create prototypes, such as environmentally friendly business incubators and green business plans (Kartika Nuringsih et al., 2022; Marchel et al., 2020).

The topic of green entrepreneurial intentions has garnered significant interest among researchers, as seen by the growing body of studies undertaken in this area (Batista-Canino et al., 2023; Cardella et al., 2020; A. Gunawan & Triansyah, 2024). Therefore, a more in-depth analysis is needed regarding research on green entrepreneurial intention. Bibliometrics is one technique that can be used to carry out the analysis in this article. Bibliometrics is a statistical method used to analyze publications and serves as a basis for determining publication trends (Sreenivasan & Suresh, 2023; Zaskia & Mulyadi, 2023). Many studies have utilized this method to analyze publications, particularly in the field of entrepreneurship (Anwar et al., 2023; Sánchez-García et al., 2018). Therefore, the researcher conducted a bibliometric analysis of research regarding green entrepreneurial intention in the past two decades, from 2004 to 2024, using the Scopus database. The Scopus database was chosen due to its extensive coverage (Ofori et al., 2023; Pranajaya et al., 2024).

This study aims to use bibliometric analysis to answer several research questions. First, which keywords are most relevant in the context of research on green entrepreneurial intention? Second, which journals and authors have the greatest impact and productivity in research on the topic of green entrepreneurial intention? Third, what innovation topics are frequently studied by academics with green entrepreneurial intentions? Fourth, what are the anticipated future publication landscape in the field of green entrepreneurial intention studies? This bibliometric analysis is distinct in that it offers a more thorough depiction of the progress of research on green entrepreneurial intention within the framework of entrepreneurship education. This analysis's findings can provide new insights, highlight research areas that need strengthening, and identify topics that have received significant attention from researchers.

■ THEORETICAL FRAMEWORK AND EMPIRICAL STUDIES
Theory of Planned Behavior (TPB)

Various theories have been proposed to explain eco-based behavior over the years. These theories come from social science disciplines such as psychology, sociology, and economics (Kalafatis et al., 1999; Yadav & Pathak, 2016). The theory used in previous research to study green entrepreneurial intention is very varied. Some of these theories are shown in table 1.

Ajzen and Fishbein's TPB, an evolution of the TRA, dominates the study of green

Table 1. Social science theory is generally used in research with the theme of green entrepreneurial intention

Theory Name	Author
The Theory of Planned Behavior (TPB)	Ajzen (1991). The theory of planned behavior. Organizational behavior and human decision processes, 50(2), 179-211.
Theory of Entrepreneurial Event (TEE)	Shapero, A. & Sokol, L. (1982). The Social Dimensions of Entrepreneurship. In C.A. Kent, D.L. Sexton, & K.H.

	Vesper (Eds.). Encyclopedia of Entrepreneurship. Englewood Cliffs, NJ: Prentice-Hall, 72-90.
Linen's Entrepreneurial Intention	Liñán, F. (2004). Intention-Based Models of Entrepreneurship Education. Dept. of Applied Economics (Economía Aplicada I), University of Seville, 1-31.

Source: Data Processed

entrepreneurial intention. The TPBs state that behavior is done because individuals have the intention or desire to do it (behavioral intention), and that individuals have perceived behavior control (Ajzen, 1991). The TPBs offer a valuable framework for comprehending the aspects that could impact students' inclinations to pursue entrepreneurship (Prabowo et al., 2022). TPBs are one of the most used psychological theories to predict and explain human behavior, including entrepreneurial intentions.

Theory of Entrepreneurial Event (TEE)

In a different perspective, the TEE proposed by Shapero and Sokol (1982) is often used by researchers to investigate entrepreneurial behavior through entrepreneurial intentions. Where there are three components that make up the Shapero and Sokol model, namely perceived desirability, which is an individual and social value system that affects one's judgment; perceived feasibility, which is a person's perception that he or she can pool resources (human, social, and financial) to build a new venture; and propensity to act, which is the impetus within a person to act (Krueger et al., 2000).

The entrepreneurial intention model is also described by the Entrepreneurial intention-based models, which are models designed to detect factors that influence entrepreneurial intention using an educational approach. This model was designed by Francisco Linan of the University of Seville, Spain. This model is constructed upon two theories, specifically the TPB proposed by Icek Ajzen (2014; 2005) and the TEE developed by Shapero and Sokol (1982), resulting in the emergence of Entrepreneurial Intention-based Models. In this model, a person's inclination towards entrepreneurship is influenced by three factors: their personal attitude towards entrepreneurship, their perception of social norms that affect their view of entrepreneurship, and their perception of their own ability in entrepreneurship. His expertise of entrepreneurship influences these three elements. Entrepreneurial knowledge that has a substantial impact on decisions made during the formation of new businesses.

Acquiring additional knowledge about entrepreneurship will undoubtedly enhance entrepreneurial intentions, subsequently leading to the development of positive attitudes towards entrepreneurship. This, in turn, will influence a more accurate perception of entrepreneurship and bolster the individual's confidence in their ability to succeed as an entrepreneur (Liñán, 2004). Previous researchers have relied on several theories to assess entrepreneurial intents, focusing on attitudes, subjective standards, and perceived behavioral control as key factors influencing behavior (Yan & Hong, 2018). "Attitude" refers to perception, assessment of results, and opinions about something. This helps anticipate and guide behavior (Ajzen, 2005). In behavioral domains that include environmentally conscious practices, the connection between attitudes and intentions to act is frequently absent or feeble (Claudy et al., 2013). Therefore, attitudes do not always change into expected behavior because many contextual factors influence behavior, such as learning environment, entrepreneurial knowledge, student creativity, and entrepreneurial orientation (Hayat et al., 2023).

■   **METHOD**

This research investigates the components that determine green entrepreneurial intention through bibliometric analysis. Bibliometric analysis is used to examine bibliographic information through evaluative quantitative and descriptive means so that it is useful and organised for certa

in fields of study (A. Gunawan & Triansyah, 2024; Kumar & Kiran, 2017). The process of collecting data is carried out in several steps, namely identification, screening, eligibility, and inclusion (Liu et al., 2022; Moher et al., 2009). The data collection process is explained in Figure 1.
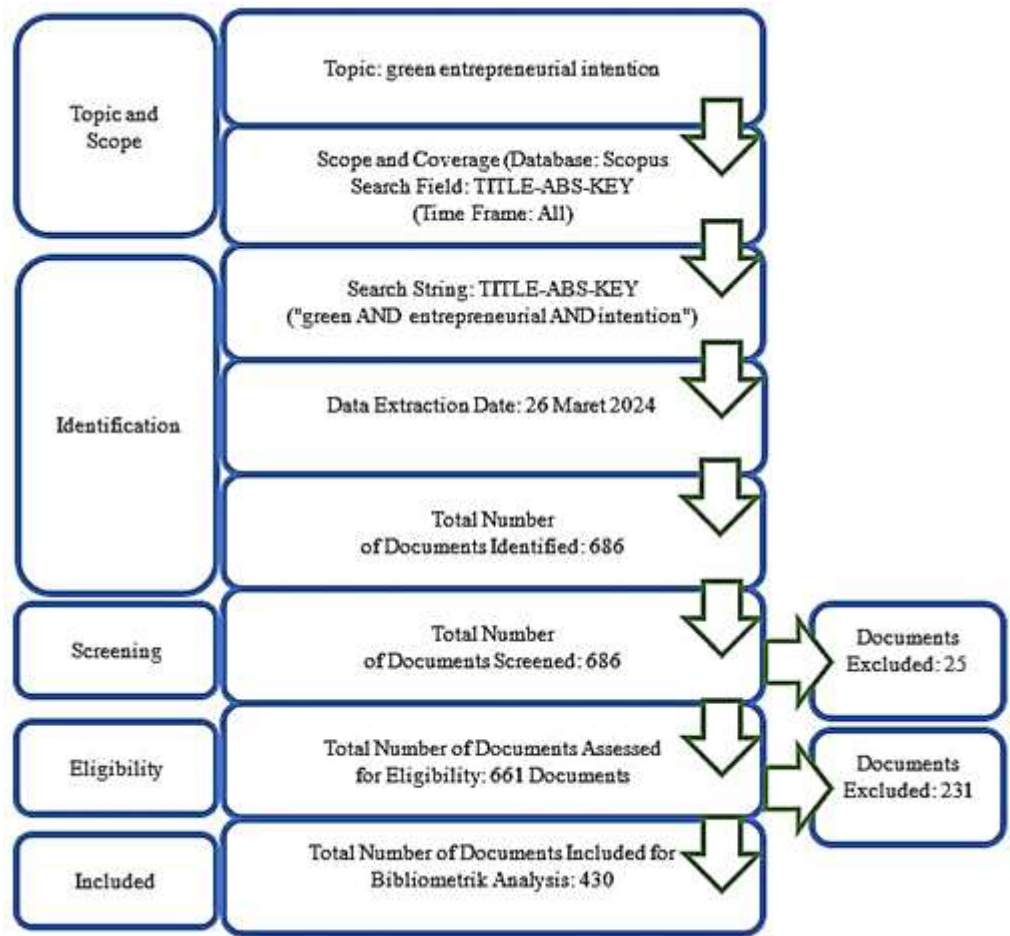

Figure 1. Information dissemination across the many stages of a systematic review

During the identification stage, the researcher conducted a search using the key term "green AND entrepreneurial AND intention" that is relevant to the research theme in the Scopus database. This process identified 686 relevant articles. Screening is the next step. In this step, researchers used two criteria to select the 686 articles that had been collected in the previous step. The criteria are that articles must be written in English and published in indexed journals. 25

articles failed to answer both criteria and did not allow these criteria to be processed further. In this regard, there are 661 articles that contain these criteria and continue to the next stage. The eligibility requirements are the next step. At this stage, the researchers evaluated whether the 661 publications that passed the previous stage were worthy of being included in the further research stages. Researchers have taken the decision to only include publications published in the last 24

years; the document type is an article, and the source type is a journal. After checking the suitability of document types and source types, only 430 publications that meet these criteria can proceed to the inclusion stage.

Researchers have used a variety of applications to process research data. Analysis of publication trends using the analyse search results application on the Scopus page based on the number of articles per year. Then, for a summary of descriptive information, use the Biblioshiny application. In the trends in the number of citations analysis, TC, NCP, TP, g-index, and h-index have been calculated using the Publish or Perish Harzing application. In analysing, the Biblioshiny application is used. We used the VOSviewer application to analyze the novelty of the research focus theme.

■ **RESULT AND DISCUSSION**

This section discusses publication trends, trends in the number of publications, trends by source, trends by authors, and trends based on conceptual structure. Over the period from 2000 to 2024, the trend in the number of publications reflects the growth in scientific publications in this field. This trend shows an increase in research on green entrepreneurial intentions by academics and scientists. In addition, the trend in the number of citations shows how much influence the research has on further research and serves as a reference for other scientists. The increasing number of citations shows that the scientific community recognises and accepts research on green entrepreneurial intention. Meanwhile, trends

by source have shown the level of collaboration between researchers from various countries, universities, and sources in conducting research on green entrepreneurial intention. Because it involves diverse expertise and perspectives, international collaboration can produce better research and have a broader impact. Trends by authors were carried out to identify the most relevant and prominent research sources and current issues related to green entrepreneurial intention. Lastly, trends based on conceptual structure refer to research fields that have experienced development over the past 24 years, as well as the novelty of the research focus with green entrepreneurial intention.

Publication Trends

Table 2 provides a thorough overview of the literature that this study analyzed. A total of 430 articles were published in 250 sources over the period 2000–2024, according to the categories of information and primary documents. Of the total 430 documents, only 68 documents, or 15.81%, were written by a single individual. This area of study requires extensive teamwork. The corpus has a high citation rate, as evidenced by the average number of citations per document of 18.5.

Figure 2 shows the trend in research publications on green entrepreneurial intentions from 2014 to 2024. In 2023, there were 111 articles published, which was the most compared to the previous year. This means more than 29% of published articles by 2023.

Table 2. Overview of the detailed data

Summary	Metric	Outcome
Main Information	Timespan	2000:2024
About Data	Sources (Journals)	250
	Documents	430
	Annual Growth Rate %	14.54
	Document Average Age	4.05
	Average citations per doc	18.5
	References	26854

Document	Keywords Plus (ID)	1209
Contents	Author's Keywords (DE)	1559
Authors	Authors	1149
	Authors of single-authored docs	68
Authors	Single-authored docs	72
Collaboration	Co-Authors per Doc	3.06
	International co-authorships %	28.37
Document Types	article	430

Source: Processed data
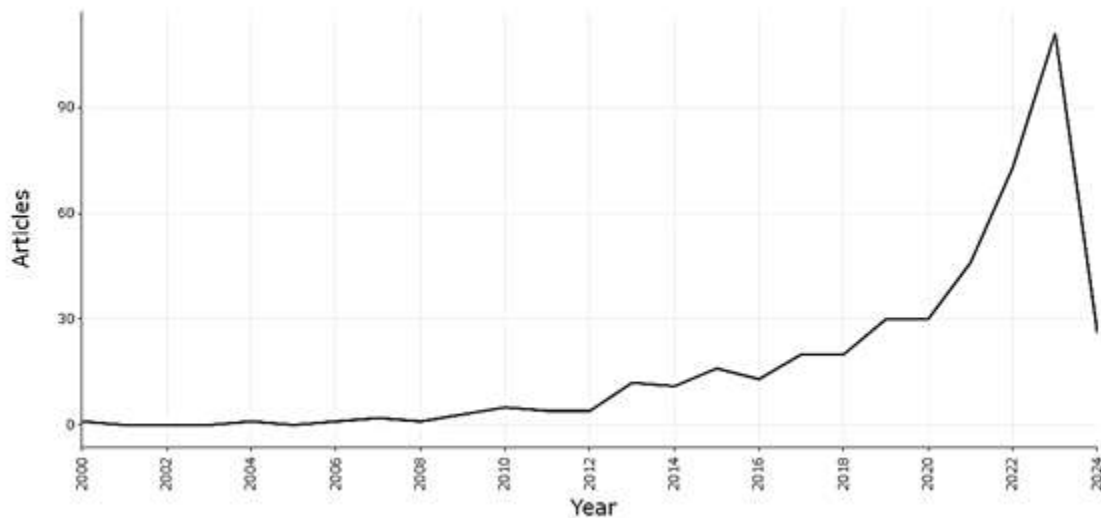
Figure 2. Publication trends

There was a significant increase in the number of articles from 2020 to 2023. In 2020, the number of articles published was 30; in 2021, publications increased by 46; in the following year, namely 2022, publications will increase by 73; and until the peak in 2023, 111 articles have been published. As of March 2024, 26 articles have been published. Meanwhile, the number of publications from 2000 to 2019 did not experience significant changes. Over the past twenty-four years, the overall number of publications on green entrepreneurial intentions has tended to increase. There are annual variations in the number of publications, but overall, there has been a significant increase in the recent period. This has reflected the increasing attention given to green entrepreneurial intentions. Several factors that may contribute to the increase in the number of green entrepreneurial intentions research themes are changes in the COVID-19 pandemic, which have caused major changes in people's behavior and mindset through awareness of the need for environmental protection and social responsibility, especially after involvement in efforts to overcome COVID-19 (Noor et al., 2023; W. Wang et al., 2021).

Trends in the Number of Citations

Table 3 shows the trend in the number of citations related to research on green entrepreneurial intention from 2003 to 2023.

Based on Table 3, it is evident that the highest total NCP occurred in the year 2023. In the year 2023, the values of the h-index and g-index reached their peak. This suggests that the publications released in that year had a substantial influence on studies related to the intention of individuals to engage in green entrepreneurship. In other words, these articles receive numerous citations from other researchers, making them

Table 3. Citation analysis of publications

Year	TP	NCP	TC	h	g	Year	TP	NCP	TC	h	g
2000	1	1	142	1	1	2013	12	12	554	8	12
2001	0	0	0	0	0	2014	11	11	560	9	11
2002	0	0	0	0	0	2015	16	15	370	10	16
2003	0	0	0	0	0	2016	13	11	211	7	13
2004	1	1	445	1	1	2017	20	20	452	12	20
2005	0	0	0	0	0	2018	20	18	591	8	20
2006	1	1	10	1	1	2019	30	28	731	14	27
2007	2	2	248	2	2	2020	30	29	726	14	26
2008	1	0	0	0	0	2021	46	44	923	16	29
2009	3	2	127	2	3	2022	73	62	567	15	19
2010	5	5	627	4	5	2023	111	72	427	11	16
2011	4	4	91	3	4	2024	26	4	7	2	2
2012	4	4	39	4	4						

TP=Total of Publication, NCP=Number of Cited Publications, TC=Total Citations, H=H-Index, G=G-Index Table.

significant contributions to the development and understanding of the topic. This demonstrates that the research conducted in 2018 made a significant contribution and had a substantial influence on advancing knowledge and understanding of green entrepreneurial intentions. Table 4 displays the five most highly cited scientific studies in 2023.

Table 4. Publications with the most citations

Authors	Title	Publication	Cites	Author Key
(Shehzad et al., 2023)	Do green entrepreneurial orientation and green knowledge management matter in the pursuit of ambidextrous green innovation: A moderated mediation model	Journal of Cleaner Production	37	Entrepreneurial orientation; Exploitative green innovation; Exploratory green innovation; Green entrepreneurial orientation; Green innovations; Green knowledge management.
(C. Wang et al., 2023)	How to convert green entrepreneurial orientation into green innovation: The role of knowledge creation process and green absorptive capacity	Business Strategy and the Environment	26	Entrepreneur; environmental economics; green absorptive capacity; green economy; green entrepreneurial orientation; green innovation; knowledge exchange.
(Alshebami, 2023)	Green Innovation, Self-Efficacy, Entrepreneurial Orientation and Economic Performance:	Sustainability	19	SMEs; economic conditions; economy; green economy; industrial enterprise; innovation; market conditions;

	Interactions among Saudi Small Enterprises			questionnaire survey; small and medium-sized enterprise; sustainability.
(Ameer & Khan, 2023)	Green entrepreneurial orientation and corporate environmental performance: A systematic literature review	European Management Journal	17	Corporate environmental performance; Favorable contextual factors; Green entrepreneurial orientation.
(Tuan, 2023)	Fostering green product innovation through green entrepreneurial orientation: The roles of employee green creativity, green role identity, and organizational transactive memory system	Business Strategy and the Environment	12	Environmental economics; green creativity; green economy; green entrepreneurial orientation; green product innovation; green role identity.

Source: Processed data

One of the articles that had the greatest impact on research in this field in 2018 was research that talked about "Do green entrepreneurial orientation and green knowledge management matter in the pursuit of ambidextrous green innovation: A moderated mediation model," which has been cited 37 times (Shehzad et al., 2023). The findings of this study indicate that the entrepreneurial mindset towards environmental sustainability has a substantial impact on both exploitative and exploratory green innovation within manufacturing firms in Pakistan. Furthermore, the presence of green knowledge management serves as a partial mediator in the connection between green entrepreneurial orientation and both exploitative and exploratory green innovation. Given serious environmental issues and stringent regulations, manufacturing companies need to recognize the value of green innovation to support sustainable development. The second article talks about "How to convert green entrepreneurial orientation into green innovation: The role of knowledge creation

process and green absorptive capacity," which has been quoted 26 times (C. Wang et al., 2023). This study demonstrates that there is a notable correlation between green entrepreneurial orientation and green innovation. Additionally, it reveals that green entrepreneurial orientation has a favorable influence on both knowledge interchange and knowledge integration. Moreover, the ability to absorb and utilize green practices enhances the beneficial influence of a green entrepreneurial mindset on the process of generating new knowledge. Furthermore, the interchange and integration of knowledge have a beneficial effect on the innovation of green products and the development of environmentally friendly processes. The third research is related to "Green entrepreneurial orientation and corporate environmental performance: A systematic literature review," which has been cited 19 times (Alshebami, 2023). The discoveries presented in this paper significantly enhance our comprehension of the determinants behind green innovation and its influence on economic

performance, particularly within the realm of small enterprises in Saudi Arabia. This research offers practical implications for policymakers and stakeholders to enhance the self-efficacy and green entrepreneurial orientation of small entrepreneurs. This, in turn, would promote the creation of sustainable and creative products and services.

Trend by source

Source-based trends This study aims to identify the most pertinent and prominent research sources pertaining to green entrepreneurial intention. The Scopus database has a total of 430 items sourced from 211 distinct sources, including periodicals. Table 5 presents the distribution of the ten sources considered most pertinent. In terms of article publication count, the journal "Sustainability" holds the top position with a total of 45 articles, while "Journal of Cleaner Production" follows closely with 18 articles and "Business Strategy and the Environment" with 13 articles. According to Table 5, the journal "Sustainability" exhibits the highest bibliometric scores in terms of publications, h-index, and g-index. Additionally, the "Journal of Cleaner Production" demonstrates the highest score in terms of total citations.

Table 5. Distribution of the 10 most relevant sources

Source	h-index	g-index	Total Citation	Total Publiction	Year Publication
Sustainability (Switzerland)	13	21	509	45	2014
Journal of Cleaner Production	14	18	793	18	2015
Business Strategy and The Environment	8	13	293	13	2000
Environmental Science and Pollution Research	6	7	68	7	2021
Journal Of Small Business and Enterprise Development	4	7	53	7	2016
Frontiers In Psychology	4	6	41	7	2021
Kybernetes	4	6	39	6	2020
Emerald Emerging Markets Case Studies	1	1	3	6	2019
Economic Research-Ekonomska Istrazivanja	2	5	123	5	2020
Cogent Business and Management	2	5	103	5	2020

Source: Processed data

Figure 3 shows that China published 89 articles, leading the way in green entrepreneurial intention research. The United Kingdom (UK) is in second place with 34 publications; the United States of America (USA) is in third place with 18 publications; and Denmark is in third place with 14 publications. Among the 15 countries shown in Figure 3, China shows a high level of global cooperation in research related to green entrepreneurial intentions. In addition, as Figure 3 shows, many articles about green entrepreneurial intention were written in developed countries such as China, the United States, Australia, Italy, Germany, the Netherlands, Spain, Norway, Hungary, Sweden, Denmark, Canada, and Saudi Arabia. While developing countries such as Brazil, Malaysia, Pakistan, India, and Indonesia.
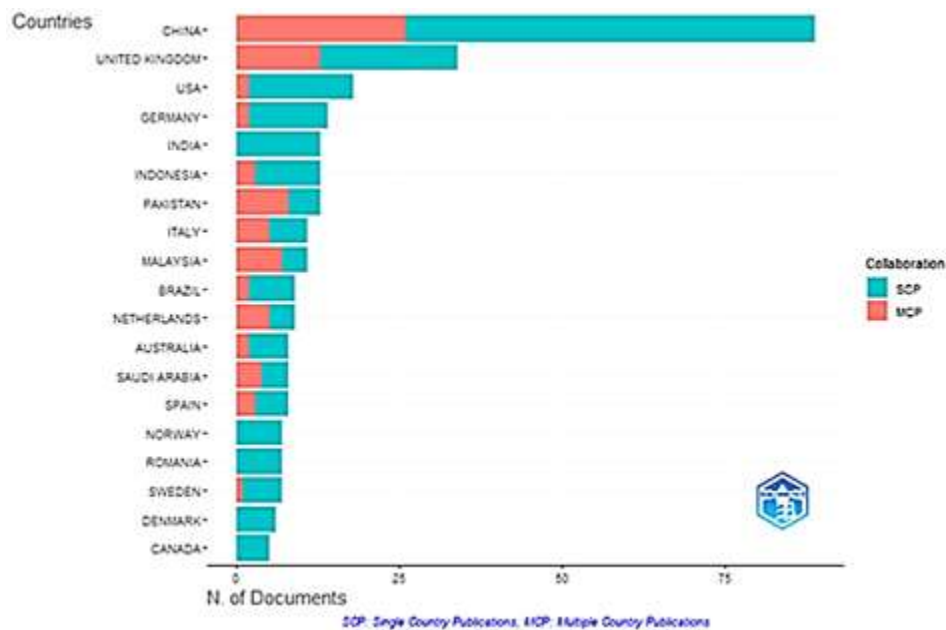
Figure 3. Corresponding authors countries

Figure 4 illustrates the additional prominent institutions determined based on the number of articles published. King Faisal University is a leading academic institution with a cumulative publication index of 24, while Jilin University has 18 publications and Jiangsu University has 17 articles. On the other hand, institutions such as the Xi'an Jiaotong University and the University of Kotli Azad Jammu and Kashmir have jointly produced a total of nine articles. Therefore, many authors originate from Arab educational institutions in Saudi Arabia, China, Pakistan, Malaysia, and Brazil who study green entrepreneurial intention.
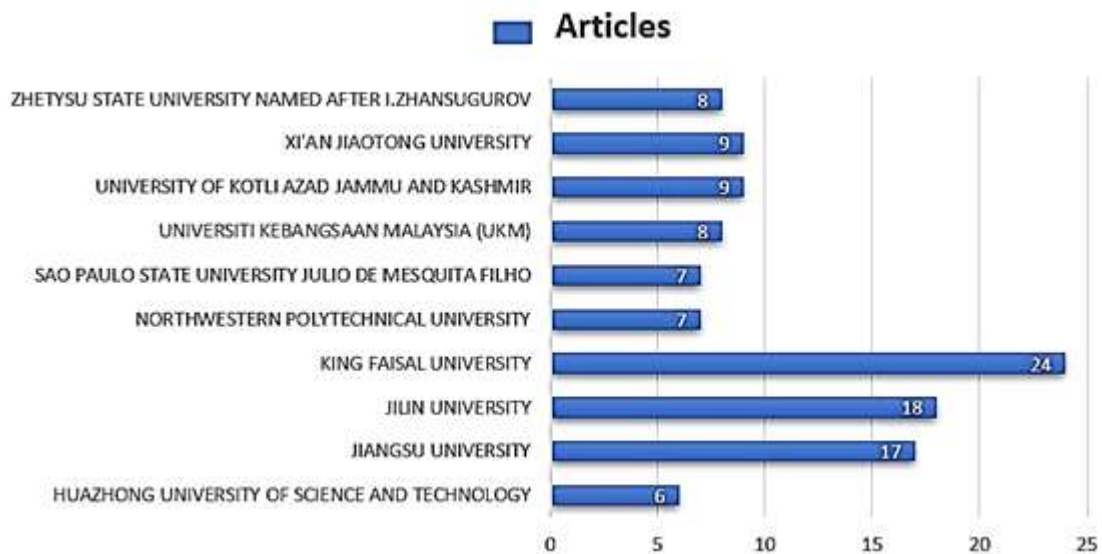

Figure 4. The top ten afiliations that publish articles about the context of green entrepreneurial intention

Trends by Authors

Figure 5 provides a comprehensive visualization of this notion, highlighting the notable article author who has made a substantial contribution to the literature on green entrepreneurial intention in recent years.

Figure 5 displays the quantity of papers written by different writers between the years 2016 and 2021. This visual depiction is characterized by variations in dot size. Each dot functions as a visual indicator, representing the comparative yearly accomplishments of different
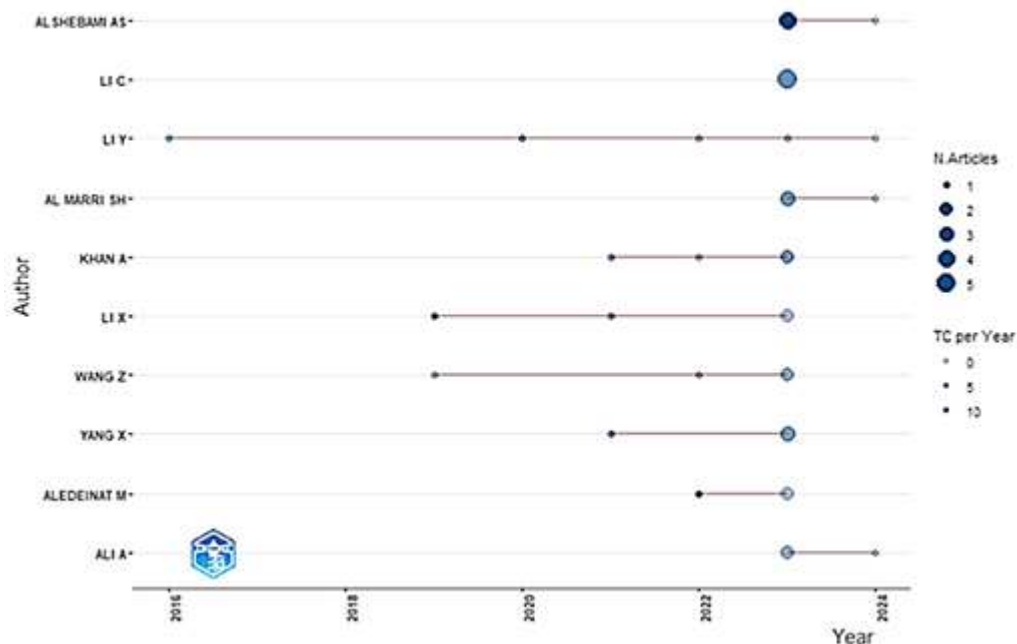

Figure 5. Authors production over time

authors. Specifically, the dot's size corresponds to the author's influence magnitude, signifying their significance on the scientific community. The color variations of the dots also provide further information. In areas with lower visibility, a greater number of research citations are displayed, reflecting the high regard that the academic community holds for the authors' work (Agyekum et al., 2024; Donthu et al., 2021). Research on green entrepreneurial intention was first published in 2016, and Figure 6 effectively illustrates the dynamic nature of productivity, effects, and impact of research across authors focused on the theme of green entrepreneurial intention. This is demonstrated by a complex interaction between dot size and color. In 2023, Alshebami AS published 5 articles and was cited 13 times. Li Y published 5 articles from 2016 to 2024 and has

been cited 41 times. From 2019 to 2023, Li X published 4 articles with 51 citations. Meanwhile, Aledeinat M. from 2022 to 2023 has published 3 articles and been cited 30 times.

Figure 6 research topic trends shows several trending issues related to green business, entrepreneurship, green entrepreneurial intention, and social issues. The following is a narrative based on the data in Figure 6.

The narrative based on the data in Figure 6 explains that Green's research theme appeared seven times and experienced an increase from 2014 to 2017. Entrepreneurship was the topic that appeared most frequently (46 times) and experienced variations from 2019 to 2022. Green entrepreneurship research topic The frequency is highest with 41 appearances, and the trend has increased from 2020 to 2022. Green
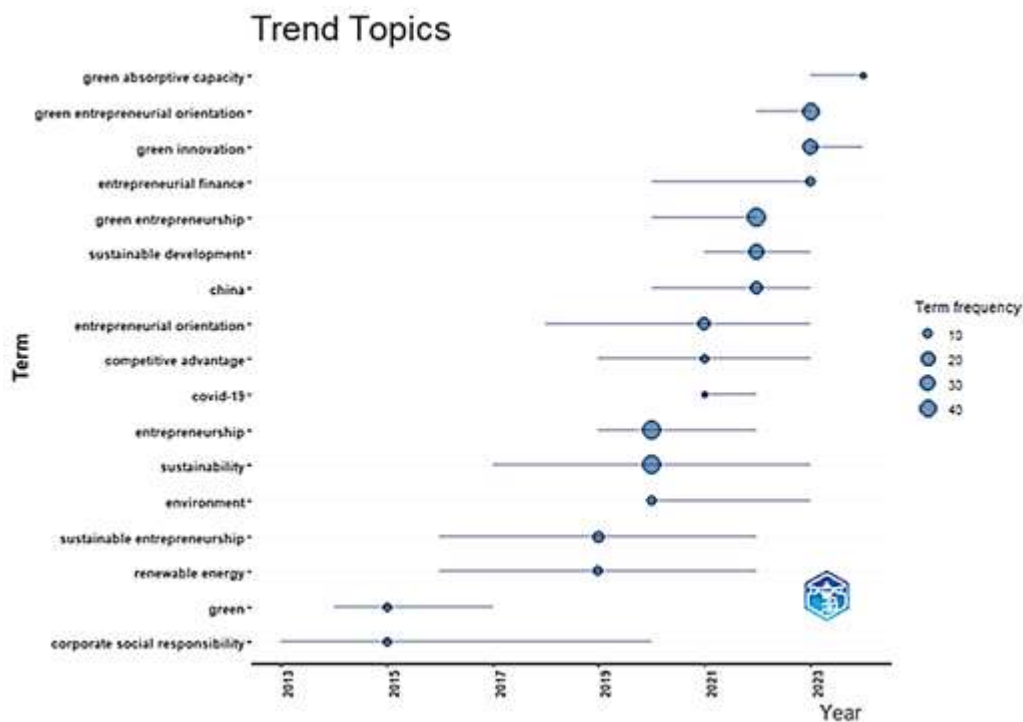
Figure 6. The last ten years have seen trends in research topics

entrepreneurial orientation appeared 34 times and experienced growth from 2022 to 2023. Meanwhile, green innovation was discovered 41 times and experienced fluctuations from 2023 to 2024. Several topics, such as COVID-19, green entrepreneurship, and green entrepreneurial orientation, emerged as topics that needed attention. The phrase "green" refers to a business that is environmentally friendly and can be initiated during the COVID-19 pandemic, when there is a heightened focus on cleanliness, personal hygiene, and environmental consciousness (Noor et al., 2023; W. Wang et al., 2021). The COVID-19 pandemic has influenced students' intentions for green entrepreneurship and highlighted the importance of universities and governments in promoting ecological ventures and entrepreneurship (Alvarez-Risco et al., 2021; Weng et al., 2022).

Trends based on conceptual structure

Thematic map analysis divide's themes based on density and centrality, as depicted in Figure 7. On the thematic map, the dots indicate the keywords that appear most frequently. The size of the dot is directly proportional to the frequency of the term (Rejeb et al., 2023). Pre-processing is necessary before applying a theme mapping algorithm to textual data. One way is to eliminate frequently used words that may not have relevant information. Additionally, we use stemming techniques to combine words into simpler phrases. For example, the words "entrepreneurial," "entrepreneurship," and "entrepreneurship" are all mapped to "entrepreneur" to ensure that the different words are considered as one phrase. For the theme identification method to be accurate, several pre-processing steps are important. For research purposes, three defined time periods were selected (2000–2013, 2012–2024). The goal is to see how the scientific literature is changing and how research issues are evolving. We carefully selected these intervals to demonstrate the development of the research theme and its extent of change.

(i)

(ii)
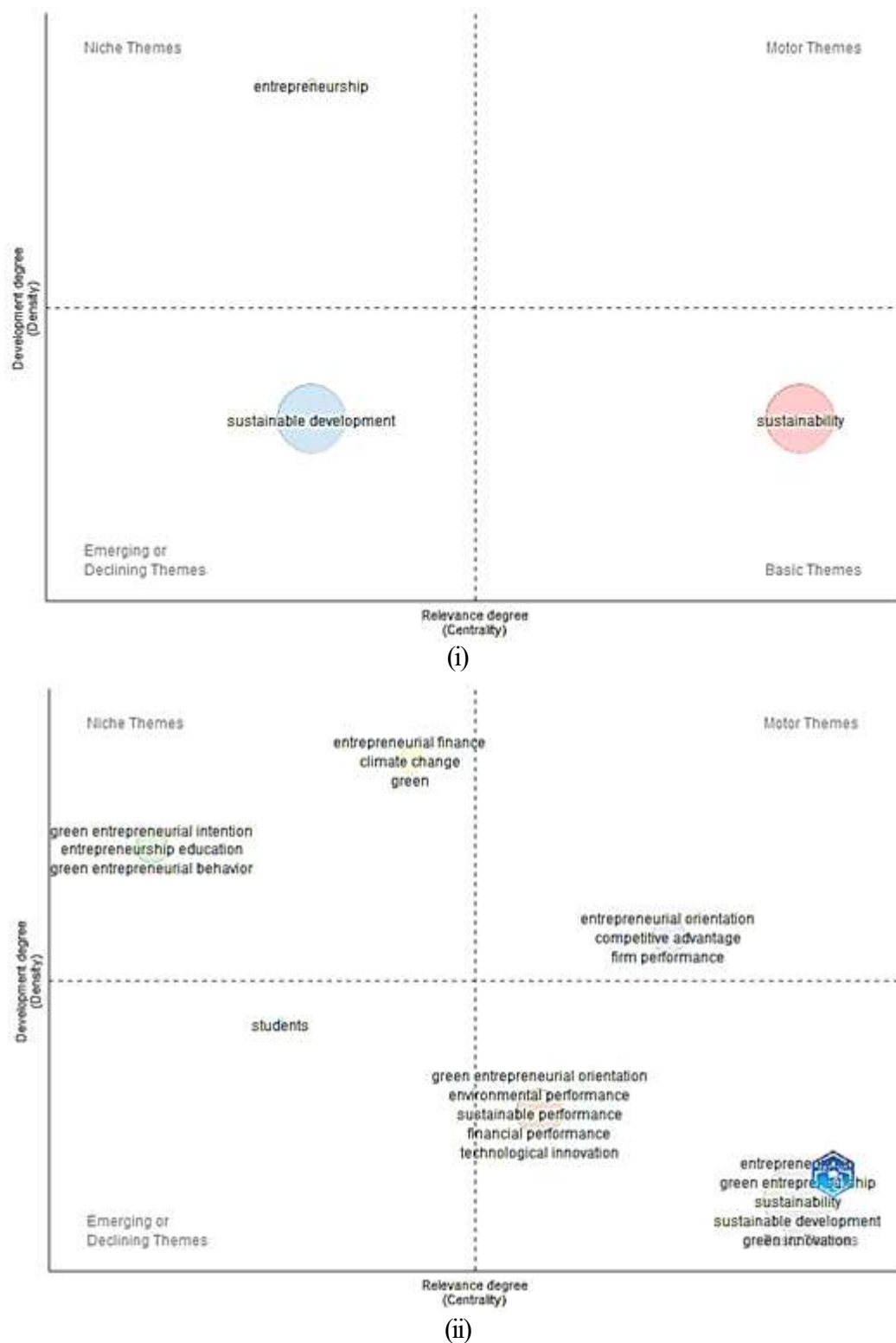
Figure 7. Thematic map (i) 2000-2012; (ii) 2013-2024

Figure 7 shows the respective keywords as dots, and the size of the dots indicates how often the keyword appears in the data set. For example, larger dots indicate how important a term is due to the number of times it appears in the corpus. The researcher carefully selected the parameter settings used in this analysis to ensure that the theme maps offered in-depth information. This study uses the following criteria (Balasopoulou et al., 2017; Parlina et al., 2020) namely First, Number of Words (250): This parameter determines how many words must be considered when identifying and analysing research themes. In this case, the analysis will concentrate on 250 words per theme. Second, Min Cluster Frequency (per thousand documents) (15): This parameter sets the lowest limit for the frequency of themes in the corpus. Themes that appeared at least fifteen times in one thousand documents were considered relevant for inclusion in the map. Third, Number of Labels (5): In this study, only five main themes were labeled and presented in the map. Fourth, Label Size (0.3): The label size determines the font size or visibility of the label related to the theme. A measure of 0.3 indicates that the main theme labels are presented quite prominently. Fifth, Rejection Community (0): This parameter controls the distance between themes on the map. A value of 0 indicates that articles do not repel each other, which could lead to a closer grouping of related articles. Sixth Clustering Algorithm (Walktrap): The "walktrap" clustering algorithm is used to identify network communities, and the choice of clustering algorithm is very important to discover related themes. This helps find interrelated themes and group them into clusters.

Thematic maps can be given different classifications based on how central and broad the topic is (Cobo et al., 2018). Within the bibliometric analysis, the motor themes located in the upper right quadrant of the thematic network are highly developed and play a crucial role in shaping the research field. On the other hand, the special themes located in the upper left quadrant are also well developed but have minimal relevance to the research area. Both types of themes have significant centrality and exert a strong influence on the direction of research. Themes that arise or diminish each week are located in the lower left quadrant of the thematic network and are both prominent and peripheral. The lower right quadrant of the thematic network exhibits a lack of centrality and density, with basic topics in bibliometric analysis being more significant but less developed. While they may not possess much influence, they hold a prominent position at the core of the matter.

During the initial phase (2000–2012), fundamental concepts were marked with red dots. The term "sustainability" is frequently used and has a substantial influence. Entrepreneurship has emerged as a novel area of emphasis, represented by a green dot, while sustainable development, represented by a blue dot, has experienced a decline in significance. From 2013 to 2024, the second phase of research focuses on specific subjects in the sector, namely green entrepreneurial intention, entrepreneurship education, and green entrepreneurial orientation (shown by green dots). These topics are highly developed and significant. The evolution of current themes has led to the emergence of new themes, notably entrepreneurial finance, climate change, and green (orange dot), which have limited significance and influence. The blue dot represents a motor theme and encompasses the concepts of entrepreneurial orientation, competitive advantage, and company performance. The primary topics that are most pertinent to the research theme include entrepreneurship, green entrepreneurship, sustainability, sustainable development, and green innovation (shown by purple dots). Meanwhile, the ongoing focal points are the green entrepreneurial mindset, environmental efficiency, sustainable outcomes, financial outcomes, and technical advancement (shown by the brown dot).

The subject that arose throughout this period of research pertained to students located at the bright green dot.

Thematic development analysis entails the process of isolating and comparing periods that have been integrated. This technique is employed to monitor the progression of different concepts inside academic fields across a period of time (Mozelius and Humble, 2022). The findings of study on thematic evolution elucidate the processes by which subjects manifest, vanish, amalgamate, or resurface over the course of time, as depicted in Figure 8. This study spans the years 2000 to 2011, 2012 to 2022, and 2023 to 2024. To comprehend the transformation of a subject into several thematic categories, we analyze a thematic map that incorporates a blend of themes.
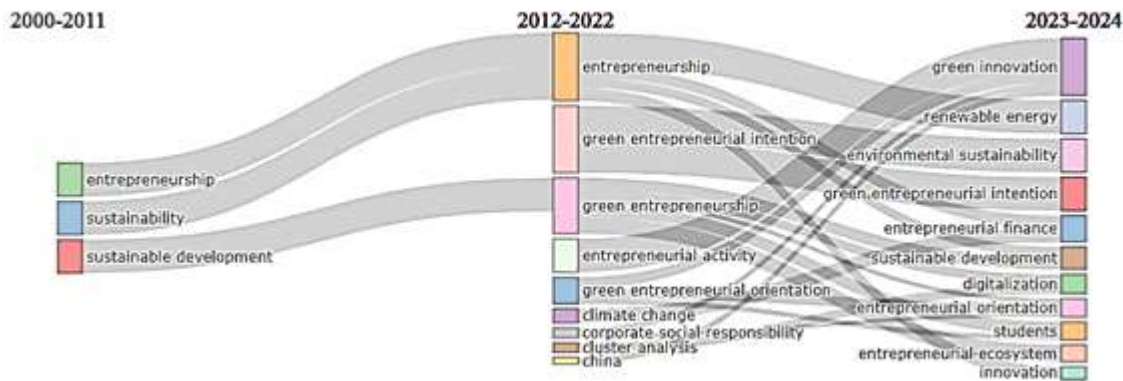

Figure 8. Thematic progression

The thematic progression from 2000 to 2024 reveals that the predominant themes during the period 2000–2011 were entrepreneurship, sustainability, and sustainable development. However, from 2012 to 2022, entrepreneurship and sustainability converged into the overarching theme of entrepreneurship, while sustainable development emerged as a distinct theme. The upcoming subject is green entrepreneurship, which will encompass sustainable development, digitalization, entrepreneurial orientation, students, an entrepreneurial ecosystem, and innovation throughout the period of 2023–2024. During the period of 2012–2022, several new themes became prominent, including entrepreneurial activity, green entrepreneurial orientation, climate change, and corporate social responsibility. These themes eventually led to the development of green innovation. Additionally, the aim is to engage in green entrepreneurial intention with a focus on environmental sustainability in the years 2022–2023. The subject of entrepreneurship from 2012 to 2022 has evolved to encompass additional areas of focus, including renewable energy, entrepreneurial finance, sustainable development, and innovation from 2021 to 2023. The 2012–2024 decade is characterised by a strong focus on and widespread interest in green entrepreneurial intentions.

The focus of research related to green entrepreneurial intention can be seen in Figure 9. The originality of the research is seen in Figure 10. The image is rendered using the Vosviewer application, employing a threshold value of 3. This indicates that the keywords shown have been utilized in a minimum of three distinct documents.

Figure 10 exhibits a variety of colors, specifically red, green, blue, yellow, and purple. These colors might serve as clusters for categorizing research focus within the relevant topic. The initial cluster, identified by a keyword and a red circle, is the most extensive cluster compared to the other clusters. This indicates that the red cluster is the primary area of research
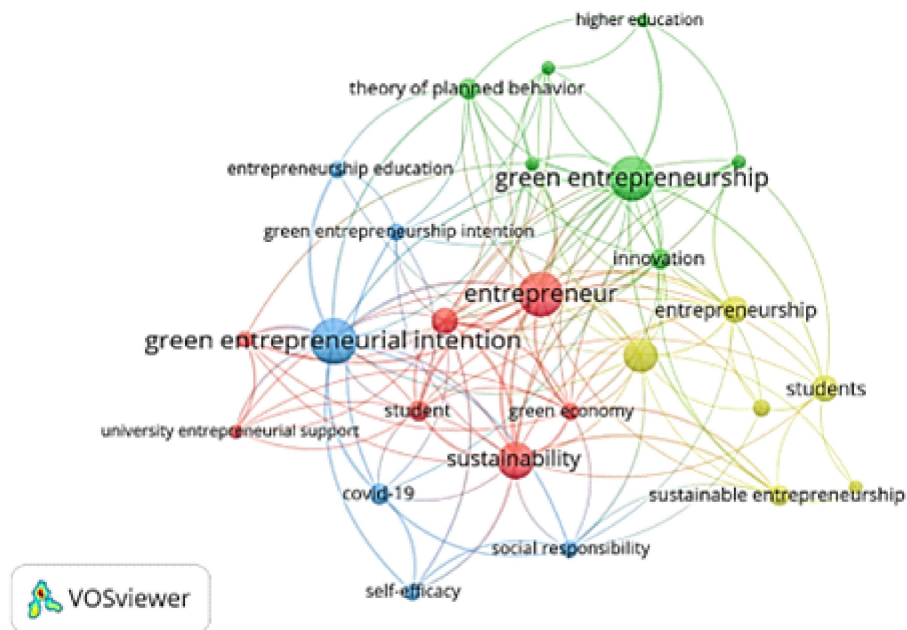
Figure 9. Research focus

that requires attention. The second-largest cluster is distinguished by keywords with green rings, signifying its status as the second significant area of study concentration. The subsequent cluster is indicated by the color blue. This suggests that the red cluster is the primary area of investigation, ranking third in importance. Meanwhile, the final cluster highlighted in yellow represents the third area of research attention in this field. The figure displays a total of 26 keywords related to green entrepreneurial intention. The first research focus consists of 7 items with the keywords "entrepreneur," "green economy," "green entrepreneurial behavior," "perception," "student," "sustainability," and "entrepreneur." These are the keywords with the largest circle in the red cluster. Therefore, these keywords became the focus of the first research. The focus of the second research consisted of seven items. The keywords "environment," "environmental value," "higher education," "innovation," "knowledge," "theory of planned behavior," and "green entrepreneurship" have the largest circle in the green cluster. So, this keyword became the second research focus. The third research

focus consists of six items. The keywords "entrepreneurship education," "green entrepreneurial intention," "self efficacy," "social responsibility," "covid-19," and "green entrepreneurial intention" have the largest circles in the blue cluster. Therefore, this keyword became the focal point of the third research project. The fourth research focus consists of six items. The keywords "entrepreneurial intention," "entrepreneurship," "intention," "students," "sustainable entrepreneurship," and "sustainable development" have the largest circles in the blue cluster. Therefore, this keyword became the primary focus of the fourth research study.

We can use these four research focuses as a guide to determine future research themes. Figure 11 above displays several colors, with blue indicating keyword usage from 2020 to 2021, green indicating keyword usage around 2022, and yellow indicating keyword usage in the last few years. Keywords with yellow circles are newly used keywords, meaning these keywords are a new theme in this field. The new themes are environmental values, entrepreneurial intention, and entrepreneurial knowledge. Researchers
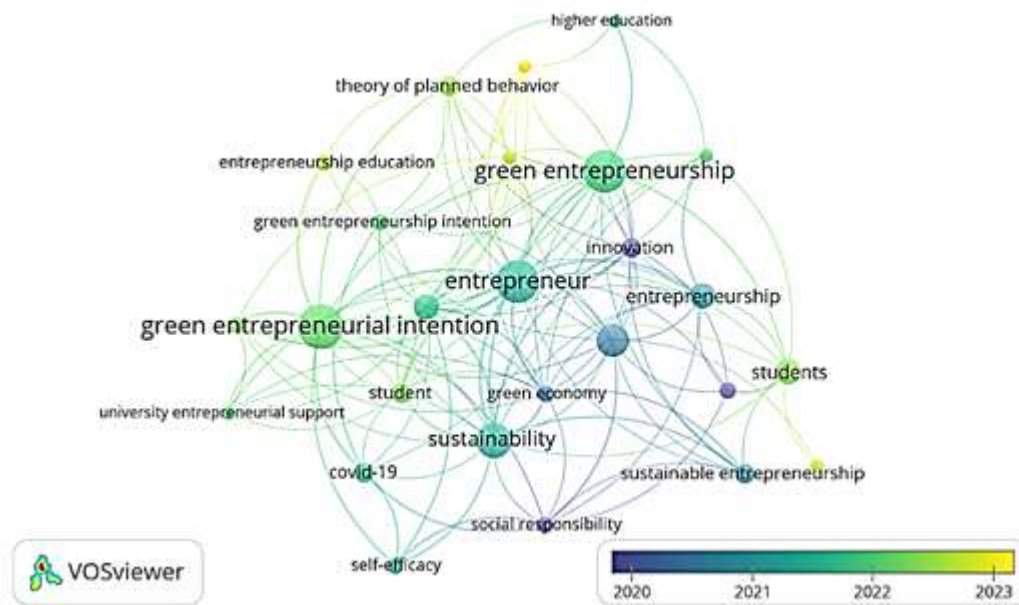
Figure 10. Novelty of research

might utilize the connections between keywords as a point of reference to evaluate the originality of their research. This implies that the absence of a connection between a keyword and other keywords signifies the originality of study in that particular area. Based on Figure 11, it can be seen that the keywords "green entrepreneurial intention," "entrepreneurial orientation," "entrepreneurial knowledge," and "entrepreneurial creativity" do not have a direct link with the keywords that are the new theme, namely "learning environment." Therefore, we can conclude that the exploration of green entrepreneurial intention in relation to learning environments remains relatively new and unexplored. This can be regarded as a fascinating scientific innovation for further investigation.

■ **CONCLUSION**

The preceding section provided a comprehensive analysis of the research studies pertaining to the inclination towards green entrepreneurship. The results offer useful information regarding the future trajectory, importance, and potential of this topic. The publication trends section displays a notable surge in the quantity of research generated over a specific timeframe. Although there has been a significant rise in the quantity of published articles, there is no clear link between the increase in citations of these articles and the number of publications. This implies the existence of several components, such as varying degrees of involvement with different types of material, varying degrees of research excellence, or shifts in research emphasis over time. In the year 2023, a total of 111 articles will be published, which is the largest amount in comparison to the previous year. More than 29% of papers have been published in 2023. Following the Covid-19 outbreak, there has been a substantial surge in the quantity of publications. This is a result of the growing recognition of the need of safeguarding the environment and fulfilling social obligations. The Covid-19 pandemic has prompted shifts in individuals' behaviour and mentality, leading to a surge in interest in environmentally conscious economic aspirations. Furthermore, engagement in initiatives to combat Covid-19 has also impacted the recognition of the need of environmental conservation and societal accountability.

Trends in the Number of Citations give an idea of how much this research is cited by other researchers in their scientific work. The table shows that the number of citations varies from year to year, with some years having a higher number of citations than others. In 2023, there were 627 citations related to research on green entrepreneurial intentions, indicating that this research has had a significant impact in the scientific literature. Additionally, the trend indicates a growing interest in green entrepreneurial intentions, as evidenced by the consistently rising number of citations. Research on green entrepreneurial intention has received significant attention from the scientific community, which is reflected in the number of citations, which continues to increase from year to year. This shows that this research has had a strong and relevant impact in the scientific literature, as well as demonstrating the growing interest in this topic.

Trend by source has shown an analysis of the most relevant and important research sources related to green entrepreneurial intentions. The journal "Sustainability" occupies the top position with a total of 45 articles, followed by "Journal of Cleaner Production" with 18 articles and "Business Strategy and the Environment" with 13 articles. Furthermore, bibliometric analysis reveals that the journal "Sustainability" has the highest bibliometric score in terms of publications, h-index, and g-index, while "Journal of Cleaner Production" has the highest score in terms of total citations. This discussion of trend-based sources provides an in-depth understanding of the most influential research sources in the context of green entrepreneurial intention. It also illustrates the significant contribution of certain journals to advancing knowledge about green entrepreneurial intentions. Thus, this source-based trend analysis provides valuable insights for researchers interested in this topic, as well as highlighting the importance of collaboration with relevant research sources to expand research impact.

Trends by Authors has provided an overview of significant author contributions to the literature on green entrepreneurial intentions over recent years. The contributions of prominent authors in the literature on green entrepreneurial intention indicate authors whose work is highly valued by the academic community. In 2023, Alshebami AS published 5 articles and was cited 13 times. Meanwhile, Li Y published 5 articles from 2016 to 2024 and was quoted 41 times. From 2019 to 2023, Li X published 4 articles with 51 citations. Likewise, Aledeinat M., from 2022 to 2023, has published 3 articles and been cited 30 times. Thus, the trend analysis by the authors provides deep insight into individual contributions to the literature on green entrepreneurial intention, as well as highlighting authors whose work has had a significant impact in the academic community. This provides valuable insight into the dynamics of productivity, effects, and research impact among authors focused on the theme of green entrepreneurial intentions.

Trends based on conceptual structure refers to an analysis of the development of research themes in the context of green entrepreneurial intentions. The data presented in this article provides an overview of research themes that have developed over the last 24 years, as well as new research focuses on green entrepreneurial intention. This analysis highlights thematic developments from 2000 to 2024. The main themes during the 2000–2011 period were entrepreneurship, sustainability, and sustainable development. However, from 2012 to 2022, entrepreneurship and sustainability merged to become the main themes of entrepreneurship, while sustainable development emerged as a separate theme. The next theme is green entrepreneurship, which includes sustainable development, digitalization, entrepreneurial orientation, students, an entrepreneurial ecosystem, and innovation in the 2023–2024

period. During the 2012–2022 period, several new themes became prominent, including entrepreneurial activity, green entrepreneurial orientation, climate change, and corporate social responsibility. These themes ultimately lead to the development of green innovation. Additionally, the goal is to engage in green entrepreneurial intention with a focus on environmental sustainability in 2022–2023. From 2012 to 2022, the subject of entrepreneurship has expanded to include additional areas of focus, including renewable energy, entrepreneurial financing, sustainable development, and innovation from 2021 to 2023. The 2012–2024 decade was marked by a strong focus and widespread interest in green entrepreneurial intentions. Therefore, the study of trends using the conceptual structure offers a comprehensive comprehension of the development of research topics within the context of green entrepreneurial aspirations. It also emphasizes emerging topics and new areas of research in this sector. This offers useful information to scholars studying the topic of green entrepreneurial purpose, while also suggesting potential avenues for further research.

This article employs a unique application of scientific analysis to examine the research topic of green entrepreneurial purpose. This study covers a substantial timeframe from 2000 to March 2024, enabling the identification of shifts and alterations in research emphasis throughout time and offering a full depiction of the field's development. Utilizing the Scopus database, a highly dependable source of scientific papers, helps enhance the legitimacy and dependability of this study data. The research primarily focuses on the issue of green entrepreneurial aim. This strategy emphasizes concentration and enables comprehensive examination and a profound comprehension of particular aspects of green entrepreneurial purpose. Through the application of bibliometric analysis, researchers who are eager to explore new research prospects can gain

insights by examining publishing patterns in several aspects such as keywords, authors, citations, sources, nations, international collaborations, important publications, and thematic advancements. In addition, the presence of related terms in both the title and abstract can offer valuable indications for potential study inquiries, so benefiting future researchers.

This research is subject to various constraints, primarily its exclusive reliance on the Scopus database for the identification of relevant papers. Moreover, the elimination of additional documents was essential to guarantee the incorporation of more pertinent information. Subsequent research endeavors can employ other scholarly databases such as PubMed and Web of Science (WoS) to conduct diverse evaluations, with the goal of offering a more comprehensive qualitative and quantitative assessment of the issue of green entrepreneurial intention. A more thorough evaluation of research subjects is a challenge; analysis is carried out without first investigating specific approaches and models in a study. As a result, bibliometric methods focus more on output than article content.

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