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**DIGITAL MARKETING AND CONSUMER EXPERIENCE IN BUILDING BRAND  
GREEN INNOVATION IN SMES: THE TREND ANALYSIS USING A  
BIBLIOMETRIC ANALYSIS**



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**Abstract**

SMEs play a key role in promoting environmental sustainability. One important aspect is the adoption of green innovation to enhance environmental performance. This study explores research trends on green innovation in SMEs using bibliometric analysis based on 229 publications from the Web of Science database. The analysis, conducted with VOSviewer, covers publication patterns, leading journals, most cited and productive authors, keyword trends, and future research directions. *The Journal of Cleaner Production* emerged as the top journal, while Afum Ebenezer, Agyabeng-Mensah, and Charles Dad were among the most prolific authors. Jiangsu University was the most productive institution. Future research is expected to explore themes like open innovation, green HRM, green finance, and competitive advantage. This study is limited to SMEs and the Web of Science database, suggesting the need for broader future studies across other sectors. This bibliometric analysis contributes new insights into the intersection of green innovation and SMEs.

**Keywords:** Green Innovation, Sustainability, SMEs, Bibliometric Analysis, Web of Science

## INTRODUCTION

As industrialization has fueled economic growth and resulted in large pollution emissions, attaining sustainable development is currently at the top of the global agenda (C. Wang et al., 2022; G. Zhang et al., 2023). Small and medium-sized enterprises, or SMEs, make up a sizable portion of all firms globally and are universally recognized as the cornerstone of every economy and the catalyst for growth (Anand, 2015). Even in small and medium-sized businesses, environmental concerns motivate entrepreneurs to maximize their internal capacity for creating environmentally friendly solutions (Rustiarini et al., 2022). One of the main elements of greening the economy is reducing the environmental effects of small and medium-sized businesses (SMEs) in the industrial and service sectors (OECD, 2015).

According to OECD (2022), Small and medium-sized firms (SMEs) are responsible for at least half of all business-related greenhouse gas emissions. However, polls suggest that most SMEs are still in the early stages of their journey to net zero, with few efforts taken to reduce the carbon footprint of their operations. Only 10% of SMEs presently monitor their GHG emissions, and 22% do not fully understand the "net zero" concept. Furthermore, nearly one-third have not sought advice or information to help them establish a net-zero strategy or enhance their environmental consciousness. SMEs have a significant environmental influence in important areas such as animal farming, construction, metal finishing, waste treatment, the food and beverage industry, and textile and leather manufacturing (OECD, 2015).

Khanna (2020) suggested that building green firms requires innovation to develop innovative technologies that employ fewer polluting inputs, boost resource utilization efficiency, and cut costs. Beyond the financial and environmental benefits of greener practices for traditional SMEs, the green economy offers new chances for SMEs to become leaders in fields including renewable energy installation, green service delivery, and green consultancy (OECD/ASEAN, 2021). To effectively compete with other suppliers in the same industry, small and medium-sized manufacturers (SMEs) that provide parts to large organizations must maintain strong relationships with customers (Kim et al., 2020). However, SMEs seem to have a detrimental effect on the environment in addition to their

economic contributions. SME administrators are recommended to change their answers to environmental concerns from being inactive and passive to being proactive and prospective in order to satisfy the expectations and goals of social and economic sustainable development (Wen, 2017).

Adopting green innovation is one of the most well-liked tactics for improving the business's environmental achievements. Sáez-Martínez et al. (2016) claimed that businesses need to invest in new environmental technology that lowers pollution and carbon emissions if they want to improve environmental achievements through eco-innovation. Businesses may easily disregard their environmental accountability in a setting of severe bureaucratic corruption (Jahanshahi et al., 2020). One of the things that propels green development is the innovation of green technologies (Xue et al., 2022). Establishing barriers to entry, fulfilling value co-creation obligations with clients, and incorporating environmental sustainability into product development and business processes are all necessary for SMEs to maintain long-term client relationships and achieve preferred supplier status (Kim et al., 2020). A key technological tool for attaining clean manufacturing, sustainable development, and corporate modernization is green innovation (C. Wang et al., 2022). Wang et al., 2022) argued that green innovation has been found to have a significant positive correlation with corporate sustainable development. Y. Chen (2008a) demonstrates that green expertise is a key driver of green innovation at work. Companies must spend on establishing green competencies in order to accomplish green innovation. The company's operations will have a greater beneficial environmental impact when green innovation is used (Przychodzen et al., 2019). Employees' green competencies, motivation, and opportunity will be difficult for a company without a green innovation culture to integrate (Muisyo & Qin, 2021). Green innovation can lead to firm sustainability (W. Song et al., 2020); (Arдын et al., 2017); (Weng et al., 2015).

This study intends to map the literature with bibliometric analysis utilizing the Web of Science Platform data source for the years 1999–2023, taking into consideration the importance of green innovation implemented in SMEs as well as the significance of SMEs in increasing their positive impact on a nation's economic growth. This study's novelty/value stems from its focus on green innovation in the SMEs sector. Bibliometric analysis refers to

the use of statistical tools to quantitatively examine scientific output (Ellegaard & Wallin, 2015).

## **REVIEW OF LITERATURE**

Small and medium-sized enterprises (SMEs) play a significant part in the establishment of businesses globally and play a crucial role in a country's economic progress by producing job opportunities, wealth, and income, and alleviating poverty (Fahad et al., 2022). Greening small and medium-sized enterprises is critical to improving environmental sustainability. Khanna (2020) claimed that green businesses are required to consider the life-cycle environmental impact of their products while developing them, as well as alter methods and operations throughout their supply chain. Organizations must employ green innovation to provide eco-friendly products and services, thereby accomplishing sustainable development goals (Huang et al., 2023).

SMEs are vital for green growth because they generate eco-innovation and are key actors in developing green sectors (OECD, 2015). There is an increasing need for services connected with sustainable manufacturing. Highly creative and inventive SMEs in the service industry, such as design and architectural firms or bio-energy solution providers, are making an increasing contribution to eco-innovation across a variety of industries (OECD, 2015). Reducing environmental pollution by implementing new or enhanced procedures, techniques, technologies, systems, or products is known as "green innovation (Beise & Rennings, 2005). SMEs' approaches are crucial for improving our understanding of the material cycle, particularly with regard to how it may be used to further environmental goals like the circular economy and energy conservation (Declich et al., 2020).

Green innovation varies from traditional innovation in that it accepts environmental responsibility while balancing economic rewards, necessitating a stronger motivation to put it into action (S. Chen et al., 2023). Furthermore, innovation is typically defined as the introduction of new products, services, or processes that involve some level of organizational change, whether radical or incremental (Ashok et al., 2014). Green innovation includes reducing energy consumption and pollutant emissions, recycling waste, sustainable resource exploitation, and green product design (El-Kassar & Singh, 2019). The attainment of

sustainable economic growth has been attributed to two crucial factors: green innovation and resource efficiency (Sun et al., 2023). Green innovation is very important to be implemented in SMEs (Han & Zhang, 2023). Green Innovation offers intangible value, and such organizations acquire a competitive advantage over their rivals through the successful use of green resources and processes (Albort-Morant et al., 2018).

In addition to helping businesses meet their environmental objectives, environmental innovation is a crucial strategy for minimizing environmental harm (Y. Li, 2014). Use eco-innovation to go green and adjust to the always-shifting environment. Eco-innovation, or any innovation that attempts to significantly and demonstrably address the goal of sustainable development by lowering detrimental effects on the environment or by enabling a more efficient and responsible use of natural resources and energy, is one-way businesses can become greener (Sáez-Martínez et al., 2016). A sustainable development approach called eco-innovation entails creating distinctive green capabilities with the help of top management, eco-technologies, and R&D expenditures. External eco-innovation encompasses all green external actions of the firm, especially those involving suppliers, government agencies, and markets (Lee & Min, 2015).

Innovation with a focus on the environment is crucial for increasing business productivity in the environmental sector. Innovation can be applied to product, operation, service, and marketing. Tseng et al. (2012) said that corporate green innovation includes establishing green management, developing environmentally friendly products, and optimizing production, operations, and service processes. A meta-analysis of the factors influencing green innovation indicated that firms with a high awareness of environmental issues are more likely to be innovative (Zubeltzu-Jaka et al., 2018). The green technology improvement by the firm is beneficial to the environment (Ahmed et al., 2022). Technology readiness is very important to support innovation; it refers to an organization's ability to successfully adopt green innovation technologies as valuable assets (Y. Zhang et al., 2020).

Ecological innovation, or green innovation, is the term for advancements that take into account reducing environmental pollution and saving energy and resources (Saunila et al., 2018). Without governmental support, companies are less inclined to green innovate since they must pay for all of the costs but do not receive all of the advantages. On the other hand,

pollution emissions have a negative externality (Bai et al., 2019). D. Li et al., (2017) measure green innovation by collecting green patents using the keywords "environmental", "green", "sustainable", "energy saving", "ecology", "clean", "recycling", "saving", "low carbon", "emissions reduction", and "environmental protection" and capturing the effects of legitimacy pressure and corporate profitability on firms' green innovation. The results show that the practice of green innovation is influenced by the internal rate of return, external legitimacy pressure, and their interaction.

Keeping the environment clean and green, not polluted, is also one aspect of implementing the company's business ethics in keeping the environment green. Environmental, corporate ethics, and marketing researchers have all paid close attention to green innovation (Jahanshahi et al., 2020). An increasing number of businesses are using green innovation as a tactic to achieve the sustainability of the environment (W. Song et al., 2020). Green innovation enhances environmental, economic, and industrial processes while assisting businesses in creating new or improved products or processes with the least amount of raw materials and other resources used (M. Song et al., 2022). Environmental innovation may help firms learn more about green innovation by maximizing their resources. Also, this can foster green creativity within organizations (W. Song et al., 2020).

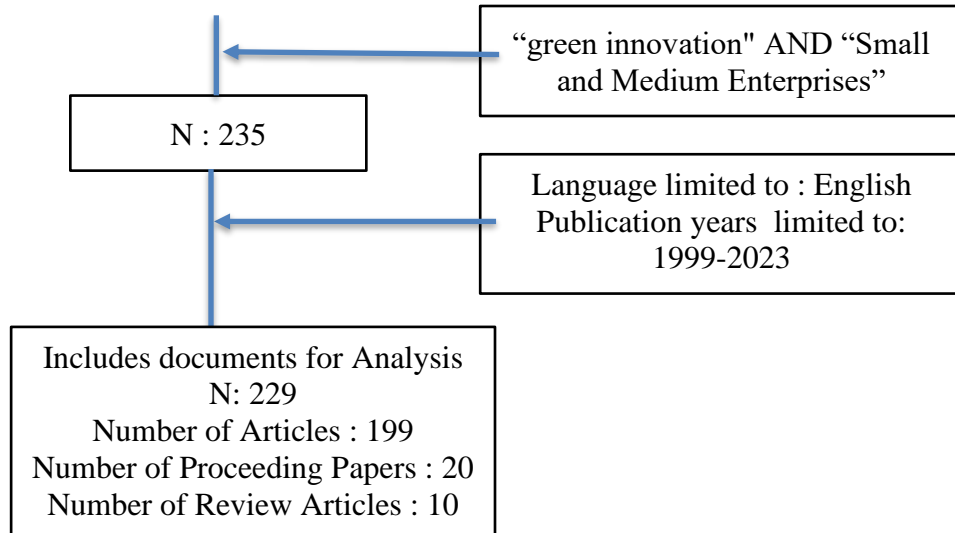
## RESEARCH METHOD

The bibliometric analysis method is the approach used in this study. Bibliometrics analysis reduces subjective bias in literature reviews by visualizing the study subject and discovering influential works. To inform their conclusions, researchers can utilize aggregated bibliographic data from other scientists through writing, collaboration, or citation (Zupic & Čater, 2015). The Web of Science provided the data. VOSviewer data, which can provide bibliometric visualizations pertaining to green innovation in SMEs, was used for data analysis. The terms "green innovation" and "small and medium enterprises" are utilized, and the years 1999–2023 are included. There are 229 articles in the analysis's published data.

**Figure 1.**  
**Screening Process**

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Searching in Web of Sciences Database Platform

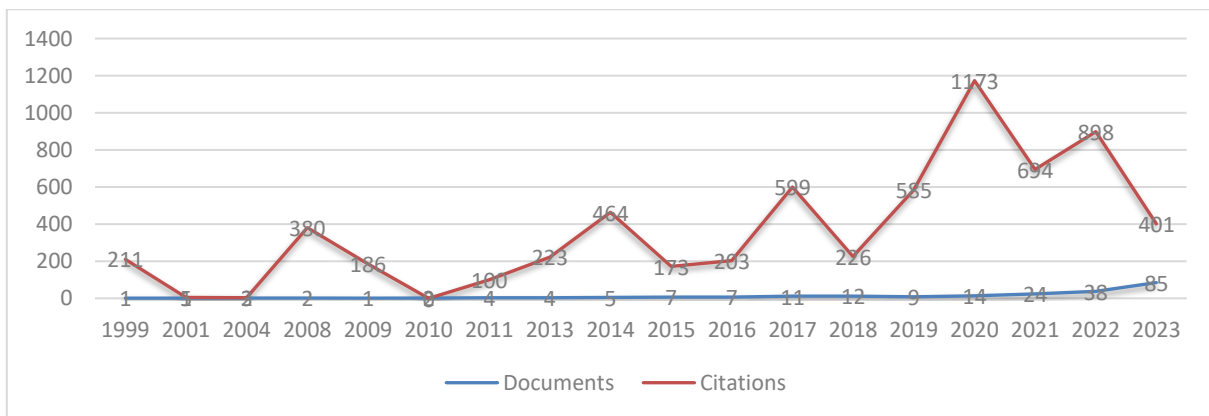


## RESULTS AND DISCUSSION

### Publication Trend

From 1999 to 2023, the number of published papers about green HRM increased, as figure 1 illustrates. The year 2023 will see the most publications, with 85 documents released overall. In 2022, there will be 38 published documents, making it the second largest. Next, with 24 published documents overall, it was the third largest in 2021. When it comes to citation counts, 2020 had the most, with 1173 citations overall. In 2022, there were 898 citations, which was the second-highest total. The year 2021 saw 694 citations, which was the third-highest amount.

**Figure 2.**  
**The Trend of Publication**



The growth in research output indicates that scholars are increasingly interested in exploring green innovation in the Small and Medium Enterprises sector. The most citations in 2020 indicate that 2020, 2021, and 2022 are the publications with the most influence.

### Most Cited Author

Chen, YS (2008) received the most citations with 820. These studies show a positive association between a company's green innovation success, green image, and green core capabilities. This study further confirmed that there were partial mediation effects between green core competences and green company images for the two types of green innovation performance.

**Table 1.**  
**Most Cited Research**

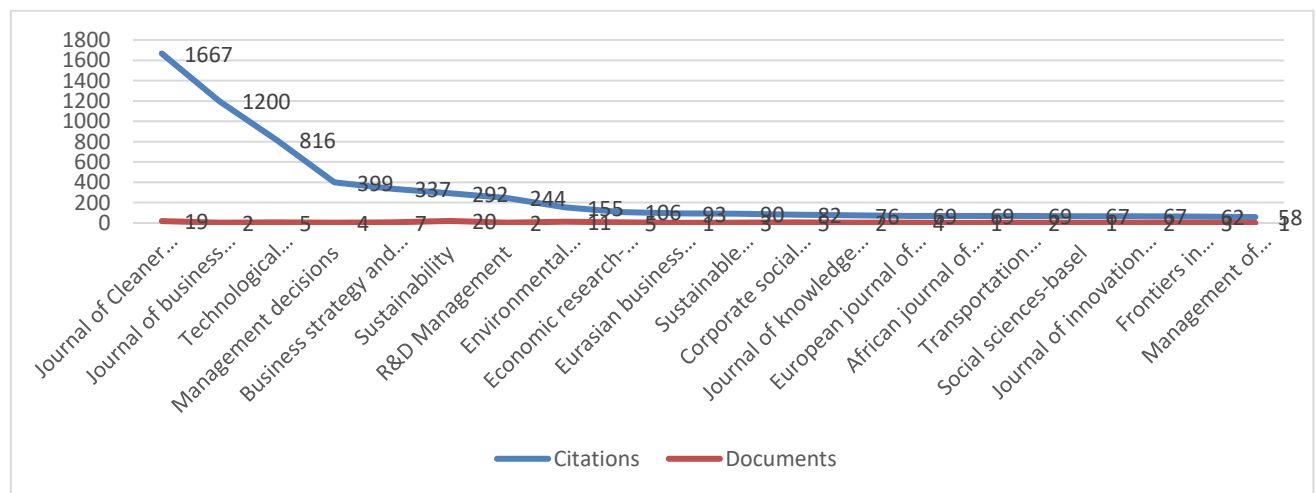
Rank	Research	Source	Citations
1	Chen, YS (2008)	Journal Of Business Ethics	820
2	Singh, SK; Del Giudice, M; Chierici, R; Graziano, D (2020)	Technological Forecasting And Social Change	682
3	Chen, YS (2008)	Journal Of Business Ethics	380
4	Cuerva, MC; Triguero-Cano, A; Córcoles, D (2014)	Journal Of Cleaner Production	346
5	Gupta, H; Barua, MK (2017)	Journal Of Cleaner Production	338
6	Bai, Y; Song, SY; Jiao, JL; Yang, RR (2019)	Journal Of Cleaner Production	282
7	Aboelmaged, M; Hashem, G (2019)	Journal Of Cleaner Production	214
8	Noci, G; Verganti, R (1999)	R & D Management	211
9	Lee, KH (2009)	Management Decision	186
10	Singh, SK; Del Giudice, M; Jabbour, CJC; Latan, H; Sohal, AS (2022)	Business Strategy And The Environment	149
11	Bartolacci, F; Caputo, A; Soverchia, M (2020)	Business Strategy And The Environment	138
12	Chang, CH; Chen, YS (2013)	Management Decision	136
13	He, F; Miao, X; Wong, CWY; Lee, S (2018)	Journal Of Cleaner Production	113
14	Ebrahimi, P; Mirbargkar, SM (2017)	Eurasian Business Review	93
15	Yousaf, Z (2021)	Environmental Science And Pollution Research	87
16	Sáez-Martínez, FJ; Díaz-García, C; Gonzalez-Moreno, A (2016)	Journal Of Cleaner Production	82
17	Chen, JW; Liu, LL (2020)	Journal Of Business Research	78
18	Bag, S; Dhamija, P; Bryde, DJ; Singh, RK (2022)	Journal Of Business Research	78
19	Chang, CH (2015)	Management Decision	74
20	Weng, MH; Lin, CY (2011)	African Journal Of Business Management	69

Singh (2020) ranks second with 682 citations. This study looked into green innovation and environmental achievements, specifically the roles of green transformational leadership and green human resource management. The study's findings suggest that green transformational leadership's influence on green innovation is mediated by green HRM practices. In addition, we discovered that green innovation, through green HRM, has an indirect impact on a company's environmental positive outcomes. Chen (2008) is the third-most-cited author, with 380 citations. This study investigates the favorable impact of green intellectual capital on organizations' competitive advantages. Cuerva, M.C. (2014) is ranked fourth, with 346 citations. This study discusses the drivers of green and non-green innovation, using empirical evidence from low-tech SMEs. Gupta, H; Barua, MK (2017) comes in fifth position, with 338 citations. This research discusses supplier selection among SMEs based on their green innovation capabilities, utilizing BWM and fuzzy TOPSIS.

**Leading Journal**

According to the research findings, the top five journals with the most citations are Journal of Cleaner Production in first position, Journal of Business Ethics in second position, Technological Forecasting and Social Change in third position, Management Decisions in fourth position, and Business Strategy and the Environment in fifth position. Figure 3 reveals that the Journal of Cleaner Manufacturing is the dominant publication on the topic of green innovation in SMEs, with 19 papers and 1667 citations.

**Figure 3.**  
**Leading Journal**



The mean number of citations was 87.73. The Journal of Business Ethics has the second most citations, with 1200, and an average of 600 citations per item. Technological forecasting and social change are ranked third, with 5 published documents and 816 citations. Each document receives an average of 163.2 citations. Management decision is ranked fourth, with 399 citations and four documents. The average citation for each document is 99.75. Business strategy and the environment takes sixth place with 337 citations, 7 documents, and an average of 48.14 citations per document.

### Most Productive Authors

**Table 2.**  
**Top 20 Productive Authors**

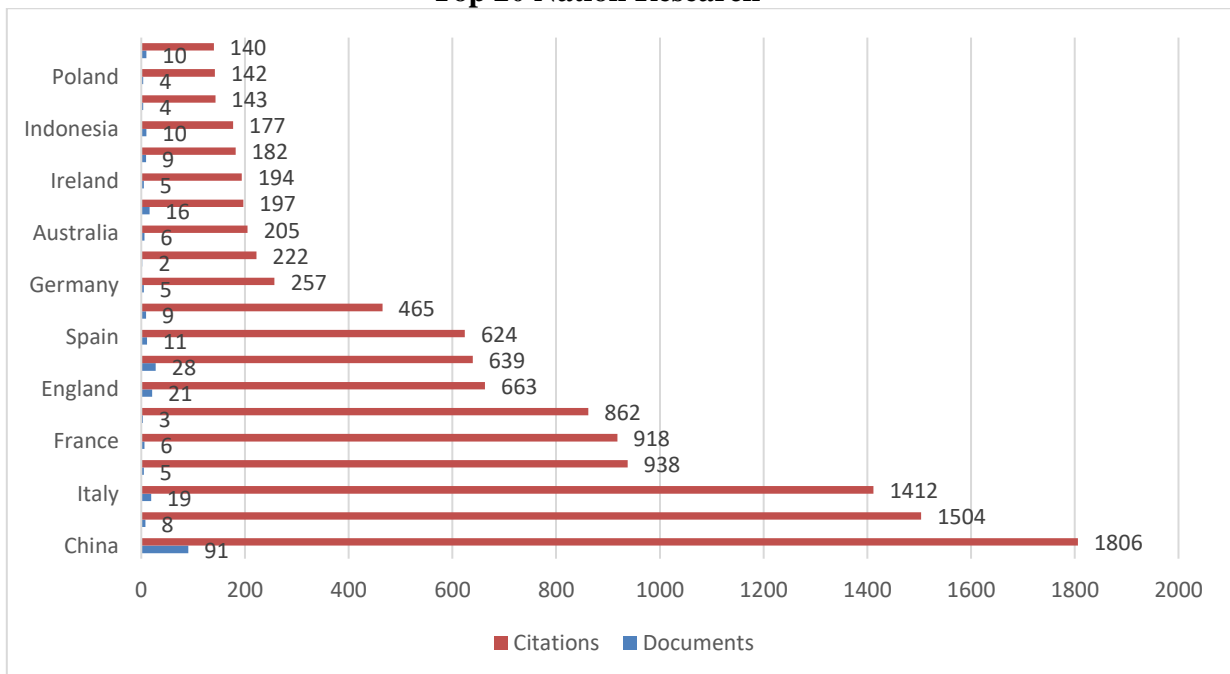
No	Source Title	Documents	Affiliations	Country
1	Afum, ebenezer	5	Florida Atlantic University	United State
2	Agyabeng-mensah, yaw	5	Curtin University	Australia
3	baah, charles	5	Charles Darwin University	Australia
4	Khan, adnan	3	Jiangsu University	China
5	Chen, yu-san	3	National Yunlin University Science & Technology	Taiwan
6	akhtar, shamim	3	University of Lahore	Pakistan
7	gupta, himanshu	3	Indian Institute of Technology System (IIT System)	India
8	shapira, philip	3	Alliance Manchester Business School	United Kingdom
9	ali, waheed	2	Xi'an Jiaotong University	China
10	hussain, hadi	2	Wuhan University	China
11	jun, wen	2	Xi'an Jiaotong University	China
12	khan, nadeem akhtar	2	Wuhan University	China
13	acquah, innocent senyo kwasi	2	University of Cape Coast	Ghana
14	abdulrahman, muhammad d	2	University of Nottingham Ningbo China	China
15	iqbal, shuja	2	University of Lahore	Pakistan
16	jamil, ihsan	2	Xi'an Jiaotong University	China
17	li, yin	2	Georgia Institute of Technology	United Stated
18	mondal, sourav	2	Indian Institute of Technology System (IIT System)	India
19	shah, syed ahsan ali	2	Al-Zaytoonah University of Jordan	Jordan
20	singh, saumya	2	Indian Institute of Technology (Indian School of Mines) Dhanbad	India

Afum, Ebenezer of the University of Bristol in the United Kingdom, Agyabeng-mensah of Curtin University in Australia, and Dad, Charles Darwin University in Australia are the authors with the most publications on green innovation in SMEs. Each of them published five publications, as shown in Table 2. If we look at the total number of authors in the top five, the majority came from Australia, with two authors, followed by China, the United Kingdom, and Taiwan, each with one author. Overall, data from the Top 20 productive writers show that China has the most productive authors in Green Innovation research on SMEs using the Web of Science Platform.

**Top 20 Nations' Research Output**

China is a leader in green innovation in SMEs using the Web of Science Platform. With 1806 citations and 91 published works. The number of citations and documents exceeds that of Taiwan, the country with the second-largest research output. Taiwan generated 1504 citations and eight published publications. Taiwan is ranked second as the most productive country in terms of citations and the Web of Science Platform. Italy ranks third, with 1412 citations and 19 papers. The United Arab Emirates ranks fourth with 5 documents and 938 citations. France ranks fifth, with six publications and 918 citations.

**Figure 4.**  
**Top 20 Nation Research**

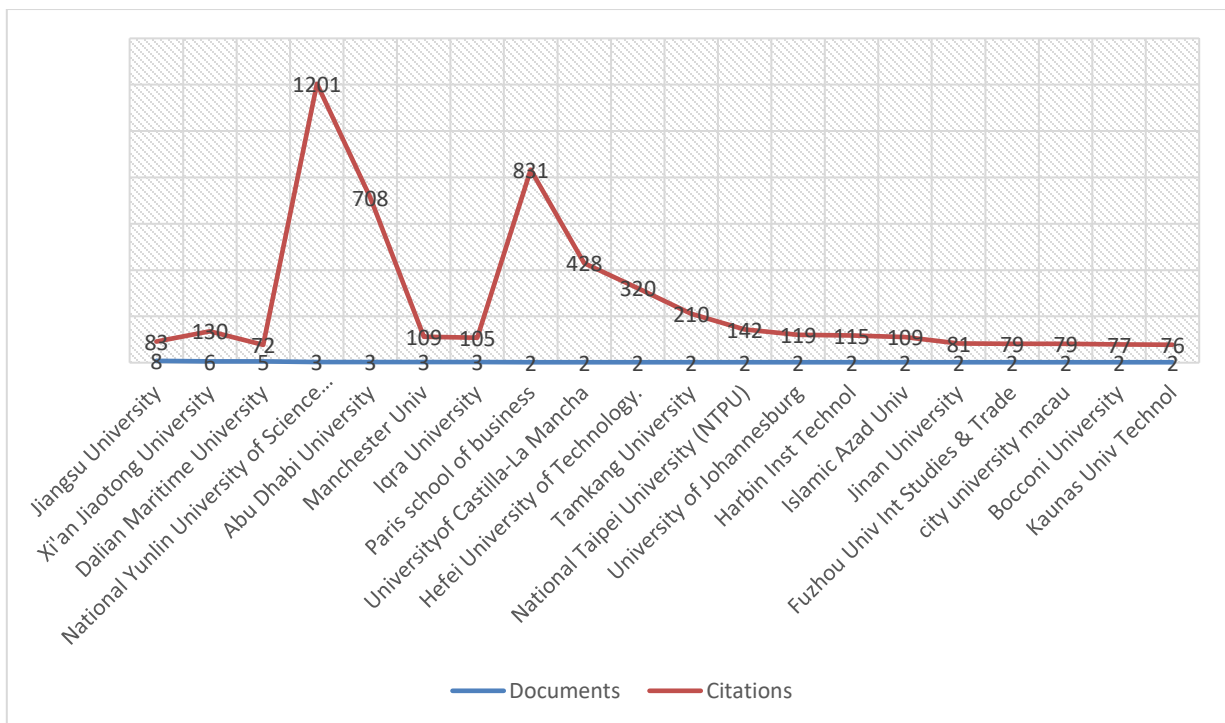


According to Figure 4, China, Taiwan, and Italy play a critical role in the research of green innovation in SMEs using Web of Science data. Furthermore, the Top 20 data in Figure 4 demonstrate that Saudi Arabia has made the smallest contribution to the research of green innovation in SMEs according to the Web of Science Platform.

**Most Influential Affiliations**

Jiangsu University is the most prolific affiliate in the Green Innovation study in SMEs using the Web of Science platform, as shown in Figure 5. Eight papers have been successfully published by Jiangsu University. The Web of Science Platform ranks Xi'an Jiaotong University as the second most productive affiliate in the study of green innovation in SMEs. Six articles are available from Xi'an Jiaotong University. Third place went to Dalian Maritime University, which had five papers published. With five publications, National Yunlin University of Science and Technology comes in at number four.

**Figure 5.**  
**Top 20 Affiliations**

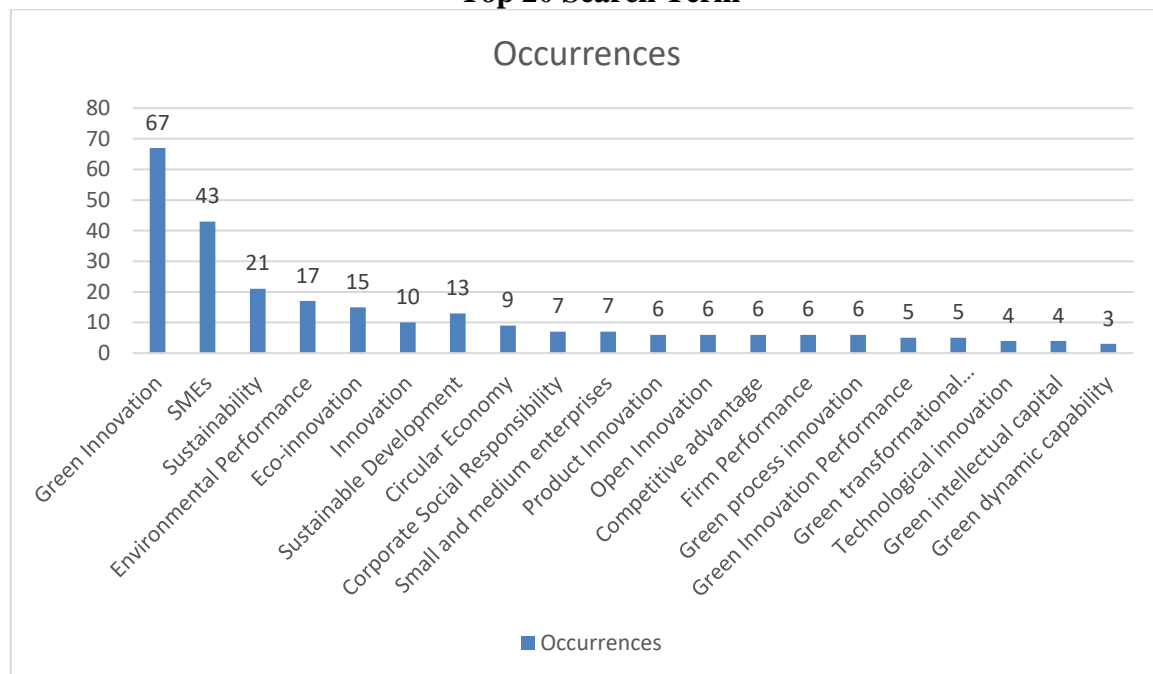


National Yunlin University of Science and Technology ranks top. National Yunlin University of Science and Technology received 1201 citations, followed by Paris School of Business, which received 831 citations. Furthermore, Abu Dhabi University ranks third with 708 citations. Abu Dhabi University is ranked fourth, with 428 citations.

**Keyword Analysis**

According to keyword analysis, green innovation is the most often used keyword, with 67 occurrences. This is consistent with the keywords of this research on green innovation in ASIA SMEs using the Web of Science platform. Next, the keyword that appears the most frequently is SMEs, with 43 instances. This is consistent with the research objective, as this study was conducted on SMEs. Furthermore, sustainability is the third most often used keyword, appearing 21 times.

**Figure 6.**  
**Top 20 Search Term**



Environmental performance terms have occurred 17 times and hence ranks fourth. Eco-innovation’s terms are ranked fifth with 15 occurrences. Green innovation, SMEs, sustainability, environmental performance’s keyword, and eco-innovation are among the top five terms used by researchers, indicating a strong interest in these topics.



This research has ten clusters (see figure 8), which include the following:

Cluster 1 examines the competitiveness of SMEs (ed). To increase their competitiveness, SMEs can cultivate financial innovation, dynamic capability, and technological innovation. For SMEs to expand, they must become more competitive in the digital economy and environment. Digital transformation, environmental management, financial constraints, green dynamic capability, green financing, green technical innovation, manufacturing, and organizational performance of small and medium-sized businesses are among the themes that researchers might study in this cluster.

Innovation as a facilitator of SMEs' sustainability as cluster 2 (Green). Researchers can study sustainability via the lens of entrepreneurship, innovation, literature review, marketing innovation, product innovation, public procurement, and small and medium enterprises. SMEs can improve their sustainability by employing various innovations, such as marketing innovation, product innovation, and fostering an entrepreneurial spirit.

Cluster 3 (blue) focuses on improving SMEs' performance through the circular economy and green human resource management. This cluster covers topics such as eco-innovation, firm performance, green entrepreneurship, green human resource management, green supply chain management, and open innovation. SMEs can continue to improve their performance by promoting eco-innovation and green entrepreneurship. Green human resource and supply chain management.

Cluster 4 (Yellow) emphasizes improving SMEs' environmental performance in terms of financial performance, green entrepreneurial orientation, green process innovation, green value co-creation, and corporate social responsibility. Financial performance, green entrepreneurial approach, green process innovation, corporate social responsibility, and co-creation of green value are all covered in this cluster. SMEs can enhance their environmental achievements through green value co-creation, green process innovation, green entrepreneurial orientation, financial performance, and corporate social responsibility.

Cluster 5 (Purple) represents the competitive edge and long-term success of SMES. This cluster covers topics such as green innovation adoption, green innovation performance, green intellectual capital, green supply chain management, and sustainable performance. SMEs may improve their long-term performance by enhancing their competitive advantage



## Future Research Trends

Vos Viewer processed the data, and Density Visualization presents a summary of widely explored or rarely investigated keywords. A keyword's darker color indicates that it is rarely investigated. Rarely explored keywords are suggested for future investigation. Researchers propose three potential study topics:

1. Sustainability performance includes green entrepreneurial approach, value co-creation, process innovation, and green intellectual capital. This study looks at how SMEs can achieve sustainability through the implementation of green value co-creation, green entrepreneurial orientation, green intellectual capital, and green process innovation. Researchers can investigate by using green value co-creation as a moderator variable or implement the green process innovation as a mediating.
2. Green innovation adoption, green human resource management, and open innovation as source of competitive advantages. This study investigates the role of green innovation adoption, green human resource management, and open innovation in enhancing SMEs' competitiveness. Furthermore, as intervening variable can use green innovation to explore the impact of green human resource management and open innovation on SMEs' competitive advantage.
3. Dynamic capability, green technology adoption, and green finance as source of sustainable development. Green technology adoption, green dynamic capability, and green funding can all help SMEs achieve more sustainable development. Researchers can utilize green finance as a moderating variable to shape the relationship between green technology adoption and green technology's impact on SMEs' sustainability.

Green entrepreneurial approach, green value co-creation, green process innovation, and green intellectual capital all have an impact on SMEs' sustainable performance. The research focuses on how to build green entrepreneurial orientation, green value co-creation, green process innovation, and green intellectual capital to improve sustainability performance. Several prior studies have demonstrated the impact of green entrepreneurial orientation, green value co-creation, green process innovation, and green intellectual capital in boosting SMEs' sustainability performance (Al-Shammari et al., 2022; Coelho et al., 2023; ( et al., 2023). The findings reveal that the sustainable performance of SMEs is positively and

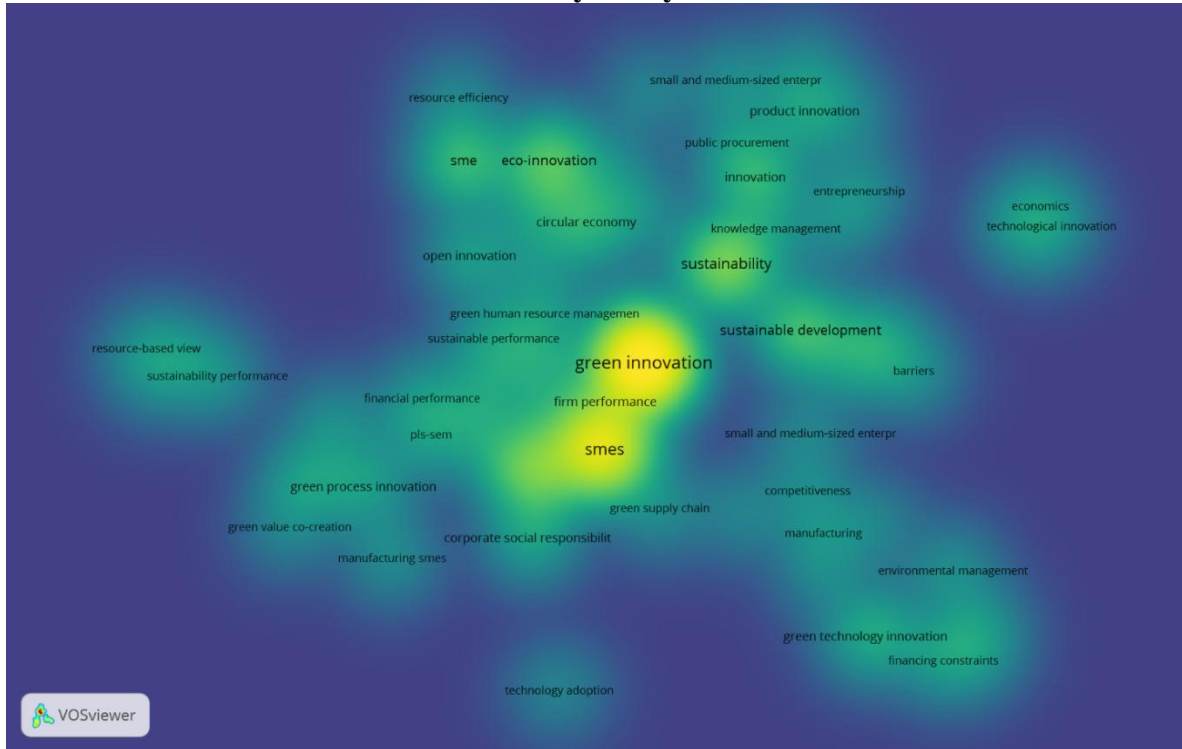
significantly influenced by green human resource management package practices, and then green innovation partially mediates the relationship between green human resource practices and the sustainable performance of SMEs (Al-Shammari et al., 2022). Zhao et al., (2023) also found that sustainable development performance can be improved with green human resource management.

Getting competitive The dream of entrepreneurs is SMEs. Adoption of green innovation, open innovation, and green human resource management can all help SMEs gain an edge over competitors. Previous research results have proven that there is a relationship between green human resource management, green innovation adoption, and open innovation (Mustafa et al., 2023; Hang et al., 2022; Chen, 2008b). The results of research conducted by Zihan & Makhbul, (2024) shows that green human resource management has a positive effect on improving business performance. Green performance management, training and development, employee involvement, compensation and incentives, and recruiting and selection are examples of green HRM methods (Tang et al., 2018). Besides green human resource management practices, green innovation practices also has a positive impact on SMEs' competitive advantage. Research conducted by Mubeen et al., (2023) that green innovation can improve SMEs's business performance. Research conducted by X. Zhang et al., (2023) shows that there is a contribution of open innovation to sustainable competitive advantage. To obtain a competitive edge, open innovation enables businesses to investigate external knowledge and externally utilize current internal resources (Popa et al., 2017).

SMEs Green finance, green dynamic capabilities, and green technology adoption can all enhance sustainable development. For SMEs to achieve sustainable development, environmentally friendly technology is crucial. Song et al., (2022) argued that green technology adoption promoted the sustainability of the firm. Green finance emerged as a vital aspect for green development, with green technological innovation as the primary way (Yuan et al., 2024; Wei et al., (2023). The other factor that can be taken into account to enhance SMEs' sustainable development is their green dynamic capability. Green finance is a moderating variable that researchers can use to impact how green technology adoption and green technology affect the sustainable development of SMEs. Mubeen et al., (2023) in his research, he found that there was an influence between green dynamic capability on SMEs'

sustainable performance. Karman & Savanevičienė, (2021) also stated that business competitiveness can be achieved by implementing green dynamic capabilities.

**Figure 9.**  
**Density Analysis**



## CONCLUSION

Using bibliometric analysis, this study examined publishing patterns pertaining to green innovation in SMEs using data from the Web of Sciences Platform between 1999 and 2023. Based on data from 229 publications, the findings indicate that researchers are becoming more interested in studying green innovation in the small and medium-sized business sector, particularly in the past five years. The author with the most citations in this field is Chen, YS (2008). According to the study's findings, the top five journals with the most citations are the Journal of Cleaner Production, Journal of Business Ethics, Technological Forecasting and Social Change, Management Decisions, and Business Strategy and the Environment.

The authors with the most publications on green innovation in SMEs are Afum, ebenezer of the University of Bristol in the United Kingdom; Agyabeng-mensah of Curtin

University in Australia; and Dad of Charles Darwin University in Australia. According to the Web of Science Platform, China is a pioneer in the area of green innovation in SMEs. According to the Web of Science portal, Jiangsu University is the most productive affiliate in the Green Innovation study in SMEs. With eight publications to date, Jiangsu University has been successful in publishing papers. Green innovation is the keyword that appears the most frequently (67 times), according to keyword research. This aligns with the research's keywords, which are based on the Web of Science platform and pertain to green innovation in SMEs in Asia. Second, with 43 occurrences, SMEs is the keyword that shows up the most. Green innovation search term, SMEs, sustainability, environmental performance's terms, and eco-innovation are the top five key words that frequently come up in analyses.

Future directions include investigating the impact of Environmental performance through green entrepreneurial orientation, green value co-creation, green process innovation, and green intellectual capital, as well as green human resource management, green innovation adoption, and open innovation on competitive advantage. This study looks at how open innovation, green innovation adoption, and green human resources management might boost SMEs' competitive edge. The final future direction is improving SMEs' sustainable development, which may be achieved by boosting their use of green technology, green finance, and green dynamic capabilities. The relationship between green technology adoption and SMEs' sustainable development can be influenced by green funding, which researchers can utilize as a moderating variable.

This study certainly has research limitations. This study has not used many databases as data sources. The data used only comes from the Web of Science database. This study is also a bibliometric analysis. In the future, it will allow subsequent researchers to conduct quantitative research related to this research topic. The Web of Science Platform is the only database source used in this study, which is one of its limitations. Future research could explore other database sources, including Scopus, Elsevier, Taylor & Francis, Sage Open, and others. Additionally, this study is restricted to SMEs; going forward, academics may broaden their focus to include the public sector, services sector, tourism industry, and other industries.

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