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Small- and medium-sized enterprises' carbon footprint reduction initiatives as a catalyst for green jobs: A systematic review and comprehensive business strategy agenda

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Abstract

Motivated by the growing attention on climate change, this study provides an up-to-date and comprehensive systematic literature review (SLR) on small- and medium-sized enterprises (SMEs) carbon footprint reduction initiatives and green jobs. Based on datasets from databases that include Web of Science, Scopus, ProQuest and Google Scholar, we conducted a SLR of 70 published articles spanning 2012 to 2022. Using VOSviewer and InfraNodus, bibliographic cluster analysis revealed the existence of three clusters namely; the role of green job initiatives and green human resource management in SMEs (cluster 1); green innovation, green Initiatives, green strategy and circular economy in SMEs (cluster 2); carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs (cluster 3). We found that SMEs adopt green supply chain, employing energy-saving strategies, eco-friendly waste reductions and recycling, circular economy, and green office practices. The study results indicate that these carbon footprint initiatives can lead to green job creation since green competences are required to implement green initiatives. However, value propositions relating to carbon reduction initiatives within SMEs need to be integrated with employee engagement. Additionally, the SLR identifies future research areas that include exploring the association among SMEs carbon footprint, green innovation and green jobs, and strategies to enhance climate change initiatives. Consequently, we call for future research to focus on the design of green jobs tracking and carbon footprint reduction reporting framework to support SMEs' green initiatives. The findings have key policy implications for SME owners, policymakers, practitioners and future researchers.

KEYWORDS
carbon footprints reductions, green innovation, green jobs, literature review, SMEs

Abbreviations: AHP, analytical hierarchy process; BC, betweenness centrality; COP26, Conference of the Parties 26; COP27, Conference of the Parties 26; COP28, Conference of the Parties 26; CEP, corporate environmental performance; ESP, environmental sustainability practices; EU, European Union; GHG, green house gas; G20, group of 20; GHRM, green human resource management; GBP, green business practices; GSCM, green supply chain management; GSCI, green supply chain integration; GSCP, green supply chain practices; GTA, green technology adoption; GTL, green transformational leadership; HRM, human resource management; HR, human resource; IRENA, International Renewable Energy Agency; LCB, low carbon emission behaviour; NLP, natural language processing; OECD, Organisation for Economic Cooperation and Development; RBV, resource based view; SDGs, sustainable development goals; SLR, systematic literature review; SMEs, small and medium sized enterprises; UNEP, United Nations Environment Programme; UN SDGs, United Nations Sustainable DevelopmentGoals; VC, venture capital; WoS, web of science.

1 | INTRODUCTION

Global climate change, particularly the emission of greenhouse gas (GHG), is currently a top concern for businesses, governments and other stakeholders. This contemporary issue continues to elicit increasing attention and focus from academics, professionals, regulators, and environmental activists (Adu & Roni, 2023). The quest to deal with climate change and GHG emissions quagmire continues to shape discussions and the net zero agreements that include the Paris Agreements, European green deal, COP26, COP27 and most recently, COP28 summit in Dubai (Adu, Flynn, & Grey, 2022; Haque & Ntim, 2020; Orazalin et al., 2023). Since the adoption of the Paris Agreement in 2015, over 110 countries, including EU countries, the USA, Japan and China, have made ambitious commitments to reach carbon neutrality before 2050. For example, China's aim to achieve carbon emission control objectives by 2030 was set out in the Sino-US Joint Statement on Climate Change (Khurram et al., 2024). Countries like the USA, UK, India and Japan have all made similar commitments. The establishment of low-carbon initiatives can play a role in promoting corporate resilience that include the survival and sustainable development of small- and medium-sized enterprises (SMEs) globally (Huang & Mirza, 2022; Jiang et al., 2018; Zhou & Zhao, 2016).

In particular, the UK Environmental Audit Committee 2021 paper and OECD SME and Entrepreneurship Ministerial meeting in 2023 maintain that achieving just net zero transition and long-term environmental goals depends on a skilled green workforce. In support, Siegel et al. (2019) and Cherrafi et al. (2017) implicitly highlighted the importance of having sound human resource management as vital for SMEs to implement initiatives such as green and lean six sigma that promote sustainable climate change action. Showcasing some of the activities of a skilled workforce, the International Renewable Energy Agency (IRENA), 2022 report reveals that India created 0.863 million green jobs, with 217,000 in solar photovoltaic vertical and 414,000 in hydropower. The report also shows that Brazil created 1.272 million green jobs, while the United States created 923,000. However, the report did not provide details regarding whether these jobs are related to large organisations or are due to SMEs' greening initiatives. SMEs make up the majority of businesses worldwide (Organisation for Economic Co-operation and Development, 2017). The European commission defines SMEs as organisations with fewer than 250 employees. For instance, in the European Union, SMEs represent 99% of all enterprises and generated an average of 85% new jobs in the last 5 years and accounted for more than 45% of total employment (OECD, 2017). Similarly, the World bank report (2019) notes that in emerging markets, most formal jobs are generated by SMEs, pointing out that they create seven out of every 10 jobs. In this case, it can be argued that the activities of SMEs and their employees affect climate change initiatives. For instance, according to the British Business Bank Report (2021), SMEs contribute about half of the UK's total industrial emissions. Thus, SMEs are critical in the transition to net zero agenda as they play a pivotal role in driving economic growth through their activities. Although the study of SMEs' finance, business management, and economics receives much attention, little is known about how these businesses behave regarding the transition towards low GHG emissions and their potential for creating green-related jobs (Bartolacci et al., 2019). We argue that SMEs can deliver positive green initiatives that can yield green jobs with the potential to contribute considerably to reducing the level of GHG globally.

Nonetheless, SMEs have not previously featured prominently in GHG emission reduction public policy discussions despite the sector's potential to contribute to driving down GHG emissions. According to Siegel et al. (2019), this non-inclusion may be due to their restricted size and resources, especially as 'SMEs struggle to effectively implement green initiatives such as integrating lean management with green management'. Meanwhile, Statistics show that about 60% of all GHG emissions and 70% of global pollution are attributed to SMEs activities (European Commission, 2010; Parker et al., 2009). Additionally, while there seems to be readily available statistics about SMEs carbon emissions, particularly in the western world, it appears there are no specifically developed metrics to track SMEs green jobs initiatives.

Considering recent literature in the domain, carbon footprint reduction studies have focussed predominantly on large-scale businesses and their commitments to a greener environment world (Abdelhamied et al., 2023; Arnedo et al., 2021; Guerci et al., 2016). However, a limited number of SLR studies have been conducted focusing on SMEs and how they respond to national and international green initiatives (e.g., Kosasih et al., 2023; Siegel et al., 2022; Takalo et al., 2021). For example, Kosasih et al. (2023) explore integrated lean-green practices and sustainability in SMEs in manufacturing sector, whereas Takalo et al. (2021) work focused on green innovation. Further, Siegel et al. (2022) examine systematic implementation of green-lean and sustainability in SMEs. Machado et al. (2020) investigated production and supply chain implications for SME's environmental management development in a related SLR. In addition, Bartolacci et al. (2019) study focused on sustainability and financial performance of SMEs, while Dasgupta (2021) SLR focused on sustainability innovation initiatives in SMEs. In a similar vein, Passaro et al. (2022) concentrated on the drivers of eco-innovation in SMEs, whereas Pacheco et al. (2018) looked at eco-innovation determinants in manufacturing SMEs from emerging markets.

Arguably, contemporary subject areas like SMEs' carbon footprint reduction initiatives and green job opportunities remain under-researched. As a result, there is a gap in knowledge in the context of SMEs' climate change initiatives and green jobs. To address this knowledge gap, we pose a few important questions. First, what are extant SMEs' carbon footprint initiatives that can be deemed as a catalyst for green jobs? Second, can SMEs' carbon footprint initiatives be a catalyst for green jobs? As highlighted earlier, prior SLR studies within the domain have yet to undertake a comprehensive review on this topic. Thus, our SLR will help shed light by addressing the identified knowledge gap and provide necessary insights for SME owners, academicians and policymakers. Accordingly, this SLR paper focuses on SMEs, one of the main players that can help contribute to the global net zero agenda by engaging in a comprehensive

examination of SMEs' carbon footprint reduction initiatives as a catalyst for green jobs.

This study aims to contribute to the extant literature by addressing the above questions through an up-to-date and comprehensive SLR of the existing studies on SMEs' carbon footprint reduction initiatives and green jobs (green employment). This SLR departs from prior literature that focuses on large firms by providing analysis of only SMEs' carbon footprint reduction initiatives studies at different levels and their impact on various green jobs and job opportunities. Initially, using relevant keywords and searching in databases including Web of Science, Scopus, ProQuest and Google Scholar, 2,205 articles spanning 2012 to 2022 were selected. We then applied various inclusion and exclusion criteria to eliminate unsuitable articles, which yielded 70 studies for a comprehensive review. Bibliographic analysis techniques using VOSviewer 1.6.20 were employed to extract specific clusters from selected studies. Cluster analysis using InfraNodus then allowed the detailed identification of these clusters. This process enabled shedding light on concepts such as (i) green jobs and green human resource management; (ii) green innovation, green initiatives, green strategy and circular economy in SMEs; and (iii) carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs. The main findings of this study show that prior studies focused on highlighting the benefits of green supply chain, eco-friendly waste management and energy efficient strategies, green human resource management and green skills.

Our SLR results demonstrate a limited focus on how SMEs' greening initiatives and job creation potentials can be harnessed. The findings also highlight the significance of SMEs' carbon footprint reduction initiatives as a factor in green job creation. The review shows there is a consensus among authors that carbon footprint initiatives can lead to green job creation since green competences are required to implement green initiatives, however value propositions relating to carbon reduction initiatives within SME's need to be integrated with employee engagement. Carbon footprint reduction initiatives can facilitate activities leading to the transition to a low-carbon economy and the realisation of global climate change goals provided SME's carbon reduction policies are actively integrated within management processes. Additionally, this SLR provides a roadmap for future research, synthesising and analysing different aspects like year of publications, article, country, research methodologies, theoretical framework, and research aim. Furthermore, we anticipate that our SLR will be of substantial interest to diverse stakeholders, particularly SME owners and managers, in their decision-making process of transitioning to low GHG emissions. This study would also benefit policymakers and regulators across industries where SMEs operate.

The remaining paper is structured as follows: Section 2 describes the methodology employed in the SLR; Section 3 presents the SLR findings; Section 4 provides an analysis of the identified clusters in the study; Section 5 discusses the findings and future research opportunities, and Section 6 concludes the study and highlights practical implications of the study, its limitations and future research direction.

2 | METHODOLOGY

While traditional literature reviews provide a broad understanding of a topic, systematic literature reviews (SLRs) offer a more rigorous approach. SLR follow a set of defined steps to minimise bias and ensure transparency (Denyer & Tranfield, 2009; Negri et al., 2021; Petticrew & Roberts, 2006). This albeit structured methodology includes developing specific search terms, comprehensively searching relevant databases, and objectively analysing the findings (Saunders et al., 2023). Hence, adopting a structured methodology can help identify impactful research, literature relevant to the current research areas of focus, and potential gaps in knowledge that may guide future research directions (Nguyen et al., 2020). In line with this approach, we employ a four-step SLR methodology similar to those recommended by Rowley and Slack (2004) and employed in the works of Fahimnia et al. (2015) and Bartolacci et al. (2019). Adopting this approach allows us to pinpoint the most impactful studies, uncover current research trends and offer valuable insights for ongoing and future research endeavours.

2.1 | Defining appropriate search terms

The SLR scope covers articles that explored SMEs carbon footprint reduction initiatives as a business strategy agenda and also as a catalyst for green jobs. It is to identify research gaps in extant studies and facilitate identification of opportunities for future research. Initially, using relevant keywords detailed in Table 3 and searching in databases including Web of Science, Scopus, ProQuest and Google Scholar, 2205 articles spanning 2012 to 2022, were selected. We then applied various inclusion and exclusion criteria detailed in Tables 1 and 2 to eliminate unsuitable articles which yielded 70 studies for comprehensive review.

TABLE 1 Inclusion criteria.

Features	Inclusion criteria
Source	Web of science, Scopus, pro-quest and Google scholar
Search criteria:	Only scientific peer-reviewed journal studies
Language of publication	English
Period	2012–2022
Subject area	Accounting, finance, economics, business and management, sustainability and environmental science.
Search method	Boolean search in the title, abstract and keywords of articles.
Quality assessment	Only articles from peer-reviewed journals
Shortlist	Only articles that examined SMEs carbon footprints, green jobs/employment opportunities, green innovation and NetZero issues.

TABLE 2 Exclusion criteria.

Features	Exclusion criteria
Search criteria	Non-academic articles (white papers and industry magazine articles), books and conference papers are omitted.
Carbon footprint and green jobs	Articles that focused on carbon footprint and green jobs as well as green innovation and other variables in large firms (corporate) are omitted.
SME definition	Exclude any study outside the generally accepted definition of SMEs.

TABLE 3 Study search keywords.

Key theme	Search string
SMEs Green jobs/Green Human Resource Management	'Green Jobs' OR 'Green Employments' OR 'Green Human Resource Management'
SMEs Green innovation	'Green Innovation' OR 'Green Strategy' OR 'Circular Economy' OR 'Green Initiatives'
SMEs carbon footprint reduction initiatives	'Carbon footprint reduction initiatives' OR 'Carbon Performance' OR 'Carbon Management' OR 'Carbon Emission'

This SLR utilises keywords to search databases selected to make sure relevant articles are discovered, and the search process was stopped when no further relevant articles are found. The keywords used were evaluated/peer reviewed by climate and sustainability panel of experts that help ensure their completeness (Deku et al., 2019; Oates, 2015; Sharma et al., 2020).

We also considered 2012 the starting year for selecting the articles as it was the year the United Nations Climate Change conference witnessed what can be termed a turning point for climate change research. The conference's outcome included amendments to the Kyoto Protocol and the setting up of new global climate change goals for nations around the world. As a result, governments worldwide started to upgrade their sustainability plan. Accordingly, this rekindled scholars' interest in the field and accelerated their research on new climate change and sustainability initiatives. Also, all 2023 articles were excluded because, at the time of this SLR study, the year had just started.

Database selection was based on subject area coverage, quality and capacity to reach a wide range of publications. This study initially utilised Google Scholar and ProQuest databases as these two databases do not exhibit any bias towards publishers. In addition, the selection of the two databases enables the researchers to reach a broad range of papers, as applied by Lu et al. (2022) and Nguyen et al. (2020). However, to strengthen our SLR study and ensure no relevant article was excluded, additional searches were conducted using two leading databases, Web of Science (WoS) and Scopus databases, from subject fields such as management, accounting, finance, business, economics, sustainability and sustainable environmental science. The keyword strings employed for search in this SLR are presented in Table 3.

In line with prior studies in the field, the search was filtered to include only academic journals written in English (e.g., Lu et al., 2022; Nguyen et al., 2020). As we seek to contribute to the existing literature by addressing the study's research questions through an up-to-date and comprehensive SLR on study focus subject area and given the limited articles in the field, papers from all academic journals were considered (Roberts et al., 2021). Consistent with previous SLRs (e.g., Nguyen et al., 2020), conference papers, workings papers and theses were excluded, the process is detailed in Figure 1.

2.2 | Screening initial results

To reduce bias, the SLR selection was done independently by three reviewers as suggested by Thomé et al. (2016). In the event of conflicts, resolution was achieved through panel discussions/debate within the context of the inclusion and exclusion criteria until consensus agreements are achieved to ensure inclusivity and limit human error as applied by Nguyen et al. (2020). Following the SLR set criteria, a title screening was conducted, which resulted in the exclusion of 1518 articles out of the 2205 articles. The remaining 687 articles were then subjected to abstract screening, resulting in a further exclusion of 568 papers. The 119 papers left were then completely text screened (which involved thorough/complete reading of each article), resulting in a further 49 articles being excluded. As shown in Figure 2, the study's final sample of 70 articles employed in this SLR thus related only to SMEs' carbon footprint reduction initiatives and green jobs.

Following the above approach ensured internal validity was attained as three people participated in the article's selection process for this SLR. Also, within the SME context, articles selection was not restricted to any specific industry, thus enhancing this study's external validity and generalisability potential of this study.

2.3 | Initial data statistics

Initial analysis provides a roadmap for the literature review. It helps one to navigate the existing research, identify opportunities and contribute to existing developments. Understanding the landscape provides a foundational grasp of the field one is researching by exploring the distribution of journals, geographic locations, theoretical frameworks and research methods, one can get a sense of the dominant trends and potential gaps in existing research. The exploration and comparison of theoretical frameworks and research methodologies employed in existing research also allow the identification of biases and trends and highlights areas where potential gaps exist in relevant methodological approaches. Understanding these characteristics allows one to position the research within the existing body of knowledge. Selected journal type distribution, journal article geographical location, theoretical framework employed in selected studies and the research methods employed in selected studies were therefore analysed initially.

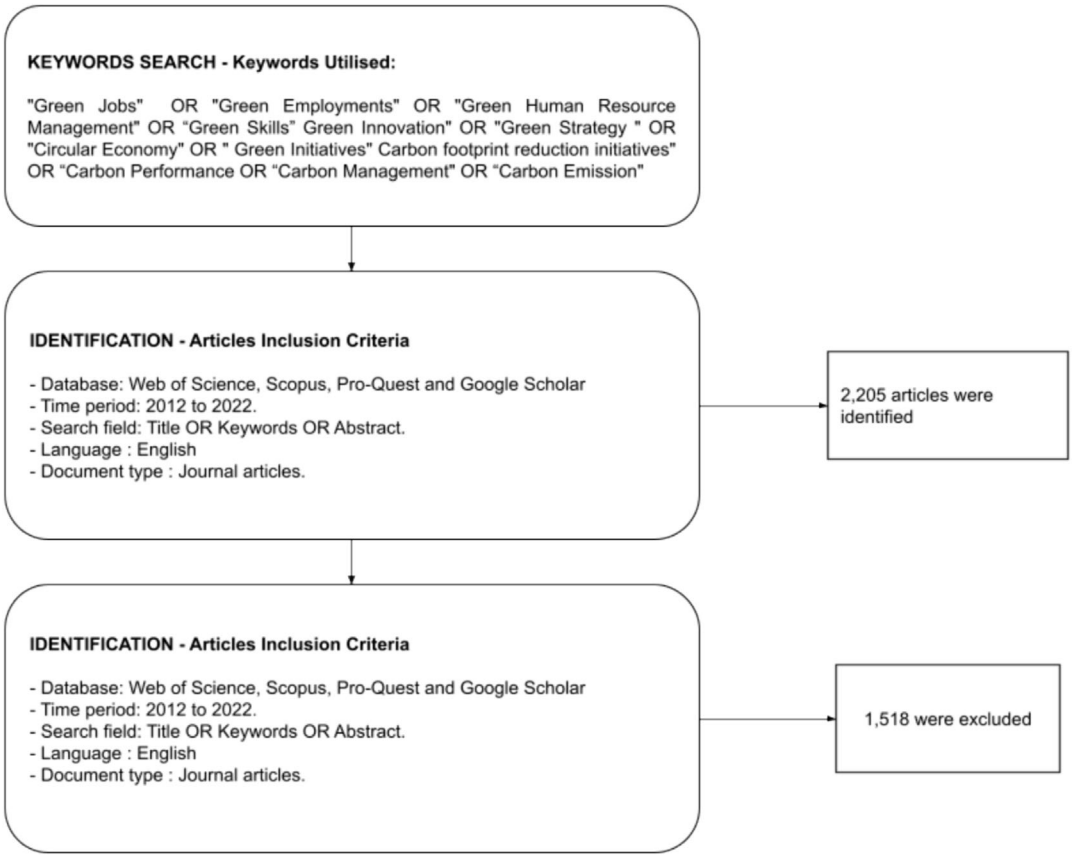

FIGURE 1 Keyword search and identification process.

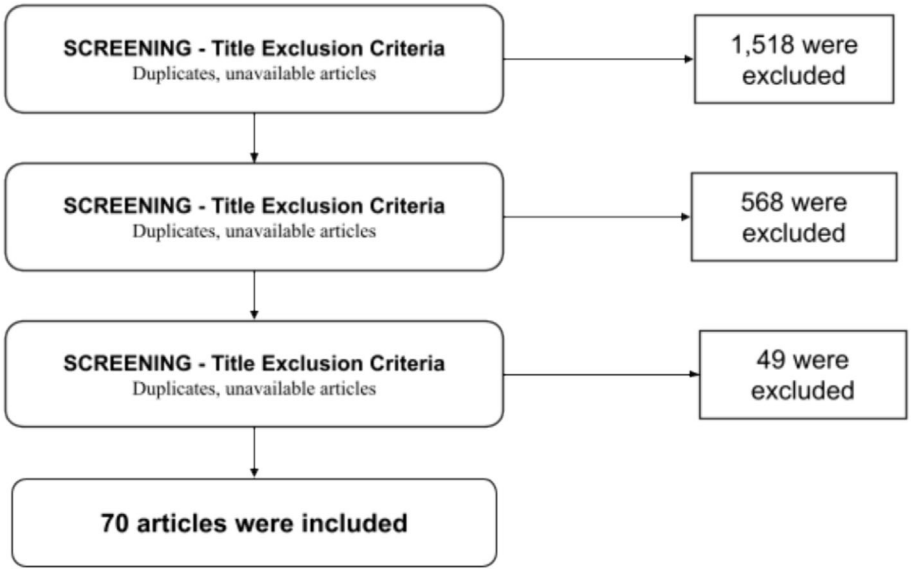

FIGURE 2 Screening and inclusion process.

2.4 | Bibliographic analysis and cluster identification

An inductive approach was adopted for the purpose of data analysis (Seuring & Müller, 2008). Data analysis was conducted in two parts. The first part involved 'bibliographic analysis' and the second part focused on 'cluster identification'.

Bibliographic analysis was conducted using the tool VOSviewer 1.6.20, adopting bibliographic coupling as the ratio to aggregate the data (Kessler, 1963). Bibliographic coupling is a form of citation

analysis and it measures the similarity between two articles by identifying the number of references they share. The assumption is that the degree of overlap of references among two articles indicates similarity in the topic investigated (Vogel & Güttel, 2013). Because the number of cited references in an article does not change over time, bibliographic coupling, compared with other bibliographic tools, is not influenced when the analysis is performed; therefore, it is considered to be particularly useful when adopted to inform SLRs (e.g., Caputo et al., 2016). The VOSviewer tool allows results from a co-occurrence matrix to be visualised, where co-occurrences emanate from the presence, frequency, and proximity of similar pairs of cited references in the data (Van Eck & Waltman, 2014). As detailed in Van Eck and Waltman (2007, 2010) using a series of scripts based on mathematical algorithms, the programme builds a two-dimensional map in which the N items are distanced from each other based on the degree of similarity of cited references X and Y, the process is detailed in Figure 3.

Cluster identification was also performed, through a cluster density view approach where each cluster is associated to a colour, through the computation of a weighted average of the colour where the weight of a colour equals the item density for the corresponding cluster (Van Eck & Waltman, 2010). The result is a graphical plot to depict where the more colour is shaded, the lower its density is. In essence, the articles' distance can be interpreted as an indication of the relatedness among the cited references. When articles belong to the same cluster, it suggests that they are strongly linked together as a group based on their shared references, indicating that a given cluster represents a stream of research or a particular topic. At the end of the process, three clusters based on bibliographic coupling emerged and a close examination of the three clusters using InfraNodus ensured that, from a qualitative point of view, the papers grouped together were investigating the topics that could be aggregated within a certain stream of research. InfaNodus was used for cluster identification to establish the underlying themes within each cluster, as shown as the final process in Figure 3. The top five cited research papers in each cluster were used for the identification of main concepts arising in each cluster. InfraNodus is a text network visualisation tool that can be used to build graphs and represent any text as a network. InfraNodus utilises a Natural Language Processing (NLP) weighting algorithm that builds a network graph where the nodes are ranked by the measure of betweenness centrality (BC). The higher the measure of BC, the bigger is the node on the graph. The nodes that appear in the same context more often are aligned into clusters on a two-dimensional plane and have the same colour. The community detection algorithm based on the modularity is used to cluster the nodes into topical groups, (Paranyushkin, 2011).

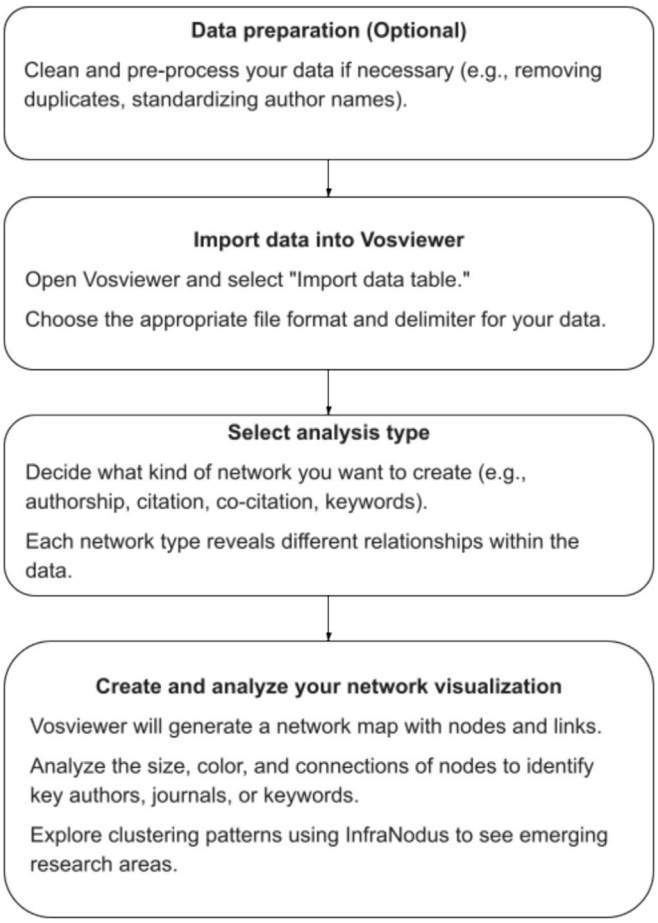

FIGURE 3 Bibliographic clustering analysis and cluster themes.

3 | SYSTEMATIC LITERATURE REVIEW FINDINGS

After a comprehensive review of the literature on SMEs' carbon footprint reduction initiatives and green jobs, our analysis suggests the existence of some gaps in knowledge within the field. This section presents a descriptive analysis of the study's outcomes.

3.1 | Selected journal distribution

The 70 articles selected from the SLR search for this study were from 44 reputable journals, that include *Sustainability Journal*, *Business Strategy and the Environment*, *Journal of Cleaner Production*, *Production Planning and Control* and *International Journal Environment Research Public Health*. Some of the other journals are the *European Journal of Innovation Management*, *Social and Behavioural Sciences*, *Management of Environmental Quality: An International Journal*, *Corporate Social Responsibility* and *Environmental Management*. According to Figure 2, 52.86% of the articles selected are from 11 journals, while the rest, 47.14%, were chosen from 33 journals. The pie chart shows the % distribution of the articles in various journals (Figure 4).

Table 4 provides a detailed list of all 44 journals from where articles were selected for this SLR study.

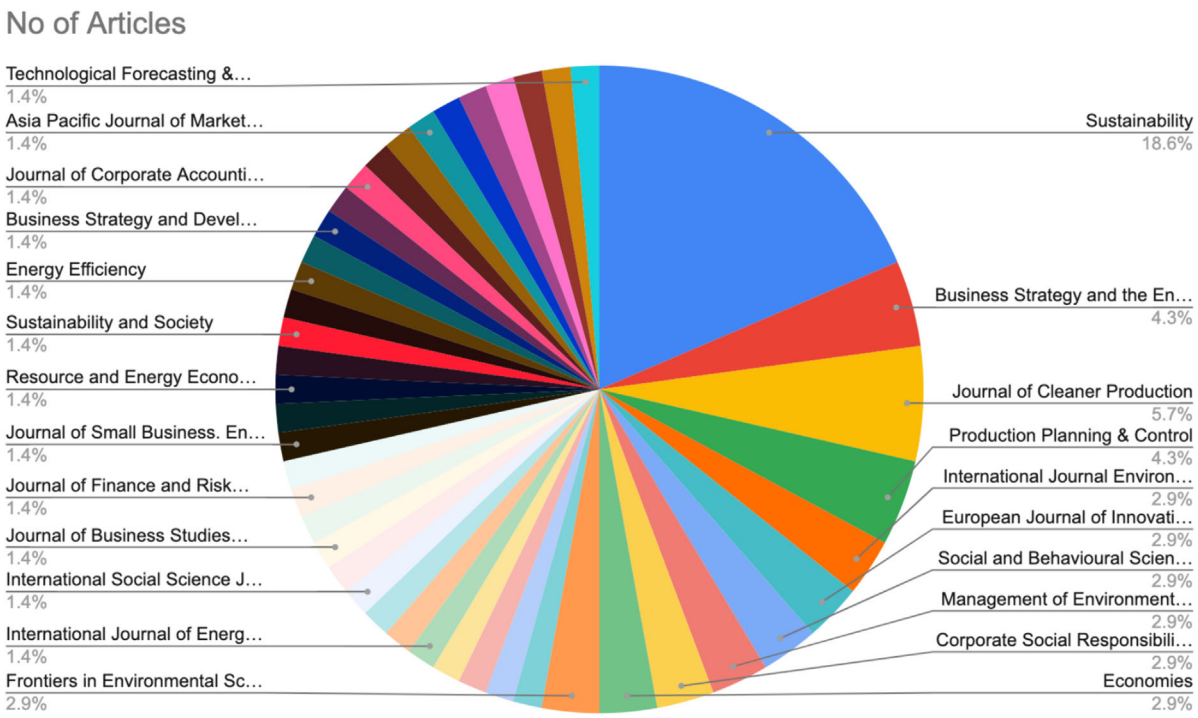

FIGURE 4 Journal distribution.

3.2 | Journal article geographical location

In terms of the geographical location of the research setting of studies selected for this SLR, the analysis shows a good spread across several countries on different continents of the world. Table 5 depicts the geographical location of the study's articles. It includes the research location, country and/or region. As illustrated in Table 5, and Figure 5, the top country is China, with seven studies, followed by Malaysia and India, with six studies each. After that, we had the UK and Pakistan, with five articles each. Moving on, Spain, Saudi Arabia, The Americas (USA and Brazil) and Indonesia had three studies each. Other EU countries had four studies, while the remaining studies were carried out in other regions/countries that include Ghana, South Africa, Zimbabwe and some OECD and G20 countries like Germany, Switzerland and Australia. While the global spread is commendable, this may not be unconnected with the fact that climate change, environment and sustainability topics are contemporary issues. As SMEs' carbon footprint initiatives and green jobs are important topical issues, there is still a need for more studies to be carried out given the limited number of research about this topic found and included in this study.

3.3 | Theoretical framework employed in selected studies

Regarding the theory adopted by authors of SMEs' carbon footprint initiatives and green jobs research selected, the analysis shows that out of the 70 studies, 45 did not employ any clear theory, hence lacking a clear theoretical foundation. The remaining 25 studies employed a total of 35 theoretical frameworks. As depicted in Table 6, the analysis of theories employed shows that about seven studies utilised resource-based view (RBV), and four employed stakeholder theory. In contrast, nine selected studies used multiple theories, totalling 20. The other theories employed include the natural resources-based view and social exchange theories. The analysis shows gaps in the literature. Though within context, most of these papers adopted the resource-based view theory and multiple theories to develop their theoretical frameworks, the lack of consistency in the use of theoretical framework within the domain has implications for the findings of the studies. Critically, over 50% of this study's selected literature lacks a theoretical foundation, thus making it difficult to better align and/or understand these studies' theoretical arguments and direction for future research.

3.4 | Research methods employed

Regarding the research method employed in the extant studies, it was noted that 70% or 49 of the 70 studies used the quantitative method. These studies investigated the relationship between sustainability variables and SMEs' carbon footprint initiatives. Those that employed the qualitative method were 13% or 19%; the mixed method was 7% or 10%, while only one study utilised a SLR. It implies that there is less research attention for SLR and other research methods like qualitative approach and mixed method within the domain. Table 7 provides the details of the research methods employed.

TABLE 4 Detailed journal distribution list.

No.	Journal title	No of articles	%
1	*Sustainability*	13	19%
2	*Business Strategy and the Environment*	3	4%
3	*Journal of Cleaner Production*	4	6%
4	*Production Planning & Control*	3	4%
5	*International Journal Environment Research Public Health*	2	3%
6	*European Journal of Innovation Management*	2	3%
7	*Social and Behavioural Sciences*	2	3%
8	*Management of Environmental Quality: An International Journal*	2	3%
9	*Corporate Social Responsibility and Environmental Management*	2	3%
10	*Economies*	2	3%
11	*Frontiers in Environmental Science*	2	3%
12	*Entrepreneurship and Sustainability Issues*	1	1%
13	*Environment Systems and Decisions*	1	1%
14	*Greenhouse Gas Measurement and Management*	1	1%
15	*International Journal of e-Education e-Business e-Management and e-Learning*	1	1%
16	*International Journal of Energy Economics and Policy*	1	1%
17	*International Journal of Production Economics*	1	1%
18	*International Journal of Sustainable Energy*	1	1%
19	*International Social Science Journal*	1	1%
20	*Journal of Business Ethics*	1	1%
21	*Journal of Business Studies Quarterly*	1	1%
22	*Journal of Environmental Management*	1	1%
23	*Journal of Finance and Risk Perspectives*	1	1%
24	*Journal of Manufacturing Technology Management*	1	1%
25	*Journal of Small Business. Entrepreneurs*	1	1%
26	*Management and Sustainable Development*	1	1%
27	*Resource and Energy Economics*	1	1%
28	*Social Sciences*	1	1%
29	*Sustainability and Society*	1	1%
30	*PLOS One*	1	1%
31	*Energy Efficiency*	1	1%
32	*Business Ethics, the Environment and Responsibility*	1	1%
33	*Business Strategy and Development.*	1	1%
34	*The International Journal of Human Resource Management.*	1	1%
35	*Journal of Corporate Accounting & Finance*	1	1%
36	*Journal of Asian Finance, Economics and Business*	1	1%
37	*Social Sciences & Humanities*	1	1%
38	*Asia Pacific Journal of Marketing and Logistics*	1	1%
39	*Journal of Innovation & Knowledge*	1	1%
40	*Industrial Management & Data Systems*	1	1%
41	*Journal of Entrepreneurship in Emerging Economies*	1	1%
42	*IEEE Transactions on Engineering Management*	1	1%
43	*International Journal of Supply Chain Management*	1	1%
44	*Technological Forecasting & Social change*	1	1%
	Total	70	100%

3.5 | Result of bibliographic analysis and cluster identification

The visualisation of similarities analysis using VOSviewer 1.6.20, based on bibliographic coupling, resulted in four clusters as shown in Figure 6.

The clusters are all interconnected, which confirms the effectiveness of the search string aimed at investigating a coherent body of knowledge. As such, the boundaries of some clusters are quite blurred, with borderline articles that incorporate themes of more than one cluster. The figures are based on bibliographic coupling using normalised citations. The normalised citations of articles are calculated as the number of total citations received by the article divided by the average number of citations of all articles published in the same year in the dataset. This normalisation allows researchers to rectify that older documents have had more time to receive citations than more recent documents (Van Eck & Waltman, 2010).

TABLE 5 Geographical distribution (country) of studies.

Country or region	No of studies	Percentage
China	7	10%
Malaysia	6	9%
India	6	9%
Pakistan	5	7%
UK	5	7%
European countries	4	6%
Spain	3	4%
Saudi Arabia	3	4%
Indonesia	3	4%
The America (USA and Brazil)	3	4%
Other countries or region	25	36%
Total	70	100%

Analysis of the 70 articles selected for this study using bibliographic coupling resulted in the emergence of four distinct clusters as shown in Figure 6 and the co-citation relationship shown in Figure 7. The three clusters can be identified as, Cluster 1 GREEN, Cluster 2 RED and Cluster 3 YELLOW. The BLUE points in Figure 3 were dispersed and were therefore not considered to be a cluster. Using the top five cited research papers in each cluster, further

TABLE 6 Theories used in selected articles.

Theory used in selected articles	No of studies	No of theories employed	Percentage of theories employed
Resource based view	7	7	20%
Natural resource based view	2	2	6%
Stakeholder theory	4	4	11%
Social exchange theory	3	2	6%
Multiple theories	9	20	57%
No clear theory	45	0	0%
Total studies selected	70	35	100%

TABLE 7 Research methods used in selected studies.

Method	No of studies	Percentage
Quantitative	49	70%
Qualitative	13	19%
Mixed method	7	10%
Systematic LR	1	1%
Total	70	100%

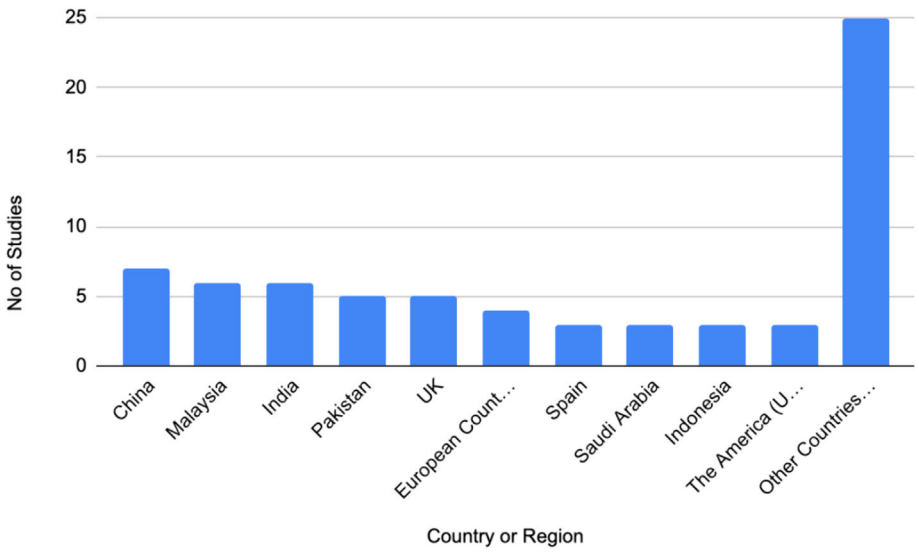

FIGURE 5 Graph representing the geographical distribution of articles.

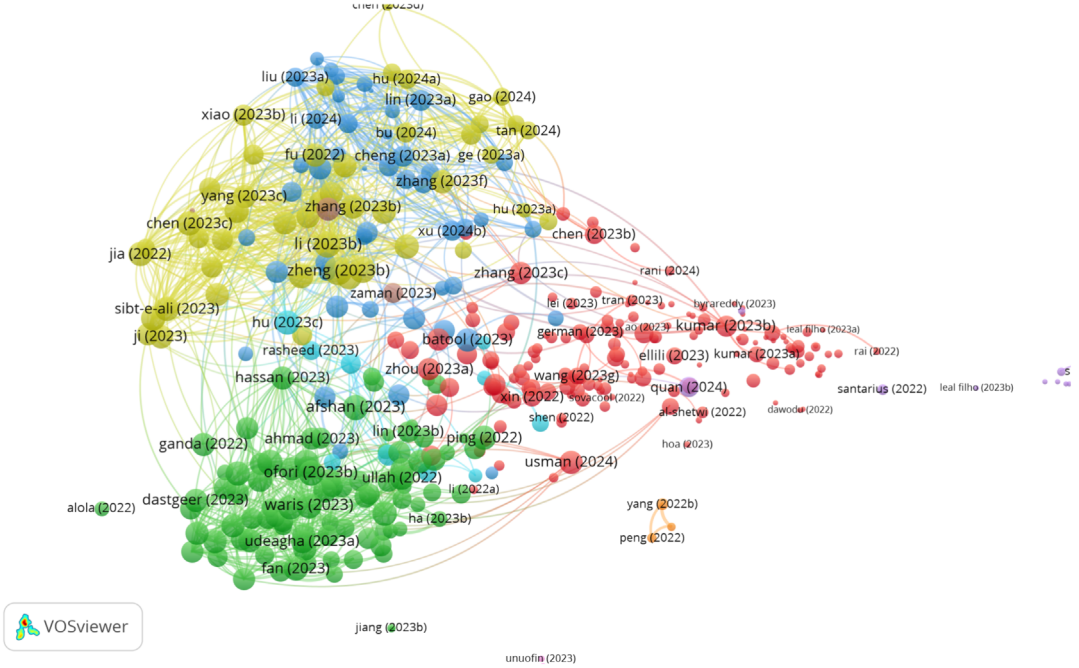

FIGURE 6 Bibliographic coupling of articles showing three clusters.

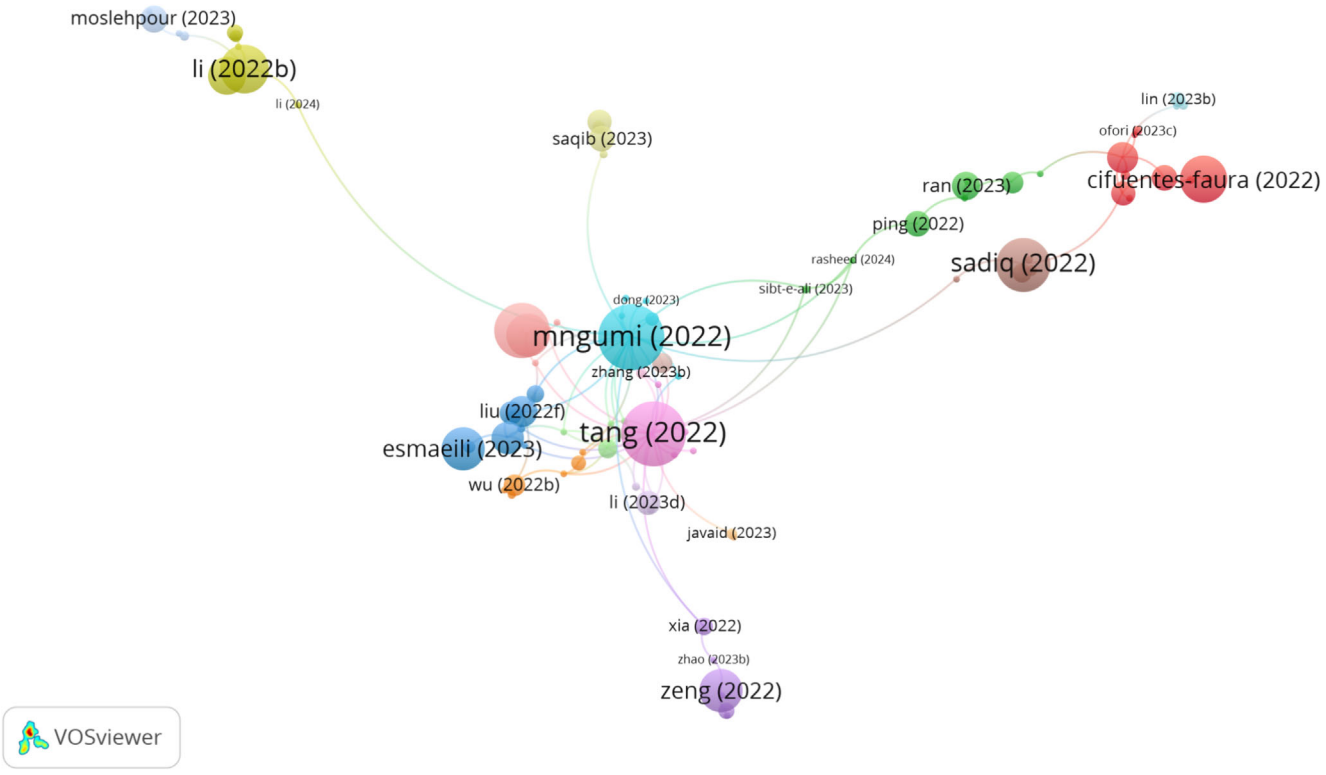

FIGURE 7 Co-citation analysis within clusters.

analysis was conducted using InfraNodus to establish the main concepts emerging within each cluster. Results for the first cluster are shown in Figure 8 with Table 8 detailing the main concepts, topics and structural gaps that were identified. The main concepts defined in Cluster 1 were related to green jobs, employees, sustainability research and green HRM.

Results for second cluster are shown in Figure 9 and Table 9 details the main concepts identified as intellectual capital, circular

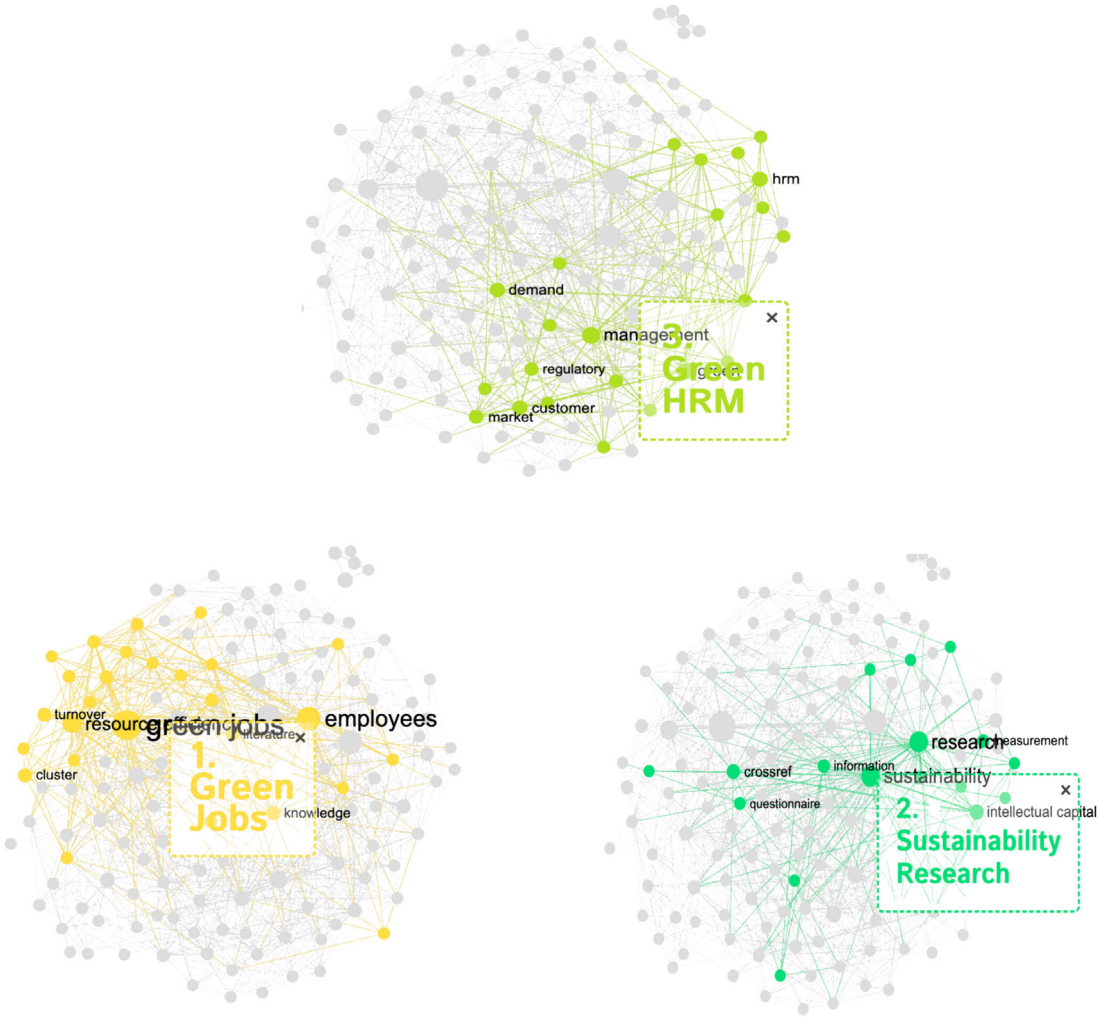

FIGURE 8 Key concepts emerging in Cluster 1.

TABLE 8 Main concepts, topics and structural gaps identified in Cluster 1.

Main concepts identified	Main topic identified	Structural gaps identified (topics to connect)
Green jobs, employees, sustainability research and green HRM	**Green jobs**: Green jobs employees resource efficiency **Sustainability research:** Research sustainability intellectual capital **Green HRM:** Management and green HRM	**Sustainable company:** Company sme policy **Green HRM:** Management and green HRM

economy, green, innovations, customer, green jobs and sustainable development.

Results for third cluster are shown in Figure 10 and Table 10 details the main concepts identified as sustainable development, carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs relating to clean tech investment.

The findings from cluster analysis were then discussed further with a particular focus to the research questions in Section 4.

4 | CONCEPTUAL ANALYSIS OF THE VARIOUS CLUSTERS

This section provides a synthesis of conceptual exploration undertaken within each cluster with a view to leveraging the SLR findings to better understand the SMEs carbon footprints initiatives and their implications for green jobs, answer the research questions and identify any gap in knowledge and opportunities for future research.

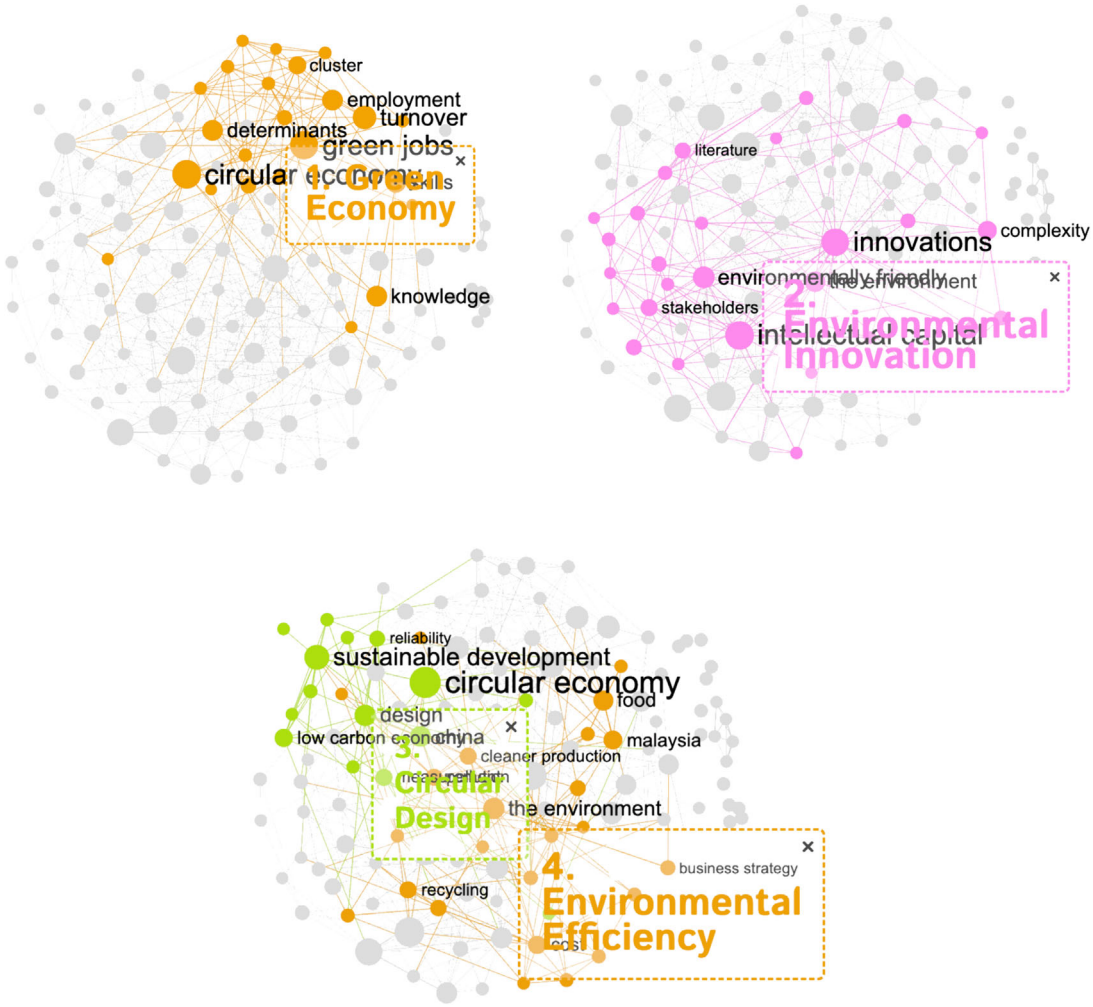

FIGURE 9 Key concepts emerging in Cluster 2.

TABLE 9 Main concepts, topics and structural gaps identified in Cluster 2.

Main concepts identified	Main topic identified	Structural gaps identified (topics to connect)
Intellectual capital, circular economy, green, innovations, customer, green jobs, sustainable development	**Green employment**: Green jobs employment determinants **Green market**: Green customer demand **Circular design:** Circular economy sustainable development design	**Environmental efficiency** **Circular design:** Circular economy sustainable development design

4.1 | Cluster 1: Green jobs and green human resource management (GHRM)

Following the results in Table 8, the main concepts identified in the first group were identified as green jobs, employees, sustainability research and green HRM. Green jobs, green recruitments/staffing and green employee performance are discussed under the 'green HRM' umbrella theme. The 20 research articles that define this cluster are detailed in Table 11. First, Stanef-Puică et al. (2022) conducted a SLR paper on green jobs. The authors stated that studies on 'green jobs' are mainly concerned with the issues of green job creation, work-life balance, correlations between green business and green jobs and the role of local government in supporting green jobs. Similarly, Cecere and Mazzanti (2017) found that green product and service innovation is primarily relevant to creating green jobs. To a large extent, these results can be generalised since they were generated from a large sample of European countries.

Aligning with this argument, Moreno-Mondejar et al. (2021) also suggested that firms' technological capabilities, openness to external sources of knowledge and green products and services specialisation are crucial not only for the probability but also for having a greater number of green jobs. In a closely related study, Cheema et al. (2015) found a positive relationship between green HR practices and employee performance. It indirectly implies that SMEs can improve

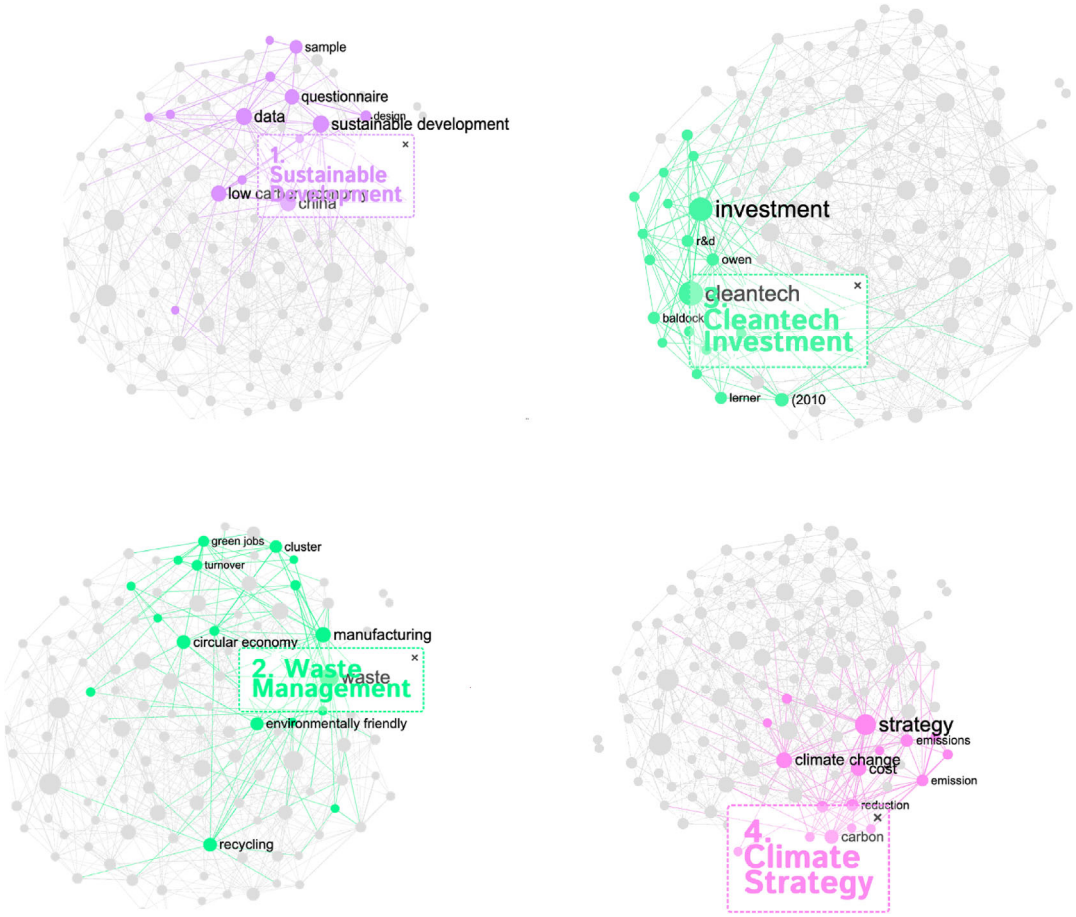

FIGURE 10 Key concepts emerging in Cluster 3.

TABLE 10 Main concepts, topics and structural gaps identified in Cluster 3.

Main concepts identified	Main topic identified	Structural gaps identified (topics to connect)
Sustainable development Carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs Cleantech investment	**Carbon management:** Carbon footprint, carbon SMEs **Low carbon business:** Crossref research employees **Sustainable value:** Value proposition environmental impact entrepreneurship	**Sustainable value**: Value proposition environmental impact entrepreneurship **Low carbon business:** Crossref research with employee engagement

employee performance in green jobs if they follow effective green HRM practices when recruiting and training employees. In support, Awwad Al-Shammari et al. (2022) observed that green innovation partially mediates the relationship between green human resource practices and the sustainable performance of SMEs. The authors concluded that the implementation of green innovation by SMEs can be increased through the use of GHRM.

Further, Kim et al. (2021) found a link between green supply chain management and employee job satisfaction. Meanwhile, Huo et al. (2022) found that incorporating GHRM practices in SMEs has performance-enabling effects in achieving green performance. The findings suggest that green job creation will enhance the green performance of SMEs. In contributing to green HR practices, Faisal and Naushad (2020) study showed that facility management SMEs in Saudi Arabia are least concerned about the 'green HR acquisition'. However, they are rather moderately concerned about 'green HR orientation, training and development' and are highly concerned about 'retaining highly competent employees'. Additionally, Prieto-Sandoval et al. (2019) maintained that SMEs should develop the capability to transform obsolete jobs into new employment through training and without redundancies. Accordingly, it can be concluded that training and development play a crucial role in creating green jobs and transforming existing jobs into green employment opportunities.

Moving on, Cegarra-Nararro et al. (2021), noted that green skills can enhance organisational reputation through technology assimilation and green knowledge management within SMEs. In support, Manyati and Mutsau (2021) observed that green skills are essential in nurturing green innovation within SMEs. Thus, GHRM can play a

TABLE 11 Research articles for Cluster 1—Green jobs and green human resource management (GRM) in SMEs.

No.	Research paper	Location	Research aim	Theoretical framework	Methods (Qual, Quan, mixed or systematic review)
1	Cecere and Mazzanti (2017)	European countries	To analyse the extent to which the future growth of green jobs is influenced by microeconomic and sector/macro level factors	No clear theory	Quantitative
2	Stanef-Puică et al. (2022)	N/A	To analyse the scientific literature published in the last five years on the topic of "green jobs."	No clear theory	Systematic review
3	Singh et al. (2020)	UAE	To examine how GHRM interplays on to the linkages among green transformational leadership, green innovation, and environmental performance.	Resource based view and the ability-motivation-opportunity theory	Quantitative
4	Moreno-Mondejar et al. (2021)	European Union	To assess the association between the probability and the number of green jobs at the firm level.	No clear theory	Quantitative
5	Faisal and Naushad (2020)	Saudi Arabia	To identify the most relevant aspects of GHRM, considered important by SMEs.	Analytical Hierarchy Process (AHP) and a multi-criteria decision-making tool	Quantitative
6	Chen and Yan (2021)	China	To explore how GHRM and GTL affect GOP.	Combination of resource-based view, social exchange theory, positive psychology, and social cognitive theory.	Quantitative
7	Islam et al. (2022)	Bangladesh	To examine the application of GHRM practices and its effectiveness on millennial employees' retention.	Social exchange theory	Quantitative
8	Cheema et al. (2015)	Pakistan	To explore the different aspects of green human resource management	No clear theory	Quantitative
9	Prieto-Sandoval et al. (2019)	Spain	To identify key strategies and resources that facilitate circular economy implementation in SMEs	Competitive advantage model	Qualitative
10	Al Doghan et al. (2022)	Saudi Arabia	To investigate environmental sustainability and environmental performance.	No clear theory	Quantitative
11	Fang et al. (2022)	Malaysia	To investigate the relationship between GHRM, green culture, green innovation, and a firm's environmental performance.	No clear theory	Quantitative
12	O'Donohue and Torugsa (2016)	Australia	To examine the impact of HRM practices on adoption of environmental and firm performance.	No clear theory	Quantitative
13	Huo et al. (2022)	Pakistan	To investigate the impact of GHRM practices on SMEs green performance	No clear theory	Quantitative
14	Kim et al. (2021)	South Korea	To assess the changes in the effects of GSCM implementation on employee job satisfaction, and so on, of SMEs.	No clear theory	Quantitative
15	Al-Swidi et al. (2022)	India	To examine whether green HRM practices translates consumer pressure to green innovation.	Stakeholder theory and Supplies-values Fit Theory	Quantitative
16	Darmandieu et al. (2022)	European Union	To examine the role of two moderators for this cost-efficiency advantage to emerge, namely, eco-innovativeness.	No clear theory	Quantitative

TABLE 11 (Continued)

No.	Research paper	Location	Research aim	Theoretical framework	Methods (Qual, Quan, mixed or systematic review)
17	Khan et al. (2022)	Pakistan	To understand the role of green human resource management (GHRM) in the efficiency of organisations' employees in small and medium enterprises (SMEs) of Pakistan.	No clear theory	Quantitative
18	Manyati and Mutsau (2021)	Zimbabwe	To explore the skills that the informal manufacturers used to navigate the uncertain business environment during the COVID-19 pandemic.	No clear theory	Qualitative
19	Cegarra-Navarro et al (2021)	Spain	To examine the effect of green skills on organisational reputation through technology assimilation and avoiding embarrassment.	No clear theory	Quantitative
20	Awwad Al-Shammari et al. (2022)	Saudi Arabia	To investigate the relationship between green human resource management bundle practices and green innovation and their impact on sustainability performance as measured by the triple bottom lines (i.e., environmental, social, and economic performance).	Resource based view	Quantitative

significant role in developing green skills within SMEs. Nonetheless, Singh et al. (2021) stated that stakeholder pressure influences green dynamic capability, with green dynamic capability influencing green innovation, and finally, green innovation impacting on firm performance. As key stakeholders in any firm, leaders can play a significant role in nurturing a green innovation culture within organisations. For example, Chen and Yan (2021), Islam et al. (2022) and Fang et al. (2022) found that leaders and managers can promote green and sustainable practices within their workforce. Crucially, the association between GHRM and green innovation has been highlighted by the Al-swidi et al. (2022) and Al Doghan et al. (2022). The authors' findings showed that GHRM can enhance green innovation within SMEs. Apart from that, scholars suggest that GHRM increases SMEs' financial performance and productivity by reducing production costs and promoting a circular economy (Darmandieu et al., 2022; Musa & Chinniah, 2016). Finally, Singh et al. (2020) highlighted that green competencies and green motivation are required to develop a new green business model for SMEs. In conclusion, critical highlights of Cluster 1 include the following:

1. Green jobs and green HRM have not been broadly researched in the context of SMEs.
2. Green HRM practices are required for the sustainable growth of SMEs.
3. Green HRM and green jobs have the potential to nurture green innovation within SMEs.
4. The necessity for green innovation is growing, and as a result, SMEs will likely create green jobs.

4.2 | Cluster 2—Green innovation, green initiatives, green strategy and circular economy in SMEs

Following Table 9, the main concepts identified were Intellectual capital, circular economy, green innovations, customer, green jobs and sustainable development. This group includes 24 articles, these are shown in Table 12. According to Latip et al. (2021), owners and managers with environmental and sustainability attitudes were likely to adopt environmental management practices in their SMEs. Similarly, Yacob et al. (2019) highlighted that owners'/managers' intention towards green fully mediates the association between green initiatives and environmental sustainability. Supporting this argument, Bassi and Guidolin (2021) also stated that the need for additional environmental skills has a positive effect on the intention to implement actions in the future. In support, Jun et al. (2019) mentioned that external partnership and cooperation, rules, and regulatory factors have an insignificant impact on the adoption of green innovation in SMEs in Pakistan. Aligning with this statement, Hansen and Klewitz et al. (2012) also emphasised that public-private partnerships can stimulate adaptations in a company's green strategy over time. Furthermore, Almeida and Wasim (2023) explained that both internal and external factors influence the design of an eco-innovation strategy. According to these findings, it can be inferred that both internal and external stakeholders trigger green innovation. This finding is further supported by Singh et al. (2021) since they argued that stakeholder pressure influences green dynamic capability, and green dynamic capability influences green innovation.

TABLE 12 Research articles for Cluster 2—Green innovation, green strategy, green initiatives and circular economy in SMEs.

No.	Research paper	Location	Research aim	Theoretical framework	Methods (Qual or Quan)
21	Latip et al. (2021)	Malaysia	To analyse the mediation effect of environmental attitudes of SMEs on the relationship between innovation and environmental management practices in SMEs	Diffusion of innovation theory	Quantitative
22	Jun et al. (2019)	Pakistan	To highlight the main determinants of green innovation adoption in SMEs in Pakistan	No clear theory	Quantitative
23	Bassi and Guidolin (2021)	European countries	C2	No clear theory	Quantitative
24	Peng (2020)	Taiwan	Investigated green innovation initiatives by Taiwanese SMEs	No theory	Quantitative
25	Rustiarini et al. (2022)	Indonesia	Assessed antecedents and consequences when implementing green innovation in SMEs.	Institutional theory	Quantitative
26	Aboelmaged and Hashem (2019)	Emerging economies	To investigate the effect of absorptive capacity on green innovation adoption.	Natural resource based view	Quantitative
27	Klewitz et al. (2012)	Germany	Explored the role intermediaries can play in an SME's pursuit for corporate sustainability with a focus on eco-innovation.	No clear theory	Qualitative
28	Kumar (2015)	India	Explored green marketing innovations in small Indian firms	Natural resources based view	Qualitative
29	Hansen and Klewitz et al. (2012)	Germany	Explored the green strategies of SMEs in public-private eco innovation initiatives.	No clear theory	Qualitative
30	Leonidou et al. (2017)	Cyprus	Investigated how internal company factors help to formulate a green business strategy among small manufacturing firms	Resource based view	Quantitative
31	Dey et al. (2020)	UK	To facilitate SMEs to achieve greater sustainability through circular economy implementation.	No clear theory	Mixed methods
32	Purwandani and Michaud (2021)	USA (Ohio)	To assess key drivers and barriers for green business practice adoption for SMEs	No clear theory	Quantitative
33	Manjumdar and Sinha (2018)	India	To investigate barriers of green supply chain management in Indian clothing SMEs.	No clear theory	Quantitative
34	Oliveira et al. (2018)	Brazil	To investigate the adherence of both lean and green practices for the development of new products (NPD)	No clear theory	Mixed methods
35	Nulkar (2014)	India	To propose a framework for SMEs to improve their environmental performance	Situation analysis	Qualitative
36	Yacob et al. (2019)	Malaysia	To assess the extent of green initiatives within manufacturing SMEs	No clear theory	Quantitative
37	Ankomah et al. (2020)	Ghana	To examine SMEs explanatory link of green supply chain integration (GSCI)	No clear theory	Quantitative
38	Musa and Chinniah (2016)	Malaysia	To examine the development of SMEs in Malaysia, challenges, and opportunities	No clear theory	Qualitative
39	Zheng et al. (2022)	China	To investigate the influence of green innovation on the market performance of SMEs.	No clear theory	Quantitative

TABLE 12 (Continued)

No.	Research paper	Location	Research aim	Theoretical framework	Methods (Qual or Quan)
40	Masocha (2018)	South Africa	To investigate the relationship between environmental sustainability and firm performance.	No clear theory	Quantitative
41	Ahmed et al. (2020)	Malaysia	To analyse the ecological aspects of eco-friendly business methods	No clear theory	Quantitative
42	Muangmee et al. (2021)	Thailand	To analyse the influence of green entrepreneurial orientation on green innovations	Resource- based view theory	Quantitative
43	Singh et al. (2021)	Abu-Dhabi, UAE	To examine direct and indirect effects among stakeholder pressure of greening SMEs	Stakeholder theory and resource-based view	Quantitative
44	Khan et al. (2022)	Malaysia	To investigate the influence of green innovation practices on consumer resistance to green innovation products and the moderating influence of environmental awareness and pro-environmental behaviours based on the diffusion of innovation and expectation theories	Diffusion of innovation theory and expectancy theory	Quantitative

By contrast, Aboelmaged and Hashem (2019) argued that sustainable human capital does not significantly impact the adoption of green innovation. The authors maintained that some other factors could influence green innovation. In support, Majumdar and Sinha (2018) identified other factors, including the lack of reward systems for suppliers, the lack of green materials, the complexity of green processes, inadequate support from regulatory authorities and the lack of customer support for green innovation. In addition, Purwandani and Michaud (2021) highlighted a lack of capital as one of the barriers to implementing green business practices. In a closely related study, Klewitz et al. (2012) pointed out that a proactive approach by local authorities is essential to trigger eco-innovation in SMEs. Meanwhile, Leonidou et al. (2017) study revealed that implementing a green business strategy generated a positional competitive advantage. Similarly, Dey et al. (2020) pointed out strategies, resources, and competences for achieving sustainability across all circular economy fields. Moving on, Peng (2020) emphasised that environmental cost is the main determinant of competitive product advantage that influences Taiwanese SMEs' internationalisation drive. In this case, green innovation and green strategies can assist SMEs in gaining a sustainable competitive advantage.

Some scholars also have focused on the benefits of green innovation. For instance, Kumar (2015) and Zheng et al. (2022) found a beneficial association between green innovation and marketing. Similarly, other studies observed that green innovation enhances environmental sustainability, energy efficiency and firm performance of SMEs (Ahmed et al., 2020; Masocha, 2018; Muangmee et al., 2021). Further, Rustiarini et al. (2022) observed that implementing green innovation directs entrepreneurs to fulfil social and environmental responsibilities and encourages SMEs to achieve their economic benefits. In addition, studies by Nulkar (2014), Ankomah et al. (2020), and Musa and Chinniah (2016) highlight how green innovation improves operational efficiency, environmental sustainability and employee development. Hence, green innovation can make significant positive changes and improvements in SMEs. However, none of these studies have considered the cost of green innovation and the challenges encountered when implementing green innovation.

Key highlights of Cluster 2 themes synthesis include the following:

1. Green innovation delivers a range of financial and non-financial benefits to SMEs.
2. Internal and external stakeholders encourage SMEs to promote green innovation within their firms.
3. Challenges of green innovation have been given less research attention. However, it remained a potential research focus as some concepts, such as the cost of green innovation, are still contemporary issues.

4.3 | Cluster 3—Carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs

As detailed in Table 10, some of the key conceptual areas identified in Cluster 3 include sustainable development, carbon footprint reduction initiatives, carbon performance, carbon management, and carbon emission in SMEs. Cluster 3 includes 26 articles, these are detailed in Table 13. The analysis of this cluster provides answers to the first research question: what are extant SMEs' carbon footprint initiatives that can be deemed a catalyst for green jobs? Our SLR revealed that Karuppiah et al. (2020) and Jermsittiparsert et al. (2019) researched

TABLE 13 Research articles for Cluster 3—Carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs.

No.	Research paper	Location	Research aim	Theoretical framework	Methods (Qual or Quan)
45	Hendrichs and Busch (2012)	Switzerland	To explore SMEs climate change mitigation during greenhouse gas measurement and management.	Kurt Lewin's Change Management	Qualitative
46	Dayaratne and Gunawardena (2015)	Sri Lanka	To explore existing situations of implementing energy efficiency measures in SMEs for carbon footprint minimisation	No clear theory	Mixed methods
47	Tong et al. (2019)	China	To assess the sustainable development strategies of SMEs in China	No clear theory	Quantitative
48	Quintas et al. (2018)	Spain	To analyse how SMEs define the components of their decarbonisation business models	No clear theory	Quantitative
49	Owen et al. (2019)	UK	To explore the need for more focused policy to address early-stage long horizon financing of cleantech.	No clear theory	Mixed methods
50	Choudhary et al. (2019)	UK	To introduce a novel tool the GIVSM to measure SMEs operational efficiency and carbon footprint	No clear theory	Qualitative
51	Yao et al. (2019)	China	To explore the behaviours and carbon emissions of SMEs under different scenario	No clear theory	Quantitative research
52	Belhadi et al. (2018)	North Africa.	To explore the impact of lean practices on green performance for SMEs.	Lean practices theory	Qualitative
53	Szennay et al. (2021)	Hungary	To develop an easy-to-use ecological footprint (EF) calculator for SMEs	Ecological footprint theory	Mixed methods
54	Hampton (2019)	UK	To explore how energy is used and managed by SMEs	Practice theory	Qualitative
55	Ghachem et al. (2022)	OECD countries (32 countries)	To investigate the impact that the ownership structure of SMEs in OECD countries exerts on the level of corporate carbon emissions	Signalling and stakeholder theories	Quantitative
56	Sureeyatanapas et al. (2021)	Thailand	To investigate the factors that drive the implementation of the footprint programme	No clear theory	Mixed methods
57	Conway (2015)	UK	To assess the current level of engagement by SMEs in carbon management	No clear theory	Mixed method
58	Yu et al. (2021)	China	To decrease the environmental footprint of the SMEs by implementing CSR at the employees' micro-level	No clear theory	Quantitative
59	Cai et al. (2022)	China	To explore how environmental factors, personal factors, and entrepreneur outcome expectations affect entrepreneur low-carbon emission behaviour (LCB).	Social cognitive theory	Quantitative
60	Costache et al. (2021)	Romania	To determine the main barriers and facilitators for sustainability that SMEs face	No clear theory	Quantitative
61	Giama and Papadopoulos (2018)	Greece	To highlight the need of SMEs to establish integrated environmental management practices	No clear theory	Quantitative
62	Karuppiah et al. (2020)	India	To identify, analyse and rank the predominant barriers, which restrict implementing of GM practices in Indian manufacturing small and medium-sized enterprises (SMEs)	No clear theory	Quantitative
63	Jermsittiparsert et al. (2019)	Indonesia	To examine the relationship between GSCM and environment related outcomes among Indonesian manufacturing SMEs	No clear theory	Quantitative
64	Lee et al. (2012)	Korea	To explore green supply chain management (GSCM) practices and their relationship with organisational performance.	Resource dependence theory	Quantitative

TABLE 13 (Continued)

No.	Research paper	Location	Research aim	Theoretical framework	Methods (Qual or Quan)
65	Gandhi et al. (2018)	India	To offer the ranking of drivers which significantly influence the successful implementation of lean manufacturing and green manufacturing in Indian manufacturing SMEs.	No clear theory	Quantitative
66	Verdolini et al. (2018)	G20 countries	To study innovative green-technology SMEs as an opportunity to promote financial de-risking	No clear theory	Qualitative
67	Huang and Mirza (2022)	China	To examine the impact of green business practices (GBP) on firm financialization and, analyses the moderating role of female directorship in China.	No clear theory	Quantitative
68	Effendi et al. (2021)	Indonesia	To analyse SMEs' technological innovation performance in the special region of Yogyakarta based on green supply chains.	No clear theory	Quantitative
69	Hossain et al. (2022)	Bangladesh	To investigate the sway of stakeholder integration and green investment on environmental sustainability practices (ESP), as well as the moderating role of green technology adoption (GTA) in Bangladesh textile small and medium enterprises (SMEs).	Stakeholder theory & transaction cost economics	Quantitative
70	Ali (2022)	Pakistan	To investigate how green supply chain practices (GSCP) directly and indirectly (via business process performance - BPP) influences firm manufacturing performance using the resource-based view as a theoretical base.	Resource-based view	Quantitative

green initiatives adopted by SMEs and found that manufacturing practices such as zero waste generation, green supply chain, green logistics and purchasing are common in SMEs today. Similarly, Lee et al. (2012), Effendi et al. (2021), and Gandhi et al. (2018) also emphasised that SMEs are likely to adopt green lean manufacturing and green supply chain practices.

Meanwhile, Khan et al. (2022) observed green marketing and innovative product (or service) developments as the main green initiatives. In a similar vein, Verdolini et al. (2018) and Effendi et al. (2021) showed that green technology (or low-carbon technology) adoption is a trendy initiative in SMEs. Nonetheless, Huang and Mirza (2022) consider reducing emissions and recycling, paperless office practices, and environmental protection measures as proxies of green office practices in SMEs. In addition, Hossain et al. (2022) added that SMEs are likely to engage with green investments as an answer for environmentally sustainable practices.

Moving on, Hendrichs and Busch (2012) stated that SMEs are required to follow a stringent GHG emission reduction path; hence, SME managers can help their organisation improve their overall 'carbon performance' by implementing a proactive carbon management strategy. In a similar vein, Lee et al. (2012) found that sustainable innovation in the value chain reduces carbon footprint. In support, Choudhary et al. (2019) study highlights that reinvesting the cost and carbon savings into sustainable procurement that includes low-carbon raw material manufacturing, low-carbon transportation, sustainable energy usage and local supplier selection while making it a part of a continuous improvement cycle can help overcome misalignments. In a related study, Yao et al. (2019) documented that trading and sharing knowledge on carbon emission reduction are conducive to reducing emissions of SMEs in the context of cap-and-trade. Furthermore, Belhadi et al. (2018) found that there is a strong correlation between operational metrics improvement and green metrics improvement. Likewise, Huang and Mirza (2022) stressed that greater female directorship strengthens the relationship of green business practices and financialization levels in Chinese firms. Also, Szennay et al. (2021) observed that corporate environmental performance (CEP) does not negatively influence SMEs' financial performance. In addition, Yu et al. (2021) highlighted the role of employees' involvement in sustainable performance and carbon footprint reduction. The authors maintained that employees' behaviour and attitudes are key factors in the environmental performance of SMEs. In support, Giama and Papadopoulos (2018) emphasised how energy conservation reduces SMEs' operating and production costs and ultimately helps SMEs be more competitive.

However, some studies have identified many obstacles confronting SMEs when implementing carbon footprint initiatives. In particular, Gandhi et al. (2018) highlighted the drivers behind the adoption of green initiatives (e.g., public pressure, green image, competitive advantage, cost savings and technology upgrade). In contrast,

Karuppiah et al. (2020) documented 25 main barriers (e.g., lack of financial and technical support, failure in eco-design, lack of innovation, technical skills and R&D) when employing these green practices. Surprisingly, most manufacturing SMEs in developing countries are not even aware of green practices and, hence, lag in implementation (Karuppiah et al., 2020). In a closely related study, Dayaratne and Gunawardena (2015) observed that the absence of national policy and lack of awareness of energy efficiency are the main barriers to reducing carbon footprint. The study by Owen et al. (2019) shows that insufficient focus has been applied to early-stage investment into innovation in SMEs that could lower CO2 emissions across a range of sectors. By contrast, Quintas et al. (2018) note that environmental practices are ineffective in reducing GHG emissions.

Further, Sureeyatanapas et al. (2021) study identified the lack of social awareness of labels and the climate change issue as the most significant challenge the implementers faced, as its rating scores were significantly higher than those of other barriers. Other scholars show that small companies also encountered difficulties due to the required initial investment. For example, Conway (2015) identified resource constraints and a lack of relevance to the business as the most common barriers to low-carbon engagement. In this case, Karuppiah et al. (2020) maintained that SMEs collectively account for a significant proportion of GHG emissions, so there is a need for urgent action to be taken by SMEs in the journey to achieve net zero. This is particularly important because Hampton (2019) suggested that business advisors are instrumental in steering SMEs' energy management practices and are responsible for reflecting on how they influence knowledge production and meaning-making processes in organisations. For example, Cai et al. (2022) explained that entrepreneurs' personal characteristics (such as self-monitoring, self-esteem and self-preference) could help them overcome carbon footprint challenges.

Key highlights of Cluster 3 studies synthesis include the following:

1. The most common carbon footprint reduction initiatives/green practices SMEs adopt are green supply chain, employing energy-saving strategies, eco-friendly waste reductions and recycling, circular economy and green office practices.
2. SMEs are trying to bring innovative solutions to carbon footprint reduction initiatives.
3. Carbon footprint reduction initiatives will bring long-term benefits for SMEs.
4. SMEs encounter unavoidable challenges when implementing carbon footprint initiatives (lack of skills, knowledge and resources)
5. The impact of carbon footprint reduction initiatives in creating green jobs within SMEs remains largely unknown as the phenomena continually evolve.

The analysis of the three clusters and their associated research articles detailed in Tables 11–13 show that 45 (63%) out of the 70 papers did not utilise any specific theory. While, only 25 papers (37%) have used one or a combination of theories to develop their study. The most commonly used theory is RBV and multiple theories. Critically, the absence of a theoretical foundation in more than half of the papers selected for this SLR elicits the need to discuss theories used in the selected studies, which may be helpful for future researchers in the field in the next section.

Based on the SLR above, it can be inferred that SMEs now employing carbon footprint initiatives at various levels. Furthermore, carbon footprint initiatives are mainly undertaken by SMEs since they generate financial benefits for the firms. For example, SMEs that engage with circular economy and energy-saving practices minimise their operational costs largely. Apart from that, they can satisfy their stakeholders as environmentally friendly firms. Nonetheless, within context, there is no sufficient evidence suggesting that carbon footprint reduction initiatives are carried out to generate or promote green jobs directly.

However, there is consensus among authors of selected studies that green jobs are originated as a result of green innovation which is triggered by the carbon footprint reduction initiatives. In other words, the preceding argument enables us to answer the second research question, 'Can SMEs' carbon footprint initiatives be a catalyst for green jobs?' From the above, it can be concluded that SMEs' carbon footprint reduction initiatives can be a direct and indirect catalyst for green job creation opportunities. In this context, carbon footprint initiatives may be the reason for creating a new post, such as an energy administrator to oversee Scope 1 and Scope 2 activities, or it could be an incentive to take on additional support staff with green competences.

5 | DISCUSSIONS AND FUTURE RESEARCH OPPORTUNITIES

The analysis of the three clusters in the last section reveals several gaps in the selected studies from the field that are theoretical, contextual, and methodological in nature that need to be addressed by future research. This section discusses the theoretical framework adopted in the studies selected for this SLR and thereafter highlights limitations of selected studies that include theoretical, methodological and contextual gaps.

5.1 | Theoretical perspective on SMEs' carbon footprint and green jobs

The first theory that the review shows to have been applied in explaining issues related to SMEs' carbon footprint is the resource-based view, which postulates that a firm's competitive advantage develops from critical resources that are rare, valuable and unique. In this regard, SMEs' competitive advantage is derived from crucial resources that are challenging for rivals to replicate (Barney, 1991; Hart, 1995; Orazalin et al., 2023). A few studies in the three groups analysed employed this theory to explain SMEs' carbon footprint. However, Dwikat et al. (2023) provide rare empirical evidence that supports this theory. The second applied theoretical viewpoint is the natural resource-based view, which maintains that carbon emission

reduction initiatives require the accumulation of distinct resources and the management of unique capabilities by firms (Hart, 1995). In this context, there is the possibility of a crucial link between carbon footprint strategies, green capabilities, and competitive advantage. Hence, the number of green jobs will depend on the pro-carbon footprint strategies (Adu, 2022; Martínez-del-Río et al., 2012; Moreno-Mondejar et al., 2021).

Third, stakeholder theory proposes that for firms to achieve long-term success and survival, they must incorporate their stakeholders' needs into their operations (Nguyen et al., 2020). Our review observes that the evidence of prior research, such as Ghachem et al. (2022) supports this theory. By contrast, this review observes that stakeholder theory has not directly been employed to explain how carbon footprint reduction influences green jobs.

Fourth, agency theory expounds on the conflicts between managers (agents) and shareholders (principals). As a result, several scholars have applied agency theory to explain the beneficial impact of carbon footprint reduction on firm value. By contrast, the theory has not been used to explain SMEs' footprint and green job opportunities (Adu, Al-Najjar, & Sitthipongpanich, 2022; Ghachem et al., 2022). Fifth, institutional theory suggests that firms set norms, rules, and practices for the employees of the firms to conform. For instance, the commitment of SMEs to GHG emission reduction may depend on specific business strategic actions, including the type of business activity or nature of the industry (Grosvold et al., 2016; Nguyen et al., 2020). The sixth theory our review found to have been applied is the legitimacy theory, which posits that a firm obtains legitimacy if its operations/activities are consistent with the values of the society in which it operates. This implies that legitimacy theory may explain the beneficial impact of GHG emissions initiatives on firm value, as observed in prior studies' findings (Adu, 2022; Ntim, 2016).

Seventh, contingency theory maintains that there is no best way to organise a firm (Lababidi et al., 2020; Nguyen et al., 2020; Pratono, 2016). For example, Dwikat et al. (2023) conducted empirical research in Palestine. They observed that several enablers could enhance SMEs' performance in carbon footprint reduction. The study shows that the external environment, such as regulatory policy, can encourage SMEs to move towards circularity and greening in their operations. Additionally, contingency theory may explain the findings of prior studies that find positive, negative or no relationship between SMEs' carbon footprints and green jobs/employment (Dwikat et al., 2023). Signalling theory is the eighth theory used to explain carbon footprints based on our review. Signalling theory is a crucial framework that highlights how GHG emission reduction initiatives can boost firm value. It argues that carbon footprint reduction allows firms to convey a positive image to their shareholders and stakeholders. In this case, carbon footprint reduction activities signal to investors and other market players the existence of good governance mechanisms and competent managerial behaviour in a firm (Ghachem et al., 2022).

The ninth theory is the triple bottom line theory derived from a resource-based view. It connects competencies to unique processes and competitive practices. Under the triple bottom line framework, all three indicators are crucial in achieving carbon footprint reduction and must be integrated into the organisational strategy of SMEs. Some studies apply this theory to explain the involvement of SMEs in carbon footprint reduction initiatives (Adu, 2022; Dwikat et al., 2023; Schulz & Flanigan, 2016). The tenth theory found is competitive advantage, which predicts that carbon footprint reduction initiatives will positively impact performance and green job opportunities. In this context, the adoption of carbon footprint initiatives by SMEs can offer the firm a competitive advantage, leading to improved financial performance (profit). The improved performance can attract and create job opportunities, including green-related jobs. To sum up, it appears this theory can sufficiently explain the beneficial impact of carbon footprint reduction on financial performance and job creation (e.g., green jobs) that prior studies have reported (Adu, Flynn, & Grey, 2022; Barney, 1991; Prieto-Sandoval et al., 2019).

Eleventh, our review shows that practice theory has been applied to explain how energy use and environmental impacts occur as part of everyday social activity (Shove & Walker, 2014). However, there are exceptions, such as the potential for flexibility among SME practices (Powells et al., 2015). In this case, SMEs are expected to focus on carbon footprint to enhance their operational efficiency and protect the environment rather than everyday social activity. A few studies apply this theory to explain the involvement of SMEs in carbon footprint reduction initiatives (e.g., Hampton, 2019). Twelfth, the review shows that the diffusion of innovation theory has been applied to elucidate SMEs' carbon footprint. The diffusion of innovation theory focuses on how innovations spread to individuals in a social system (Rogers, 2003). In this case, the theory offers crucial insight into the features of technology that influence the adoption of innovation by SMEs. Within this framework, it can be argued that carbon footprint innovation is more likely to be adopted by SMEs if it is compatible with the lifestyle of the firm and not too complex, and its benefits can be observed prior to adoption. As a result, a few but an increasing number of studies are applying this theory to explain the complexities involved in SMEs' carbon footprints (Latip et al., 2021; Rogers, 2003).

To conclude, the review of theoretical applications reveals that different authors in different countries have applied different theories to explain the motivation and drivers of SME owners and managers in reducing carbon footprint and creating job opportunities, including green jobs.

5.2 | Limitations of existing studies and future research opportunities

In this section, we employed the content analysis tool (Gaur & Kumar, 2018) to identify and discuss the limitations of this study and suggest future research opportunities.

5.2.1 | Theoretical gaps

First, as illustrated in Tables 11–13, 45% or 63% of the 70 selected study articles have not applied clear theoretical frameworks in their

studies. A theoretical framework is essential as it offers fundamental concepts and directs scholars to raise crucial questions (Nguyen et al., 2020). Studies with no theoretical framework may only be able to describe phenomena without understanding why they happen, making it challenging to make meaningful predictions or derive meaningful inferences from data (Creswell & Creswell, 2017; Olekanma, 2023). Therefore, it is imperative that future researchers clearly implement a theoretical framework to improve the quality of the study.

Second, some studies used a single theory to explain carbon footprint reduction and green job opportunities. Arguably, each theoretical viewpoint has limitations. For instance, Adu, Al-Najjar, and Sitthipongpanich (2022) demonstrate clear limitations of agency, stakeholder, resource-based view, or legitimacy perspectives in explaining the link between GHG emission reduction initiatives and corporate governance mechanisms. Because of this, some scholars apply multiple theories to provide broader perspectives on SMEs' carbon footprints and green jobs, which enable a comprehensive understanding of the phenomena. Hence, future scholars are encouraged to adopt a multi-theoretical approach in their investigation (Adu, Flynn, & Grey, 2022; Dwikat et al., 2023; Ghachem et al., 2022).

Furthermore, some studies utilise theoretical frameworks more descriptively and do not necessarily link them to their hypotheses and/or empirical findings. Using a theoretical framework but not linking it to the research result draws parallel inferences to our first theoretical gap. Therefore, it is critical for future studies to establish a link between the theoretical framework and the empirical results in order to improve the quality of the study.

5.2.2 | Methodological gaps

Regarding the research methods adopted, most papers used a single research method. Specifically, this study's findings show that about 19% of papers used the qualitative method (e.g., Belhadi et al., 2018; Choudhary et al., 2019; Kumar, 2015), while the majority, 70% of papers utilised the quantitative method approach (e.g., Ankomah et al., 2020; Huo et al., 2022; Tong et al., 2019). Noticeably, only 10% of studies used the mixed method approach (e.g., Dey et al., 2020; Owen et al., 2019; Szennay et al., 2021). The implications, therefore, can be that 70% of the selected literature may not have captured the nuances of both the subjective and objective essence of their study's phenomenon.

Most of these papers arguably may show limitations when defining their philosophical stances in their methodology postulation within the context of their study's phenomena (Hansen & Klewitz, 2012; Zheng et al., 2022). The complexity associated with climate change suggests adopting qualitative or mixed methods may be valuable. To ensure a more holistic understanding of the carbon footprint reduction initiatives as a comprehensive strategy and catalyst for green jobs may necessitate integration of mixed methods or qualitative approach (Huo et al., 2022; Olekanma, 2022; Olekanma et al., 2022). In this regard, future research in the domain needs to broaden the use of methods beyond the dominant quantitative approach. We suggest adopting mixed methods and/or qualitative approaches to capture subjective insights deemed crucial for understanding phenomena in the domain.

5.2.3 | Contextual gaps

In the contemporary green economy and carbon footprint research arena, the limelight always focuses on large firms. As a result of this, green jobs have also become a trendy topic in the context of large businesses. However, while green jobs have been widely researched in large firms, they remained less researched in the context of SMEs. In other words, how carbon footprint reduction initiatives generate green jobs in the context of SMEs is under-researched to date. Though the issue of SMEs' carbon footprint reduction initiatives and green jobs are a global phenomenon, our SLR showed that research papers published are dominated by researchers in the western countries, China, and other Global North developed countries, particularly EU and G20 countries. Noticeably, this leaves a massive gap in representation for developing countries from the Global South, such as Nigeria, Burkina Faso and Kenya.

It can also be observed from our SLR that there is insufficient literature on SMEs' commitments to the United Nations SDGs and how their green initiatives indirectly or directly promote SDGs that are related to the environment (Costache et al., 2021; Lee et al., 2012; Quintas et al., 2018). Apart from that, from this SLR, the direct and indirect relationships among green jobs, green innovation and carbon footprint reduction initiatives in SMEs seem not to have been studied to date. In other words, researchers have yet to conceptualise the tri-partite relationship among these three variables. Also, from the SLR, there are no specifically developed metrics or studies to track green jobs created by SMEs as a result of carbon footprint initiatives and other climate change actions. Hence, it is suggested that future studies should focus on developing a novel SME green jobs tracking tool to enhance climate action initiatives' performance reporting. While considering every contextual issue may not be expedient, we believe focusing on critical ones can help progress the debate within the field and equip practitioners, SME owners and managers, policy/decision-makers and other stakeholders with helpful toolkits.

5.2.4 | Research structural gaps

Cluster analysis using InfraNodus revealed several areas of structural gaps in current research. Some of these point to greater focus on researching the benefits of implementing a platform that leverages blockchain to track and validate cleantech investments and their environmental impact within SME's, directly linking financial incentives with verifiable sustainability outcomes. This would aim to bridge the gap between the VC/finance sectors and tangible eco-friendly advancements. Further areas of consideration include implementing cleaner production and energy policies to reduce a company's carbon

footprint, cutting costs and meeting the rising demand for green products in markets where SMEs are keen to integrate such policies and are supported by government initiatives. Such approaches could enhance competitive advantage through internationalisation, while aligning organisational strategies with climate change strategies and caters to eco-conscious customers.

TABLE 14 Comparison with related studies.

Author	Title of SLR	How the current paper is different from previous SLR papers in the domain
Kosasih et al. (2023)	Integrated lean-green practices and supply chain sustainability for manufacturing SMEs: A systematic literature review and research agenda.	Kosasih et al. (2023) emphasises that there is a lack of empirical research that comprehensively investigates the impact of lean and green practices on sustainable supply chain performance and involves economic, environmental and social aspects. However, the current study critically evaluated a number of empirical studies related to supply chain management and it fills the knowledge gap in the literature.
Takalo et al. (2021)	Green innovation: A systematic literature review	Takalo et al. (2021) reviewed studies only related to the green innovation. However, the current paper reviewed the research articles related to not only the green innovation, but also carbon footprint reduction initiatives and green jobs. Unlikely to most of other traditional systematic literature reviews, the current paper further tries to develop a conceptual link among the key research themes reviewed.
Machado et al. (2020)	Production and supply-chain as the basis for SMEs' environmental management development: A systematic literature review	Machado et al. (2020) concluded that the achievement of environmental requirements imposed by governments and large companies associated with environmental production and supply-chain initiatives drive the development of environmental management in small and medium-sized companies. When it comes to this current paper, authors found that owners and managers with environmental and sustainability attitudes were likely to adopt environmental Management Practices for their SMEs. Apart from that, the current paper did not limit to production and supply chain or any other specific industry.
Bartolacci et al. (2019)	Sustainability and financial performance of small and medium sized enterprises: A bibliometric and systematic literature review	Bartolacci et al. (2019) conducted this systematic literature review under three themes and clusters. Bartolacci et al. (2019) focused on three themes and those are the role of innovation and entrepreneurship and their impact on the sustainability in SMEs (Cluster 01), CSR in the context of SMEs (Cluster 02) and green management and environmental issues for SMEs (Cluster 03). Even though the current paper has three groups, those themes are different compared to Bartolacci et al. (2019). Another main difference between the two papers is that Bartolacci et al. (2019) focused on sustainability in financial context, while the current paper mainly focussed on sustainability within the HR context.
Pacheco et al. (2018)	Eco-innovation determinants in manufacturing SMEs from emerging markets: Systematic literature review and challenges	The main difference is that Pacheco et al. (2018) highlight the ways to promote eco innovation in the Brazilian context, while current paper summarises the eco innovation strategies used by SMEs globally.
Siegel et al. (2022)	A framework for the systematic implementation of green-lean and sustainability in SMEs	Siegel et al. (2022) uncover considerable implementation problems, such as employee motivation and integration, responsibilities and measurements. Rather than identifying the issues, this paper tries to explore carbon footprint initiatives (including the green lean practices) used by SMEs and how they create green jobs.
Passaro et al. (2022)	The drivers of eco-innovations in small and medium-sized enterprises: A systematic literature review and research directions	Passaro et al. (2022) summarised the determinants of eco-innovation in SMEs and explored the relationships among them. The present paper reviewed the relationship among carbon footprint initiatives, green innovation, and green jobs creation.
Dasgupta (2021)	Sustainable innovation initiatives by small and medium enterprises: a systematic literature review	Dasgupta (2021) highlighted the performance measures used to measure and control the outcome of the innovation initiatives. The current paper identified the different innovation practices used and costs and benefits of green innovation.

Green innovation adoption within SMEs, driven by sustainable collaboration and environmental consciousness, fosters a competitive edge through eco-friendly practices that resonate with consumer demand. This strategic approach not only enhances market position but also contributes to a more sustainable global ecosystem, aligning economic gains with ecological stewardship. Integrating carbon reduction policies into SMEs' organisational strategies can foster a culture of innovation and sustainability, enhancing competitive advantage through green technologies and products while responding to market demands and regulatory pressures for environmental stewardship.

Research relating to the exploration of how SMEs can integrate green innovation into their business strategies to enhance competitive advantage, meet emerging market demands for environmentally friendly products, and navigate the regulatory landscape effectively could be developed further.

5.3 | Comparison with related studies

We studied existing literature on SMEs' carbon footprint reduction initiatives and green job creation opportunities. The evidence of our SLR shows a consensus among authors of extant literature that carbon footprint initiatives can lead to green job creation. Our evidence corroborates the findings of prior SLR in the field (e.g., Bartolacci et al., 2019; Siegel et al., 2022; Takalo et al., 2021), as highlighted in Table 14. For example, Pacheco et al. (2018) focus on the ways to promote eco-innovation in the Brazilian context. In contrast, Takalo et al. (2021) SLR is based on green innovation. By contrast, none of the existing SLRs focused on reviewing studies on SMEs' carbon footprint reduction and green job creation opportunities, as elaborated in Table 14.

6 | CONCLUSION

This research aims to contribute to the extant literature within the field by providing a comprehensive SLR of the existing studies on SMEs' carbon footprint reduction initiatives and green jobs (green employment). This was done through a comprehensive SLR of 70 articles from 2012 to 2022. The SLR results depict that prior studies predominantly focused on three key areas: green jobs and green human resource management (GHRM), green innovation, green initiatives and circular economy in SMEs and carbon footprint reduction initiatives, carbon performance, carbon management and carbon emission in SMEs.

Further examination of the SLR results shows that SMEs' most common carbon footprint reduction initiatives/green practices are green supply chain, energy-saving strategies, eco-friendly waste reduction and recycling, circular economy and green office practices. However, from the findings, it was unclear how these initiatives have been harnessed into green job opportunities and also how company policies relating to carbon footprint reduction initiatives are integrated efficiently with management processes within SMEs. In addition, limited studies focused on translating green initiatives into actual green jobs. In a nutshell, green jobs are new for SMEs; also, green jobs have the potential to nurture green innovation within the SMEs. However, how green jobs cultivate green innovation and strategies within SMEs' literature remained ambiguous. This represents a knowledge gap that requires further examinations, hence an opportunity for future research. This SLR thus contributes to knowledge and practice by providing a comprehensive review with the potential to benefit SMEs' owners/managers, researchers, policymakers and practitioners.

We also presented research and structural gaps based on the selected studies' theoretical framework, methods and contextual dimensions. Interest in climate change and SMEs' carbon footprint research in this field, which accelerated in 2012, is still on an upward trajectory, as evidenced by the high number of 2022 works selected for this SLR. We also note the predominant use of quantitative research methods in the field, accounting for 70% of selected studies. We believe this may not allow for a comprehensive understanding of SMEs' carbon footprint initiatives, most of which can be considered qualitative/subjective in nature to be captured. Hence, future researchers in the field should consider adopting qualitative or mixed methods for their studies. We also noted that 63% of the literature did not use clear theoretical frameworks; most of those that adopted one employed resource-based view theory.

While climate change, sustainability and environmental science fields can be deemed relatively new, we suggest that future researchers make concerted efforts to review extant theories in the domain and adopt them to enable them to explain their studies better. It is also suggested that future studies should focus on developing novel green jobs tracking tools within the SME context to enhance climate action initiatives' performance reporting. Also, concerted efforts should be made to encourage more research from the Global South and focus on the UN SDGs within the context of SMEs' carbon footprint reduction and green jobs.

6.1 | Practical implications and limitations of the study

We acknowledge that a few authors have dedicated some attention to investigating green innovation and green jobs particularly circular economy, but not yet at a level that occasioned green initiatives leading to the creation of scalable SMEs-related green jobs. In other words, the direct and indirect relationships existing among green jobs, green innovation and carbon footprint reduction initiatives in SMEs have not been the main focus of researchers in the field. We also note that in terms of reporting, there seems to be readily available statistics and data about SMEs' carbon emissions, particularly in the Western world; however, there are no specifically developed metrics or studies to track green jobs created by SMEs as results of carbon footprints initiatives and other climate change action.

From the overall analysis, some arguments can help support future research directions. Less research attention has been paid to the issue of green jobs and how they reduce carbon footprint initiatives in SMEs. To progress this debate, we suggest further empirical research

should be oriented towards identifying key internal and sector-related factors that can help SMEs improve their operational efficiency, reduce costs and create avenues for green job opportunities. In addition, future studies may explore the channel(s) or framework through which these factors help SMEs to improve their operational efficiency via integrating carbon footprint reduction policies with management practice. The identification of the factors and the framework will help SME business managers/owners, policymakers, regulators and other stakeholders to design a fit-for-purpose green SME operations data tracking model. Such an innovative novel model, when developed, can help provide a better understanding, among other things, of what constitutes SMEs' green initiative-driven jobs and non-SMEs' green-related jobs. For example, an SME-specific framework is currently unavailable; hence, it is a veritable opportunity and focus for future researchers, policymakers, regulators and environmentalists.

This paper recognised the resource-based view as the most commonly used theory by researchers. It implies that SMEs are essentially required to understand the resources and capabilities before selecting their future strategies. Besides, green innovations in businesses should bring a sustainable competitive advantage to their firms. In order to generate innovative ideas for firms, SMEs are advised to nurture an innovative culture within the firms. Moreover, other stakeholders involved in the businesses, such as suppliers and consumers, have a great responsibility to welcome SMEs practising green initiatives to reduce their carbon footprint. Finally, policymakers and authorities from local councils to national governments can motivate SMEs by offering incentives to SMEs that create more green jobs.

We also acknowledge that our study has some limitations. The limited number of publications in the field of SMEs' carbon footprint reduction initiatives and green jobs impacts the generalisability of this study's outcomes. The focus of this SLR, which is on SMEs' carbon footprint initiatives and green jobs, limited the scope, so other related issues like Scope 1, Scope 2 and Scope 3, which are carbon footprint reduction initiatives, could not be explored. This study also did not consider studies that focused on mediating and moderating variables associated with SMEs' carbon footprint initiatives and green jobs, which may have significant implications for future research. We, however, believe that despite these limitations, this work is valuable, as it clearly contributes to the understanding of the research landscape in the field and signposts readers to areas for future research. In addition, the study provides practical implications that will benefit SME owners, policymakers, academicians, practitioners and other stakeholders.

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