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Employee green behavior and employee sustainable behavior in relation to organizational factors in hospitality and tourism: A bibliometric analysis

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ABSTRACT
This study aims to map the knowledge structure of employee green behavior and employee sustainable behavior in relation to organizational factors in hospitality and tourism. Data were retrieved from Scopus on 22 April 2026 and comprised 146 publications (143 research articles and 3 review articles) with publication years from 2017 to 2026. The study used descriptive statistics and author-keyword co-occurrence analysis with VOSviewer. After standardization, 55 of 440 keywords met the minimum occurrence threshold of two. The results show that publication output increased markedly during 2021–2025, reaching its highest level in 2025 with 42 publications. Green human resource management, corporate social responsibility, employee green behavior, and environmental performance were prominent in the keyword network, whereas terms related to leadership and green psychological mechanisms were associated with more recent average publication years. The study identifies five thematic directions that overlap in content. Employee green behavior (EGB) is more visible than employee sustainable behavior (ESB) on the keyword map, but the evidence is insufficient to claim a conceptual shift or an expansion of measurement content from EGB to ESB. The study helps clarify the knowledge structure within the selected dataset and proposes that the EGB–ESB distinction be further examined through analyses of definitions, measurement scales, and behavioral indicators.
Keywords: *bibliometric analysis; employee green behavior; employee sustainable behavior; green human resource management; hospitality and tourism*

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I. INTRODUCTION

1.1. Background and research problem

In hospitality and tourism, achieving sustainability goals depends not only on organizational strategies and commitments but also on employees' everyday decisions, actions, and interactions. Employees are directly involved in the use of energy, water, and materials, waste control, service operations, and coordination with colleagues and customers. Therefore, alongside management policies, research needs to attend to specific behavioral expressions at the employee level. Studies in the hospitality sector have highlighted the relevance of the relationships among green human resource management, employees' eco-friendly behavior, and the environmental performance of accommodation establishments (Kim et al., 2019; Pham et al., 2019).

Against this background, employee green behavior (EGB) has become an important research stream in management and organizational psychology. EGB may include not only compliance with assigned environmental procedures but also voluntary initiatives, proactive suggestions for improvement, and encouragement of others to engage in environmentally beneficial behavior. Norton et al. (2015) distinguish between in-role and extra-role green behavior, while Zacher et al. (2023) further emphasize the need for a multilevel approach to this behavioral domain. These distinctions indicate that the adoption of green policies by an organization should not be assumed to lead automatically to corresponding employee behaviors.

However, organizational sustainability requirements are not expressed only through the term "green". Some approaches to sustainable behavior simultaneously consider environmental protection, responsible resource use, and contributions to people or social relationships. For example, the Delphi study by Ruiz-Pérez et al. (2021) identified employee behaviors that may contribute to the economic, social, and environmental dimensions of corporate sustainability. This raises an issue that requires clarification: in hospitality and tourism publications, within what research structures are employee green behavior and employee sustainable behavior situated, and to what extent are their differences visible in the scientific literature?

1.2. Conceptual issues and the need for knowledge mapping

Relevant studies use a range of terms, including EGB, workplace pro-environmental behavior, organizational citizenship behavior for the environment (OCBE), and employee sustainable behavior (ESB). These terms overlap but do not completely coincide in terms of whether behaviors are required or voluntary, the objectives of the actions, and the scope of measurement (Boiral & Paillé, 2012; Norton et al., 2015; Ruiz-Pérez et al., 2021). Co-occurrence within the same keyword group is not sufficient to demonstrate that studies use the same definition or the same measurement scale. Therefore, when synthesizing the literature, it is necessary to distinguish the terminology chosen by authors from the actual behavioral content being studied.

Another difficulty arises from the interweaving of levels of analysis. In a hospitality study, green human resource management, corporate social responsibility (CSR), or green leadership typically describe organizational conditions and practices; factors such as green psychological climate, commitment, or motivation reflect employees' psychological states; while EGB, OCBE, or ESB refer to behavior. Environmental performance may, in turn, be an organizational-level outcome. If these roles are not distinguished, a keyword map can easily be interpreted as a causal model, even though keyword links themselves only reflect co-occurrence within publications.

Bibliometric analysis provides an appropriate approach for describing the development of publication activity and examining knowledge structures through links among documents, authors, and keywords (Donthu et al., 2021; Zupic & Čater, 2015). In particular, keyword co-occurrence networks and temporal maps make it possible to observe prominent issue clusters and the relative positions of terms within a publication set. Nevertheless, such data are not sufficient to conclude that one concept has replaced another or that the substantive scope of behavior has genuinely expanded. Accordingly, the present study combines a mapping objective with an interpretive principle that limits conclusions to what the evidence can support.

1.3. Published reviews and the research gap

Review research on employee green behavior in hospitality and tourism has made important contributions. Ta et al. (2025) analyzed 70 Scopus documents on EGB in the hotel industry and identified six thematic groups, including green human resource management, leadership, organizational support, green innovation, psychological motivation, and CSR. Mahran et al. (2025) synthesized 74 studies on the green workforce in tourism and hospitality, combining bibliometric analysis with thematic synthesis and proposing a future research agenda. More recently, Abas et al. (2026) also used a two-tiered approach, combining literature mapping with a content review of employee green creativity in hospitality contexts. These studies demonstrate that the use of bibliometrics or VOSviewer for this topic is no longer novel in itself.

However, each review is built around its own research question and document-selection scope. Studies focusing on EGB in hotels, the green workforce, or green creativity do not necessarily examine the same intersection of employee behavior, sustainability-related organizational factors, and the hospitality–tourism context. A separate analysis of this intersection therefore remains meaningful for clarifying which organizational themes commonly appear alongside employee behavior, how leadership and psychological themes are connected, and how the terms EGB and ESB are positioned in the network. Differences in the number of documents or the periods covered across reviews are not, by themselves, evidence that one study is more comprehensive or of higher quality.

An issue requiring particular caution is the boundary between changes in research vocabulary and changes in conceptual content. The appearance of keywords related to leadership, motivation, or green commitment in more recent publications does not mean that ESB has replaced EGB. Similarly, the limited presence of the term "employee sustainable behavior" on the map does not demonstrate that social or economic behavioral content is absent from the full texts of the studies. Direct assessment of conceptual expansion requires comparison of definitions, observed indicators, and measurement scales over time. Until such an examination is conducted, the present study can identify only the structure and relative distribution of terms in the selected dataset.

1.4. Research aim, questions, and contributions

On the basis of the issues outlined above, this study aims to map publication activity and thematic structure at the intersection of employee green or sustainable behavior, related organizational factors, and the hospitality - tourism context. The analysis comprises 146 Scopus documents selected using the original study's three-group search query. The observed publication years span 2017 - 2026, with 2026 incomplete at the time of data retrieval. This is a defined publication set rather than the entirety of international research on EGB or ESB; the retrieval and selection procedures and analytical techniques are described in Section 3.

The study addresses four research questions:

RQ1. How has publication activity in the selected document set developed and been distributed over time, across publication sources, countries/territories, and authors?

RQ2. Which terms and thematic directions are prominent in the keyword co-occurrence network concerning employee behavior, organizational factors, and sustainability in hospitality and tourism?

RQ3. What is the relative temporal distribution of term groups related to organizational management, leadership, and psychological mechanisms in the dataset?

RQ4. How are EGB and ESB represented on the keyword map, and what evidential limitations should be considered before drawing conclusions about conceptual expansion or shift?

The study seeks to make three contributions that can be assessed directly from its design and results. First, it provides a structured picture of publication output and thematic directions at a specific intersection of the hospitality and tourism literature. Second, combining a co-occurrence network with temporal visualization helps identify the relative positions of themes concerning management, leadership, and employee behavior, rather than merely listing individual factors examined in prior studies. Third, by distinguishing the presence of terms from the scope of definitions and measurement, the study establishes appropriate boundaries for interpreting EGB and ESB and identifies content checks that should be undertaken in future research. This third contribution is methodological and analytical in orientation; it is not a claim that a shift from EGB to ESB has been demonstrated.

The remainder of the article is organized as follows. Section 2 presents the conceptual foundation; Section 3 describes the data and methods; Section 4 reports the results; Section 5 discusses the implications and limitations of the findings; and Section 6 summarizes the contributions, limitations, and directions for further verification.

2. CONCEPTUAL FOUNDATION AND POSITIONING OF THE STUDY

2.1. Employee green behavior and related concepts

In hospitality and tourism, employees are directly involved in energy, water, and material use, waste handling, and customer service. Employee behavior therefore connects an organization's environmental orientation with operational practice. Previous studies have examined the relationships between green human resource management (GHRM) and hotel employees' eco-friendly behavior and environmental performance (Kim et al., 2019), as well as organizational citizenship behavior for the environment (Pham et al., 2019). However, organizational management practices, employee behavior, and organizational-level environmental outcomes need to be distinguished.

Employee green behavior (EGB) refers to workplace actions related to environmental sustainability. Ones and Dilchert (2012) developed a taxonomy of EGB comprising five categories: conserving, avoiding harm, transforming, influencing others, and taking initiative. Norton et al. (2015) distinguish between required in-role EGB and voluntary extra-role EGB. Accordingly, EGB encompasses not only compliance with environmental procedures but also proactive contributions intended to improve organizational operations (Zacher et al., 2023).

Workplace pro-environmental behavior (PEB) overlaps substantially with EGB. Bissing-Olson et al. (2013) distinguish between task-related PEB and proactive PEB. Organizational citizenship behavior for the environment (OCBE), by contrast, emphasizes voluntary actions, including eco-initiatives, participation in the organization's environmental activities, and support for colleagues in engaging in environmentally friendly behavior (Boiral & Paillé, 2012; Paillé & Boiral, 2013). Thus, EGB, workplace PEB, and OCBE are overlapping but not fully identical concepts, particularly with regard to behavioral scope and whether behavior is required or voluntary.

2.2. Scope of sustainable behavior and the EGB - ESB boundary

Sustainable behavior (SB) can be approached more broadly than environmental behavior. Tapia-Fonllem et al. (2013) simultaneously considered four categories of action: pro-ecological, frugal, altruistic, and equitable. However, that study focused on sustainable behavior in general and did not develop a separate scale for hotel employees. At the corporate level, Ruiz-Pérez et al. (2021) used a Delphi method to identify employee behaviors that may contribute to the economic, social, and environmental sustainability of organizations. Their findings provide a conceptual basis for employee sustainable behavior (ESB), but they are not equivalent to a universally validated and accepted ESB measurement scale.

In this article, ESB refers to employee behaviors with an explicitly identified relationship to organizational sustainability goals; depending on the definition adopted in each study, this scope may include environmental content as well as social or economic content. EGB and ESB overlap substantially but are not automatically synonymous. A study may use the label "ESB" while measuring only electricity and water conservation and waste reduction, in which case its measurement content remains predominantly environmental. Conversely, behaviors that support colleagues do not automatically constitute the social dimension of ESB if the study does not link them to sustainability goals. Conceptual boundaries must therefore be assessed from definitions and behavioral indicators rather than from variable labels alone.

Table 1. Distinctions among the behavioral concepts used in the study

Concept	Primary focus	Key distinction for interpretation
EGB	Employee behavior directed toward environmental sustainability at work	Includes both in-role and extra-role behavior; not limited to simple conservation behaviors.
Workplace PEB	Environmentally beneficial behavior in the work context	Overlaps with EGB, but definitions and the types of behavior measured should be checked.
OCBE	Voluntary employee contributions to the organization's environmental goals	Emphasizes eco-initiatives, participation, and environmental support; does not represent the whole domain of EGB.
ESB	Employee behavioral contributions to organizational sustainability	May extend beyond the environmental dimension; studies should not be assumed to measure all three dimensions.

Source: Synthesized from Ones and Dilchert (2012), Boiral and Paillé (2012), Norton et al. (2015), Tapia-Fonllem et al. (2013), and Ruiz-Pérez et al. (2021).

2.3. Organizational and psychological factors in green behavior research

In hospitality research, green human resource management (GHRM) is a prominent explanatory stream. Renwick et al. (2013) systematized GHRM practices according to the ability - motivation - opportunity (AMO) logic; Tang et al. (2018) identified five groups of practices: green recruitment, green training, green performance management, green pay and reward, and green involvement. Studies by Kim et al. (2019) and Pham et al. (2019) illustrate the examination of GHRM alongside hotel employees' eco-friendly behavior or OCBE. GHRM is an organizational-level management practice, not employee behavior itself.

Alongside GHRM, the literature also addresses corporate social responsibility (CSR), green leadership, and psychological mechanisms such as green psychological climate, green values, or engagement. Dumont et al. (2017) show that the relationships between GHRM and in-role and extra-role green behavior are not identical, thereby highlighting the importance of cognitive mechanisms. In this bibliometric article, groups of terms concerning organizational policy, psychological processes, and employee behavior are used as interpretive layers for reading the knowledge map, not as a tested causal model.

2.4. Scope and interpretive framework of the study

Previous studies have used bibliometric analysis to investigate employee green behavior in hotels (Ta et al., 2025), the green workforce in hospitality and tourism (Mahran et al., 2025), and combinations of bibliometric analysis with content synthesis concerning green behavior and green creativity (Abas et al., 2026). Building on these studies, the present article focuses on the publication stream at the intersection of employee green or sustainable behavior, related organizational factors, and the hospitality - tourism context.

The results are interpreted in two ways: (i) by identifying the structure and interconnections among research themes; and (ii) by examining the relative presence of EGB and ESB in the keyword network. This approach helps clarify the knowledge structure within the selected data while also defining the limits of inference from terminology to conceptual content. Accordingly, differences in the frequency or visibility of EGB and ESB are not treated as evidence of a conceptual shift without additional analyses of definitions and measurement scales.

III. RESEARCH METHODS

3.1. Research design

The study applies bibliometric analysis by combining performance analysis and science mapping. This approach enables the development of the document set to be described and the linkage structure among research themes to be identified (Zupic & Čater, 2015; Donthu et al., 2021). The unit of analysis is a Scopus-indexed document. The main analyses include publication-year statistics, publication sources, authors, countries/territories, and the co-occurrence network of author keywords. The results reflect the bibliometric structure of the sample and do not permit causal conclusions about relationships among variables in the original studies.

3.2. Database and search strategy

Bibliographic data were collected from the Scopus database on 22 April 2026 through the title, abstract, and keyword fields (TITLE-ABS-KEY). Scopus was selected because it provides structured bibliographic data suitable for performance analysis and scientific network analysis (Baas et al., 2020).

The search strategy combined three groups of terms: (i) employee green, pro-environmental, or sustainable behavior; (ii) management practices and organizational factors related to sustainable development; and (iii) the hospitality and tourism context. Terms within each group were combined using the OR operator, while the three groups were linked using the AND operator to identify publications within the scope of the study.

The search string was as follows:

TITLE-ABS-KEY((“employee sustainable behavior” OR “employee green behavior” OR “green behavior” OR “pro-environmental behavior” OR “workplace pro-environmental behavior” OR “organizational citizenship

behavior for the environment") AND ("green human resource management" OR "green HRM" OR "green training" OR "green recruitment" OR "green performance appraisal" OR "green reward" OR "organizational sustainability" OR "corporate sustainability" OR "sustainability perception" OR "green organizational climate" OR "green psychological climate" OR "perceived organizational support" OR "corporate social responsibility") AND (hotel OR hospitality OR tourism OR "tourism business" OR "hotel employee"))

The search strategy did not impose a publication-year limit (PUBYEAR). Documents in the final dataset were published between 2017 and 2026; this was the observed period after retrieval and screening, not a limit specified in advance. Because the data were collected on 22 April 2026, the number of 2026 publications reflects only documents indexed by Scopus up to that date.

Using the three groups of terms simultaneously focuses the dataset on the research stream at the intersection of employee behavior, organizational factors, and the hospitality - tourism context. However, because the organizational-factor group was a mandatory component of the query, the dataset does not cover all studies of employee green behavior (EGB) or employee sustainable behavior (ESB) in this field. The findings are therefore interpreted within the body of literature defined by the search strategy.

3.3. Data selection and standardization

The initial Scopus query returned 171 records. After restricting the publication types to research articles (Article) and review articles (Review), 161 documents remained. Applying the English-language criterion did not change the dataset size. The documents were then screened on the basis of titles, abstracts, and keywords to assess their relevance to the study population and context. This process excluded 15 documents, mainly studies focusing on customers, tourists, consumers, or sustainability issues not directly related to employees and organizations in hospitality and tourism.

The final dataset comprised 146 documents, including 143 research articles and 3 review articles. The selection process is presented in Table 2.

Table 2. Process used to construct the research dataset

Step	Rule	Number of records
1	Initial TITLE-ABS-KEY query result	171
2	Retain Article and Review	161
3	Restrict to English (no change in dataset size)	161
4	Screen relevance based on title, abstract, and keywords	146
5	Analysis dataset: 143 Articles, 3 Reviews	146

Source: Authors' compilation based on Scopus data retrieved on 22 April 2026.

Before the network analysis, the keyword data were reviewed and standardized using a thesaurus file to harmonize equivalent wording variants and reduce frequency fragmentation caused by differences in spelling or expression. For example, the terms "green HRM", "GHRM", and "green human resource management" were consolidated into a single standardized form.

The standardization process was designed not to merge concepts with different substantive meanings, particularly employee green behavior (EGB), workplace pro-environmental behavior (workplace PEB), organizational citizenship behavior for the environment (OCBE), and employee sustainable behavior (ESB). This principle preserves distinctions in conceptual scope and reduces bias in identifying the structure of the keyword network.

3.4. Bibliometric analysis and principles of interpretation

Bibliographic data were processed in Microsoft Excel to summarize publication counts by year, publication source, author, and country/territory. VOSviewer was used to analyze the keyword co-occurrence network and visualize the thematic structure of the research field (van Eck & Waltman, 2010; Donthu et al., 2021).

The analysis used Author Keywords, the full-counting method, and a minimum occurrence threshold of two. After standardization, the dataset contained 440 keywords, of which 55 met the analysis threshold. Based on prominent keywords and the links among them, the study synthesized five thematic directions with overlapping content; these should not automatically be treated as identical to the clusters identified by the VOSviewer algorithm.

Overlay visualization was used to examine the average publication year of documents associated with each keyword, thereby identifying relative differences in publication timing across themes.

The findings are interpreted within the defined dataset and search strategy. Keyword co-occurrence does not indicate causal relationships among variables. Likewise, differences in the visibility of EGB and ESB on the map are insufficient to establish a conceptual shift or an expansion in measurement content without additional evidence from the definitions and measurement scales used in the underlying studies.

IV. RESULTS

4.1. Dataset characteristics and publication trends

The final dataset comprised 146 documents, including 143 research articles (97.9%) and 3 review articles (2.1%). Only 12 documents (8.2%) were published during 2017–2020. From 2021 onward, publication output increased more clearly, with 11 documents in 2021, 22 in 2022, 16 in 2023, 25 in 2024, and 42 in 2025. Thus, the 2021–2025 period alone accounted for 116 documents, or 79.5% of the sample, and 2025 recorded the highest number in the dataset (28.8%). The increase was not completely continuous, as shown by the decline from 22 documents in 2022 to 16 in 2023.

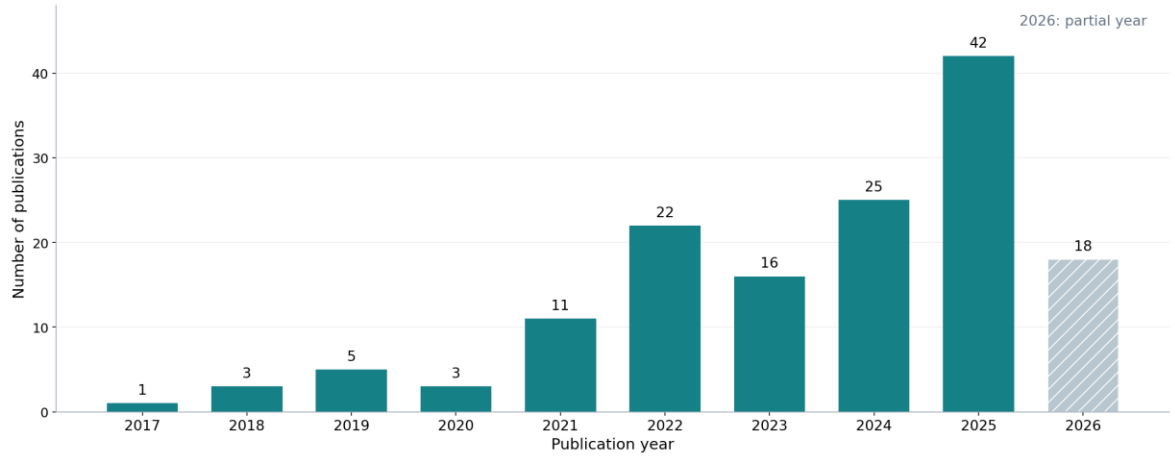


Figure 1. Distribution of publications by year (2017–2026)

Source: Authors' compilation and visualization based on Scopus data retrieved on 22 April 2026.

Note: The 2026 figure includes only publications indexed by Scopus up to 22 April 2026 and therefore does not represent the full year.

Eighteen documents were recorded for 2026 as of the extraction date. This figure cannot be compared with 2025 as though 2026 were a complete year in order to infer a decline in research activity. The results indicate growing interest within the scope of the Scopus query used, but they do not represent the entire EGB - ESB literature beyond the search strategy.

4.2. Publication sources, countries, and authors

Publications appeared in both hospitality and tourism journals and journals focusing on management, social responsibility, and the environment. Journal of Hospitality and Tourism Insights ranked first with 11 documents, followed by Journal of Sustainable Tourism (9); Sustainability (Switzerland) and Corporate Social Responsibility and Environmental Management each had 8 documents. The ten most frequently represented sources accounted for 66 documents (45.2%), while the remaining 80 documents were dispersed across other sources.

Table 3. Ten leading publication sources and ten countries/territories by number of documents

Source/journal	n	Country/territory	n
Journal of Hospitality and Tourism Insights	11	China	40
Journal of Sustainable Tourism	9	Pakistan	38
Sustainability (Switzerland)	8	Malaysia	22
Corporate Social Responsibility and Environmental Management	8	Saudi Arabia	17
International Journal of Hospitality Management	7	United Kingdom	15
International Journal of Contemporary Hospitality Management	6	Australia	14
Frontiers in Psychology	5	South Korea	14
International Journal of Environmental Research and Public Health	4	Vietnam	11
Cogent Business and Management	4	India	11
Tourism Management	4	Indonesia	9

Source: Authors' compilation and processing of Scopus data retrieved on 22 April 2026.

Based on authors' country-affiliation information, China (40), Pakistan (38), and Malaysia (22) appeared most frequently. Vietnam was represented in 11 documents. This distribution reflects countries associated with the publications and does not necessarily indicate where empirical data were collected. The results therefore do not permit the conclusion that study sites were concentrated in these countries or the determination of research intensity at specific destinations.

At the author level, Han H. had the largest number of publications in the dataset (7 documents), while Nisar Q.A., Karatepe O.M., and Ahmad N. each had 4. Publication counts indicate an author's presence in the sample; they are not substitutes for measures of scholarly influence or evidence of intellectual leadership.

4.3. Keyword co-occurrence network and thematic directions

The VOSviewer network was constructed from 55 Author Keywords that met the minimum occurrence threshold of two out of 440 standardized keywords. Prominent terms in the figure include green human resource management, employee green behavior, corporate social responsibility, environmental performance, and terms referring to the hotel context. Keywords related to leadership and green psychological states are also present. Co-occurrence indicates thematic proximity among publication streams and cannot be used as evidence of causal effects.

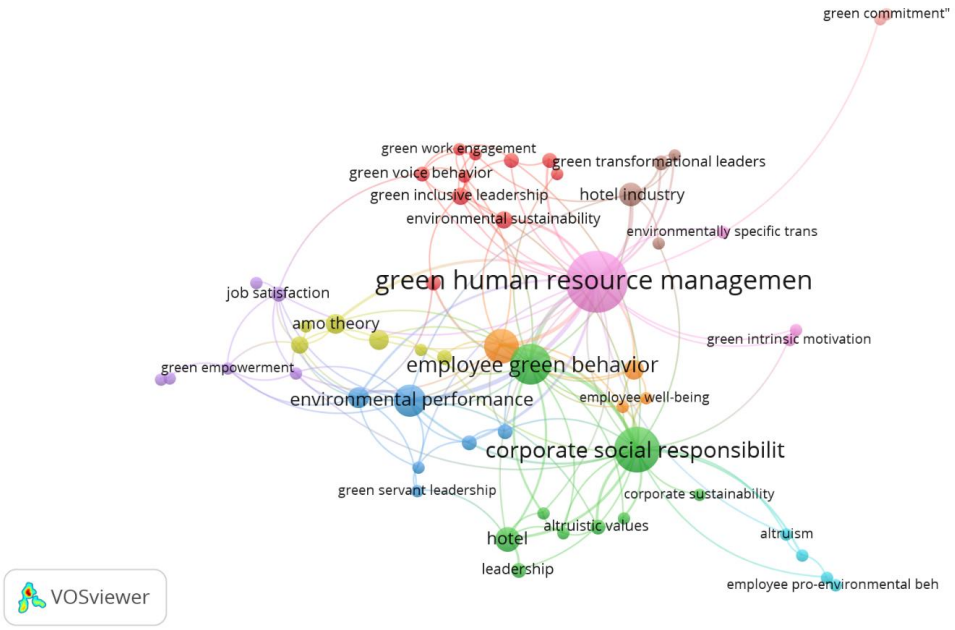


Figure 2. Author-keyword co-occurrence network

Source: Authors' analysis of Scopus data retrieved on 22 April 2026 using VOSviewer.

Based on the positions and links among the terms, five thematic directions can be synthesized as shown below. These directions represent the authors' interpretation and are not a claim about the number of algorithmic clusters identified by VOSviewer. The directions may overlap, and a keyword may participate in multiple relationships.

Table 4. Five thematic directions interpreted from the keyword map

Thematic direction	Representative keywords	Meaning within the publication set
GHRM and green behavior	green human resource management; employee green behavior; AMO theory	Connects green HR practices with behavior and environmental outcomes.
CSR and sustainability orientation	corporate social responsibility; corporate sustainability; hotel	Links corporate responsibility with the organizational context and employee behavior.
Leadership and green psychological states	green transformational leadership; green work engagement; green commitment	Focuses on the roles of leadership, motivation, and engagement.
Hospitality and environmental context	hotel industry; hospitality industry; environmental sustainability	Establishes the application context and environmental goals.
PEB and related outcomes	pro-environmental behavior; environmental performance; employee well-being	Positions environmental behavior alongside individual or organizational outcomes.

Source: Authors' analysis of Scopus data retrieved on 22 April 2026

Overall, environmental terms occupy prominent positions, while management and psychological terms reflect thematic strands connected to employee behavior. However, visual prominence does not provide a quantitative ranking by number of occurrences or total link strength; these indicators would need to be obtained from VOSviewer export files for precise comparisons among nodes.

4.4. Temporal patterns and the position of EGB - ESB

VOSviewer's overlay visualization reflects the average publication year of documents associated with each keyword in the study dataset. The results show that keywords such as corporate social responsibility, employee green behavior, environmental performance, and AMO theory are associated with relatively earlier average publication years. By contrast, green commitment, green intrinsic motivation, green servant leadership, and green work engagement are associated with more recent average publication years. This distribution suggests that themes concerning leadership and green psychological mechanisms occur in a relatively more recent group of publications than some themes concerning organizational management and environmental behavior.

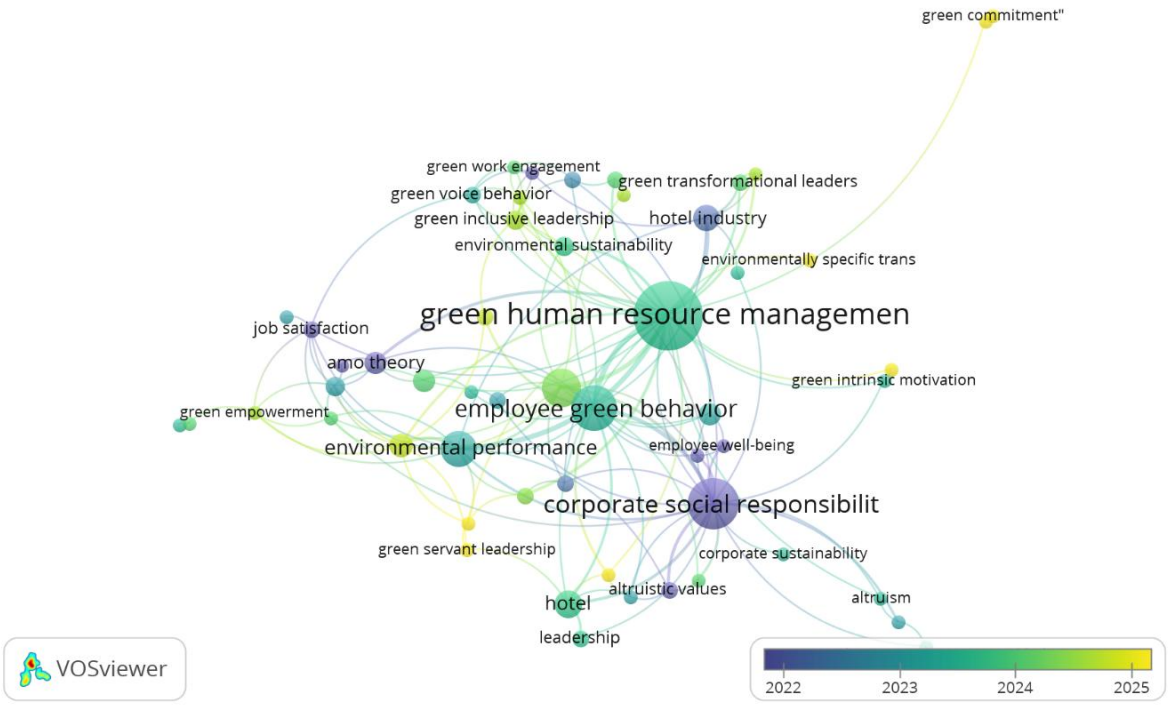


Figure 3. Temporal distribution of keywords in the research network (overlay visualization)

Source: Authors' analysis of Scopus data retrieved on 22 April 2026 using VOSviewer.

Note: Colors represent the average publication year of documents associated with each keyword; they do not indicate the first year in which a topic appeared or the rate at which it developed.

For the behavioral concepts, the keyword employee green behavior (EGB) is clearly visible on the map, whereas employee sustainable behavior (ESB) does not appear as a comparably prominent keyword. This result indicates that green-behavior and environmental-behavior terminology is more readily visible in the analyzed keyword network. However, differences in visual prominence do not imply corresponding differences in the number of studies or in the scope of measurement content represented by the two concepts.

Overall, the temporal map shows differences in average publication timing among thematic groups and also reflects the prominent position of EGB in the keyword structure. Nevertheless, the results are insufficient to establish a shift from EGB to ESB or an expansion in behavioral content from the environmental dimension to broader dimensions of sustainability. These issues require further examination through analysis of definitions and behavioral indicators in individual studies.

V. DISCUSSION

5.1. Growth in publication output and the cross-disciplinary character of the research stream

The results in Section 4.1 show that the number of publications in the dataset increased clearly from 2021 and reached its highest level in 2025. Noteworthy is not only the larger volume of publications in recent years but also the increasingly visible presence of employee behavior at the intersection of hospitality management, human resource management, and sustainable development. However, this result reflects scholarly attention within the selected publication set; it does not directly measure the growth rate of the entire international literature on EGB or ESB. The number of publications in 2026 also reflects only the retrieval point before the end of the year, making it inappropriate to infer a declining trend after 2025.

The distribution of publication sources in Section 4.2 reinforces the view that the research problem is approached from multiple academic traditions. The presence of studies in both specialist hospitality–tourism journals and journals concerned with management, social responsibility, and the environment indicates that the

topic is not confined to a single discipline. However, the spread across several journal groups demonstrates cross-disciplinary coverage in publication venues only; it is not sufficient to establish that the studies have integrated theories across fields. Assessing such integration would require analysis of theoretical foundations, cited literature, and the model content of individual studies.

Regarding country and author distributions, the prominent representation of China, Pakistan, and several other Asian countries should be understood as their participation in publication output within the dataset, not as direct evidence that employee surveys were concentrated in those countries. Authors' institutional affiliations may differ from the locations where data were collected. Likewise, an author's publication count does not indicate scholarly influence or centrality in a collaboration network unless citation and co-authorship analyses are conducted. The value of these distributional results therefore lies in identifying prominent national affiliations and contributors rather than ranking scholarly influence or determining the geographic distribution of empirical evidence.

The growth in publication output can be considered alongside published reviews of EGB and the green workforce in hospitality and tourism (Ta et al., 2025; Mahran et al., 2025). Nevertheless, the 146-document dataset in the present study was generated by the simultaneous intersection of employee-behavior terms, organizational factors, and the industry context, whereas previous studies used different scopes and document-selection procedures. Differences in sample size therefore cannot be used as evidence that the present article is inherently broader or more representative. The value of the findings lies in the knowledge structure of the specific publication stream defined by the search strategy.

5.2. GHRM, CSR, and environmentally oriented behavior in the research structure

The keyword-network analysis shows that green human resource management (GHRM), corporate social responsibility (CSR), employee green behavior, and environmental performance are prominent themes in the research dataset. The co-occurrence of these terms reflects thematic links among management practices, organizational sustainability orientations, and employees' environmentally oriented behavior. This pattern is consistent with earlier research streams on GHRM and environmental behavior at work (Renwick et al., 2013; Kim et al., 2019; Pham et al., 2019).

However, the prominence of GHRM and CSR needs to be interpreted in relation to the search strategy. Specifically, the Scopus query required each document to satisfy simultaneously a group of employee-behavior terms, a group of organizational-factor terms, and a hospitality–tourism context group. Because GHRM and CSR are terms within the organizational-condition group, the query structure may have contributed to their relatively high visibility in the selected dataset. The findings therefore do not provide sufficient grounds to claim that GHRM and CSR are the two dominant research streams across the entire literature on employee green behavior and employee sustainable behavior in hospitality and tourism.

From a theoretical perspective, the studies by Renwick et al. (2013), Kim et al. (2019), and Pham et al. (2019) provide a basis for examining relationships between green management practices and employees' environmentally oriented behavior. However, the links among keywords in the present study reflect only thematic structure; they do not establish the direction or magnitude of effects of GHRM or CSR on EGB or ESB. The findings should therefore be understood as evidence of the presence and connectivity of research streams within the defined dataset, rather than as evidence of causal relationships or the relative importance of organizational factors.

5.3. The relative emergence of green leadership and psychological themes

The overlay map in Section 4.4 shows that several terms related to green leadership, green commitment, green intrinsic motivation, and green work engagement are associated with more recent average publication years than terms related to CSR, green behavior, or environmental performance. This pattern may be interpreted as a sign of increasing specialization in research questions: in addition to identifying relevant management practices, some studies have examined leadership conditions and employees' psychological states in greater depth. This interpretation remains descriptive of the timing of terms within the sample and is not evidence of a linear process of theoretical evolution.

At the conceptual level, psychological themes may help distinguish between an organization's adoption of green policies and employees' actual enactment of environmentally oriented behavior. For example, Dumont et al. (2017) show that green psychological climate and employees' green values play different roles in relationships involving in-role and extra-role green behavior. That study provides an important point of comparison: different forms of behavior are not necessarily explained by the same mechanism. However, the present bibliometric article does not synthesize coefficients, statistical tests, or the consistency of findings within each research stream; it is therefore not possible to determine which psychological mechanism has stronger empirical support from keyword positions alone.

The diversity of leadership and psychological-state terms also suggests the need to consider compatibility between the level of explanation and the behavioral content being studied. Green leadership, organizational

support, green psychological climate, and green commitment may serve as antecedents or mechanisms in different models; they do not automatically constitute a single causal chain. More importantly, increasingly specific research on green mechanisms does not mean that the scope of outcome variables has expanded from environmental behavior to sustainable behavior encompassing social and economic dimensions.

A technical limitation of overlay data should also be noted: colors generally represent the average publication year of documents associated with a keyword, rather than the keyword's first year of appearance or its rate of frequency growth over time. Without the VOSviewer export table and period-based checks, wording such as "more recent" or "earlier" is more appropriate than claims that a stream is growing rapidly, replacing another stream, or becoming dominant.

5.4. The EGB–ESB boundary: the gap between research terminology and measurement content

The finding with the most direct conceptual relevance in Section 4.4 is that employee green behavior (EGB) is prominent in the co-occurrence network, whereas employee sustainable behavior (ESB) does not form a comparably central node in the map presented. This allows the conclusion that green/environmental behavior terminology is more readily visible among the keywords meeting the threshold. However, it does not demonstrate that ESB studies are proportionately fewer, nor does it demonstrate that multidimensional sustainable behavior is absent from the full texts of the 146 documents.

Theoretically, EGB generally focuses on workplace actions related to environmental sustainability and may include both required in-role behavior and voluntary behavior (Ones & Dilchert, 2012; Norton et al., 2015). OCBE emphasizes voluntary contributions to environmental goals, such as eco-initiatives, participation in environmental activities, or support for colleagues in ecological practices (Boiral & Paillé, 2012). Broader approaches to sustainable behavior, meanwhile, may consider contributions related to resource use, social relationships, and dimensions of corporate sustainability (Tapia-Fonllem et al., 2013; Ruiz-Pérez et al., 2021). These distinctions justify asking how EGB and ESB are used and measured, but they do not justify assuming that every study labeled ESB covers all three economic, social, and environmental dimensions.

In particular, the Delphi study by Ruiz-Pérez et al. (2021) identified behaviors through which employees may contribute to dimensions of corporate sustainability; the study itself did not establish a universal ESB scale validated across multiple industries. Potential expansion in the substantive content of ESB should therefore be distinguished from the degree of scale standardization in empirical research. Behavioral content should also be distinguished from behavioral consequences: saving electricity may yield economic benefits, but this does not mean that a scale consisting only of electricity-saving behavior measures both economic and environmental dimensions; similarly, supporting colleagues in pursuit of ecological goals is not automatically an indicator of social sustainability.

At least three methodological reasons may explain why ESB is not prominent in the keyword network even though it may still be present in research content. First, the analysis uses only Author Keywords; a concept may be defined or measured in an article without being selected by the authors as a keyword. Second, the minimum occurrence threshold of two and the term-standardization step affect which nodes are displayed. Third, the query includes an organizational-factor condition, meaning that the dataset is a purposefully defined subset rather than an exhaustive inventory of ESB research. The limited visibility of ESB in the graph is therefore not equivalent to its absence from the field.

Based on the available findings, the article can identify a question for further testing: has the use of the term "sustainable" been accompanied by a substantive expansion in definitions and behavioral indicators, or has it mainly involved an expansion in labeling in some studies? Answering this question requires separate coding of the terminology used by authors, the definitions cited, and the groups of behaviors measured, followed by comparisons across publication periods. Until such coding is undertaken, the most appropriate conclusion is that EGB and ESB differ in their visibility within the keyword network, not that a "shift from EGB to ESB" has been demonstrated.

5.5. Academic contributions and implications for research and hotel management

At the academic level, the contribution directly supported by the data is a structured picture of the publication stream at the intersection of employee behavior, organizational factors, and the hospitality–tourism context. Combining publication trends, source distributions, keyword networks, and relative temporal maps makes it possible to identify interconnected thematic directions while also clarifying the boundaries of what can and cannot be inferred from bibliometric evidence. This contribution is different from claiming that the study explains causal relationships or quantifies the effectiveness of individual management practices.

Compared with Ta et al. (2025), who mapped 70 Scopus documents on EGB in hotels, and Mahran et al. (2025), who reviewed 74 studies on the green workforce in tourism and hospitality, the present study should be positioned through its research question and the intersection defined by its three groups of search terms. A further contribution that could be developed is to clarify the EGB–ESB boundary through analyses of definitions and measurement scales.

Theoretically, the findings suggest that future studies should clearly distinguish three levels: (i) organizational policies, practices, and signals, such as GHRM or CSR; (ii) employees' cognitive and motivational processes, such as green psychological climate or green commitment; and (iii) employees' actual behaviors together with organizational-level outcomes. This distinction helps avoid treating green policies, self-perceptions, or environmental performance as interchangeable indicators of a behavioral construct. It also helps clarify whether a study is explaining in-role EGB, voluntary EGB, OCBE, or the potentially broader ESB construct (Norton et al., 2015; Dumont et al., 2017).

From a managerial perspective, the presence of GHRM, CSR, and green-behavior themes on the map only suggests issue areas of relevance to hotel organizations; keyword frequency itself does not allow the most effective solutions to be ranked. Empirical studies cited here, such as Kim et al. (2019), provide grounds for attention to green HR practices and eco-friendly behavior, while Dumont et al. (2017) emphasize differences between in-role and extra-role green behavior. When designing sustainability programs, managers should therefore specify the behaviors to be supported and select appropriate evaluation indicators, rather than treating the announcement of a policy or provision of training as evidence in itself that employee behavior has changed.

If managerial objectives expand from reducing environmental impacts to contributing to economic and social sustainability, organizations need to define the behavioral content of each dimension and select corresponding measures. For example, indicators concerning resource conservation, improvement suggestions, safety, or responsible support should be linked to clearly defined sustainability concepts and goals rather than grouped under the general label "sustainable behavior". This is a conceptual implication derived from the EGB–ESB distinction and the approach of Ruiz-Pérez et al. (2021), not a result of testing the effects of management practices in the present bibliometric dataset.

5.6. Limitations and directions for further verification

The contributions above should be considered within the limitations of the data. First, the study uses only Scopus and English-language documents and requires the presence of the organizational-factor term group. This makes the scope of the review explicit but may also exclude studies of employee behavior that do not use the exact search terms. The findings therefore cannot be generalized as a complete map of all EGB–ESB research in the field.

Second, the network structure was built from 55 Author Keywords meeting the threshold among 440 keywords after standardization. The results are affected by the choice of Author Keywords, term consolidation, counting method, and occurrence threshold. The five thematic directions synthesized by the authors should not be understood as five confirmed algorithmic clusters; indicators such as the number of nodes, total link strength, cluster codes, and specific average publication years would also need to be checked against the VOSviewer export files before extending quantitative comparisons.

Third, the analysis is primarily descriptive and based on science mapping; it does not synthesize definitions, observed indicators, or empirical evidence from the full texts of the studies. Questions concerning the proportion of multidimensional ESB studies, the mediating role of psychological mechanisms, differences in the effects of GHRM practices, and the stability of the network under alternative analysis thresholds therefore remain unanswered. These should be treated as open research questions, not as negative conclusions or evidence confirming an absolute research gap.

Given these limitations, future research should examine the coverage of the Scopus query; retain and reanalyze keyword files using fully reported settings; and systematically code EGB–ESB definitions and measurement scales. These steps would help distinguish changes in terminology, thematic structure, and behavioral content, thereby supporting a future research agenda with a clearer basis for verification.

VI. CONCLUSION

This study provides a systematic view of 146 Scopus publications at the intersection of employee behavior, organizational factors, and the hospitality–tourism context. Within the selected dataset, publication activity increased markedly from 2021, reached its highest level in 2025, and was distributed across journals in hospitality, management, and sustainability. Distributions by source, author, and country indicate the cross-disciplinary character of the research stream, but they do not equate to the geographic distribution of study sites or the scholarly influence of individual publications.

The keyword co-occurrence network highlights green human resource management, corporate social responsibility, employee green behavior, and environmental performance. Five overlapping thematic directions are interpreted from the map: green human resource management and green behavior; social responsibility and sustainability orientation; leadership and green psychological states; the hospitality and environmental context; and pro-environmental behavior and related outcomes. The temporal map indicates that terms concerning leadership, commitment, and green motivation are associated with more recent average publication years than some earlier environmental and organizational themes. These are observations about bibliometric structure, not evidence of causality or theoretical replacement.

Regarding the conceptual boundary, EGB is more visible than ESB in the Author Keyword network after applying the analysis threshold. This finding reflects the prominence of green/environmental behavior language in the publication set, but it does not demonstrate a shift from EGB to ESB or a substantive expansion of measurement scales into economic and social dimensions. The contribution of the study therefore lies in identifying thematic structure and clarifying interpretive boundaries among organizational policies, psychological states, employee behavior, and operational outcomes, rather than advancing an unsupported conclusion about conceptual evolution.

These conclusions are limited by the use of Scopus and English-language documents only, the search strategy's mandatory organizational-factor term group, the keyword-selection threshold, and the absence of full-text coding of definitions and behavioral indicators. Future research should examine the coverage of the query, cross-check VOSviewer settings and results, and systematically code EGB–ESB measurement scales. Only then can it be fully assessed whether changes in terminology are accompanied by an expansion in the substantive meaning of employee sustainable behavior in hospitality and tourism.

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