

## Environmental Responsibility in The Hospitality Sector: A 2000 – 2024 Bibliometric Analysis

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**Abstract:** Hospitality industry should pay attention with their business through environmental responsibility, which attract researchers in several literatures. Based on the 1,476 articles about hospitality environmental responsibility from 2000 to 2024 in the WoS database, bibliometric and content analysis by using VOSviewer were conducted to examine the research themes. By using co-occurrence analysis, there are four themes found in this study: (1) sustainable behaviour drivers, (2) hospitality performance, (3) green tourism development, and (4) tourism framework and impact. Then content analysis revealed the subthemes. Three subthemes for sustainable behaviour drivers are tourist psychology, environmental attitude and values, and education and awareness campaigns. Hospitality performance consists of four subthemes: financial performance, sustainable business model, green certifications, and employee training. Subthemes of green tourism development are sustainable daily operational, eco-tourism, and responsible tourism. Subthemes for fourth cluster are tourism impact, destination management, and policy planning. Finally, directions for future research on this field were revealed, providing spaces for beneficial references to researchers.

**Keywords:** Environmental responsibility, Responsible action, Environmental ethic, Bibliometric review; Hospitality

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### INTRODUCTION

Environmental problems became a serious attention in hospitality and tourism industries because they caused environmental damage (Xu et al., 2020) such as water and air pollution, waste generation, environmental degradation, climate changes (Onwezen & Bartels, 2013; Wang et al., 2020), and destroying vegetation (Xiao & Huang, 2010). Because of that, hospitality and tourism industries have huge significance in the environmental impact. They should have responsibilities regarding their business, this had been expressed interest in understanding hospitality environmental responsibility (Grazzini et al., 2018).

According to Zu (2023), the definition of environmental responsibility is the concept that industries have a responsibility to take into consideration how their business affects the environment. So, hospitality environmental responsibility can be defined as the obligation of the hospitality industry to take responsibility for their business that has an impact on the environment. In the last decade, investigations towards environmental responsibility of hospitality industry have been surged and different theoretical and method were adopted by previous studies to examine this theme. The growth of research is seen by the diversification in research areas to subtopics such as waste management (Martin-Rios et al., 2020; Junkrachang et al., 2024), energy efficiency (Baloglu & Jones, 2015), water conservation (Styles et al., 2015; Han & Hyun, 2018), green certifications (Bianco et al., 2023; Peiro-Signes et al., 2014), environmental technologies (Chan et al., 2017), lower carbon emission (Chen, 2019), towel reuse (Cvelbar et al., 2017; Han & Hyun, 2018), nature conservation (Milder, 2016) and Go Green practices (Yang et al., 2023).

Systematic review, according to Petticrew and Roberts (2008), gives benefit in synthesizing and assessing the relevant studies more comprehensive by identifying gaps in the literature. With research on this topic is spanning in multiple decades, a bibliometric analysis offers a systematic way for

mapping the progression of knowledge and emerging trends (Bruyn et al., 2023). Analyzing the literature from 2000–2024 enables the comprehensive understanding of how environmental responsibility in hospitality has evolved, examining influential research study and major contributor (Legendre et al., 2024), also the key themes that shaped this area of study. This investigation allows a better understanding through highlighting the new trends, remaining gaps in this theme. Supported by VOSviewer, it is possible to generate visualization map based on the 1,476 articles from Web of Science (WoS) as well as shaping clearer clusters to represent the connection among the literature (Gao, 2015). Lastly, this study provides understanding of environmental responsibility in hospitality industry research and unlocks the future direction of study.

## MATERIALS AND METHODS

### Data Collection

The data about environmental responsibility are gathered from the Social Science Citation Index (SSCI) which can be found in the Web of Science (WoS) database, Zupic & Cater (2015) stated that WoS can be accessed by online and common for doing bibliometric analysis. Additionally, the data are collected using terms related to tourism and hospitality.

In the WoS, some keywords need to fill in the “Advanced Search” function to display all of related journals. As the topic, Hospitality Environmental Responsibility, the keywords are mixed from environmental responsibility (e.g., “ecology responsibility” and “environmental ethics”) and hospitality (e.g., “hotel(s)”, “hospitality”, “lodging”). So, the first step is finding the synonyms of environmental responsibility and hospitality, then combine them with connector “AND” in the advanced search. Each synonym is connected with connector “OR”. Furthermore, to limit it into hospitality industry, three categories of WoS are searched: “Business,” “Management,” and “Hospitality, Leisure, Sport & Tourism”. Finally, the advanced search code in the WoS was TS=(“environmental responsibilit\*” OR “ecolog\* responsibility” OR “environmental stewardship” OR “sustainability” OR “sustainable” OR “green responsibility” OR “environmentally responsible action” OR “sustainable practice” OR “eco-consciousness” OR “environmental ethics” OR “sustainable responsibility” OR “eco-responsibility” OR “green commitment” OR “environmental duty” OR “eco-consciousness” OR “environmental conservation” OR “ecolog\* ethics” OR “ecosystem ethic” OR “conservation responsibility” OR “green responsibility” OR “green ethics”) AND TS=(“hotel” OR “hotels” OR “hospitality” OR “lodging” OR “accommodation” OR “accommodations” OR “resort” OR “resorts” OR “inn” OR “inns” OR “motel” OR “motels” OR “restaurant” OR “restaurants” OR “foodservice\*” OR “catering” OR “hostel” OR “hostels”) NOT TS=(“resort” OR “catering theory” OR “catering incentive\*” OR “accommodation of” OR “theory of accommodation” OR “communication accommodation” OR “communication accommodation theory” OR “Leisure”) AND WC=(“business” OR “management” OR “hospitality, leisure, sport & tourism”)

Additionally, “NOT” command is used to ignore specific cases in which the synonyms for “hospitality” may have meanings that are too similar to the hospitality context. The word “accommodation,” for example, can refer to both the hospitality sector and the process of adapting to something. Then in the search option, the language is limited to English, so only journal with using English language is selected. Then, the document types also limited to “articles” and “review articles” (excluding “book reviews” and “proceedings papers”). While the searching is conducted, A total of 1,476 high-quality, high-impact documents are available for bibliometric analysis for articles published between 2000 and 2024 (the data ends on 10 October 2024).

## Data Analysis

In this review study, bibliometric analysis is employed which according to Donthu et al. (2021a), when the review's scope is broad and the dataset is too large (more than 300 articles) for manual analysis, this approach is suitable. Additionally, the practice of developing and displaying bibliometric maps to facilitate comprehension is becoming more and more popular in bibliometric analysis (Mayr and Scharnhorst, 2015). Accordingly, bibliometric analysis is preferred because it is more trustworthy and simpler to handle a large number of articles objectively, provides in-depth analysis and comprehensive information on the connections between papers, citations, co-citations, and keywords in the field of study, and has a strong visualization that helps readers comprehend the field of study and identify possible areas of research (Phulwani et al., 2020).

In order to perform bibliometric analysis on the results obtained from WoS, this study uses VOSviewer software, which is supported by Ms. Excel and EndNote for data processing. This analysis includes titles, abstracts, author keywords, authors, author affiliations, citations, and cited references. Aimed to investigate the overall structure of the literature on hospitality environmental responsibility, co-authorship, citation, and co-citation analyses were performed. Following that, co-occurrence analysis of index keywords, which keywords that appear in the title, abstract, and author keywords was used to identify the theme and evolution trends of the clusters. Since in-depth interpretations of bibliometric findings necessitate extensive reading and synthesis, content analysis is carried out at the end of analysis by manually classifying highly influential articles to identify subthemes for each clustered theme (Zupic & Cater, 2015).

## RESULTS AND DISCUSSION

VOSviewer and other quantitative bibliometric tools, such as EndNote and Microsoft Excel, are the main tools used in this review to support data analysis. VOSviewer is a software used to construct and display bibliometric data (Kirby, 2023). Here are the results of analysis by using VOSviewer software.

### Highly Productive Journals

There are 1,476 articles on hospitality environmental responsibility topic were published in 159 journals. Then, according to Table 1, the top 20 journals account for 73.04% of all publications. Three important journals in the field of hospitality environmental responsibility were ranked according to the quantity of publications in table 1. Among them, Journal of Sustainable Tourism published 194 (13.13%) articles as the first rank; followed by International Journal of Contemporary Hospitality Management which published 168 (11.38%) articles in the second rank, and International Journal of Hospitality Management with 136 (9.21%) articles in the third rank. Because of these results, researchers can choose which journals would be a good choice for their publications.

**Table 1. Top 20 Journals Ranked by The Number of Publications**

#	Sources (159 in total)	N↓	%	Citations
1	Journal of Sustainable Tourism	194	13.14%	5049
2	International Journal of Contemporary Hospitality Management	168	11.38%	6339
3	International Journal of Hospitality Management	136	9.21%	7448
4	Tourism Management	68	4.61%	3804
5	Current Issues in Tourism	61	4.13%	1344
6	Journal of Hospitality and Tourism Management	52	3.52%	1516
7	Tourism Review	43	2.91%	351

#	Sources (159 in total)	N↓	%	Citations
8	Cornell Hospitality Quarterly	37	2.51%	1764
9	Tourism Management Perspectives	36	2.44%	912
10	Journal of Hospitality Marketing & Management	35	2.37%	1244
11	International Journal of Tourism Research	32	2.17%	430
12	Corporate Social Responsibility and Environmental Management	31	2.10%	396
13	Business Strategy and The Environment	28	1.90%	708
14	Tourism Economics	26	1.76%	232
15	Journal of Travel & Tourism Marketing	25	1.69%	555
16	Journal of Travel Research	25	1.69%	805
17	Journal of Retailing and Consumer Services	23	1.56%	242
18	Journal of Hospitality & Tourism Research	20	1.36%	383
19	Scandinavian Journal of Hospitality and Tourism	20	1.36%	279
20	Asia Pacific Journal of Tourism Research	18	1.22%	299

### Highly Productive Authors, Institutions, and Countries/Regions

Literature related hospitality environmental responsibility involves more than 3000 authors affiliated with 1000 institutions across 89 countries. Further, the top 20 authors were ranked by the frequency of published documents and showed on the table 2. It was observed that Heesup Han published the most articles, counted by 27 articles with 1029 citations, followed by Horng (19 articles and 491 citations) and Chou (17 articles and 422 citations). This result indicates that they have high contributions in environmental responsibility in hospitality field.

Table 3 below shows the output of the top 10 leading universities conducting research on environmental responsibility in hospitality based on the number of documents published. From 1000 institutions, Hong Kong Polytechnic University with 75 articles stands out the most published articles, followed by Griffith University with 36 articles, and University of Central Florida with 29 articles. These institutions have the highest contribution in publishing articles related to environmental responsibility in hospitality industry, which is essential for raising student understanding and interest on this field.

The top 10 from 89 countries that contribute to studies on publications on hospitality environmental responsibility are shown in Table 4. With 229 articles published, or 15.51% of all publications, the USA emerges as the most productive nation among them, followed closely by China with 207 articles (14.02%) and Australia comes in third place with 128 articles (8.67%). These countries have contributed significantly to the development of the field of hospitality environmental responsibility, demonstrating their deep engagement and knowledge of the subject.

**Table 2. Top 20 Authors Ranked by The Number of Publications**

#	Author	Documents↓	Citations↓↓	Total Link Strength
1	Han, Heesup	27	1029	9.00
2	Horng, Jeou-Shyan	19	491	17.00
3	Chou, Sheng-Fang	17	422	17.00
4	Liu, Chih-Hsing	17	360	15.00
5	Dolnicar, Sara	16	315	10.00
6	Koseoglu, Mehmet Ali	12	455	8.00
7	Dhir, Amandeep	11	495	8.00
8	Gossling, Stefan	9	246	4.00
9	Okumus, Fevzi	9	681	4.00

#	Author	Documents↓	Citations↓↓	Total Link Strength
10	Chua, Bee-Lia	8	175	8.00
11	Gruen, Bettina	8	199	8.00
12	Hall, C. Michael	8	338	4.00
13	Kim, Seongseop (Sam)	8	142	3.00
14	Lee, Seoki	8	519	1.00
15	Lopez-Gamero, Maria D.	8	126	7.00
16	Yu, Tai-Yi	8	119	8.00
17	Cvelbar, Ljubica Knezevic	7	310	4.00
18	Kaur, Puneet	7	169	6.00
19	Molina-Azorin, Jose F.	7	126	7.00
20	Srivastava, Shalini	7	39	4.00

Notes: Data in Tables 3-5 were generated by co-authorship analysis with VOSviewers and the counting method is fractional counting. The total link strength in Tables 3-5 represents the strength of the co-authorship links of a given item with other items. Citations are based on the WoS database.

**Table 3. Top 10 Institutions Ranked by The Number of Publications**

#	Institutions	Documents↓	Citations	Total Link Strength
1	Hong Kong Polytechnic University	75	2835	20.00
2	Griffith University	36	1450	9.00
3	University of Central Florida	29	1323	13.00
4	Kyung Hee University	26	1074	17.00
5	University of Surrey	26	870	8.00
6	University of Johannesburg	24	863	17.00
7	University of Queensland	22	600	9.00
8	Sejong University	20	1067	4.00
9	Ming Chuan University	17	671	17.00
10	University of Houston	17	383	8.00

**Table 4 Top 10 Countries/Regions Ranked by The Number of Publications**

#	Country	Documents↓	Citations	Total Link Strength
1	USA	229	10984	136.00
2	China	207	5963	125.00
3	Australia	128	5309	71.00
4	Spain	125	3865	47.00
5	England	122	5415	97.00
6	Italy	69	2107	44.00
7	South Korea	65	2389	48.00
8	Taiwan	58	2291	17.00
9	France	40	1843	33.00
10	Malaysia	40	1212	29.00

### Highly Cited Articles and Authors

VOSviewer software uses citation analysis to examine the most cited authors and articles. Citation analysis is a technique that counts the number of times a publication has been cited in order to assess its impact (Cronin & Ding, 2011). It also helps to establish intellectual connections between articles, particularly when one paper cites another (Donthu et al., 2021a).

The top 10 most frequently cited articles in the area of environmental responsibility in hospitality are shown in Table 5. According to this observation, the most frequently cited articles are Cheng (2016), which focuses on the sharing economy, Goldstein (2008), which focuses on environmental conservation, and Kang (2012), which focuses on hotel environmental performance. According to table 6, Heesup Han is the most cited author in the literature on hospitality environmental responsibility, followed by Chan and Xavier Font. They help to establish greater accountability for hotels in their operations and acknowledge the significance of environmental responsibility in the hospitality sector.

**Table 5. Top 10 Most Cited Articles Based on Citation Analysis**

#	Document	Focus	Citations↓	Links
1	Goldstein (2008)	Environmental Conservation	1818	6
2	Cheng (2016)	Sharing Economy	567	2
3	Kang (2012)	Hotel Environmental Performance	432	10
4	Nhat Tan Pham (2019)	Green Hospitality	365	9
5	Han (2021)	Environmentally Sustainability on Consumption	319	3
6	De Grosbois (2012)	Green Commitment	304	7
7	Omerzel (2016)	Green Innovation	271	2
8	Hu (2010)	Environmentally Sustainability on Restaurant	259	8
9	Leonidou (2013)	Environmentally Sustainability on Marketing	252	4
10	Chan (2014)	Green Hospitality	249	8

**Table 6. Top 10 Most Cited Authors Based on Citation Analysis**

#	Author	Documents	Citations↓	Total Link Strength
1	Han, Heesup	27	1029	150
2	Chan, Eric S. W.	6	853	73
3	Font, Xavier	14	738	121
4	Okumus, Fevzi	9	681	78
5	Jiang, Yangyang	6	572	49
6	Jones, Peter	5	552	87
7	Lee, Seoki	8	519	72
8	Dhir, Amandeep	11	495	75
9	Horng, Jeou-Shyan	19	491	172
10	Filimonau, Viachaslau	17	484	107

### Highly Co-Cited References

Small (1973) defined co-citation analysis as one measurement that assesses and explains the relationship between journals, authors, topics, or keywords when two articles are cited together with at least one reference. Finding influential publications is one benefit of employing co-citation analysis (Donthu et al., 2021a). There are 1476 articles with 52,236 cited references in this study. It also includes more than 31,000 authors and more than 16,000 sources. This type of dataset serves as the foundation for co-citation analysis and further investigation of the significant contributions and relationships found in the literature on hospitality environmental responsibility.

The top 10 most co-cited references, co-cited authors, and co-cited journals are detailed in Tables 7–9, which are based on VOSviewer output. Fornell and Larcker (1981), who concentrate on the SEM method, Hair (2010), who concentrate on data analysis, and Podsakoff et al. (2003), who

concentrate on Common Method Variance (CMV), are the top three most often co-cited references in Table 7. The top 10 most co-cited authors are shown in Table 8, with Heesup Han, Joseph F. Hair, and Chan being the three most significant co-cited authors. Lastly, table 9 shows that the International Journal of Hospitality Management, Tourism Management, and International Journal of Contemporary Hospitality Management are the three most often co-cited journals.

**Table 7. Top 10 Most Co-Cited References from The Co-Citation Analysis**

#	Co-cited References	Focuses	Citations
1	Fornell & Larcker (1981)	Method: SEM	150
2	Hair (2010)	Method: Data Analysis	124
3	Podsakoff et al. (2003)	Method: CMV of self-report data	103
4	Kang (2012)	Hotel Environmental Performance	82
5	Ajzen (1991)	Theory of Planned Behaviour	77
6	De Grosbois (2012)	Green Commitment	70
7	Lee (2010)	Environmental Conservation	68
8	Anderson & Gerbing (1988)	Method: SEM	67
9	Henseler (2015)	Method: SEM	62
10	Han (2010)	Green Hospitality	60

**Table 8 Top 10 Most Co-Cited Authors from The Co-Citation Analysis**

#	Co-cited Authors	Citations↓	Total Link Strength
1	Han, H	616	20241
2	Hair, J. F.	310	8305
3	Chan, E. S. W.	286	9329
4	Dolnicar, S.	261	6446
5	Gössling, S.	245	5420
6	Bohdanowicz, P.	241	7324
7	Filimonau, V.	231	5188
8	Font, X.	216	6129
9	Hall, C. M.	180	3397
10	Fornell, C.	179	4873

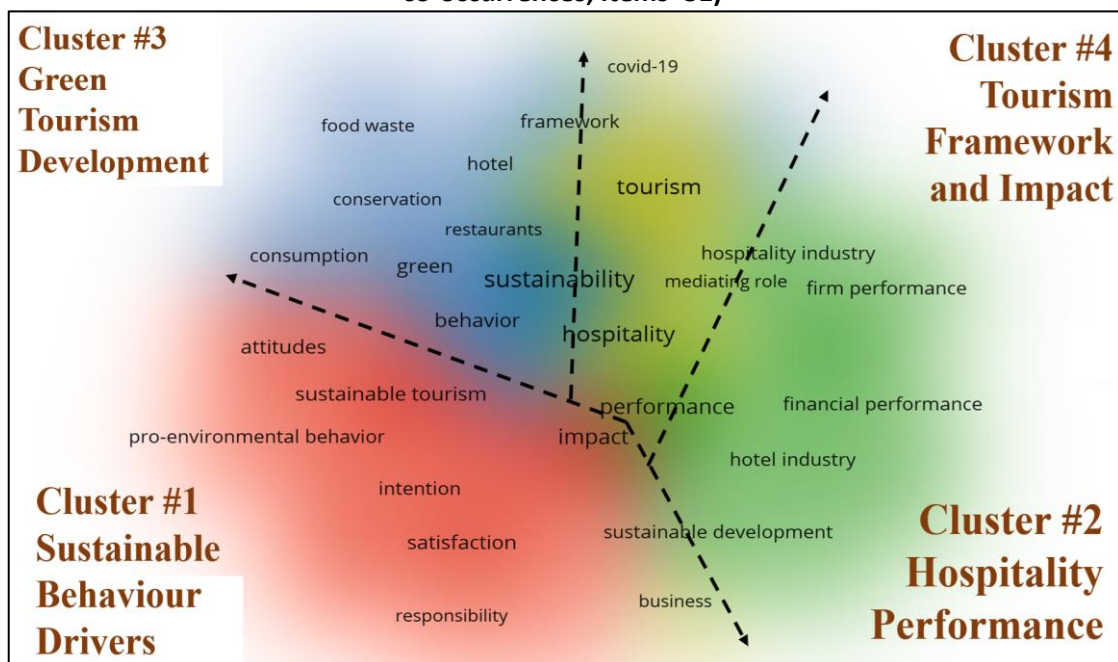
**Table 9 Top 10 Most Co-Cited Journals from The Co-Citation Analysis**

#	Co-cited Journals	Citations↓	Total Link Strength
1	International Journal of Hospitality Management	4620	294924
2	Tourism Management	3770	233262
3	International Journal of Contemporary Hospitality Management	2944	193317
4	Journal of Sustainable Tourism	2690	163040
5	Annals of Tourism Research	1768	98650
6	Journal of Cleaner Production	1518	101716
7	Journal of Business Ethics	1188	79849
8	Journal of Business Research	1106	80627
9	Sustainability-Basel	951	62220
10	Journal of Travel Research	839	56675

**Co-Occurrence Analysis: Identifying Research Themes and Trends**

Through co-occurrence analysis, the research area can be identified. Keyword relationships can be established by using the frequency of co-occurrence among the keywords (Zheng et al., 2015). It is possible to identify an integrated body of research that focuses on specific topics and has similar themes by employing keyword cluster analysis. Four clusters of research themes are formed by the co-occurrence analysis of index keywords from journal titles, abstracts, and author keywords, as shown in Figure 1. From that figure, we named cluster #1 as sustainable behaviour drivers, cluster #2 as hospitality performance, cluster #3 as green tourism development, and cluster #4 as tourism framework and impact. In addition, figure 2 presents the temporal overlay visualization of index keywords, allowing us to observe the period in research direction over time. Since 2020, hospitality environmental responsibility has focused on food waste and pro-environmental behavior.

**Figure 1 Clustering results of the co-occurrence analysis of index keywords (Threshold=46 co-occurrences; Items=31)**



Note: Keywords with similarity and variant spellings were combined using the VOSviewers thesaurus data-clear file, while terms without significant meanings were left out. Since some overlapping co-words might not be visible in the figure, please refer to Appendix Table A1 for a complete list of co-words associated with each cluster.



Looking at the environmental responsibility research, the investigation for external factors influencing hospitality industry conduct sustainable practices still less. For example, government policies which mentioned by Mak (2008) about State-owned hotels (SOHs), indicates that the challenge to do responsibility practice is unstable in internal system, maintenance and accommodation, human resource management, and marketing strategy. Overall, this cluster illustrate the psychological factors that driving hospitality industry to occur responsibility toward environment. By understanding the importance of environmental responsibility, hospitality industries may get positioning as the participant in global environmental challenge.

### **1.2 Cluster #2 Hospitality Performance**

As the output of responsibility practice, performance of hospitality industry is reflected in financial performance (Becerra-Vicario et al., 2022). This cluster explores how environmental responsibility influence hospitality performance such as efficiency (Filimonau & Magklaropoulou, 2020), customer satisfaction (Olya et al., 2021), and brand reputation (Gonzalez-Rodriguez et al., 2019). The researchers examine several performance metrics to measure the impact of conducting environmental responsibility. The metric used are sustainability metric-business ethics to determine sustainability in restaurant (Zhu & Zhang, 2023) and ad hoc metric to investigate new trend about social responsibility (Rabad-Martin et al., 2024).

Literatures mentioned that responsibility practices such as energy efficiency (Baloglu & Jones, 2015), waste management (Martin-Rios et al., 2020), water conservation (Styles et al., 2015), and towel reuse (Cvelbar et al., 2017) can lead to significant cost savings and operational benefits. For example, energy efficient practices such as electricity, gas/fuel, steam, and water/sewer are effective to reduce hotel operational expense (Woodworth et al., 2014) shown the decreasing of operational costs. In other hand, research indicates that the guests support environmental practice which is represented in satisfaction in choosing green accommodation (Olya et al., 2021).

Hotels that adopt green certification not only attract the travelers, but also enhance the loyalty among them. By improving their environmental responsibility, hospitality industry can achieve competitive advantages in brand image (Lee et al., 2010). Then various key factors are considered as key mediators are environmental responsibility, perceived innovation, green information, environmental attitude, and knowledge, while the moderators such as perception, power distance, and willingness to pay more also considered. Most articles also focused on the different theory beside TPB in sustainable development such as organizational citizenship theory (Umrani et al., 2020) and Hunt-Vitell theory of ethics (H-V model) (Nimri et al., 2021). This cluster emphasized that environmental responsibility is a moral obligation and assets for improving performance and reputation.

### **1.3 Cluster #3 Green Tourism Development**

The third cluster focuses on the responsibility practices, called by green tourism. This concept shows the environmental management by hospitality industry aimed to minimizing environmental impacts. Keywords such as conservation, consumption, and food waste become main practices done by hospitality industry. For example, conservation by doing recycling, reuse, reduction, curtailing, and compromise to measure the responsibility practices on hospitality industry (Miao & Wei, 2016). Then in food waste context is measured by excessive food ordering by guests, errors in inventory management, staff errors in food preparation, and food safety practices (Okumus, 2020).

The core of this cluster is balancing the ecological footprint of tourism industry with socio-economic benefit (Filimonau & Magklaropoulou, 2020), focus on chef awareness of food waste. The chefs in restaurant should have professional skills to minimize food waste and encourage

management in hotel conduct chef's training. Initiatives such as ecotourism are elevating responsible travel to natural areas, environmental protection, and local communities' well-being (Almeyda et al., 2010), showing that the relationship between tourism activity and nature. Additionally, ecotourism encourages responsible practices that respect nature, giving education among tourists.

Economic implication also revealed in this cluster which green tourism practices can enhance destination's attractiveness, leading to economic growth. When economic system is integrated with environment, tourism and hospitality is not being the source of ecological degradation, but as the contributor of environmental preservation (Inchausti-Sintes, 2023). Hospitality industry that prioritizes environmental responsibility often attract visitors are willing to pay higher price for their experiences (Kang et al., 2012). By promoting green tourism, this cluster reflects the efforts in environmental protection that minimize harm to the environment while maximizing socio-economic benefits.

#### **1.4 Cluster #4 Tourism Framework and Impact**

This cluster examines the consequences of adopting environmental responsibility practice by hospitality industry. For example, Messabia et al. (2022) mentioned that innovation is the key for restaurant to survive during Covid-19 crisis. After that, in rural area, sustainability practice is recommended to enable rural hotels pass the Covid-19 crisis (Marco-Lajara et al., 2022). The impact of Covid-19 pandemic in hospitality industry also can be examined from small and luxury enterprise. In the term of small enterprise, the recovery is depending on resilience (planned and adaptive) which impact on the development on environmental responsibility (Sobaih et al., 2021). Then luxury enterprise could implement new technologies after pandemic to engage more sustainable practices and impact the change of consumer behavior (Peng & Chen, 2021). Additionally, digital technologies are included to data analysis to measure the performance such as water and energy usage or waste production.

Under covid-19 situation, the management technology-organization-environment (TOE) framework is implemented (Osei et al., 2024), stated the increasing of technologies adoption at hotels such as Big Data, robotics, Internet of Things (IoT). The hotel providers hope the adoption of such technologies will offer successful outcomes in sustainable and responsibility innovation in hospitality industry. Additionally, restaurants and hotels were able to survive during pandemic because they implemented home delivery as business framework model, there is no difficulties founded in the kitchen and they can more manage their waste (Sobaih et al., 2021).

At the end, the outcomes of responsibility practice leading a healthier contribution to the environment. Beyond ecological benefits, this kind of responsibility not attract community support but also strengthen hotel reputation by achieve eco-certificate (Xue et al., 2023). Moreover, it also promotes local job and encourage travelers to spend more within communities that prioritize environmental responsibility (Bohdanowicz & Zientara, 2008). Literature in this cluster suggest that the impact of environmental responsibility in hospitality industry not only gives benefit for local environment and residents but also help build awareness among travelers related the importance of environmental responsibility.

#### **Discussion and Future Directions**

The finding of this study showed a comprehensive perspective of environmental responsibility by hospitality industry. The analysis concluded to four main themes that illustrate research area in 2000-2024 and each cluster represent the dimensions of responsibility behavior even the outcomes. Hospitality industry which aware toward environment issues are driven by psychological factors such as attitude norms, and perceived behavioral control. This highlights the impact of internal motivations

within management rather than external factors. After that, by implementing environmental responsibility practices, hospitality industries enable to boost their performance, especially in cost reduction, reputation, and customer loyalty. It means that business should be balance with environmental goals to encourage other industry adopt green practices as a part of business strategy.

Environmental responsibility tourism aimed to minimizing environmental impact while support initiatives such as nature conservation, eco-tourism, and community involvement. This topic is increased in the last decade, show the high interest of researchers. Some articles also measure the effectiveness of environmental responsibility by providing basis for the outcomes including waste production, carbon footprint, consumed energy, and overall cost. The observation gives positive impact of hospitality framework and promotes the implementation within the industry.

Based on the findings of bibliometric analysis, several research areas for future research are revealed to develop more understanding about practical application of environmental responsibility.

### **1.5 Exploring more factors that influence environmental responsibility in hospitality**

Future research can consider more factors related to psychological factors such as environmental identification and moral obligation. Then, external factors also should be investigated such as government policy and socio-cultural impact. There is a gap for more research that could examine the impact of cultural preservation, local employment, and communities' involvement, particularly in developing areas. Comparative research across countries also recommended to reveal the comparison of responsibility practices between two or more countries such as waste management regulations and conservation.

### **1.6 Developing quantitative metrics for responsibility outcomes and environmental impacts**

Measuring the environmental impact of hospitality industry become a challenge, especially in quantitative measurement. Future research could focus on developing some metrics to evaluate outcome of hospitality environmental practice, which can be a standardization. By developing clear and consistent metric, hospitality and policymakers have a guidance to make decision. For example, metric related to measure the carbon footprint reduction, allowed hotels to evaluate the effectiveness energy saving strategies in minimize carbon usage. In waste production, some metric like recycling and composting is important for tracking how much the waste is kept out of landfills through recycling or composting programs. Providing quantitative information could allow the comparison across business, motivate others in implementation of environmental responsibility practices.

### **1.7 The implementation of technologies to enhance performance toward environment**

As hospitality industry aware about environmental issues, advanced technology offers benefits to optimize resource use. This can build trust in environmental responsibility. nowadays, AI and IoT has huge potential in predicting needs, analyzing patterns in hospitality industry. In deepen context, AI also can support the minimization of unnecessary energy consumption and reduce costs such as reminders to reuse towel or suggesting efficiency in energy usage in the room settings based on the guest preference. Future research can assess the potential of AI usage in reducing environmental impact, especially in analysis for energy, water, and waste management. Future research can evaluate the costs and benefits of technology adoption, especially for small and medium-sized hospitality industry.

## **CONCLUSION**

Through bibliometric analysis of the literature, this study reveals the research performance and themes in hospitality environmental responsibility literature from 2000-2024. Founded 1,476 articles from Web of Science database, analysis gives finding related to the most productive authors and

journals. Based on the co-occurrence analysis, four major themes are revealed, they are sustainable behavior drivers, hospitality performance, green tourism development, and tourism framework and impact. Additionally, each theme also consists of subthemes, make it more detail in explaining hospitality environmental responsibility. Subthemes of sustainable behavior drivers are tourist psychology, environmental attitude and values, and education and awareness campaigns. Four subthemes for hospitality performance are financial performance and sustainability, sustainable business model, green certifications, and employee training. Regarding green tourism development, subthemes include sustainable daily operational, eco-tourism, and responsible tourism. Then the subthemes for tourism framework and impact are tourism impact, destination management, and policy planning. Furthermore, the content analysis suggests detailed directions and guidance to support future studies with environmental responsibility in hospitality industries.

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