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Food waste research in hospitality, leisure, and tourism: A bibliometric approach with VOSviewer

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ABSTRACT

This study presents a comprehensive bibliometric analysis of food waste research within the hospitality, leisure, and tourism domains using the Web of Science (WoS) Core Collection. A total of 127 English-language articles published between 2012 and 2025 were analyzed. Data were retrieved using the keyword “food waste” across all indexers and refined by language, document type, and WoS subject category filters specific to hospitality, leisure, and tourism. VOSviewer software was employed to conduct co-occurrence, co-authorship, and bibliographic coupling analyses. The findings reveal a sharp increase in food waste research post-2020, with peak activity in 2024. Core journals include the International Journal of Hospitality Management and the Journal of Sustainable Tourism. Thematic clusters highlight three dominant research strands: (1) sustainability practices such as circular economy models and resource-efficient operations, (2) consumer behavior, including plate waste, portion size, and behavioral nudges, and (3) food waste management strategies addressing pre-consumer and post-consumer waste. This interdisciplinary mapping highlights the intersection of environmental sustainability, managerial interventions, and consumer actions in the context of food waste research. The study provides valuable insights for scholars and practitioners seeking to reduce food waste and align industry practices with global sustainability objectives.

KEYWORDS

Food waste, bibliometric analysis, VosViewer

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INTRODUCTION

Food waste has emerged as one of the most pressing global challenges, intersecting with environmental sustainability, economic efficiency, and social equity. From buffet overproduction and portion misalignment to inefficient inventory management and consumer behavior, the sector's operational dynamics pose unique challenges and opportunities for waste reduction. The growing urgency to reduce food waste has prompted a proliferation of academic studies exploring both upstream and downstream factors, including consumer attitudes, managerial interventions, technological innovations, and policy frameworks. Despite the increasing body of literature, there is a lack of structured knowledge synthesis specific to food waste within hospitality, leisure, and tourism domains. While several systematic reviews and thematic analyses exist, they often focus on broader sectors such as agriculture, household waste, or urban food systems, thereby overlooking the nuanced and service-oriented characteristics of hospitality-related food waste.

To address this gap, the current study employs a bibliometric approach to systematically map and analyze the intellectual landscape of food waste research within hospitality, leisure, and tourism. Using data from the Web of Science Core Collection and visualization tools like VOSviewer, this research identifies key publication trends, influential journals, prolific authors, thematic clusters, and global research contributions. The novelty of this study lies in its exclusive focus on hospitality, leisure, and tourism sectors—a scope that has not been comprehensively examined through bibliometric techniques to date. By doing so, this research not only uncovers the evolution of academic thought but also highlights emerging trends, interdisciplinary linkages, and underexplored areas, offering a valuable reference for scholars, practitioners, and policymakers aiming to design targeted interventions for sustainable food practices in service-oriented contexts.

LITERATURE REVIEW

Food Waste

The issue of food waste in out-of-home consumption was acknowledged as both an ethical and economic concern during the post-World War II years of scarcity (Antonschmidt & Lund-Durlacher, 2021). The United Nations has identified food waste as a significant global societal issue, as it undermines the sustainability (both business and environmental) of the food supply chain, exacerbates food insecurity, and worsens social inequality (Filimonau et al., 2021). Defining food waste is challenging, as there is frequently no clear distinction, particularly from a managerial perspective, between food waste and food loss (Filimonau et al., 2020). The primary distinction between *food loss* and *food waste* lies in their origins: food loss typically occurs unintentionally, whereas food waste results from both unintentional and intentional human actions. Food loss typically occurs from harvest, slaughter, or catch through distribution, excluding retail. Food waste, conversely, occurs at the retail and consumption stages (Matzembacher et al., 2020; Pirani & Arafat, 2016), referring to food intended for human consumption that is used for non-consumptive purposes, diverted to animal feed, or discarded despite being edible. It encompasses both edible and inedible food parts removed from the supply chain, which can be recovered or managed through disposal (Dhir et al., 2020). Food waste is classified into three categories based on the degree of human involvement: avoidable, unavoidable, and potentially avoidable (Filimonau & De Coteau, 2019).

According to the United Nations (UN) Food and Agriculture Organization (FAO), about one-third of the global food produced annually for human consumption, roughly 1.3 billion tons, is either lost or wasted. Out-of-home consumption accounts for at least 15% of global food waste (Global Sustainable Tourism Council, 2024). The hospitality and tourism industry generates substantial food waste due to the high volume of food production and service. World Sustainable Hospitality Alliance (2024) estimates that the industry contributes 3% of global food waste, with hotels, restaurants, and catering services producing significant waste through overproduction, preparation losses, and plate waste. In the hospitality and tourism industry, food waste can be divided into categories based on the preparation stage: (a) unavoidable losses, which include inedible food parts like bones or peels, and (b) avoidable losses, referring to food prepared for

consumption but rendered unusable and no longer consumable (Munir, 2022). Food waste occurs during various processes, including food storage, meal preparation, serving, and consumption. The literature commonly categorizes it into storage waste, preparation waste, buffet leftovers, and plate waste (Leverenz et al., 2021). Roy et al. (2023) classify food waste into pre-consumer (e.g., kitchen errors, spoilage) and post-consumer (e.g., uneaten food), emphasizing the need for stage-specific interventions. Overproduction often results from inaccurate demand forecasting, while plate waste is linked to oversized portions and guest preferences (Dhir et al., 2020).

Bibliometric Analysis

Bibliometric analysis is a specialized method for objectively evaluating bibliometric data. It enables researchers to explore the evolution of a discipline and gain insights into emerging trends within that field (Han et al., 2023; Knani et al., 2022; Pelit & Katircioglu, 2022). Bibliometric methods enable a rigorous quantitative evaluation of a specific field's literature (Ülker et al., 2023). The primary methods involve evaluative approaches, which focus on productivity and impact metrics, and relational approaches, such as analyzing co-citation, co-authorship, keyword co-occurrence, and bibliographic coupling. While bibliometrics offers descriptive insights, it is effective for studying extended timeframes, revealing the dynamic evolution, academic, conceptual, and social structure of a scientific field (Coll-Ramis et al., 2024; Okumus et al., 2018). Bibliometric analysis involves utilizing various bibliographical databases, such as ProQuest, Google Scholar, and Scopus; however, Web of Science (WoS) is widely recognized as the primary database for this purpose. With over a century of extensive coverage and more than one billion cited reference links, WoS enables researchers to reliably explore the whole citation network within a research field (Kim & So, 2022). The purpose of the research is to explore how studies have examined food waste in the field of hospitality, leisure, and tourism.

Bibliometric Studies on Food Waste

Bibliometric Studies on Food Waste

Bibliometrics is a research approach that employs qualitative, quantitative, and statistical techniques to analyze academic studies within a particular discipline, identifying relationships and distinctions among them. Widely applied in the social sciences, bibliometric analysis is a favored method for thoroughly investigating and evaluating scientific data, making it ideal for tracing the evolution of research fields (Kement, 2024). To date, a total of 16 studies have been identified that include bibliometric or bibliometric aspects related to *food waste* in their titles in the Web of Science (WoS) database. Research trends highlight consumer behavior, sustainable management, and valorization strategies, with a growing emphasis on circular economy principles and technologies, such as anaerobic digestion and biorefineries, to address the environmental and economic impacts of food waste.

Zhang & Jian (2024) analyzed student food waste research (2000–2023), identifying three phases: starting (2000–2010), exploration (2011–2015), and development (2016–2023). Hotspots included quantification, influencing factors, and behavioral interventions, with the U.S. leading in output. Silva et al. (2024) conducted a bibliometric analysis of Anaerobic Digestion Model No. 1 (ADM1) for dry anaerobic digestion of food waste, identifying adaptations for fruit, vegetable, and municipal waste. Kostakis et al. (2024) explored food waste and sustainable development via a bibliometric review of 761 papers. Findings highlighted the role of effective waste management in environmental sustainability, identifying gaps in research on consumer and entrepreneurial behavior. Danya et al. (2024) reviewed food waste management via biorefineries, finding that microbial and enzymatic technologies transform food waste into biofuels, biochemicals, and bio-based materials, reducing greenhouse gas emissions. Baybars et al. (2024) reviewed food waste in the context of sustainability and circular economy, noting its intersection with economic, social, and environmental goals. The study found increased research interest in consumer-driven avoidable waste, aligning with SDGs 12 and 13.

Syafrudin et al. (2023) performed a bibliometric analysis to examine sustainable food waste management using multicriteria decision-making (MCDM). The study highlighted the role of MCDM in evaluating interventions across environmental, economic, and social dimensions,

thereby promoting interdisciplinary collaboration. Findings emphasized that sustainable strategies reduce avoidable food waste (e.g., edible food discarded due to consumer behavior) and enhance resource efficiency. Pilone et al. (2023) conducted a bibliometric review of 111 papers to investigate household food waste behaviors. They identified four research strands: antecedents of food management behavior (using the Theory of Planned Behavior), economic impacts, COVID-19 effects on consumer behavior, and environmental/the effects of COVID-19 on consumer behavior, and environmental and social effects. Łaba & Olech (2023) analyzed Polish food waste research, finding a focus on ex-post management (e.g., bioenergy) rather than ex-ante prevention, which tends to prioritize energy security over food security. Elgarahy et al. (2023) reviewed sustainable food waste management, finding that pre-treatment strategies enable the conversion of food waste into green fuels, bioplastics, and enzymes. The study confirmed the economic feasibility of transforming both avoidable and unavoidable food waste produced by the hospitality and tourism industry.

Sridhar et al. (2022) conducted a bibliometric analysis on the conversion of food waste to hydrogen energy, finding a 50-fold increase in publications over the past two decades. Five research hotspots were identified, including fuel delivery and environmental impacts. The study focuses on valorizing both avoidable and unavoidable food waste produced by the hospitality and tourism industries to address the global statistic of 33% food waste. Kumar et al. (2022) conducted a bibliometric analysis of 2,498 publications (2000–2022) to explore food waste linked to consumer behavior. They found a 500% increase in publications since 2015, highlighting consumer behavior as a key driver of avoidable food waste, which aligns with the FAO's estimate that 33% of food produced globally (1.3 billion tons) is wasted, often due to deliberate consumer actions. Jia & Qiao (2022) utilized CiteSpace to analyze global food waste research, highlighting a shift from treatment processes to quantification, environmental impacts, and interventions targeting consumer behavior. Restaurant waste was higher per capita than household waste, with meat having a larger environmental footprint. Assis & Gonçalves (2022) reviewed anaerobic digestion for food waste valorization, finding co-digestion as a key optimization strategy. Ideal conditions for methane production included a pH of 7, a solids content of 4–15%, and a C/N ratio of 25. The study addresses both avoidable and unavoidable food waste produced by the hospitality and tourism industry. Bertocci and Mannino (2022) investigated the utilization of plant waste in aquaculture, revealing positive impacts on fish growth, immune systems, and antioxidant defenses. The study highlights the potential of valorizing unavoidable food waste produced by the hospitality and tourism industries (e.g., peels) for sustainable food production.

Zhang et al. (2018) analyzed food waste research (1991–2015), noting a significant publication increase post-2012. Anaerobic digestion and fermentation were mainstream disposal methods, with life cycle assessment gaining popularity. The study addresses both unavoidable and avoidable waste. Chen et al. (2017) conducted a bibliometric analysis of food waste research over 18 years using the WoS database, focusing on 2,340 articles published in 801 journals across 161 WoS subject categories. It found a significant increase in food waste research, particularly over the last eight years, reflecting growing academic interest. Key research themes identified through keyword analysis included clean energy, treatment and valorization, and management innovation, which have gained traction over the past decade.

METHODS

This study employs a science mapping approach within bibliometric analysis, incorporating co-word analysis, co-authorship, citation, and co-citation techniques, primarily visualized through VOSviewer (van Eck & Waltman, 2010). Co-occurrence analysis was used to identify and map keywords and abstract terms. Following the guidelines by Donthu et al. (2021), a co-occurrence threshold of 10 was set to strike a balance between comprehensiveness and interpretability.

Data Source

This study employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol to ensure transparency and replicability of the bibliometric process

(Moher et al., 2009). The PRISMA flow diagram (Figure 1) illustrates the four-step process of identification, screening, eligibility, and inclusion used for document selection.

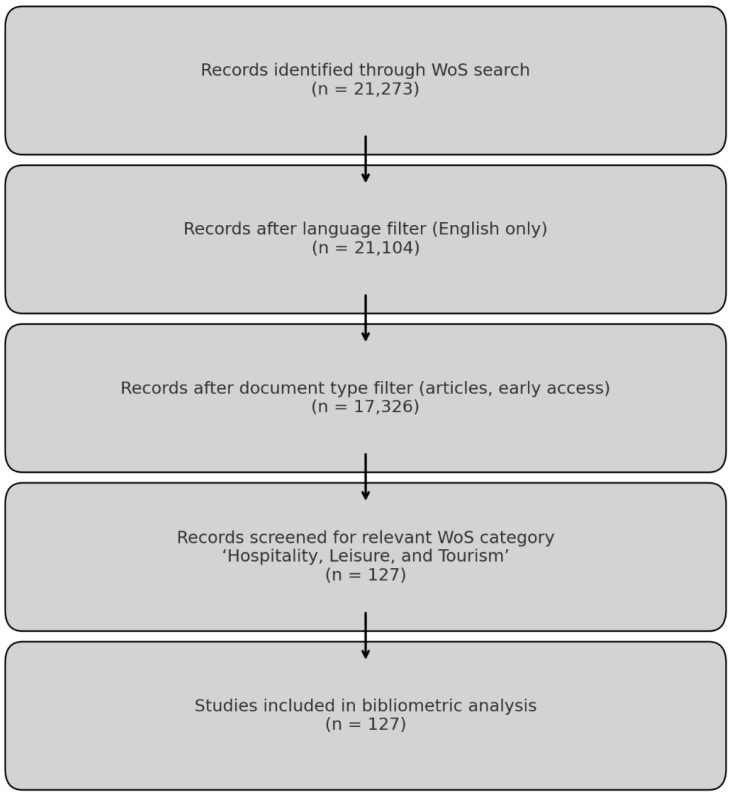

Figure 1. PRISMA Flow Diagram (Source: Moher et al., 2009)

The initial search was conducted in the Web of Science Core Collection on May 1, 2025, using the keyword "food waste" across all the WoS indexes. While broader terms such as *food loss* or *plate waste* are conceptually related, they were excluded to maintain consistency in scope and conceptual clarity, as these terms often refer to distinct stages and causes of food inefficiency (Filimonau & De Coteau, 2019; Roy et al., 2023). Future studies could adopt a broader set of terms for more inclusive coverage.

A total of 21,273 documents were retrieved. After filtering by English language, document type (articles and early access), and disciplinary category (limited to hospitality, leisure, and tourism), the final sample was narrowed down to 127 publications. The rationale for using this specific category lies in the study's objective to map food waste scholarship within service-based, tourism-oriented environments, rather than industrial or household contexts. While alternative databases, such as Scopus or ProQuest, offer broader indexing, the WoS was chosen due to its curated high-impact journals and standardized citation indexing, which are widely accepted in bibliometric research (Han et al., 2023; Ülker et al., 2023).

Data Analysis

The VOSviewer software was employed for data analysis. VOSviewer is a software tool designed for constructing and visualizing networks, with a focus on graphical representation and aiding in the interpretation of extensive bibliometric maps. These networks can encompass journals, authors, or institutions, built on relationships such as citations, bibliographic coupling, co-citations, or co-authorships. In the visualizations, circles represent analyzed items, labeled accordingly, with larger circles indicating greater weight in the network. The proximity between items reflects their degree of relatedness, while thicker connecting lines signify stronger ties. Items are grouped into clusters using location and color (Palácios et al., 2021; Pelit & Katircioglu, 2022).

FINDINGS

Descriptive Findings

Publication by Year

The frequency distribution of publication years reveals a growing academic interest in food waste research within the hospitality and tourism fields. While publication activity was relatively modest in 2020—likely due to the disruptions caused by the COVID-19 pandemic—it began to recover in 2022 and 2023. A significant surge occurred in 2024, with the number of studies doubling compared to previous years, indicating heightened scholarly attention likely driven by global sustainability goals and increased institutional or policy support. Publication levels remain high in 2025, suggesting that food waste has become a well-established and maturing research area. This trend highlights the field's responsiveness to contemporary environmental challenges and its alignment with broader responsible consumption and production agendas. Figure 2 illustrates the upward trajectory of food waste research in the hospitality, leisure, and tourism domain.

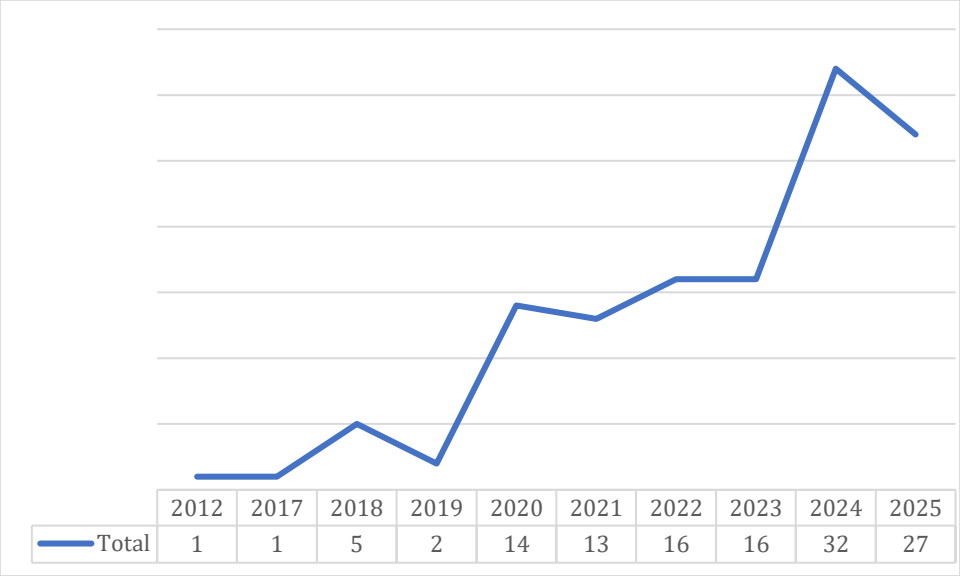

Figure 2. Publication Trend (Source: Own research)

Publications by Journal

Research on food waste is highly concentrated in a few key academic journals, particularly those focused on hospitality and sustainability. The International Journal of Hospitality Management leads with 28 publications, followed closely by the Journal of Sustainable Tourism with 25, demonstrating that food waste is being addressed both from an operational hospitality perspective and a broader sustainable tourism lens. These journals serve as primary outlets for scholars exploring food waste issues, suggesting a strong alignment between journal scopes and the interdisciplinary nature of food waste topics. Other journals, such as the Journal of Quality Assurance in Hospitality & Tourism and the International Journal of Contemporary Hospitality Management, also appear with fewer but notable contributions, indicating a secondary tier of interest among hospitality-focused journals. The presence of multiple specialized journals reflects a healthy diversification of publication venues; however, the dominance of a few core outlets suggests an emerging consolidation of authority in this research space. Overall, the source title distribution highlights the field's integration into mainstream hospitality and tourism research, while also underscoring its relevance to sustainability-driven academic discourse. Figure 3 shows the frequency of journals.

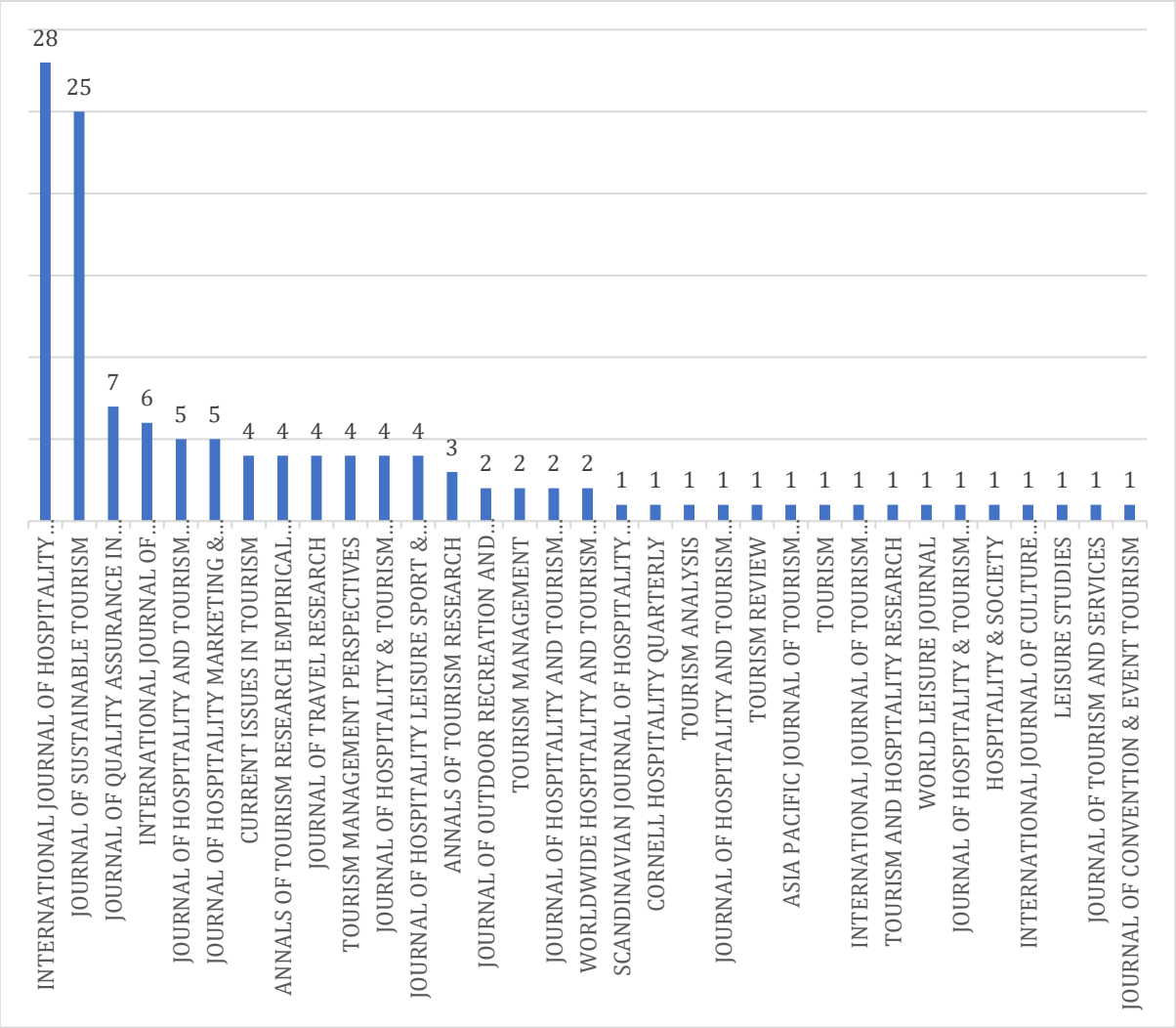

Figure 3. Journals (Source: Own research)

Publications by Country

The bibliometric analysis encompassed publications from 33 countries worldwide (Figure 4). The USA leads in food waste research publications (19 articles), closely followed by Australia (17). This demonstrates a strong research presence from English-speaking countries in the Global North. England and the People's Republic of China each contributed 10 publications, highlighting the engagement of both developed Western and major Eastern economies in this area. Countries such as Spain, Türkiye, Taiwan, and Austria also demonstrate substantial involvement, indicating a broader geographic presence within Europe and Asia. The presence of emerging economies and developing nations, such as South Africa, Kenya, and Indonesia—although with lower frequencies—indicates a growing awareness and engagement in sustainability issues on a global scale. The wide distribution across over 30 countries underlines the global relevance of food waste as a research topic and its connection to policy, sustainability, and hospitality industry practices across diverse socio-economic contexts.

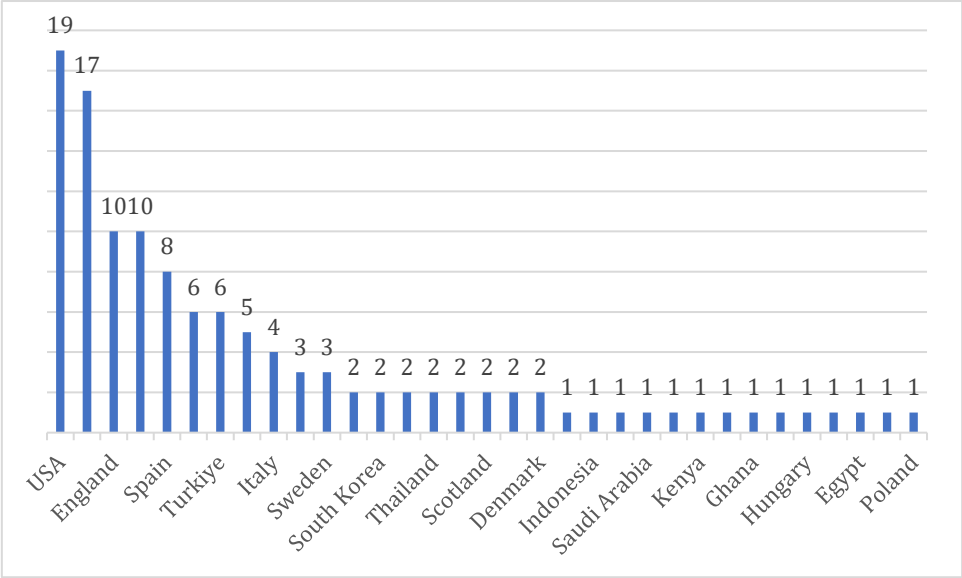

Figure 4. Countries (Source: Own research)

Publications by Research Approach

Researchers employed qualitative or quantitative approaches, striking a balance between in-depth exploration (e.g., interviews) and statistical modeling (e.g., structural equation modeling, or SEM). Experimental and quasi-experimental studies are also common, indicating a focus on testing interventions to reduce food waste. Reflective and review studies highlight theoretical contributions and literature syntheses in the field (Figure 5).

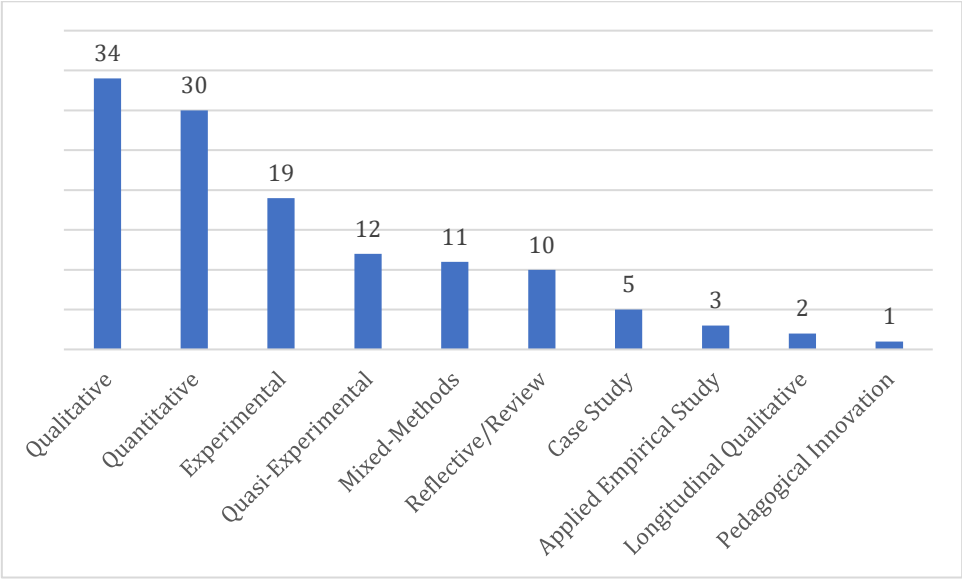

Figure 5. Research Approach (Source: Own research)

Publications by Data Collection Method

Interviews are the most common data collection method, reflecting the qualitative focus on understanding the perspectives of stakeholders (e.g., managers, chefs). Surveys are widely used in quantitative studies, often to collect data from diners or employees for SEM or statistical analysis. Experiments are prevalent, particularly for testing interventions such as nudging or message framing, in both controlled and field settings. Literature reviews support reflective and review studies, while observation is employed in specific contexts, such as naturalistic studies or field experiments (Figure 6).

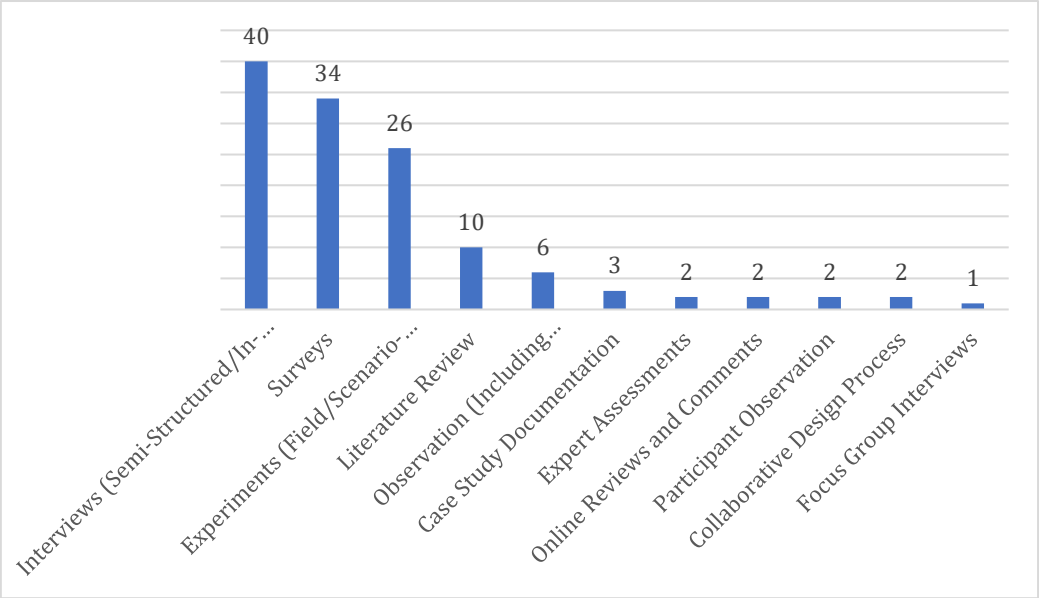

Figure 6. Data Collection Method (Source: Own research)

Mostly Used Abstracts

Co-occurrence analysis is a method that identifies word pairs appearing together in the titles, keywords, or abstracts of scholarly articles, enabling the grouping of topics into related but distinct categories. This approach quantifies the frequency of keyword co-occurrences in academic literature, providing a structured overview of a research field's knowledge landscape (Liao et al., 2025). The VOSviewer software was used for this analysis, as it thoroughly examines all words in the titles and abstracts, computes their co-occurrence frequencies, and visualizes relationships through network mapping. When filtered to include terms with at least 10 occurrences each, the total number of the most frequently used words was 30. A visual map depicting these most frequently used keywords is shown in Figure 7.

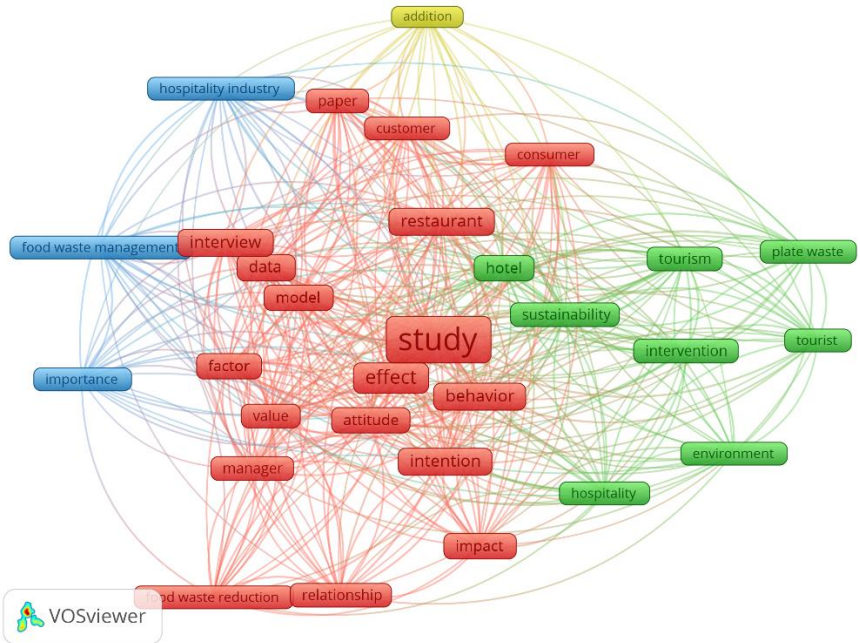

Figure 7. Most Commonly Used Words in Abstracts (Source: Own research)

Figure 7 illustrates that food waste research in hospitality and tourism is primarily centered on behavioral and empirical themes, with key terms such as *study, effect, behavior,* and *intention* highlighting a strong focus on understanding consumer actions and the outcomes of interventions. The field is interdisciplinary, with one cluster focusing on sustainability and tourism-related topics, including the environment, tourism, and food waste. At the same time, the other focuses on operational and managerial contexts within the hospitality industry, including topics such as food waste management and sustainability in the hospitality sector. The strong interconnectivity among clusters indicates that researchers are linking behavioral insights with sustainability practices and industry applications, reflecting a holistic and solution-oriented approach to addressing food waste.

Most Commonly Used Keywords

The VOSviewer software was employed again, and when filtered to include terms with at least 10 occurrences each, the total number of the most frequently used keywords in the studies was 22. The results identify three primary keyword co-occurrence networks: Food waste generation and reduction (blue), sustainability and management (green), and consumption and behavior (red). A visual map depicting these most frequently used keywords is shown in Figure 8.

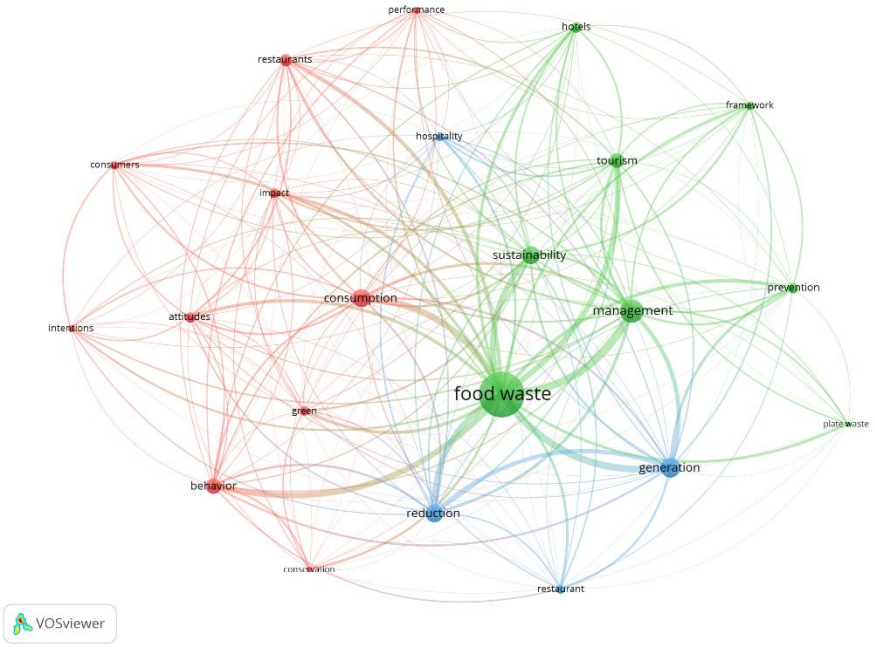

Figure 8. Most Commonly Used Keywords (Source: Own research)

The green cluster integrates food waste with sustainability goals, emphasizing management strategies in hotels and restaurants to achieve environmental outcomes, often through waste reduction and circular economy practices. It focuses on the broader ecological and managerial aspects of food waste in the hospitality industry, emphasizing sustainable practices and operational strategies. The Blue Cluster focuses on the sources of waste and direct mitigation strategies, highlighting operational challenges that arise from these sources. It captures the *what* and *how* of food waste generation and immediate reduction tactics. Red Cluster addresses the human element, exploring how consumer behaviors, social norms, and communication strategies influence food waste, with a focus on fostering pro-environmental actions. It examines the human and social aspects of food waste, concentrating on consumption patterns and behavioral factors.

DISCUSSIONS

This study contributes to the literature by providing the first focused bibliometric mapping of food waste research within the hospitality, leisure, and tourism sectors, a gap previously overlooked by broader food waste reviews that primarily emphasize agriculture, household settings, or industrial contexts (Dhir et al., 2020; Kumar et al., 2022). It uniquely bridges bibliometric science mapping with a service-sector lens, revealing thematic clusters around consumer behavior, sustainability practices, and operational management, thereby advancing knowledge on how food waste is conceptualized and tackled in service-intensive industries.

The findings from this bibliometric study reveal that research on food waste in hospitality, leisure, and tourism has gained remarkable momentum over the past decade, particularly since 2020. The temporal distribution of publications suggests that global environmental concerns, coupled with the Sustainable Development Goals (e.g., SDG 12), have significantly influenced scholarly attention. The dominance of journals such as the International Journal of Hospitality Management and Journal of Sustainable Tourism emphasizes the dual lens through which food waste is studied—both as an operational inefficiency and a broader sustainability challenge. The most frequently cited terms and keywords indicate three core thematic areas: the behavioral dimensions of consumption and waste, strategic waste management practices, and the environmental impacts of food systems. Furthermore, the co-occurrence networks of abstract terms and keywords depict a highly interdisciplinary knowledge structure where psychological theories, managerial practices, and ecological models intersect. Countries such as the USA, Australia, and China lead in research output, highlighting a geographic concentration of academic resources and a policy emphasis on food sustainability. The bibliometric mapping also reveals a gradual shift from waste quantification and processing technologies to prevention-oriented approaches, which involve consumer engagement and operational innovation. This trend aligns with the hospitality industry's broader shift toward circularity, ethical responsibility, and environmental accountability. The interconnectivity among clusters suggests a holistic approach, where sustainability goals drive management strategies that, in turn, target consumer behavior to reduce waste generation.

One noticeable finding in this study is the relatively low emphasis on technology-related themes in the current body of research. For example, the keyword *technology only* appeared a few times across all the analyzed articles. This underrepresentation could be due to several reasons. First, food waste research in hospitality has traditionally focused on human behavior and operational practices—such as portion sizes, consumer choices, or buffet design—rather than digital solutions (Filimonau & De Coteau, 2019). Second, many hospitality businesses, particularly small and independent ones, may not yet have the resources or infrastructure to adopt advanced technologies like AI or IoT, which makes these topics less prominent in both practice and academic inquiry (Liao et al., 2025). It is also worth noting that the integration of technology into sustainability efforts is a relatively new area, meaning research is just beginning to explore these possibilities (Kement, 2024).

IMPLICATIONS

This study provides valuable insights for both industry professionals and policymakers. For hospitality managers, the findings reinforce the value of practical strategies, such as right-sizing portions, more accurate forecasting of guest demand, and training staff to minimize waste during service. These are low-cost, practical steps that can make a real difference. On the other hand, the current research's lack of focus on digital tools suggests a significant opportunity for businesses willing to adopt innovative technologies, such as AI-powered kitchen systems or real-time waste tracking apps, to stand out as leaders in sustainability.

For policymakers, the study highlights the need for increased support in this area. Offering financial incentives, grants, or sustainability certifications that reward innovation could help businesses, especially in developing regions, invest in food waste technology. Promoting these tools more broadly can also help the industry move closer to achieving global sustainability goals, such as those outlined in SDG 12.

LIMITATIONS

This study offers a novel contribution by systematically mapping the intellectual structure of the field and identifying sustainability-centered thematic clusters, such as consumer behavior, operational management, and circular economy strategies, using advanced visualization techniques. By focusing specifically on the service-oriented dimensions of food waste, this research provides clarity to an area that broader studies on agricultural or household waste have often overshadowed.

However, several limitations must be acknowledged. The analysis was restricted to the Web of Science Core Collection, which, despite its academic rigor, may exclude relevant literature indexed in other databases such as Scopus, Google Scholar, or ProQuest. Additionally, only English-language publications were considered, which may have introduced language bias and limited the global representativeness of the findings. Finally, while VOSviewer is a powerful tool for identifying structural relationships between keywords, authors, and sources, it does not provide qualitative content analysis or interpretive depth. Future research could complement this study by incorporating thematic analysis or full-text reviews to capture nuanced insights and evolving discourse in the field.

FUTURE RESEARCH DIRECTIONS

This bibliometric analysis identifies several promising directions for future research on food waste in the hospitality, leisure, and tourism field.

First, while the field has made meaningful progress in exploring consumer behavior and operational management, technological solutions remain notably underrepresented. Given the rise of AI, IoT, and smart kitchen innovations, future studies could explore how these tools enhance forecasting, inventory control, and waste monitoring. Big data analytics, machine learning algorithms, and systematic implementation case studies could offer valuable insights into scalable tech-based interventions.

Second, the green cluster, which centers on sustainability goals and management strategies (e.g., circular economy, waste reduction practices in hotels and restaurants), would benefit from comparative case studies or action research to assess the effectiveness of different organizational practices across cultural and economic contexts.

Third, the red cluster, which emphasizes consumption and behavior, including topics such as plate waste, social norms, and pro-environmental actions, presents an opportunity for experimental designs, longitudinal studies, or cross-cultural surveys to evaluate how different interventions perform over time and in various hospitality settings.

Fourth, the current geographic distribution of research is concentrated in developed countries. Expanding food waste studies to developing regions, particularly in Africa and Latin America, through qualitative fieldwork, ethnographic studies, or participatory approaches, could yield more inclusive and culturally relevant findings.

Finally, while prevention and reduction dominate the conversation, the concept of food valorization—turning waste into resources—is emerging. Here, design science, pilot projects, or collaborative research with engineers and food scientists could help bridge gaps between hospitality practices and circular economy innovations.

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