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Understanding Multisensory Experiences in Hotels: A Review of Emerging Trends and Research

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ABSTRACT

This study investigates the evolution of multisensory experiences in the hospitality industry, focusing on hotels. Despite the growing importance of digital applications, in-depth research on digital multisensory development remains limited. It provides insights into notable works, research trends, and possibilities for further research. Scopus database identified 214 digital multisensory experiences articles in hospitality, analysed using VOSviewer to examine publishing and citation structures, integrating co-authorship, co-citation networks, keyword co-occurrence networks, and bibliographic coupling. This research highlights key insights from extensively referenced works about multisensory experiences in hospitality, analyzing publishing trends and the impact of authors, journals, and studies using bibliometric analysis. It emphasizes the need to explore the relationship between multisensory experiences and digital advancements and suggests future research directions. This research enhances the understanding of multisensory applications in hotels by analyzing bibliometric data from the Scopus database covering 2014 to 2024. The study highlights the growing importance of multisensory experiences and digital transformation in the hospitality sector, highlighting new opportunities for effective implementation.

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1. INTRODUCTION

The tourism and hospitality industries have been pioneers in adopting digital innovations, starting with the rise of online bookings. Database marketing, including consumer segmentation and guest profile enhancements, which was a trend 20 years ago, is now a standard tool in daily hotel operations. At the same time, consumers face more complex choices and have more channels to explore them than ever before. This heightened competition makes it challenging for hotel brands to differentiate themselves in a crowded market.

Beyond digital applications, multisensory experiences are essential for enhancing guest satisfaction and staff efficiency. The hotel industry is undergoing a significant transformation driven by technological advancements and shifting consumer preferences. Uniqueness remains a critical factor for consumers when selecting tourism products.

Guest-oriented technological conveniences in hotel rooms improve comfort and safety while enabling personalized experiences. These include selecting minibar preferences, adjusting lighting and climate controls, operating the television, choosing room scents, and scheduling morning coffee. These services serve as both functional enhancements and sensory stimulations for guests.

Recognizing the critical importance of consumer experience in the hotel industry, this paper addresses the gap in research on multisensory experiences. Using a systematic literature review (SLR) guided by PRISMA protocols (Moher et al., 2015), it examines peer-reviewed English-language articles published between 2014 and 2024, providing a comprehensive analysis of recent advancements in the field.

2. METHODOLOGY

2.1. Data Collection and Selection

The study aimed to analyze academic literature on digital transformation in the tourism sector through a bibliometric approach. The Scopus database is the largest repository for peer-reviewed literature, serving as both an abstract and citation repository (Schotten et al., 2017), was used for its comprehensive coverage of global research output across disciplines (Aksnes & Sivertsen, 2019) the research utilizes advanced tools for tracking and visualizing data.

The data gathering procedure included three stages.:

a. Keyword Search: Terms “multi-sensory,” “hospitality,” and “hotel”. The search was conducted using the title, abstract, and keywords.
b. Data Refinement: Duplicate records were removed, data was filtered by subject area, and top journals were identified. The sample covered publications from 2004 to February 2024.
c. Exclusion of Non-English Publications: Non-English records were excluded to ensure consistency in the dataset.

This systematic approach provided a robust foundation for the bibliometric analysis.

2.2. Tools for Analysis

The Scopus database and VOSviewer software were used for showing the bibliographic data of this research. Bibliometric analysis is often used in tourist literature to evaluate publications and contributing researchers. A limitation of this study is its focus solely on articles and conference papers, with some documents being unretrievable. Specifically, out of 214 identified items, three articles and six conference papers could not be collected.

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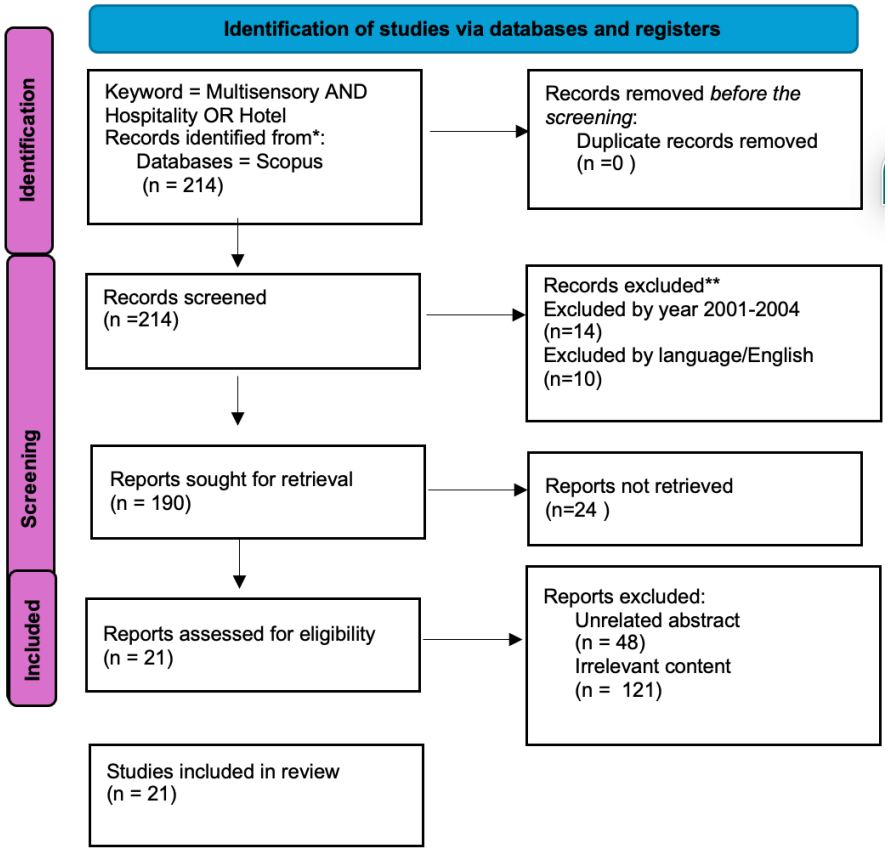


Figure 1. Protocol for Selection of Articles

3. RESULTS AND DISCUSSION

3.1. Most Influential Study

Identifying influential studies in a literature review is crucial for establishing a solid research foundation, understanding core ideas and frameworks, and aligning with key contributions in the field. Table 1 highlights Ten important publications in the area of multisensory experiences and hospitality. The leading authors, Buhalis et al. (2019), with 360 citations, explore the impact of emerging technologies like IoT, AI, VR, and AR on tourism and hospitality management. Their work emphasizes disruptive innovations such as immersive experiences, hyper-personalized services, and beyond-automated solutions, advocating for further research to enhance customer engagement and satisfaction.

Dohee and Perdue's (2013) study on multisensory experiences in hospitality revealed that guests prioritize emotional and sensory experiences, which significantly enhance satisfaction. Their findings suggest that hotel managers can refine marketing strategies by emphasizing emotional connections and sensory elements, effectively meeting customer expectations and improving overall satisfaction.

The study "Multisensory Experience for Enhancing Hotel Guest Experience: Empirical Evidence from Big Data Analytics" (Lee et al., 2019) examines the influence of Multisensory experiences and their impact on customer satisfaction within the hospitality industry. It concludes that positive sensory experiences substantially increase satisfaction, while negative experiences amplify dissatisfaction.

Studies highlight the critical impact of multisensory experiences on guest satisfaction and hotel choice, with emotional and sensory elements being top priorities in decision-making. Integrating these elements enhances satisfaction, fosters emotional connections, and meets

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or exceeds expectations. Big data analytics further enables hotels to design immersive sensory environments and address sensory shortcomings proactively. Positive sensory experiences boost satisfaction, while negative ones heighten dissatisfaction.

The findings emphasize the strategic importance of multisensory appeal in marketing, product development, and operations. By creating meaningful and immersive guest experiences, hotels can build loyalty, differentiate their offerings, and gain a competitive edge in the hospitality industry.

Table 1. Ten important publications in the area of multisensory experiences and hospitality

No	Author	Scopus Citations	Title	Year
1	Dimitrios, B., Harwood, T.	360	Technological disruptions in services: lessons from tourism and hospitality	2019
2	Callinan, Joanne E; Clarke, Anna; Doherty, Kirsten; Kelleher, Cecily	315	Legislative smoking bans for reducing secondhand smoke exposure, smoking prevalence and tobacco consumption	2010
3	Dohee, Kim., Perdue, Richard.	154	The effects of cognitive, affective, and sensory attributes on hotel choice	2013
4	Farrelly M.C., Nonnemaker J.M., Chou, R.	149	Changes in hospitality workers' exposure to secondhand smoke following the implementation of New York's smoke-free law	2005
5	Chan, Ambrose Pak Ho, Tung, Vincent Wing Sun	127	Examining the effects of robotic service on brand experience: the moderating role of hotel segment	2019
6	Wiedmann, Klaus-Peter., Labenz, Franziska	101	The power of experiential marketing: Exploring the causal relationships among multisensory marketing, brand experience, customer perceived value and brand	2018
7	Lee, Minwooa., Lee M., Koh, Yoon	91	Multisensory experience for enhancing hotel guest experience: Empirical evidence from big data analytics	2019
8	Kang, Juhee., Manthiou, Aikaterini., Sumarjan, Norzuwana., Tang, Liang (Rebecca)	86	An Investigation of Brand Experience on Brand Attachment, Knowledge, and Trust in the Lodging Industry	2017
9	Lin, Lin., Mao, Pei-Chuan	87	Food for memories and culture - A content analysis study of food specialties and souvenirs	2015
10	Kim D.; Park B.-J.R.	74	The moderating role of context in the effects of choice attributes on hotel choice: A discrete choice experiment	2017

Source: https://www.scopus.com/2026

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3.2. Most Productive Author

Research trends are shaped by key contributors, such as prolific authors, who set quality standards, guide future research, and inspire academic progress. Recognizing productive authors not only motivates others but also influences resource allocation and increases the visibility of the academic community. Metrics evaluating productivity and impact provide valuable insights into an author's influence, aiding scholarly communication, strategic planning, and the quality of literature reviews.

Using VOSviewer software, the analysis of bibliographic information identified Spence et al. as the most prolific contributors, with five documents related to multisensory hospitality. Their work strengthens the emerging field of multisensory integration, emphasizing a multidisciplinary approach that moves beyond traditional "sense-by-sense" studies to view perception as inherently multisensory (Spence et al., 2014).

Charles Spence is a prominent figure in multisensory research, bridging experimental psychology with real-world applications in industries like food, hospitality, marketing, and product design. His work on the guest experience specifically shows how deliberately designed multisensory cues can be used to shape emotion and memory during a hotel stay (Spence, 2022), establishing him as a central figure in the field and driving its integration into global industries.

Betina Piqueras-Fiszman is a leading expert in multisensory perception, emphasizing its applications in culinary and dining experiences. Her research demonstrates how sensory elements, such as utensil design (Piqueras-Fiszman et al., 2011) and ambient music, influence emotions and enhance guest satisfaction and loyalty. A collaborator with Charles Spence, she has significantly contributed to the fields of gastrophysics and sensory marketing (Piqueras-Fiszman & Spence, 2015), inspiring innovation in restaurant and food product design. Her work highlights the importance of multisensory elements in shaping consumer behavior and decision-making, driving advancements in hospitality and food industries.

Norzuwana Sumarjan, the third most productive author, has made significant contributions to hospitality and tourism management, focusing on quality practices — for example, examining the operational and management challenges hotels face in implementing Total Quality Management (Anuar, Sumarjan, & Mohd Radzi, 2017) — which in this bibliometric cluster sits alongside, and is treated as connected to, the multisensory-experience literature reviewed here. The significance of sensory engagement in influencing consumer perceptions, satisfaction, and loyalty. By integrating sensory elements into service delivery and marketing strategies, Sumarjan provides practical insights for enhancing guest experiences and achieving a competitive edge in the hospitality industry. Her work serves as a valuable resource for practitioners aiming to improve customer satisfaction and foster loyalty through strategic sensory experiences.

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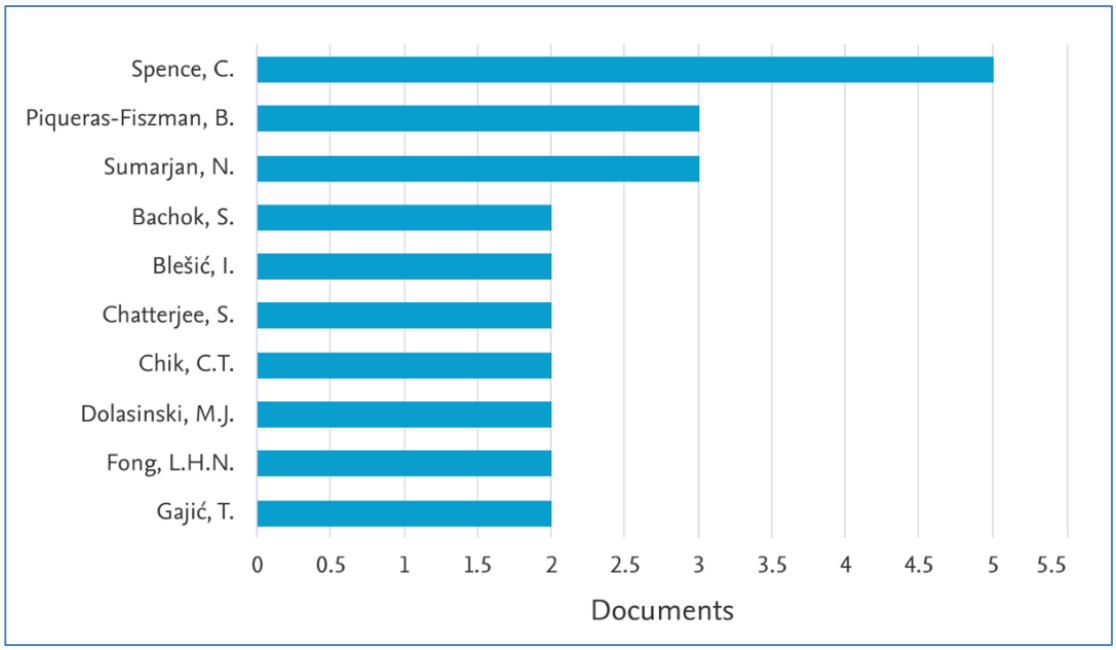


Figure 2. The highest documents produced by authors
Source: https://www.scopus.com/2026

The authors mentioned above represent a diverse group of individuals who have collaborated on various projects related to multisensory experiences. Below is a list of authors who have contributed to research on multisensory experiences through collaboration.

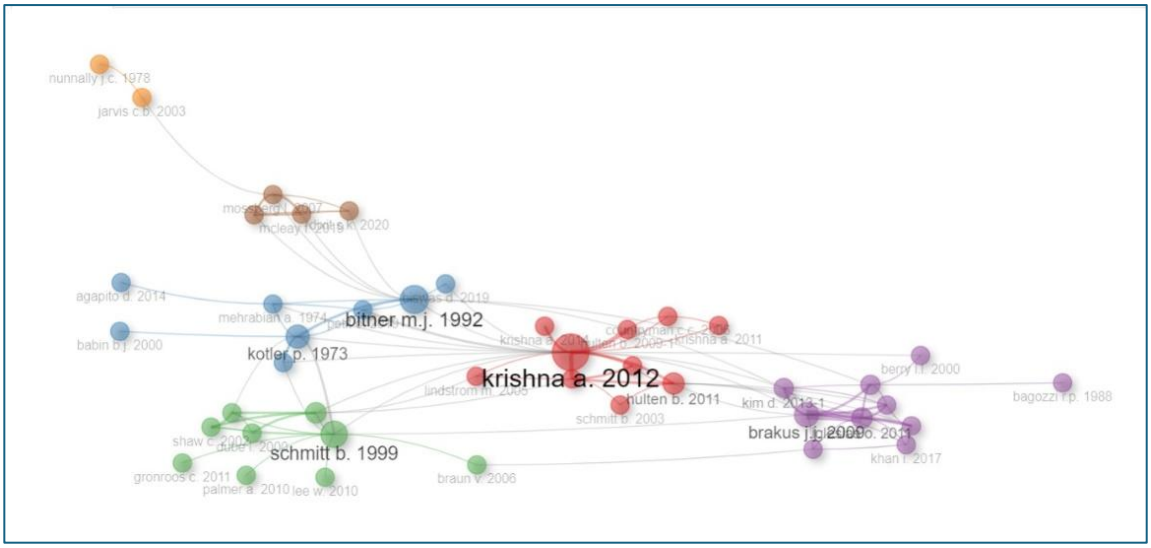


Figure 3. Co-citation Network
Source: VosViewer, 2026

Co-citation networks are crucial for identifying influential works and authors, mapping research themes, and tracing the evolution of ideas in a field. They analyze citation frequencies to reveal a discipline's intellectual structure, highlight research gaps, and foster interdisciplinary collaboration. This method enhances literature reviews and provides insights into foundational theories, methods, and key focus areas.

Red Cluster: Sensory Marketing

A study by Krishna (2012) pioneered sensory marketing, emphasizing the role of sensory stimuli—sight, sound, taste, touch, and smell—in shaping consumer perceptions, emotions, and behavior. (Schmitt, 1999) contributed to experiential marketing by focusing on creating

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engaging, multisensory brand experiences. (Hultén, 2011) introduced the concept of sensory branding, demonstrating how brands can strategically use sensory elements to build emotional connections with consumers. (Lindstrom, 2008) authored influential work on brand sense, integrating sensory branding into comprehensive marketing strategies.

This cluster lays the groundwork for sensory marketing as a subfield, connecting neuroscience, psychology, and marketing. It examines how sensory inputs influence customer experiences, emotions, memory, and brand attachment. By integrating research with practical applications, it offers insights for companies to design multisensory experiences that enhance brand differentiation and consumer engagement.

Blue Cluster: Theoretical Foundations and Servicescape

A study by Russell & Mehrabian (1974) proposed the stimulus-organism-response (SOR) framework, which explains how environmental stimuli influence emotions and behaviors. A study by Kotler (1973) introduced the concept of atmospherics in marketing, emphasizing how physical environments, such as lighting and music, impact consumer decision-making. A study by Bitner (1992) developed the servicescape framework, which highlights how the design and atmosphere of service environments shape customer experiences and satisfaction.

These foundational theories form the theoretical basis for understanding consumer behavior in physical and digital settings. They highlight the role of environmental psychology in marketing and service design, paving the way for sensory and experiential marketing by connecting environmental stimuli to customer emotions and behaviors.

Green Cluster: Experiential Marketing

A study by Schmitt (1999) conducted groundbreaking work in experiential marketing, focusing on creating memorable and engaging customer experiences that extend beyond functional benefits. Grönroos (2006) contributed to the understanding of service management by emphasizing the importance of co-creating value through customer interactions. A study by Koenig-Lewis & Palmer (2014) examined the role of emotions and experiences in shaping consumer satisfaction.

The study shifted marketing focus from product features to customer emotions and experiences, emphasizing emotional connections for brand loyalty and integrating sensory inputs into experiential strategies, advancing experiential and sensory marketing practices.

Purple Cluster: Brand Experience

A study by Brakus et al (2009) sensory, emotional, behavioral, and intellectual elements of brand experience were defined and quantified according to the brand experience — providing a widely cited framework that serves as a cornerstone for brand experience research. A study by Berry & Carbone (2002) investigated the relationship between service quality and brand equity, so laying the framework for the confluence of services and branding. A study by D. Kim & Perdue (2013) focused on brand-consumer interactions, particularly how digital environments enhance brand experiences. A study by I. Khan et al (2015) investigated emotional branding and its influence on customer loyalty and advocacy.

The cluster emphasizes the significance of multisensory branding in brand management, linking it to customer satisfaction, loyalty, and advocacy, as a strategic tool for differentiation in competitive markets.

Orange Cluster: Methodology and Measurement

A study by Nunnally (1978) is a foundational reference in psychometrics, focusing on reliability and validity in measurement models. A study by Jarvis et al. (2003) examined the distinctions between reflective and formative conceptions, which are essential for guaranteeing accurate and trustworthy data in marketing research. (Davies et al., 2020)

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introduced advancements in quantitative methodologies, emphasizing novel tools and models in marketing and psychology research.

This study enhances methodological rigor for sensory, experiential, and brand marketing studies by improving measurement techniques and ensuring reliability and validity of constructs like brand experience and servicescape effects.

The Red Cluster, a key component of marketing research, connects theory, methodology, and practical applications. The Blue Cluster provides a theoretical framework for experiential marketing, while the Green, Purple, and Orange Clusters focus on consumer-facing contexts. The Orange Cluster ensures empirical robustness of research across all clusters, illustrating the interdisciplinary nature of modern marketing, which integrates psychology, branding, and experiential design.

3.3. Most Productive Journal

A systematic literature review (SLR) ensures high-quality reviews by aligning with research trends, guiding strategic publication decisions, and fostering academic collaboration. It helps researchers prioritize reputable sources, increase exposure, and inform resource allocation and policy-making. This study identifies top journals contributing to research on multisensory experiences in hospitality; assessing measures include total citations (2020), SJR rank (2020), SNIP, and total publications.

The International Journal of Contemporary Hospitality Management (IJCHM) leads in publishing research on guest journey mapping, multisensory experiences, experiential marketing, and the role of technology in customer satisfaction. It addresses emerging hospitality trends, informs industry practices, and is the most productive journal in this domain, with nine articles on multisensory experiences.

The International Journal of Hospitality Management (IJHM) is another renowned journal focusing on customer experience and satisfaction. It has published four articles on multisensory experiences and features rigorous studies on guest behavior, service quality, experiential design, service innovation, digitalization, emotional and sensory experiences, and sustainability. Bridging theory and practice, IJHM offers valuable insights for both researchers and practitioners.

Table 2. Most Productive Journal

No	Journal	No of articles	Nation	CiteScore (2022)	Impact index SJR (2022)	SNIP	Publisher
1	International Journal of Contemporary Hospitality Management	9	United Kingdom	13.06	2.500	2.074	Emerald Group Published Ltd.
2	International Journal of Hospitality Management	4	United Kingdom	18.03	2.928	2.694	Elsevier Ltd.
3	Sustainability	3	Switzerland	05.08	0,4611	1.198	Multidisciplinary Digital Publishing Institute (MDPI)
4	British Food Journal	4	United Kingdom	05.04	0,4479	0,6590	

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No	Journal	No of articles	Nation	CiteScore (2022)	Impact index SJR (2022)	SNIP	Publisher
5	Proceedings of The Academy of Marketing Science	4	United States	0.1	N/A	N/A	

Source: https://www.scopus.com/2024

3.4. Country-Based Productivity

Figure 4 depicts the geographic distribution of study results concerning multisensory experiences within the hospitality industry. The United States has most number of research, then comes the United Kingdom with 30 studies, China with 16 studies, and Malaysia and Spain ranking fourth and fifth, respectively. This distribution highlights the global interest in multisensory experiences in hotels, with contributions spanning regions across the Americas, Europe, and Asia.

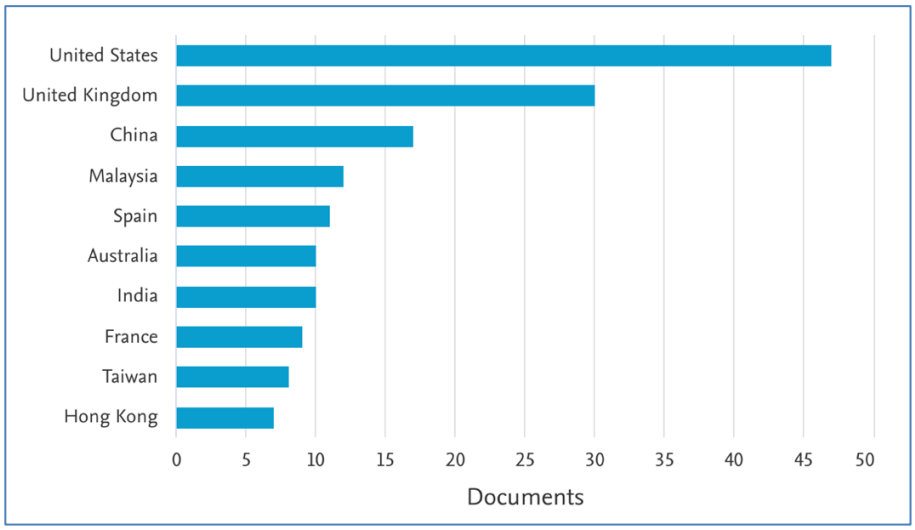


Figure 4. Most Productive country
Source: https://www.scopus.com/2026

3.5. Country-Wise Collaboration Network Analysis

The study reveals that the United States, China, the UK, Malaysia, and France have the highest levels of collaboration in 14 countries, with the "United States" node having the most connections. The network is organized into four clusters: Canada, Germany, Japan, Spain, the United Kingdom, Australia, France, India, China, Hong Kong, Taiwan, and South Korea and the United States.

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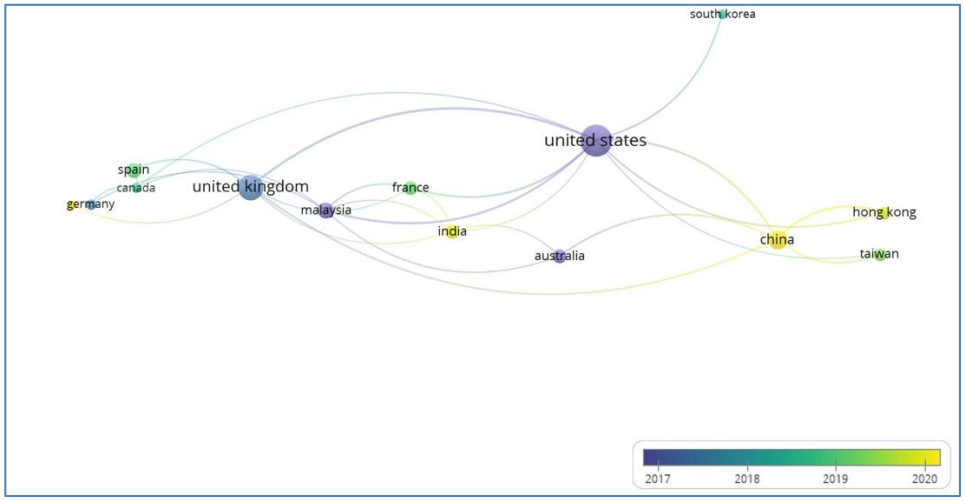


Figure 5. Cross-country collaboration networks
Source: Vosviewer, 2026

The global multisensory research network connects countries working on diverse sensory experiences. The United States leads in foundational research, focusing on sensory marketing, psychology, and neuroscience. The UK is prominent in applied research, emphasizing sensory design and marketing. Emerging countries like China and India advance applied multisensory research, while Germany and France explore cognitive responses and sustainable practices. Australia and Canada focus on environmental and cultural dimensions of multisensory experiences.

Multisensory research emphasizes collaboration and cultural diversity, with Asian countries like China, India, and Hong Kong playing a crucial role in understanding sensory preferences. Global partnerships, particularly between the US and the UK, are essential for interdisciplinary understanding. Global collaboration patterns reveal key contributors, emerging players, and the evolution of partnerships, reflecting the interconnected nature of the field and Asia's growing influence in the future.

3.6. Predominantly frequent keywords

The thirty most frequent terms indicate that "Human" is the most prevalent, appearing 27 times with a total link strength of 188. Other keywords related to human characteristics include “male,” “female,” “adult,” and “middle-aged.” Keywords associated with work areas include “catering service,” “restaurant,” “hotels,” and the “hospitality industry.” Behavioral terms such as “consumer behavior,” “tourist behavior,” and “consumption behavior” also feature prominently.

In the context of multisensory studies, notable keywords include “sensory dysfunction,” “sensory evaluation,” “sensory marketing,” and “sensory perception.” Additionally, digital technology-related keywords such as “artificial intelligence,” “virtual reality,” and “human experiment” highlight the integration of technology into multisensory research.

Table 3. Most Occurring Keyword

Keyword	Occurrences	Total link strength	Keyword	Occurrences	Total link strength
human	27	188	sustainability	7	21
male	14	128	customer experience	9	18

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Keyword	Occurrences	Total link strength	Keyword	Occurrences	Total link strength
female	13	126	artificial intelligence	6	15
adult	13	124	virtual reality	6	15
workplace	7	124	consumption behaviour	4	14
legal aspect	6	71	trust	5	13
catering service	7	70	multisensory	4	11
middle aged	6	61	sensory analysis	4	11
restaurants	8	58	brand experience	7	10
sensory dysfunction	5	58	service quality	4	10
human experiment	6	40	surveys	4	10
hospitality industry	14	35	tourist behaviour	5	10
hotels	13	33	covid-19	4	10
hotels industry	13	32	hospitality	14	9
commerce	4	29	tourism	6	8
marketing	6	26	experience	4	7
procedures	4	24	hotel	4	7
perception	8	23	sensory evaluation	8	7
customer satisfaction	7	21	acceptance	4	5
sales	7	21	consumer behaviour	4	5
sensory marketing	10	21	consumer perception	4	4
sensory perception	7	21			

Source: https://www.scopus.com/2024

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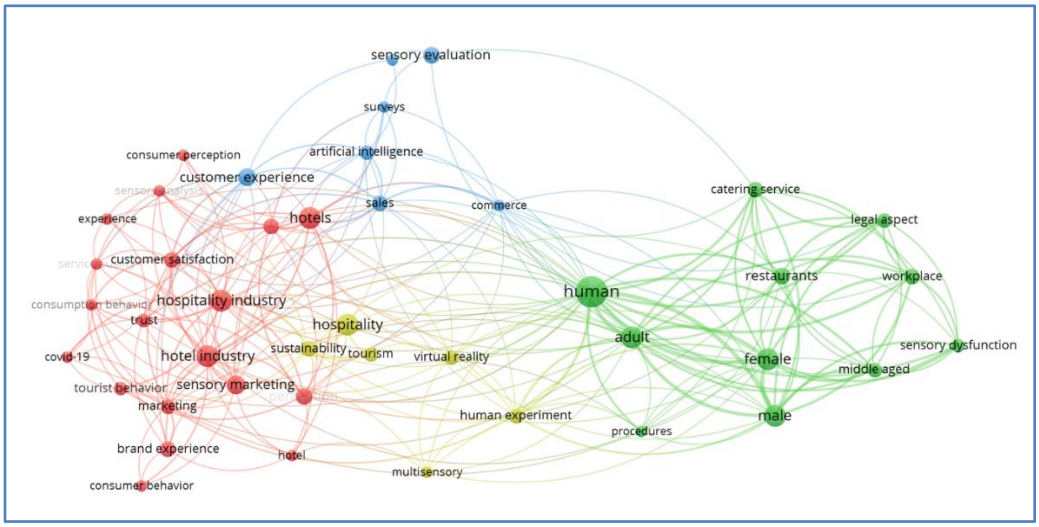


Figure 6. Network Overlay
Source: Vosviewer, 2024

Figure 6 presents the keyword co-occurrence network for the study on multisensory experiences in hospitality, with "human" emerging as the largest and most prominent node, followed by "hotel." Keywords grouped by color represent their associations with specific thematic clusters. The network map includes 43 items, 248 links, and a total link strength of 504, illustrating the interconnectedness of these themes.

The map displays four separate clusters, each denoted by an individual color:

a. Cluster 1 (Red): Focuses on sensory marketing in hotels, highlighting how sensory cues enhance the guest experience.
b. Cluster 2 (Green): Centers on human characteristics, including guests and people, exploring factors such as demographics and behavior.
c. Cluster 3 (Blue): Examines sensory technology and evaluation, showcasing advancements and tools used to enrich sensory experiences.
d. Cluster 4 (Yellow): Addresses trends in hospitality, emphasizing sustainability practices.

This visualization provides valuable insights into the primary themes and their interrelations within the field of multisensory research in hospitality.

a. Cluster 1 (Red): Sensory Marketing in Hotels

Cluster 1 focuses on research related to sensory marketing in the hospitality industry, with an emphasis on customer experience, satisfaction, and the influence of sensory marketing and brand experience on guest perceptions. Studies in this cluster analyze the impact of different sensory appeals. For instance, (Payne et al., 2023) discuss how scents in toiletries influence guest perceptions, while (Chan et al., 2021) examine how visually appealing website designs enhance the guest journey during information searches. Additional sensory stimuli, including haptic, gustatory, and olfactory cues, are also explored. Design elements that create enjoyment are highlighted as significant contributors to fulfilling the hedonic purpose of website use (Chan et al., 2021).

The cluster explores how sensory elements like ambiance, scent, lighting, and sound impact customer satisfaction and loyalty in hotels. It highlights the significance of sensory marketing techniques in crafting unforgettable guest experiences. The research also addresses evolving customer expectations, particularly in response to COVID-19, emphasizing the role of cleanliness visuals, fresh scents, and touch-free technologies. Personalization and digital transformation are also key, with technologies like VR and AR

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providing guests with virtual previews of hotel offerings, enhancing engagement and confidence in their choices.

Sensory and emotional factors significantly influence Consumer behavior and decision-making in the hotel industry. Hotels can use multisensory design, sustainability, and customer-centric strategies to deliver exceptional experiences and foster loyalty. However, there are gaps in the literature regarding sensory appeals, such as the integration of multiple sensory stimuli within a single destination.

Future research should explore advanced multisensory integration, emerging technologies, sustainability practices, and hygiene-focused sensory cues. Sensory marketing can contribute to emotional branding and create lasting guest memories by incorporating nostalgia-driven elements. Data-driven sensory marketing can optimize sensory environments by tailoring experiences to guest preferences. Exploring sensory and social experiences in communal hotel spaces can reveal how shared sensory environments influence group dynamics and overall satisfaction.

b. Cluster 2 (Green): Human Characteristics/Guests/People

This cluster focuses on human-centric multisensory studies, examining sensory perception, behavioral differences, and demographic factors in various settings like restaurants, catering services, and workplaces. It explores how sensory experiences vary across age groups, genders, and capabilities, and how demographics shape sensory preferences and behaviors.

For instance, (Kustos et al., 2019) examines the heritage management process and sensory characteristics of fine wine, identifying specific gender-based differences in consumer behavior. Similarly, (Pelet et al., 2021) revealed that olfactory stimuli have a more pronounced influence on well-being and behavioral intentions in women than to males. (Kim et al., 2008) noted that women are more concerned with data security, while men prioritize convenience when using technology.

The green cluster explores sensory research in workplaces and public settings, focusing on how sensory environments enhance productivity, well-being, and customer satisfaction. It also addresses sensory changes related to aging or health conditions. The green cluster offers insights for designing inclusive sensory experiences in hospitality, workplace, and service contexts. The hospitality sector faces challenges in technology integration, making it essential to explore human-technology interactions during service encounters.

Future research will explore human-centric aspects of multisensory experiences, focusing on individual differences in sensory perception, dysfunction, and rehabilitation. Factors like age, gender, cultural background, and sensory impairments will influence responses. Adaptive sensory solutions could enhance accessibility and inclusion, improve well-being, reduce stress, and enhance cognitive functioning, especially for vulnerable populations.

c. Cluster 3 (Blue): Sensory Technology and Technological Evolution

This cluster focuses on technology-driven multisensory research, using AI, surveys, and sensory evaluation techniques. It explores the intersection of sensory experiences, data analytics, and commercial applications, particularly in marketing, sales, and customer experience management.

A study by Pelet et al. (2021) highlights how IoT can stimulate customer senses, thereby enhancing multisensory experiences. Integrating technology into sensory experiences in hospitality settings has shown significant impacts. For example, real-time multisensory-social interactions (RTMSIs) in metaverse tourism (MV), accessed via VR

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headsets, provide greater user engagement as opposed to conventional 2D online interactions (Rather, 2023). Additionally, olfactory cues within VR environments enhance realism and immersion, increasing user engagement and presence (H. Khan & Nilsson, 2023).

VR technology offers a range of sensory information, allowing users to experience immersive environments. This technology is crucial in various industries like hospitality, marketing, and tourism. Sensory evaluation techniques like taste tests and olfactory analyses refine products and environments, enhancing customer satisfaction. The integration of commerce and sales in sensory research explores how sensory inputs influence purchasing decisions and customer engagement. Tools like VR, AR, and IoT devices simulate and measure sensory experiences in controlled or virtual environments.

Future research in this cluster should focus on AI, VR/AR, IoT-enabled sensory environments, and innovative commercial strategies while addressing ethical considerations. This will create personalized, immersive experiences while addressing societal expectations.

d. Cluster 4 (Yellow): Trends in Hospitality, Sustainability, and Human Experiments

This cluster explores hospitality and sustainability trends, focusing on dining experiences, food exploration, brand storytelling, wine experiences, brand identity, and shared meal experiences within strategic experiential frameworks. (Liu et al., 2024) identifies five core experiential dimensions—sensory, affective, behavioral, social, and intellectual—that collectively contribute to sustainable and impactful hospitality experiences.

This visualization cluster highlights research in hospitality and tourism that integrates sensory experiences and technology into sustainable practices. It connects human-centric sensory research with environmental responsibility and digital transformation. Virtual reality (VR) is a prominent theme, enabling immersive pre-arrival experiences. Sustainability in hospitality is emphasized through eco-friendly practices, natural scents, and energy-efficient lighting. Human-centered experimentation is explored to enhance guest experiences.

The cluster highlights the growing demand for immersive, sustainable, and customer-centric solutions in the tourism and hospitality industry. It emphasizes the use of VR and AR technologies, sustainable practices, cultural authenticity, and ethical considerations in multisensory environments. These studies contribute to inclusive, immersive, and environmentally responsible guest experiences, driving industry growth.

Table 4. Keyword based on Cluster

Cluster 1		Cluster 2		Cluster 4	** **
Sensory Marketing in Hotels. (Red area/19 items)	Brand experience Consumer behavior Consumer perception Consumption behavior Covid-19 Customer satisfaction Experience	Human Characteristics/ Guests/People. (Green area/11 items)	Adult Catering service Female Human Legal aspect Male Middle aged	Trends in Hospitality and Sustainability and human experiments. (Yellow area**/**6 items)	Hospitality Human experiment Multisensory Sustainability Virtual reality Tourism

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Cluster 1	Cluster 2	Cluster 4	** **
Hospitality industry		Procedures	
Hotel		Restaurants	
Hotel industry		Sensory dysfunction	
Hotels		Workplace	
Marketing	Cluster 3		
Perception	Sensory	Acceptance	
Sensory analysis	Technology and Technological	Artificial intelligence	
Sensory marketing	Evolution , (Blue area/7 items)	Commerce	
Sensory perception		Customer experience	
Service quality		Sales	
Tourist behavior		Sensory evaluation	
Trust		Surveys	

Source: Vosviewer, 2026

3.7. Research evolution

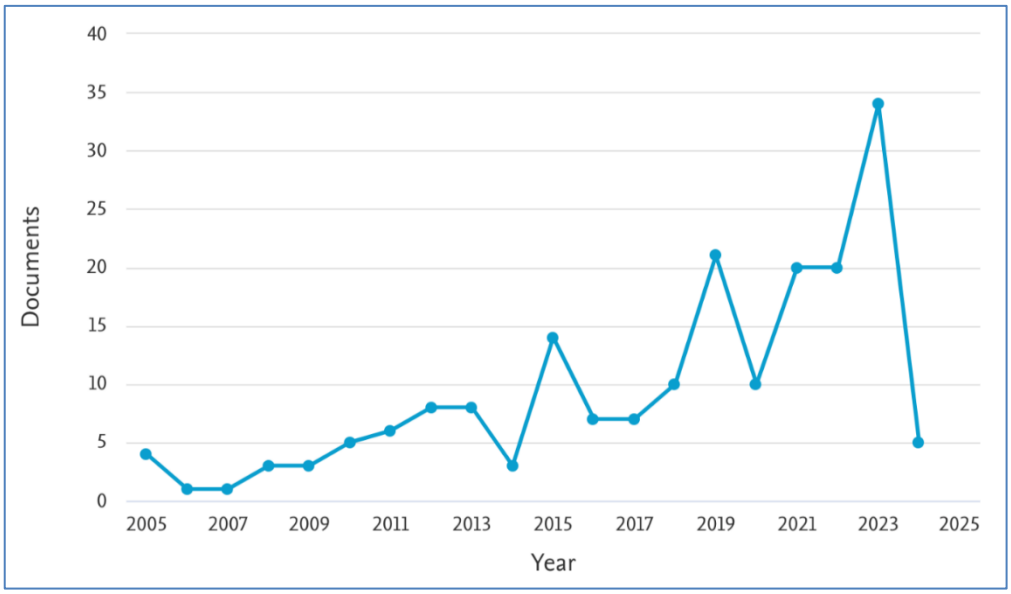


Figure 7. Documents produced year by year
Source: https://www.scopus.com/2026

Research on multisensory experiences in hospitality has shown an increasing trend over time. Beginning with four documents in 2005, the number of publications grew consistently, with three publications annually in 2008 and 2009. This upward trajectory continued with five publications in 2010 and six in 2011. Significant growth was observed in 2012 and 2013, with eight publications each year. However, 2014 experienced a decline, with only three publications.

A sharp increase occurred in 2015, with 14 publications, followed by seven publications annually in 2016 and 2017. In 2018, the number rose to 10, reaching 21 in 2019. Despite challenges posed by the pandemic, both 2021 and 2022 recorded 20 publications each. The upward trend persisted in 2023 with a remarkable 34 publications. Early 2024 has already seen

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five publications, indicating sustained and growing scholarly interest in multisensory experiences within the hospitality sector.

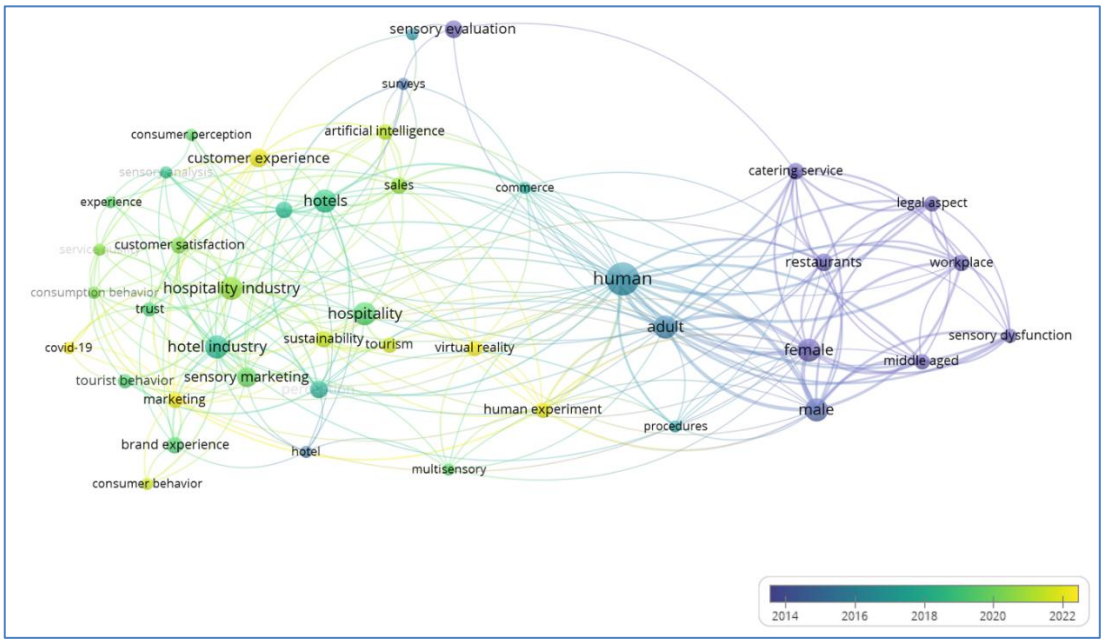


Figure 8. Overlay Visualization
Source: Vosviewer, 2026

The hotel industry has advanced multisensory applications since 2014, focusing on experience marketing and sensory dysfunction, particularly in restaurants and catering services. Early research explored food acceptance and the impact of sensory stimuli on tourist satisfaction and spending. Between 2016-2018, studies emphasized methodological advancements in hospitality multisensory experiences.

Post-2018, research shifted toward sensory marketing and enhancing customer experiences. Notable works include studies on hotel website visuals (S. Lee, 2018), sensory-driven design, and the use of online reviews with VR for immersive booking experiences (Zeng et al., 2020).

From 2020, the focus integrated advanced technology and human-centered experiments. Studies explored scent marketing (Errajaa et al., 2021), robot gestures for engagement, and using robot clothing colors for emotional expression. Recent advancements include neural models assessing relaxation through olfactory stimuli to enhance sensory.

The sensory and hospitality industries are experiencing a shift towards personalized, eco-conscious, and health-focused research, with emerging technologies like AI, VR, and IoT optimizing sensory environments and enhancing customer experiences. This interdisciplinary study highlights the importance of customized, sustainable, and health-oriented methodologies, positioning these sectors at the forefront of innovation.

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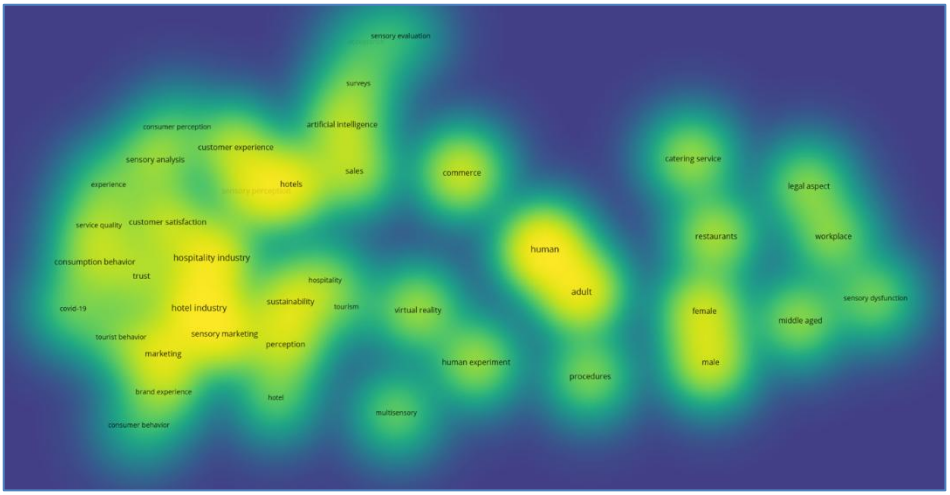


Figure 10. Density Visualization
Source: Vosviewer, 2026

The density visualization map is a tool used in bibliometric analysis to highlight the importance of specific terms within a dataset. It highlights central themes and research focus areas, with brighter yellow areas indicating higher concentrations of related terms. The map focuses on human-centric research, focusing on sensory perception, behavioral responses, and experimental procedures involving human participants. The hospitality and sensory marketing cluster on the left focuses on enhancing customer experiences in the hospitality sector, exploring sensory inputs like sound, scent, and lighting. The top left cluster highlights the use of technology and sensory evaluation methods to analyze consumer behavior and optimize sales strategies. The right cluster explores demographic factors and sensory studies, examining how demographic factors shape sensory experiences in hospitality and workplace settings. The map highlights the increasing integration of sustainability and tailored sensory experiences into hospitality practices, and points to emerging research areas like the application of AI and sensory evaluation techniques to enhance customer satisfaction and optimize commercial outcomes.

Sara, Ningsih, and Andari (2017): An Indonesian empirical study finding that physical evidence (exterior, interior design, and supporting facilities) significantly affects consumer purchase decisions at a Bandung food-and-beverage outlet, illustrating the same tangible/sensory-environment mechanism described by Bitner (1992) and Kotler (1973) in a local hospitality setting.

Table 5. Future Agenda

Area	Potential Research Questions
Sensory Marketing in Hotels	• How does sensory evaluation influence the overall quality of life and customer satisfaction in hotel environments? • What role does sensory design play in improving the guest experience in controlled hospitality studies? • How can sensory marketing strategies enhance guest experiences in services, particularly through sensory elements related to the five senses? • What sensory cues (e.g., scent, lighting, sound) most significantly impact consumer perception during hotel stays?

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Area	Potential Research Questions
	• What is the impact of sensory marketing on the overall guest experience during hotel stays? • How can sensory evaluation tools be standardized across different hotel types to measure guest satisfaction consistently? • How does the design of sensory stimuli in hotel spaces, such as lobbies, restaurants, or rooms, influence guest behavior and satisfaction?
Human Characteristics/Guests/People	• What are the key sensory factors that drive customer loyalty and trust in the hospitality industry across different cultural contexts? (e.g., local vs. expatriate, Asian, etc.) • How do multisensory experiences affect individuals of different genders in the context of hospitality services? • What are the cultural differences in sensory preferences that influence customer loyalty in international hospitality chains? • What are the gender-based differences in sensory expectations for luxury versus budget hospitality services?
Sensory Technology and Technological Evolution	• How can virtual reality be used to create immersive pre-arrival experiences for potential guests in the hospitality sector? • How can virtual reality (VR) and augmented reality (AR) enhance sensory marketing efforts in the hospitality sector? • How can energy-efficient sensory technologies (e.g., smart HVAC systems, lighting) balance sustainability goals with guest comfort in hotels? • What opportunities exist for using deep learning algorithms to analyze guest feedback and predict future sensory preferences in the hospitality sector? • What role does AI-driven personalization play in creating sensory marketing strategies for hotel guests?
Trends in Hospitality and Sustainability** **and human experiments	• What specific sensory design strategies are most effective in improving guest experiences during experimental hospitality research? • How does the integration of sensory branding (e.g., signature scents) contribute to hotel brand identity and guest loyalty? • What is the impact of eco-friendly sensory design on guest perceptions of sustainability in hotels? • What innovative approaches can hotels adopt to enhance the sensory appeal of

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Area	Potential Research Questions
	room amenities, such as eco-friendly packaging materials? • How can sensory marketing be integrated with sustainable practices to appeal to eco-conscious guests?

Source: Author, 2026

Our systematic review delineates the multisensory research literature in hospitality and offers numerous significant additions. Initially, it offers a comprehensive perspective on multisensory research within hospitality, leisure, business, and management by statistically analyzing and delineating the conceptual framework of the discipline. In addition, the descriptive analysis shows that multisensory research in hospitality has shown significant growth over the previous decade. The study of countries identifies the USA and United Kingdom as the primary suppliers with the International Journal of Contemporary Hospitality Management publishing the highest number of relevant articles.

Third, we accomplished bibliographic coupling to delineate the study components and reveal current topics in the literature. This analysis identified four thematic clusters within the luxury hospitality research domain:

a. Sensory Marketing in Hotels
b. Human Characteristics/Guests/People
c. Sensory Technology and Technological Evolution
d. Trends in Hospitality, Sustainability, and Human Experiments

These clusters provide a retrospective analysis of multisensory research in hospitality and give suggestions for future study paths, which are elaborated upon in the following sections.

4. CONCLUSION

This passage argues that multisensory experience is a central theoretical concept in hospitality for three main reasons. First, on the industry-landscape side, the rise of smart/technology-driven environments is forcing hospitality stakeholders to rethink how they use technology and design services to stay competitive (Buhalis et al., 2019), which in turn heightens the importance of sensory information in technology-mediated experiences (Krishna, 2012).

Second, within the experience economy, service providers are expected to deliver distinctive, emotionally resonant, memorable experiences — not just functional ones — in order to build loyalty and competitive advantage (Berry & Carbone, 2002; Zatori et al., 2018; Walls et al., 2011), though consistently achieving this remains difficult in practice (Chathoth et al., 2013).

Third, multisensory/sensory marketing is positioned as the key mechanism for delivering these experiences: sensory cues help customers extract more value from marketing efforts and shape memory, perception, and decision-making (Krishna, 2012; Krishna et al., 2016; Dzhandzhugazova & Blinova, 2016; Hultén, 2011; Panksepp et al., 2017), while also differentiating offerings in competitive markets (Spence et al., 2014; Pine & Gilmore, 1998).

The passage closes by flagging a gap: many hotel operators still over-focus on visual design and neglect non-visual senses (smell, sound, touch), even though this affects overall guest satisfaction and ratings (Spence, 2022) — leading to the conclusion that further research on how multisensory stimuli affect hotel operations would be valuable.

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