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RESEARCH ARTICLE

AI-Enabled Service in Hotels: A Bibliometric Review of Research Trends and Service Quality Outcomes

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ABSTRACT

Robots, Artificial Intelligence and Service Automation (RAISA) are rapidly reshaping how hotels design and deliver service, yet existing reviews often mix hotel contexts with other tourism sectors and rarely focus explicitly on service quality. This study provides a hotel-centred bibliometric analysis of AI-enabled service in hotels, with particular attention to service quality, service experience and customer outcomes. We followed a PRISMA flow and collected a dataset from Scopus, containing 313 journal articles published between 2011 and mid-2025. Data analysis and visualisation was done by using both an R package namely bibliometrix and VOSviewer. The results show a unmatured but fast-growing field, with publications accelerating sharply after 2020 and clustering in a small set of core hospitality journals. Author, institution and country analyses reveal a globally distributed but uneven knowledge base dominated by a limited group of prolific scholars and hubs in the United States, China, the United Kingdom, Spain and Malaysia. Keyword co-occurrence, thematic mapping and trending-topics analysis identify four main research topics: AI and service robots in hotel service quality and satisfaction; AI-driven analytics and decision support; customer experience, anthropomorphism and human–robot interaction; and organisational, ethical and societal implications of AI-enabled hotel service. The paper concludes with implications for theory and practice and outlines a future research agenda for AI-rich hotel service environments.

Contribution/Originality: This study contributes to the existing literature by mapping AI research in hospitality and tourism through a hotel-centred bibliometric analysis.

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Using Scopus data (2011–2025) and bibliometrix/VOSviewer, it identifies influential outlets and authors, thematic clusters, and emerging topics, and proposes a concise research agenda with practical implications for AI-enabled service design.

1. Introduction

In the last decade, Robots, Artificial Intelligence and Service Automation (RAISA) 4have moved from futuristic ideas to concrete technologies in hotels. Travel and hospitality firms now deploy robot concierges and delivery robots, AI-powered chatbots, smart self-check-in kiosks, dynamic pricing engines and, more recently, generative AI tools such as ChatGPT across the customer journey (Ivanov & Webster, 2017; Gursoy et al., 2023). These technologies touch the core of hospitality, where firms compete not only on efficiency but on service quality and emotionally rich guest experiences. As service encounters become increasingly mediated by algorithms and machines rather than human employees, issues such as perceived warmth and competence, trust, anthropomorphism, and service failure and recovery move to centre stage (Tung & Au, 2018; Yassin et al., 2022).

Research on these developments has expanded rapidly. Conceptual and empirical studies have examined cost–benefit trade-offs of RAISA in hospitality, the impact of robots and AI on customer experience, and the use of machine learning and text mining for online reviews, demand forecasting and revenue management (Ivanov & Webster, 2019; Nilashi et al., 2015). More recently, generative AI has been framed as a disruptive innovation that could transform how guests search for information, interact with hotels and co-create value (Gursoy et al., 2023; Sigala et al., 2024). Several reviews and bibliometric analysesmap AI in tourism and hospitality more broadly (Knani et al., 2022; Özdemir, 2025), but they typically adopt a wide sectoral lens ("AI in tourism" or "AI in hospitality and tourism"), mix hotel studies with other contexts, and only partially visualise the intellectual structure and emerging themes specific to AI-enabled service quality in hotels. Given the fast-evolving nature of AI—especially the recent wave of generative AI—an updated, hotel-centred and quantitatively grounded overview is still missing.

This study responds to that gap by offering a focused bibliometric and thematic review of AI-enabled service in hotels, with particular attention to service quality, service experience and customer outcomes. Using a Scopus dataset of 313 English-language journal articles published between 2011 and mid-2025, we apply a suite of bibliometric techniques (e.g., annual production, source and author impact, co-citation and co-authorship networks, keyword co-occurrence, thematic mapping and trending topics) implemented in R with the bibliometrix package and visualised using VOSviewer (Aria & Cuccurullo, 2017; van Eck & Waltman, 2010). The aim is to map how this research stream has developed over time and across journals, identify the main contributors and collaboration patterns, uncover its conceptual and thematic structure, and distil the main research topics and future directions for understanding AI-enabled service quality in hotels.

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2. Literature Review

2.1. RAISA and AI in hospitality

Work on RAISA in tourism and hospitality provides the broader backdrop for this study. Ivanov and Webster (2017, 2019) show that firms adopt chatbots, self-service kiosks, delivery robots and robot concierges to cut labour costs, increase efficiency and signal innovativeness, but also face high investment, technical failures and possible guest resistance. Within this stream, AI is understood both as embodied technologies (service and social robots in physical spaces) and disembodied systems (algorithms for forecasting, dynamic pricing and recommendation). Both forms ultimately shape what guests experience and how they evaluate service quality.

2.2. AI-enabled service in hotels

Within hotels, AI-enabled service research has mainly followed two lines. The first examines service robots and guest–robot encounters, showing that guests judge robot-delivered service using criteria similar to human service quality (reliability, responsiveness, assurance, empathy), but filtered through technological competence, safety and social presence (Choi et al., 2020; Yassin et al., 2022). Studies on anthropomorphism and human–robot interaction find that moderate human-likeness can increase enjoyment and trust, while poorly designed or overly human-like robots may trigger discomfort or "uncanny" reactions (Tung & Au, 2018; Seo, 2022). The second line treats AI as an analytics and decision-support tool: machine-learning and text-mining techniques are used to mine online reviews, extract service quality dimensions and predict satisfaction, loyalty or performance (Nilashi et al., 2015). More recently, generative AI tools such as ChatGPT have been proposed for personalised communication and real-time support, potentially transforming how guests search, decide and interact with hotels (Gursoy et al., 2023; Sigala et al., 2024).

2.3. Existing reviews on AI in hospitality

Several reviews and bibliometric studies now map AI in tourism and hospitality, identifying key outlets, countries and themes across marketing, operations, revenue management and destination management (Knani et al., 2022; Bulchand-Gidumal et al., 2024; Kim et al., 2025). Other overviews focus on service robots and human–robot interaction (Huang, 2022; Park et al., 2025), while a very recent wave discusses ChatGPT and generative AI in tourism and hospitality (Gursoy et al., 2023; Sigala et al., 2024; Tuyen et al., 2025). These contributions confirm that AI is becoming integral to hospitality and that issues of service quality, guest experience and ethics are central. However, they mostly adopt a broad sectoral scope, mix hotel studies with other service settings, and often focus on specific technologies or organisational outcomes. What is still missing—and what this study sets out to provide—is a hotel-centred, quantitatively grounded overview that brings together embodied AI, analytics-based AI and generative AI and examines how they collectively shape service quality, service experience and customer outcomes in hotels.

2.4. Research gap and research questions

Existing reviews and bibliometric studies on AI in tourism and hospitality provide valuable overviews of technological trends, but they usually adopt a broad sectoral lens

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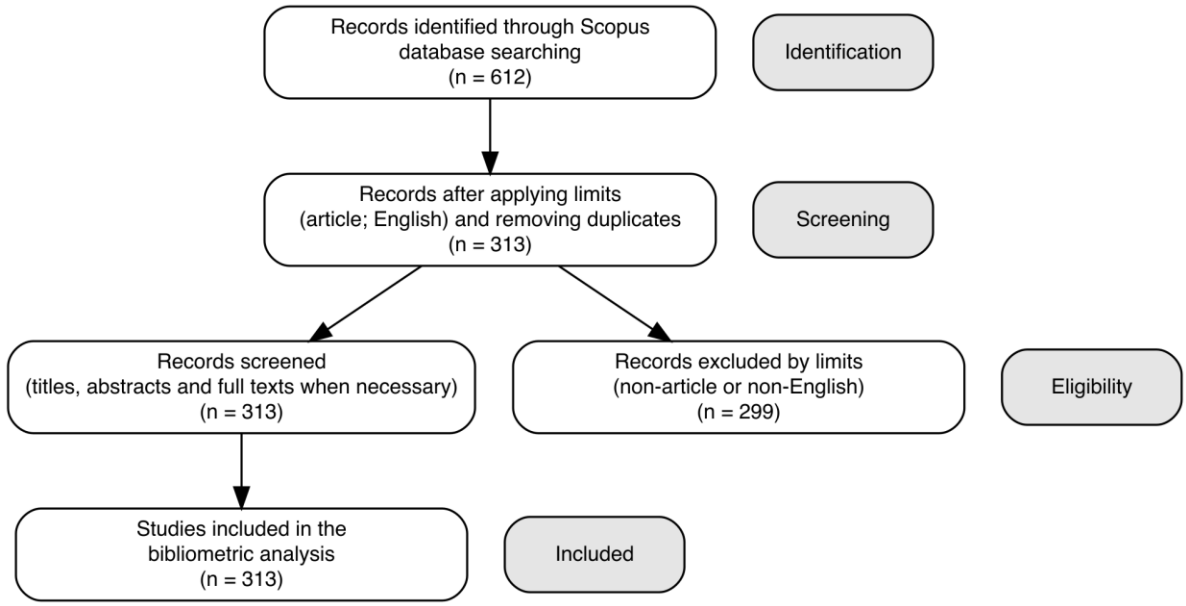
("AI in tourism" or "AI in hospitality and tourism"), mix hotel studies with other service contexts, and only partially capture the intellectual structure and emerging themes specific to AI-enabled service quality in hotels. They also tend to focus on either embodied AI (such as service robots) or analytics-based AI (such as machine learning and text mining), while the more recent wave of generative AI (e.g., ChatGPT) is only beginning to be incorporated. As a result, there is still a lack of a hotel-centred, quantitatively grounded map that integrates these strands and shows how AI-enabled hotel service research has evolved over time, who drives it, and how key concepts and themes are organised.
To address this gap, this study is guided by the following research questions:

i. RQ1. How has research on AI-enabled service in hotels evolved over time in terms of publication trends, core journals and highly cited contributions?
ii. RQ2. Who are the main authors, institutions and countries contributing to this field, and how are they connected through co-authorship, co-citation and international collaboration networks?
iii. RQ3. What are the main conceptual and thematic clusters of AI-enabled hotel service research—particularly regarding service quality, service experience and customer outcomes—and which emerging topics and future directions can be identified?

3. Research Methods

This study adopts a quantitative bibliometric design to map the development and intellectual structure of research on artificial intelligence and hotel service quality, following established guidelines for bibliometric reviews (Donthu et al., 2021). The overall procedure follows a PRISMA-style logic of identification, screening and inclusion, which is adapted to the bibliometric context and summarised in the flow diagram (Figure 1) (Page et al., 2021).

Figure 1: PRISMA_Flow_Diagram



Scopus was selected as the data source because it offers broad coverage of peer-reviewed journals in hospitality, tourism, management and information systems. The search was conducted in the title, abstract and keyword fields using the following query: "artificial

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intelligence" OR "AI" OR "robot*" OR "chatbot*" OR "service robot*" OR "machine learning" OR "generative AI" OR "ChatGPT" AND "hotel*" OR "hospitality" AND "service quality" OR "service experience" OR "customer experience" OR "customer satisfaction" OR "service encounter". This search returned 612 records. We then applied a set of eligibility criteria that limited the sample to English-language journal articles and removed duplicate items. After these restrictions, 313 records remained. Their titles and abstracts, and when necessary their full texts, were screened to confirm that each study dealt with AI-enabled or robot-enabled services in hotel or hospitality settings and explicitly engaged with service quality, service or customer experience, customer satisfaction or service encounters. All 313 records met these criteria; therefore, no additional items were excluded at this stage. Consequently, from the 612 documents initially identified, 299 were removed because they were non-articles or non-English publications, and the remaining 313 studies constituted the final dataset for bibliometric analysis.

Bibliographic information of the 313 articles was exported from Scopus in BibTeX format and imported into R (Aria & Cuccurullo, 2017). We cleaned the data by checking author names, standardising journal and country labels and consolidating synonyms of key terms such as artificial intelligence, service robots and customer experience. A simple thesaurus file was used to treat closely related geographical labels consistently, so that Hong Kong, Macau and Taiwan could be grouped when appropriate in country-level analyses. These procedures reduced noise in the dataset and enhanced the reliability of the subsequent network calculations.

Building on this prepared database, we conducted performance and science-mapping analyses. Descriptive indicators such as annual scientific production, the most productive authors, leading countries and institutions, core journals and highly cited papers were obtained using bibliometrix and visualised with customised plots in ggplot2 (Wickham, 2016). To uncover the topical structure of the field, we performed keyword co-occurrence analysis using both author keywords and all available keywords, and then generated a thematic map that positions themes according to their centrality and density, distinguishing motor, basic, niche and emerging or declining themes. In addition, we examined the intellectual foundations of the field through co-citation analysis of references and source articles, and we explored the relationships among authors, countries and key topics by constructing a three-fields Sankey diagram linking authors, countries and high-frequency keywords. All computations were carried out in R using bibliometrix and its web interface Biblioshiny (Aria & Cuccurullo, 2017), whereas network layouts and additional visual refinement were supported by VOSviewer and CiteSpace (van Eck & Waltman, 2010; Chen, 2006). High resolution figures were exported by these tools to visualise the analytics.

4. Results

4.1. Descriptive performance of AI-enabled hotel service research

Based on the final Scopus corpus of 313 articles published between 2011 and mid-2025, this review traces how research on AI-enabled service in hotels has evolved in terms of publication dynamics, outlets and landmark contributions, key actors and geographical networks, and the conceptual–thematic structure of the field. Overall, it highlights an unmatured yet dynamic research stream that has grown in parallel with the rapid diffusion of RAISA in travel, tourism and hospitality practice under a hotel-centred background (Ivanov & Webster, 2017; Ivanov & Webster, 2019).

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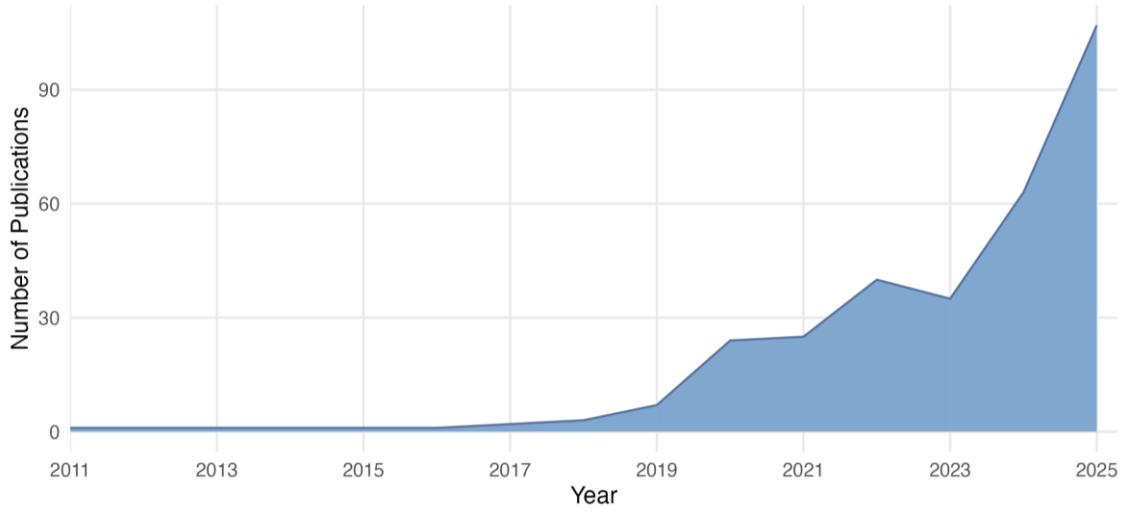
4.1.1. Publication trends, core outlets and landmark papers

Figure 2 plots the annual scientific production on AI-enabled hotel service. From 2011 to 2016 the curve remains almost flat, with only sporadic publications touching on AI or robotics in hotel settings. This "silent stage" largely reflects the fact that, although AI and automation were already transforming back-office travel operations, there were very few concrete hotel applications—especially at the frontline—on which to build empirical studies (Ivanov & Webster, 2017). From 2017 to 2019, the number of publications begins to rise modestly, coinciding with conceptual discussions of RAISA and its likely economic and social impacts on hospitality firms and destinations (Ivanov & Webster, 2019).

Figure 2: Annual Production on AI-Enabled Service in Hotel



A clear structural break occurs after 2020. The time series in Figure 2 shows a sharp and almost exponential increase from 2020 onwards, with the steepest growth between 2023 and 2025. Several forces appear to converge here. First, a growing number of hotels and tourism organisations started experimenting with service robots, smart check-in kiosks, AI-based recommendation systems and revenue-management tools, generating rich empirical material. Second, the COVID-19 pandemic made contactless technologies and automation more salient as ways to ensure health safety and operational resilience, thereby accelerating both managerial adoption and academic interest (Samala et al., 2022). Third, the launch of powerful generative models such as ChatGPT triggered a new wave of papers examining AI-mediated information search, conversational agents and AI-augmented service employees in hotel contexts (Gursoy et al., 2023; Sigala et al., 2024). Taken together, these dynamics indicate that AI-enabled hotel service has shifted from a marginal curiosity to a strong stream research topic in less than a decade.

The journals structuring this conversation are summarised in Table 1 and visually presented in Figure 3. When outlets are ranked by the number of AI-hotel articles, the International Journal of Hospitality Management (24 publications) and the International Journal of Contemporary Hospitality Management (19 publications) clearly dominate. Both journals have actively embraced technological issues and have hosted seminal work on robots, AI and smart tourism—such as bibliometric reviews of AI in hospitality (Doborjeh et al., 2021) and syntheses of smart hotel research (Liao et al., 2025). Sustainability (Switzerland) and the Journal of Hospitality and Tourism Technology follow with around 10–11 articles each, indicating that AI-enabled service is also intertwined with sustainability and technology-management debates.

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Figure 3: Leading Journals on AI-Enabled Service in Hotels

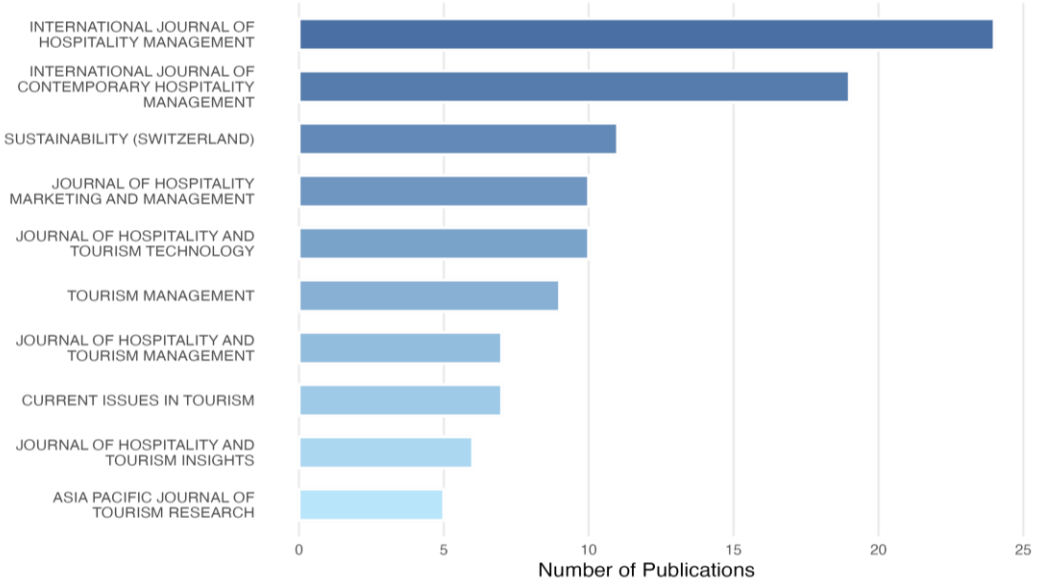

Table 1: Journals Most Relevant Cited Impact

Most Relevant Journals (Number of Articles on Ai)	Most Cited Journals (Number of Citations)	Journal Impact (H-Index; G-Index)
International Journal of Hospitality Management (24)	Journal of Hospitality Marketing and Management (1563)	Journal of Hospitality Marketing and Management (10; 10)
International Journal of Contemporary Hospitality Management (19)	International Journal of Contemporary Hospitality Management (1314)	International Journal of Contemporary Hospitality Management (12; 19)
Sustainability (Switzerland) (11)	International Journal of Hospitality Management (1217)	International Journal of Hospitality Management (13; 24)
Journal of Hospitality and Tourism Technology (10)	Journal of Service Management (1093)	Journal of Service Management (4; 4)
Journal of Hospitality Marketing and Management (10)	Tourism Management (927)	Tourism Management (7; 9)
Tourism Management (9)	Journal of Retailing and Consumer Services (544)	Journal of Retailing and Consumer Services (3; 3)
Current Issues in Tourism (7)	Sustainability (Switzerland) (411)	Sustainability (Switzerland) (6; 11)
Journal of Hospitality and Tourism Management (7)	Journal of Tourism Futures (360)	Journal of Tourism Futures (3; 3)
Journal of Hospitality and Tourism Insights (6)	Cornell Hospitality Quarterly (306)	Cornell Hospitality Quarterly (2; 2)
Asia Pacific Journal of Tourism Research (5)	Current Issues in Tourism (269)	Current Issues in Tourism (4; 7)

However, when journals are ranked by total citations and impact indicators, the picture nuances further. As shown in Table 1, the Journal of Hospitality Marketing & Management emerges as the most cited outlet (1,563 citations), ahead of the International Journal of Contemporary Hospitality Management (1,314) and the International Journal of

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Hospitality Management (1,217). Impact metrics tell a similar story: International Journal of Hospitality Management (h-index = 13; g-index = 24) and International Journal of Contemporary Hospitality Management (12; 19) occupy central positions, while high-impact service and tourism journals such as Journal of Service Management, Tourism Management and Sustainability also appear with strong h- and g-indices. This pattern shows that AI-enabled hotel service is anchored in a relatively small set of core hospitality and tourism outlets, but reaches across adjacent domains such as marketing, service management and sustainability (Buhalis & Law, 2008; Buhalis et al., 2019).

The influence of individual studies within this corpus is detailed in Table 2 and Table 3, which list the top five papers by overall citation counts and the top five most-cited recent papers. The earlier high-impact works (Table 2) include Buhalis et al.'s (2019) analysis of technological disruptions in tourism and hospitality, which frames AI as part of wider smart, data-driven service ecosystems; De Kervenoael et al.'s (2020) examination of human–robot interaction and perceived value in hospitality; Choi et al.'s (2020) study of service quality in robot-mediated hotel encounters; Tung and Au's (2018) exploration of memorable experiences with robotics and AI; and Tuomi et al.'s (2021) review of service robots' applications and implications for hospitality management. Collectively, these papers move the debate beyond simple "accept or reject the technology" questions and foreground co-created experiences, emotions and operational implications.

The recent citation leaders in Table 3 extend this agenda while integrating new phenomena. Gursoy et al. (2023) provide a comprehensive overview of ChatGPT and its implications for hospitality and tourism, arguing that large language models will reshape information search, decision making and value co-creation. Samala et al. (2022) review the impact of AI and robotics on tourism, identifying opportunities and challenges across the value chain. Bulchand-Gidumal et al., 2024 discusses AI's role in hospitality and tourism marketing, with particular emphasis on personalisation and customer engagement, while Chi et al. (2022) and Seo (2022) focus on tourists' attitudes toward AI devices and the nuanced effects of robot gender and anthropomorphism on service evaluations. These highly cited publications have become key reference points for subsequent empirical work on AI-enabled hotel service quality, customer satisfaction and ethical issues.

Table 2: Top Five Papers Ordered by Citations Score

Authors	Title	Journal (Year)	Total Citations	Keywords
Buhalis et al. (2019)	Technological Disruptions in Services: Lessons from Tourism and Hospitality	Journal of Service Management (2019)	792	Automation; Co-Creation; Disruption; Personalization; Sensory Experiences; Tourism and Hospitality
De Kervenoael et al. (2020)	Leveraging Human-Robot Interaction in Hospitality Services: Incorporating the Role of Perceived Value, Empathy, and Information Sharing into	Tourism Management (2020)	471	Artificial Intelligence; Hospitality Services; Human-Robot Interaction; Intention to Use

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	Visitors' Intentions to Use Social Robots			Robots; Social Robots
Choi et al. (2020)	Service Robots in Hotels: Understanding the Service Quality Perceptions of Human-Robot Interaction	Journal of Hospitality Marketing and Management (2020)	389	Artificial Intelligence; Humanrobot Interaction; Service Quality; Service Robots
Tung & Au (2018)	Exploring Customer Experiences with Robotics in Hospitality	International Journal of Contemporary Hospitality Management (2018)	382	Consumer Reviews; Embodiment; Emotions; Experience Co-Creation; Human-Robot Interaction; User Experience
Tuomi et al. (2021)	Applications and Implications of Service Robots in Hospitality	Cornell Hospitality Quarterly (2021)	288	Hospitality Management; Robotization; Service Encounter; Service Robots

Table 3: Top5 Recent Papers by Citations

Authors	Title	Journal (Year)	Total Citations	Keywords
Gursoy, Li, & Song (2023)	ChatGPT and The Hospitality and Tourism Industry: An Overview of Current Trends and Future Research Directions	Journal of Hospitality Marketing and Management (2023)	282	Benefits; Challenges and Threats; Chatgpt; Customer Behavior; Research Agenda; Service Experience Creation and Delivery
Samala et al. (2022)	Impact of Ai and Robotics in The Tourism Sector: A Critical Insight	Journal of Tourism Futures (2022)	224	Artificial Intelligence; Chatbots; Human-Robot Interaction; Machine Learning; Robots; Technologies
Bulchand-Gidumal et al. (2024)	Artificial Intelligence' Impact on Hospitality and Tourism Marketing: Exploring Key Themes and Addressing Challenges	Current Issues in Tourism (2024)	198	Ai; Big Data; Customization; Innovation; Marketing; Personalization
Chi, Gursoy, & Chi (2022)	Tourists'Attitudes Toward the Use of Artificially Intelligent (Ai) Devices in Tourism Service Delivery: Moderating Role of Service Value Seeking	Journal of Travel Research (2022)	194	Artificial Intelligence; Hedonic Value; Technology Acceptance; Tourism Services; Utilitarian Value
Seo (2022)	When Female (Male) Robot Is Talking to Me: Effect of Service Robots' Gender and	International Journal of Hospitality	142	Anthropomorphism; Gender; Gender Stereotyping; Moderated

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Anthropomorphism on Customer Satisfaction	Management (2022)	Mediation Model; Service Robot

4.1.2. Influential authors, institutions and global collaboration patterns

Table 4 ranks the most impactful authors in terms of h-index, g-index and year of first AI-hotel publication. At the top of the list stands Nilashi, M. (Universiti Sains Malaysia), with an h-index of 7 and g-index of 8, who has published since 2019 on hybrid machine-learning models, online reviews and sustainability evaluation in hotels. Scholars such as Liu, J. (Hainan University) and Li, Y. (Audencia) follow with h-indices of 5, having contributed to AI-driven customer analytics, ChatGPT applications and revenue-optimisation models. Other recurrent names—Prentice, D. C.; Samad, S.; Wong, I. K. A.; Abumalloh, R. A.; Gursoy, D.; Law, R.; and Nguyen, M. T. T.—illustrate the growing role of Asia–Pacific institutions (Malaysia, China, Australia) alongside established hospitality schools in Europe and North America.

Table 4: Top-ranked authors based on the highest impact

Authors	University	h-index	g-index	Year of first publication
Nilashi, M.	Universiti Sains Malaysia, Malaysia	7	8	2019
Liu, J.	Hainan University, China	5	7	2022
Li, Y.	Audencia, France	5	5	2022
Prentice, D. C.	Griffith Business School, Australia	5	5	2020
Samad, S.	Universiti Sains Malaysia, Malaysia	5	5	2019
Wong, I. K. A.	Faculty of Business Administration, Macao	4	5	2020
Abumalloh, R. A.	Universiti Sains Malaysia, Malaysia	4	4	2021
Gursoy, D.	Carson College of Business, United States	4	4	2020
Law, R.	Beijing International Studies University, China	4	4	2020
Nguyen, M. T. T.	Griffith Business School, Australia	4	4	2020

The author co-citation network in Figure 4, produced in VOSviewer 1.6.20, reveals how these and other scholars are intellectually connected. Classic service and consumer behaviour scholars—such as Bagozzi, R. P.; Belk, R. W.; Bolton, R. N.; and Baumeister, R. F.—form one cluster, signalling that theories of attitudes, emotions, self-concept and consumption experiences still provide the backbone for understanding AI and robot encounters. A second cluster groups hospitality and tourism technology researchers like Ayeh, J. K., Bowen, J., and De Kervenoael, R., whose work on social robots, online reviews and smart tourism destinations directly informs AI-enabled hotel studies. The dense links between these clusters indicate that the field is rooted both in generic service/marketing theories and in domain-specific hospitality technology research.

Figure 5 tracks top authors' production over time, highlighting that a small but growing group of researchers maintain continuous output across multiple years, while the majority contribute one or two papers. For example, Nilashi's trajectory shows repeated publications on AI-enabled recommendation and green hotel selection, whereas authors such as Liu, J.; Prentice, D. C.; and Gursoy, D. appear at several points in the timeline with work on customer analytics, ChatGPT, and robot-mediated experiences. This dual

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pattern—sustained productivity by a core group and one-off contributions by a wider set of scholars—is typical of an emerging research domain that is still open to cross-disciplinary inputs but is gradually consolidating around specialised expertise.

Figure 4: Author Co-citation Network

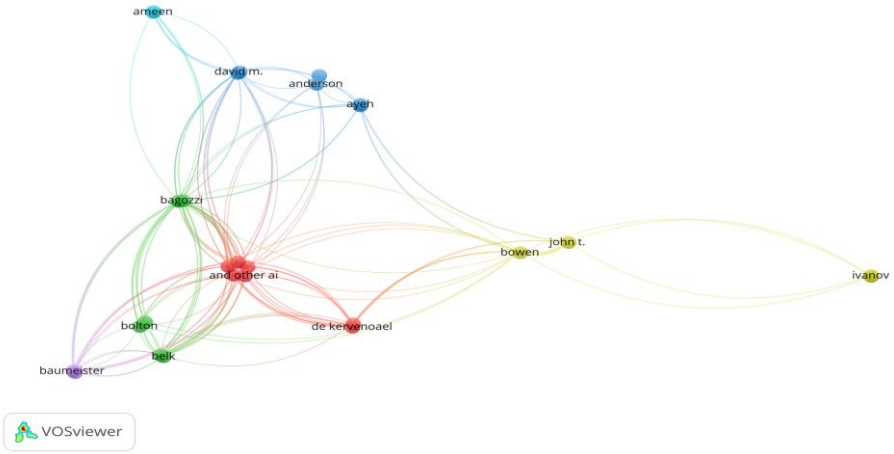
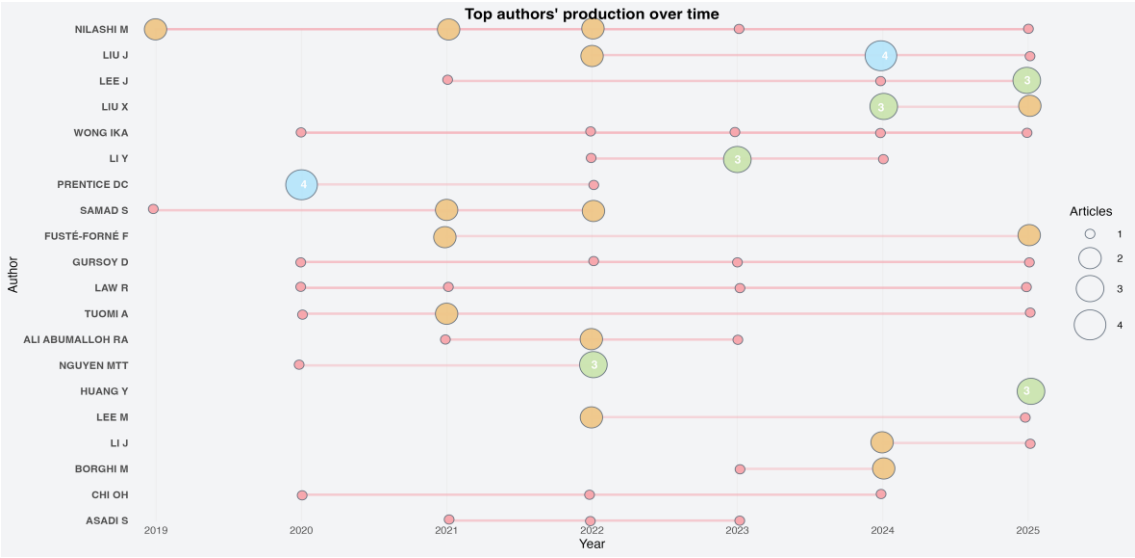


Figure 5: Top Authors Over Time



The geographical structure of the field, based on author affiliations, is depicted in Figure 6 and Figure 7. Figure 6 shows that the United States and China dominate in total publication counts, followed by the United Kingdom, Spain, Malaysia, Korea and India. Importantly, the figure distinguishes between single-country publications (SCP) and multi-country publications (MCP). China and the USA not only generate many domestic studies but also engage in extensive international collaboration, while countries such as Malaysia and Spain record relatively high MCP shares, signalling strong involvement in cross-border projects. This resonates with broader bibliometric findings on tourism and hospitality technology, which emphasise Anglo-American and East-Asian universities as central nodes, with emerging economies increasingly active in smart and AI-enabled tourism research (Buhalis & Law, 2008; Wang et al., 2025).

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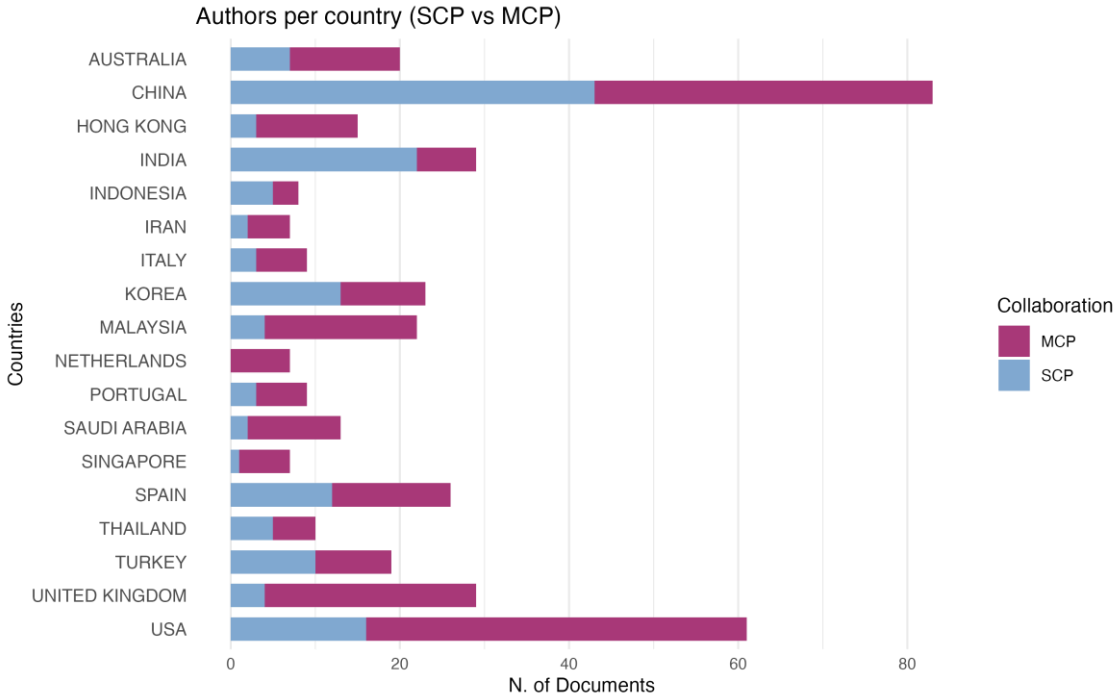
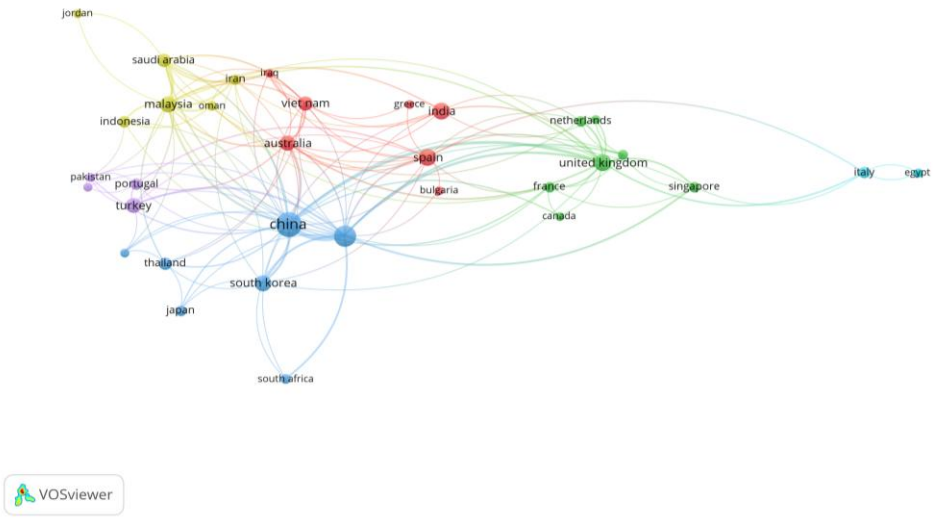
Figure 6: Authors Per Country (including single-country and multiple-country)



Note: SCP: Single-country publications, MCP: Multiple-country publications.

The country collaboration network in Figure 7, also generated in VOSviewer 1.6.20, gives a finer-grained picture of these relationships.

Figure 7: Country Co-authorship Network



China appears as a major hub connecting to South Korea, Japan, Thailand, Malaysia and Vietnam in Asia, but also to European countries such as Spain, the United Kingdom and the Netherlands. The United Kingdom, in turn, bridges several European partners and links to Asian collaborators. The United States connects with both European and Asian nodes, although in this particular dataset its collaboration ties are somewhat less central than China's. Smaller nodes represent emerging tourism markets in the Middle East (e.g., Saudi Arabia, Oman) and South-East Asia (e.g., Indonesia), often focusing on case studies

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of smart destinations, robot adoption in local hotel chains, or AI-driven customer analytics. Overall, the collaboration structure suggests that AI-enabled hotel service research is geographically diverse and increasingly globalised, which enhances the external validity of empirical findings on customer responses to AI and robots across different cultural contexts.

4.1.3. Conceptual and thematic structure

Table 5 lists the most frequent author keywords. On the high-frequency side, terms such as artificial intelligence (64 occurrences), service robots (45), customer satisfaction and machine learning (31 each), hospitality and sentiment analysis (28 each), and service quality (25) dominate.

Table 5: Most Frequent Keywords

Keywords_Left	Occurrence_	Keywords_Right	Occurrence_t
Artificial Intelligence	64	Hotels	13
Service Robots	45	Service Failure	13
Customer Satisfaction	31	Tourism	13
Machine Learning	31	Anthropomorphism	11
Hospitality	28	Hospitality Industry	11
Sentiment Analysis	28	Online Reviews	10
Service Quality	25	Robots	9
Service Robot	24	Satisfaction	9
Customer Experience	17	Service Encounter	9
Hotel	13	Text Mining	9

These keywords encapsulate the core research question of the field: how AI and robotics are operationalised as service robots, recommendation systems, prediction models, chatbots or generative AI, shaping service quality and customer-related outcomes in hospitality. On the "long tail", recurring terms include hotel(s), hospitality industry, customer experience, service encounter, service failure, tourism, online reviews, text mining, anthropomorphism, robots and satisfaction. These vocabulary show that researchers are not only interested in technological capabilities but also in experiential, behavioural and ethical dimensions of AI-mediated hotel encounters (Buhalis et al., 2019; Samala et al., 2022; Siddik et al., 2025).

The three-fields Sankey diagram in Figure 8, produced using the bibliometrix package in R (Aria & Cuccurullo, 2017), links authors, countries and keywords. Thick flows from prolific authors in China, the USA, Malaysia, Spain and the United Kingdom to terms such as artificial intelligence, service robots, customer satisfaction, service quality, machine learning and online reviews show that the most active research groups focus strongly on evaluating AI tools in relation to guest outcomes and data-driven decision making. At the same time, flows towards keywords like anthropomorphism, service failure, customer experience and tourist behaviour reveal specialised lines of work concerned with psychological mechanisms and the management of AI-related risks. This three-way mapping highlights how epistemic communities (authors), institutional contexts (countries) and knowledge foci (keywords) jointly structure the field.

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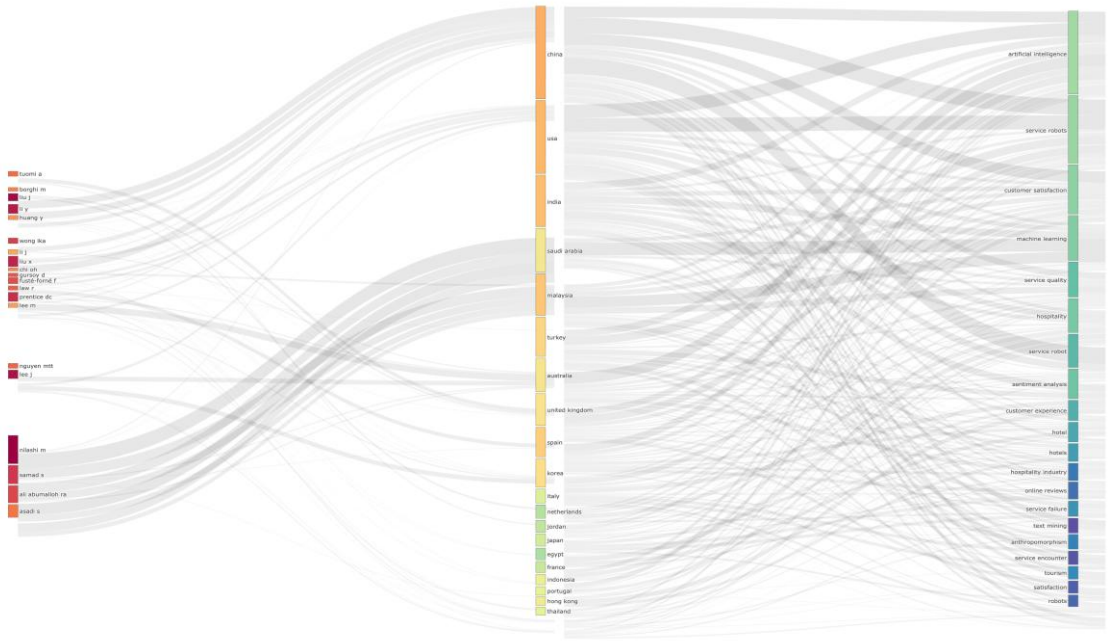
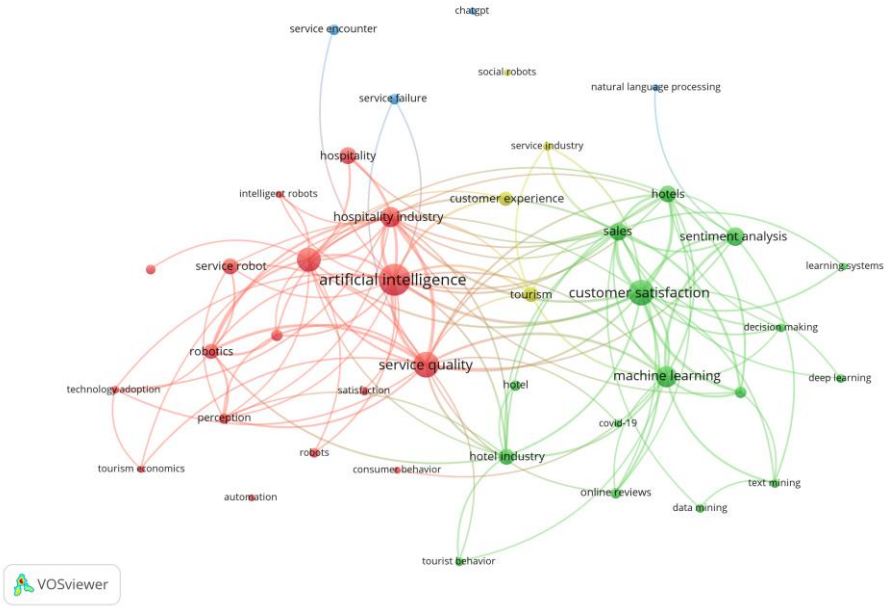
Figure 8: Three fields plot visualizing how authors, countries, and keywords are related through a Sankey diagram



The keyword co-occurrence network in Figure 9, generated in VOSviewer 1.6.20, transforms these frequencies into a relational structure.

Figure 9: The Keyword Co-occurrence Network



One major cluster centre on artificial intelligence, service quality, hospitality industry and service robots. This cluster represents research that investigates how RAISA technologies reshape hotel service processes, service design and perceived service quality, often through surveys and experiments that compare robot-mediated and human-mediated encounters (Ivanov & Webster, 2019; Yassin et al., 2022). A second cluster links customer satisfaction, machine learning, sentiment analysis, online reviews, data mining and decision making, reflecting studies that use AI algorithms to mine big data, forecast

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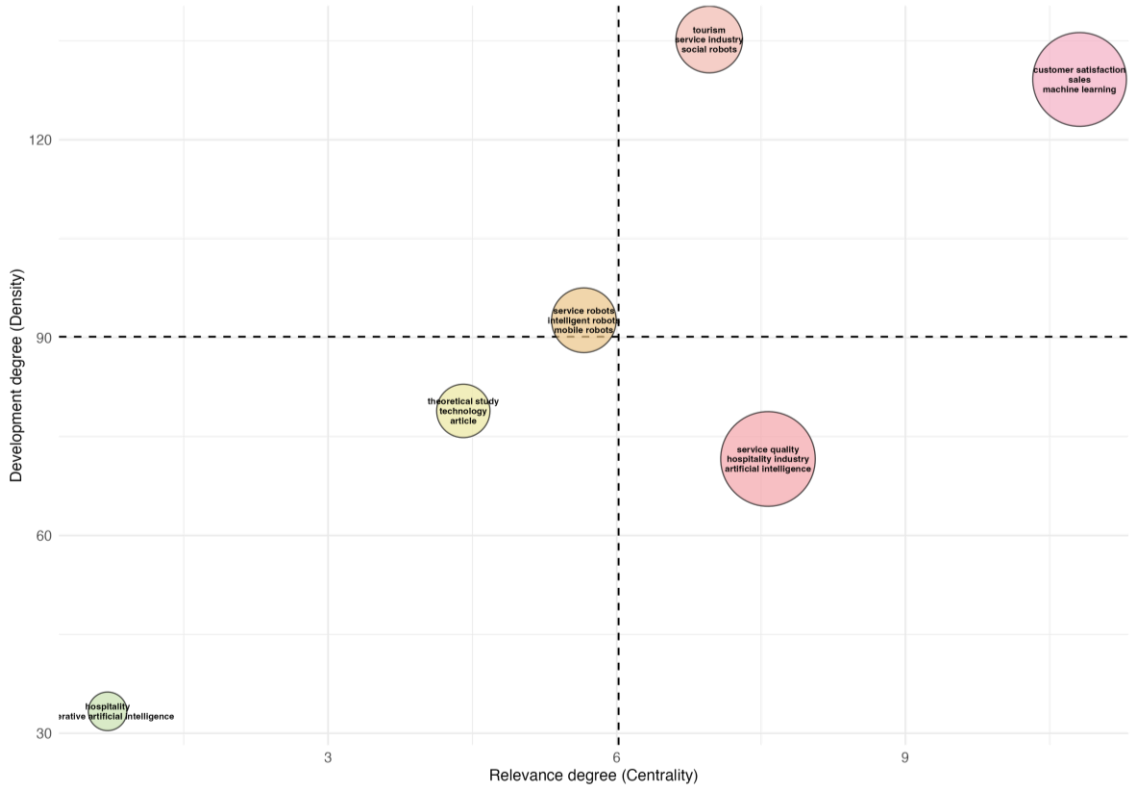
demand or predict satisfaction and loyalty (Nilashi et al., 2015). A smaller but fast-growing cluster contains customer experience, service encounter, natural language processing and ChatGPT, representing the very recent wave of work on conversational agents and generative AI in hotels (Gursoy et al., 2023; Sigala et al., 2024).

The thematic map in Figure 10, also computed with bibliometrix, positions these clusters along centrality (relevance to the field) and density (internal development). The large bubble labelled service quality/hospitality industry/artificial intelligence sits in the high-centrality region, confirming that the interplay between AI and perceived service quality in hotels constitutes the field's conceptual backbone. Nearby, but slightly higher in density, are "motor themes" such as customer satisfaction/sales/machine learning and service robots/intelligent robots/mobile robots. These topics combine strong internal coherence with extensive external links, indicating that they are driving the research frontier by connecting sophisticated AI techniques with outcome variables such as satisfaction, sales, revenue or operational performance (Mariani & Borghi, 2021; Borghi et al., 2023). On the periphery, "niche themes" with high density but lower centrality include clusters around tourism, service industry and social robots, while a small low-density cluster consists mainly of generic terms such as hospitality and artificial, which may represent declining stand-alone topics or evolving conceptual labels (Nannelli et al., 2023).

Figure 10: Thematic Map of AI-Enabled Service Hotels



The temporal evolution of these themes is visualised in Figure 11, which plots trending topics based on author-keyword frequency over time. In the early 2010s, the key terms are broad—hotels, hospitality, sentiment analysis, tourism—reflecting exploratory applications of text mining and basic recommendation systems. From around 2018 onwards, the prominence of service robots, customer experience, service quality, customer satisfaction and machine learning increases rapidly, consistent with the introduction of robots in hotel lobbies and the growing availability of big data for AI-based

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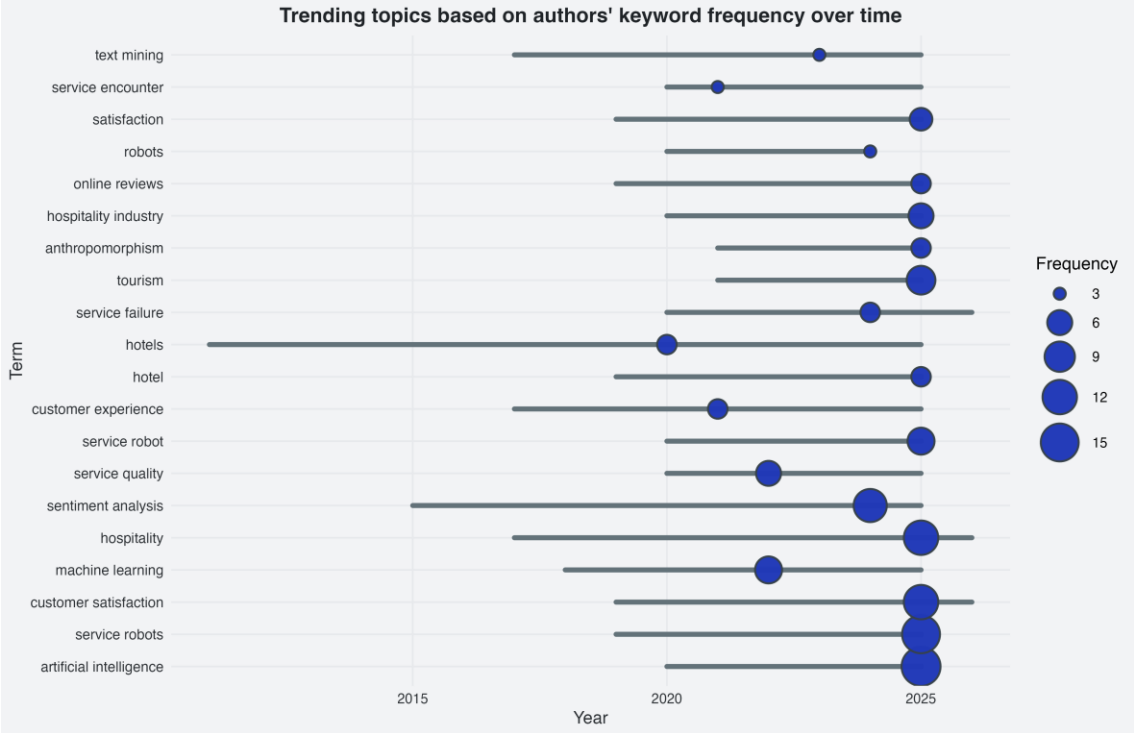
analytics (Samala et al., 2022; Wang et al., 2025). In the most recent period (2022–2025), late-emerging keywords such as anthropomorphism, service failure, service encounter, text mining and artificial intelligence itself stand out. The rise of anthropomorphism and robot gender reflects a shift toward sophisticated psychological research on how guests interpret and emotionally respond to human-like machines, while the appearance of service failure and service recovery signals recognition that AI can misfire and that hotels must design recovery strategies for AI-mediated encounters (Seo, 2022; Yassin et al., 2022).

Figure 11: Trending Topics Author Keywords



5. Conclusion

5.1. Overview of key patterns

This review set out to offer a hotel-centred, bibliometric and thematic overview of AI-enabled service, focusing on service quality, service experience and customer outcomes. Across the 313 Scopus articles, the results confirm that this is a young but fast-growing field. Publication activity stays low until the mid-2010s and then accelerates sharply after 2020, in step with the rollout of RAISA technologies, the push for contactless service during COVID-19 and the emergence of generative AI such as ChatGPT (Ivanov & Webster, 2017, 2019; Wang et al., 2025). Core hospitality journals—in particular International Journal of Hospitality Management, International Journal of Contemporary Hospitality Management and Journal of Hospitality Marketing & Management – concentrate both productivity and citations, indicating that AI-enabled hotel service has moved from a niche "tech topic" into the mainstream of hospitality research (Buhalis et al., 2019; Knani et al., 2022).

Taken together, the answers to RQ1–RQ3 suggest a structured yet still evolving knowledge base. Highly cited work clusters around three focal themes: RAISA and technological disruption in hospitality, service robots and guest experience in hotels, and

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the implications of ChatGPT and generative AI (Ivanov & Webster, 2019; Tung & Au, 2018; Gursoy et al., 2023; Sigala et al., 2024). The mapping of authors, institutions and countries shows a globally distributed but uneven field: a small group of prolific scholars (e.g., Nilashi, Liu, Li, Gursoy) account for much of the output, while many others contribute only one or two papers (Nilashi et al., 2015). The United States and China lead in volume, with the United Kingdom, Spain, Malaysia, Korea and India also playing visible roles, and dense collaboration links connecting Asia–Pacific and Europe. Thematic analyses converge on four main topics: AI and service robots as enablers (and sometimes disruptors) of service quality and satisfaction; AI-based analytics and decision support; customer experience, anthropomorphism and human–robot interaction; and organisational, ethical and societal implications of AI-enabled hotel service (Park et al., 2025; Bulchand-Gidumal et al., 2024).

5.2. Implications for theory and practice

Theoretically, these patterns underline that AI-enabled hotel service quality is multi-layered. Embodied AI (service and social robots), analytics-based AI (forecasting, dynamic pricing, recommendation) and generative AI should be understood as interconnected components of a socio-technical service system rather than as isolated tools (Ivanov & Webster, 2019; Buhalis et al., 2019). The prominence of notions such as anthropomorphism, social presence, trust and service failure shows that classical service quality models need to be complemented by insights from consumer behaviour, social psychology and human–robot interaction to explain how guests evaluate non-human agents (Tung & Au, 2018; Seo, 2022). In that sense, AI-rich hotels offer a fertile context for re-thinking core constructs like “service encounter” and “service employee” in hybrid human–AI environments.

Managerially, the review reinforces that AI in hotels is a double-edged sword. Robots, chatbots and predictive analytics can support more consistent, responsive and personalised service, enable real-time monitoring of online reviews and inform targeted quality improvements (Nilashi et al., 2015). Yet the human–robot interaction literature shows that design details—appearance, voice, gender cues, interaction style and task allocation—strongly shape perceived warmth, competence and fairness (Tung & Au, 2018; Seo, 2022; Huang, 2022). Over-reliance on AI in emotionally sensitive encounters, or poorly explained use of generative AI, may backfire. Hotels therefore need to align AI deployment with clear service role definitions, using automation where standardisation and speed matter, and preserving or enhancing human contact where empathy and complex judgment are critical (Gursoy et al., 2023; Sigala et al., 2024).

5.3. Future research directions

The mapping also suggests several concise priorities for future work. First, many studies remain cross-sectional and single-touchpoint; longitudinal and customer-journey designs could capture how perceptions of AI evolve across pre-arrival, stay and post-stay stages. Second, research on employees and AI is still fragmented and should be linked more explicitly to customer-facing service quality, for example by examining hybrid human–AI service teams, role negotiation and emotional labour in robot-rich hotels (Kim et al., 2025). Third, empirical work on generative AI in hotel settings is still scarce; controlled experiments and field trials comparing AI-generated and human service, and testing disclosure and recovery strategies, are badly needed (Gursoy et al., 2023; Tuyen et al., 2025). Finally, most evidence comes from technologically advanced markets and mid- to

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high-end properties; comparative studies across hotel segments, cultures and guest groups—including older or more vulnerable travellers—would strengthen external validity and allow ethical, legal and sustainability concerns to be addressed in a more systematic way (Bulchand-Gidumal et al., 2024; Nannelli et al., 2023).

Ethics Approval and Consent to Participate

This study relies entirely on secondary data extracted from published journal articles indexed in Scopus and does not involve any direct contact with human participants or the collection of primary empirical data. No personal, sensitive or identifiable information was obtained or processed at any stage. In line with common institutional and international guidelines, formal ethics committee approval and informed consent from participants were therefore not required for this research.

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Conflict of Interest

The author declares that there are no conflicts of interest regarding the research, authorship, or publication of this article.

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