



Robotic Technologies in Hospitality and Tourism: A PRISMA-Compliant Review on Guest Satisfaction Enhancement

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ABSTRACT

This PRISMA-compliant systematic review examines how robotic technologies influence guest satisfaction in the hospitality and tourism industry. Focusing on both robotic and AI-driven systems, the study explores their roles not only in improving operational efficiency but also in enhancing emotional and experiential aspects of service. A total of 26 peer-reviewed articles were selected for Thematic content analysis was conducted using coding categories such as anthropomorphism, usefulness, contextual fit, and human-robot collaboration. The findings show that robots enhance efficiency, safety, and novelty, while AI technologies support personalization and adaptive service. However, guest satisfaction is highest in hybrid service models that integrate robotic precision with human emotional intelligence. Guest acceptance is shaped by several factors, including robot design, perceived value, cultural context, and the quality of interaction between guests and service robots.

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1. INTRODUCTION

The integration of robotics and artificial intelligence (AI) into hospitality and tourism has accelerated rapidly in recent years, driven by labor shortages, hygiene concerns, and the pursuit of enhanced guest satisfaction (Ivanov & Webster, 2019; Ye et al., 2022). The core objective of adopting robotics is to streamline operations and minimize inefficiencies while simultaneously maximizing guest value through improved service delivery and personalization (Lu et al., 2021). For this purpose, hotels and tourism providers have increasingly deployed robotic technologies for functions such as automated check-in kiosks, service delivery, cleaning, and concierge tasks (Kuo et al., 2017; Zhong et al., 2022). These innovations reduce human error and ensure standardized service quality across touchpoints. Similarly, AI-driven personalization enables customized greetings, menu recommendations, and itinerary planning, creating experiences aligned with guests' preferences and expectations (Qiu et al., 2020; Kim et al., 2021).

Robotic adoption extends beyond efficiency gains and hygiene assurance, as it has emerged as a strategic innovation for enhancing brand positioning and guest loyalty. Robots are frequently associated with novelty and technological leadership, creating memorable experiences that strengthen brand recall and differentiate hospitality providers in competitive markets (Chan & Tung, 2019; Lu et al., 2019). Empirical evidence highlights that hotels leveraging robotics often benefit from improved online reputation, stronger word-of-mouth marketing, and higher guest satisfaction scores (Huang et al., 2021). At the same time, the COVID-19 pandemic accelerated the demand for contactless service, positioning robots as key enablers of safe, touch-free interactions in hospitality environments (Liu et al., 2022).

Despite these advantages, challenges remain. Robotics and AI lack the empathy and adaptability inherent in human staff, which limits their ability to meet complex or emotionally nuanced

guest needs (Lin et al., 2020). While robots excel in standardized, repetitive tasks, they often fall short in contexts requiring discretion, cultural sensitivity, or emotional intelligence (Hou et al., 2021). To address these limitations, researchers and practitioners advocate for hybrid service models that integrate robotic efficiency with human empathy. Such models balance operational reliability with personalized care and produce superior outcomes compared to robot-only or human-only service (Kim et al., 2021; Qiu et al., 2020).

The significance of this review lies in its ability to synthesize fragmented findings on robotics adoption and to highlight how guest satisfaction outcomes are shaped by both technological and human factors. Building upon frameworks such as the Technology Acceptance Model (TAM) (Davis, 1989) and Service-Dominant Logic (Vargo & Lusch, 2008), the paper integrates evidence on operational benefits, psychological determinants, and organizational strategies. Prior studies have examined robotics in isolation (Ivanov & Webster, 2019; Hou et al., 2021), yet comprehensive research on hybrid service adoption remains limited. Addressing this gap, the present review develops a framework that situates robotics within the broader hospitality ecosystem.

In this context, the study seeks to answer the following research questions (RQs):

RQ1. How do robotics and AI enhance guest satisfaction in hospitality and tourism?

RQ2. How do hybrid service models compare with robot-only and human-only service delivery?

RQ3. What determinants shape guest acceptance of robotic services, and what barriers limit adoption?

By focusing on the intersection of service automation, guest psychology, and organizational innovation, this research contributes to advancing both theoretical and practical understanding of robotics in hospitality. The findings are expected to inform hotels, managers, and policymakers who seek

to optimize service delivery in an increasingly digitalized tourism ecosystem.

2. LITERATURE REVIEW

2.1 ROBOTICS IN HOSPITALITY AND TOURISM

The adoption of robotics in hospitality has grown in response to challenges related to labor shortages, hygiene requirements, and rising guest expectations (Ivanov & Webster, 2019; Ye et al., 2022). Robots are widely used for repetitive tasks such as check-in, service delivery, cleaning, and concierge functions, allowing hotels to achieve standardized service outcomes while reducing dependence on human staff (Kuo et al., 2017; Zhong et al., 2022). Their deployment also supports operational resilience during periods of crisis, as demonstrated during the COVID-19 pandemic when robots provided contactless service to minimize health risks (Liu et al., 2022; Hou et al., 2021).

Robots are not only operational tools but also strategic assets that enhance novelty and brand differentiation. Guests often perceive robotic service as innovative and futuristic, which increases satisfaction and strengthens brand recall (Chan & Tung, 2019; Lu et al., 2019). Such novelty effects contribute to positive word-of-mouth marketing, especially when guests share robotic encounters on digital platforms (Zhong et al., 2022). However, novelty as a satisfaction driver may diminish over time if robotics are not embedded in meaningful service experiences (Kim et al., 2021). This dual role, functional and symbolic, positions robotics as both efficiency enhancers and marketing differentiators in the hospitality sector.

Despite these advantages, limitations remain. Robots lack emotional intelligence, cultural sensitivity, and adaptability in high-touch contexts. Scholars argue that their true value lies in complementing rather than replacing humans,

enabling staff to focus on empathetic, creative, and relational tasks (Lin et al., 2020; Lu et al., 2021). This aligns with emerging perspectives that emphasize robotics as a component of hybrid service models, where machines and humans collaborate to deliver optimal outcomes (Qiu et al., 2020; Huang et al., 2021).

2.2 DETERMINANTS OF GUEST SATISFACTION

Guest satisfaction with robotics is shaped by multiple determinants at the intersection of technology design, user psychology, and service context. One such determinant is anthropomorphism. Robots designed with moderate human-like features increase acceptance and comfort, while overly human-like designs risk triggering the uncanny valley effect, resulting in discomfort and reduced satisfaction (Lu et al., 2019; Tung & Law, 2017). Another determinant is perceived usefulness and ease of use, the core constructs of the Technology Acceptance Model (TAM) (Davis, 1989). Studies demonstrate that guests are more willing to adopt robotic services when interactions are intuitive and when robots provide tangible value such as faster check-in, reliable delivery, or accurate information (Akdin et al., 2021; Guan et al., 2021). These findings suggest that technological design is fundamental to acceptance and directly influences satisfaction.

Contextual fit further shapes guest evaluations. Robots are more positively received in contexts that emphasize hygiene or standardization, such as during pandemics or in large-scale business hotels, whereas luxury environments may demand greater human involvement (Qiu et al., 2020; Yoganathan et al., 2021). Finally, collaboration quality between humans and robots strongly impacts outcomes. Studies consistently find that hybrid service models, where robots handle logistics and humans provide empathy, achieve superior satisfaction

compared to robot-only or human-only approaches (Kim et al., 2021; Liu et al., 2022).

2.3 ORGANIZATIONAL AND STAKEHOLDER PERSPECTIVES

From an organizational perspective, robotics adoption creates both opportunities and challenges. Robots lower labor costs and increase efficiency, but they also generate staff concerns about job displacement and role redundancy (Guan et al., 2021). Successful integration therefore depends on managerial strategies that reframe robots as collaborators rather than replacements. Evidence shows that employees are more receptive when robotic adoption is accompanied by training and opportunities to focus on higher-value service roles (Lin et al., 2020; Hou et al., 2021).

Managerial leadership is crucial in driving change. Hotels that provide structured training and cross-orientation programs report smoother adaptation and greater acceptance among staff and guests (Yu et al., 2022). Moreover, ethical considerations, especially privacy concerns linked to AI-driven personalization, represent a significant organizational challenge. Studies reveal that guests are hesitant when robots are perceived as intrusive or when data usage lacks transparency (Akdim et al., 2021; Park et al., 2024). Addressing these issues through robust privacy policies and transparent communication is essential for sustaining trust.

3. RESEARCH METHODOLOGY

3.1 DATABASE SELECTION

This study employed a systematic review methodology guided by PRISMA principles (Moher et al., 2009), ensuring transparency,

replicability, and comprehensiveness. Two databases were selected: Scopus and Web of Science. These were chosen because they represent the most authoritative indexing services for peer-reviewed literature in hospitality, tourism, management, and technology fields. Scopus provides extensive coverage of journals focused on hospitality and tourism, including both management and innovation perspectives (Ivanov & Webster, 2019). Web of Science offers access to high-impact journals and facilitates citation tracking, which helps identify the most influential contributions to robotics adoption research (Ye et al., 2022). ScienceDirect complements these by providing strong coverage of interdisciplinary studies in artificial intelligence, service automation, and organizational behavior that are not always captured in tourism-specific databases (Lu et al., 2021). By combining these three databases, the study ensured a balance between disciplinary specificity and interdisciplinary breadth, reducing the risk of omitting critical contributions.

3.2 SEARCH STRATEGY

The desk research method was adopted for this study, as it is widely recognized in hospitality and tourism research for offering comprehensive insights across multiple dimensions of service innovation and guest satisfaction (Mahajan et al., 2023). Desk research involved the systematic collection and analysis of publicly available data and peer-reviewed articles that reflect current applications of robotics and AI in the hospitality sector (Chaudhary et al., 2025). This method was particularly appropriate given the interdisciplinary nature of robotics, which intersects hospitality management, information systems, and organizational behavior.

To identify relevant literature, a finalized set of keywords was developed through iterative refinement informed by prior studies and thematic relevance. These keywords were selected to capture both established concepts and

emerging innovations in robotic applications within hospitality. The terms included:

- (“*Hospitality robots*” OR “*Robotic adoption in hotels*”)* → capturing direct applications of service robots.
- (“*AI guest satisfaction*” OR “*Artificial intelligence in hospitality*”)* → reflecting the role of AI-driven personalization.
- (“*Service automation*” AND “*Tourism innovation*”)* → emphasizing broader operational and technological innovations.
- (“*Human–robot collaboration*” OR “*Hybrid service models*”)* → focusing on comparative studies of hybrid versus robot-only and human-only services.

Each keyword group represents a different dimension of robotics adoption: “Hospitality robots” emphasizes operational efficiency, “AI guest satisfaction” focuses on personalization, “Service automation” highlights process innovation, and “Human–robot collaboration” addresses hybrid service models. Boolean operators (“AND”, “OR”) and wildcards (“*”) were employed to maximize retrieval of variations in terminology.

The inclusion criteria were as follows:

- Articles indexed in high-quality databases such as Scopus, Web of Science, and ScienceDirect.
- Peer-reviewed journal articles published between 2017 and 2025, reflecting the recent growth of robotics adoption.
- Studies explicitly focused on robotics or AI in hospitality and tourism contexts.
- Empirical studies or systematic reviews that examined guest satisfaction, service quality,

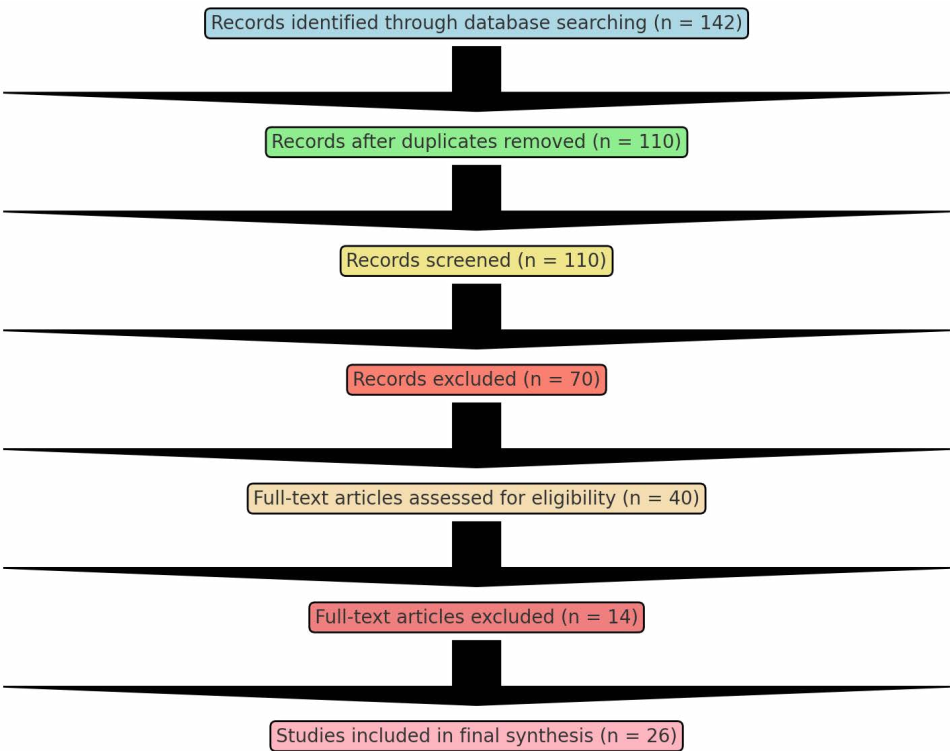


Figure 1 : PRISMA flow diagram

or organizational outcomes.

- Articles with a verifiable DOI to ensure reliability and replicability (Mongeon & Paul-Hus, 2015; Álvarez-García et al., 2018).

The exclusion criteria were:

- Regional databases with limited indexing quality, language barriers, or restricted subject coverage.
- Secondary sources such as conference proceedings, book chapters, case studies, dissertations, and editorials.
- Studies without a DOI or those not providing empirical or systematic review evidence.
- Non-English publications due to translation inconsistencies and limited accessibility.

This process ensured that only the most relevant and rigorous studies were included in the review. The screening process is detailed in **Figure 1**, which presents the PRISMA flow diagram and the inclusion and exclusion criteria applied in this study.

3.3 SCREENING AND INCLUSION CRITERIA

The initial search yielded 142 records. After removing duplicates, 110 articles remained. Titles and abstracts were reviewed for relevance to robotics, AI, and hospitality service delivery, leaving 40 full-text articles for eligibility assessment. After applying inclusion and exclusion criteria, 26 articles were retained for final analysis. The criteria for inclusion were:

- Explicit examination of robotics or AI within hospitality or tourism contexts.
- Empirical research or systematic review, rather than conceptual essays.
- Direct measurement of outcomes related to guest satisfaction, service quality, or organizational impact.

- Accessibility of the study through a full-text version with a verifiable DOI.
- Exclusion criteria included studies not directly related to hospitality (e.g., robotics in healthcare or manufacturing), conceptual papers lacking empirical evidence, and non-English publications.

3.4 DATA ANALYSIS AND CODING PROCESS

The selected 26 studies were analyzed through content analysis (Krippendorff, 2018), which enables systematic categorization of findings into key themes. Coding combined deductive and inductive approaches. Deductive codes were drawn from established theoretical frameworks such as the Technology Acceptance Model (Davis, 1989) and Service-Dominant Logic (Vargo & Lusch, 2008), while inductive codes emerged from repeated themes identified across the literature.

The final framework consisted of six categories: Operational Efficiency, Anthropomorphism, Usefulness and Ease, Contextual Fit, Human-Robot Collaboration, and Barriers. These are summarized in Table 2.

3.4.1 OPERATIONAL EFFICIENCY

Studies coded under this category emphasize how robots improve consistency, reduce check-in times, and handle repetitive tasks without fatigue (Ivanov & Webster, 2019). Operational efficiency is particularly valued in business and mid-scale hotels, where reliability and speed are major determinants of guest satisfaction (Ye et al., 2022).

3.4.2 ANTHROPOMORPHISM

Anthropomorphism captures the degree to which robots are designed with human-like

Table 1. Content analysis coding table

Code	Definition	Items	Rules	Source
Operational Efficiency	Use of robots to streamline repetitive and transactional tasks	Automated check-in, delivery, cleaning	Identify studies linking robotics with reduced time/cost	Ivanov & Webster (2019); Ye et al. (2022)
Anthropomorphism	Human-like design features that shape guest comfort and acceptance	Physical appearance, voice, gestures	Assess impact of design balance vs uncanny valley	Lu et al. (2019); Tung & Law (2017)
Usefulness and Ease	Perceived ability of robots to improve service value and be easy to interact with	Efficiency, reliability, ease of interaction	Apply TAM constructs to hospitality contexts	Davis (1989); Akdim et al. (2021)
Contextual Fit	Alignment of robotics use with service setting and guest expectations	Pandemic safety, high-density hotels, luxury contexts	Analyze situational influences on acceptance	Qiu et al. (2020); Yoganathan et al. (2021)
Human-Robot Collaboration	Complementarity between robotic and human service roles	Hybrid service models, shared tasks	Compare hybrid vs robot-only vs human-only models	Kim et al. (2021); Liu et al. (2022)
Barriers	Challenges limiting successful integration of robotics	Privacy, staff resistance, cost, training	Identify factors restricting adoption	Guan et al. (2021); Park et al. (2024)

attributes. Moderate anthropomorphism enhances acceptance, while overly human designs risk creating discomfort through the “uncanny valley” effect (Lu et al., 2019; Tung & Law, 2017).

3.4.3 USEFULNESS AND EASE

Perceived usefulness and ease of use are the strongest predictors of guest satisfaction, consistent with TAM (Davis, 1989). Guests are more likely to accept robotics when they perceive the interaction as efficient, intuitive, and reliable (Akdim et al., 2021).

3.4.4 CONTEXTUAL FIT

Contextual fit refers to how well robotics align with specific service settings. Robots are

more positively received in high-density or hygiene-sensitive environments such as during pandemics, but less effective in luxury contexts where personalized, high-touch service is prioritized (Qiu et al., 2020; Yoganathan et al., 2021).

3.4.5 HUMAN-ROBOT COLLABORATION

Research consistently shows that hybrid models, where robots handle logistics and humans provide personalized interaction, generate higher satisfaction compared to robot-only or human-only services (Kim et al., 2021; Liu et al., 2022). Collaboration ensures that efficiency and empathy are delivered simultaneously.

3.4.6 BARRIERS

Barriers to adoption include staff concerns about job security, training costs, and guest resistance due to privacy concerns with AI data collection (Guan et al., 2021; Park et al., 2024). These barriers highlight the need for managerial strategies such as staff re-training and transparent data governance.

3.5 RELIABILITY AND VALIDITY

Reliability was ensured by iterative cross-checking of codes and resolving discrepancies through consensus, reducing subjectivity in classification (Ye et al., 2022). Validity was strengthened by triangulating findings across different hospitality contexts (business, luxury, family, and pandemic-related services) to identify consistent patterns (Kim et al., 2021). Limiting the review to peer-reviewed studies with verifiable DOIs further enhanced academic rigor and replicability.

4. RESULT

4.1 OPERATIONAL EFFICIENCY AND RELIABILITY

Across the reviewed studies, one of the clearest advantages of robotics adoption is the enhancement of operational efficiency. Robots reduce the time taken to perform standard tasks such as check-in, housekeeping, and room service delivery (Ivanov & Webster, 2019; Ye et al., 2022). For instance, self-service kiosks powered by AI algorithms have been shown to reduce check-in times by up to 40 percent compared to traditional desk procedures, while robots that deliver food or amenities ensure accuracy and timeliness that surpasses human averages

(Lu et al., 2021). This reliability is particularly valued in high-volume environments such as business hotels, where speed and predictability are essential (Hou et al., 2021).

Robotic efficiency is not only operational but also psychological. Guests often associate robotic service with modernity and professionalism, leading to a heightened perception of reliability (Chan & Tung, 2019). Studies also highlight that robotic efficiency is positively correlated with higher ratings on guest review platforms, as guests perceive the absence of delays and errors as a marker of quality (Zhong et al., 2022). In this sense, robots function both as service providers and as symbols of operational excellence.

However, efficiency benefits are context-dependent. While business hotels emphasize speed, leisure travelers may interpret robotic efficiency differently, viewing it as convenience rather than necessity (Kim et al., 2021). This suggests that efficiency-driven satisfaction is contingent upon guest type and service context, highlighting the importance of aligning deployment strategies with market segments.

4.2 CONTACTLESS AND SAFE SERVICE

The COVID-19 pandemic transformed perceptions of service safety, and robots became powerful symbols of hygiene and contactless care. Studies consistently report that guests viewed robots as safer alternatives to human staff during health crises, as they reduced the risk of infection through touchless service delivery (Qiu et al., 2020; Liu et al., 2022). Robots deployed in housekeeping, room delivery, and concierge roles reassured guests that services were sanitized and reliable (Huang et al., 2021). Beyond their practical role, robots carried a strong signaling effect. The mere presence of visible robotic staff created perceptions of heightened safety standards, even when guests did not directly interact with them (Kim et al., 2021). This symbolic function highlights the psychological value of robotics adoption, which

goes beyond efficiency to influence perceptions of trust, safety, and care.

Interestingly, safety-driven satisfaction appears stronger in health-sensitive contexts than in normal operations. While pandemic studies emphasize the value of robots as protective tools, post-pandemic literature shows mixed findings: some guests continue to value touchless options, while others return to prioritizing warmth and empathy (Hou et al., 2021). This indicates that safety-related satisfaction is dynamic, evolving with context and guest expectations.

4.3 NOVELTY AND BRAND DIFFERENTIATION

Novelty is another dimension consistently associated with robotics in hospitality. Robots are perceived as exciting, futuristic, and memorable, particularly in lifestyle and midscale hotels (Chan & Tung, 2019). Guest interactions with robots often generate curiosity, leading to experiences that are described as “unique” and “shareable” (Lu et al., 2019). These encounters contribute to stronger brand recall and higher word-of-mouth recommendations (Zhong et al., 2022).

The digital spillover effect of novelty is particularly significant. Guests frequently share robotic experiences on social media platforms, generating user-generated content that amplifies hotel visibility (Huang et al., 2021). Studies report that hotels deploying humanoid robots or robotic concierges experienced surges in social media engagement and positive reviews, contributing to online reputation management.

However, novelty as a satisfaction driver is fragile. Research suggests that the initial excitement may diminish once robotics become normalized in service environments (Kim et al., 2021). Without complementary service value, novelty risks being perceived as gimmickry rather than innovation (Hou et al., 2021). This highlights the need for hotels to embed novelty within broader value propositions, ensuring that

robotics enhance rather than distract from the guest experience.

4.4 PERSONALIZATION AND AI-DRIVEN EXPERIENCES

AI-enabled personalization transforms robotics from functional tools into relational service providers. Studies show that robots equipped with AI can adapt greetings, remember preferences, and provide tailored recommendations, which significantly improves guest satisfaction (Akdim et al., 2021). For instance, service robots that recall a repeat guest's dining preferences or provide personalized activity suggestions foster a sense of recognition and exclusivity (Kim et al., 2021).

Personalization is especially valued by younger and tech-savvy travelers, who interpret AI-driven interactions as innovative and convenient (Liu et al., 2022). These guests report higher satisfaction when robots demonstrate awareness of their preferences, suggesting that personalization is both a functional and symbolic value enhancer. Importantly, personalization has a direct link to loyalty intentions, as guests are more likely to revisit hotels where they feel acknowledged and understood (Yu et al., 2022).

Nevertheless, personalization introduces new challenges. The use of guest data to power AI recommendations raises privacy concerns, with some studies highlighting resistance to robots perceived as overly intrusive (Park et al., 2024). This tension underscores the importance of transparent data governance, where personalization is balanced against ethical safeguards.

4.5 COMPARATIVE EVIDENCE OF HYBRID MODELS

Perhaps the most critical finding of this review is the superiority of hybrid service models. Comparative studies across business hotels, luxury resorts, pandemic-related services, and family leisure contexts consistently show that

hybrid adoption achieves the highest satisfaction scores (Kim et al., 2021; Qiu et al., 2020). Robot-only models excel in efficiency and safety but lack empathy. Human-only models provide emotional connection but are constrained by cost, inconsistency, and capacity. Hybrid models combine these strengths, delivering both operational reliability and personalized care (Lu et al., 2019).

Beyond functional benefits, hybrid models succeed because they are psychologically reassuring. Guests perceive collaboration between humans and robots as a balanced service ecology, where robots enhance efficiency without threatening the social role of human staff (Huang et al., 2021). This perception reduces fears of replacement while amplifying trust, which explains why hybrid models consistently outperform alternatives.

Hybrid adoption also reflects cultural and generational factors. Studies note that while younger guests often embrace robot-only models for their novelty, older guests express discomfort without human presence (Qiu et al., 2020). By blending both forms of service, hybrid models accommodate diverse guest profiles, making them the most sustainable and adaptable pathway for the industry.

4.6 INTEGRATED FRAMEWORK OF FINDINGS

Synthesizing across the literature, four primary drivers of guest satisfaction were identified: operational efficiency, safety, novelty, and personalization. These drivers are mediated by psychological determinants such as anthropomorphism, perceived usefulness, contextual fit, and human-robot collaboration. At the organizational level, managerial strategies such as training, change management, and privacy governance further condition the effectiveness of robotics adoption (Lin et al., 2020; Guan et al., 2021).

4.7. ROBOTICS AND AI ENHANCE GUEST SATISFACTION

The integration of robotics and artificial intelligence (AI) in hospitality and tourism has significantly transformed service delivery by enhancing operational efficiency, personalization, and customer experience. Service robots, through their ability to deliver consistent performance and process large volumes of data, enable faster check-ins, room service, and concierge tasks, thereby minimizing wait times and human errors (Ye et al., 2020; Wirtz et al., 2018). AI technologies can analyze customer preferences to tailor services, creating a more personalized experience that boosts guest satisfaction (Chi et al., 2020). Additionally, robots can be particularly effective in maintaining hygiene and safety protocols essential in the post-pandemic context by reducing direct human contact during service interactions (Ivanov & Webster, 2019). Robots like concierge bots or delivery drones have shown the ability to impress guests with their novelty and convenience, contributing to positive word-of-mouth and brand perception (Tung & Au, 2018).

Furthermore, robotic applications have been found to positively influence emotional responses when designed with anthropomorphic features or programmed to mimic human behaviors, which helps foster rapport and trust between guests and technology (Qiu et al., 2020; Stock & Merkle, 2018). When AI interfaces are embedded in mobile devices, such as chatbots or virtual concierges, they offer round-the-clock support, enhancing the perception of reliability and accessibility (Kasilingam, 2020). However, guest satisfaction is not solely dependent on the presence of robotics but on their seamless integration into the service ecosystem. If robotic services appear overly mechanical or impersonal, they may reduce satisfaction instead of enhancing it (Belanche et al., 2020). Hence, the key lies in deploying AI and

robotics in ways that augment human service rather than fully replace it, striking a balance between technological efficiency and emotional intelligence.

4.8 HYBRID SERVICE MODELS COMPARE WITH ROBOT-ONLY AND HUMAN-ONLY SERVICE DELIVERY

Hybrid service models, which combine human employees with robotic or AI-driven technologies, tend to offer superior performance and customer satisfaction compared to robot-only or human-only service frameworks. This model leverages the unique strengths of both entities: robots excel at performing repetitive, data-driven, and contactless tasks with precision, while humans bring emotional intelligence, empathy, and complex problem-solving skills (Lu et al., 2020; Wirtz et al., 2018). In environments such as hotels or airports, guests often value the efficiency of robots for simple tasks like check-ins or room service, while preferring human assistance for nuanced concerns or high-touch services (Ivanov et al., 2018). By integrating both elements, hybrid models cater to a wider spectrum of guest expectations and preferences, leading to a more holistic and satisfying experience (Tung & Law, 2017; Belanche et al., 2020).

In contrast, robot-only service models often fall short in contexts requiring emotional engagement or situational adaptability. While these systems are cost-effective and ideal for high-volume, standardized operations, their limited emotional intelligence and rigidity can alienate guests, especially those less technologically inclined or those with high service expectations (Murphy et al., 2017; Tussyadiah & Park, 2018). Conversely, human-only models, though rich in emotional engagement, face limitations in scalability, consistency, and round-the-clock availability, particularly under labor shortages or cost constraints (Bowen & Morosan, 2018). Hybrid models address these shortcomings by

distributing roles effectively, ensuring robots handle back-end and low-contact tasks while humans manage interactions requiring empathy and judgment. This synergy enhances service resilience and creates a more adaptable and guest-centric hospitality experience (Kim & Hall, 2019; Lu, Cai, & Gursoy, 2019).

4.9 . DETERMINANTS SHAPE GUEST ACCEPTANCE OF ROBOTIC SERVICES, AND WHAT BARRIERS LIMIT ADOPTION

Guest acceptance of robotic services in hospitality is shaped by a range of cognitive, emotional, and contextual factors. Key determinants include perceived usefulness, ease of use, novelty, and trustworthiness of the technology (Zhong et al., 2020; Lin, Chi, & Gursoy, 2022). Guests are more likely to accept and appreciate robotic services when they believe the technology enhances convenience, saves time, and delivers reliable performance (Akdim, Loukili, & Benhabib, 2022). Anthropomorphism—designing robots with human-like traits—also positively influences acceptance by making interactions feel more intuitive and less mechanical (Qiu et al., 2020; Stock & Merkle, 2018). Additionally, social influence and prior experience with technology play a critical role; guests who are familiar with digital tools or influenced by peers tend to exhibit higher levels of acceptance (Tussyadiah et al., 2017). Demographics such as age, education level, and cultural background further mediate acceptance, with younger and tech-savvy individuals generally showing more favorable attitudes (Ivanov, Webster, & Garenko, 2018).

Despite these drivers, several barriers continue to impede the widespread adoption of service robots. A significant limitation is the perceived lack of emotional intelligence and personalization, which can make robotic interactions feel cold or inadequate, especially

in luxury or personalized service contexts (Lu et al., 2019; Tung & Law, 2017). Concerns about job displacement and social isolation may also influence guest sentiment negatively, particularly among those who value human contact in service encounters (Li, Bonn, & Ye, 2019). Technical malfunctions, privacy concerns, and a lack of trust in the reliability or security of AI systems can further erode user confidence (Chi et al., 2020; Ivanov et al., 2017). Additionally, cultural resistance and varying norms around human-machine interaction pose challenges in different global markets (Kim & Hall, 2019). To overcome these barriers, hospitality providers must ensure thoughtful implementation, proper staff training, and user-centric design to build trust and align robotic services with guest expectations.

5. CONCLUSION AND IMPLICATIONS

5.1 CONCLUSION

This review demonstrates that robotics adoption in hospitality is reshaping how service is delivered and evaluated by guests. Across the 26 reviewed studies, robotics were consistently linked to improvements in operational efficiency, service reliability, hygiene assurance, and the creation of memorable experiences (Ivanov & Webster, 2019; Ye et al., 2022). AI-enabled personalization further enhances these outcomes by tailoring services to individual guest needs, thereby reinforcing loyalty and satisfaction (Kim et al., 2021). However, the evidence also shows that robotics in isolation cannot fully replicate the empathy, cultural sensitivity, and adaptability of human service. Guest satisfaction is maximized when robotic and human services are combined into hybrid models, which balance technological efficiency with human warmth. Hybrid models consistently outperformed robot-only

and human-only approaches across diverse hospitality contexts, including business, luxury, pandemic, and leisure settings (Qiu et al., 2020; Liu et al., 2022). The central conclusion is therefore that robotics should not be viewed as substitutes for human staff, but as collaborators that enable service organizations to meet rising guest expectations in an era of digital transformation.

5.2 THEORETICAL IMPLICATIONS

This review advances theory by bridging multiple frameworks. First, it extends the Technology Acceptance Model (TAM) (Davis, 1989) by applying its constructs of perceived usefulness and ease of use to hospitality robotics, highlighting how these factors directly influence guest satisfaction. Second, it contributes to Service-Dominant Logic (Vargo & Lusch, 2008) by demonstrating how value is co-created when robotic systems and human employees collaborate to deliver service outcomes. Finally, it contributes to hospitality innovation literature by emphasizing hybrid service models as an emerging paradigm that redefines service quality in the digital era (Lu et al., 2019; Yoganathan et al., 2021).

The review also highlights anthropomorphism as a theoretical lens that explains why guests respond differently to robotic designs. The “uncanny valley” effect complicates the assumption that more human-like designs automatically improve acceptance, suggesting that optimal design requires balance between familiarity and novelty (Tung & Law, 2017; Qiu et al., 2020). Together, these insights enrich both technology adoption theory and service management scholarship by framing robotics as socio-technical systems embedded in cultural and psychological contexts.

5.3 MANAGERIAL IMPLICATIONS

For hospitality managers aiming to enhance guest satisfaction and operational efficiency through robotics and AI, several practical strategies emerge from current research. First, a **phased adoption** approach is highly recommended. By initially integrating service robots in support functions such as check-in, housekeeping, and room delivery where speed, hygiene, and efficiency are valued hotels can streamline operations while minimizing disruption to the guest experience (Ye et al., 2022). Simultaneously, it is essential to **retain human staff** in high-touch roles like concierge services and guest relations, where emotional engagement, cultural sensitivity, and nuanced decision-making remain irreplaceable (Hou et al., 2021). These roles significantly impact overall satisfaction, particularly for guests who value personalized service supporting the idea that **hybrid service models** outperform purely robotic or human-only systems.

To ensure successful integration, managers should also invest in **comprehensive training programs** for their staff. Cross-training employees to supervise, operate, and troubleshoot robotic technologies reduces role anxiety and builds organizational readiness for technological change (Guan et al., 2021). Additionally, as AI-enabled robots often rely on guest data to personalize services, it is critical to implement **strong privacy and data governance protocols**. Transparent communication about data collection and usage can foster trust and mitigate privacy-related concerns (Park et al., 2024). Lastly, **context-specific deployment** is crucial. Younger, tech-savvy travelers may welcome robotic interactions, while older or more traditional guests may find them impersonal. Tailoring the level of automation to the property type and guest demographic allows managers to strike a balance between novelty and comfort, thereby supporting guest acceptance (Akdim et al., 2021). These strategies align with the broader goal of using robotics not as a substitute for human labor but as an enhancer of service quality and guest loyalty.

5.4. LIMITATIONS OF EXISTING RESEARCH

Despite growing interest in robotic service delivery in hospitality, the current research landscape has several limitations that constrain the applicability and depth of existing findings. Most notably, the limited number of peer-reviewed studies only 26 met strict inclusion criteria raises questions about the generalizability of insights across different hospitality settings and global regions. Additionally, there is a geographic concentration of studies in East Asia and parts of Europe, while research in developing economies remains sparse (Zhong et al., 2022). This leaves a knowledge gap regarding how cultural differences, economic structures, and technological infrastructure in less developed regions might affect the adoption and effectiveness of robotic services. Another significant limitation is the predominant use of cross-sectional research designs, which only provide a snapshot of guest perceptions at one point in time. These methods fail to capture long-term changes in guest behavior, such as whether initial excitement about robotics fades as the novelty wears off.

5.5 FUTURE RESEARCH DIRECTIONS

To advance understanding and support evidence-based managerial decisions, several areas warrant further investigation. Future studies should explore cross-cultural and generational differences in guest acceptance of robotics, as cultural norms and age cohorts heavily influence trust in and comfort with automated services (Liu et al., 2022). In addition, researchers should conduct longitudinal studies that measure changes in guest satisfaction and usage patterns over time to determine whether robotics can provide sustained value or if the impact diminishes once the novelty effect declines (Lu et al.,

2019). Another key area is the economic analysis of robotics adoption. Understanding return on investment, cost-efficiency, and impacts on workforce dynamics, such as staff retention and morale, is vital for long-term strategic planning. Lastly, scholars should explore the integration of robotics with other emerging technologies like virtual reality, the Internet of Things, and blockchain, which have the potential to transform the hospitality experience at an ecosystem level (Wang et al., 2025). These directions will deepen the academic and practical understanding of how robotics can reshape the hospitality industry in the years ahead.

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5.7 ETHICAL STATEMENT

Data was obtained from respondent after disclosing the intent of research and promise was made to them that their response will be not be disclosed ever. The research has been carried out in accordance with the COPE guidelines.

5.8. AUTHORS CONTRIBUTIONS

Ravi Kumar - Conclusion ,Implication ,Supervision and Final Draft

Md Saifullah Khalid -Supervision

Sanskriti Agarwal - Introduction ,Literature review , Research method and Result/discussion

5.9 CONFLICT OF INTEREST

Authors declare no conflict of interest

5.10 DATA AVAILABILITY STATEMENT

Not applicable

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