Journal of Hospitality and Tourism Technology

Guest editorial: The current landscape and research priorities of human–robot interactions in hospitality and tourism

1. Introduction

The convergence of artificial intelligence (AI) and robotics is reshaping the landscape of hospitality and tourism (Lu *et al.*, 2019; Zhang *et al.*, 2024), creating new possibilities for enhancing customer experiences, operational efficiency and workplace dynamics. As the global hospitality industry embraces smart technologies, the introduction of service robots into hotels, restaurants and tourism settings brings both tremendous opportunities and significant challenges. This special issue of the *Journal of Hospitality and Tourism Technology* (JHTT), titled "Human-Robotic Interactions in Hospitality and Tourism: Opportunities, Challenges, Advancements, and Beyond," seeks to explore the multifaceted implications of this technological evolution, presenting a collection of research that advances our understanding of human–robot interactions (HRIs).

The articles in this issue span diverse aspects of HRIs (see Figure 1), ranging from the enhancement of consumer experiences to the operational realities of integrating robots into hospitality workplaces. Each study delves into specific dimensions of how humans interact with robots in service environments, offering valuable insights into the future of hospitality and tourism in the age of automation. As robots become increasingly embedded in the hospitality industry, understanding the nuances of these interactions will be key to harnessing their full potential while addressing the social, emotional and organizational challenges they pose.

2. Overview of the accepted articles

The research in this special issue can be organized into five core themes:

(1) Consumer Experience with Smart Technology;

(2) AI and Novel Experiences;

(3) Robot Acceptance: New Models and Perspectives;

(4) Employee Resistance and Awareness; and

(5) Human–Robot Collaboration in the Workplace.

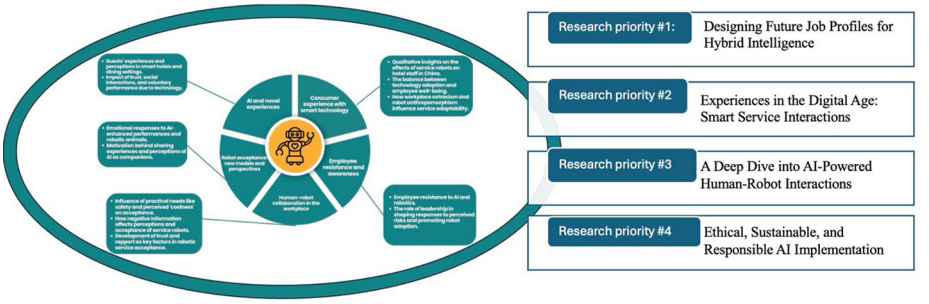
Each theme reflects a critical aspect of HRIs, providing a comprehensive look at the opportunities and challenges inherent in the adoption of AI and robotics.

2.1 Consumer experience with smart technology

Robots in hospitality settings significantly impact how consumers perceive and engage with smart services. In Wang and Fu (2024), the authors explore guest experiences in smart hotels, emphasizing how robots contribute to the overall service experience through enhanced service quality, social presence and novelty. The findings highlight that HRIs are central to guest satisfaction, offering a blend of utilitarian, sensual, social and experiential gratifications. Similarly, Jiao *et al.* (2024) investigated the role of triadic interactions between customers,

Journal of Hospitality and Tourism Technology
Vol. 15 No. 5, 2024
pp. 693-700

1757-9880
DOI 10.1108/JHTT-11-2024-438



Source: Authors' own creation

Figure 1. Human–robot interaction research and future directions

employees and robots in smart dining settings. The study uncovers how trust, social support and customer-to-customer interactions foster voluntary performance, reflecting the complex social dynamics that emerge when robots are integrated into hospitality environments. Both studies underscore the evolving role of robots as co-creators of guest experiences, enhancing efficiency while also shaping social and emotional interactions.

2.2 Artificial intelligence and novel experiences

As AI-driven robots move beyond simple service roles, they are transforming the emotional landscape of hospitality experiences. In Li *et al.* (2024), the focus is on robotic performances in tourism destinations, where robots interact with guests in novel ways, encouraging electronic word-of-mouth through emotional engagement. The study demonstrates how AI can enhance audience emotions, prompting guests to share their experiences and fostering deeper connections between technology and human behavior. Expanding on this theme, Lu *et al.* (2024a, 2024b) conceptualizes the introduction of AI dogs in tourism and hospitality, offering a glimpse into the future of robotic companions. The study explores how these AI entities generate emotional responses and create novel, interactive experiences that go beyond functional service delivery. These innovations highlight the increasing role of AI in creating personalized, engaging experiences that resonate emotionally with consumers.

2.3 Robot acceptance: new models and perspectives

Understanding how consumers accept and interact with robots is critical for the successful integration of AI in hospitality. Chang (2024) explores the role of coolness and affinity in influencing consumer acceptance of service robots. The study uses the stimulus-organism-response model to investigate how utilitarian and hedonic values drive behavioral intentions, emphasizing the importance of perceived value in shaping consumer attitudes toward robots. Jia *et al.* (2024) take a different approach by examining the impact of negative information on robot adoption. The study reveals that while negative information may heighten risk perceptions, it does not significantly affect adoption intentions, suggesting that self-efficacy and trust play more critical roles in determining how consumers engage with robots. These findings provide valuable insights into how hospitality operators can manage public perceptions and mitigate potential barriers to robot acceptance.

2.4 Employee resistance and awareness

The introduction of robots in hospitality settings has profound implications for the workforce, particularly in terms of employee acceptance and resistance. Kang *et al.* (2024) addresses the issue of AI-induced job insecurity, exploring how the adoption of AI technologies can lead to increased job stress and turnover intentions. The study finds that employees are more likely to leave their current jobs due to perceived threats from AI, especially in environments where social capital and job security are lacking. This highlights the need for organizational strategies that support employees during technological transitions. In a related study, Shum *et al.* (2024) explored the phenomenon of robot abuse, driven by service robot risk awareness (SRRA) among employees. The research leverages emotional appraisal theory to examine how fear of robots mediates the relationship between SRRA and robot abuse, with findings suggesting that transformational leadership can mitigate these negative responses. Together, these studies underscore the importance of fostering a supportive work environment where employees feel empowered to collaborate with robots rather than competing against them.

2.5 Human-Robot collaboration in the workplace

Robots are not just reshaping consumer interactions – they are also transforming how frontline employees work. Wang *et al.* (2024) examined the affordances of service robots and their effects on frontline employees in hotels, identifying how robots reduce work stress and shift task priorities for employees. By enhancing the physical, sensory and social affordances of robots, hospitality businesses can create environments where robots complement rather than replace human workers. Mejia *et al.* (2024) investigated the realities of working with service robots from the perspective of restaurant employees. The study reveals a complex set of challenges, including robot reliability, management support and the impact of robot adoption on employee well-being. Despite these challenges, the research highlights how robots can reduce physical exertion and enhance employee satisfaction when effectively integrated into daily operations. Patwary *et al.* (2024) further explored the dynamics of HRI by examining how workplace ostracism and robot anthropomorphism influence employees' readiness to change and adaptive behavior. The study provides insights into how organizational and individual factors shape employees' responses to robotic technologies, highlighting the importance of fostering a culture of adaptability and service adaptability.

3. Future directions

The collection of research in this special issue provides a comprehensive exploration of the opportunities, challenges and advancements associated with HRIs in hospitality and tourism. As robots become integral to both service delivery and workplace dynamics, understanding the complex interplay between technology, consumer behavior and employee experience will be critical to the success of hospitality businesses in the future. By addressing the emotional, social and practical dimensions of HRIs, this special issue offers valuable insights for scholars, practitioners and industry leaders looking to navigate the evolving landscape of hospitality in the age of AI and automation. Therefore, this special issue encompasses five major themes characterizing innovation, challenges and opportunities for HRIs research in hospitality and tourism. In alignment with the existing literature and the contributions within this special issue, we have identified the following key research priorities (see Figure 1) at the forefront of HRI research, which aims to shape the future of hospitality and tourism scholarship and practices. However, we acknowledge that the following is not an exhaustive list of future research themes but rather a more urgent research dialogue that should take place in the coming years.

3.1 Designing future job profiles for hybrid intelligence

The ongoing development of AI and automation technology allows robots to take on tasks traditionally performed by humans. This evolving landscape of the hospitality workforce has necessitated a rethinking of organizational roles. A 2023 report by the World Economic Forum highlights that training employees to use AI is a leading priority for skill development in the near future, with 42% of the surveyed companies identifying it as one of their top three training priorities (Di Battista *et al.*, 2023). Although service robots have activated employee anxiety and resistance (Fu *et al.*, 2022; Koo *et al.*, 2021), scholars emphasize the importance of adapting to technological advancements and "rise with machines" rather than opposing changes (Kim, 2022; Le *et al.*, 2023). This vision involves redesigning roles and reskilling employees to work collaboratively with machines, thereby synergizing human and machine strengths to optimize task completion and the workplace environment.

Designing job profiles for hybrid intelligence demands a comprehensive examination of robots' capacity as job resources that empower employees, and what human attributes and skillset should be emphasized for employees to complement machine intelligence. Therefore, future research should unearth the key factors involved in collaborative work relationships, consequences and underlying mechanisms. Effective design and implementation of AI robots require ongoing human involvement to ensure the collaborative tasks and roles can address workers' needs and inspirations, and mitigate negative outcomes (e.g. worker anxiety, animosity and usability barriers) (Kim, 2022; Fu *et al.*, 2022), facilitating the transitions to the future frontier of service work. As such, future studies should spark dialogues that advance organizational strategies and interventions to achieve these goals.

Future research should also tap into the multifaceted effects of service robot's implementation on employee psychology and workplace behavior. Building on studies of employee deviance and abusive behavior toward robots (Shum *et al.*, 2024), future investigations should examine shifts in workplace culture and organizational climate resulting from introducing service robots. Research within this domain can pave the way for more effective integration strategies and enhance hospitality workforce retention.

3.2 Experiences in the digital age: smart service interactions

Despite extensive research on service technology, most studies focus on interactions with service robots as standalone entities, rather than as part of connected systems (e.g. Choi *et al.*, 2020; Lu *et al.*, 2019, 2021). Unlike interacting with an independent device, smart service interactions characterize the integration of AI, data-driven and connected devices to "anticipate and satisfy customer needs and flexibly adapt service offerings to interchangeable environments or service situations" (Zhang *et al.*, 2024, p. 2). Future research should investigate how service interactions, mediated by connected smart technologies including robots, impact traditional measures, redefine the journey of service delivery and key metrics such as guest satisfaction, service quality and value co-creation across smart hospitality and tourism settings (e.g. hotels, destinations, smart restaurants, museums and others). In addition to intention-based measures collected via surveys and hypothetical scenarios, exploring the effectiveness and limitations of intelligent systems based on behavioral data is crucial to bridging knowledge gaps and continuing to shape the direction of future research.

Another key focus is a nuanced understanding of service experiences and behavioral outcomes, as the *locus* of control shifts away from human staff to customer self when interacting with service robots – intelligent technologies lacking human agency. In HRIs, individuals tend to engage in internal attribution of their service experiences and outcomes and are more influenced by the presence of others (Fishman and Husman, 2017; Lee and Lu, 2023). However, scholars have rarely examined how individual traits affect consumers'

interactions with smart technology systems. For example, stable individual differences, such as perceived anthropomorphism, have been identified (e.g. Waytz *et al.*, 2010). Future research should prioritize exploring how internal factors such as individual differences, psychological mechanisms and the presence of other customers affect consumers' interactions with smart services (Saydam *et al.*, 2022).

3.3 A deep dive into AI-powered human–robot interactions

The rapid advancements in AI-powered technologies have forced the consumer experiences landscape to undergo significant transformations. Moving beyond initial acceptance factors, such as the novelty, appearance and functionality of AI (Leung *et al.*, 2023; Lin and Mattila, 2021), it is crucial to identify key affordances of AI robots that drive long-term integration in addition to existing efforts (Leung *et al.*, 2023). Human presence has been found to be a source of discomfort during encounters when guests may fear human judgment (e.g. ordering wine, returning services, ordering late-night room service and purchasing embarrassing products) (e.g. Holthöwer and Van Doorn, 2023; Lu *et al.*, 2024a, 2024b; Pitardi *et al.*, 2024). Future research should continue to explore mechanisms and outcomes associated with AI-mediated interactions in scenarios where human employees may impediment superior experiences and vice versa.

The current literature on AI applications in hospitality predominantly relies on quantitative methodologies, with approximately 80% of studies using this approach (Law *et al.*, 2024). There is a pressing need for research adopting inductive and qualitative methods to explore psychological and behavioral nuances for robotic services that enhance both workplace and customer experiences. This is particularly relevant where perceptions of human consciousness and mind attribution can influence experiences of service interactions.

As AI and robots become the new actors in providing hospitality services, future research should investigate whether and how hospitableness can be achieved through robotic service providers. Genuine hospitableness is a fundamental spirit that transcends the mere provision of goods and services (Mody *et al.*, 2019; O'Connor, 2005). Key questions for future studies include whether robots can convey a sense of hospitality, what factors contribute to such perceptions and how the perceptions influence the consumer's experience and evaluation of robot services. This line of inquiry could deepen our understanding of HRIs as technology becomes integral to the realization of the hospitality spirit. Addressing these questions will contribute to vital conversations advancing HRI research and shaping the future of AI-powered experiences of hospitality.

3.4 Ethical, sustainable and responsible AI implementation

The integration of service robots demands ongoing endeavors to understand the ethics and responsibility dimensions (Gursoy and Cai, 2024; Hao *et al.*, 2024). AI-driven analytics used in service robots can introduce ethical considerations, including data privacy, the lack of technology infrastructure and the moral implications of technologies (e.g. facial recognition and voice assistants) (Law *et al.*, 2024). Recent research suggests that the mere presence of AI wording in product/service descriptions can undermine consumer trust (Cicek *et al.*, 2024). Besides information privacy concerns (e.g. data collection and management), consumer privacy concerns with service robots can also stem from the interpersonal dimension (e.g. physical presence) and the external environment (e.g. media influence, perceived regulatory gaps and surveillance) (Jia *et al.*, 2024). There is a pressing need to address the ethical implications and privacy concerns associated with AI in robotics applications.

Future research should discuss how AI robots can be implemented responsibly, ensuring they enhance decision-making, policy transparency and operational efficiency without compromising customer privacy or ethical standards. Hospitality and tourism enterprises need to strike a balance between leveraging AI-driven decision-making tools and consumer welfare.

Studies should explore ethical ramifications from both employee and customer perspectives and identify interventions to address these consequences. Ensuring ethical practices in the use of robots is not solely the responsibility of manufacturers and service companies to implement protocols and safeguards; rather, it requires a collective effort to build a foundation of trust and understand the drivers of these concerns when introducing robotic technologies.

Moreover, scholars should investigate how to leverage technology to promote sustainability and ethical goals (e.g. Hao *et al.*, 2024), with intentional efforts to guide its use in achieving long-term goals for individuals, businesses and society. Beyond the phase of initial acceptance and reactions to robots' entrance into the workforce, research should explore innovative strategies that focus on developing human capital and enhancing workers' career prospects within the organization through the integration of AI robots. Future research should explore how AI robots can empower disadvantaged individuals, preparing them for equal opportunities in the workplace. By doing so, AI implementations can realize their potential to support responsibility goals and ethical considerations, benefiting consumers, the workforce, organizations and society at large.

This special issue and proposed research priorities prompt the tourism and hospitality industry to envision future experiences and workforce as hybrid intelligence between AI robots and humans. Investigating these issues can aid in the groundwork for future scholarship on the foresight of HRI and its continually evolving impact on customers, employees and organizational outcomes. By publishing this special issue, we aim to inspire future research that sparks insightful dialogues and develops evidence-based business strategies to help consumers, employees and companies adapt to changes as we navigate the downstream effects of the technological revolution, ultimately fostering prosperity and advancement in the future of hospitality and tourism.

Tingting Zhang
School of Hospitality and Tourism Management, University of South Florida Muma College of Business, Tampa, Florida, USA, and

Lu Lu
School of Sport, Tourism and Hospitality Management, Temple University, Philadelphia, Pennsylvania, USA

References

Chang, S.T. (2024), "Influence of robot coolness and affinity on behavioral intention: examining perceived value as a mediating factor", *Journal of Hospitality and Tourism Technology.*

Choi, Y., Choi, M., Oh, M. and Kim, S. (2020), "Service robots in hotels: understanding the service quality perceptions of human-robot interaction", *Journal of Hospitality Marketing and Management*, Vol. 29 No. 6, pp. 613-635.

Cicek, M., Gursoy, D. and Lu, L. (2024), "Adverse impacts of revealing the presence of 'artificial intelligence (AI)' technology in product and service descriptions on purchase intentions: the mediating role of emotional trust and the moderating role of perceived risk", *Journal of Hospitality Marketing and Management*, pp. 1-23.

Di Battista, A., Grayling, S., Hasselaar, E., Leopold, T., Li, R., Rayner, M. and Zahidi, S. (2023), Future of jobs report 2023. World Economic Forum, Geneva, Switzerland, available at: www.weforum.org/reports/the-future-of-jobs-report-2023

Fishman, E.J. and Husman, J. (2017), "Extending attribution theory: considering students' perceived control of the attribution process", *Journal of Educational Psychology*, Vol. 109 No. 4, pp. 559-573, doi: 10.1037/edu0000158.

Fu, S., Zheng, X. and Wong, I.A. (2022), "The perils of hotel technology: the robot usage resistance model", *International Journal of Hospitality Management*, Vol. 102, p. 103174.

Gursoy, D. and Cai, R. (2024), "Artificial intelligence: an overview of research trends and future directions", *International Journal of Contemporary Hospitality Management*, doi: 10.1108/IJCHM-03-2024-0322.

Hao, F., Ng, W., Aman, A.M. and Zhang, C. (2024), "Technology for sustainability: the impact of avatar-led green training on OCBE and green creativity", *International Journal of Contemporary Hospitality Management*, doi: 10.1108/IJCHM-12-2023-1927.

Holthöwer, J. and Van Doorn, J. (2023), "Robots do not judge: service robots can alleviate embarrassment in service encounters", *Journal of the Academy of Marketing Science*, Vol. 51 No. 4, pp. 767-784.

Jia, S.J., Chi, O.H. and Lu, L. (2024), "Social robot privacy concern (SRPC): rethinking privacy concerns within the hospitality domain", *International Journal of Hospitality Management*, Vol. 122, p. 103853.

Jiao, H., Wong, I.A. and Lin, Z. (2024), "Understanding customer multi-interactions, trust, social support and voluntary performance in smart restaurants", *Journal of Hospitality and Tourism Technology.*

Kang, J., Shin, H. and Kang, C. (2024), "Hospitality labor leakage and dynamic turnover behaviors in the age of artificial intelligence and robotics", *Journal of Hospitality and Tourism Technology.*

Kim, S. (2022), "Working with robots: human resource development considerations in human–robot interaction", *Human Resource Development Review*, Vol. 21 No. 1, pp. 48-74.

Koo, B., Curtis, C. and Ryan, B. (2021), "Examining the impact of artificial intelligence on hotel employees through job insecurity perspectives", *International Journal of Hospitality Management*, Vol. 95, p. 102763.

Law, R., Lin, K.J., Ye, H. and Fong, D.K.C. (2024), "Artificial intelligence research in hospitality: a state-of-the-art review and future directions", *International Journal of Contemporary Hospitality Management*, Vol. 36 No. 6, pp. 2049-2068.

Le, K.B.Q., Sajtos, L. and Fernandez, K.V. (2023), "Employee-(ro) bot collaboration in service: an interdependence perspective", *Journal of Service Management*, Vol. 34 No. 2, pp. 176-207.

Lee, W. and Lu, L. (2023), "Lined up? Examining a 'waiting line' effect in Technology-Enabled restaurant menu ordering", *Journal of Hospitality and Tourism Research*, p. 10963480231211741.

Leung, X.Y., Zhang, H., Lyu, J. and Bai, B. (2023), "Why do hotel frontline employees use service robots in the workplace? A technology affordance theory perspective", *International Journal of Hospitality Management*, Vol. 108, p. 103380.

Li, Y., Wang, S. and Li, Z. (2024), "Animating arousal and engagement: empirical insights into AI-enhanced robotic performances and consumer reactions", *Journal of Hospitality and Tourism Technology.*

Lin, I.Y. and Mattila, A.S. (2021), "The value of service robots from the hotel guest's perspective: a mixed-method approach", *International Journal of Hospitality Management*, Vol. 94, p. 102876.

Lu, L., Cai, R. and Gursoy, D. (2019), "Developing and validating a service robot integration willingness scale", *International Journal of Hospitality Management*, Vol. 80, pp. 36-51.

Lu, L., Zhang, P. and Zhang, T.C. (2021), "Leveraging 'human-likeness' of robotic service at restaurants", *International Journal of Hospitality Management*, Vol. 94, p. 102823.

Lu, Y., Liang, Y. and Wang, Y.C. (2024a), "AI dogs vs. real dogs and human-like robots: clarification, conceptualization, and applications in tourism and hospitality settings", *Journal of Hospitality and Tourism Technology.*

Lu, L., Hua, M., Sun, X., Zou, R. and Lin, B. (2024b), "AI robots over sommeliers? Exploring the service provider effect on diners' wine ordering decisions at restaurants", *International Journal of Hospitality Management*, Vol. 122, p. 103879.

Mejia, C., Crandell, H.A., Broker, E. and Shoss, M. (2024), "Working with service robots in the dining room: employees' perspectives and realities", *Journal of Hospitality and Tourism Technology.*

Mody, M., Suess, C. and Lehto, X. (2019), "Going back to its roots: can hospitableness provide hotels competitive advantage over the sharing economy?", *International Journal of Hospitality Management*, Vol. 76, pp. 286-298.

O'Connor, D. (2005), "Towards a new interpretation of "hospitality", *International Journal of Contemporary Hospitality Management*, Vol. 17 No. 3, pp. 267-271.

Patwary, A.K., Hossain, M.S., Mistry, T.G. and Parvez, M.O. (2024), "Enhancing service adaptability: a moderated mediation model of workplace ostracism, robot anthropomorphism, employees' readiness to change, and performance efficacy", *Journal of Hospitality and Tourism Technology.*

Pitardi, V., Wirtz, J., Paluch, S. and Kunz, W.H. (2024), "Metaperception benefits of service robots in uncomfortable service encounters", *Tourism Management*, Vol. 105, p. 104939.

Saydam, M.B., Arici, H.E. and Koseoglu, M.A. (2022), "How does the tourism and hospitality industry use artificial intelligence? A review of empirical studies and future research agenda", *Journal of Hospitality Marketing and Management*, Vol. 31 No. 8, pp. 908-936.

Shum, C., Min, H.K., Sun, J., Yu, H.C. and He, Z. (2024), "Kicking the robots: the roles of transformational leadership and fear on service robot risk awareness and robot abuse relationship", *Journal of Hospitality and Tourism Technology.*

Wang, J. and Fu, X. (2024), "Unveiling the human–robot encounter: guests' perspectives on smart hotel experience", *Journal of Hospitality and Tourism Technology.*

Wang, X., Chen, M., Wang, Z., Law, C.H.R. and Zhang, M. (2024), "Exploring the affordances of service robots and the effects on frontline employees in China: a qualitative research in hotels", *Journal of Hospitality and Tourism Technology.*

Waytz, A., Cacioppo, J. and Epley, N. (2010), "Who sees human? The stability and importance of individual differences in anthropomorphism", *Perspectives on Psychological Science*, Vol. 5 No. 3, pp. 219-232.

Zhang, T., Lu, L., Chi, O.H., Lu, C. and Cobanoglu, C. (2024), "Smart service interactional experience for family travelers: Scale development and validation", *Journal of Hospitality and Tourism Research*, p. 10963480231226085.

Further reading

Parvez, M.O., Eluwole, K.K. and Lasisi, T.T. (2024), "Robotic safety and hygiene attributes: visitors' intention to receive robot-delivered hospitality services", *Journal of Hospitality and Tourism Technology.*

Saputra, F.E., Buhalis, D., Augustyn, M.M. and Marangos, S. (2024), "Anthropomorphism-based artificial intelligence (AI) robots typology in hospitality and tourism", *Journal of Hospitality and Tourism Technology.*

Song, X., Gu, H., Ling, X., Ye, W., Li, X. and Zhu, Z. (2024), "Understanding trust and rapport in hotel service encounters: extending the service robot acceptance model", *Journal of Hospitality and Tourism Technology.*