Artificial intelligence: an overview of research trends and future directions

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Abstract

Purpose – This study aims to offer an overview of hospitality and tourism research on artificial intelligence (AI) and its impact on the industry. More specifically, this study examines hospitality and tourism AI research trends in hospitality and tourism customer service experience creation and delivery, service failure and recovery, human resources and organizational behavior. Based on the review, this study identifies the challenges and opportunities and provides directions for future studies.

Design/methodology/approach – A narrative synthesis approach was used to review the hospitality and tourism research on AI and its impact on various aspects of the industry.

Findings – AI and AI applications in customer service experience creation and delivery and its possible effects on employees and organizations are viewed as a double-edged sword. Although the use of AI and AI applications offers various benefits, there are also serious concerns over the ethical use of AI, the replacement of human employees by AI-powered devices, discomfort among customers and employees and trust toward AI.

Originality/value – The paper offers an updated holistic overview of AI and its implications in different facets of the hospitality and tourism industry. Challenges and opportunities are discussed to foster future discussions on the use of AI among scholars and industry professionals.

Keywords Artificial intelligence, Hospitality, Tourism, Service delivery, Service creation, Organizational behavior, Strategy

Paper type Viewpoint

Introduction

Artificial intelligence (AI) involves machines performing cognitive tasks traditionally associated with humans, like learning, problem-solving and interacting with the environment. In recent years, AI has shifted from a niche topic in technology circles to a central focus for industry leaders. With the rapid expansion of generative AI (GenAI) tools and decreasing costs for AI implementation, it has evolved from a mere buzzword to a technology capable of revolutionizing service creation and delivery processes. According to McKinsey and Company (2023), more than a third of organizations regularly use AI in at least one business function, whereas the rest have included AI in their board discussions. The expected disruption from AI is significant, with many foreseeing substantial changes. AI has propelled the Fourth Industrial Revolution to a

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turning point, and organizations are urged to swiftly embrace the AI revolution to maintain competitiveness (McKinsey and Company, 2024).

The hospitality and tourism industries are no exception to the AI revolution. AI has permeated nearly every aspect of these industries, spanning from marketing to operations and management (Chi *et al.*, 2020; Law *et al.*, 2023; Lv *et al.*, 2022a, 2022b). Many technological innovations within hospitality are now powered by AI. For instance, travelers can use chat-based large language models such as ChatGPT to receive suggestions for accommodations, dining options or personalized travel plans. Within hotels, guests can engage with voice-activated AI assistants for room service and encounter AI-driven robots providing services and upkeeping cleanliness. AI platforms facilitate reservations and streamline check-out procedures in restaurants, where AI-driven service robots might also aid in kitchen operations and table service.

Although AI has been a pivotal theme in hospitality and tourism research, previous studies have shown an imbalance in attention toward the various topics surrounding AI and its applications. An analysis of research spanning from 1984 to 2021 indicates that the predominant focus of AI studies in hospitality and tourism has been on big data and machine learning (Knani *et al.*, 2022). However, a recent systematic review of AI-related studies in hospitality published between 2021 and 2023 reveals a shift in thematic emphasis, with service robots and voice assistants emerging as primary areas of interest (Law *et al.*, 2023).

As we witness the rapid growth of recent AI technologies, the pervasive presence of AI has the potential to perplex scholars in the hospitality and tourism fields. This review aims to provide a comprehensive yet nonexhaustive evaluation of AI and its applications in hospitality literature, shedding light on future research directions amidst the burgeoning emergence of GenAI and the escalating public discourse surrounding AI. The review is structured with an overview of the types of AI and their applications in the hospitality and tourism sectors, followed by reviews of studies on AI in customer experience, employees' perceptions, organizational strategy and external environmental contexts. Challenges and opportunities for future research will then be discussed. Figure 1 illustrates the framework of this review.

Types of artificial intelligence

Advancements in deep learning and other AI technologies ensure that the field of AI remains in a constant state of flux. Our understanding of realized AI and theoretical AI continues to evolve, leading to variations and overlaps in AI categories and terminology across different sources. Nonetheless, two overarching categories can help elucidate AI: AI capabilities and AI functionalities, as proposed by IBM (IBM Data and AI Team, 2023). AI capabilities can be classified into three categories: artificial narrow AI, general AI and super AI. Artificial narrow intelligence, also known as narrow AI or weak AI, is the most commonly applied type in the hospitality and tourism industries. These systems are trained to perform specific tasks, such as virtual assistants for customer service or delivery robots. General AI, or strong AI, is currently in development and is expected to perform tasks intelligently, akin to human capabilities. Super AI, a theoretical concept, would surpass human cognitive abilities if realized.

Within the realm of narrow AI, various types exist based on functionalities. Reactive machines, lacking memory, perform specific tasks without past data. Limited memory AI, on the other hand, can recall past events to monitor specific situations over time. In hospitality and tourism, reactive AI includes check-in/check-out kiosks and voice control in guest rooms. Limited memory AI is used in autonomous vehicles, chat-based voice assistants, robotic vacuum cleaners and room service robots. Narrow AI is often combined with computer vision, robotics and expert systems. Combining narrow AI with computer vision enables facial recognition and image classification applications, allowing for a streamlined service experience.

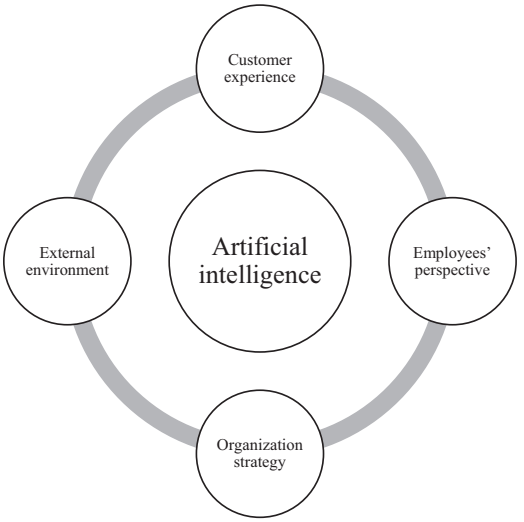

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Figure 1.
Review framework

Narrow AI also facilitates routine tasks performed by robots, aids in forecasting through expert systems and enhances efficiency for event planning, revenue management and decision-making.

Following a similar logic, Huang and Rust (2021) classified AI in the service industry into mechanic AI, thinking AI and feeling AI, based on their capabilities to follow instructions, analyze and process emotions coupled with the nature of service. Li *et al.* (2021) proposed four modes of AI technology-based service encounters: AI-supplemented, AI-generated, AI-mediated and AI-facilitated. In AI-supplemented service encounters, AI fulfills the role of providing guidance and network facilitation. AI-generated service encounters are those in which AI substitutes human labor and interacts directly with customers. AI-mediated service encounters occur when AI serves as the intermediary between customers and employees, extending employees' abilities. AI-facilitated service encounters are conditions in which both AI and human employees serve customers.

The present review follows IBM's categories to maintain consistency with mainstream discussions about AI. Figure 2 demonstrates examples of AI in hospitality and tourism experiences through a service blueprint. As depicted in Figure 2, AI and its applications are integrated into many aspects of service encounters, with some being more visible than others (Table 1).

Artificial intelligence in service delivery

Artificial intelligence and customer experience

AI is poised to revolutionize the customer experience within the hospitality industry. However, as a nascent and innovative technology, existing literature has primarily focused on customers' acceptance of integrating AI and AI-powered technologies. Various models and scales have been used to examine this acceptance, including the Technology Acceptance Model, the Unified Theory of Acceptance and Use of Technology (Venkatesh *et al.*, 2003; Huang *et al.*, 2024; Pillai and Sivathanu, 2020), the Artificially Intelligent Device Use Acceptance model (Gursoy *et al.*, 2019) and the Service Robot Integration Willingness scale (Lu *et al.*, 2019).

Figure 2.
Key future research directions

Source: Authors' own creation

Furthermore, the hospitality and tourism literature has incorporated psychological theories to elucidate customers' perceptions and behavioral intentions toward AI (Law *et al.*, 2023). For example, the uncanny valley theory has been used to comprehend the negative association between AI and human likeness (Akdim *et al.*, 2023; Kang *et al.*, 2023). Cognitive appraisal theory has been used as the conceptual framework to comprehensively explain how individuals perceive AI and its implications (Gursoy *et al.*, 2019). Additionally, self-determination theory has unveiled intrinsic and extrinsic motivations regarding AI adoption (Liu *et al.*, 2024a, 2024b).

These theoretical frameworks offer a basis for discussing the factors influencing customers' willingness to adopt AI and AI-powered devices. Cognitive evaluations, such as performance expectancy, effort expectancy, social influence, perceived usefulness and perceived value (Huang *et al.*, 2024; Venkatesh *et al.*, 2003), have been drawn from the technology adoption literature. Additionally, hindrance factors like perceived risk, privacy

	Preservice			In-service		Postservice
Physical evidence of AI	Search engine optimization Immersive technology	Chatbots AI assistants	Autonomous vehicles	Service robot Facial recognition AI assistants	Internet-of-things Service robot AI assistants	Autonomous vehicles Service robot	AI assistants Image recognition
Customer action	Search information	Inquire Make reservations	Go to the site	Check-in	Receive on-site service Service recovery	Check-out Depart Make payments	Spread word-of-mouth communications
Line of interaction							
Front-of-stage interactions		Answer questions		Assist check-in process Greet customers	Provide service Answer questions	Check-out	Follow up
Line of visibility							
Back-of-stage interactions	Manage digital presence		Schedule employees	Coordinate employees in different functional units		Conclude billing, accounts, etc.	
Line of internal interaction							
Support processes powered by AI	Create content Develop marketing plan Forecast Revenue management	Manage reservations	Monitor routes, departs and arrivals Manage employees with AI-powered tools	Recruit and train Purchasing Maintain	Monitor real-time data in customer experience	Monitor routes, departs and arrivals	Customer relationship management Planning Analyzing

Source: Authors' own creation

Table 1.
AI application examples in service blueprint

concerns and technology anxiety (Cai *et al.*, 2022; Pillai and Sivathanu, 2020) play significant roles as predictors of customer acceptance.

Recent discussions in the literature have also focused on the attributes of AI and AI-powered devices, emphasizing the importance of anthropomorphism, cuteness and uncanniness (Lu *et al.*, 2019; Lv *et al.*, 2021). Moreover, studies have explored the affective components of interacting with AI and AI-powered devices, including hedonic motivation, perceived novelty, positive emotions and negative emotions (Gursoy *et al.*, 2019; Lu *et al.*, 2019; Lv *et al.*, 2021).

There has been a growing interest in examining customer outcomes beyond mere acceptance of AI and AI-powered devices. Trust has emerged as a critical factor in human–AI interaction within the hospitality and tourism context (e.g. Gursoy *et al.*, 2019; Chi *et al.*, 2023). Additionally, factors such as satisfaction, intention to continue usage (Huang *et al.*, 2024), word-of-mouth communication (Wang *et al.*, 2022) and brand-related attitudes and behavioral intentions (Liu *et al.*, 2023; Lv *et al.*, 2022a, 2022b) have also been explored.

Service robots

Service robots, due to their promising role in enhancing the hospitality and tourism experience, have garnered significant attention (Law *et al.*, 2023). Research in this area encompasses a wide range of topics, including anthropomorphic attributes (Akdim *et al.*, 2023; Hu and Min, 2023; Zhang *et al.*, 2021), functional roles (Yang *et al.*, 2024), rapport building (Qiu *et al.*, 2020), humor in service failures (Xu and Liu, 2022), gender considerations (Seo *et al.*, 2024), perceived value (Lin and Mattila, 2021) and overall framework design (McCartney and McCartney, 2020), among others.

Despite the fervent discussions surrounding service robots and their potential applications, numerous studies depend on customers' mental simulations, reaching conclusions through scenario-based surveys (Xu *et al.*, 2023). The findings of a recent review of studies in leading hospitality journals indicate a growing interest among scholars in exploring strong AI capable of demonstrating human-like traits, despite its limited real-world implementation (Law *et al.*, 2023).

Artificial intelligence–powered immersive experiences

Immersive technologies such as augmented reality, virtual reality and mixed reality have been integrated into hospitality and tourism service creation and delivery to enhance customer experiences (de Lurdes Calisto and Sarkar, 2024). The concept of the metaverse has recently garnered attention, with the belief that AI will power it to provide immersive and seamless experiences aimed at enticing customers in the hospitality and tourism sectors. However, due to the limited number of active users, discussions surrounding the metaverse experience in these industries largely remain conceptual and speculative about future directions. Furthermore, there are fervent discussions regarding how the metaverse experience could translate into physical visits and its potential influence on customer experiences (Buhalis *et al.*, 2023). Gursoy *et al.* (2023) have suggested that the metaverse experience will likely primarily impact the preservice stage by offering a digital preview of the actual property, thus prompting customers to visit.

Generative artificial intelligence

GenAI has experienced a surge in attention in recent years, marked by its rapid growth and adoption. The application of GenAI, particularly large language models, is perceived to reduce barriers to entry for the general population, allowing for more interactive and

intelligent AI experiences at users' fingertips. Current discussions focus on the potential impact and applications of chat-based AI in the hospitality and tourism industry.

Recent research by Dogru *et al.* (2023) delves into the potential implications of GenAI and large language models in value cocreation and codestruction. It is believed that GenAI will influence various facets of the hospitality and tourism industry, spanning strategic management, operations, human resources and talent management, accounting, finance, destination management, marketing, demand and supply management, revenue management, as well as architecture, design and art.

The recent introduction of Sora by OpenAI, a tool designed to convert text into video, further underscores the potential applications of GenAI (Werner, 2024). Experts anticipate a promising future for AI, with expectations of transitioning into the general AI phase soon. Despite the anticipated proliferation of large language models and GenAI, discussions on their applications are still nascent.

Service failure and recovery

Discussions surrounding customers' attitudes and perceptions toward service failures caused by AI and AI-powered devices, as well as subsequent service recovery, have gained considerable traction in recent years. Researchers have been exploring how customers respond differently to service failures in AI interactions than those involving humans. Studies indicate that, overall, customers tend to exhibit a higher tolerance for service failures caused by humans than those caused by AI or AI-powered devices (Kim and So, 2023; Lv *et al.*, 2021).

Moreover, recent research suggests that various appearance attributes of service robots play a significant role in influencing customers' satisfaction and intentions to revisit hospitality businesses following a service failure. Attributes such as the level of anthropomorphism (Yang, Liu, *et al.*, 2022), cuteness (Lv *et al.*, 2021), gender (Seo *et al.*, 2024) and humor (Xu and Liu, 2022; Yang, Xu *et al.*, 2022) have been found to impact customers' perceptions and reactions. For example, a service robot with a high level of anthropomorphism or a cute appearance may elicit more positive responses from customers, potentially mitigating the negative impact of a service failure.

Artificial intelligence and service strategy

Employees' perception

AI has significantly impacted employees' sentiments in the workplace, particularly against the backdrop of the industry's recovery from the pandemic. Although integrating AI into the hospitality experience promises substantial benefits for the industry's future, current and prospective employees may have varied reactions to the incorporation of AI and AI-powered technologies in their work environments. Extant literature has delved into various factors influencing employees' acceptance and sentiments regarding AI. Studies have explored a range of factors, including emotional intelligence (Prentice *et al.*, 2020), interface design and aesthetics (McCartney and McCartney, 2020) and socio-technical resources (Makarius *et al.*, 2020), all of which shape employees' perceptions of AI in the workplace. Additionally, some research has shed light on the potential negative consequences of AI integration, such as increased job insecurity, job stress and turnover intention (Xu *et al.*, 2023), as well as decreased job performance and subjective well-being (Darvishmotevali and Ali, 2020). Others have examined how AI impacts job crafting behaviors (Cheng *et al.*, 2023a, 2023b).

These studies have underscored human resources and organizational behavior concerns regarding how hospitality and tourism organizations should address employees' apprehensions about AI. They emphasize the importance of providing resources and support mechanisms to

help employees navigate and cope with the challenges associated with AI integration in the workplace.

Various theories have been applied to comprehend employees' perspectives on AI within the hospitality industry. Cognitive appraisal theory, for instance, has been used to investigate how employees evaluate and cope with AI in their work tasks (Ding, 2021). Conservation of resource theory (Cheng *et al.*, 2023a, 2023b; Teng *et al.*, 2023), along with the job demands–resources model (Kong *et al.*, 2021; Qiu *et al.*, 2020), has been used to investigate how resources at both individual and organizational levels may intervene in employees' perceptions and reactions toward AI and AI-powered devices.

Furthermore, social presence theory has been applied to explore employees' feelings about the social presence of robot coworkers (Song *et al.*, 2022). Concerns regarding the potential replacement of human jobs by AI as technology advances have also been raised, impacting not only current employees but also prospective employees (Yu *et al.*, 2022). Moreover, the importance of employees' trust in AI has been emphasized and warrants further attention, as highlighted by studies like those conducted by Makarius *et al.* (2020). These theories provide valuable frameworks for understanding the multifaceted impacts of AI on employees within the hospitality industry. By leveraging insights from these theories, organizations can better navigate the integration of AI technologies in the workplace and address employees' concerns and needs effectively.

Organizational strategies

In recent years, AI has grown rapidly and captured public attention due to three primary factors: the abundance of data available in various formats, advancements in algorithms and significant improvements in computational hardware (Brynjolfsson and McAfee, 2017). To gain and sustain competitive advantages, hospitality and tourism organizations must actively and innovatively explore the integration of AI across various stages of their operations.

First, AI can assist and even create marketing materials to attract customers. An increasing number of companies, including industry leaders like Forbes, the New York Times and the Washington Post, are developing GenAI to produce reports from scratch (Graham, 2024). With the surging popularity of Sora by OpenAI, video creators are using GenAI to translate text descriptions into videos in minutes (Werner, 2024). Because AI can now develop marketing materials at a lower cost, hospitality and tourism organizations should use such tools to respond to customer trends more promptly.

Second, previous studies have highlighted the importance of using AI in the prepurchase stage. For instance, AI-powered chatbots could assist hospitality and tourism organizations in addressing customer inquiries before their visit. Although chatbots have previously faced criticism for being unempathetic and lacking intelligence (e.g. Lv *et al.*, 2022a, 2022b), the rapid advancement of GenAI technologies suggests that chatbots may now offer more benefits than hindrances. With GenAI's advancements, chatbots can become more intelligent and capable of providing personalized and empathetic responses to customer queries. By leveraging AI-driven chatbots, hospitality and tourism organizations can enhance customer engagement and satisfaction, streamline the prepurchase process and ultimately improve the overall customer experience (Dogru *et al.*, 2023). As a result, chatbots powered by GenAI technologies have the potential to revolutionize the prepurchase stage, offering organizations a valuable tool to connect with customers and drive business growth.

Third, AI and AI-powered devices can significantly enhance service delivery in the hospitality and tourism industry. Many hotels, restaurants and theme parks are now employing service robots to produce and deliver services, leading customers to become more

accustomed to their presence in their hospitality and tourism experiences (Lin and Mattila, 2021). Service robots are primarily used to perform mechanical tasks such as cleaning floors, carrying items, preparing dishes and providing directions. Although service robots currently excel at executing routine tasks, there is growing anticipation for them to evolve beyond their mechanical functions and provide more emotionally engaging and interactive customer experiences through hedonic interactions by displaying empathy and humor (Xu and Liu, 2022). By leveraging AI technologies to enhance the capabilities of service robots, hospitality and tourism organizations can further elevate the quality of service delivery and enrich the overall customer experience.

In addition, AI can be integrated into strategic business planning and operations because AI offers capabilities for developing and implementing complex forecasting models for estimating customer demand and developing more effective revenue management strategies using machine learning techniques (Dogru *et al.*, 2023). AI can also be used to run errands and perform repetitive and routine tasks, thereby improving efficiency in administrative work. Despite the extensive discussion about AI and its applications in customer interface and employees' perceptions, only a few studies have explored the potential of AI to stimulate business development (e.g. Filieri *et al.*, 2021) or streamline the management process (Qiu *et al.*, 2020). By harnessing AI technologies for organizational planning and management, hospitality and tourism organizations can gain valuable insights into customer demand patterns and changes in the marketplace, optimize resource allocation and make data-driven decisions to enhance operational efficiency and profitability. Moreover, integrating AI into administrative tasks can free up employees' time, allowing them to focus on more strategic initiatives and value-added activities.

As a labor-intensive industry, hospitality and tourism organizations must carefully manage not only the interaction between humans and AI in customer-facing roles but also consider how integrating AI may impact their employees. Previous studies have indicated potential negative consequences, such as feelings of job insecurity (Darvishmotevali and Ali, 2020), concerns over job performance (Koo *et al.*, 2021), burnout (Kong *et al.*, 2021) and turnover intention (Yu *et al.*, 2022).

To address these challenges, organizations should allocate substantial resources to help employees cope with negative feelings associated with AI integration. This may involve implementing support programs, training to enhance employees' understanding of AI capabilities and fostering a culture of adaptation and continuous learning. Organizations can mitigate potential negative impacts and foster a more positive work environment by empowering employees with the knowledge and skills to collaborate with AI technologies effectively. Overall, hospitality and tourism organizations need to pay special attention to balancing technology adoption with the retention and development of human talent. By striking a harmonious balance between AI integration and human resource management, organizations can harness the full potential of technology while ensuring the well-being and productivity of their workforce.

Artificial intelligence and sustainability

Sustainability refers to the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). As AI advances along with a lot of public concerns over its potential adverse impact, some researchers have explored how AI may contribute to sustainability.

Studies argue that AI may contribute to biodiversity, water resource conservation, energy conservation and renewable energy, sustainable transportation and smart cities (Nishant *et al.*, 2020), which may, in turn, help companies lower their carbon footprint and

conserve natural heritage sites and national parks. AI can also combat climate change by offering a more comprehensive understanding of different climate change scenarios and details of carbon emissions. Despite the fact that AI can offer a liberating opportunity to build intelligence systems that can generate the knowledge needed for sustainability, its use in sustainability initiatives and applications is still in the early stages and requires efforts from all organizations to extend efforts and resources to bring it to fruition.

Future research considerations

As we reviewed the different themes currently discussed in the hospitality and tourism literature, the paper aims to offer a more holistic view of future research directions based on challenges and opportunities posed by AI technologies and their adoption.

Challenges

Legal and ethical concerns

AI's emergence and increasing applications have brought attention to previously gray areas, raising complex ethical questions. Media coverage on concerns over AI spans a wide range of topics, including legal, personal, intellectual property rights, algorithmic bias, discrimination, unfairness, labor protection, privacy and data protection, cybersecurity, access to justice, transparency of algorithms, liability for harm, accountability, social inequity and surveillance (Rodrigues, 2020). For example, as AI technologies become more pervasive, concerns over privacy have become prevalent among customers (e.g. Cai *et al.*, 2022) as evidenced by numerous lawsuits related to AI focus on issues surrounding data use (Walsh, 2023).

Navigating this complex legal landscape presents significant challenges, particularly as existing legal frameworks may not adequately address new AI-related problems (Walsh, 2023). This murky legal terrain imposes legal risks on organizations as they endeavor to integrate AI technologies into their operations. As such, it is essential for organizations to carefully consider and address legal and ethical concerns surrounding AI implementation to mitigate potential risks and ensure compliance with relevant regulations. As hospitality and tourism organizations often operate on a multinational level, the management team must take proactive actions early on to alleviate the potential legal risks related to use of AI technologies in service creation and delivery.

At the current stage of Narrow AI, both policymakers, public concern and legislators' perspectives mainly center around data usage. As AI advances in its capabilities and moves into general AI and strong AI, where AI can process emotion and develop intentions, it is expected to have more discussions about ethics and interventions in AI and its application. Hence, future studies should delve into various issues related to ethics and AI.

Customers' skepticism

Despite the optimistic perspective about AI, many customers share their concerns over the capability of AI and the potential of losing the "human touch," which may lead to customer anger, confusion or dissatisfaction (Castillo *et al.*, 2021). Customers who have strong relationships with their service provider may even feel insulted when AI is used rather than human (Belanche *et al.*, 2021). Even though some recent studies have explored how AI may assist in building relationships (Qiu *et al.*, 2020) and trust (e.g. Chi *et al.*, 2023; Gursoy *et al.*, 2019), the underlying mechanism is still unclear. Furthermore, some studies have reported that customers, at this stage, are still keen on receiving services from human staff rather than robot staff (Huang and Rust, 2021), even if the service delivered by humans is inferior and at a higher price. Such skepticism from customers indicates a long way to go for an

industry like hospitality and tourism, which is traditionally centered on human interaction and relationship building. Because customers may feel less intimidated when nonhumanoid and less anthropomorphic AI is placed in private service contexts (e.g. Hu and Min, 2023), hospitality and tourism organizations may want to strategically allocate different formats of AI in different service environments.

Despite the extensive discussions and intriguing findings regarding customer attitudes and behaviors toward the use of AI and AI-powered devices in service delivery, it is worth noting that most research in this area relies heavily on scenario-based surveys. Although these surveys provide valuable insights into customers' hypothetical reactions, there is a need for more real-world data and observational studies to fully understand customer attitudes and behaviors toward the use of AI and AI-powered devices in various service delivery contexts. This gap in empirical research presents an opportunity for future studies to delve deeper into understanding customer behaviors and perceptions in this evolving landscape.

Workforce development

Integrating AI, especially the AI-powered devices that may highlight their presence in the workplace, is expected to receive some pushback from employees. Many studies have indicated that AI may negatively affect employees' performance and career choices in the hospitality and tourism industry (Yu *et al.*, 2022). Others are concerned that applying AI may result in adverse consequences like increases in social inequity as AI advances and replaces human staff in less developed countries and regions (Belanche *et al.*, 2021). These concerns suggest that integration of AI into service creation and delivery can have serious human resource consequences for labor-intensive industries such as the hospitality and tourism industry. The management may need to clarify the type of AI and what AI is capable of and highlight the benefits that AI could provide to hospitality and tourism professionals to alleviate adverse effects of AI integration on employees.

Looking at the bright side, AI may assist in a more holistic understanding of the organizations by delving into employees' perspectives. Sull and Sull (2024) have suggested that AI can transform companies' understanding of themselves by garnering information from their employees, particularly about organizational culture based on data from diverse formats.

As the industry continues to evolve, understanding and addressing employees' sentiments toward AI will be crucial for fostering a positive work environment and ensuring the successful integration of AI technologies in hospitality and tourism organizations. Thus, future studies should explore employees' concerns about increasing AI and AI powered devices presence in the workplace and develop human resources strategies to address employees' concerns.

Building artificial intelligence infrastructure

A significant barrier to the adoption of AI, particularly GenAI, is the perceived lack of technology infrastructure (Dogru *et al.*, 2023). Recent reviews, such as those by Law *et al.* (2023), have underscored that current discussions of AI in hospitality literature predominantly concentrate on aspects of the customer interface or employees' perceptions regarding AI without paying much attention to the technology infrastructure needed to integrate AI into service creation and delivery. Technology infrastructure encompasses a comprehensive system comprising hardware components like data storage and processing systems, as well as soft infrastructure involving data collection and the technical and business skills necessary to harness AI's capabilities (Mikalef and Gupta, 2021). Building

this infrastructure within the hospitality and tourism industry sooner rather than later could afford the industry substantial competitive advantages. Thus, future research is needed to identify industry's infrastructure needs and how to optimize this infrastructure for successful integration of AI technologies and AI-powered devices into service creation and delivery processes.

Opportunities

Artificial intelligence and consumer service journey

AI and AI-powered devices offer great opportunities to improve customer service journey at every stage, from information search to postconsumption evaluation. As argued in previous studies, an increasing number of hospitality and tourism companies continue to develop AI applications using immersive technologies, such as augmented reality, virtual reality, mixed reality and metaverse and GenAI-based chatbots to provide better experiences at each stage of customer service journey. Although the use of generative-based chatbots and other immersive technologies can have a significant impact on the customer decision-making process, research in this area is still in its infancy stage. There is an urgent need for more research to understand the factors that can influence consumers' information search and information processing behaviors and the underlying mechanism of this influence. Furthermore, we need more research on how AI may influence customer service experiences during service delivery and their post service evaluations, which requires a thorough understanding of their expectations and their level of willingness to interact with AI-powered technologies throughout their service experience journey. Although AI can be used to respond to customer inquiries and their post consumption comments on various social media platforms, it is also important to explore interface design of AI-powered applications that meet customers' expectations based on their level of technology savviness to make AI applications and tools more accessible and user-friendly. These efforts can enhance customer use of AI applications and tools throughout their service journey.

Leveraging artificial intelligence capabilities to enhance service creation and delivery

As argued in previous studies, AI and AI-supported devices can have a significant influence on the efficiency of service creation and delivery. However, studies also suggest that although the use of AI in service creation and delivery can have positive effects on customer satisfaction in some service contexts, it can also have devastating effects on satisfaction in other service contexts. Thus, it is critical to explore the potential effects of AI on customer satisfaction and loyalty in various service contexts. Because the factors that are likely to influence how customers view the use of AI in service creation and delivery are likely to be service delivery context-specific, findings of studies that investigate the factors, such as reliability, accuracy, trust, loss of human touch and personalization capabilities, that influence customers attitudes and behaviors toward the use of AI and the underlying mechanism they use to form those attitudes and behaviors in various service contexts can provide significant guidance to improve customer service creation and delivery in specific service delivery contexts.

Leveraging artificial intelligence to groups with special needs

The predominant focus of AI discussions revolves around the general population and mainstream customers. However, there is a growing discourse regarding the transformative potential of AI in offering previously inaccessible hospitality and tourism experiences to marginalized groups with special needs. There exists an urgent need for further research to explore how AI could impact or even assist senior citizens, individuals with physical

impairments and families with special needs (Liu *et al.*, 2024a, 2024b). It is believed that AI technologies, such as GenAI, have the capability to provide personalized and customized experiences at a reduced cost, thereby potentially increasing accessibility for traditionally disadvantaged groups (Dwivedi *et al.*, 2023). This underscores the importance of investigating AI's potential benefits and how to harness those benefits to improve the accessibility of hospitality and tourism experiences for these marginalized and disadvantaged communities.

Studying actual experience than hypothetical scenarios

As advancements in AI continue to progress, the majority of studies in the field use qualitative methods to glean insights from both customers and employees regarding their perceptions of AI's potential impact on the hospitality and tourism experience. Researchers often use hypothetical scenarios to simulate real-life conditions (Law *et al.*, 2023; Xu *et al.*, 2023). However, as AI and AI-powered devices become increasingly prevalent and accessible, there is a growing imperative for studies to transition toward examining actual experiences and measuring real behaviors. This shift would enable a more comprehensive understanding of the tangible effects of AI on the hospitality and tourism industry, providing valuable insights for both practitioners and researchers alike.

Applying artificial intelligence to sustainability

As the hospitality and tourism industry is striving to become more sustainable and the younger generations care more about sustainability than any generations before them, hospitality and tourism organizations should benefit from capabilities offered by AI technologies by integrating AI into their sustainability strategy development and implementation process to ensure the development and implementation of comprehensive sustainability strategies. Such potential applications are probably built upon more advanced use of expert systems powered by AI and require the continued effort from hospitality and tourism organizations and researchers.

Conclusions

This study presents an overview of hospitality and tourism research on AI and its impact on the industry. More specifically, this study examines hospitality and tourism AI research trends in hospitality and tourism customer decision making, service experience creation and delivery, service failure and recovery, human resources and organizational behavior. Both the benefits and challenges posed by the integration of AI and AI applications into every stage of the customer service experience journey for customers, employees and organizations are discussed. Findings suggest that the integration of AI and AI technologies is viewed as a double-edged sword, which can offer both benefits and challenges. A thorough understanding of those challenges and benefits to enhance positive aspects while alleviating negative concerns definitely requires further in-depth research. Through the comprehensive review of studies that explored AI in the hospitality and tourism field, a number of future research directions for examining the appropriate use of AI technologies during service experience creation and delivery are identified. Studies that explore the future research ideas and directions identified in this study are likely to provide critical insights to hospitality and tourism industry practitioners and researchers for implementing AI tools that can benefit both customers and businesses. However, it is important to note that research ideas and future research directions identified in this study only represent a small set of potential research avenues in the rapidly expanding AI field.

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