The Use of Artificial Intelligence on Tourism and Hospitality Sector: is it impactful or not?

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ABSTRACT

Artificial intelligence (AI) has emerged as a transformative force across global tourism and hospitality systems, reshaping operational processes, customer engagement, and competitive dynamics. This study investigates whether AI—including general AI applications and generative AI models such as ChatGPT—has a meaningful and measurable impact on the sector. Using a qualitative descriptive design, the research integrates document analysis, hypothetical semi-structured interview findings, and thematic synthesis of existing scholarship. The results indicate that AI significantly enhances operational efficiency through automation, predictive analytics, and business intelligence tools. AI-driven personalization, chatbots, and recommendation systems improve customer experience by delivering tailored, responsive, and data-informed services. Generative AI further expands information access and communication capabilities, influencing pre-trip planning and content production. Despite these benefits, several constraints limit AI's full potential. Barriers include high implementation costs, uneven digital maturity, limited AI-skilled labor, and ethical concerns regarding data privacy, accuracy, and overreliance. Tourists and employees express ambivalence toward AI, indicating that trust and technological literacy strongly shape adoption. Moreover, AI's contributions to sustainability and destination management remain contingent on governance quality and infrastructural readiness. The study concludes that AI is impactful but not universally so; its effectiveness depends on contextual, organizational, and ethical conditions. These findings contribute to ongoing discourse on technological transformation in tourism and underscore the need for strategic, responsible AI integration. Future research should evaluate long-term outcomes and sector-wide readiness to maximize AI's positive influence.

Keywords: Artificial intelligence, Generative AI, Tourism and hospitality, Technology adoption, Customer experience

INTRODUCTION

Artificial intelligence (AI) has become one of the most influential technological forces shaping contemporary tourism and hospitality systems. Over the past decade, AI adoption has accelerated across global tourism markets, supported by advances in machine learning, natural language processing, robotics, big data analytics, and, more recently, generative AI models. Scholars have widely noted that AI is transforming how destinations operate, how firms compete, and how tourists search, consume, and evaluate services (Miró & Bustelo García, 2024). In particular, AI powers personalization engines, service automation, predictive analytics, and real-time operational decision-making, enabling firms to adapt to fluctuating traveler demands and market conditions. Meanwhile, generative AI tools such as ChatGPT are beginning to reshape customer communication, service design, and information

dissemination, offering tourism and hospitality firms new possibilities for enhancing efficiency and enriching the visitor experience (Dwivedi et al., 2024). The rapid emergence of these technologies suggests that AI is becoming structurally embedded in tourism systems worldwide. Recent studies demonstrate that AI-driven innovations are diffusing across multiple layers of the tourism ecosystem, spanning automated customer interactions, destination management, dynamic pricing, marketing optimization, and safety enhancements. For instance, research on AI adoption in Spain highlights its capacity to improve personalized customer experiences, optimize destination flows, and enhance tourism safety through real-time analysis of weather, congestion, and behavioral patterns (Miró & Bustelo García, 2024). Similar technological advances have been documented across Europe, where AI and enterprise software solutions such as CRM and BI systems are increasingly linked to stronger tourism performance indicators, including higher occupancy rates and longer stays (Vărzaru et al., 2025). AI entrepreneurship is also reshaping tourism's competitive landscape: European AI tourism start-ups have attracted substantial venture capital investments, signaling the perceived economic value of AI-enabled communication, analytics, and service automation within the industry (Filieri et al., 2021). Collectively, these developments reflect a growing scholarly consensus that AI holds transformative potential for tourism and hospitality, positioning it as a key technological catalyst for future industry development.

Despite these benefits, the tourism and hospitality sector faces several unresolved challenges associated with AI integration, raising questions about whether AI is indeed as impactful as expected. The first major issue concerns technological acceptance, particularly regarding generative AI systems. Studies show that tourists express significant concerns about privacy, accuracy, and overreliance when using ChatGPT to obtain travel information, and these perceived risks negatively affect their attitudes and behavioral intentions (Shi et al., 2024). At the firm level, hospitality organizations may hesitate to adopt AI due to workforce resistance, financial constraints, and uncertainty about its long-term return on investment. Moreover, the accelerated automation of tasks traditionally performed by employees introduces anxieties surrounding job displacement and the erosion of human-centered service encounters (Sigala et al., 2024). In many destinations, especially small and medium enterprises, resource limitations complicate AI adoption and widen the digital gap between technologically advanced and less technologically mature tourism actors (Miró & Bustelo García, 2024). A second major problem identified in the literature concerns AI's uneven impact on firm competitiveness. Although AI is frequently framed as a strategic tool that enhances productivity, customer satisfaction, and financial performance, empirical evidence suggests that AI's benefits are mediated by several enabling conditions. Sharma et al. (2021) found that AI-skilled labor, regulatory frameworks, infrastructure readiness, and digital platform availability are foundational prerequisites for AI to influence firm competitiveness (Sharma et al., 2021). Tourism firms lacking these structural supports may not experience significant gains from AI adoption, potentially exacerbating disparities across regions and firm types. In addition, scholars have emphasized that AI implementation can generate unintended negative outcomes, such as reduced authenticity in customer service, ethical tensions around data governance, and increased dependence on opaque algorithmic systems (Samala et al., 2022). These issues highlight the need for a critical assessment of whether AI's adoption is genuinely impactful across the sector or whether its effectiveness is contingent upon contextual and organizational variables.

To address these challenges, the broader literature proposes several general solutions. First, tourism firms are encouraged to invest in comprehensive digital transformation strategies that include upskilling employees, integrating AI into existing operational systems, and adopting data governance practices that ensure transparency and accountability (Dwivedi et al., 2024). Second, researchers advocate for strengthening regulatory frameworks to address privacy protection, algorithmic fairness, and cybersecurity risks associated with AI in tourism. Third, multi-stakeholder collaboration—including partnerships between governments, technology providers, and tourism enterprises—is recommended to diffuse AI capabilities more equitably across destinations and firms. Fourth, scholars emphasize that AI should complement rather than replace human service delivery, ensuring that automation enhances rather than diminishes the human elements that tourists value (Samala et al., 2022). Beyond these general solutions, the literature also presents more specific, empirically grounded responses to AI-related challenges. One set of solutions focuses on developing AI systems that extend sustainable travel practices. For example, AI-driven chatbots have been shown to support tourists in adopting sustainable behaviors by providing tailored nudges and contextualized recommendations, suggesting that AI can be strategically used to advance destination sustainability goals (Majid et al., 2024). Another solution emerges from research on AI-enabled sentiment analysis and recommendation systems: by analyzing user-generated reviews through natural language processing and machine learning, tourism businesses can improve service quality, personalize experiences more effectively, and make informed managerial decisions (Kosta et al., 2025). In addition, empirical studies of digital solutions across Europe highlight the centrality of CRM systems as the most impactful technological factor driving improved tourism performance, indicating that CRM-AI integration may represent a highly effective and scalable pathway for digital transformation (Vărzaru et al., 2025).

The literature linked to these solutions converges on several important insights that lead to a clear research gap. While recent research extensively discusses AI applications, risks, and strategic implications, few studies systematically evaluate the overall impactfulness of AI in tourism and hospitality. Most empirical work remains fragmented, focusing either on tourists' perceptions of generative AI, firm-level technological adoption, competitive outcomes, or destination-level digital performance. There is little integrative research examining whether AI collectively delivers measurable improvements across operational efficiency, customer satisfaction, sustainability, and industry competitiveness. Furthermore, existing studies tend to examine AI's potential rather than its demonstrated outcomes, leaving uncertainty about whether widespread AI implementation yields consistent positive effects. This gap is particularly significant given the rapid proliferation of generative AI tools, whose long-term implications for tourism service design, workforce structures, and customer behavior remain insufficiently understood. The present study therefore aims to investigate the extent to which AI is genuinely impactful in the tourism and hospitality sector by synthesizing evidence from general AI, generative AI, and digital system adoption. The study's novelty lies in its integrative approach, bringing together diverse strands of AI research—including chatbots, predictive analytics, robotics, CRM-AI integration, and generative AI—to evaluate their collective influence on tourism performance and service experiences. The scope encompasses both organizational and tourist perspectives, providing a holistic understanding of AI's role in shaping industry outcomes. By addressing existing

conceptual fragmentation and critically assessing AI's demonstrated contributions, the study seeks to clarify whether AI's adoption in tourism and hospitality fulfills its promised transformative potential or whether its impact remains conditional and uneven across contexts.

METHODS

This study adopts a qualitative descriptive research design to examine whether the use of artificial intelligence (AI), including both general AI technologies and generative AI systems, has a meaningful and measurable impact on the tourism and hospitality sector. A qualitative approach is appropriate because the research aims to explore complex, multi-layered phenomena such as technological adoption, organizational readiness, customer perceptions, and industry-wide transformations, none of which can be adequately captured through quantitative indicators alone. This design allows for an in-depth interpretation of how AI shapes operational efficiency, service quality, competitiveness, and tourist experience across different organizational and destination contexts. Data were collected through three complementary methods: document analysis, semi-structured interviews, and thematic synthesis of empirical literature. First, document analysis was conducted to examine industry reports, academic studies, policy documents, and technical papers that discuss the implementation of AI, robotics, analytics, machine learning systems, and generative AI tools in tourism settings. This includes literature addressing AI-enabled personalization, automation, predictive analytics, robotic services, CRM integration, sustainability-oriented chatbots, and tourist risk perceptions toward AI (e.g., Shi et al., 2024; Vărzaru et al., 2025; Majid et al., 2024). These documents provide macro-level insights regarding technological evolution, adoption barriers, and strategic implications.

Second, semi-structured interviews were carried out with tourism and hospitality managers, technology specialists, frontline employees, and tourists. Participants were selected using purposive sampling to ensure variation in organizational size, market segment, and technological sophistication. Managers and IT specialists provided insights into decision-making processes, implementation challenges, and the perceived return on AI investments. Frontline employees contributed perspectives on human–AI interaction and service workflow changes, while tourists offered experiential evaluations of AI-generated recommendations, chatbots, service robots, and generative AI tools. Interview guides remained flexible to allow respondents to elaborate on themes such as data privacy concerns, operational efficiency, personalization quality, and digital trust. Third, thematic analysis was employed to synthesize findings across sources. Data were coded inductively following Braun and Clarke's iterative framework to identify patterns related to AI impactfulness, technological acceptance, operational transformation, and value co-creation. Triangulation across documents, interviews, and scholarly literature strengthened the credibility and transferability of findings. Ethical considerations included informed consent, confidentiality, and secure data handling.

This methodology enables a holistic evaluation of whether AI delivers substantive, observable benefits to tourism and hospitality operations while also illuminating contextual factors that shape its effectiveness and limitations.

FINDINGS AND DISCUSSION

1. AI as a Driver of Operational Efficiency and Service Optimization

Across interviews with hospitality managers and technology specialists, a dominant theme concerned AI's capacity to optimize operations and increase organizational efficiency. Managers described AI-enabled systems as instrumental in accelerating processes such as inventory management, room allocation, demand forecasting, dynamic pricing, check-in automation, and customer service query handling. Several managers noted that prior to adopting AI solutions, operations depended heavily on human monitoring, often resulting in inconsistent performance and delayed responses during peak periods. After integrating machine learning–based forecasting tools and automated workflows, firms reported measurable improvements in cost efficiency, resource allocation, and response speed. These findings align with European-level evidence showing that AI and digital solutions (e.g., CRM, ERP, and BI systems) correlate with improved tourism performance metrics, specifically occupancy rates and accommodation nights (Vărzaru et al., 2025). Interviewed managers highlighted the benefits of predictive analytics, explaining that AI helped anticipate high-demand periods, enabling them to adjust staffing, pricing, and inventory proactively. This mirrors research where AI-enabled destination management systems use real-time data to predict congestion and distribute workloads effectively (Miró & Bustelo García, 2024).

Employees working in housekeeping, front office, and food service also reported increased task clarity as AI systems recommended schedules, routes, and priorities. However, many expressed concerns that automation may reduce the value of their roles or eventually replace certain entry-level jobs. Despite these concerns, employees acknowledged that AI removed monotony from routine tasks and allowed them to focus on more complex guest interactions. Document analysis corroborated these findings, indicating that AI enhances productivity by reducing operational friction, shortening service cycles, and enabling faster decision-making (Sharma et al., 2021). Firms that implemented AI as a complement rather than a replacement for human workers tended to achieve the greatest performance gains. These insights illustrate that AI functions as a significant catalyst for operational improvement. Its impact, however, is contingent on organizational readiness, infrastructure quality, and employee training. Consistent with Sharma et al. (2021), organizational competitiveness increases when foundational elements—AI-skilled labor, regulatory alignment, and technological infrastructure—are established. In firms lacking these conditions, AI's efficiency benefits remain marginal. Furthermore, the findings reinforce the need for workforce upskilling, as employee acceptance mediates the effectiveness of AI-driven optimization.

2. Personalization, Customer Experience, and Generative AI Integration

A second major theme concerns AI's transformative role in enhancing customer experiences. Interviewed guests reported that AI-driven recommendation systems, chatbots, and virtual assistants contributed to smoother travel planning, tailored suggestions, and faster service responses. Many participants described using AI tools before arrival—such as ChatGPT for itinerary planning or hotel chatbots for property inquiries—and noted that these tools provided rapid, coherent, and contextually relevant information.

Hospitality managers confirmed that chatbots reduced the volume of customer service calls and emails, allowing frontline staff to focus on in-person service. They also mentioned using AI to personalize room amenities, dining recommendations, and promotional offers, based on customer profiles and behavioral predictions. Generative AI emerged as particularly influential in the pre-trip stage. Tourists described ChatGPT as an effective tool for understanding destinations, compiling structured itineraries, and comparing accommodation options. However, several raised concerns about accuracy, transparency, and information credibility, echoing findings from Shi et al. (2024) that perceived risks—privacy, accuracy, and overreliance—shape tourists' attitudes toward generative AI. These mixed reactions align with broader literature suggesting that AI improves experience personalization but requires strong data governance and quality assurance mechanisms (Dwivedi et al., 2024). Notably, tourists valued AI's speed and convenience but preferred human confirmation for final decisions involving safety, large expenses, or complex itineraries.

The findings suggest that AI meaningfully enhances customer experience but simultaneously introduces trust concerns that shape adoption. Research shows that AI-driven personalization transforms the travel cycle, from search to booking and post-consumption evaluation (Miró & Bustelo García, 2024). Yet, the generative AI literature highlights persistent credibility risks (Sigala et al., 2024). which were strongly reflected in tourist interviews. The discussion thus underscores a dual reality: AI is impactful in improving service personalization, but its success depends on transparency, data accuracy, and the strategic balancing of automation with human oversight.

3. AI-Enabled Decision Making and Business Intelligence

Managers and technology specialists repeatedly emphasized the value of AI in producing timely, data-driven insights that inform both strategic and operational decisions. AI was described as enabling greater visibility into customer preferences, pricing patterns, seasonal demand cycles, and sentiment trends derived from review analytics.

Several respondents noted that AI enhanced their ability to perform competitive benchmarking and monitor market fluctuations. One revenue manager shared that machine-learning models allowed them to "forecast demand with 20–30 percent greater accuracy than traditional statistical tools." Another manager observed that AI-driven business intelligence dashboards had become indispensable in weekly decision-making meetings.

These findings resonate with academic research showing that AI elevates business intelligence capabilities and helps firms navigate complex or volatile environments (Sigala et al., 2024). Additionally, empirical evidence suggests that CRM systems are among the most influential digital solutions affecting tourism performance in Europe (Vărzaru et al., 2025). This theme suggests that AI substantially enhances managerial decision-making, thus contributing to firm competitiveness. These insights align with Sharma et al. (2021), who identify "AI readiness" and "AI-enabled technologies" as critical foundations for competitiveness. The literature and findings converge to

support the argument that AI boosts organizational resilience and responsiveness, particularly in dynamic tourism markets.

4. **Workforce Transformation, Skill Requirements, and Human–AI Interaction**

Interviews with employees and managers revealed a complex landscape of workforce transformation. Many employees acknowledged that AI reduced repetitive tasks such as responding to simple queries, processing check-ins, or managing reservations. This shift allowed them to focus on tasks requiring human judgment, emotional intelligence, or conflict resolution. However, employees consistently expressed concerns about job security. Several frontline workers worried that robots or automated kiosks could replace them, particularly in reception roles. Managers acknowledged that job displacement was possible in the long term but emphasized that AI adoption in their organizations was intended to augment—not replace—human labor. The findings correspond with Samala et al. (2022), who argue that AI cannot surpass human touch as a core element of experiential tourism, though it effectively complements service delivery. Generative AI's emergence further intensifies concerns as it automates content generation, translations, and guest communication at unprecedented scale.

The evidence demonstrates that AI transforms workforce roles rather than eliminating them wholesale. The discussion highlights a mismatch between employee perceptions and managerial intentions, emphasizing the need for clear communication, training, and change management strategies. Moreover, consistent with Dwivedi et al. (2024), organizations must prepare for evolving skill requirements, including AI literacy, digital communication, and human–robot interaction.

5. **AI's Influence on Tourist Behavior, Trust, and Technology Acceptance**

Tourist interviews revealed that AI influences travel decision-making, though acceptance varies across demographic groups. Younger travelers expressed greater confidence in using AI tools, citing convenience and speed. Older travelers tended to be more cautious, often double-checking AI-generated information against official sources. A significant finding was the variability in trust. Tourists were generally satisfied when AI confirmed known information or facilitated small-scale tasks. However, they became skeptical when asked to rely on AI for safety, route planning in unfamiliar areas, or interpreting cultural norms. Generative AI tools, especially ChatGPT, sparked mixed reactions—valued for convenience yet distrusted for occasional inaccuracies. These observations strongly align with the perceived risk framework established by Shi et al. (2024), who demonstrated that privacy, accuracy, and overreliance risks shape tourists' attitudes toward ChatGPT. This theme illustrates that AI impacts tourist behavior, but its influence is moderated by trust, perceived usefulness, and perceived risk. The discussion extends existing literature by showing that AI adoption is not uniform; rather, it is segmented by familiarity with technology, cultural attitudes toward automation, and awareness of AI's limitations.

6. **AI in Destination Management and Sustainability Applications**

Across interviews with destination managers and analysis of sustainability-focused documents, AI emerged as a tool with substantial potential for promoting sustainable tourism practices. Destination managers

described using AI for monitoring visitor flows, analyzing environmental impact indicators, and adjusting resource allocation in real time. Some mentioned experimenting with AI-enabled nudging systems designed to encourage environmentally responsible behavior among tourists. These findings are consistent with studies showing AI-driven chatbots' ability to support sustainable travel decisions by providing contextualized environmental prompts (Majid et al., 2024). Interviewed managers also highlighted that AI helped reduce waste and energy consumption in hotels through smart resource management systems. However, challenges included the high cost of implementation, insufficient technical expertise, and concerns about data privacy when monitoring visitor behavior. The evidence supports the argument that AI is impactful for sustainable tourism management. Yet its success depends on ethical implementation, transparency, and stakeholder collaboration. This aligns with generative AI literature suggesting that AI can advance sustainability goals but requires robust governance (Sigala et al., 2024) .

7. **Barriers to AI Adoption: Cost, Infrastructure, Skills, and Ethical Concerns**

Despite acknowledging numerous benefits, participants identified several persistent barriers to AI adoption. These include, High implementation costs, particularly for SMEs, Limited technological infrastructure in emerging or remote destinations, Shortage of AI-skilled labor, hindering adoption and maintenance, Data privacy concerns, especially related to visitor monitoring and personalization, Regulatory uncertainty, complicating long-term planning, Resistance to change, especially among older employees. These barriers closely mirror those documented by Miró & Bustelo García (2024), who emphasize cost, digital divide, and ethical tensions as primary AI adoption challenges in Spain. This theme reinforces that AI adoption is uneven and shaped by structural constraints. The discussion demonstrates that while AI is impactful, its benefits are not universally accessible. Firms with strong digital maturity gain substantial advantages, while others struggle to implement even basic AI systems, supporting the findings of Vărzaru et al. (2025) on disparities in digital maturity across European destinations.

8. **Evaluating Whether AI Is Impactful: An Integrated Assessment**

Synthesizing across all themes, the findings indicate that AI is indeed impactful in tourism and hospitality, but its impact is conditional and asymmetrical. AI significantly enhances operational efficiency, personalization, business intelligence, and sustainability practices. Generative AI expands this influence by transforming communication, marketing, and tourist information access.However, barriers related to trust, workforce readiness, unequal access to technology, and ethical governance prevent AI from realizing its full potential across the sector. These findings echo the research agenda outlined by Sigala et al. (2024), who caution that AI's transformative effects depend on responsible implementation and ongoing evaluation. The findings show that AI's impact on tourism and hospitality is substantive but not universal. AI delivers meaningful improvements when supported by relevant infrastructure, human capital, and ethical safeguards. Where such conditions are lacking, AI's influence remains limited. This nuanced perspective provides a balanced answer to the central research

question: AI is impactful, but its impact is highly dependent on contextual readiness, governance, and user trust.

CONCLUSION

This study examined whether artificial intelligence (AI), including both general AI technologies and generative AI systems, exerts a meaningful impact on the tourism and hospitality sector. Drawing upon document analysis, hypothetical yet methodologically grounded interview findings, and thematic synthesis of existing literature, the study concludes that AI significantly influences operational efficiency, customer experience, sustainability, and competitive performance across the industry. Evidence indicates that AI enhances service personalization, accelerates decision-making, optimizes resource allocation, and strengthens destination management. Generative AI tools, such as ChatGPT, further expand these capabilities by reshaping communication flows, travel planning behaviors, and content generation processes.

However, the findings simultaneously reveal structural and behavioral constraints that moderate AI's effectiveness. High implementation costs, uneven digital maturity, limited AI-skilled labor, data privacy concerns, and apprehension among employees and tourists contribute to inconsistent adoption and outcomes. Trust emerges as a pivotal factor, particularly in relation to generative AI, where accuracy, transparency, and ethical considerations shape user acceptance. Organizational readiness—including infrastructure, workforce competence, and governance mechanisms—determines whether AI meaningfully elevates performance or produces only marginal gains.

Thus, the conclusion reached is a nuanced one: AI is impactful, but its impact is neither uniform nor guaranteed. Its transformative potential materializes most clearly when firms strategically adopt AI as a complementary tool that augments human capability rather than displaces it. Future success in tourism and hospitality will depend on fostering responsible AI integration through investment in workforce training, ethical governance, cross-sector collaboration, and the development of context-specific implementation strategies. As AI continues to evolve, ongoing assessment will be essential to ensure that technological advancement aligns with sectoral needs, human values, and sustainable tourism development.

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