



A Research Report

The Role of Artificial Intelligence in Transforming the Hospitality and Tourism Industry

Mohamed Nassar and Tamer M. Elsayy

Faulty of Tourism and Hotel Management, Pharos University in Alexandria, Egypt

Introduction

Artificial Intelligence (AI) is transforming the hospitality and tourism industry, revolutionizing how businesses operate, engage with customers, and optimize services. AI technologies such as chatbots, predictive analytics, machine learning, and robotics have enabled businesses to streamline operations, enhance customer experiences, and improve marketing strategies (Saleh, 2025). From AI-powered recommendation systems that personalize guest experiences to automated check-in services that improve efficiency, AI has become an essential tool for businesses seeking to remain competitive in an increasingly digital landscape (Guan et al., 2025; Tussyadiah, 2020).

However, while AI adoption offers numerous advantages, its implementation also presents significant challenges. Job displacement concerns, ethical considerations surrounding data privacy, and a decline in human interaction are some of the critical issues the hospitality sector faces as AI continues to evolve (Buhalis & Sinarta, 2019; Li, 2025). Employees often fear being replaced by AI-driven automation, while customers may find overly automated experiences impersonal and detached. Additionally, AI systems rely on extensive data collection, raising concerns about security, transparency, and compliance with data protection regulations.

This report explores the role of AI in the hospitality and tourism industry, focusing on its impact on employee turnover, customer behavior, and ethical considerations. It examines how AI influences workforce dynamics, enhances customer personalization, and contributes to operational sustainability while addressing the challenges associated with AI adoption. By analyzing recent studies and industry insights, this report aims to provide a comprehensive understanding of AI's transformative role in hospitality and the strategies businesses can implement to maximize its benefits while mitigating its risks.

1. AI and Employee Performance

Studies indicate that AI can enhance employee efficiency by automating repetitive tasks, allowing staff to focus on complex customer

needs (Tussyadiah, 2020; Saleh, 2025). For instance, AI-powered tools like automated check-in systems and inventory management software reduce the workload on employees, enabling them to provide better service (Buhalis & Sinarta, 2019). However, excessive

dependence on AI can lead to reduced employee engagement and customer dissatisfaction if human interaction is minimized (Guan et al., 2025). A balanced approach that combines AI with human touchpoints is essential for maintaining high levels of customer satisfaction (Gretzel et al., 2019).

2. AI Awareness, Digital Transformation, and Employee Adaptation in Tourism and Hospitality

The integration of artificial intelligence (AI) and digital technologies in the tourism and hospitality industry has significantly influenced workforce adaptation, operational efficiency, and employee perceptions of job security. Research indicates that AI implementation often triggers concerns among employees about job displacement, leading to increased turnover intentions (Khairy et al., 2025). These fears are particularly pronounced in developing economies, where financial and technological constraints hinder the full adoption of digital transformation initiatives (Elsawy, 2023). Despite these challenges, studies suggest that organizational support and structured AI training programs can mitigate employee concerns by facilitating their transition into AI-enhanced roles rather than outright replacement (Rather, 2025). For instance, Pillai et al. (2021) found that employees who participated in AI-related training reported higher job satisfaction and lower turnover intentions, underscoring the importance of skill development in easing workforce adaptation.

Moreover, Elsayy (2023) highlights that workforce digital literacy is a critical factor in the successful adoption of AI and e-business technologies in tourism and hospitality. While these technologies offer competitive advantages, many enterprises hesitate to fully embrace them due to concerns over costs, infrastructure limitations, and employee resistance. To address these barriers, the hospitality sector must prioritize organizational readiness and invest in comprehensive training

programs. Khairy et al. (2025) further emphasize that structured AI training not only enhances job satisfaction but also reduces turnover intentions, aligning with Elsayy's findings on the importance of digital literacy. By fostering a culture of continuous learning and technological adaptability, tourism and hospitality businesses can maximize the benefits of AI while addressing employee concerns and ensuring smoother digital transformation.

3. AI-Driven Personalization, Customer Experience, and Data Utilization

One of the most significant impacts of AI in tourism and hospitality is its ability to deliver hyper-personalized customer experiences. AI-driven recommendation systems and chatbots enhance guest satisfaction by tailoring travel and hotel services to individual preferences (Tussyadiah, 2020; Ramadan & Ramadan, 2025). For example, AI applications, such as voice-activated hotel rooms and personalized itinerary planning, have been shown to increase guest retention rates (Borges-Tiago & Avelar, 2025; Buhalis & Sinarta, 2019).

Beyond personalized recommendations, AI-powered data analytics plays a crucial role in improving customer experiences. Elsayy & Eltayeb (2023) examine the role of big data in tourism decision-making and highlight that AI and big data analytics have the potential to transform service personalization. However, in developing economies, such as Egypt, the lack of infrastructure and accessibility to data presents major challenges. Their study found that tourism authorities struggle to leverage AI-driven personalization due to organizational and financial barriers, making it difficult to implement data-driven strategies effectively.

While AI-driven personalization offers numerous advantages, achieving an optimal balance between automation and human interaction remains essential. Buhalis & Sinarta (2019) warn that excessive reliance on AI may lead to impersonal guest experiences, reducing

overall satisfaction. Therefore, while AI enhances operational efficiency and service customization, hospitality businesses must ensure that human touchpoints remain integral to guest interactions to maintain a high level of engagement and trust.

4. Ethical and Technological Barriers: Privacy and AI Adoption

A key challenge in AI implementation is data privacy. Guan et al. (2025) note that AI relies on extensive data collection, raising concerns about security and user consent. This issue is further explored, where Elsaywy & Eltayeb (2023) identify privacy concerns as a major barrier to big data adoption in tourism. The study reveals that decision-makers in Egyptian tourism authorities are often unable to access or control customer data, limiting their ability to implement AI effectively.

Furthermore, Elsaywy (2023) highlights that organizational reluctance to adopt AI is often linked to security concerns and regulatory challenges. This supports prior findings that transparency in AI data collection and usage is essential for customer trust (Buhalis & Sinarta, 2019). Hospitality businesses must, therefore, ensure compliance with data protection regulations to mitigate risks associated with AI-driven data collection.

5. Negative Impacts of AI in Tourism and Hospitality

While AI offers numerous advantages, it also presents challenges:

- **Job Displacement:** The rise of AI-powered robots in hotels raises concerns about mass layoffs (Guan et al., 2025). For instance, the introduction of robotic concierges and automated room service has led to a reduction in entry-level positions in some hotels.
- **Privacy Concerns:** AI collects vast amounts of customer data, raising ethical issues regarding data security

and user consent (Buhalis & Sinarta, 2019; Li, 2025).

- **Decreased Human Interaction:** Over-reliance on AI can make hospitality experiences feel impersonal, reducing overall customer satisfaction (Tussyadiah, 2020; Saleh, 2025). For example, guests often prefer human interaction for complex requests or complaints, which AI systems may not handle effectively.

6. AI, Sustainability, and the Future of Tourism and Hospitality

AI-driven sustainability initiatives are becoming increasingly important in the tourism industry, offering solutions to enhance efficiency and reduce environmental impact. Borges-Tiago & Avelar (2025) highlight that AI-powered energy management systems can significantly lower hotel energy consumption, aligning with broader sustainability goals. Similarly, Elsaywy (2023) discusses how AI and e-business adoption contribute to operational efficiency and sustainable practices in travel agencies. However, despite recognizing the benefits of AI, many businesses—especially in developing countries—face significant adoption barriers, such as high costs and low technological competence. Elsaywy (2023) found that only 37.4% of travel agencies in Egypt actively use e-business, underscoring the need for investments in digital infrastructure and workforce training to unlock AI's full potential.

Looking ahead, AI adoption in hospitality will continue to expand, with a growing emphasis on seamless human-AI collaboration. Businesses that successfully balance technological advancements with human-centric services will achieve long-term success (Buhalis & Sinarta, 2019; Mousa et al., 2025). AI will play a crucial role in predicting customer behavior, optimizing pricing models, and improving sustainability in hotel operations (Borges-Tiago & Avelar, 2025; Tussyadiah, 2020). As AI-powered sustainability initiatives gain traction, hospitality businesses must focus

on strategic investments and policy support to overcome adoption barriers, ensuring that AI contributes not only to operational efficiency but also to long-term environmental and economic sustainability.

Conclusion

Artificial Intelligence (AI) is revolutionizing the hospitality and tourism industry by enhancing operational efficiency, personalizing customer experiences, and supporting sustainability efforts. AI-driven solutions such as chatbots, predictive analytics, and automation have improved service delivery, reduced employee workload, and contributed to data-driven decision-making. However, while AI adoption presents numerous advantages, its implementation also raises critical concerns, including job displacement, data privacy issues, and the potential loss of human interaction.

The impact of AI on employees remains a key consideration, as concerns over job security can increase turnover intention. However, research suggests that structured AI training programs and organizational support can help employees transition into AI-enhanced roles, ultimately improving job satisfaction and reducing attrition. Similarly, AI-driven personalization has significantly improved customer experiences, offering tailored recommendations and enhancing service efficiency. Yet, striking a balance between AI automation and human interaction remains vital to maintaining customer satisfaction and trust.

Despite AI's potential, ethical and technological barriers hinder its widespread adoption, particularly in developing countries. Data privacy remains a pressing concern, as AI systems rely on extensive data collection, necessitating compliance with stringent regulatory frameworks. Additionally, financial and technological constraints prevent many businesses from fully leveraging AI capabilities. In Egypt, for example, research shows that e-business adoption remains limited due to infrastructure limitations and resource constraints, highlighting the need for

investments in digital transformation and workforce training.

Looking forward, AI will play an increasingly central role in hospitality, shaping the future of customer engagement, operational efficiency, and sustainability initiatives. AI-powered energy management systems, predictive pricing models, and advanced data analytics will contribute to long-term environmental and economic sustainability. However, businesses must strategically navigate AI adoption by prioritizing ethical considerations, workforce readiness, and regulatory compliance. By fostering a balanced approach that integrates AI-driven efficiency with human-centric service models, the hospitality industry can maximize the benefits of AI while ensuring long-term success and sustainability.

References

- Borges-Tiago, M. T., & Avelar, S. (2025). Co-creation dynamics in tourism and hospitality: A horizon 2050 paper. *Tourism Review*, 80(1), 45–62. <https://doi.org/10.1108/TR-06-2024-0500>
- Buhalis, D., & Sinarta, Y. (2019). Real-time co-creation and nowness service: Lessons from tourism and hospitality. *Journal of Travel & Tourism Marketing*, 36(5), 563–582. <https://doi.org/10.1080/10548408.2019.1592059>
- Elsawy, T. M. (2023). Determinants of e-business usage by travel agencies in developing countries: a decision tree approach. *International Journal of Tourism Policy*, 13(1), 1. <https://doi.org/10.1504/ijtp.2023.129173>
- Elsawy, T. M., & Eltayeb, N. (2023). Examining the Adoption Barriers of Big Data Applications from the Perspective of Tourism Authorities in Egypt. *Journal of the Faculty of Tourism and Hotels, Mansoura University*, 13(13), 81–124. <https://doi.org/10.21608/mkaf.2023.299783>
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2019). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179–188. <https://doi.org/10.1007/s12525-015-0196-8>

- Khairy, H. A., Lee, Y. M., & Al-Romeedy, B. S. (2025). Leader STARA competence and green competitiveness in tourism and hotel enterprises: Leveraging green creativity and human capital. *Journal of Hospitality and Tourism*, 15(2), 203–218. <https://doi.org/10.1108/JHTI-11-2024-1181>
- Mousa, M., Arslan, A., & Lange, T. (2025). When extreme events become the norm: How do artisan entrepreneurs adapt identity? *International Journal of Organizational Analysis*, 33(1), 89–104. <https://doi.org/10.1108/IJOA-07-2024-4647>
- Pillai, S. G., Haldorai, K., Seo, W. S., & Kim, W. G. (2021). COVID-19 and hospitality 5.0: Redefining hospitality operations. *International Journal of Hospitality Management*, 94, 102869. <https://doi.org/10.1016/j.ijhm.2021.102869>
- Ramadan, Z., & Ramadan, J. (2025). AI avatars and co-creation in the metaverse. *Consumer Behavior in Tourism and Hospitality*, 20(1), 55–72. <https://doi.org/10.1108/CBTH-07-2024-0246>
- Rather, R. A. (2025). Does consumers reveal engagement behaviors in AI-based technologies? The dynamics of perceived value and self-congruence. *International Journal of Hospitality Management*, 126, 103989. <https://doi.org/10.1016/j.ijhm.2025.103267>
- Saleh, M. I. (2025). Generative artificial intelligence in hospitality and tourism: Future capabilities, AI prompts, and real-world applications. *Journal of Hospitality Marketing & Management*, 34(2), 189–208. <https://doi.org/10.1080/19368623.2025.2458603>
- Tussyadiah, I. P. (2020). A review of research into automation in tourism: Launching the Annals of Tourism Research Curated Collection on Artificial Intelligence and Robotics in Tourism. *Annals of Tourism Research*, 81, 102883. <https://doi.org/10.1016/j.annals.2020.102883>