Available online at: https://jurnal.integrasisainsmedia.co.id/index.php/JTHTM
Journal of Tourism, Hospitality and Travel Management
Volume 3 Nomor 1, 2025: 53-66
DOI: 10.58229/jthtm.v3i1.302

Adoption of Artificial Intelligence (AI) Technology in Enhancing Tourist Experience: A Conceptual Model

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Abstract

The rapid advancement of Artificial Intelligence (AI) technologies is fundamentally transforming the global tourism industry, reshaping how travellers plan, experience, and reflect on their journeys. AI applications such as chatbots, virtual assistants, intelligent recommendation systems, and real-time translation tools have enhanced personalization, operational efficiency, and real-time decision-making throughout the tourist experience. However, despite AI's potential to drive innovation and competitiveness, its adoption faces critical barriers, including data privacy concerns, algorithmic bias, digital literacy gaps, and unequal technological infrastructure. This study explores AI adoption's drivers, barriers, and strategic implications in tourism through a qualitative expert panel discussion involving academics, industry practitioners, and government representatives. Data were collected via a structured email-based discussion guide covering AI applications, operational benefits, motivational factors, adoption challenges, ethical considerations, and future directions. Findings reveal that AI enhances tourist experiences and business operations by enabling hyper-personalization, improving resource optimization, and supporting sustainable tourism governance. Ethical and regulatory challenges remain significant, particularly around trust, transparency, and data protection. The study proposes a conceptual model that positions AI as a transformative enabler, moderated by governance frameworks and ethical considerations. This research offers strategic insights for policymakers, industry stakeholders, and scholars, emphasizing the need for inclusive digital infrastructure, ethical AI design, and sector-specific regulations to ensure responsible, equitable, and sustainable AI adoption in the tourism sector.

Keywords: Artificial Intelligence; Tourist Experience; Digital Transformation; Ethical AI; Sustainable Tourism; Conceptual Model.

A. INTRODUCTION

The rapid advancement of digital technologies has profoundly reshaped the global tourism landscape, positioning Artificial Intelligence (AI) as a central driver of this transformation. AI-powered applications—ranging from chatbots, virtual assistants, intelligent recommendation systems to real-time translation tools—are increasingly embedded across various stages of the tourist journey. These technologies enhance convenience and efficiency and enable personalization, allowing tourism businesses to tailor services to individual preferences and real-time traveller needs. The growing sophistication of AI systems, particularly their ability to analyze vast datasets, facilitates accurate predictions of tourist behaviours and preferences, thereby improving satisfaction and creating more memorable, personalized experiences (Bui, 2021; García-Madurga & Grilló-Méndez, 2023; Ma, 2024).

Beyond personalizing the tourist experience, AI is critical in optimizing operational efficiency within the tourism and hospitality sectors. AI-driven chatbots and virtual assistants automate routine service tasks, respond promptly to customer inquiries, and deliver real-time recommendations—enhancing service quality while fostering customer loyalty (Lei et al., 2021; Pillai & Sivathanu, 2020; Wang & Shao, 2022; Zlatanov & Popesku, 2019). Simultaneously, deploying predictive analytics enables tourism businesses to forecast demand, manage resources efficiently, and refine pricing strategies. This dual impact—enhancing customer experience

and operational performance—positions AI as a strategic innovation vital to sustainable growth, competitiveness, and profitability in the global tourism ecosystem (Bulchand-Gidumal, 2020; Rashid & Aziz, 2022).

An equally significant contribution of AI lies in providing travellers with real-time, context-aware information. AI-powered platforms now deliver dynamic updates on flight schedules, weather conditions, and local events, empowering tourists to make more informed decisions (Aliyah et al., 2023; García-Madurga & Grilló-Méndez, 2023; Kumar et al., 2023). Machine learning models embedded in these systems process historical travel data, behavioural patterns, and demographic profiles to generate tailored suggestions for destinations, accommodations, and activities (Agostino & Costantini, 2021; Kirtil & Askun, 2021; Law et al., 2024). Popular platforms such as Google Trips, Airbnb, and Skyscanner exemplify this AI-driven transformation, offering seamless itinerary planning, optimized travel routes, and reduced decision-making burdens while aligning closely with individual traveller preferences (Bui, 2021; Ma, 2024; Rianawati et al., 2024).

However, despite AI's promising potential, its widespread adoption in tourism faces a series of critical challenges that could hinder its equitable impact. Among the foremost concerns is data privacy, as AI systems inherently depend on the collection and processing of large volumes of personal data, raising risks of misuse and non-compliance with stringent regulations such as the General Data Protection Regulation (GDPR) (Kumar et al., 2023; Minardi et al., 2020; Nanda et al., 2023). Equally problematic is the issue of trust, with travellers often sceptical of AI-generated recommendations or automated services—particularly when these systems fail to capture the nuance of human empathy or produce inaccurate outputs (Afaq et al., 2024; García-Madurga & Grilló-Méndez, 2023; Shafiee, 2024). Furthermore, disparities in digital literacy exacerbate these issues, as not all travellers possess the skills necessary to effectively interact with AI tools, thereby risking the exclusion of certain demographic groups (Bui, 2021; Ma, 2024; Rianawati et al., 2024).

The unequal distribution of technological infrastructure across global destinations further compounds these challenges. While technologically advanced cities and developed nations offer seamless, AI-integrated tourism experiences, many developing regions struggle with insufficient digital infrastructure, limiting their ability to support sophisticated AI applications (Lei et al., 2021; Pillai & Sivathanu, 2020; Zlatanov & Popesku, 2019). This digital divide not only reinforces competitive imbalances within the global tourism market but also restricts the equitable distribution of AI's benefits, concentrating advantages within more developed regions (Rashid & Aziz, 2022; Wang & Shao, 2022). Addressing these structural and systemic barriers is crucial to ensuring that AI adoption in tourism is inclusive and sustainable, delivering value to diverse traveller segments and destination types.

Against this backdrop, understanding the underlying dynamics of AI adoption from the traveller's perspective becomes essential for stakeholders across the tourism value chain. Identifying the key drivers and barriers influencing traveller engagement with AI technologies is vital for designing solutions that align with user expectations while minimizing associated risks. Therefore, this study seeks to explore current trends, opportunities, and challenges surrounding AI adoption in tourism, specifically from the standpoint of traveller behaviour and decision-making. Through an extensive literature review, this paper offers strategic insights and recommendations to foster responsible, user-centric, and sustainable AI integration within the global tourism industry.

B. LITERATURE REVIEW

The Rise of AI in Tourism

The rise of Artificial Intelligence (AI) technologies has significantly transformed the tourism industry, reshaping how travellers plan, experience, and reflect on their journeys. AI applications such as chatbots, virtual assistants, intelligent recommendation systems, and AI-powered translation tools have enhanced service efficiency, enabled real-time interactions, and provided travellers with greater convenience throughout their trips (Garanti, 2023). AI technologies also play a critical role in enhancing customer interactions and

personalizing experiences. For instance, AI-powered chatbots and virtual assistants offer instant responses to traveller inquiries, delivering convenience beyond traditional service methods. (Pai et al., 2021) emphasize that high-quality experiences with smart tourism technologies can increase tourist satisfaction and encourage repeat visits, reinforcing the importance of aligning services with individual preferences. Furthermore, intelligent recommendation systems analyze tourists' behaviours and preferences to generate tailored suggestions for accommodations, attractions, and activities, enhancing engagement while supporting destination management strategies that promote sustainability (Zhang et al., 2022).

The integration of AI also supports the development of smart tourism ecosystems, where collaborative networks of stakeholders co-create experiences that maximize destination value (Garanti, 2023). This approach fosters greater tourist satisfaction while preserving local culture and environmental integrity (Novianti et al., 2022). Additionally, AI-driven technologies contribute to sustainability by enabling data-driven decision-making, allowing tourism businesses to minimize environmental impacts and manage visitor flows more effectively (Filieri et al., 2021). Studies further reveal that smart tourism technologies positively influence traveller attitudes and destination appeal. However, challenges such as data privacy, ethical concerns, and potential job displacement remain significant despite these benefits. (Nguyen & Tran, 2024) stress the importance of navigating these issues carefully to maintain consumer trust and achieve socially responsible AI adoption. While AI enhances personalization, operational efficiency, and sustainability in tourism, establishing ethical frameworks and addressing privacy concerns is vital for long-term success.

Personalization and Predictive Capabilities

Implementing Artificial Intelligence (AI) technologies in tourism has ushered in a new era of hyper-personalization, allowing tailored recommendations that significantly enhance traveller experiences. AI systems process vast amounts of visitor data, including preferences, past behaviours, and contextual factors, to generate personalized suggestions for destinations, accommodations, attractions, and dining experiences. (Aliyah et al., 2023) highlight how integrating AI with Internet of Things (IoT) technologies enables smart tourism destinations to offer highly targeted recommendations, enhancing satisfaction and engagement. Similarly, (Jang et al., 2023) emphasize that tourists increasingly perceive AI-generated recommendations as credible, particularly when aligned with their specific interests, making AI a reliable decision-making tool comparable to expert advice. AI-powered chatbots and virtual assistants also play a critical role in real-time engagement by providing instant responses and facilitating seamless information access, booking, and customer support (Pillai & Sivathanu, 2020). As noted by (Zhu et al., 2023), the reliability and consistency of AI-driven information foster greater user trust, deepening traveller engagement throughout the journey.

In addition to personalization, predictive analytics enhance tourist experiences by anticipating preferences and adapting itineraries in real time. AI tools can recommend alternative attractions in response to changing conditions, such as weather disruptions or overcrowding, minimizing inconvenience for travellers. (Setiawan, 2024) adds that AI empowers destination managers to refine offerings based on emerging trends and visitor feedback, improving service delivery and operational efficiency. However, the increasing reliance on AI personalization raises ethical concerns, particularly regarding data privacy and consumer autonomy. (Jobin et al., 2019) stress the need for clear ethical guidelines to ensure transparency and responsible data use in AI-driven tourism services. Building consumer trust is essential to balance technological advancements with ethical considerations, ensuring AI adoption enhances the travel experience without compromising user rights. Future research should explore these dimensions to optimize AI's potential while safeguarding ethical standards in the tourism industry.

AI in Enhancing Real-Time Tourist Experience

Artificial Intelligence (AI) technology integration has substantially enhanced the real-time tourist experience by providing instant information, contextual insights, and 24/7 customer support. AI-powered chatbots and

virtual assistants assist travellers with booking services, offering local attraction recommendations, and resolving inquiries almost instantly—greatly improving overall satisfaction (Arifuddin et al., 2019; Bachri & Lonik, 2023). The COVID-19 pandemic accelerated the use of AI chatbots due to increased demand for safe and convenient interactions, giving tourists peace of mind and allowing them to focus on their experiences. AI systems further employ contextual and predictive capabilities by analyzing real-time data—such as weather conditions, local events, and user history—to optimize itineraries dynamically. (Af'idah et al., 2023) explain how context-aware systems suggest alternative activities in response to unforeseen circumstances, while (Syafi'i & Uula, 2022) highlight that AI-driven platforms adjust routes based on real-time traffic, enhancing efficiency and traveller satisfaction.

Beyond instant responses, AI elevates personalization by learning from user interactions and preferences to provide tailored recommendations for attractions, accommodations, and dining experiences. (Hariani & Hanafiah, 2023) emphasize that this personalization fosters stronger engagement and more memorable experiences, particularly when AI adapts to each traveller's unique needs. (Churiyah et al., 2020) further, illustrate how AI enriches niche segments like religious tourism through highly specific recommendations. However, as AI systems increasingly rely on vast amounts of personal data, ethical concerns about privacy and security intensify. (Yoshinta et al., 2024) stress the need for responsible data management and compliance with privacy regulations to sustain traveller trust. As AI evolves, balancing technological advancements with ethical considerations will be vital for optimizing real-time tourist experiences while protecting user rights.

Barriers and Ethical Considerations in AI Adoption

Despite its transformative potential, adopting Artificial Intelligence (AI) in tourism faces several barriers, with data privacy remaining a primary concern. AI systems routinely collect sensitive traveller information, raising data misuse or breach risks if not properly managed. Jobin et al. (Ramadhaniah, 2020) warn that such risks can erode consumer trust, while (Bachri & Lonik, 2023) stresses the need for robust data protection frameworks aligned with regulations like the General Data Protection Regulation (GDPR). Trust in AI-generated decisions is equally significant, as travellers may doubt automated recommendations' fairness, accuracy, and cultural sensitivity (Syafi'i & Uula, 2022). The study emphasizes that building transparency and communicating AI limitations is vital for consumer confidence. Additionally, digital literacy gaps hinder AI adoption, especially in rural or emerging tourism destinations. Many SMEs lack the skills and resources to leverage AI effectively, underscoring the need for capacity-building initiatives (Hariani & Hanafiah, 2023).

Ethical challenges such as algorithmic bias and cultural insensitivity also pose significant risks. AI systems trained on historical data may reinforce societal biases, leading to unequal treatment or unfair recommendations, as (Churiyah et al., 2020) highlight. Moreover, over-reliance on AI-powered services risks diminishing authentic human interactions—an essential element of hospitality and tourism (Yoshinta et al., 2024). Cultural insensitivity remains another concern, where AI systems may generate suggestions that disregard local customs and social norms. (Amaral et al., 2020; Rashid & Aziz, 2022) stress the importance of involving local communities and cultural experts to prevent such issues. Addressing these barriers and ethical considerations through strong governance and training initiatives is essential for fostering responsible AI adoption that benefits travellers while respecting local contexts and values.

AI and Operational Efficiency for Tourism Businesses

Artificial Intelligence (AI) application in the tourism sector offers significant potential to enhance operational efficiency and profitability. AI-driven predictive analytics support businesses in demand forecasting, enabling them to analyze historical booking data, economic indicators, and seasonal trends to predict visitor flows (Aryaningtyas et al., 2023). This allows businesses to optimize staffing and inventory, especially during peak and low seasons (Aliyah et al., 2023). Additionally, AI-powered dynamic pricing strategies adjust prices in real time

based on demand, competitor pricing, and market conditions. (Shin et al., 2021) affirm that such dynamic pricing maximizes revenue while balancing customer satisfaction, allowing businesses to remain competitive during off-peak periods.

AI also plays a crucial role in resource optimization and personalized marketing. AI systems forecast operational needs, minimizing wastage and reducing costs while ensuring service quality (Pai et al., 2020; Pramudito, 2020). This is particularly useful for hotels and restaurants managing inventory and staffing efficiently. Moreover, AI enables targeted marketing campaigns by analyzing customer behaviour and preferences, resulting in higher conversion rates and improved customer loyalty (Agyeiwaah et al., 2016; González-Reverté, 2019). Enhanced customer engagement is further supported by chatbots and virtual assistants, which provide instant responses to inquiries and improve overall service delivery (Moscardo, 2017; Wang & Shao, 2022). Collectively, these AI applications not only streamline operations but also strengthen customer relationships, positioning tourism businesses for sustainable growth and competitiveness.

C. METHODS

This study employed a qualitative expert panel discussion via email to examine multidisciplinary perspectives on adopting Artificial Intelligence (AI) technologies to enhance tourist experiences. The research design aimed to gather in-depth insights from experts across academia, industry, and policymaking sectors, ensuring a comprehensive understanding of the key factors influencing AI adoption in tourism and contributing to developing a conceptual model. Panelists were selected through purposive sampling based on their academic qualifications, professional experience, and active involvement in tourism, digital transformation, and AI-driven innovation. Invitations were extended to selected experts who met these criteria, and those who consented to participate were provided with a structured discussion guide comprising twelve thematic questions. These questions were designed to explore critical topics, including AI applications and trends in tourism, factors motivating traveller adoption, barriers and challenges, ethical considerations, and strategic directions for sustainable AI integration in the sector.

The panel discussion was conducted entirely via email to provide participants with the flexibility to reflect deeply and deliver detailed written responses. To ensure consistency and analytical depth, each panellist was requested to limit their responses to 200 words per question. All responses were subsequently compiled and subjected to thematic content analysis. This analytical process involved coding the data, identifying recurring patterns, and categorizing expert insights into key thematic areas, including AI-driven personalization, real-time enhancement of the tourist experience, operational and economic efficiency, adoption barriers, and ethical challenges. The findings from this structured analysis were synthesized into a coherent narrative that informed the development of the proposed conceptual model of AI adoption in tourism. Informed consent was obtained from all participants to ensure ethical integrity. The study upheld voluntary participation and data confidentiality principles, with all responses anonymized to protect panellists' identities throughout the analysis and reporting stages.

D. RESULTS AND DISCUSSIONS

The email-based panel discussion generated rich, multi-perspective insights from academics, industry practitioners, and government representatives regarding adopting Artificial Intelligence (AI) technology to enhance tourist experiences. The findings are synthesized into several thematic areas.

AI Adoption in Tourism: Progress and Key Applications

The panellists unanimously agreed that Artificial Intelligence (AI) adoption in the tourism sector had grown significantly over the past five years, driven by rapid digital transformation, changing consumer behaviour, and the increasing need for efficiency in service delivery. The COVID-19 pandemic further accelerated the adoption of AI-powered solutions as tourism businesses sought safer, contactless alternatives to conventional human-

based services. As a result, AI has evolved from being a mere supporting technology to becoming an integral part of the tourism ecosystem. One of the most visible applications of AI is the widespread use of chatbots and virtual assistants in the hospitality and travel sectors. These tools handle many customer inquiries, from booking assistance to providing local recommendations, with minimal human intervention. Industry practitioners noted that such AI-driven communication systems reduce operational costs and improve response speed and availability, operating 24/7 to meet the expectations of digitally connected travellers.

Equally important is the application of AI-powered intelligent recommendation systems, which have redefined how tourists make decisions. By analyzing vast datasets of traveller preferences, behaviours, and contextual factors (e.g., weather, location), these systems generate personalized suggestions for destinations, activities, accommodations, and dining experiences. Platforms like Google Travel, TripAdvisor, and Booking.com heavily rely on these technologies, influencing tourist behaviour by offering hyper-personalized itineraries that align with individual interests. Government panellists added that AI's potential extends beyond individual businesses to destination-level management systems. AI facilitates the development of smart tourism ecosystems by integrating real-time data from transportation networks, environmental sensors, and social media trends. Such systems enable authorities to monitor visitor flows, predict overcrowding, and implement dynamic strategies to improve tourist distribution—key in managing over-tourism in popular destinations.

Another emerging application is integrating AI-powered real-time translation tools that break down language barriers for international tourists. These tools enhance accessibility and cultural engagement, allowing travellers to navigate local environments more confidently, thus improving overall satisfaction. Despite these advancements, panellists emphasized that the level of AI adoption remains uneven. Large industry players, such as multinational hotel chains, airlines, and online travel agencies (OTAs), lead AI utilization due to better resources and digital readiness. In contrast, small and medium-sized tourism enterprises (SMEs), especially those in rural and community-based tourism settings, struggle with limited digital infrastructure and financial capacity to adopt AI technologies. This creates a growing gap in technological capability within the tourism sector. The panel stressed that AI will continue to shape the tourism experience by offering real-time, context-aware, and hyper-personalized services. However, they also cautioned that AI's benefits might remain concentrated among large players without strategic interventions, leaving SMEs and rural destinations further behind. Therefore, fostering an inclusive digital transformation strategy becomes crucial to ensure that AI serves as an enabler for the entire tourism ecosystem, not just the privileged few.

Motivational Factors: Efficiency, Personalization, and Safety

The panellists identified several key motivational factors driving travellers to adopt AI-based services during their tourism journeys. Across responses, three dominant drivers consistently emerged: efficiency, personalization, and safety—each reflecting the evolving expectations of modern tourists in the digital era. First, efficiency is seen as the most immediate benefit of AI adoption. Travellers today demand speed, accuracy, and convenience when accessing information or services, particularly during critical phases of the travel journey, such as planning, booking, and on-site navigation. AI-powered chatbots, virtual assistants, and recommendation systems significantly reduce the time and effort needed to search for information, compare options, and make decisions. Industry panellists highlighted that the ability of AI to provide instant responses—available 24/7—enhances the tourist experience, especially in situations requiring quick adjustments, such as rescheduling flights or finding alternative accommodations during disruptions.

Secondly, personalization emerged as a powerful motivator shaping traveller behaviour. AI systems leverage big data, machine learning, and predictive analytics to analyze individual preferences, travel history, demographics, and real-time contextual factors (e.g., weather conditions or local events). This enables the delivery of highly customized recommendations—from tailored itineraries and dining suggestions to personalized promotions. Panellists agreed that this hyper-personalized experience creates a sense of being

"understood" by the system, increasing traveller satisfaction and engagement. Government representatives further emphasized that personalization enhances the individual tourist's experience and allows destinations to manage better and distribute visitor flows, reducing overcrowding and promoting lesser-known attractions. The third motivation, increasingly relevant post-pandemic, is the perceived safety and hygiene offered by AI-driven services. The panel acknowledged that COVID-19 has accelerated demand for contactless interactions in tourism, making AI applications like digital check-ins, virtual guides, and automated customer service more attractive. AI enables travellers to access services with minimal physical interaction, reducing health risks while maintaining service quality. Practitioners noted that businesses implementing AI-based contactless solutions gained a competitive advantage during recovery as travellers gravitated towards safer, tech-enabled experiences.

Interestingly, the government perspective added a long-term vision of AI as an enabler of inclusive and sustainable tourism ecosystems. By promoting AI use, policymakers aim to improve efficiency and personalization and empower destinations to design smarter tourism management strategies, including visitor flow monitoring, real-time crisis management, and resource optimization. The panellists underscored that combining practical benefits and experiential enhancements fuels the growing traveller preference for AI-based services. AI's ability to deliver speed, accuracy, and tailored experiences while meeting modern safety standards positions it as a critical tool in shaping the future of tourism. However, this growing reliance on AI also raises expectations for continuous system improvements, data privacy protection, and ethical personalization—setting the stage for further research and policy attention.

Business Benefits and Operational Efficiency

The panellists strongly agreed that one of the most tangible impacts of AI adoption in tourism is enhancing operational efficiency and business profitability. For industry practitioners, AI is no longer perceived as an experimental technology but as a strategic business asset that directly contributes to revenue growth, cost reduction, and service quality improvement. AI's ability to process vast datasets in real time allows businesses to perform accurate demand forecasting. Airlines, hotels, and tour operators utilize AI-driven predictive models to anticipate fluctuations in demand based on seasonality, economic trends, weather patterns, and booking behaviours. This enables more precise planning for staffing, inventory management, and capacity utilization. Practitioners highlighted that such forecasting minimizes operational inefficiencies, reduces wastage, and optimizes resources—crucial for sectors with tight margins like hospitality and transport.

Another critical benefit is dynamic pricing, where AI algorithms adjust prices in real-time based on market conditions, competitor rates, and customer demand. Panellists from the industry confirmed that AI-driven pricing strategies have helped maximize revenues during peak seasons while offering competitive rates in low seasons. This agility provides a significant competitive edge, especially for businesses operating in highly dynamic markets influenced by sudden events like pandemics or natural disasters. Additionally, AI enhances resource optimization, particularly in operations that rely heavily on human resources, such as hotels, restaurants, and attractions. AI systems assist in forecasting staffing needs, managing inventory, and automating routine administrative tasks. By reducing human error and streamlining workflows, businesses can reallocate staff to more complex, guest-facing roles that require empathy and critical decision-making. Practitioners emphasized that this allows for a hybrid service model—where AI handles repetitive tasks while humans focus on delivering authentic, personalized interactions.

The panel also acknowledged the role of AI in enabling personalized marketing strategies. By analyzing customer behaviour, preferences, and spending patterns, AI allows tourism businesses to create targeted promotions and customized offers that resonate with individual travellers. This not only increases conversion rates but also strengthens customer loyalty. Industry players noted that AI-driven marketing campaigns are more efficient and impactful, allowing businesses to allocate budgets more effectively while improving

engagement. From a government standpoint, there was a strong emphasis on ensuring that these business benefits extend beyond large corporations. Panelists from the public sector stressed the need for inclusive policies that empower small and medium enterprises (SMEs) and community-based tourism operators to access and adopt AI technologies. Without such intervention, there is a risk that AI advancements will widen the digital and economic gap between large, tech-savvy players and smaller local businesses. The panellists concurred that AI adoption significantly strengthens tourism business operations—improving productivity, enabling smarter decision-making, and enhancing profitability. However, they also cautioned that maximizing these benefits requires inclusive digital transformation strategies to ensure SMEs are not left behind. Sustainable AI integration must prioritize capacity-building and equitable access so the tourism sector can thrive in the digital era.

Barriers to AI Adoption: Digital Divide, Trust, and Data Privacy

While the potential of AI in transforming tourism is widely recognized, the panellists unanimously identified several critical barriers that continue to hinder widespread adoption, particularly among small and medium-sized tourism enterprises (SMEs) and in less-developed destinations. These barriers span technological, social, and ethical dimensions—each presenting unique challenges that require targeted interventions. One of the most pressing challenges is the digital divide between large, resource-rich tourism players and smaller, community-based operators. Practitioners highlighted that many SMEs struggle to access basic digital infrastructure while multinational hotels, airlines, and online travel agencies (OTAs) leverage advanced AI tools for dynamic pricing, customer service, and personalized marketing. Panellists from government and academia emphasized that rural and remote tourism destinations face significant barriers in adopting AI due to limited internet connectivity, lack of skilled human resources, and financial constraints. Without intervention, this divide risks exacerbating inequality within the tourism sector, where only dominant players benefit from AI-driven efficiencies.

Trust in AI-generated decisions also emerged as a significant concern. Travellers and tourism operators expressed scepticism toward AI recommendations' accuracy, fairness, and cultural sensitivity. Practitioners shared cases where AI-generated suggestions failed to align with local context or guest preferences, leading to dissatisfaction. Panelists stressed that opaque algorithms—often called "black box" systems—make it difficult for users to understand how AI reaches certain conclusions, further undermining trust. This is especially problematic in tourism, where experiences are deeply personal and culturally nuanced. Equally important is the issue of data privacy and security, which panellists identified as a major barrier to AI adoption. AI systems in tourism heavily rely on collecting and processing vast amounts of personal data, including traveller preferences, behaviours, biometric information, and location data. Such practices raise serious ethical concerns, particularly around consent, data ownership, and potential misuse of sensitive information. Government representatives noted that while some jurisdictions have general data protection laws (e.g., GDPR), specific regulations addressing AI-driven tourism services remain lacking. This regulatory gap increases the risk of data breaches and undermines traveller confidence in engaging with AI-based systems.

Additionally, digital literacy gaps were highlighted as a compounding factor. Many local tourism operators lack the skills to understand, operate, or maintain AI systems. This limits their ability to leverage AI tools effectively and increases dependency on third-party platforms, which often centralize data and power outside local communities. Panelists stressed that many SMEs would be left behind without significant capacity-building programs, reinforcing the concentration of AI benefits among large players. In conclusion, the panellists emphasized that while AI offers transformative potential for tourism, overcoming these barriers is critical to ensuring equitable and ethical adoption. Solutions must include investments in digital infrastructure, strengthened regulatory frameworks, and targeted training for SMEs. Without addressing these challenges, the tourism sector risks creating a two-speed industry where technological advancement benefits a few while others are marginalized.

Ethical and Regulatory Challenges

As AI adoption in tourism expands, the panellists agreed that ethical and regulatory challenges become increasingly critical to address. Integrating AI into tourism services raises complex issues surrounding algorithmic bias, cultural sensitivity, transparency, and the erosion of human interaction, which can significantly impact the authenticity and inclusivity of the tourist experience. One of the most frequently raised concerns was algorithmic bias embedded in AI systems. Panellists highlighted that many AI models are trained on large, global datasets that may not fully represent local cultural contexts or minority groups. As a result, AI-generated recommendations can inadvertently promote certain destinations, businesses, or experiences while marginalizing smaller, community-based operators. Practitioners noted cases where AI systems favoured mainstream attractions or large hotel chains, potentially disrupting local economies and reinforcing existing power imbalances within the tourism sector. Equally pressing is the issue of cultural insensitivity. AI tools, especially those developed by global tech companies, may lack a nuanced understanding of local customs, traditions, and social norms. Government panellists expressed concern that AI-driven services—such as automated itinerary planners or virtual assistants—could generate inappropriate or offensive recommendations in certain cultural settings. This raises the need for context-aware AI systems that respect local values and promote culturally responsible tourism. The erosion of human interaction in tourism services also surfaced as a critical ethical dilemma. Both practitioners and academics stressed that tourism is inherently a human-centred experience, where personal engagement, storytelling, and cultural exchange are integral. Over-reliance on AI technologies, particularly in customer service roles, risks diminishing this human touch, leading to a sterile, transactional tourism experience that lacks emotional depth. Panelists argued that while AI should enhance efficiency, it must not replace the empathetic and relational aspects that define hospitality.

From a regulatory perspective, government representatives acknowledged that current legal frameworks lag behind technological developments in AI. While general data protection regulations, such as the GDPR, provide a baseline for privacy protection, they do not adequately address sector-specific AI challenges in tourism. Issues like decision-making transparency, algorithmic accountability, and ethical use of personal data remain largely unregulated, creating risks for travellers and service providers. Panellists agreed that tourism-specific AI regulations are urgently needed to safeguard ethical standards and stakeholder interests. Such regulations should mandate transparency in AI decision-making processes, require explainability of recommendations, and ensure that travellers retain control over their data. Furthermore, governments should establish ethical guidelines for AI use in tourism that emphasize fairness, cultural respect, and sustainability. The panel emphasized that addressing ethical and regulatory challenges is not optional but essential for the responsible integration of AI in tourism. Failure to do so could undermine traveller trust, exacerbate inequalities, and compromise the cultural richness of tourism experiences. A balanced approach, combining robust governance, ethical AI design, and human oversight, is crucial to ensure that AI enhances rather than detracts from the values of global tourism.

Future Directions and Strategic Recommendations

Looking forward, the panellists collectively emphasized that Artificial Intelligence (AI) will continue to play a transformative role in shaping the future of the tourism industry. However, governments, industry stakeholders, and local communities must prioritize several strategic directions to ensure AI adoption delivers inclusive, ethical, and sustainable benefits. First, inclusivity must be at the heart of future AI development in tourism. Government panellists stressed the need for targeted digital infrastructure investment in rural and remote destinations to prevent the growing digital divide. AI may only serve large, well-resourced tourism operators without such support while marginalizing small and medium-sized enterprises (SMEs) and community-based tourism (CBT). Capacity-building programs focused on improving digital literacy and AI

competencies among local tourism stakeholders were also recommended as essential steps to empower smaller players and promote more equitable AI adoption.

Secondly, sustainability emerged as a critical focus area. AI technologies offer significant potential to support environmentally responsible tourism by optimizing tourist flows, preventing overcrowding, and reducing the environmental impact of tourism activities. For example, AI-driven visitor management systems can help disperse tourists more evenly across destinations and periods, mitigating over-tourism risks in fragile cultural and natural heritage sites. Panelists encouraged governments and businesses to integrate AI tools that actively support sustainability goals and align with the principles of responsible tourism. The panellists also advocated for developing sector-specific regulatory frameworks and ethical guidelines tailored to the unique characteristics of tourism. Governments must move beyond generic data protection laws and establish clear standards for AI deployment, ensuring algorithmic transparency, fairness, and accountability. Ethical AI systems should incorporate local cultural values and safeguard the human dimension of tourism, preventing the erosion of face-to-face engagement and community connection that defines authentic tourism experiences.

Additionally, adopting hybrid service models—where AI is used to augment rather than replace human interaction—was identified as a promising approach. This strategy allows AI to handle repetitive, operational tasks while preserving human-centred tourism services' empathetic, storytelling, and relational aspects. Practitioners agreed that businesses that strike this balance would gain a competitive advantage by offering technological efficiency and personalized human warmth. Finally, the panel recommended the establishment of independent monitoring bodies or industry alliances to oversee AI implementation in tourism. These entities could serve as watchdogs, maintaining ethical standards, promoting best practices, and fostering collaboration between governments, industry players, and local communities. While AI is set to become a cornerstone of future tourism experiences, its successful integration requires proactive strategies prioritizing inclusivity, ethical governance, and sustainability. The panel firmly agreed that AI should serve economic objectives and enhance social and cultural values, ensuring that the tourism industry evolves responsibly in the digital age.

Conceptual Model Proposal: AI Adoption in Enhancing Tourist Experience

Based on the comprehensive insights gathered from the panel discussion, this study proposes a Conceptual Model of AI Adoption in Enhancing the Tourist Experience, integrating key factors that influence the successful implementation of AI technologies in the tourism sector. This model reflects the complex interplay between technological enablers, operational outcomes, ethical considerations, and policy frameworks. The model's core is AI Technology—encompassing applications such as chatbots, intelligent recommendation systems, predictive analytics, virtual assistants, and real-time translation tools. These technologies function as central enablers that directly influence three critical dimensions of tourism:

1. Personalized Tourist Experience: AI enables the delivery of hyper-personalized services by analyzing traveller preferences, behaviours, and contextual data in real time. This leads to enhanced satisfaction, greater engagement, and a sense of connection between travellers and destinations.
2. Operational and Economic Efficiency: AI supports tourism businesses in optimizing resources, implementing dynamic pricing, improving demand forecasting, and enhancing marketing precision. These capabilities drive profitability, reduce costs, and improve service delivery, especially in large-scale operations.
3. Sustainable and Responsible Tourism Governance: AI contributes to smarter destination management by supporting visitor flow control, reducing environmental pressure, and promoting under-visited locations. It also strengthens the real-time monitoring and response capacity in managing tourism sustainability challenges.

However, the model also incorporates Barriers and Ethical Concerns that act as moderating factors potentially hindering AI adoption: Data privacy and security risks; Algorithmic bias and cultural insensitivity; Loss of human interaction in service delivery; and Digital literacy gaps, particularly among SMEs and rural

destinations. Recognizing these challenges, the Government and Policy Framework is positioned as a crucial moderating force in the model. Its role includes Developing sector-specific regulations and ethical guidelines, Investing in digital infrastructure to bridge the digital divide, Providing capacity-building programs for tourism SMEs and local communities, and Ensuring inclusivity and protection of cultural values in AI-driven services.

The conceptual model suggests that the positive impacts of AI on tourist experience and operational efficiency will only be fully realized when supported by robust governance structures, ethical AI design, and equitable digital inclusion policies. This approach positions AI as a business tool and a driver of sustainable, inclusive, and culturally respectful tourism development, as depicted in Figure 1.

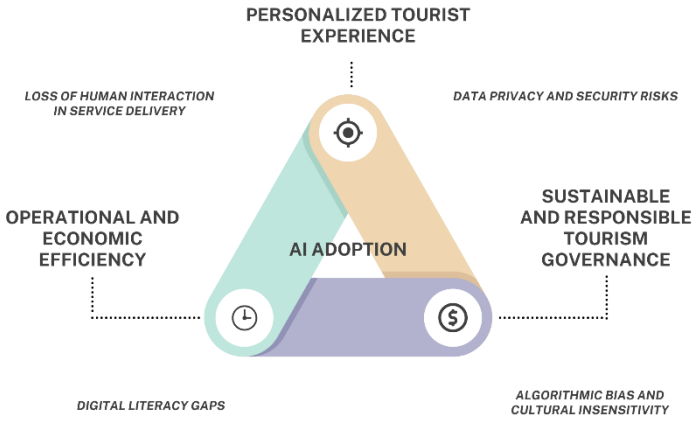

Figure 1. Conceptual Model
Source: Research data, 2025

E. CONCLUSION

This study comprehensively explores the adoption of Artificial Intelligence (AI) technologies in enhancing tourist experiences, drawing on multidisciplinary expert perspectives from academia, industry, and government. The findings confirm that AI has become an integral component of the tourism sector, offering substantial benefits across three interrelated domains: personalization of tourist experiences, operational and economic efficiency, and sustainable destination governance. AI-driven tools like chatbots, recommendation systems, and predictive analytics enable service providers to deliver highly tailored, efficient, and context-aware experiences. Simultaneously, AI supports businesses in optimizing resources and strengthening competitiveness while assisting policymakers in managing visitor flows and promoting sustainability. These advancements respond to the evolving demands of modern travellers for convenience, personalization, and safety—trends accelerated by the COVID-19 pandemic.

However, the study also underscores significant barriers and ethical challenges that must be addressed to ensure responsible AI adoption. Data privacy risks, algorithmic bias, digital divides, and the potential erosion of human interaction represent critical issues that, if neglected, could exacerbate inequalities and undermine trust in AI-based systems. This paper proposes a conceptual model integrating AI's enabling functions with moderating factors such as ethical considerations and government intervention. The model highlights the necessity of sector-specific regulatory frameworks, inclusive digital infrastructure, and capacity-building initiatives to foster equitable AI adoption across diverse tourism contexts. This research contributes to the growing knowledge of AI in tourism by offering a structured framework to guide future empirical studies and policymaking. Ensuring that AI catalyzes inclusive, ethical, and sustainable tourism development remains imperative. Future research is encouraged to empirically validate the proposed model across different regional and socio-economic settings, further advancing our understanding of AI's role in shaping the future of global tourism.

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