Scientific Research Publishing

Journal of Intelligent Learning Systems and Applications, 2026, 18(1), 45-76
https://www.scirp.org/journal/jilsa
ISSN Online: 2150-8410
ISSN Print: 2150-8402

Artificial Intelligence (AI) Adoption for Ecotourism Development: A Multi-Stakeholder Analysis in Sri Lanka

Thudugalage Don Chaminda Pushpakumara[1], Fazeela Jameel Ahsan[2], D. A. C. Suranga Silva[3]

[1]Department of Civil Engineering, University of Moratuwa, Moratuwa, Sri Lanka
[2]Department of Marketing, University of Colombo, Colombo, Sri Lanka
[3]Department of Economics, University of Colombo, Colombo, Sri Lanka
Email: pushpakumara@uom.lk, fazeelaja@mkt.cmb.ac.lk, suranga@econ.cmb.ac.lk

How to cite this paper: Pushpakumara, T. D. C., Ahsan, F.J. and Suranga Silva, D.A.C. (2026) Artificial Intelligence (AI) Adoption for Ecotourism Development: A Multi-Stakeholder Analysis in Sri Lanka. *Journal of Intelligent Learning Systems and Applications*, **18**, 45-76.
https://doi.org/10.4236/jilsa.2026.181004

Received: August 9, 2025
Accepted: February 24, 2026
Published: February 27, 2026

Abstract

Artificial Intelligence (AI) offers transformative potential for the tourism industry by enhancing operational efficiency, personalizing visitor experiences, and advancing sustainability objectives. In the ecotourism sector, AI-powered chatbots can provide real-time information, facilitate bookings, promote eco-friendly practices, and engage visitors in conservation awareness. Despite these benefits, adoption within Sri Lanka's ecotourism industry remains limited, hindered by infrastructural constraints, organizational readiness, and varying levels of tourist acceptance. This study adopts an exploratory sequential mixed-methods design to investigate the technological, organizational, and behavioral factors influencing the adoption intention and actual usage of AI chatbots among ecotourism service providers and tourists in Sri Lanka. In the first qualitative phase, semi-structured interviews with ecotourism operators will identify context-specific barriers and enablers such as digital literacy, infrastructure readiness, workforce capabilities, and Corporate Social Responsibility (CSR). Insights from this phase will refine the subsequent survey instrument. In the second quantitative phase, a stratified random sample of tourists and service providers will be surveyed, and data will be analyzed using Structural Equation Modeling (SEM) to test hypothesized relationships among constructs. Grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT), Organizational Readiness for Change (ORC), and Institutional Theory, the research examines performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trust, anthropomorphism, perceived intelligence, technological anxiety, cost considerations, workforce capabilities, sustainable initiatives, and CSR. The findings are expected to generate empirical insights into adoption drivers and barriers while

integrating stakeholder perspectives, offering practical and policy recommendations to enhance AI integration for sustainable ecotourism development in Sri Lanka.

Keywords

Artificial Intelligence, Chatbots, Ecotourism, Sustainable Tourism, UTAUT, Organizational Readiness, Institutional Theory, Sri Lanka

1. Introduction

1.1. Background

Tourism in Sri Lanka has become a pivotal driver of its economy, with evolving tourist attitudes shifting from focusing solely on beach destinations to wanting deeper natural, cultural, and social engagements [1]. Also, contemporary tourism concepts have transcended traditional paradigms, with tourists' preferences shifting from mass tourism to niche tourism experiences. Among these niche sectors, rural tourism emerges as a burgeoning trend in Sri Lanka [2].

Ecotourism is presently seen as one of the most profitable niche markets in the tourism industry, as Ecotourists are higher spenders than "ordinary" mass tourists. High-spending, nature-loving, responsible tourists are undoubtedly an attractive option for governments looking to earn scarce foreign exchange through tourism. While there are numerous places to engage in ecotourism across Sri Lanka, implementing ecotourism practices in the country remains relatively limited compared to other nations [3]. On the global scale ecotourism market was valued at approximately USD 195.9 billion in 2022 and is projected to reach around USD 656.19 billion by 2032, with an anticipated Compound Annual Growth Rate (CAGR) of 12.90% during the forecast period from 2023 to 2032 [4] Also, hoteliers in Sri Lanka advocate for the sustainable implementation of this concept as a novel market-driven approach. Nonetheless, the influx of ecotourists to Sri Lanka has remained below 1% over the past decade [3]. However, 7.9% of all tourists visiting Sri Lanka explored conservation forests further underscoring the importance of eco-tourism as a key component of the country's tourism industry. [5], the history of eco-tourism in Sri Lanka has been marked by periodic declines due to several factors. These include inadequate planning, insufficient involvement of the private sector and local communities, ineffective management of responsibilities between the Tourism Ministry and related organizations, a shortage of manpower, and a lack of coordination among organizations to enhance foreign investment in tourism [6]. Due to hotelier practices of eco-tourism differing from international practices and standards, they could not meet the expectations of eco-tourism [3]. Effective ecotourism development requires meticulous planning and thoughtful guidance [7]. Careful consideration and strategic direction are essential to ensure that ecotourism initiatives align with environ-

mental sustainability, conservation goals, and community well-being. By emphasizing proper planning and providing clear guidance can cultivate a harmonious balance between tourism activities and the preservation of natural ecosystems, fostering a positive impact on the environment and the local communities involved [8].

In the 21st century, globalization has significantly increased the adoption of Information and Communication Technologies (ICT), driving the evolution of the information society [9]. Sri Lanka has seen remarkable growth in exports, particularly in the ICT, Business Process Outsourcing (BPO), and professional services sectors, with ICT emerging as the fourth largest contributor to export revenue. It ranks 11th globally in A. T. Kearney's Global Services Location Index [10]. This positions Sri Lanka's ICT sector to capitalize on its infrastructure and skilled workforce for further growth. ICT also plays a crucial role in Sustainable Tourism Development (STD), aiding in information management, tourist satisfaction, partnerships, and energy conservation. Tools such as Computer Simulation, Destination Management Systems (DMS), and Geographical Information Systems (GIS) enable stakeholders to make informed decisions aligned with sustainability goals, optimizing resource management and supporting responsible tourism practices [11].

Artificial intelligence holds relevance in travel and tourism for various compelling reasons. Travelers are often confronted with numerous decisions when planning future trips, including selecting destinations, transportation, accommodations, and activities, among others [12]. The outcomes of these decisions significantly influence tourists' overall satisfaction with their travel experiences. However, the vast array of available options for destinations, transportation modes, accommodations, and activities presents a daunting challenge, necessitating assistance in decision-making processes. Integrating digital tools and AI into Sri Lanka's tourism industry requires collaborative efforts among the government, private sector, and academia [3]. Building the necessary infrastructure, implementing regulations, and developing a skilled workforce are essential steps to harness the full potential of these innovations effectively. Incorporating digital tools and AI into Sri Lanka's tourism industry presents a unique opportunity to meet the evolving needs of modern travelers while promoting sustainable practices [13]. The incorporation of AI enables smart resource management, enhances energy efficiency within hospitality venues and aids in the implementation of waste reduction initiatives. These intelligent systems can adapt resource allocation in response to current demand, promoting the effective functioning of tourism infrastructure while reducing environmental impact [14].

AI applications in tourism are increasingly vital in enhancing efficiency, personalization, and sustainability across the sector. Technologies such as virtual assistants, predictive analytics, and Augmented Reality (AR) are improving the traveler experience by providing real-time information, tailored recommendations, and immersive virtual tours [15]. AI-driven tools like facial recognition and trans-

lation software streamline operations and facilitate travel for international tourists, breaking down language barriers and speeding up processes such as airport check-ins [16]. Furthermore, sustainability analytics software powered by AI helps tourism operators track and reduce their environmental impact, promoting responsible and eco-friendly practices [17]. Among these innovations, AI chatbots are particularly significant for sustainable tourism development. By offering 24/7 support, chatbots reduce the need for large customer service teams, thereby lowering operational costs and minimizing energy consumption [18]. They also personalize travel experiences by recommending eco-friendly accommodations and sustainable activities, while simultaneously promoting conservation efforts and educating tourists on responsible behaviors [19]. Moreover, AI chatbots enhance logistical efficiency, reducing waste associated with overbooking and misallocated resources, ultimately contributing to a more sustainable tourism model that balances environmental preservation with visitor satisfaction [17].

Integrating Artificial Intelligence (AI) into Sri Lanka's tourism sector presents significant potential for promoting sustainability, particularly in the context of ecotourism [20]. AI can transform tourism by enabling personalized experiences, optimizing resource management, and supporting environmentally responsible practices [21]. Despite this promise, the adoption of AI technologies in Sri Lanka's tourism industry remains limited.

Relevant studies from other emerging economies offer valuable theoretical and empirical insights into AI adoption. For instance, Authors in [22] contribute to theory by extending the Technology Acceptance Model (TAM) with constructs specific to human-robot interaction, including Perceived Trust (PTR), Perceived Intelligence (PNT), Anthropomorphism (ANM), and Technology Anxiety (TXN) [22]. These additions enhance TAM's ability to explain customer adoption intentions toward AI chatbots, an area still under explored in hospitality and tourism, especially in developing contexts.

Similarly, authors in [23] investigate AI chatbot adoption among research scholars in Pakistan using the UTAUT. Their findings—based on a cross-sectional survey and confirmatory factor analysis identify social influence, trust, and facilitating conditions as key predictors of adoption intention. The study also highlights the importance of reducing perceived risks through AI literacy and ethical user guidelines, contributing to UTAUT by integrating constructs such as trust and perceived risk.

Building on these frameworks, authors in [24] extend UTAUT2 to examine factors influencing AI chatbot adoption among frequent travelers. Their quantitative analysis using partial least squares reveals that performance expectancy, effort expectancy, habit, personal innovativeness, and chatbot awareness positively affect behavioral intention. These findings offer actionable insights for tourism professionals and AI developers to enhance chatbot adoption and service delivery.

Together, these studies provide a rich foundation for understanding the diverse factors influencing AI chatbot adoption. They offer transferable lessons that can

inform the development of AI-driven solutions in Sri Lanka's ecotourism sector, supporting both technological advancement and sustainable tourism goals.

1.2. Research Gap

Despite the growing global recognition of Artificial Intelligence (AI) as a transformative force in ecotourism, the integration of AI-powered chatbots within Sri Lanka's ecotourism sector remains underdeveloped. Existing studies have primarily explored AI adoption in broader hospitality and tourism contexts, with a strong focus on customer-centric variables in developed or emerging economies such as India and Pakistan. While frameworks like the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) have been widely applied to examine technology adoption, their application within the niche domain of ecotourism in Sri Lanka is scarce.

Furthermore, previous research has largely concentrated on tourists' behavioral intentions toward AI adoption, with limited empirical work that simultaneously considers both tourist and service provider perspectives. Context-specific factors such as cultural influences, sustainability initiatives, infrastructure readiness, and institutional support have received little attention, and few studies have examined how these factors moderate the relationship between adoption intention and actual use of AI chatbots. In addition, critical constructs such as perceived trust, perceived risk, anthropomorphism, and technology anxiety well-established in other emerging market studies—remain underexplored in the Sri Lankan context.

This study addresses these gaps through a multi-stakeholder approach that integrates extended UTAUT and TAM frameworks with additional constructs including trust, sustainability orientation, and organizational readiness. By focusing on both tourists and ecotourism operators, the research aims to provide a holistic understanding of the barriers and enablers of AI adoption in ecotourism. It also seeks to generate locally relevant insights that can guide evidence-based policy and practice to advance AI-driven, sustainable tourism development in Sri Lanka.

1.3. Problem Statement

Sri Lanka's tourism industry is experiencing a digital transformation, with growing interest in leveraging Artificial Intelligence (AI) technologies particularly chatbots to enhance visitor engagement, improve service delivery, and promote sustainable tourism practices. Among these innovations, AI-based chatbots offer substantial potential for ecotourism by providing real-time information, facilitating reservations, and encouraging environmentally responsible behavior. Despite these benefits, the adoption of AI chatbots in the ecotourism sector remains limited, especially among service providers.

This limited adoption is primarily due to a combination of operational and strategic challenges. Many ecotourism operators are in remote areas with inadequate digital infrastructure and unreliable internet access. In addition, workforce limitations such as a lack of technical skills and training impede the effective deploy-

ment and management of AI technologies. High initial costs, ongoing maintenance expenses, and limited financial support further reduce feasibility, particularly for small-scale and community-based operators. Moreover, insufficient top management support and a lack of strategic alignment between sustainability initiatives and digital innovation present additional barriers to adoption.

From the tourist perspective, adoption behavior is shaped by both technological and psychological factors. Tourists' intention to use AI chatbots is influenced by their perceptions of usefulness, ease of use, trust, and the human-like characteristics of the technology. These factors significantly affect their level of engagement and actual usage during ecotourism experiences. Therefore, understanding tourists' expectations is equally important in designing chatbot solutions that are not only efficient but also intuitive, trustworthy, and aligned with sustainable tourism values.

While existing research has extensively examined AI adoption in general tourism and hospitality contexts often in developed or digitally advanced settings there is a lack of empirical evidence addressing the unique challenges and drivers within Sri Lanka's ecotourism sector. Key contextual dimensions such as service provider readiness, infrastructure limitations, cultural influences, and sustainability integration have not been adequately explored. Furthermore, few studies adopt a comprehensive, stakeholder-inclusive approach that simultaneously considers both service providers and tourists, particularly in developing country contexts where digital transformation is uneven and sustainability is a critical policy goal.

To address this gap, the present study adopts a multi-stakeholder perspective to examine and quantify the key factors influencing both the adoption intention and actual usage of AI chatbots in Sri Lanka's ecotourism sector. This approach will support the development of context-sensitive, evidence-based strategies for promoting AI adoption in ways that align with sustainability goals contributing to a more intelligent, inclusive, and eco-conscious tourism industry.

1.4. Research Questions/Objectives

Research Questions	Objectives
What are the significant factors that influence tourists' intentions to adopt AI chatbots in Sri Lanka's eco-tourism sector?	To examine and evaluate the key factors that significantly influence tourists' intentions to adopt AI chatbots in Sri Lanka's eco-tourism sector.
What are the significant factors that influence tourists' Actual usage of AI chatbots in Sri Lanka's eco-tourism sector?	To examine and evaluate the key factors that drive tourists' actual usage of AI chatbots within Sri Lanka's eco-tourism sector.
What organizational factors such as top management support, workforce capabilities, cost considerations, corporate social responsibility, and sustainable initiatives influence service providers' adoption and actual usage of AI chatbots in ecotourism?	To identify and quantify the organizational factors (e.g., top management support, workforce capabilities, cost, CSR, sustainable initiatives) that influence service providers' adoption and actual usage of AI chatbots in ecotourism.

2. Literature Review

The tourism industry is undergoing a significant digital transformation, driven by the rapid evolution of Artificial Intelligence (AI). Among AI applications, chatbots have gained widespread attention for their ability to simulate human interaction through natural language processing [25]. These chatbots play an increasingly vital role in enhancing customer service, streamlining operations, and offering real-time assistance to tourists [26]. AI chatbots are recognized for their capacity to improve service efficiency and personalization, enabling tourists to receive instant, tailored responses about destinations, accommodations, and activities [19]. Additionally, their integration into mobile apps and websites supports travel planning by automating bookings, offering multilingual support, and providing 24/7 service availability [27]. These features position AI chatbots as transformative tools in the digitalization of tourism services.

AI chatbots also contribute significantly to sustainable tourism development. They reduce operational costs, minimize energy consumption, and lower environmental impacts by replacing resource-intensive customer service methods [22]. These chatbots promote responsible tourism by offering eco-friendly recommendations, discouraging over-tourism, and supporting waste reduction strategies [28]. Studies emphasize the role of AI chatbots in promoting pro-environmental behaviors. For instance, authors in [29] highlight their ability to guide tourists in making low-impact decisions, such as choosing sustainable transportation or avoiding overcrowded destinations. Similarly, authors in [30] note that AI chatbots can distribute visitor flows and suggest alternative travel routes, thereby mitigating pressure on environmentally sensitive sites. These functions are critical for ecotourism, which relies on environmental preservation and community involvement. Furthermore, by digitizing interactions and reducing reliance on printed materials, AI chatbots contribute to a lower carbon footprint. They also collect data on tourist behavior, which can inform strategic planning for sustainability [31]. Their scalability and adaptability make them suitable tools for supporting long-term sustainable tourism models [32].

Several factors influence the adoption of AI chatbots among tourists and service providers. From the tourist perspective, perceived usefulness, ease of use, trust, and anthropomorphism are major drivers of adoption. Technological anxiety, however, does not significantly hinder adoption according to their study [22]. Authors in [22] extend the TAM by introducing constructs such as PNT, PTR, and ANM, which help explain customer engagement with AI chatbots. UTAUT-based research [23] also shows that facilitating conditions, social influence, and trust significantly affect adoption behavior. From the service provider perspective, infrastructure readiness, financial constraints, and organizational readiness (leadership support, workforce capabilities, and sustainability alignment) are key enablers or barriers to AI chatbot adoption [33].

Ecotourism, characterized by responsible travel to natural areas that conserves the environment and sustains the well-being of local people, presents unique chal-

lenges and opportunities for AI integration. In Sri Lanka, the implementation of ecotourism practices remains limited due to poor infrastructure, fragmented institutional coordination, and a lack of digital readiness among operators [34]. AI chatbots can enhance ecotourism by providing real-time, location-specific guidance on sustainable practices, educating tourists on conservation, and supporting the logistics of remote-area travel [14]. Their role in managing tourist flows, reducing paper-based materials, and enabling data-driven decisions aligns closely with ecotourism's goals. However, few studies directly address the application of AI chatbots in ecotourism settings. There is a significant research gap in understanding how such technologies can support ecotourism operators and engage tourists in sustainability-centered experiences.

2.1. Conceptual Framework and Hypothesis Development

The conceptual framework guiding this study integrates user-centric and organizational-level perspectives to examine the adoption and actual usage of AI-based chatbots within Sri Lanka's eco-tourism sector. From the tourist perspective, Adoption Intention (AIN) is shaped by constructs derived from UTAUT, including Performance Expectancy (PE), Effort Expectancy (EE), and Social Influence (SIF), alongside key psychological and perceptual variables such as PRT, TXN, PNT, and ANM. These factors collectively influence a tourist's intention to use AI chatbots for eco-tourism travel planning. On the service provider side, the framework draws on elements from Organizational Readiness for Change (ORC) and Institutional Theory to intent to used and assess actual usage. Constructs such as top management support, workforce capabilities, cost considerations, facilitating conditions, and sustainable initiatives serve as core determinants of AI chatbot adoption in operational settings. Notably, the framework also introduces commitment to Corporate Social Responsibility (CSR) as a moderating variable that strengthens the relationship between sustainable initiatives and actual AI chatbot usage. The model emphasizes that when organizations demonstrate strong CSR commitment, their sustainability goals are more likely to be aligned with meaningful technological implementation. By capturing both demand-side and supply-side dynamics, this multidimensional framework provides a comprehensive basis for understanding how AI chatbot technologies can advance sustainable tourism and digital transformation in eco-tourism contexts.

2.1.1. Conceptual Framework

In the context of tourism, particularly eco-tourism, UTAUT provides a comprehensive framework to understand the key factors influencing the adoption of digital technologies by both tourists and service providers [35] [36]. PE refers to the degree to who believe that using a system will help them achieve better outcomes; in tourism, tourists perceive AI chatbots as tools that enhance their experience by offering accurate, real-time, and personalized assistance during their travels [35] [37]. For service providers, performance expectancy includes anticipated improvements in service delivery, operational efficiency, and customer engagement

[38]. EE involves the perceived ease of use of technology; tourists are more likely to adopt chatbots that are intuitive and require minimal effort to navigate, especially when used in unfamiliar environments [39] [40]. On the provider side, ease of installation, system maintenance, and staff training determine how burdensome or feasible implementation appears [41]. SIF plays a role in shaping users' decisions through peer recommendations, online reviews, or perceived social norms; tourists may be encouraged by others to use chatbots if such use is common in their networks [42]. Service providers may feel pressured by industry expectations, sustainability certifications, or policy guidance to adopt AI-driven technologies [43]. FC refer to the availability of technical infrastructure and support mechanisms that enable effective system use [35] [44]; for tourists, this includes mobile connectivity and app accessibility, while for service providers, it includes IT infrastructure, skilled staff, and financial resources [45]. Furthermore, additional constructs such as Workforce Capabilities (WC), Cost Considerations (CC), Top Management Support (TMS), and Sustainable Initiatives (SI) are often integrated into extended UTAUT models to reflect context-specific influences in eco-tourism and AI adoption [46] [47]. Together, these constructs offer a multidimensional understanding of how both individual users and organizations engage with AI chatbots in sustainable tourism environments.

TXN and PTR are included in the framework to capture the psychological and emotional factors influencing AI adoption. Research shows that high levels of TXN, often driven by privacy concerns and unfamiliarity with AI, can erode trust and reduce the likelihood of adoption [48]. Conversely, PTR, which depends on transparency, ethical practices, and system reliability, is critical for fostering user confidence and long-term engagement with AI systems [49] [50]. These constructs are particularly relevant in tourism, where trust in AI chatbots and recommendation systems directly affects user satisfaction [51].

AI-driven tools offering real-time recommendations, personalized itineraries, and multilingual support create opportunities for engagement that can strengthen the perceived benefits of these systems. For example, Tourist Engagement (TE) moderates the relationship between Perceived Usefulness (PU) and Tourist Satisfaction (TS), such that the positive effect of PU on TS is stronger when engagement levels are high [50]. Similarly, TE enhances the effect of PTR on TS, as engaged tourists are more likely to experience and trust the reliability and transparency of AI systems.

The inclusion of Anthropomorphism (ANM) and Perceived Intelligence (PNT) further extends the framework, as human-like features and intelligent capabilities of AI systems enhance user engagement, reliability, and trust [22] [29].

The framework also integrates Sustainable Initiatives (SI) as a critical outcome, highlighting the role of AI in promoting eco-friendly practices and sustainable tourism [52]. SI refer to the environmental, social, and ethical practices undertaken by eco-tourism service providers to minimize negative impacts and promote long-term sustainability such as energy-efficient operations, community en-

gagement, or reducing paper-based services [53]. These initiatives can create a favorable environment for adopting technologies like AI chatbots, which support sustainability by reducing resource consumption, promoting responsible behavior among tourists, and improving service efficiency [37] [39]. However, the actual usage of AI chatbots (AUA) by service providers often depends not just on the presence of sustainable initiatives but also on the organization's level CCR [54].

CCR reflects the strategic and ethical orientation of the organization's leadership toward sustainability, community welfare, and long-term environmental goals [55]. This commitment goes beyond surface-level initiatives; it involves integrating sustainability into core decision-making, resource allocation, and technological innovation [56]. When CCR is high, organizations are more likely to translate their SI into actual technology adoption, such as using AI chatbots to enhance eco-friendly services, automate responsible tourist education, and optimize operations [22] [47]. In such cases, corporate responsibility acts as a motivating and enabling force, ensuring that sustainability goals are reinforced by actionable digital transformation [54]. Conversely, when CCR is low, sustainable initiatives may remain superficial or symbolic, lacking the strategic drive to implement supporting technologies [57]. In such organizations, the potential of AI chatbots to support sustainability is underutilized, leading to a weaker or non-existent relationship between sustainability efforts and actual chatbot usage [36]. Therefore, CCR acts as a moderating variable, influencing the strength and direction of the relationship between SI and actual AI chatbot usage (AUA) [55]. This moderation highlights the importance of aligning environmental strategies with top-level leadership commitment to achieve meaningful adoption outcomes in sustainable tourism [52] [54].

In the conceptual framework of this study, Adoption Intention (AIN) and AUA of AI-based chatbots are treated as two critical stages in the behavioral process of technology acceptance, particularly within the eco-tourism sector. AIN refers to the willingness or planned behavior of tourists and service providers to use AI chatbots in their travel experiences or service operations [22] [35]. For tourists, this intention is primarily influenced by constructs from the UTAUT, including PE, EE, SIF, and perceived trust [37] [39]. These factors shape whether a tourist perceives the chatbot as useful, easy to use, socially endorsed, and trustworthy. For service providers, adoption intention is also affected by organizational readiness, which includes TMS, WC, and CC, as conceptualized in the ORC framework [47] [58]. Moving from intention to behavior, AUA refers to the real-world deployment and utilization of AI chatbot systems. According to UTAUT, AUA is influenced by both prior intention and FC, such as infrastructure, technical support, and digital literacy [35] [46]. Additionally, for service providers, this transition is moderated by the organization's CCR, a key concept from Institutional Theory, which suggests that external norms and ethical commitments shape organizational actions [54] [59]. In eco-tourism, organizations with strong CSR are more likely to translate sustainable initiatives into actual AI adoption [56] [60].

Thus, while AIN captures motivational readiness, actual usage reflects the successful enactment of digital practices, influenced by both structural enablers and institutional commitments.

The proposed model (Figure 1) differentiates between two categories of influencing factors. Tourist-side factors include Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SIF), Facilitating Conditions (FC), Perceived Trust (PTR), Anthropomorphism (ANM), Perceived Intelligence (PNT), Technological Anxiety (TXN), and Infrastructure Readiness (IR). Service-provider factors comprise Top Management Support (TMS), Workforce Capabilities (WC), Cost Considerations (CC), Sustainable Initiatives (SI), and Corporate Social Responsibility (CSR).

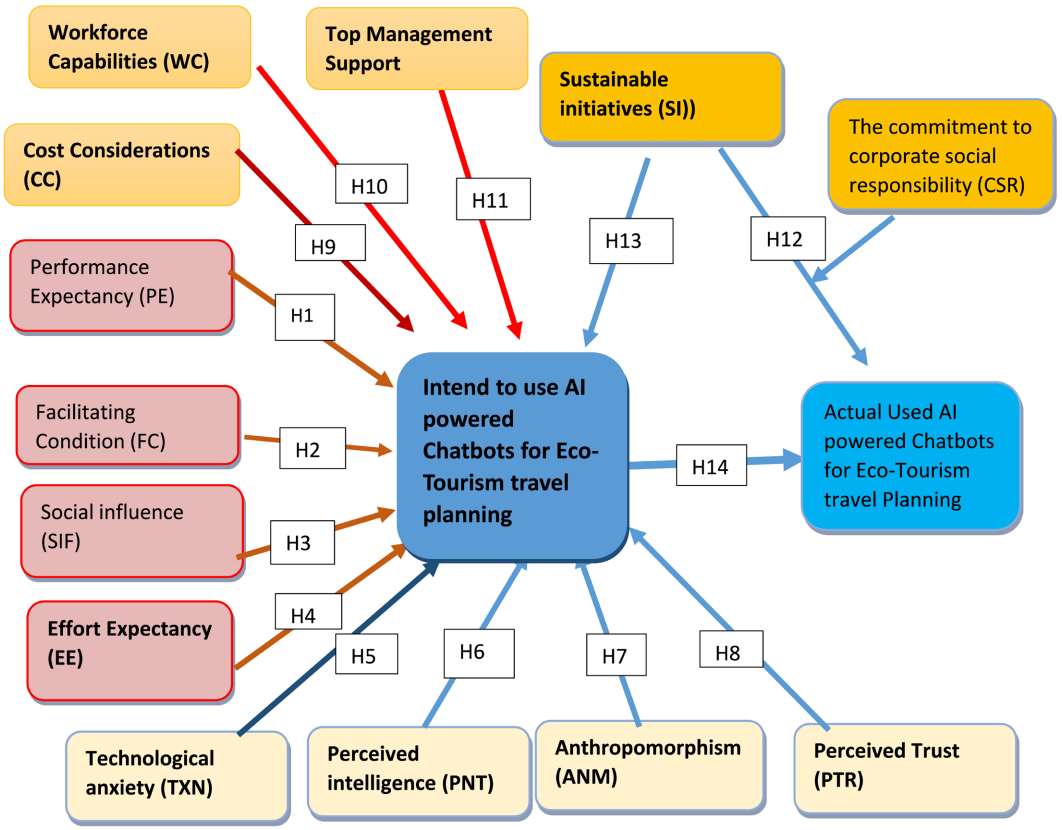

Figure 1. Conceptual framework.

2.1.2. Hypothesises

The following hypotheses are formulated to address the research objectives aimed at understanding the factors influencing the adoption and impact of AI-based chatbots in eco-tourism travel Planning. Each hypothesis is grounded in established theoretical frameworks and is designed to quantify the specific elements that contribute to the adoption intentions, usage, and effectiveness of AI chatbots among tourism operators and tourists. The hypotheses are categorized under three main objectives, each focusing on a different aspect of chatbot adoption and its implications for eco-tourism development (Table 1).

Table 1. Hypothesis and null hypothesis.

Variable	Alternative Hypothesis (H1)	Null Hypothesis (H0)
H1: Performance Expectancy (PE)	PE positively affects the AIN of AI chatbots for eco-tourism travel planning.	PE does not affect the AIN of AI chatbots for tourism.
H2: Effort Expectancy (EE)	EE positively affects the AIN of chatbots for eco-tourism travel planning.	EE does not affect the AIN of AI chatbots for eco-tourism travel planning.
H3: Social Influence (SIF)	SIF positively affects the AIN of chatbots for eco-tourism travel planning.	SIF does not affect the AIN of AI chatbots for eco-tourism travel planning.
H4: Facilitating Conditions (FC)	FC positively affects the AIN of AI chatbots for eco-tourism travel planning.	FC does not affect the AIN of AI chatbots for eco-tourism travel planning.
H5: Technological Anxiety (TXN)	TXN negatively affects the AIN of chatbots for eco-tourism travel planning.	TXN does not affect the AIN of chatbots for eco-tourism travel planning.
H6: Perceived Trust (PTR)	PTR positively affects the AIN of chatbots for eco-tourism travel planning.	PTR does not affect the AIN of chatbots for eco-tourism travel planning.
H7: Anthropomorphism (ANM)	ANM positively affects the AIN of chatbots for eco-tourism travel planning.	ANM does not affect the AIN of chatbots for eco-tourism travel planning.
H8: Perceived Intelligence (PNT)	PNT positively affects the AIN of chatbots for tourism.	PNT does not affect the AIN of chatbots for tourism.
H9: Cost Consideration (CC)	CC negatively affects the AIN of AI chatbots for eco-tourism travel planning.	CC does not affect the AIN of AI chatbots for eco-tourism travel planning.
H10: Workforce Capability (WC)	WC negatively affects the AIN of AI chatbots for eco-tourism travel planning	WC does not affect the AIN of AI chatbots for eco-tourism travel planning.
H11: Top Management support (TMS)	TMS positively affects the AIN of AI chatbots for eco-tourism travel planning.	TMS does not affect the AIN of chatbots for eco-tourism travel planning.
Hypothesis 12: The commitment to Corporate Social Responsibility (CSR)	The CSR positively moderates the relationship between sustainable initiatives and the actual usage of AI chatbots for eco-tourism travel planning.	The CSR does not positively moderates the relationship between sustainable initiatives and the actual usage of AI chatbots for eco-tourism travel planning.
Hypothesis 13: Sustainable Initiatives (SI)	SI positively influences service providers' AIN for eco-tourism travel planning.	SI does not positively influence service providers' AIN for eco-tourism travel planning.
Hypothesis 14: Adoption Intention (AIN)	AIN positively influences AUA eco-tourism travel planning.	AIN does not positively influence AUA eco-tourism travel planning.

Hypothesis 1: Performance Expectancy (PE)

PE refers to the degree to which an individual believes that using a particular system or technology will help them achieve improved performance or outcomes [40]. Within the eco-tourism context, PE is a critical determinant of adoption intention for both tourists and service providers when engaging with AI-based chatbot technologies.

For tourists, performance expectancy captures their perception of how effectively AI chatbots can enhance their travel experiences. Tourists are more likely to adopt chatbots if they believe these systems can provide accurate, real-time information, assist with itinerary planning, enable quick bookings, and offer multi-

lingual or context-aware support during their journey [61]. In eco-tourism settings, where tourists often explore remote or unfamiliar environments, the value of reliable and intelligent assistance becomes even more apparent. If tourists believe that chatbots can reduce uncertainty, improve safety, and enrich learning about local ecosystems or cultural practices, they are more inclined to adopt those [39].

For eco-tourism service providers, PE refers to the expected benefits of implementing AI chatbots in their operations. These include improved service delivery, reduced human workload, enhanced customer engagement, and alignment with sustainability goals by reducing paper-based processes or physical infrastructure demand. For example, providers may perceive chatbots as tools that streamline communication with tourists, promote responsible tourism behavior, and ensure 24/7 support availability all contributing to operational efficiency and improved customer satisfaction [62]. Moreover, in the competitive tourism sector, the anticipated performance gains from AI implementation can also contribute to maintaining market relevance and innovation leadership.

Thus, PE acts as a powerful driver influencing the willingness of both tourists and service providers to adopt AI chatbots in the eco-tourism domain [35] [37].

H1: PE positively affects the AIN of AI chatbots for Eco tourism.

Hypothesis 2: Effort Expectancy (EE)

EE refers to the degree of ease associated with the use of a particular system or technology [35]. It plays a central role in shaping users' behavioral intentions toward adopting AI chatbots in eco-tourism, for both tourists and service providers.

From the tourist's perspective, effort expectancy relates to how simple and user-friendly the chatbot system is perceived to be. If a chatbot interface is intuitive, requires minimal learning, and allows for quick interactions (e.g., making bookings, receiving information, or navigating sites), tourists are more likely to adopt and continue using it [39] [63]. This becomes especially critical in eco-tourism, where tourists may face language barriers, limited connectivity, or unfamiliar cultural settings. A chatbot that simplifies communication and reduces cognitive load—especially during planning or while on-site enhances perceived ease of use, thereby increasing adoption intention [37].

For eco-tourism service providers, effort expectancy involves the perceived difficulty or ease in implementing and managing chatbot technologies within their operations. This includes the complexity of installation, the user-friendliness of the backend system, staff training requirements, and ongoing technical support [47]. When service providers perceive chatbot systems as easy to integrate into their daily processes without requiring excessive resources or causing workflow disruption they are more inclined to adopt the technology. Moreover, when effort expectancy is low (*i.e.*, the system is easy to use), the organization's readiness to adopt innovative solutions increases, especially in resource-constrained eco-tourism settings.

In both user groups, lower perceived effort contributes positively to adoption

intention, underscoring EE as a foundational construct in AI chatbot acceptance within eco-tourism [35] [39].

H2: EE positively affects the AIN of AI chatbots for eco-tourism travel planning.

Hypothesis 3: Social Influence (SIF)

SIF refers to the degree to which individuals perceive that important others (e.g., friends, family, peers, and industry stakeholders) believe they should use a particular technology [35]. In the context of eco-tourism and AI-based chatbot adoption, social influence operates at both the tourist and service provider levels. For tourists, SIF plays a significant role in shaping adoption intention. Tourists are more likely to use AI chatbots when influenced by peer recommendations, positive online reviews, social media influencers, or the prevailing norms in their social or travel circles [42]. For example, if eco-tourism destinations commonly advertise AI chatbots as innovative and sustainable tools, tourists may feel social pressure or encouragement to engage with them. In culturally collectivist societies, such as Sri Lanka, social endorsement carries more weight, amplifying the influence of peers and community members on technology usage [52].

For service providers, SIF manifests through external expectations from government authorities, destination management organizations, sustainability certification bodies, and industry competitors. If AI chatbot adoption is framed as a progressive and sustainable industry norm, eco-tourism operators may feel compelled to adopt such technologies to maintain reputation, meet customer expectations, or comply with industry trends. In addition, service providers might act under normative pressures driven by institutional expectations or a desire to align with global best practices in sustainable tourism management. Thus, Social Influence acts as a significant driver in both consumer behavior and organizational decision-making in AI adoption for eco-tourism [35] [42] [52].

H3: SIF positively affects the AIN of AI chatbots for eco-tourism travel planning.

Hypothesis 4: Facilitating Conditions (FC)

FC refer to the degree to which individuals believe that the technical and organizational infrastructure is available to support the use of a specific system [35]. In the context of eco-tourism, FC are critical in determining both tourists' and service providers' ability to adopt and use AI-based chatbots effectively. From the tourist perspective, facilitating conditions include access to smartphones or digital devices, stable internet connectivity at travel destinations, user-friendly chatbot interfaces, and the availability of support services such as language options or help features. These conditions ensure that tourists can comfortably interact with chatbots for travel planning, navigation, and service inquiries. When such infrastructure is lacking, particularly in remote eco-tourism areas, even tourists with a strong intention to use chatbots may struggle to do so, thereby reducing actual usage [37].

From the service provider's side, FC encompass the availability of sufficient IT

infrastructure to implement and maintain chatbot systems, the technical skills of staff, access to vendor or technical support, and the financial resources required to adopt the technology. Many eco-tourism operators operate in resource-constrained environments where digital infrastructure is underdeveloped, and workforce capabilities may be limited. In such contexts, the absence of strong facilitating conditions can hinder even the most sustainability-oriented operators from effectively deploying chatbot systems [64]. Therefore, FC play a dual role in ensuring that both tourists and providers can move beyond adoption intention to actual usage of AI-based chatbot technologies in the tourism sector [22] [35].

H4: FC positively affects the AIN of AI chatbots for tourism.

Hypothesis 5: Technological anxiety (TXN)

TXN represents the apprehension or fear that tourism operators may experience when adopting new technologies. Concerns may include the potential for technical failures, the complexity of managing AI systems, or the impact on job roles. High levels of technological anxiety can deter operators from adopting chatbots, which could hinder the promotion of sustainable tourism. Form tourist side it refers to the apprehension or fear experienced by individuals when they are required to use advanced technologies particularly in unfamiliar settings like eco-tourism. For tourists, this anxiety may stem from concerns over making mistakes while using the technology, unfamiliarity with AI interfaces, fear of system failure, or doubts about data privacy and security [22] [65]. In tourism contexts especially in rural or international destinations such anxiety can be heightened due to language barriers, limited digital skills, or past negative experiences with automated systems. High technological anxiety can reduce tourists perceived control and comfort, leading to decreased trust and a lower likelihood of adopting AI chatbots, even when the perceived usefulness or ease of use is high [37]. Therefore, in the conceptual framework, TXN is hypothesized to negatively influence tourists' adoption intention by acting as a psychological barrier practice [22] [66].

H3: TXN negatively affects the AIN of chatbots for eco-tourism travel planning.

Hypothesis 6: Perceived Trust (PTR)

PTR refers to the belief that a technology or system is reliable, secure, and operates with integrity and transparency. In the context of eco-tourism and AI chatbot adoption, trust plays a pivotal role in reducing uncertainty and encouraging both tourists and service providers to engage with the technology [22] [50] [67].

From the tourist's perspective, perceived trust encompasses confidence in the chatbot's ability to provide accurate, unbiased, and timely information while safeguarding personal data. Tourists interacting with AI chatbots often share sensitive information such as location, preferences, or payment details. If users believe that the chatbot respects privacy, protects data, and offers dependable assistance such as itinerary planning or eco-guidance they are more likely to adopt and use it during their travel experience [37] [46]. Particularly in eco-tourism, where travel may involve unfamiliar or remote areas, trust in the technology's competence and safety assurances is critical to usage intention.

From the service provider's perspective, perceived trust involves confidence in the technology's operational reliability and ethical performance. Providers must trust that the chatbot will function consistently without disrupting service delivery, while also aligning with their sustainability and brand values. This includes trust in system developers, data handling protocols, and long-term vendor support [68]. If service providers doubt the chatbot's integrity or fear reputational damage from technological failure or privacy breaches, they are less likely to proceed with adoption [41].

Ultimately, high levels of perceived trust serve as a catalyst in narrowing the gap between intention and actual usage of AI-based chatbots by instilling assurance in both tourists and operators, especially in sustainability-focused tourism ecosystem [22].

H6: PTR affects the AIN of chatbots for tourism.

Hypothesis 7: Anthropomorphism (ANM)

ANM refers to the attribution of human-like characteristics, behaviors, or emotions to non-human entities such as AI chatbots. In the context of eco-tourism, anthropomorphism plays a significant role in influencing user perception, emotional connection, and acceptance of chatbot technologies among both tourists and service providers [22] [69].

From the tourist's perspective, anthropomorphic features such as a chatbot with a friendly name, human-like voice, expressive language, or emotional responses can significantly enhance the user's comfort and engagement. Tourists may feel more at ease interacting with a system that mimics human social behaviors, especially in unfamiliar environments where personal interaction is often valued. These human-like traits increase perceived social presence, emotional trust, and overall satisfaction with the travel experience, making tourists more willing to adopt and continue using the technology [37] [39]. This is particularly important in eco-tourism, where authentic, personalized experiences are highly appreciated.

From the service provider's perspective, the inclusion of anthropomorphic elements in AI chatbots is seen as a strategic feature to foster stronger emotional bonds between the tourist and the service brand. Providers recognize that a more human-like chatbot can simulate the warmth of traditional human service, which is critical in hospitality and eco-tourism settings where guest interaction and trust are essential. This capability enhances brand perception and contributes to customer retention. However, service providers must also ensure that these features are not misleading and remain aligned with ethical AI design principles [47].

H7: ANM affects the AIN of chatbots for tourism.

Hypothesis 8: Perceived Intelligence (PNT)

PNT refers to the degree to which users believe that an AI system such as a chatbot can demonstrate intelligent behavior, such as understanding user needs, responding appropriately, learning from interactions, and offering meaningful assistance [70]. In the context of eco-tourism, perceived intelligence plays a vital role in shaping the trust, usefulness, and overall acceptance of AI chatbots among

tourists and service providers [22] [69].

From the tourist's perspective, AI chatbots with high perceived intelligence are viewed as more reliable and competent. Tourists are more likely to adopt chatbots that can answer complex questions, provide context-aware suggestions, support multilingual interactions, and adapt to their travel preferences and behavior. These intelligent capabilities create a seamless and efficient experience, especially in eco-tourism, where personalized itineraries, responsible travel tips, and up-to-date local information are essential for sustainability and enjoyment [37] [50].

From the service provider's perspective, perceived intelligence enhances the value proposition of chatbot technologies. Operators expect AI systems to streamline customer service by intelligently managing inquiries, recommending sustainable travel practices, and learning from guest interactions to improve future responses. A perceived high level of intelligence boosts confidence in the system's ability to reduce human workload while maintaining service quality, which is particularly useful in resource-constrained eco-tourism settings [52]. Perceived intelligence strengthens user satisfaction, trust, and continued use of AI chatbots. It supports the dual goals of improving service delivery and advancing sustainability by enabling smart, efficient, and adaptive communication.

H8: PNT affects the AIN of chatbots for eco-tourism travel planning.

Hypothesis 9: Infrastructure Readiness (IR)

Infrastructure Readiness (IR) refers to the extent to which the necessary technological, human, and operational infrastructure is in place to support the successful implementation and usage of AI-based chatbots. In the context of eco-tourism, infrastructure readiness is critical on both the tourist and service provider sides, as it influences whether the environment is conducive to the adoption of intelligent digital tools.

From the tourist's perspective, infrastructure readiness includes access to reliable internet connectivity, the availability of mobile or smart devices, and digital literacy. Tourists visiting eco-tourism destinations often rely on real-time support, navigation, and eco-guidance from AI chatbots, which can only function effectively in areas with adequate network coverage and power supply. If digital infrastructure is limited in rural or natural destinations, tourists may be less likely to use chatbot services, regardless of their usefulness or trustworthiness [37] [39].

From the service provider's perspective, infrastructure readiness encompasses backend technical systems (e.g., servers, software platforms), staff training and digital skills, and organizational processes required to deploy and manage AI chatbots. Many eco-tourism operators in developing regions like Sri Lanka face challenges due to outdated systems, lack of IT personnel, and financial limitations. Without adequate readiness, even motivated operators may struggle to implement chatbot technologies successfully [24]. Thus, infrastructure readiness becomes a precondition for chatbot adoption, ensuring both accessibility and sustainability of AI systems in tourism services. Infrastructure readiness serves as a key facilitating condition that enables the functional and strategic integration of AI-based

chatbots in eco-tourism. Its presence ensures that technological adoption is feasible, reliable, and scalable for both users and providers [33].

H9: IR affects the AIN of chatbots for eco-tourism travel planning.

Hypothesis 10: Workforce Capabilities (WC)

WC refers to the skills, knowledge, and digital literacy of employees that enable the effective adoption and use of AI-based chatbots within eco-tourism service operations. These capabilities are essential for both the implementation and ongoing management of chatbot technologies and play a critical role in determining the success of digital transformation efforts.

From the service provider's perspective, workforce capabilities are a key internal readiness factor. Staff must possess the technical proficiency to operate and troubleshoot chatbot systems, manage AI-generated content, and respond to complex customer queries that require human intervention. The absence of such capabilities can create resistance to technology adoption or lead to ineffective implementation, thereby reducing the anticipated benefits of AI integration. On the other hand, well-trained personnel can maximize the chatbot's potential by customizing its responses, aligning it with sustainable branding, and using insights generated by the chatbot to improve services [46].

From the tourist's side, while workforce capabilities are not directly visible, their influence is indirectly felt through the quality and consistency of chatbot interactions. A knowledgeable workforce ensures that the chatbot is properly maintained, regularly updated with accurate eco-tourism information, and designed to meet diverse tourist needs—such as multilingual support, itinerary personalization, or responsible travel guidance. This enhances the perceived usefulness and trustworthiness of the system from the tourist's perspective [39].

In the conceptual framework, workforce capabilities are often integrated under the broader construct of organizational readiness. This means WC serves as a precursor to the adoption intention and actual usage of AI technologies. A workforce that is capable and adaptive is more likely to support innovation and overcome the operational barriers to AI adoption in the eco-tourism context [22] [52].

H10: WC negatively affects the AIN of AI chatbots for eco-tourism travel Planning.

Hypothesis 11: Top Management Support (TMS)

TMS refers to the extent to which senior leadership within an organization is committed to and actively facilitates the adoption and implementation of new technologies, such as AI-based chatbots. In the context of eco-tourism, TMS plays a crucial role in ensuring organizational alignment, resource allocation, and strategic commitment to digital transformation initiatives.

From the service provider's perspective, strong top management support is essential for overcoming resistance to change and ensuring that the implementation of AI chatbots aligns with broader sustainability and service quality objectives [71]. Leaders who prioritize innovation are more likely to invest in necessary infrastructure, provide training for employees, and foster a culture that embraces

technological advancements [72]. Such support also ensures that AI chatbot initiatives are integrated into the organization's long-term strategic vision, particularly when aligned with eco-tourism values such as responsible tourism, operational efficiency, and customer engagement [46].

Although tourists may not directly observe the level of top management support within a tourism enterprise, its impact is indirectly evident through the quality and consistency of AI chatbot services. A well-supported implementation results in chatbots that are better maintained, more responsive, and capable of delivering real-time, personalized, and sustainable travel experiences. Tourists benefit from seamless interactions, which contribute to greater satisfaction and trust in the brand [39] [52] [73].

In the conceptual framework, TMS is positioned as a key organizational factor influencing both the AIN and actual usage of AI-based chatbots by eco-tourism service providers. Without top management buy-in, even well-designed AI solutions may fail to be adopted or sustained due to lack of institutional support, inadequate resources, or poor strategic alignment. Conversely, with strong TMS, organizations are more likely to translate digital innovations into practice, ensuring that AI chatbots contribute meaningfully to sustainable tourism development [74].

H11: TMS positively affects the AIN of AI chatbots for eco-tourism travel planning

Hypothesis 12: The commitment to Corporate Social Responsibility (CSR)

CSR refers to the degree to which tourism service providers integrate ethical, environmental, and social considerations into their business strategy and operations. In the context of eco-tourism and AI chatbot adoption, CSR commitment plays a moderating role, influencing whether sustainable initiatives translate into actual technological implementation.

From the service provider's perspective, CSR commitment reflects how deeply an organization aligns its mission with sustainability, community well-being, and environmental conservation. Operators that are strongly committed to CSR are more likely to adopt AI-based chatbots not just for operational efficiency but to fulfill broader sustainability goals. For instance, chatbots can promote responsible tourist behavior, reduce paper usage through digital communication, and assist with real-time eco-guidance. High CSR commitment ensures that such technologies are not implemented merely for image but as part of an embedded strategy for sustainable development [54] [56].

On the tourist side, while tourists do not directly demonstrate CSR, their perception of a service provider's CSR values may influence their trust and engagement with that provider's technological tools. When tourists perceive that a company is ethically and environmentally responsible, they may be more inclined to interact with its AI chatbots, trusting the information provided and feeling aligned with the brand's values [75].

Thus, CSR commitment not only drives the motivation to adopt AI chatbots

but also strengthens the relationship between SI and the AUA. It ensures that sustainability is not symbolic but is supported by practical, technology-driven actions. Organizations with weak CSR commitments may struggle to translate their sustainability goals into tangible technological practices, resulting in limited or superficial adoption of AI systems [36] [57].

H12: The CSR positively moderates the relationship between sustainable initiatives and the actual usage of AI chatbots for eco-tourism travel planning.

Hypothesis 13: Sustainable Initiatives (SI)

SI refer to the strategic actions and operational practices undertaken by eco-tourism service providers to minimize environmental harm, promote social equity, and enhance long-term economic viability. In the context of AI chatbot adoption in eco-tourism, SI play a crucial role by creating the conditions and motivations for technology usage aimed at supporting green and responsible tourism.

From the service provider's perspective, SI encompass various efforts such as reducing paper-based processes, minimizing carbon emissions, engaging in community-based tourism, conserving natural resources, and promoting eco-friendly transportation and accommodation practices. AI-based chatbots can facilitate these goals by digitizing tourist communication, offering sustainability-oriented recommendations, and guiding tourists toward responsible behaviors [76]. For example, chatbots can suggest environmentally friendly activities, alert tourists about sensitive ecosystems, and encourage recycling and conservation behaviors all aligned with a provider's sustainability mission.

From the tourist's perspective, sustainable initiatives often manifest through the digital services they interact with. Tourists increasingly favor destinations and operators that demonstrate visible commitments to sustainability. When chatbots provide information about a destination's conservation efforts, eco-certifications, or community contributions, they help reinforce positive perceptions, enhance the tourist experience, and influence sustainable behaviors during travel [39] [61].

Moreover, SI are not just operational choices they serve as antecedents to AI chatbot adoption. Organizations committed to sustainability are more likely to adopt technologies that can help achieve their environmental and social objectives. However, for these initiatives to lead to actual usage of AI systems, factors like organizational readiness, leadership support, and commitment to corporate social responsibility must also align [52] [54].

H13: SI positively influences service providers' AIN for eco-tourism travel planning.

Hypothesis 14: Adoption Intention (AIN)

AIN refers to an individual's or organization's conscious willingness and readiness to adopt and use a specific technology in this case, AI-based chatbots in the eco-tourism sector. AIN is a well-established construct in behavioral technology adoption theories such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), where it acts as a key predictor of actual technology usage [35] [77]. In the context of eco-tourism,

AIN captures the psychological and motivational factors that influence whether tourists or service providers are likely to engage with AI chatbot technologies. For tourists, a high level of adoption intention indicates a favorable perception of the chatbot's usefulness, ease of use, trustworthiness, and ability to provide eco-friendly travel support. These perceptions are often shaped by personal beliefs about technology, digital literacy, and prior experiences [22]. For service providers, AIN reflects their organizational readiness and perceived strategic value of integrating AI chatbots into their operations to support sustainability, efficiency, and customer engagement. Adoption intention plays a crucial mediating role in translating perceptions and enabling conditions into actual usage. Users may find the technology appealing, but without a formed intention to adopt, actual implementation or engagement is unlikely. In tourism, this gap is particularly relevant, as travelers often rely on pre-trip planning tools and real-time support systems areas where chatbots are most effective [37]. Empirical research has consistently shown that stronger adoption intentions significantly increase the likelihood of actual technology use [35] [78]. In the eco-tourism setting, this means that when tourists or operators perceive AI chatbots as intelligent, reliable, and aligned with sustainable values, their intention to adopt becomes a strong determinant of whether the technology is ultimately used during travel or service delivery. Moreover, adoption intention can be shaped by contextual factors such as digital infrastructure, peer influence, cultural acceptance, and environmental consciousness.

In the proposed conceptual framework, AIN is positioned as a pivotal factor that bridges individual attitudes and system attributes with actual usage behavior. Without strong intention, even well-designed AI chatbot systems may be underutilized. Conversely, fostering high adoption intention through targeted strategies such as awareness campaigns, user-friendly design, and alignment with sustainability goals can significantly enhance the implementation and impact of AI chatbots in eco-tourism.

H14: AIN positively influences AUA eco-tourism travel planning.

3. Methodology

3.1. Qualitative Approach

The qualitative phase of this study seeks to understand managerial perspectives on the adoption of AI-based chatbots within Sri Lanka's eco-tourism sector. To achieve this, in-depth semi-structured interviews will be conducted with a purposive sample of eco-tourism operators who are either planning or considering the implementation of chatbot technologies. This qualitative approach directly addresses the first research question by exploring the operational, technological, and strategic challenges encountered by service providers. The semi-structured format allows for open-ended responses while maintaining comparability across interviews, thereby enabling the identification of recurring themes and context-specific barriers.

Data collection will continue until theoretical saturation is reached, ensuring a

comprehensive understanding of the subject matter. The interviews will be analyzed using NVivo software through an inductive coding process. To enhance the credibility of findings, inter-rater reliability checks will be conducted, and validation will be sought from Subject Matter Experts (SMEs) to minimize researcher bias.

Importantly, the qualitative insights will inform the development and refinement of the survey instrument used in the subsequent quantitative phase. Themes such as digital literacy, infrastructure readiness, CSR practices, workforce capabilities, cost considerations, top management support, and sustainable initiatives will guide the wording of survey items, enhance contextual validity, and provide empirical grounding for the conceptual framework. In this way, the study adopts an exploratory sequential mixed-methods design, with qualitative interviews conducted first, followed by quantitative testing of hypotheses. This approach enhances reliability, contextual relevance, and theoretical robustness.

The qualitative phase also contributes to the second research objective, which examines the extent to which AI-based chatbots support the growth and sustainability of eco-tourism development in Sri Lanka. Interviews will provide in-depth insights into how service providers perceive the role of chatbots in advancing sustainability goals, including improving resource efficiency, reducing environmental impact, enhancing visitor education on responsible behaviour, and supporting community engagement. The analysis will also explore how chatbot implementation influences business performance and service innovation, thus contributing to sectoral growth.

These insights will validate and refine constructs such as actual usage, Sustainable Initiatives (SI), and Corporate Social Responsibility (CSR) in the conceptual framework, ensuring that the subsequent quantitative analysis is firmly rooted in the practical realities of eco-tourism operations.

Given the number of constructs, latent variables, and hypotheses moderating relationships, Structural Equation Modeling (SEM) has been selected as the primary analytical method. SEM is better suited than multiple regression due to the model's complexity and the need for rigorous validity checks of both measurement and structural components.

3.2. Quantitative Approach

The study adopts a primarily quantitative approach to examine the factors influencing the adoption of AI-based chatbots in Sri Lanka's tourism industry, their impact on tourist satisfaction, and the role of sustainable initiatives in service provider adoption. Quantitative analysis is appropriate because it allows for hypothesis testing, measurement of relationships among constructs, and the generation of empirical evidence that can be generalized across larger populations.

3.2.1. Research Design

This study follows an exploratory sequential mixed-methods design. In the first phase, qualitative semi-structured interviews with eco-tourism service providers

will be conducted to capture context-specific insights on adoption challenges and enablers. Themes such as digital literacy, infrastructure readiness, and Corporate Social Responsibility (CSR) will be extracted to refine and validate the survey instrument, ensuring contextual and cultural relevance.

In the second phase, a structured quantitative survey will be administered to both tourists and service providers. This phase will test the proposed hypotheses and measure the relationships between constructs, such as perceived usefulness, ease of use, trust, cultural influences, sustainable initiatives, and adoption intention versus actual usage.

The sequential design strengthens both theoretical robustness and contextual validity, ensuring that findings from the qualitative phase inform the quantitative instrument and enhance its accuracy. Given the complexity of the conceptual model, with multiple constructs, moderating effects, and the need to assess measurement validity, Structural Equation Modeling (SEM) is selected as the primary analytical method. SEM is preferable to regression because it allows for simultaneous testing of measurement and structural models, accommodates latent variables, and handles moderating and mediating paths more effectively.

3.2.2. Population and Sampling

The target population for this study includes two distinct groups: (1) tourists who have interacted with digital technology while planning or experiencing their visit to Sri Lanka, and (2) tourism service providers (e.g., hotels, and tour operators) considering AI and digital technology. Stratified random sampling will be employed tourists by nationality, age, and eco-destination; providers by size, ownership, and region with N = 450 (300 tourists; 150 providers). And a priori power analysis ($f^2 = 0.15$, $\alpha = 0.05$, $1 - \beta = 0.80$) indicates N ≈ 200 minimum; thus, our plan is adequate for SEM, multi-group contrasts, and robustness checks. This method will ensure representation from both groups, capturing a diverse range of experiences and perspectives. The sample size will be determined using a power analysis to ensure that it is large enough to detect significant relationships between the variables being studied, particularly regarding factors like perceived usefulness, ease of use, trust, cultural influences, and the impact of sustainable initiatives.

3.2.3. Data Collection

Data collection for this study will be conducted using a structured questionnaire and semi-structured interviews, aligned with the specific research objectives.

For Objective 1, which focuses on service providers, semi-structured interviews will be conducted with senior managers and decision-makers from eco-tourism organisations. These interviews will explore key organizational factors such as top management support, workforce capabilities, cost considerations, Corporate Social Responsibility (CSR), sustainable initiatives, and technological readiness. Insights from these interviews will guide the refinement of the survey instrument and provide contextual depth regarding organizational readiness and adoption drivers.

For Objective 2, the survey will collect quantitative data on sustainable initiatives (e.g., eco-friendly practices, community engagement, environmental policies) and their influence on service providers' adoption intentions and actual usage of AI chatbots. In parallel, expert interviews will be carried out with individuals holding high-level responsibility for sustainability alignment within their organizations. This will provide a richer understanding of how sustainable strategies interact with technological adoption decisions.

For Objective 3, the survey will target tourists to examine the factors outlined in the conceptual framework—such as perceived usefulness, ease of use, trust, cultural influences, and CSR—that are hypothesised to influence Adoption Intention (AIN) and the link between Sustainable Initiatives (SI), CSR, and actual usage (AUA) of AI chatbots in eco-tourism.

Given the complexity of the model, which includes multiple constructs, hypothesised moderating paths, and the need for rigorous validity testing, Structural Equation Modeling (SEM) has been selected as the primary analytical method. SEM is better suited than regression for simultaneously assessing the measurement model and structural relationships, thereby providing a robust analysis of both tourist- and service provider-side data.

3.2.4. Instrumentation

The survey instrument will consist of Likert-scale questions ranging from 1 (strongly disagree) to 5 (strongly agree) to quantify the key factors influencing chatbot adoption, and the impact of sustainable initiatives. The questions for Objective 3 will be derived from validated scales in the literature on technology adoption, with modifications to fit the context of AI chatbots in tourism. A pilot study will be conducted to test the reliability and validity of the survey instrument, with adjustments made as needed.

3.2.5. Data Analysis

Data analysis will be conducted using a combination of descriptive and inferential statistical techniques. Preliminary analysis will be performed with SPSS or R to generate descriptive statistics summarizing the demographic characteristics of respondents and providing an overview of the main study variables.

Given the complexity of the conceptual model, which includes multiple latent constructs, hypothesized moderating effects, and the need to establish both measurement and structural validity, Structural Equation Modeling (SEM) has been selected as the primary analytical method. SEM is more appropriate than multiple regression because it allows for the simultaneous testing of measurement models (validity and reliability of constructs) and structural models (relationships among constructs). This is particularly important for hypotheses that involve mediating and moderating relationships, such as the role of CSR in moderating sustainable initiatives and actual usage.

For Objective 1 and Objective 2, SEM will be used to assess the influence of organizational factors (e.g., top management support, workforce capabilities, cost considerations, CSR, and sustainable initiatives) on service providers' adoption

intention and actual usage of AI chatbots. For Objective 3, SEM will also be applied to quantify the relationships between tourists' perceptions (e.g., usefulness, ease of use, trust, cultural influences) and their intention to adopt AI chatbots, as well as the integration of sustainable initiatives and CSR into actual usage outcomes.

All hypothesis tests will be conducted at a significance level of 0.05, and interaction effects will be modelled where necessary to capture moderating influences. This analytical approach ensures a rigorous evaluation of both the demand-side (tourists) and supply-side (service providers) factors influencing chatbot adoption in Sri Lanka's eco-tourism sector.

4. Expected Results

This study will make several contributions to both theory and practice in the field of sustainable tourism and technology adoption.

First, it will identify and quantify the key drivers of adoption across both tourists and service providers in Sri Lanka's eco-tourism sector. On the tourist side, the study will assess how factors such as Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SIF), Facilitating Conditions (FC), Perceived Trust (PTR), Perceived Intelligence (PNT), Anthropomorphism (ANM), and Technological Anxiety (TXN) shape Adoption Intention (AIN) and subsequent usage of AI chatbots. On the service-provider side, it will highlight the role of Top Management Support (TMS), Workforce Capabilities (WC), and Infrastructure Readiness (IR) in influencing adoption behavior.

Second, the study will advance understanding of how Sustainable Initiatives (SI) and Corporate Social Responsibility (CSR) interact in shaping technology adoption. Specifically, it will demonstrate the moderating role of CSR in strengthening the link between sustainable initiatives and actual usage (AUA) of AI chatbots, thereby offering a more nuanced perspective on the integration of sustainability into digital transformation.

Third, by examining adoption factors on both the demand side (tourists) and supply side (service providers), the study will provide policy-relevant and managerial insights. Findings are expected to guide tourism authorities, eco-tourism operators, and policymakers in developing strategies that promote digitally enabled, sustainable tourism practices. This includes recommendations for capacity building, investment in digital infrastructure, and alignment of CSR practices with eco-tourism goals.

Overall, the study will contribute to the academic literature on AI adoption in tourism by integrating perspectives from multiple stakeholder groups and by highlighting the intersection of technology, sustainability, and organizational readiness. At the same time, it will deliver practical guidance for achieving a more sustainable and digitally empowered tourism industry in Sri Lanka.

5. Discussion

This study offers several important contributions to the literature on technology

adoption in tourism. First, it integrates multiple theoretical perspectives by combining the Unified Theory of Acceptance and Use of Technology (UTAUT), Organizational Readiness for Change (ORC), and Institutional Theory into a unified framework. This theoretical integration enables a more comprehensive understanding of AI adoption by addressing both individual behavioral drivers and organizational readiness factors, as well as the institutional and legitimacy pressures that shape adoption decisions.

Second, it extends AI adoption research into the ecotourism domain, a niche yet rapidly growing segment of the tourism industry. While most previous studies have concentrated on technology adoption within general hospitality or mainstream tourism contexts, this research applies and adapts existing adoption models to a sustainability-driven environment, where environmental stewardship and community engagement are central to operational success.

Third, the study introduces Corporate Social Responsibility (CSR) as a moderating variable in the relationship between Sustainable Initiatives (SI) and Actual Usage (AUA) of AI chatbots. By empirically testing this moderating effect, the research contributes new insights into how CSR commitment can translate sustainability intentions into concrete, technology-enabled actions—moving beyond symbolic sustainability measures toward genuine operational integration.

Finally, the study adopts a multi-stakeholder approach, simultaneously examining the perspectives of both tourists and service providers. This approach addresses a notable gap in the technology adoption literature, where most studies have focused on a single stakeholder group. By capturing the interplay between tourist expectations and operator readiness, the study provides a more holistic understanding of the factors influencing AI chatbot adoption in ecotourism.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Fernando, S., Bandara, J. and Smith, C. (2017) Tourism in Sri Lanka. In: Hall, M.C. and Page, S.J., Eds., *The Routledge Handbook of Tourism in Asia*, Routledge, 251-264. https://www.researchgate.net/publication/312576645

[2] Pattiyagedara, S.S. and Fernando, P.I.N. (2020) Rural Tourism Niche-Market as a Development Strategy on Rural Community: Reference to Hiriwadunna Village Track, Meemure and Heeloya Knuckles Valley Tourism Village, Sri Lanka. *Sri Lanka Journal of Management Studies*, **2**, 87-103. https://doi.org/10.4038/sljms.v2i1.29

[3] Sri, R., Arachchi, S.W., Shukri, M., Yajid, A., Alam-Malaysia, S. and Khatibi, A. (2015) Eco-Tourism Practices in Sri Lankan Eco Resorts: An Analysis of Satisfaction and Behavioral Intention of Eco-Tourists. *International Journal of Business and Social Science*, **6**, 211-226. https://www.ijbssnet.com

[4] Mahmudova, M., Kurbonbekova, M. and Mamadiyarov, U.Z. (2024) Exploring Eco-Tourism and Its Role in Sustainable Development: An Example of Karakalpakstan. *International Conference of Economic*, *Finance and Accounting Studies*, **3**, 64-67.

[5] Thusitha Dilshan, N.W. and Toko, A. (2022). Sustainable Practices in Hotels in Sri Lanka: Analysis of Environmentally Sustainable Aspects. *WIT Transactions on Ecology and the Environment*, **256**, 121-132. https://doi.org/10.2495/st220111

[6] Chai-Arayalert, S. (2020) Smart Application of Learning Ecotourism for Young Ecotourists. *Cogent Social Sciences*, **6**, Article ID: 1772558. https://doi.org/10.1080/23311886.2020.1772558

[7] Salahuddin, M. (2024) Assessing Ecotourism Potential of Munro Track, Mansehra, KP. https://www.researchgate.net/publication/378877767

[8] Bathla, G., Raina, A., Kumar, A., Tripathi, R. and Kaur, D. (2024) Exploring the Role of Sustainable Tourism in Building Environmental and Social Resilience. In: Hassan, V., Staszewska, A. and Bhartiya, S., Eds., *Building Community Resiliency and Sustainability with Tourism Development*, IGI Global, 83-106. https://doi.org/10.4018/979-8-3693-5405-6.ch004

[9] Kozłowska-Adamczak, M., Essing-Jelonkiewicz, P. and Jezierska-Thöle, A. (2023) Leveraging Information and Communication Technologies in Forest Ecotourism: A Case Study from Poland. *Sustainability*, **16**, Article 56. https://doi.org/10.3390/su16010056

[10] Abeywickrama, Y.V., Abeywickrama, Y.V., Degamboda, S. and Manchanayake, K. (2020) Review Paper-Literature Research of Factors Limiting the Growth of Sri Lanka's ICT/BPM Industry. *International Journal of Latest Engineering and Management Research*, **5**, 1-10.

[11] Ali, A. and Frew, A.J. (2010) ICT and Its Role in Sustainable Tourism Development. In: Gretzel, U., Law, R. and Fuchs, M., Eds., *Information and Communication Technologies in Tourism* 2010, Springer, 479-491. https://doi.org/10.1007/978-3-211-99407-8_40

[12] García-Madurga, M. and Grilló-Méndez, A. (2023) Artificial Intelligence in the Tourism Industry: An Overview of Reviews. *Administrative Sciences*, **13**, Article 172. https://doi.org/10.3390/admsci13080172

[13] Muwandeniya, W.A.K.C.B. and Eranda, B.A.N. (2022) Virtual Reality for Enhancing Customer Value in Sri Lankan Hospitality and Tourism Industry: Perspective of Industry Experts. *Sri Lanka Journal of Marketing*, **8**, 64-83. https://doi.org/10.4038/sljmuok.v8i2.102

[14] Rane, N.L. (2025) ChatGPT and Similar Generative Artificial Intelligence (AI) for Smart Industry: Role, Challenges, and Opportunities for Industry 4.0, Industry 5.0, and Society 5.0. *Innovations in Business and Strategic Management*, **2**, 10-17. https://doi.org/10.61577/ibsm.2024.100002

[15] Fatima, T. and Arsalan, H. (2024) AI-Driven Innovations for Sustainable Tourism Development and Customer Engagement. https://www.researchgate.net/publication/380527970

[16] Bandara Wijekoon, V. (2022) The Potential of Artificial Intelligence Adoption in Mitigating the Economic Crisis in Sri Lanka: A Case Study. https://www.researchgate.net/publication/382242672

[17] Dilshan, A., Wijayanayake, J., Asanka, D. and Karunarathna, C. (2024) Adoption Success of Using Generative AI Apps for the Ecommerce Platforms in Sri Lanka. *International Conference on Sustainable & Digital Business*, Sri Lanka, 1-2 December 2024, 414-429. https://doi.org/10.54389/burh1886

[18] Pillai, R. and Sivathanu, B. (2020) Adoption of AI-Based Chatbots for Hospitality and Tourism. *International Journal of Contemporary Hospitality Management*, **32**, 3199-

3226. https://doi.org/10.1108/ijchm-04-2020-0259

[19] Pushpakumara, T.D.C. and Ahsan, F.J. (2025) Artificial Intelligence Adoption in Sustainable Tourism in Sri Lanka: An Operator Perspective. *International Journal of Innovative Science and Research Technology*, **10**, 2516-2530. https://doi.org/10.5281/zenodo.14885949

[20] Pushpakumara, T.D.C. and Ahsan, F.J. (2025) The Evaluation of AI Chatbots in Sustainable Tourism: A Systematic Literature Review. *International Journal on Cybernetics & Informatics*, **14**, 28-44. https://doi.org/10.5121/ijci.2025.140303

[21] Kahan, B.C., Hindley, J., Edwards, M., Cro, S. and Morris, T.P. (2024) The Estimands Framework: A Primer on the ICH E9(R1) Addendum. *BMJ*, **384**, e076316. https://doi.org/10.1136/bmj-2023-076316

[22] Chen, G., Fan, J. and Azam, M. (2024) Exploring Artificial Intelligence (AI) Chatbots Adoption among Research Scholars Using Unified Theory of Acceptance and Use of Technology (UTAUT). *Journal of Librarianship and Information Science*, **57**, 1205-1223. https://doi.org/10.1177/09610006241269189

[23] Chen, T., Gascó-Hernandez, M. and Esteve, M. (2023) The Adoption and Implementation of Artificial Intelligence Chatbots in Public Organizations: Evidence from U.S. State Governments. *The American Review of Public Administration*, **54**, 255-270. https://doi.org/10.1177/02750740231200522

[24] Tamilmani, K., Rana, N.P., Wamba, S.F. and Dwivedi, R. (2021) The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A Systematic Literature Review and Theory Evaluation. *International Journal of Information Management*, **57**, Article ID: 102269. https://doi.org/10.1016/j.ijinfomgt.2020.102269

[25] Huseynov, F. (2023) Chatbots in Digital Marketing. In: Munna, A.S., Shaikh, S.I. and Kazi, B.U., Eds., *Contemporary Approaches of Digital Marketing and the Role of Machine Intelligence*, IGI Global, 46-72. https://doi.org/10.4018/978-1-6684-7735-9.ch003

[26] Kannan, D., Khademolqorani, S., Janatyan, N. and Alavi, S. (2024) Smart Waste Management 4.0: The Transition from a Systematic Review to an Integrated Framework. *Waste Management*, **174**, 1-14. https://doi.org/10.1016/j.wasman.2023.08.041

[27] Krithikaa Venket, V.S., Korsipati, V., Korsipati, R., Anagha, P., Narendran, M. and Sathya, A. (2025) Travel Sphere: AI-Powered, All-In-One Travel Solution for Seamless Journeys. 2025 *International Conference on Data Science and Business Systems* (*ICDSBS*), Chennai, 17-18 April 2025, 1-6. https://doi.org/10.1109/icdsbs63635.2025.11031920

[28] Talib, R.H. and Mohammed, N.I. (2025) The Influence of Catechin on Adiponectin Gene Expression and Insulin Resistance in Obese Rats. *Egyptian Journal of Veterinary Sciences*, **56**, 1533-1540. https://doi.org/10.21608/ejvs.2024.284513.2026

[29] Afzal, I., Majid, M.B., Tariq, M.I. and Nasir, A. (2024) Investigating the Impact of Smart Tourism Technologies on Tourist Satisfaction, Engagement & Image and with the Mediation of Memorable Tourist Experience. *Pakistan Journal of Humanities and Social Sciences*, **12**. https://doi.org/10.52131/pjhss.2024.v12i1.1942

[30] Hsu, C.C. (2018) Artificial Intelligence in Smart Tourism: A Conceptual Framework. *Proceedings of the* 18*th International Conference on Electronic Business*, Guilin, 2-6 December 2018, 124-133.

[31] Acosta-Prado, J.C., Hernández-Cenzano, C.G., Villalta-Herrera, C.D. and Barahona-Silva, E.W. (2024) Three Horizons of Technical Skills in Artificial Intelligence for the Sustainability of Insurance Companies. *Administrative Sciences*, **14**, Article 190.

https://doi.org/10.3390/admsci14090190

[32] Khneyzer, C., Boustany, Z. and Dagher, J. (2024) Ai-driven Chatbots in CRM: Economic and Managerial Implications across Industries. *Administrative Sciences*, **14**, Article 182. https://doi.org/10.3390/admsci14080182

[33] Pathak, A. and Bansal, V. (2023) Factors Influencing the Readiness for Artificial Intelligence Adoption in Indian Insurance Organizations. In: Sharma, S.K., Dwivedi, Y.K., Metri, B., Lal, B. and Elbanna, A., Eds., *Transfer, Diffusion and Adoption of Next-Generation Digital Technologies*, Springer, 43-55. https://doi.org/10.1007/978-3-031-50192-0_5

[34] Wadippuli Arachchi, R.S.S., Ab Yajid, M.S. and Kkatibi, A. (2015) A Comparison of Eco-Tourism Practices of Sri Lankan Hoteliers with Reference to the International Standards. *Tourism, Leisure and Global Change*, **2**, TOC-156. http://geog.nau.edu/igust/srilanka2014/

[35] Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003) User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, **27**, 425-478. https://doi.org/10.2307/30036540

[36] Sigala, M. (2018) New Technologies in Tourism: From Multi-Disciplinary to Anti-Disciplinary Advances and Trajectories. *Tourism Management Perspectives*, **25**, 151-155. https://doi.org/10.1016/j.tmp.2017.12.003

[37] Tussyadiah, I. (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**, Article ID: 102883. https://doi.org/10.1016/j.annals.2020.102883

[38] Rahi, K. (2022) Project Resilience: A Conceptual Framework. *International Journal of Information Systems and Project Management*, **7**, 69-83. https://doi.org/10.12821/ijispm070104

[39] Gretzel, U., Sigala, M., Xiang, Z. and Koo, C. (2015) Smart Tourism: Foundations and Developments. *Electronic Markets*, **25**, 179-188. https://doi.org/10.1007/s12525-015-0196-8

[40] Guo, H. and Erdenebold, T. (2025) Factors Influencing Intention to Adopt an AI Chatbot for Learning in Higher Education: An Integrated PLS-SEM, IPMA, and ANN Approach. *Computers and Education: Artificial Intelligence*, **9**, Article ID: 100477. https://doi.org/10.1016/j.caeai.2025.100477

[41] Mariani, M.M., Machado, I., Magrelli, V. and Dwivedi, Y.K. (2023) Artificial Intelligence in Innovation Research: A Systematic Review, Conceptual Framework, and Future Research Directions. *Technovation*, **122**, Article ID: 102623. https://doi.org/10.1016/j.technovation.2022.102623

[42] Morosan, C. and DeFranco, A. (2016) It's about Time: Revisiting UTAUT2 to Examine Consumers' Intentions to Use NFC Mobile Payments in Hotels. *International Journal of Hospitality Management*, **53**, 17-29. https://doi.org/10.1016/j.ijhm.2015.11.003

[43] Yang, J., Blount, Y. and Amrollahi, A. (2024) Artificial Intelligence Adoption in a Professional Service Industry: A Multiple Case Study. *Technological Forecasting and Social Change*, **201**, Article ID: 123251. https://doi.org/10.1016/j.techfore.2024.123251

[44] Kaufmann, D., McGuirk, E.F. and Vicente, P.C. (2019) Foreign Aid Preferences and Perceptions in Donor Countries. *Journal of Comparative Economics*, **47**, 601-617. https://doi.org/10.1016/j.jce.2019.03.003

[45] Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N. and Roig-

Tierno, N. (2021) Digital Transformation: An Overview of the Current State of the Art of Research. *Sage Open*, **11**, 1-15. https://doi.org/10.1177/21582440211047576

[46] Williams, M.D., Rana, N.P. and Dwivedi, Y.K. (2015) The Unified Theory of Acceptance and Use of Technology (UTAUT): A Literature Review. *Journal of Enterprise Information Management*, **28**, 443-488. https://doi.org/10.1108/jeim-09-2014-0088

[47] Mariani, M. and Borghi, M. (2021) Customers' Evaluation of Mechanical Artificial Intelligence in Hospitality Services: A Study Using Online Reviews Analytics. *International Journal of Contemporary Hospitality Management*, **33**, 3956-3976. https://doi.org/10.1108/ijchm-06-2020-0622

[48] Fickers, A., Promoteur, A. and Dessart, L. (2020) The Dark Side of Customer Engagement in AI-Driven Interactions: The Case of Chatbots in the Tourism Industry. https://lib.uliege.behttps://matheo.uliege.be

[49] Stahl, B.C. and Eke, D. (2024) The Ethics of ChatGPT—Exploring the Ethical Issues of an Emerging Technology. *International Journal of Information Management*, **74**, Article ID: 102700. https://doi.org/10.1016/j.ijinfomgt.2023.102700

[50] Suanpang, P. and Pothipassa, P. (2024) Integrating Generative AI and IoT for Sustainable Smart Tourism Destinations. *Sustainability*, **16**, Article 7435. https://doi.org/10.3390/su16177435

[51] Alsheibani, S., Cheung, Y. and Messom, C. (2018) Artificial Intelligence Adoption: AI-Readiness at Firm-Level. https://aisel.aisnet.org/pacis2018/37

[52] Zechiel, F., Blaurock, M., Weber, E., Büttgen, M. and Coussement, K. (2024) How Tech Companies Advance Sustainability through Artificial Intelligence: Developing and Evaluating an AI X Sustainability Strategy Framework. *Industrial Marketing Management*, **119**, 75-89. https://doi.org/10.1016/j.indmarman.2024.03.010

[53] Becken, S. and Carmignani, F. (2020) Are the Current Expectations for Growing Air Travel Demand Realistic? *Annals of Tourism Research*, **80**, Article ID: 102840. https://doi.org/10.1016/j.annals.2019.102840

[54] Font, X. and Lynes, J. (2018) Corporate Social Responsibility in Tourism and Hospitality. *Journal of Sustainable Tourism*, **26**, 1027-1042. https://doi.org/10.1080/09669582.2018.1488856

[55] Wang, S., Wang, Q., Cui, Q. and Lan, T. (2025) Artificial Intelligence in Tourism: A Systematic Literature Review and Future Research Agenda. *Sustainability*, **17**, Article 9080. https://doi.org/10.3390/su17209080

[56] Rhou, Y. and Singal, M. (2020) A Review of the Business Case for CSR in the Hospitality Industry. *International Journal of Hospitality Management*, **84**, Article ID: 102330. https://doi.org/10.1016/j.ijhm.2019.102330

[57] Baum, T. and Hai, N.T.T. (2020) Hospitality, Tourism, Human Rights and the Impact of Covid-19. *International Journal of Contemporary Hospitality Management*, **32**, 2397-2407. https://doi.org/10.1108/ijchm-03-2020-0242

[58] Armenakis, A.A., Harris, S.G. and Mossholder, K.W. (1993) Creating Readiness for Organizational Change. *Human Relations*, **46**, 681-703. https://doi.org/10.1177/001872679304600601

[59] DiMaggio, P. and Powell, W.W. (2010) The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields (Translated by G. Yudin). *Journal of Economic Sociology*, **11**, 34-56. https://doi.org/10.17323/1726-3247-2010-1-34-56

[60] Wang, Y., Wang, C., Zhang, X. and Zeng, L. (2025) Towards Intelligent Emergency

Management: A Scenario-Learning-Decision Framework Enabled by Large Language Models. *Mathematics*, **13**, Article 3463. https://doi.org/10.3390/math13213463

[61] Tussyadiah, I. and Miller, G. (2019) Nudged by a Robot: Responses to Agency and Feedback. *Annals of Tourism Research*, **78**, Article ID: 102752. https://doi.org/10.1016/j.annals.2019.102752

[62] Jayakummar, S. (2025) Tourism Industry-Issues and Challenges in Global Perspective, 2025 Impact of AI-Enabled Chatbots on Tourist Satisfaction and Decision-Making. Self Publisher.

[63] Santiago, T. (2019) AI Bias: How Does AI Influence the Executive Function of Business Leaders? *Muma Business Review*, **3**, 181-192. https://doi.org/10.28945/4380

[64] Hwang, Y., Lee, S. and Jeon, J. (2024) Integrating AI Chatbots into the Metaverse: Pre-Service English Teachers' Design Works and Perceptions. *Education and Information Technologies*, **30**, 4099-4130. https://doi.org/10.1007/s10639-024-12924-4

[65] Furneaux, B. and Wade, M. (2011) An Exploration of Organizational Level Information Systems Discontinuance Intentions. *MIS Quarterly*, **35**, 573-598. https://doi.org/10.2307/23042797

[66] Frenkenberg, A. and Hochman, G. (2025) It's Scary to Use It, It's Scary to Refuse It: The Psychological Dimensions of AI Adoption—Anxiety, Motives, and Dependency. *Systems*, **13**, Article 82. https://doi.org/10.3390/systems13020082

[67] Gefen, D., Karahanna, E. and Straub, D.W. (2003) Trust and TAM in Online Shopping: An Integrated Model. *MIS Quarterly*, **27**, 51-90. https://doi.org/10.2307/30036519

[68] Ledro, C., Nosella, A. and Dalla Pozza, I. (2023) Integration of AI in CRM: Challenges and Guidelines. *Journal of Open Innovation*: *Technology*, *Market*, *and Complexity*, **9**, Article ID: 100151. https://doi.org/10.1016/j.joitmc.2023.100151

[69] Majid, G.M., Tussyadiah, I., Kim, Y.R. and Pal, A. (2023) Intelligent Automation for Sustainable Tourism: A Systematic Review. *Journal of Sustainable Tourism*, **31**, 2421-2440. https://doi.org/10.1080/09669582.2023.2246681

[70] Ma, N., Khynevych, R., Hao, Y. and Wang, Y. (2025) Effect of Anthropomorphism and Perceived Intelligence in Chatbot Avatars of Visual Design on User Experience: Accounting for Perceived Empathy and Trust. *Frontiers in Computer Science*, **7**, Article 1531976. https://doi.org/10.3389/fcomp.2025.1531976

[71] Urbani, R., Ferreira, C. and Lam, J. (2024) Managerial Framework for Evaluating AI Chatbot Integration: Bridging Organizational Readiness and Technological Challenges. *Business Horizons*, **67**, 595-606. https://doi.org/10.1016/j.bushor.2024.05.004

[72] Ahsan, R.M., Uddin, B., Hossen, T. and Das, S. (2025) Resilient Intelligence: AI and MIS in the Cyber-Economic Era. *The Eastasouth Journal of Information System and Computer Science*, **3**, 151-163. https://doi.org/10.58812/esiscs.v3i02.758

[73] Duong, C.D. (2024) ChatGPT Adoption and Digital Entrepreneurial Intentions: An Empirical Research Based on the Theory of Planned Behaviour. *Entrepreneurial Business and Economics Review*, **12**, 129-142. https://doi.org/10.15678/eber.2024.120208

[74] Faiz, F., Le, V. and Masli, E.K. (2024) Determinants of Digital Technology Adoption in Innovative SMEs. *Journal of Innovation & Knowledge*, **9**, Article ID: 100610. https://doi.org/10.1016/j.jik.2024.100610

[75] Wang, S. and Cheablam, O. (2025) Sustainable Tourism and Its Environmental and Economic Impacts: Fresh Evidence from Major Tourism Hubs. *Sustainability*, **17**, Article 5058. https://doi.org/10.3390/su17115058

[76] Collins, C., Dennehy, D., Conboy, K. and Mikalef, P. (2021) Artificial Intelligence in

Information Systems Research: A Systematic Literature Review and Research Agenda. *International Journal of Information Management*, **60**, Article ID: 102383. https://doi.org/10.1016/j.ijinfomgt.2021.102383

[77] Davis, F.D. (1989) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, **13**, 319-340. https://doi.org/10.2307/249008

[78] Alalwan, A.A. (2018) Investigating the Impact of Social Media Advertising Features on Customer Purchase Intention. *International Journal of Information Management*, **42**, 65-77. https://doi.org/10.1016/j.ijinfomgt.2018.06.001