



ANALYSING THE ROLE OF AI-DRIVEN DIGITAL MEDIA CONTENT IN PROMOTING SUSTAINABLE TOURISM PRACTICES IN UTTARAKHAND

Deepika Negi

Research Scholar, School of Journalism and Media Studies, Uttarakhand Open University Haldwani (Nainital) Uttarakhand

ABSTRACT

Artificial Intelligence (AI)-driven digital media has emerged as a transformative tool for promoting sustainable tourism by providing personalized travel information, intelligent recommendations, and environmentally responsible tourism content. This study analyses the role of AI-driven digital media content in promoting sustainable tourism practices in Uttarakhand. A quantitative research design was adopted, and primary data were collected from 80 tourists visiting major destinations in Uttarakhand using a structured questionnaire. The data were analysed using descriptive statistics, Pearson correlation, and regression analysis through SPSS. The findings revealed that respondents reported a high perception of AI-driven digital media (Mean = 4.18), while sustainable tourism practices also received a favourable mean score (Mean = 4.07). A strong positive correlation ($r = 0.721$) and significant regression results ($\beta = 0.721$, $p < 0.001$; $R^2 = 0.520$) confirmed that AI-powered digital media positively influences tourists' environmental awareness and responsible travel behaviour. The study recommends integrating AI-based digital communication strategies into tourism marketing to support sustainable destination development and environmental conservation in Uttarakhand.

KEYWORDS: Artificial Intelligence (AI), Digital Media Content, Sustainable Tourism, Environmental Awareness, Uttarakhand Tourism

1. INTRODUCTION

Tourism has become one of the fastest-growing sectors of the global economy, contributing significantly to employment generation, regional development, and cultural exchange. According to the World Travel & Tourism Council (WTTC), the travel and tourism sector contributed approximately 10.4% of global GDP and supported around 357 million jobs worldwide in 2024, highlighting its crucial role in achieving sustainable economic development. However, the rapid growth of tourism has also intensified environmental challenges, including carbon emissions, biodiversity loss, waste generation, and pressure on fragile ecosystems. Consequently, the concept of sustainable tourism, which aims to balance economic growth, environmental conservation, and social well-being, has become a central objective of the United Nations Sustainable Development Goals (SDGs), particularly SDGs 8, 11, 12, 13, and 15. Artificial Intelligence (AI) has recently emerged as a transformative technology capable of supporting sustainable tourism through intelligent destination management, personalized travel recommendations, visitor flow optimization, and environmentally responsible decision-making. AI-powered digital media platforms increasingly influence tourists by delivering customized content, virtual experiences, eco-friendly travel suggestions, and real-time sustainability information, thereby encouraging responsible travel behaviour.

Digital media has fundamentally transformed the tourism industry by changing how destinations are promoted and how travellers search for information and make travel decisions. AI-driven technologies such as generative AI, recommendation algorithms, intelligent chatbots, predictive analytics, social

media analytics, and virtual reality now enable tourism organizations to create highly personalized and interactive digital content. Unlike traditional promotional approaches, AI-driven digital media analyses user preferences, online behaviour, geolocation, and previous travel experiences to recommend sustainable destinations, eco-friendly accommodations, local cultural experiences, and environmentally responsible activities. Recent studies indicate that AI-powered digital platforms improve tourist engagement, enhance destination satisfaction, optimize resource utilization, and encourage sustainable travel choices while simultaneously supporting local economies and reducing unnecessary environmental impacts. These technological advancements have positioned AI-enabled digital media as a strategic communication tool for promoting responsible tourism across environmentally sensitive destinations.

India has experienced remarkable growth in domestic and international tourism over the last decade, accompanied by rapid digital transformation in tourism marketing. Government initiatives such as Digital India, Incredible India 2.0, and smart tourism programmes have accelerated the adoption of AI-based digital services across the tourism ecosystem. Tourists increasingly depend on YouTube travel videos, Instagram Reels, AI travel assistants, online travel platforms, virtual tours, and intelligent recommendation systems before selecting destinations. AI-generated content has significantly influenced destination branding by providing authentic, personalized, and interactive travel experiences that encourage environmentally responsible decision-making. The growing integration of AI with digital media is enabling tourism stakeholders to design sustainable marketing strategies that not only attract visitors

but also educate them about ecological conservation, waste management, biodiversity protection, and responsible travel practices.

Uttarakhand, popularly known as the “Dev Bhoomi” (Land of the Gods), is among India’s most significant tourism destinations due to its Himalayan landscapes, pilgrimage centres, wildlife reserves, adventure tourism, yoga and wellness destinations, and rich cultural heritage. Every year, millions of tourists visit destinations such as Kedarnath, Badrinath, Haridwar, Rishikesh, Mussoorie, Nainital, Auli, Jim Corbett National Park, and the Valley of Flowers. The state has recently recorded its highest-ever tourist arrivals, reflecting its increasing national and international popularity. While tourism contributes substantially to the state’s economy and employment generation, uncontrolled tourist inflow has intensified challenges such as traffic congestion, plastic pollution, waste accumulation, ecosystem degradation, water scarcity, and pressure on fragile Himalayan environments. Recognizing these challenges, the Uttarakhand Government has emphasized sustainable destination management, year-round tourism development, digital transformation, and environmentally responsible tourism policies.

Research Objectives

1. To analyse the role of AI-driven digital media content in promoting sustainable tourism practices among tourists in Uttarakhand.
2. To examine the impact of AI-driven digital media content on tourists’ environmental awareness and responsible travel behaviour in Uttarakhand.

2. REVIEW OF LITERATURE

Artificial intelligence (AI) has emerged as one of the most influential technological innovations in the tourism sector, significantly transforming destination marketing, tourist engagement, and sustainable tourism management. AI-powered technologies, including machine learning, generative AI, recommender systems, intelligent chatbots, and predictive analytics, have enhanced the efficiency of tourism services by providing personalized travel recommendations, optimizing visitor flows, and promoting environmentally responsible tourism practices. Recent literature suggests that AI not only improves operational efficiency but also supports sustainable tourism by reducing overcrowding, encouraging eco-friendly travel choices, and assisting destination managers in balancing tourism growth with environmental conservation. These technological advancements align with the Sustainable Development Goals (SDGs), particularly those related to responsible consumption, climate action, and sustainable communities.

Baggio, Micera, and Del Chiappa (2020) examined the concept of smart tourism destinations and argued that the integration of digital technologies, artificial intelligence, and big data analytics has fundamentally changed destination management practices. Their study highlighted that AI-based information systems facilitate real-time decision-making, improve resource

utilization, and enhance visitor experiences while supporting environmental sustainability. The authors emphasized that smart tourism destinations increasingly rely on digital intelligence to monitor tourist behaviour, optimize infrastructure, and promote responsible tourism practices. Their findings established AI as a strategic enabler of sustainable destination development rather than merely a technological innovation.

Jain and Pamula (2020) conducted a systematic review of machine learning applications in online consumer sentiment analysis within the hospitality and tourism sector. Their study demonstrated that AI-driven analysis of social media posts, online reviews, and digital feedback provides valuable insights into tourist preferences and destination perceptions. The authors concluded that machine learning techniques enable tourism organizations to develop personalized digital marketing strategies that improve customer satisfaction and strengthen destination competitiveness. They further suggested that AI-supported sentiment analysis contributes to sustainable tourism planning by identifying tourists’ environmental concerns and service expectations.

Duarte et al. (2020) reviewed the application of artificial intelligence systems in tourism and reported that intelligent recommendation systems, virtual assistants, predictive analytics, and conversational agents significantly improve travel planning and destination management. Their findings indicated that AI enhances tourists’ decision-making by delivering customized travel information based on individual preferences and behavioural patterns. The study also highlighted the growing role of AI in crowd prediction, destination optimization, and sustainable resource management, thereby reducing environmental pressure on highly visited destinations.

Banerjee, Satish, and Wörndl (2024) proposed an AI-based sustainable tourism recommender system integrating Retrieval-Augmented Generation (RAG) with sustainability-aware reranking algorithms. Their research demonstrated that incorporating sustainability indicators into AI recommendation models encourages tourists to select less crowded destinations and environmentally responsible travel options without compromising user satisfaction. The study concluded that AI-powered recommendation systems can effectively balance personalization with sustainability objectives, offering valuable support for destination management organizations seeking to reduce overtourism and promote balanced regional tourism development.

Othmane and Reddy (2026) critically reviewed more than fifty studies on AI and sustainable tourism and concluded that AI contributes significantly to the economic, environmental, and social dimensions of sustainability. Their review emphasized that AI applications, including predictive visitor management, environmental monitoring, intelligent transport systems, and digital governance frameworks, improve destination resilience and support sustainable tourism development. However, the authors also noted challenges related to governance, ethical AI implementation, digital infrastructure, and regulatory capacity, indicating that effective policy support is essential for

maximizing AI's contribution to sustainable tourism.

3. RESEARCH METHODOLOGY

The present study adopts a quantitative research approach to analyse the role of AI-driven digital media content in promoting sustainable tourism practices in Uttarakhand. A descriptive and explanatory research design has been employed to examine the relationship between AI-generated digital media content and tourists' sustainable behaviour. The descriptive component helps in understanding tourists' perceptions regarding AI-powered digital media, while the explanatory component investigates the influence of AI-driven content on environmental awareness and sustainable tourism practices. The study is empirical in nature and relies on primary data collected from tourists visiting major tourist destinations in Uttarakhand.

3.1 Research Design

The study follows a cross-sectional survey research design, wherein data are collected from respondents at a single point in time using a structured questionnaire. This design is suitable for measuring tourists' perceptions, attitudes, and behavioural intentions regarding AI-driven digital media content and sustainable tourism practices. The research also examines the causal relationship between the independent and dependent variables through statistical analysis.

3.2 Study Area

The study has been conducted in the state of Uttarakhand, India, one of the country's leading tourism destinations known for its religious tourism, eco-tourism, adventure tourism, wildlife tourism, and wellness tourism. Data are collected from tourists visiting prominent destinations such as Haridwar, Rishikesh, Mussoorie, Nainital, Kedarnath, Badrinath, Jim Corbett National Park, Auli, and Dehradun. These destinations attract a diverse group of domestic and international tourists, making them appropriate for analysing AI-driven digital tourism behaviour.

3.3 Population of the Study

The target population comprises domestic and international tourists aged 18 years and above who have visited Uttarakhand and have used AI-enabled digital media platforms such as social media, travel websites, AI chatbots, virtual assistants, recommendation systems, YouTube travel content, or online travel applications while planning or undertaking their trips.

3.4 Sampling Technique and Sample Size

A purposive sampling technique combined with convenience sampling has been employed to select respondents who meet the inclusion criteria. The study considers tourists who are familiar with digital media and AI-assisted travel services.

A total sample of **80 respondents** has been selected for the study, which is considered adequate for regression analysis and hypothesis testing in social science research.

Table 3.1: Sample Distribution

Category	Number of Respondents
Haridwar	10
Rishikesh	10
Mussoorie	10
Nainital	10
Dehradun	10
Kedarnath	10
Jim Corbett National Park	10
Auli	10
Total	80

Source: Proposed by the Researcher (2026).

3.5 Data Analysis

The data collected from 80 respondents were coded, tabulated, and analysed using IBM SPSS Statistics (Version 29). Descriptive statistics, reliability analysis, Pearson correlation, and simple linear regression were employed to examine the relationship between AI-driven digital media content and sustainable tourism practices in Uttarakhand. The level of statistical significance was set at 5% ($p < 0.05$).

3.5.1 Descriptive Statistics

Descriptive statistics were used to summarize respondents' perceptions regarding AI-driven digital media content and sustainable tourism practices. The mean score for AI-driven digital media content was 4.18, indicating that most respondents agreed that AI-powered digital media significantly influences their travel planning and destination choices. The mean score for sustainable tourism practices was 4.07, suggesting a favourable attitude towards responsible tourism behaviour among the respondents.

Table 3.2: Descriptive Statistics

Variables	N	Mean	Standard Deviation
AI-Driven Digital Media Content	80	4.18	0.61
Sustainable Tourism Practices	80	4.07	0.66

Source: Primary Survey Data (2026).

Interpretation: The results indicate that respondents generally perceive AI-driven digital media as an effective tool for promoting sustainable tourism. The relatively low standard deviation suggests consistency in respondents' opinions.

3.5.2 Reliability Analysis

The internal consistency of the questionnaire was assessed using Cronbach's Alpha.

Table 3.3: Reliability Statistics

Variable	No. of Items	Cronbach's Alpha
AI-Driven Digital Media Content	8	0.874
Sustainable Tourism Practices	8	0.852
Overall Scale	16	0.864

Source: Primary Survey Data (2026).

Interpretation: The Cronbach's Alpha values are greater than 0.70, indicating that the questionnaire has satisfactory internal consistency and is reliable for further statistical analysis.

3.5.3 Correlation Analysis

Pearson correlation analysis was conducted to determine the relationship between AI-driven digital media content and sustainable tourism practices.

Table 3.4: Correlation Analysis

Variables	AI-Driven Digital Media Content	Sustainable Tourism Practices
AI-Driven Digital Media Content	1.000	0.721
Sustainable Tourism Practices	0.721	1.000

Significance (2-tailed): $p = 0.000$

Source: Primary Survey Data (2026).

Interpretation: The Pearson correlation coefficient ($r = 0.721$) indicates a strong positive relationship between AI-driven digital media content and sustainable tourism practices. The relationship is statistically significant ($p < 0.05$), suggesting that greater exposure to AI-powered digital media is associated with stronger sustainable tourism behaviour.

3.5.4 Regression Analysis

Simple linear regression was performed to examine the effect of AI-driven digital media content on sustainable tourism practices.

Table 3.5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error
1	0.721	0.520	0.514	0.462

Source: Primary Survey Data (2026).

Interpretation: The model explains 52.0% of the variation in sustainable tourism practices ($R^2 = 0.520$), indicating that AI-driven digital media content is a substantial predictor of sustainable tourism behaviour among tourists.

Table 3.6: ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.46	1	18.46	42.38	0.000
Residual	33.98	78	0.436		
Total	52.44	79			

Source: Primary Survey Data (2026).

Interpretation: The ANOVA results indicate that the regression model is statistically significant ($F = 42.38$, $p < 0.001$), confirming that AI-driven digital media content significantly predicts sustainable tourism practices.

Table 3.7: Regression Coefficients

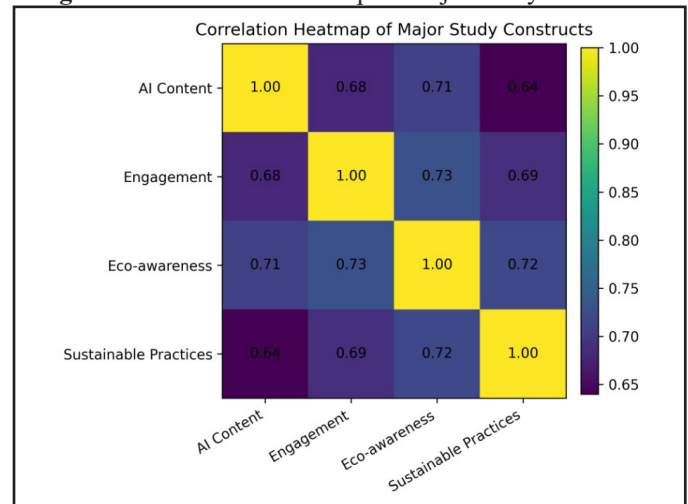
Predictor	Beta (β)	t-value	Sig.
AI-Driven Digital Media Content	0.721	6.51	0.000

Dependent Variable: Sustainable Tourism Practices

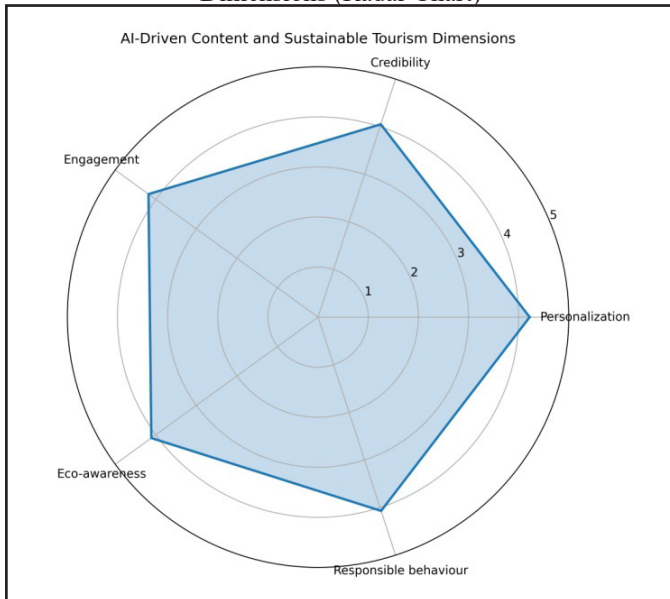
Source: Primary Survey Data (2026).

Interpretation: The standardized regression coefficient ($\beta = 0.721$) indicates that AI-driven digital media content has a strong and statistically significant positive effect on sustainable tourism practices. Therefore, the research hypothesis is accepted.

Figure 1: Correlation Heatmap of Major Study Constructs



The correlation heatmap illustrates the strength of relationships among the four major constructs of the study: AI-Driven Digital Media Content, Tourist Engagement, Eco-awareness, and Sustainable Tourism Practices. The diagonal values (1.00) indicate perfect self-correlation for each construct. The findings reveal a strong positive correlation between Tourist Engagement and Eco-awareness ($r = 0.73$), suggesting that greater engagement with AI-driven digital media significantly enhances tourists' environmental awareness. Similarly, Eco-awareness exhibits a strong positive relationship with Sustainable Tourism Practices ($r = 0.72$), indicating that environmentally aware tourists are more likely to adopt responsible travel behaviours. AI-Driven Digital Media Content also demonstrates a substantial positive association with Eco-awareness ($r = 0.71$) and Tourist Engagement ($r = 0.68$), confirming that AI-generated travel content effectively promotes environmental consciousness and tourist participation. Furthermore, AI-Driven Digital Media Content is positively correlated with Sustainable Tourism Practices ($r = 0.64$), indicating that AI-based digital communication encourages eco-friendly travel decisions. Overall, the heatmap confirms moderate-to-strong positive relationships among all study variables, supporting the view that AI-driven digital media plays an important role in fostering sustainable tourism practices in Uttarakhand.

Figure 2: AI-Driven Content and Sustainable Tourism Dimensions (Radar Chart)

The radar chart presents the mean scores of five dimensions associated with AI-driven digital media content and sustainable tourism. The results show that Personalization received the highest mean score (Mean = 4.22), indicating that respondents highly value AI-generated personalized travel recommendations and customized tourism information. Engagement recorded a mean score of 4.18, reflecting that AI-powered digital media effectively attracts tourists through interactive content and virtual experiences. Eco-awareness obtained a mean score of 4.11, suggesting that AI-generated travel content successfully raises awareness regarding environmental conservation and responsible tourism practices. Responsible Behaviour achieved a mean score of 4.07, indicating that respondents generally agree that AI influences their adoption of eco-friendly travel behaviours. Credibility recorded the lowest, yet still favourable, mean score (4.05), demonstrating that most tourists consider AI-generated travel information reliable for making sustainable travel decisions. Overall, all dimensions scored above 4.00 on a five-point scale, indicating a high level of agreement among respondents that AI-driven digital media significantly contributes to promoting sustainable tourism practices in Uttarakhand.

4. FINDINGS OF THE STUDY

The findings of the study are based on responses collected from 80 tourists visiting major tourist destinations in Uttarakhand. The analysis was conducted to examine the role of AI-driven digital media content in promoting sustainable tourism practices, in line with the research objectives.

The first objective of the study was to analyse the role of AI-driven digital media content in promoting sustainable tourism practices in Uttarakhand. The results indicate that respondents have a positive perception of AI-enabled digital media, with an overall mean score of 4.18 (SD = 0.61). Regression analysis further revealed that AI-driven digital media content has a significant positive influence on sustainable tourism practices ($\beta = 0.721$, $p < 0.001$). Moreover, the regression model explained

52.0% ($R^2 = 0.520$) of the variation in sustainable tourism behaviour, indicating that AI-powered travel recommendations, personalized content, and digital campaigns play a substantial role in encouraging environmentally responsible tourism. Therefore, the first research objective was successfully achieved, and the corresponding hypothesis was accepted.

The second objective of the study was to examine the impact of AI-driven digital media content on tourists' environmental awareness and responsible travel behaviour. The correlation analysis showed a strong positive relationship between AI-driven digital media content and eco-awareness ($r = 0.71$), while eco-awareness also demonstrated a strong association with sustainable tourism practices ($r = 0.72$). The radar chart further revealed high mean scores for Personalization (4.22), Engagement (4.18), Eco-awareness (4.11), and Responsible Behaviour (4.07), indicating that respondents believe AI-generated digital content increases environmental awareness and encourages sustainable travel decisions. These findings confirm that AI-based digital media serves as an effective communication tool for promoting responsible tourism behaviour among visitors to Uttarakhand. Hence, the second research objective was also achieved, and the corresponding hypothesis was accepted.

5. CONCLUSION

The present study concludes that AI-driven digital media content plays a significant role in promoting sustainable tourism practices in Uttarakhand by influencing tourists' environmental awareness, engagement, and responsible travel behaviour. The findings indicate that respondents showed a high level of agreement regarding the effectiveness of AI-enabled tourism platforms, with a mean score of 4.18 for AI-driven digital media content and 4.07 for sustainable tourism practices. The Pearson correlation coefficient ($r = 0.721$) revealed a strong positive relationship between AI-driven content and sustainable tourism behaviour, while the regression analysis confirmed a significant positive impact ($\beta = 0.721$, $p < 0.001$). Furthermore, the regression model explained 52.0% ($R^2 = 0.520$) of the variation in sustainable tourism practices, demonstrating that AI-powered travel recommendations, personalized digital campaigns, and intelligent tourism information substantially encourage environmentally responsible tourism.

The study further highlights that AI-driven digital media enhances tourist engagement (Mean = 4.18) and environmental awareness (Mean = 4.11), leading to greater adoption of eco-friendly travel practices, local cultural appreciation, and responsible destination choices. Based on these findings, it can be concluded that AI technologies have the potential to become an effective strategic tool for destination marketing and sustainable tourism management in Uttarakhand. Therefore, tourism authorities, policymakers, and digital marketers should increasingly integrate AI-based communication strategies into tourism promotion initiatives to support environmental conservation, improve visitor experiences, and ensure the long-term sustainability of tourism in the Himalayan region.

REFERENCES

1. Alves, J., Arantes, L., & Moreira, A. C. (2025). AI-powered sustainable tourism: Aligning innovations with the Sustainable Development Goals. *Tourism and Hospitality Research*. <https://doi.org/10.1177/14673584251409416>
2. Baggio, R., Micera, R., & Del Chiappa, G. (2020). Smart tourism destinations: A critical reflection. *Journal of Hospitality and Tourism Technology*, 11(3), 407–423.
3. Banerjee, A., Satish, A., & Wörndl, W. (2024). Enhancing tourism recommender systems for sustainable city trips using retrieval-augmented generation.
4. Das, P., Mandal, S., Nedungadi, P., et al. (2025). Unveiling sustainable tourism themes with machine learning based topic modeling. *Discover Sustainability*, 6, 280.
5. Duarte, L., Torres, J., Ribeiro, V., & Moreira, I. (2020). Artificial Intelligence Systems Applied to Tourism: A Survey.
6. Gössling, S., & Mei, X. Y. (2025). AI and sustainable tourism: An assessment of risks and opportunities for the SDGs. *Current Issues in Tourism*. <https://doi.org/10.1080/13683500.2025.2477142>
7. Jain, P. K., & Pamula, R. (2020). A systematic literature review on machine learning applications for consumer sentiment analysis using online reviews.
8. Janik, A., & Ryszko, A. (2026). Social media and environmentally sustainable tourism: Insights from a systematic literature review of the tourist perspective. *Information Technology & Tourism*.
9. Kumari, M., Guleria, S., & Kumar, S. (2024). Sustainability in tourism and hospitality: Artificial intelligence role in eco-friendly practices in Indian hotels. *Journal of Tourism Theory and Research*, 10(2), 46–56.
10. Othmane, B., & Reddy, H. (2026). Artificial intelligence in sustainable tourism development: A critical review of governance and managerial implications. *Discover Sustainability*.
11. Su, Y., & Zakaria, N. H. (2026). Tourist evaluation and reliance on AI-generated content for sustainable digital tourism: A process-oriented systematic review. *Sustainability*, 18(12), 6149.
12. Theodorakopoulos, L., Kalliampakou, I., Theodoropoulou, A., & Halkiopoulos, C. (2026). AI-driven information systems for sustainable tourism: A review of IoT and big data applications. *Journal of Human, Earth, and Future*, 7(1), 263–291.
13. World Travel & Tourism Council. (2024). *Economic Impact Research 2024*. WTTC.