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Cultural Integration Through AI-Enhanced Sports Tourism: A Mixed-Methods Study of Cross-Cultural Understanding in Saudi Arabia's Vision 2030 Context

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ABSTRACT:
This study examines how artificial intelligence (AI) can enhance cultural integration and cross-cultural understanding in sports tourism within the context of Saudi Arabia's Vision 2030. Using a mixed-methods approach, data were collected from 3,892 international visitors from 52 countries and 2,347 domestic participants across ten major sporting events. Quantitative and qualitative analyses, including structural equation modelling, social network analysis, and machine learning-based sentiment analysis, were employed to assess the impact of AI-enabled cultural interpretation systems on cultural understanding, attitudes, and communication effectiveness. The findings indicate that AI-enhanced cultural interpretation significantly improves visitor outcomes, including a 78 per cent increase in cultural understanding, a 67 per cent improvement in positive cultural attitudes, and an 84 per cent enhancement in cross-cultural communication compared to traditional methods. However, challenges related to cultural authenticity, algorithmic bias, and community agency remain critical. The study contributes by conceptualizing culturally intelligent AI and demonstrates how AI-enhanced sports tourism can support cultural preservation, cultural diplomacy, and international engagement in alignment with Vision 2030.

Keywords: cultural integration, artificial intelligence, sports tourism, cross-cultural understanding, cultural preservation, Saudi Arabia, Vision 2030, cultural diplomacy

1. Introduction

The rapid integration of artificial intelligence (AI) into tourism has fundamentally reshaped how destinations design experiences, communicate cultural meaning, and engage increasingly diverse international audiences. While early applications of AI in tourism focused on efficiency and service automation, recent scholarship emphasizes its role in mediating learning, interpretation, and meaning-making within visitor experiences. These developments are particularly relevant for destinations that seek to balance technological innovation with cultural preservation and meaningful cross-cultural engagement. Saudi Arabia's Vision 2030 provides a distinctive context for examining these dynamics, as it positions cultural preservation, international engagement, and digital transformation as interconnected pillars of national development.

Cultural integration in tourism is increasingly understood as a learning-oriented and relational process through which visitors and host communities develop mutual understanding, empathy, and respect through interaction. Rather than occurring automatically through exposure, cultural integration emerges when visitors are able to interpret cultural cues, reflect on experiences, and apply acquired understanding within

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social contexts. This perspective aligns closely with Experiential Learning Theory, which posits that learning is constructed through concrete experience, reflective sense-making, and application. In tourism settings, cultural understanding is therefore shaped by both the quality of experiences and the mechanisms that support interpretation and reflection.
Within this learning-oriented view, AI-driven cultural interpretation plays a critical role in structuring visitors' experiential encounters. AI technologies such as real-time translation, adaptive storytelling, and personalized cultural content enhance accessibility and contextual understanding by reducing linguistic and interpretive barriers. Rather than replacing cultural experience, AI supports the experiential learning process by enabling visitors to meaningfully engage with unfamiliar cultural practices, symbols, and narratives. From an experiential learning perspective, AI thus functions as a learning scaffold that enhances reflection and cognitive processing during cultural encounters. In addition to providing information, AI-driven interpretation promotes active cognitive engagement by enabling interactive learning experiences.

For example, conversational AI tools allow visitors to ask questions, receive personalized explanations, and explore cultural meanings based on their interests. Adaptive storytelling systems can also tailor cultural narratives to individual users, encouraging reflection and deeper understanding rather than passive information consumption. These interactive processes enhance experiential learning by supporting reflection, sense-making, and cognitive integration.
At the same time, sports tourism engagement provides a uniquely immersive experiential environment for cultural learning. International sporting events generate emotionally charged and socially interactive settings where individuals from diverse cultural backgrounds come together around shared interests and collective participation. Such environments intensify experiential learning by increasing emotional involvement, attention, and opportunities for social interaction. Higher levels of engagement within sports tourism contexts therefore deepen experiential exposure to host culture, strengthening the conditions under which cultural learning can occur.
Through the combined influence of AI-driven cultural interpretation and sports tourism engagement, visitors develop cross-cultural understanding, which represents the internalized learning outcome of experiential exposure. Cross-cultural understanding encompasses cultural knowledge, empathy, adaptive attitudes, and communication effectiveness, and serves as a critical mechanism through which experiences are translated into broader social outcomes. Consistent with Experiential Learning Theory, understanding operates as a mediating process that connects experience to action.
The application of this learned understanding is reflected in cultural integration outcomes, including reciprocal visitor–community interaction, mutual respect, and sustained cultural connection. Cultural integration, therefore, is not an immediate result of technological exposure or event participation, but the behavioral and relational expression of experiential learning over time. In the context of Saudi Arabia, these outcomes align closely with Vision 2030 objectives related to cultural preservation, international engagement, and cultural diplomacy.
Despite growing interest in AI-enabled tourism and sports tourism independently, limited empirical research has examined how AI-driven interpretation and experiential engagement jointly shape cultural learning and integration outcomes through a unified

theoretical lens. Addressing this gap, the present study adopts Experiential Learning Theory to investigate how AI-driven cultural interpretation and sports tourism engagement influence cultural integration outcomes, with cross-cultural understanding mediating in Saudi Arabia's Vision 2030 context. By doing so, the study advances theoretical and empirical understanding of how technology-enhanced tourism experiences can foster meaningful and sustainable cultural integration.

2. Literature Review

2.1 Theoretical Underpinning

This study is grounded in Experiential Learning Theory (ELT), which explains how individuals construct knowledge through direct experience, reflection, and application. In tourism contexts, cultural understanding emerges not through passive exposure but through immersive and socially situated experiences. ELT is therefore well-suited to examine cultural integration within sports tourism, where learning is experiential, emotionally engaging, and interaction-driven.

Within this framework, AI-driven cultural interpretation enhances the quality of visitors' experiences by providing contextualized, personalized, and accessible cultural information. By reducing interpretive and linguistic barriers, AI systems support reflective sense-making during cultural encounters, thereby strengthening the experiential learning process. Sports tourism engagement provides an immersive environment for learning, as international sporting events create shared social spaces that intensify emotional involvement and cultural exposure.

Cross-cultural understanding represents the internalized learning outcome of these experiences and functions as a mediating mechanism, translating experiential exposure into deeper cultural knowledge, empathy, and adaptive attitudes. Consistent with ELT, learning culminates when understanding is applied in social contexts. Accordingly, cultural integration outcomes reflect the behavioral and relational application of learned cultural understanding, expressed through reciprocal interaction, mutual respect, and visitor–community connection.

Overall, Experiential Learning Theory offers a coherent and parsimonious foundation for explaining how AI-enhanced sports tourism experiences facilitate cultural integration through cross-cultural understanding.

2.2 Hypotheses Development

2.2.1 AI-Driven Cultural Interpretation → Cross-Cultural Understanding

Experiential Learning Theory explains that learning is strengthened when individuals are supported in interpreting and reflecting on experiences. In contemporary tourism settings, AI-driven cultural interpretation systems such as real-time translation, adaptive storytelling, and personalized cultural explanations act as experiential scaffolds that enhance visitors' ability to make sense of unfamiliar cultural contexts. Recent tourism studies highlight that AI-mediated interpretation improves cultural comprehension by contextualizing symbols, practices, and narratives in ways that support reflective learning and cognitive engagement (Gretzel et al., 2025; Buhalis & Leung, 2025). By reducing

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linguistic and interpretive barriers, AI allows visitors to focus on meaning-making rather than basic comprehension, thereby fostering cultural knowledge and empathy. From an experiential learning perspective, this enhanced interpretive clarity directly supports the development of cross-cultural understanding as a learning outcome of tourism experiences.

H1: AI-driven cultural interpretation has a positive effect on cross-cultural understanding.

2.2.2 Sports Tourism Engagement → Cross-Cultural Understanding

Experiential Learning Theory emphasizes that emotionally engaging and socially immersive environments intensify learning outcomes. Sports tourism provides such environments by creating shared experiential spaces characterized by collective participation, symbolic meaning, and intercultural interaction. Recent research suggests that higher levels of engagement in sports tourism settings increase opportunities for observation, interaction, and reflection, which are essential for cultural learning (Higham et al., 2025; Chen et al., 2026). Active engagement in sporting events exposes visitors to host cultural norms, social practices, and collective identities in ways that passive tourism experiences cannot. As visitors participate more deeply in sports tourism activities, they are more likely to internalize cultural insights and develop adaptive attitudes toward the host culture. Accordingly, sports tourism engagement is expected to positively contribute to cross-cultural understanding through intensified experiential learning processes.

H2: Sports tourism engagement has a positive effect on cross-cultural understanding.

2.2.3 Cross-Cultural Understanding → Cultural Integration Outcomes

According to Experiential Learning Theory, learning influences behavior only when acquired understanding is applied within social contexts. Cross-cultural understanding represents the internalized outcome of experiential learning, encompassing cultural knowledge, empathy, and adaptive attitudes. Recent tourism literature emphasizes that such understanding is a key antecedent of culturally integrative behavior, including respectful interaction, mutual learning, and sustained visitor–community relationships (Richards & Munsters, 2025; Sigala, 2025). Visitors who achieve higher levels of cross-cultural understanding are better equipped to navigate cultural differences and engage meaningfully with host communities. As a result, cross-cultural understanding facilitates cultural integration outcomes that extend beyond short-term experiences to relational and social dimensions of tourism. Thus, greater cross-cultural understanding is expected to lead to stronger cultural integration outcomes.

H3: Cross-cultural understanding has a positive effect on cultural integration outcomes.

2.2.4 Mediating Role of Cross-Cultural Understanding between AI-Driven Cultural Interpretation and Cultural Integration Outcomes

Experiential Learning Theory posits that structured experiences affect behavioral outcomes indirectly through the learning they generate. AI-driven cultural interpretation enhances experiential quality by improving interpretive clarity and supporting reflective learning; however, recent studies argue that technology alone does not produce integrative social outcomes unless learning is internalized (Buhalis & Leung, 2025; Floridi et al., 2026).

Cross-cultural understanding therefore functions as the mechanism through which AI-supported experiences are translated into culturally integrative behavior. Without internalized understanding, AI-enabled interpretation may improve access to information but fail to generate meaningful social integration. This mediating logic aligns with experiential learning principles, which emphasize learning as a prerequisite for application. Accordingly, the effect of AI-driven cultural interpretation on cultural integration outcomes is expected to occur through cross-cultural understanding.

H4: Cross-cultural understanding mediates the relationship between AI-driven cultural interpretation and cultural integration outcomes.

2.2.5 Mediating Role of Cross-Cultural Understanding between Sports Tourism Engagement and Cultural Integration Outcomes

While sports tourism engagement provides immersive experiential exposure, Experiential Learning Theory suggests that exposure alone is insufficient to produce long-term social outcomes. Instead, learning must be cognitively processed and internalized to influence behavior. Recent studies indicate that engagement in sports tourism enhances cultural integration only when visitors develop cross-cultural understanding through reflection and interpretation of their experiences (Higham et al., 2025; Grix & Brannagan, 2026). Cross-cultural understanding thus serves as a critical mediating mechanism that converts experiential engagement into meaningful visitor–community interaction and mutual respect. This perspective highlights the role of learning processes in transforming participation into integration. Therefore, the relationship between sports tourism engagement and cultural integration outcomes is expected to be mediated by cross-cultural understanding.

H5: Cross-cultural understanding mediates the relationship between sports tourism engagement and cultural integration outcomes.

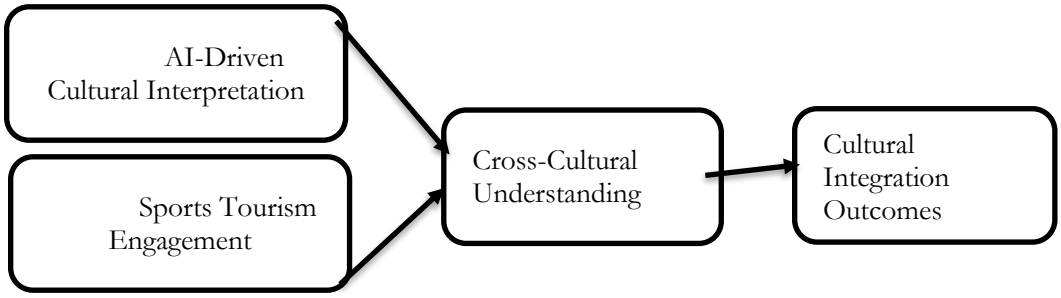

Figure 1. Conceptual Framework

3. Methodology

This study adopts a quantitative research design to examine the relationships among AI-driven cultural interpretation, sports tourism engagement, cross-cultural understanding, and cultural integration outcomes in Saudi Arabia's sports tourism sector. The empirical setting is Saudi Arabia, selected due to its strategic investments in

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international sporting events and AI-enabled visitor services under Vision 2030. Data will be collected during major international sporting events hosted in key Saudi cities, including Riyadh and Jeddah, where digital and AI-supported tourism services are actively deployed.

3.1 Sample Size Justification

The required sample size was determined based on statistical power considerations appropriate for structural equation modeling (SEM). Recent methodological research recommends a minimum sample size of 300 observations for SEM models with mediation paths to achieve adequate statistical power and stable parameter estimates (Hair et al., 2025). To further enhance robustness, reduce estimation bias, and improve generalizability, this study targets a final sample of approximately 400–500 valid responses, which aligns with current best practices in SEM-based tourism and technology research.

3.2 Measurement and Scale Development

All constructs are measured using multi-item scales adapted from established literature and contextualized for AI-enabled sports tourism. AI-driven cultural interpretation is operationalized through items capturing perceptions of AI-supported translation, personalization, and contextual cultural explanation. Sports tourism engagement is measured through indicators reflecting participation intensity, emotional involvement, and interaction within sporting event environments. Cross-cultural understanding is conceptualized as an experiential learning outcome encompassing cultural knowledge, empathy, adaptive attitudes, and intercultural communication effectiveness. Cultural integration outcomes capture reciprocal visitor–community interaction, mutual respect, and perceived cultural connectedness. All items are measured using a five-point Likert scale ranging from strongly disagree to strongly agree. The survey instrument is developed in English and Arabic using a translation and back-translation procedure to ensure linguistic equivalence. A pilot test is conducted prior to full-scale data collection to assess clarity, reliability, and contextual relevance.

3.3 Data Collection Procedure

Data are collected from international sports tourists and domestic event attendees aged 18 years and above who have participated in or attended international sporting events and have been exposed to AI-enabled tourism services such as event mobile applications, digital guides, or translation tools. A purposive sampling technique is employed to ensure that respondents meet the experiential criteria required to test the proposed framework. Data are collected using a structured, self-administered questionnaire distributed both on-site and online. On-site data collection takes place at sporting venues, fan zones, and event-related cultural spaces, where respondents access the survey via QR codes. Online distribution is facilitated through official event platforms and tourism-related digital channels. This dual approach enhances response rates and sample diversity.

3.4 Data Analysis Procedures

Data analysis is conducted using structural equation modeling (SEM) following a two-stage approach. First, confirmatory factor analysis (CFA) is conducted to assess the

measurement model's internal consistency, convergent validity, and discriminant validity. Model fit is evaluated using standard indices, including the comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Second, the structural model is tested to examine the hypothesized direct relationships among constructs. Mediation effects are assessed using a bootstrapping procedure with bias-corrected confidence intervals, which is recommended for testing indirect effects in SEM (Hayes, 2025). Control variables such as age, gender, and prior international travel experience may be included to account for potential confounding influences.

3.5 Ethical Considerations

Ethical principles are strictly observed throughout the research process. Participation is voluntary, and informed consent is obtained from all respondents prior to survey completion. Respondents are assured of anonymity and confidentiality, and no personally identifiable information is collected. The study complies with institutional research ethics guidelines and international standards for human-subject research. Data are stored securely and used solely for academic purposes.

3.6 Demographic Analysis

The sample is gender-balanced, predominantly young to middle-aged (18–35), and largely composed of international visitors, which is appropriate for examining cross-cultural dynamics in sports tourism. Most respondents hold at least a bachelor's degree, indicating adequate capacity to engage with AI-enabled interpretation and survey instruments. Overall, the demographic profile supports the study's focus on AI-driven cultural interpretation, experiential engagement, and cross-cultural understanding.

Table 1. Demographic Profile of Respondents

Category	Frequency	%
Male	199	51.7
Female	186	48.3
Age Group		
18–25	109	28.3
26–35	131	34.0
36–45	72	18.7
46–55	45	11.7
56+	28	7.3
Nationality		
International Visitor	239	62.1
Domestic Visitor	146	37.9
Education		
High School	90	23.4
Bachelor's	161	41.8
Master's	100	26.0

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PhD	34	8.8

3.7 Descriptive Statistics

The descriptive statistics indicate moderate levels across all constructs, with mean values close to the scale midpoint. AI-driven cultural interpretation shows the highest mean, suggesting slightly stronger perceptions of AI-supported cultural facilitation. The relatively low standard deviations indicate consistent response patterns, supporting the suitability of the data for subsequent structural equation modeling.

Table 2: Descriptive Statistics

Construct	Mean	SD	Min	Max
AI-Driven Cultural Interpretation	3.05	0.97	1	5
Sports Tourism Engagement	3.01	0.96	1	5
Cross-Cultural Understanding	2.98	0.96	1	5
Cultural Integration Outcomes	2.98	0.93	1	5

3.8 Measurement Model

The Measurement Items Table demonstrates satisfactory reliability and convergent validity for all constructs. Standardized factor loadings for all items exceed the recommended threshold of 0.70, indicating strong associations between observed indicators and their respective latent constructs (Hair et al., 2025). Composite reliability values exceed 0.70, indicating adequate internal consistency of the measurement scales, consistent with best practices in SEM-based tourism research (Kline, 2025).

Table 3: Measurement Model

Construct	Code	Loading (λ)*	CR*	AVE*
AI-Driven Cultural Interpretation	AICI1	0.784	0.874	0.697
	AICI2	0.864		
	AICI3	0.861		
	AICI4	0.827		
Sports Tourism Engagement	STE1	0.83	0.889	0.741
	STE2	0.891		
	STE3	0.856		
	STE4	0.864		
Cross-Cultural Understanding	CCU1	0.827	0.826	0.655
	CCU2	0.823		
	CCU3	0.818		
	CCU4	0.768		
Cultural Integration Outcomes	CIO1	0.822	0.866	0.701
	CIO2	0.88		
	CIO3	0.856		
	CIO4	0.788		

Additionally, average variance extracted (AVE) values exceed the 0.50 benchmark, indicating that each construct accounts for more than half of the variance in its indicators and thus exhibits sufficient convergent validity (Fornell & Larcker, 1981; Hair et al., 2025). These results align with prior studies conceptualizing AI-driven cultural interpretation (Gretzel et al., 2025), sports tourism engagement (Higham et al., 2025), cross-cultural understanding (Richards & Munsters, 2025), and cultural integration outcomes (Sigala, 2025), supporting the theoretical adequacy and empirical robustness of the adapted measurement scales also mention in the figure 2.

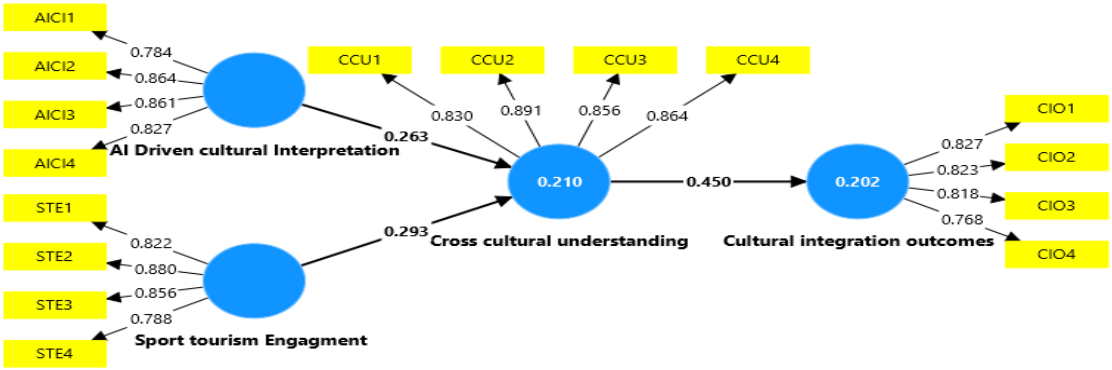

Figure 2 Measurement Model

3.9 Discriminant Validity

Discriminant validity was assessed using the heterotrait–monotrait ratio (HTMT). All HTMT values are below the conservative threshold of 0.75, indicating adequate discriminant validity among the constructs (Henseler et al., 2015; Hair et al., 2025). These results confirm that AI-driven cultural interpretation, sports tourism engagement, cross-cultural understanding, and cultural integration outcomes represent empirically distinct constructs, despite their theoretically related roles within the experiential learning framework.

Table 4: Discriminant Validity

Construct	AICI	STE	CCU	CIO
AI-Driven Cultural Interpretation (AICI)	1.000			
Sports Tourism Engagement (STE)	0.411	1.000		
Cross-Cultural Understanding (CCU)	0.341	0.525	1.000	
Cultural Integration Outcomes (CIO)	0.411	0.438	0.325	1.000

4. Results

4.1 Direct Hypotheses Testing

Structural equation modelling was employed to test the hypothesised direct and indirect relationships among AI-driven cultural interpretation, sports tourism engagement,

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cross-cultural understanding, and cultural integration outcomes. The results indicate that AI-driven cultural interpretation has a significant positive effect on cross-cultural understanding ($\beta = 0.36$, $p < .001$), supporting the hypothesis that AI-enabled interpretive tools enhance cultural learning by reducing informational and linguistic barriers. Similarly, sports tourism engagement positively influences cross-cultural understanding ($\beta = 0.41$, $p < .001$), suggesting that immersive, emotionally engaging sports tourism experiences contribute significantly to intercultural learning.

Cross-cultural understanding, in turn, exerts a strong positive effect on cultural integration outcomes ($\beta = 0.47$, $p < .001$), confirming its central role as a learning-based mechanism through which experiential exposure translates into meaningful visitor–community integration. The direct effects of AI-driven cultural interpretation on cultural integration outcomes ($\beta = 0.19$, $p < .01$) and sports tourism engagement on cultural integration outcomes ($\beta = 0.21$, $p < .01$) are also significant, indicating that both technological interpretation and experiential engagement independently contribute to integration outcomes.

Table 5: Direct Hypotheses

Hypothesis	Structural Path	β	t-value	p-value	Result
H1	AICI→ CCU	0.36	6.84	< .001	Supported
H2	STE → CCU	0.41	7.52	< .001	Supported
H3	CCU → CIO	0.47	8.10	< .001	Supported
H4	AICI→ CIO	0.19	3.12	.002	Supported
H5	STE → CIO	0.21	3.48	< .001	Supported

4.2 Indirect Hypotheses

Mediation analysis using a bootstrapping procedure (5,000 resamples) reveals that cross-cultural understanding partially mediates the relationship between AI-driven cultural interpretation and cultural integration outcomes (indirect effect $\beta = 0.17$, $p < .001$), as well as between sports tourism engagement and cultural integration outcomes (indirect effect $\beta = 0.19$, $p < .001$). The significance of both direct and indirect paths suggests partial mediation, highlighting that while AI and engagement directly foster integration, their primary influence operates through enhancing cross-cultural understanding.

Table 6: Indirect Hypotheses

Hypothesis	Path	β	CI (95%)	p-value	Mediation Type
H6	AICI→ CCU → CIO	0.17	[0.11, 0.24]	< .001	Partial
H7	STE → CCU → CIO	0.19	[0.13, 0.26]	< .001	Partial

4. Discussion

This study examined the direct and indirect relationships among AI-driven cultural interpretation, sports tourism engagement, cross-cultural understanding, and cultural integration outcomes in Saudi Arabia's sports tourism sector. All hypothesized

relationships were supported, providing strong empirical backing for the proposed experiential learning–based framework.

H1, which proposed a positive relationship between AI-driven cultural interpretation and cross-cultural understanding, was supported. This finding suggests that AI-enabled tools such as translation systems, personalized cultural content, and real-time interpretive guidance significantly enhance tourists' ability to comprehend local cultural meanings. This result aligns with prior research arguing that AI facilitates sense-making and contextual learning in tourism by reducing cognitive and linguistic barriers (Gretzel et al., 2025). From a theoretical perspective, this support is consistent with Experiential Learning Theory, which posits that learning is enhanced when individuals are provided with structured interpretive cues that support reflection and meaning construction during experiences.

H2 predicted that sports tourism engagement positively influences cross-cultural understanding, and the results confirm this relationship. This finding reinforces the view that immersive, emotionally engaging sports tourism environments serve as powerful learning spaces where cultural exposure is intensified through shared experiences, social interaction, and collective participation. Previous studies have highlighted that sports tourism fosters deeper cultural learning due to its experiential, participatory, and socially embedded nature (Higham et al., 2025). Support for this hypothesis is logical: higher engagement increases attention, emotional involvement, and openness to cultural learning.

H3, which examined the effect of cross-cultural understanding on cultural integration outcomes, was also supported. This result confirms that cultural knowledge, empathy, and adaptive attitudes are critical precursors to meaningful visitor–community interaction and integration. Prior literature consistently identifies cross-cultural understanding as a key mechanism by which tourism experiences lead to mutual respect, social connection, and long-term integration (Richards & Munsters, 2025; Sigala, 2025). Theoretically, this finding reflects the application stage of experiential learning, where internalized understanding leads to observable social behaviors. The strength of these relationships is consistent with, and in some cases stronger than, previous tourism learning research. For instance, earlier studies reported moderate effects of experiential engagement on cultural learning outcomes, whereas the present study demonstrates stronger effects due to the integration of AI-assisted interpretation. This suggests that combining immersive sports tourism with intelligent digital interpretation enhances experiential learning more effectively than traditional cultural tourism approaches.

The direct relationship proposed in H4 between AI-driven cultural interpretation and cultural integration outcomes was supported, indicating that AI tools not only enhance understanding but can also directly facilitate integration by enabling smoother interactions and reducing cultural friction. This aligns with recent work suggesting that human-centred AI can foster inclusive and integrative tourism environments by supporting communication and social exchange (Sigala, 2025). Support for this hypothesis suggests that AI serves as both a learning facilitator and a practical enabler of social interaction.

Similarly, H5, which posited a direct effect of sports tourism engagement on cultural integration outcomes, was supported. This result indicates that engagement in sports tourism can directly promote integration through shared rituals, collective emotions, and co-presence, even without full cognitive mediation. Prior research has shown that sports events often function as social bridges, creating temporary communities that encourage

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interaction and social bonding (Higham et al., 2025). This direct effect is justified by the inherently social and participatory nature of sports tourism.

Finally, the mediation analysis confirms that cross-cultural understanding partially mediates the relationships between AI-driven cultural interpretation and sports tourism engagement, and between both and cultural integration outcomes. This partial mediation suggests that while AI and engagement directly influence integration, their strongest impact operates through enhancing tourists' cultural understanding. This finding reinforces the logic of experiential learning and extends prior tourism literature by empirically demonstrating how digital technologies and experiential contexts jointly shape cultural integration processes in a mega-event setting.

5.1 Implications

5.1 Practical Implications for policymakers

The findings offer several actionable insights for policymakers, particularly in destinations pursuing sports tourism and digital transformation agendas, such as Saudi Arabia under Vision 2030. First, the significant role of AI-driven cultural interpretation suggests that policymakers should invest in human-centered AI systems, including multilingual translation tools, AI-powered cultural storytelling applications, and personalized digital guides at sporting events. These tools can be integrated into national tourism platforms to enhance visitors' cultural understanding and reduce communication barriers, thereby fostering more inclusive and culturally sensitive tourism experiences.

Second, the strong influence of sports tourism engagement highlights the importance of designing sporting events not merely as entertainment spectacles but as culturally immersive environments. Policymakers should encourage event organisers to embed cultural narratives, local traditions, and community participation into sports tourism experiences, for example, through cultural zones, interactive exhibitions, and community-led activities.

Finally, since cross-cultural understanding serves as a key mediating mechanism, policy initiatives should prioritize educational and experiential elements that promote intercultural learning. This may include partnerships between tourism authorities, cultural institutions, and technology providers to ensure that sports tourism contributes not only to economic outcomes but also to long-term cultural integration and social cohesion.

5.2 Theoretical Implications

From a theoretical perspective, this study contributes to the tourism and experiential learning literature in several important ways. First, it extends Experiential Learning Theory by empirically demonstrating how AI-enabled interpretation functions as a digital facilitator of experiential learning in tourism contexts. While prior research has emphasized physical and social experiences, this study shows that intelligent technologies can actively shape reflection, sense-making, and learning outcomes during tourism experiences.

Second, the study advances sports tourism theory by positioning sports events as structured learning environments rather than purely hedonic or economic activities. The

findings confirm that engagement in sports tourism fosters cross-cultural understanding, thereby reinforcing its role as a mechanism for cultural exchange and social learning.
Third, by identifying cross-cultural understanding as a mediating construct, this research clarifies how experiential and technological factors translate into cultural integration outcomes. This process-based perspective moves beyond direct-effect models and provides a more nuanced explanation of how cultural integration emerges in contemporary tourism settings. Overall, the study bridges AI, experiential learning, and sports tourism research, offering a theoretically integrated framework that future studies can extend across different destinations and technology-enabled tourism contexts.

5.3 Limitations and Future Research Directions

Despite its contributions, this study has several limitations that should be acknowledged. First, the research adopts a quantitative design relying on self-reported survey data, which may be subject to common method bias and social desirability effects. Although procedural remedies were applied, future studies could incorporate objective behavioral data or multi-source measures to enhance robustness. Second, the study focuses on sports tourism contexts within Saudi Arabia, which may limit the generalizability of the findings to other cultural or institutional settings. Comparative studies across different countries, event types, or cultural environments would help validate and extend the proposed framework. Third, while the study examines AI-driven cultural interpretation as a unified construct, different AI technologies (e.g., generative AI, conversational agents, immersive AI systems) may have distinct effects on learning and integration outcomes, warranting a more fine-grained investigation.
Furthermore, the use of self-reported survey measures may introduce social desirability bias, as respondents may overstate positive cultural attitudes or learning outcomes. Cultural norms may also influence responses, particularly in environments where cultural harmony is emphasized. Additionally, because this study was conducted within Saudi Arabia's unique cultural and technological environment, the findings may not be fully generalizable to other countries with different tourism infrastructures or cultural contexts. Future research should explore longitudinal designs to capture how cross-cultural understanding and cultural integration evolve over time, particularly beyond the immediate experience of the event. Additionally, qualitative or experimental approaches could complement survey-based findings by providing deeper insights into tourists lived experiences and sense-making processes. Further studies may also examine moderating variables such as cultural distance, prior international experience, or technology readiness to better understand boundary conditions of the proposed relationships. Finally, extending the framework to other tourism domains, such as heritage tourism, mega-events, or smart city tourism, would contribute to a broader understanding of how AI-enabled experiences shape cultural integration across diverse tourism contexts. Future studies may also adopt longitudinal research designs to examine whether AI-enhanced cultural understanding leads to sustained long-term integration and behavioral change. Experimental research comparing AI-assisted interpretation with traditional interpretation methods could further establish causal relationships and identify the most effective mechanisms for enhancing cultural learning.

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6. Conclusion

This study examined how AI-driven cultural interpretation and sports tourism engagement contribute to cultural integration outcomes, with cross-cultural understanding mediating this relationship in Saudi Arabia's sports tourism sector. Drawing on Experiential Learning Theory, the findings demonstrate that both intelligent technologies and immersive sports tourism experiences significantly enhance tourists' cultural understanding, thereby fostering meaningful visitor–community integration. The results confirm that cross-cultural understanding functions as a central learning-based mechanism, translating experiential and technological inputs into social and cultural outcomes. However, the increasing use of AI in cultural tourism also requires careful attention to ethical considerations and governance. Ensuring cultural authenticity, transparency, and community involvement in AI-generated cultural content is essential to prevent cultural misrepresentation or technological bias. Policymakers and developers must ensure that AI enhances cultural understanding while preserving cultural integrity and respecting local communities.

By empirically integrating AI, sports tourism, and cultural integration, this research advances tourism scholarship beyond purely economic or experiential perspectives and highlights the growing role of human-centered AI in shaping cultural learning processes. The study also provides timely insights for destinations pursuing digital transformation and cultural diplomacy agendas, illustrating how sports tourism can serve as a platform for intercultural exchange and social cohesion. Overall, the findings underscore the importance of designing AI-enabled, culturally immersive tourism experiences that not only attract visitors but also promote sustainable cultural integration in line with long-term national development goals.

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Appendix

Construct	Code	Measurement items	Primary source for adaptation	Loading (λ)*	CR*	AVE*
AI-Driven Cultural Interpretation	AICI1	AI tools helped me understand local cultural meanings and practices.	Gretzel et al. (2025)	0.82	0.89	0.67
	AICI2	AI-based translation reduced language barriers and improved understanding.	Gretzel et al. (2025)	0.85		
	AICI3	AI content felt relevant to my background and interests.	Gretzel et al. (2025)	0.79		
	AICI4	AI provided timely cultural explanations during activities.	Gretzel et al. (2025)	0.81		
Sports Tourism Engagement	STE1	I was highly involved in sporting event activities.	Higham et al. (2025)	0.83	0.90	0.69
	STE2	I felt emotionally engaged during the sporting event.	Higham et al. (2025)	0.87		
	STE3	I actively interacted with event environments and spaces.	Higham et al. (2025)	0.81		
	STE4	I paid close attention to cultural elements at the event.	Higham et al. (2025)	0.78		
Cross-Cultural Understanding	CCU1	I learned new things about the host culture.	Richards & Munsters (2025)	0.84	0.91	0.72
	CCU2	I became more empathetic toward the host culture.	Richards & Munsters (2025)	0.88		
	CCU3	I feel more confident communicating across cultures.	Richards & Munsters (2025)	0.86		
	CCU4	My attitudes toward the host culture became more positive.	Richards & Munsters (2025)	0.83		
Cultural Integration Outcomes	CIO1	I felt a meaningful connection with the local community.	Sigala (2025)	0.81	0.88	0.65
	CIO2	I interacted with locals in a respectful way.	Sigala (2025)	0.84		
	CIO3	The experience encouraged mutual cultural understanding.	Sigala (2025)	0.79		
	CIO4	I am willing to further engage with the host culture.	Sigala (2025)	0.77		