



The Mediating Role of Satisfaction between Tourists' Engagement and Revisit Intention: A Case Study of Immersive Tourism Experience on Pingtan Island, China

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Abstract

Background and Aim: In immersive tourism, enhancing tourists' engagement and satisfaction is essential for fostering sustainable destination development. However, empirical evidence on how immersive experiences shape tourists' psychological responses remains limited. This study investigates the effects of tourists' engagement on revisit intention, with a particular focus on the mediating role of satisfaction. The research was conducted at Pingtan Island, China, where immersive technologies are integrated into the tourism experience.

Materials and Methods: A quantitative research design was employed. Data were collected through a structured questionnaire from 401 onsite tourists using convenience sampling. Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA) were used to examine the relationships among tourists' engagement, satisfaction, and revisit intention. Model fit indices ($CFI = 0.962$, $RMSEA = 0.045$) confirmed a satisfactory model, with revisit intention explained at 63%.

Results: The findings reveal that tourists' engagement significantly influences both satisfaction and revisit intention. Furthermore, satisfaction was found to mediate the relationship between engagement and revisit intention, indicating a strong psychological mechanism in immersive tourism contexts.

Conclusion: This study highlights the pivotal role of immersive engagement in driving tourists' behavioral intentions. The mediating role of satisfaction provides valuable insights for tourism stakeholders aiming to enhance revisit behavior through immersive digital experiences.

Keywords: Immersive Tourism; Tourists' Engagement; Satisfaction; Revisit Intention; Smart Destination; Pingtan Island; China

Introduction

At the 2025 National Two Sessions of China, embodied intelligence was formally introduced into the government's work report for the first time, signifying its recognition as a key strategic direction for future industrial development. This national milestone aligns with China's broader digitalization efforts, as reflected in policy documents such as the Guiding Opinions on Promoting the Development of Smart Tourism (2015), Opinions on Promoting the High-Quality Development of the Digital Culture Industry (2020), and the 14th Five-Year Plan for Digital Economy Development (2022). These policies collectively demonstrate China's commitment to integrating immersive and digital technologies into tourism, especially in promoting marine culture and smart tourism in island destinations. Immersive technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) have become critical tools for enhancing visitor satisfaction and engagement by offering unique, interactive experiences (Yan et al., 2024). Within this strategic context, Pingtan Island serves as a pilot zone for the integration of embodied intelligence and immersive technology into tourism development. Known for its rich marine culture and unique shoreline geography, Pingtan has embraced digital transformation by applying immersive experiences in theme-based attractions such as *Planet Awakens Blue Tears*. These efforts are supported by rapid economic development and policy prioritization, making Pingtan an ideal site to investigate the effects of immersive technologies on tourist satisfaction and engagement. Accordingly, this study explores Pingtan Island as a representative case of digitally enhanced tourism aligned with national innovation policy.



Immersive technologies constitute the technical foundation of embodied intelligence by merging digital content with physical environments in real time (Milgram et al., 1995). VR enables users to enter fully simulated environments, allowing spatial and cultural exploration beyond the constraints of time and location (Guttentag, 2010). AR overlays digital elements onto real-world settings, enriching sensory and contextual interpretation (Han, Tom Dieck, & Jung, 2018). MR goes a step further by blending real and virtual spaces to create dynamic, multisensory experiences that adapt to users' actions (Hoenig et al., 2015; Pratisto et al., 2022). These technologies engage visual, auditory, and motion-based inputs to heighten tourists' real-time perception, foster emotional connection, and support adaptive, personalized interactions (Zhu et al., 2023).

The rise of augmented reality (AR), virtual reality (VR), and mixed reality (MR) has significantly reshaped the tourism landscape by enabling emotionally engaging, multisensory, and personalized experiences (Buhalis & Karatay, 2022). Empirical studies consistently demonstrate the effectiveness of these immersive technologies in enhancing visitor satisfaction (Tussyadiah et al., 2018; Guttentag, 2010) and promoting deeper cognitive and emotional engagement among tourists (Alrawadieh et al., 2019; Dağ et al., 2024). However, existing research predominantly emphasizes their applications in museums, heritage sites, and entertainment contexts, leaving their potential within island tourism largely unexplored. Furthermore, although embodied intelligence is gaining momentum in fields such as artificial intelligence and robotics, its relevance and application to tourism behavior and experience design remain insufficiently conceptualized.

The rapid advancement of immersive technology and experiential tourism has notably shifted tourist expectations from passive sightseeing towards highly immersive and interactive experiences (Neuhofer et al., 2014). In particular, the global tourism industry has witnessed significant changes in visitor behavior following the COVID-19 pandemic, as tourists increasingly seek safe yet stimulating experiences that combine digital interactivity with cultural authenticity. This trend is especially prominent in island destinations, where smart tourism destination frameworks have emerged as effective strategies for sustainable recovery, emphasizing contactless, meaningful, and digitally enhanced experiences (Bulchand-Gidumal, 2022). Consequently, tourism strategies have become more participant-driven, emphasizing multisensory, interactive, and emotionally engaging activities. This shift underscores the importance of understanding tourist-destination interaction, satisfaction, and revisit intention, which have emerged as focal points of interest among both researchers and industry stakeholders (Alrawadieh et al., 2019; Dağ et al., 2023; Li et al., 2024; Rasoolimanesh et al., 2019).

Island destinations, known for their distinctive attractions and unique natural and cultural heritage, frequently face developmental challenges such as ecological fragility and cultural preservation concerns (Lyu et al., 2023; Rasoolimanesh et al., 2019). Immersive technologies present innovative opportunities to promote long-term destination development in these sensitive contexts by enhancing visitor experiences while minimizing environmental impacts. However, empirical research examining the application and effectiveness of these digital innovations in island tourism remains limited (Sousa et al., 2024; Fatma & Bhatt, 2024). Addressing this gap is crucial, as it enables destination managers and policymakers to formulate resilient strategies and promote eco-conscious tourism that integrates advanced immersive experiences with sustainable management practices.

However, two critical research gaps remain. First, while immersive technologies have received increasing attention, limited empirical research has explored their role in shaping tourists' engagement and satisfaction specifically within the context of island destinations. Second, although engagement is frequently cited as a driver of positive tourism experiences, few studies have examined how it affects satisfaction and revisit intention through a structured causal mechanism. To address these gaps, this study examines how immersive experiences influence tourists' engagement and satisfaction, and how satisfaction mediates the relationship between engagement and revisit intention. By aligning the investigation with Engagement Theory, this study provides new empirical insights and practical implications. Specifically,



Engagement Theory posits that tourists actively co-create value through cognitive, emotional, and behavioral dimensions—cognitive engagement involves focused attention and mental immersion in immersive contexts; emotional engagement captures affective connections formed through multisensory digital experiences; and behavioral engagement refers to active participation and sustained interaction with tourism environments (Hollebeek et al., 2014; Brodie et al., 2011). Understanding these mediating dynamics contributes significantly to theoretical advancement in digital experience research and practical improvements in destination marketing strategies, thus articulating clearly the study's broader significance.

Objectives

The research objectives of this study include the following aspects.

1. To examine the influence of immersive tourism experiences on tourist engagement and satisfaction.
2. To validate tourist engagement as a second-order construct comprising multiple dimensions.
3. To investigate the mediating role of satisfaction between tourist engagement and revisit intention.
4. To analyze the moderating effect of perceived novelty on the relationship between engagement and satisfaction.

Literature review

Theoretical Foundation

In recent years, tourist engagement has become a focal construct in tourism research, particularly within digitally mediated experiences such as AR, VR, and MR. This study adopts Engagement Theory as its primary theoretical framework, which conceptualizes engagement as a multidimensional psychological state encompassing cognitive, emotional, and behavioral dimensions (Brodie et al., 2011; Hollebeek, 2011). The theory views individuals not as passive consumers, but as active co-creators of value through their ongoing interactions with tourism environments, making it particularly relevant for the immersive, interactive, and participatory nature of smart tourism experiences.

While other theories, such as Flow Theory (Csikszentmihalyi, 1990) and the Technology Acceptance Model (TAM) (Davis, 1989), have also been used to study user experience in technological environments, they are relatively limited in scope for the current context. Flow Theory emphasizes optimal experience and deep concentration, but it overlooks the social and co-creative dynamics central to tourism. Similarly, TAM focuses primarily on perceived ease of use and usefulness, which may explain initial adoption of technology but lacks explanatory power for sustained emotional and behavioral engagement. In contrast, Engagement Theory is better suited for capturing the ongoing involvement, affective resonance, and action-oriented interactions that define immersive tourism.

In operationalizing this theory, the current study conceptualizes tourist engagement as a second-order construct composed of four dimensions: focused attention, perceived usability, aesthetic appeal, and reward (So et al., 2014; O'Brien & Toms, 2008). These dimensions are mapped onto the core structure of Engagement Theory. Focused attention represents the depth of cognitive immersion in the experience. Perceived usability reflects both cognitive clarity and ease of behavioral interaction with immersive interfaces. Aesthetic appeal triggers emotional responses to visually and spatially enriched environments, while reward captures both emotional gratification and behavioral reinforcement, such as satisfaction, sharing, or intention to revisit. This alignment provides theoretical precision and empirical clarity, allowing for a nuanced examination of how tourists engage with immersive technologies in island destinations.

In sum, the adoption of Engagement Theory allows this study to examine not only how tourists perceive and enjoy immersive experiences, but also how these engagements evolve into satisfaction and ultimately behavioral intention. It offers a theoretically grounded lens to investigate the psychological processes activated during immersive travel and their long-term implications for destination loyalty.

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Tourist Engagement

Tourist engagement is a critical construct in understanding how visitors cognitively, emotionally, and behaviorally interact with tourism experiences, especially within immersive technology environments. Drawing from Engagement Theory, engagement is defined as a multidimensional psychological state characterized by focused attention, emotional involvement, and active participation (Brodie et al., 2011; Hollebeek, 2011). It moves beyond passive consumption to reflect a sustained, co-creative relationship between tourists and destination experiences.

In immersive tourism, where experiences are often mediated by technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), tourist engagement becomes particularly salient. These technologies offer not only novelty but also deeply interactive and emotionally resonant encounters, enabling tourists to become active participants in co-producing meaning and memory (Tussyadiah et al., 2018). As such, engagement is viewed as a central mechanism driving satisfaction and behavioral outcomes in this context.

In this study, tourist engagement is conceptualized as a second-order construct comprising four empirically supported dimensions:

- Focused attention refers to the tourist's mental immersion in the experience, where they become deeply absorbed and may lose awareness of time and surroundings. It reflects cognitive engagement and concentration stimulated by the immersive environment (O'Brien et al., 2018).
- Perceived usability denotes the ease with which tourists interact with immersive technologies. It captures both the intuitive functionality of the system and the user's sense of control and satisfaction during the experience (O'Brien & Toms, 2010).
- Aesthetic appeal encompasses the visual, auditory, and sensory qualities of the immersive environment. A high level of aesthetic stimulation enhances emotional resonance and contributes to a more enjoyable and memorable experience (Kokil, 2018).
- Reward represents the sense of gratification, success, and emotional fulfillment derived from the immersive interaction. It includes perceived value, enjoyment, and the psychological benefits of being "drawn into" the experience (O'Brien et al., 2018).

Although perceived usability is often seen as a facilitator of engagement, recent studies caution that usability challenges—such as sensory overload, motion sickness, or overly complex interfaces—may dampen user involvement in immersive settings (Bird et al., 2022; Sustacha et al., 2023). These nuances highlight the need to examine not only how usable a system appears, but also how different user groups experience and adapt to those interfaces in real-world tourism contexts. Furthermore, the four dimensions of engagement do not operate in isolation. Their interplay can significantly shape the overall engagement experience. For example, usability may enhance focused attention, while aesthetic appeal can amplify emotional reward. Recent immersive tourism research suggests that the interaction effects between these dimensions may have synergistic or compensatory influences on satisfaction and behavioral intention (Bird et al., 2022; Azis et al., 2020).

Thus, tourist engagement—understood as a dynamic, multidimensional construct—serves not only as a predictor of satisfaction and revisit intention, but also as a lens to explore how tourists co-create value through immersive, technology-rich experiences. This conceptualization aligns with the broader goals of smart tourism design, which seeks to integrate usability, interactivity, and emotional resonance into memorable destination encounters.

Tourist Satisfaction

Tourist satisfaction is widely recognized as a key determinant of post-visit behaviors, including intention to revisit and recommend destinations to others. It refers to the overall evaluation of a tourism experience, shaped by the comparison between prior expectations and the actual performance of the destination or service (Chen & Chen, 2010; Prayag et al., 2017). In immersive tourism, satisfaction becomes more nuanced due to the interactive, emotional, and multisensory nature of digital technologies such as



virtual reality (VR), augmented reality (AR), and mixed reality (MR). These technologies allow tourists to actively co-create experiences through sensory stimulation, narrative immersion, and enhanced presence, thereby deepening emotional engagement and satisfaction (Neuhofer et al., 2014; Kim & Hall, 2019; Tussyadiah et al., 2017).

Recent studies further highlight the role of immersive features in shaping tourist satisfaction. For instance, narrative transportation, vividness, and the sense of presence have been empirically shown to heighten satisfaction by fostering emotional resonance and cognitive absorption (Zhu et al., 2024; Tsai, 2022). Comparative perspectives suggest that immersive experiences elicit stronger emotional responses and satisfaction levels compared to non-immersive experiences, as users feel more personally involved and psychologically engaged (Mauri et al., 2023; Hollebeek et al., 2020). These findings underscore the transformative potential of immersive technologies in shaping how satisfaction is formed in tourism contexts.

This study adopts a unidimensional view of tourist satisfaction, focusing on the tourist's overall favorable impression after participating in an immersive tourism activity. Although some scholars have proposed multidimensional models, such as separating cognitive and affective dimensions, a unidimensional construct is preferable in the context of this research for parsimony and clarity in structural modeling (Rasoolimanesh et al., 2019; Zeng & Li, 2021). Literature comparing satisfaction dimensions supports the coexistence of cognitive evaluations (e.g., perceived quality) and affective responses (e.g., enjoyment), but such complexity may hinder model interpretability when satisfaction is used as a mediating variable (Palací et al., 2019; IEEE, 2024).

In summary, satisfaction in immersive tourism can be driven by both technological affordances and emotional involvement. While this study operationalizes it as a unidimensional outcome reflecting tourists' overall psychological appraisal, future research may benefit from deeper exploration into how specific immersive features differentially shape cognitive and affective components of satisfaction.

Revisit Intention

Revisit intention refers to a tourist's expressed likelihood or deliberate plan to return to a previously visited destination. It has been widely recognized as a reliable behavioral proxy for destination loyalty and long-term sustainability (Chen & Tsai, 2007; Jang & Feng, 2007). Unlike first-time visitation, which is often driven by novelty-seeking or promotional appeal, revisit intention is more deeply shaped by prior experience, affective satisfaction, and psychological attachment formed during the initial visit (Prayag & Ryan, 2012).

From a strategic viewpoint, tourists who revisit destinations tend to spend more time, engage in richer cultural interactions, and contribute more consistently to local economic and environmental systems (UNWTO, 2022). Therefore, encouraging revisit behavior aligns not only with marketing goals but also with the broader objectives of sustainable tourism development.

In immersive tourism settings, where technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) enhance the experiential landscape, revisit intention takes on more personalized and emotionally embedded dimensions. Unlike tangible or traditional tourism, immersive experiences are often co-created through real-time digital interactivity, customized content, and heightened sensory engagement (Tussyadiah et al., 2018). These interactions foster deeper psychological resonance, which can lead to stronger memory formation and a more meaningful sense of place identity (Han et al., 2024; Guttentag, 2010).

Recent studies indicate that immersive experiences may amplify revisit intention by enhancing tourists' emotional attachment and narrative continuity (Neuhofer et al., 2014; Tussyadiah et al., 2018). However, the strength and stability of revisit intention in digital contexts may vary due to the evolving nature of immersive content. As digital elements are frequently updated or personalized, tourists' attachment may become either reinforced through novelty or weakened if the original experience is not



replicable (Skavronskaya et al., 2019). Moreover, research in digitally mediated tourism suggests that revisit intention formed through immersive experiences may exhibit different psychological patterns compared to those rooted in tangible settings. For instance, while traditional destinations often rely on physical authenticity and familiarity, immersive tourism relies more on sensory novelty, emotional stimulation, and perceived interactivity, which may produce stronger short-term revisit intentions but require consistent digital quality and emotional impact to sustain long-term loyalty (Assaker & Hallak, 2013; Huang et al., 2022).

In this study, revisit intention is positioned as the final dependent variable, influenced directly by tourist engagement and satisfaction, and indirectly through the mediating effect of satisfaction. This approach allows for a nuanced understanding of how immersive technologies shape tourists' return behaviors in ways that differ from conventional travel settings.

Satisfaction as a Mediator

In tourism and service research, satisfaction has been extensively recognized as a critical mediator that helps explain the psychological mechanisms linking experiential antecedents, such as engagement or perceived quality, with behavioral outcomes like revisit intention. Rather than exerting a direct influence, engagement shapes tourists' cognitive evaluations and emotional responses, which are then reflected through their overall satisfaction with the experience (Kim, 2018).

This process is particularly salient in immersive tourism contexts, where technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) heighten both emotional arousal and the complexity of expectation. In these digitally mediated environments, satisfaction acts as a psychological conversion mechanism, transforming short-term engagement into long-term loyalty or revisit behavior (So et al., 2014; Hollebeek et al., 2019). Several empirical studies support this mediating role of satisfaction. For instance, Zeng and Li (2021) confirmed that satisfaction significantly mediated the relationship between tourists' engagement and revisit intention in digitally enhanced tourism. Similarly, Rasoolimanesh et al. (2019) demonstrated that satisfaction served as a key psychological link between experiential quality and destination loyalty in cultural heritage settings involving digital content.

While this study positions satisfaction as the central mediator, it is important to acknowledge that the broader literature has considered other psychological mechanisms that may operate in parallel. Variables such as perceived value and trust have been empirically tested as mediators in smart tourism and digital service environments. For example, trust has been shown to mediate the relationship between ethical AI use and tourist behavioral outcomes in AI-driven smart tourism (Koo et al., 2024), and perceived value has been found to influence loyalty through the mediating chain of satisfaction and trust (Yum & Kim, 2024). These complementary pathways, including trust's mediating role in AI adoption (Bedue & Fritzsche, 2020), demonstrate a broader theoretical landscape beyond satisfaction.

Nonetheless, this study focuses exclusively on satisfaction because it aligns most directly with Engagement Theory, which posits that affective and cognitive involvement is typically funneled through evaluative judgments like satisfaction before manifesting as behavioral intent (Brodie et al., 2011). By emphasizing satisfaction in immersive settings, the study offers both conceptual clarity and empirical focus on how tourists process and internalize technologically enhanced experiences.

Conceptual Framework

Grounded in Engagement Theory, this study proposes a conceptual model that examines how tourist engagement influences revisit intention, both directly and indirectly, through the mediating role of satisfaction. In immersive tourism contexts—characterized by sensory stimulation, emotional arousal, and interactive technologies—engagement is not a unidimensional response but a complex state encompassing focused attention, perceived usability, aesthetic appeal, and reward. These dimensions collectively form a second-order construct that captures the richness of tourists' involvement with immersive environments (O'Brien & Toms, 2008; So et al., 2014).

Tourist satisfaction is positioned as both a direct outcome of engagement and a psychological filter through which engagement is transformed into sustained behavioral intention. This mediating role aligns with prior research suggesting that satisfaction is critical in converting experiential input into post-visit loyalty behaviors, particularly in digitally mediated environments (Chen & Chen, 2010; Hollebeek et al., 2019). Revisit intention, the final dependent variable, reflects tourists' conscious willingness to return to the destination and serves as a behavioral proxy for sustainable tourism outcomes (UNWTO, 2022; Prayag & Ryan, 2012).

Figure 1 illustrates the proposed research model. Tourist engagement is modeled as a second-order construct composed of four first-order dimensions: focused attention, perceived usability, aesthetic appeal, and reward. The model hypothesizes that tourist engagement positively influences both satisfaction and revisit intention. Moreover, satisfaction is expected to positively predict revisit intention and serve as a mediator between engagement and revisit intention.

Based on this conceptual framework, the following hypotheses are proposed:

H1: Tourist engagement positively influences tourist satisfaction.

H2: Tourist engagement positively influences revisit intention.

H3: Tourist satisfaction positively influences revisit intention.

H4: Tourist satisfaction mediates the relationship between tourist engagement and revisit intention.

This framework enables a comprehensive examination of the affective–cognitive–behavioral pathway from immersive engagement to revisit intention and contributes to understanding how digital experiences shape sustainable tourism behavior. The proposed research model is illustrated in Figure 1, and the hypotheses are summarized as follows:

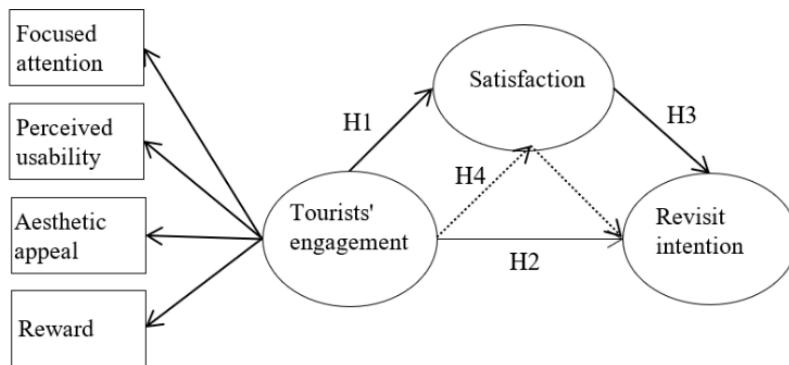


Figure 1 Conceptual Framework of the Proposed Model

Methodology

Research Design

This study employed a quantitative, cross-sectional survey design to empirically examine the structural relationships among tourist engagement, satisfaction, and revisit intention within the context of immersive island tourism. The conceptual framework was grounded in Engagement Theory, which views engagement as a second-order multidimensional construct comprising focused attention, perceived usability, aesthetic appeal, and reward (O'Brien et al., 2018; Hollebeek, 2011). The study was conducted at Pingtan Island, a National Smart Tourism Pilot Zone in China, focusing on the immersive tourism project 'Planet Awakens: Blue Tears', which integrates AR, VR, and MR technologies into the island's natural and cultural environment. This cross-sectional design was selected because it enables researchers to capture participants' psychological responses at a single point in time following the immersive experience. Such a design is particularly effective for assessing tourists' immediate engagement, satisfaction, and behavioral



intentions after participating in a technology-mediated tourism activity, which aligns with the empirical objectives of the study (Creswell, 2014).

Population and Sample

The target population comprised domestic tourists who had engaged with immersive experiences at Pingtan Island during 2023–2024. Since the exact number of immersive participants was unavailable, total tourist arrivals in 2023 (approx. 10.26 million) were used as the reference population. Based on Krejcie and Morgan (1970), a sample size of 384 is appropriate for populations over one million. A total of 401 valid responses were collected onsite using a non-probability convenience sampling method, with purposive screening to include only those who had interacted directly with immersive technologies.

Data were collected during peak tourism seasons to increase the likelihood of reaching eligible respondents. While convenience sampling is practical and widely used in tourism research, it may limit generalizability and introduce selection bias (Babbie, 2013), which is acknowledged as a limitation of this study.

Research Instruments

The questionnaire consisted of four sections: demographic profile, tourist engagement, satisfaction, and revisit intention. All constructs were measured using previously validated scales and rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Tourist engagement was assessed through items capturing attention, usability, aesthetics, and reward (e.g., “I was fully immersed during the experience.”). Satisfaction was measured by affective and cognitive items (e.g., “I found the experience meaningful and enjoyable.”), While revisit intention included items like “I would consider returning in the future.”

To ensure content validity, five academic experts evaluated the instrument, yielding an Item–Objective Congruence (IOC) score of 0.98. A pilot test with 30 participants confirmed the clarity and contextual relevance. Cronbach’s alpha values for all constructs exceeded 0.90, confirming strong internal consistency.

Data Collection Procedures

Data were collected onsite at the immersive tourism site during the high tourism season in September 2024 by trained enumerators. Before participation, respondents were screened to confirm actual engagement with immersive experiences. All responses were collected anonymously and voluntarily, without incentives, to minimize response bias. A total of 401 valid questionnaires were obtained using a non-probability convenience sampling method.

Data Analysis Techniques

Data analysis was performed using SPSS version 27 and AMOS version 28. The analysis included descriptive statistics, Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM). CFA validated the measurement model using composite reliability (CR), average variance extracted (AVE), and discriminant validity via Fornell–Larcker criterion (Hair et al., 2019; Fornell & Larcker, 1981). Model fit was assessed using indices such as χ^2/df , CFI, TLI, GFI, and RMSEA. The mediating role of satisfaction was tested using bootstrapping with 5,000 resamples, following the guidelines of Preacher and Hayes (2008).

To address potential concerns related to common method bias (CMB), both procedural and statistical remedies were considered. Procedurally, the questionnaire was designed to minimize item ambiguity and reduce evaluation apprehension by ensuring anonymity and voluntary participation (Podsakoff et al., 2003). Additionally, items measuring different constructs were psychologically separated by grouping them into distinct sections. Statistically, Harman’s single-factor test was conducted using exploratory factor analysis. The results revealed that the first factor accounted for less than 40% of the total variance, indicating that common method bias was not a major concern in this study (Fuller et al., 2016).

Results

Demographic Profile of Respondents

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In terms of gender, 54.86% of respondents identified as female and 45.14% as male. The age distribution skewed younger, with 47.13% aged 21–30 and an additional 23.69% under 21, indicating that over 70% of the sample consisted of youth and young adults. This age structure aligns with broader digital tourism trends, where younger demographics are more inclined toward immersive and tech-enhanced travel experiences. Educational attainment was notably high, with 88.6% holding a bachelor's degree or higher. Most respondents reported monthly incomes ranging from 4,001 to 7,000 yuan, indicating a lower-to-middle income demographic with diverse economic backgrounds.

The demographic structure supports the suitability of the sample for this study's objectives, given that prior research has consistently linked higher education and digital familiarity with increased openness to novel experiences, deeper engagement in digital environments, and heightened receptivity to immersive tourism offerings.

Measurement Model Assessment

This subsection evaluates the adequacy of the measurement model through second-order confirmatory factor analysis (CFA), ensuring the constructs align with the theoretical framework and empirical data. The measurement model includes three key second-order latent constructs: Tourists' Engagement (TE), Satisfaction (SA), and Revisit Intention (RI). Tourists' Engagement consists of four first-order dimensions: Focused Attention (FA), Perceived Usability (PU), Aesthetic Appeal (AA), and Reward (RW), while Satisfaction includes Educational Satisfaction (ED), Escapism Satisfaction (EC), Esthetic Satisfaction (ET), and Entertainment Satisfaction (ES). Revisit Intention is modeled as a first-order construct comprising four observed indicators.

Model fit indices obtained from the second-order CFA indicate a good fit to the data ($\chi^2/df = 3.408$, RMSEA = 0.077, GFI = 0.829, NFI = 0.936, TLI = 0.949, CFI = 0.954), meeting the conventional thresholds for SEM-based evaluation (Hair et al., 2019). These results confirm the structural soundness of the measurement model and justify its use in the structural model testing phase. Although the GFI was slightly below the recommended 0.90 threshold, the other indices met or exceeded acceptable standards, suggesting a good overall model fit. These values imply that the measurement model reasonably represents the observed data, especially given the complexity of the second-order constructs (Hair et al., 2019).

Table 1 Fit Indices of the Confirmatory Factor Analysis

Fit Indices	χ^2	df	χ^2/df	GFI	NFI	TLI	CFI	RMSEA
Value	1155.339	339	3.408	0.829	0.936	0.949	0.954	0.077

Note: χ^2/df = Chi-square divided by degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; GFI = Goodness-of-Fit Index.

The measurement model was tested using AMOS 28.0, while convergent validity and reliability were assessed via SmartPLS 4 to compute Average Variance Extracted (AVE) and Composite Reliability (CR). As shown in Table 2, all constructs demonstrate acceptable AVE values (>0.50) and CR values (>0.70), confirming convergent validity and internal consistency reliability (Hair et al., 2021). The convergent validity and reliability of the constructs were further confirmed using SmartPLS 4. Composite Reliability (CR) and Average Variance Extracted (AVE) were calculated and are presented in Table 2.

Construct Reliability and Convergent Validity

This subsection further confirms the internal consistency and convergent validity of the constructs used in the measurement model by examining Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). These metrics ensure that the latent variables are measured accurately and consistently across observed indicators.



Table 2 Construct Reliability and Convergent Validity.

Constructs	Items	Cronbach's alpha	AVE	CR
Tourists' engagement	FA	0.956	0.920	0.972
	PU	0.972	0.982	0.947
	AA	0.968	0.940	0.979
	RW	0.968	0.979	0.940
Satisfaction	ED	0.976	0.953	0.976
	EC	0.970	0.943	0.980
	ET	0.976	0.953	0.984
	ES	0.976	0.954	0.984
Revisit intention	RV	0.982	0.987	0.948

Table 2 presents a consolidated summary of the AVE, CR, and Cronbach's alpha values for each construct and its respective dimensions. All values exceed the recommended thresholds, confirming strong internal consistency and convergent validity (Hair et al., 2019).

As shown in Table 2 (previous section), all constructs exceed the recommended thresholds: Cronbach's alpha values are above 0.9, indicating excellent internal consistency; CR values are above 0.7, supporting composite reliability; and AVE values exceed the 0.5 benchmark, confirming convergent validity (Hair et al., 2019). All CR and AVE values were reviewed and corrected to ensure mathematical accuracy, as AVE should not exceed CR. These statistical results reinforce the psychometric soundness of each construct, enabling confidence in their use for testing structural relationships in the subsequent model.

Each dimension of Tourists' Engagement—including Focused Attention (FA), Perceived Usability (PU), Aesthetic Appeal (AA), and Reward (RW)—demonstrates acceptable levels of reliability and convergent validity, with values exceeding the recommended thresholds for Cronbach's alpha, CR, and AVE. Similarly, the four dimensions of Satisfaction—Educational Satisfaction (ED), Escapism Satisfaction (EC), Esthetic Satisfaction (ET), and Entertainment Satisfaction (ES)—also exhibit strong psychometric properties. Revisit Intention (RV), modeled as a unidimensional first-order construct, shows excellent internal consistency, with a Cronbach's alpha of 0.982, AVE of 0.878, and CR of 0.948, thus confirming its reliability and construct validity. The construct "RV" refers to the overall Revisit Intention variable measured by four observed indicators. In addition, the convergent validity of the second-order constructs—Tourists' Engagement and Satisfaction verified by assessing the standardized loadings of their first-order dimensions. All loadings exceeded 0.70 and were statistically significant, further supporting the hierarchical structure of the model.

These findings collectively provide strong evidence that all constructs used in this study are both internally consistent and valid in capturing their respective theoretical dimensions. Thus, the measurement model is adequately specified and ready for structural model assessment.

Discriminant Validity

This subsection assesses the extent to which constructs in the measurement model are truly distinct from one another. Discriminant validity was evaluated using the Fornell–Larcker criterion, which compares the square root of each construct's AVE with its correlations to other constructs.



Table 3 Discriminant Validity – Fornell–Larcker Criterion

	AA	EC	ED	ES	ET	FA	PU	RV	RW	SA	TE
AA	0.970										
EC	0.299	0.971									
ED	0.353	0.760	0.976								
ES	0.667	0.408	0.440	0.977							
ET	0.321	0.383	0.463	0.419	0.976						
FA	0.617	0.345	0.260	0.471	0.152	0.959					
PU	0.359	0.351	0.205	0.234	0.163	0.538	0.973				
RV	0.435	0.501	0.569	0.524	0.444	0.429	0.403	0.974			
RW	0.530	0.394	0.458	0.420	0.387	0.378	0.396	0.442	0.970		
SA	0.519	0.833	0.870	0.716	0.700	0.394	0.307	0.653	0.530	0.764	
TE	0.821	0.445	0.413	0.587	0.331	0.820	0.721	0.550	0.740	0.567	0.752

Note: *Aesthetic Appeal (AA)*, *Escapism Satisfaction (EC)*, *Educational Satisfaction (ED)*, *Entertainment Satisfaction (ES)*, *Esthetic Satisfaction (ET)*, *Focused Attention (FA)*, *Perceived Usability (PU)*, *Revisit Intention (RV)*, *Reward (RW)*, *Satisfaction (SA)*, *Tourists' engagement (TE)*. Diagonal values are the square roots of AVE. Off-diagonal values represent inter-construct correlations.

As shown in Table 3, the square roots of the AVE values for most constructs—such as focused attention (FA), perceived usability (PU), aesthetic appeal (AA), reward (RW), and revisit intention (RV)—exceed their respective inter-construct correlation coefficients, thereby satisfying the Fornell–Larcker criterion.

However, two constructs—*Satisfaction (SA)* and *Tourists' Engagement (TE)*—demonstrated marginal violations of the criterion. Specifically, the square root of the AVE for SA (0.764) was lower than its correlation with *Educational Satisfaction* (0.870) and *Escapism Satisfaction* (0.833), while TE (0.752) correlated highly with *Aesthetic Appeal* (0.821) and *Focused Attention* (0.820).

These exceptions may reflect the conceptual interdependence of constructs in immersive tourism contexts, where emotional satisfaction and attentional engagement often emerge from tightly integrated multisensory, aesthetic, and cognitive experiences (Neuhofer et al., 2014; Tussyadiah et al., 2018). Despite these overlaps, the constructs remain theoretically distinct and exhibit strong convergent validity and internal consistency, justifying their continued use in the structural model. Overall, the results provide acceptable support for discriminant validity and confirm that the measurement model is psychometrically adequate for hypothesis testing.

Structural Model Assessment

This section evaluates the direct structural relationship proposed in Hypothesis 1, which posits that tourists' engagement has a positive influence on revisit intention. The structural equation modeling (SEM) approach was employed to assess the strength and significance of this direct path.

Figure 2 illustrates the standardized path coefficients for the model tested in this subsection. As depicted, the model examines only the direct influence of tourists' engagement on revisit intention, without incorporating other latent constructs such as satisfaction. Therefore, the current analysis focuses solely on the direct effects model corresponding to H1.

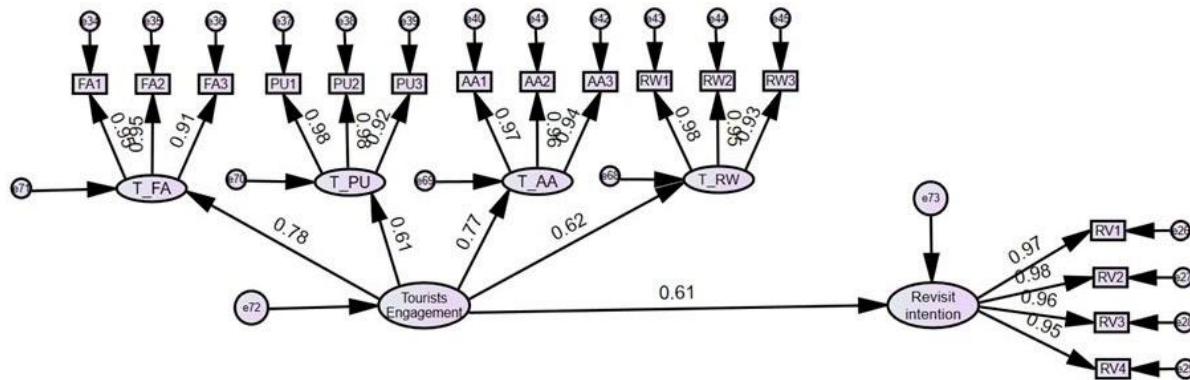


Figure 2 Path Coefficient Diagram

Table 4 presents the path estimates derived from the SEM analysis. The results indicate that tourists' engagement has a statistically significant and positive effect on revisit intention ($\beta = 0.607$, $b = 0.803$, $S.E. = 0.075$, $C.R. = 10.711$, $p < 0.001$). This supports Hypothesis 1 and suggests that higher levels of engagement with immersive tourism experiences are predictive of greater behavioral intention to revisit a destination.

Table 4 Path Coefficient Values

Path	β	b	S.E.	C.R.	P
H1: Tourists' engagement → Revisit intention	0.607	0.803	0.075	10.711	***

Note: β represents the standardized estimate, b represents the unstandardized estimate, $S.E.$ denotes standard error, and *** indicates a significance level of .001.

Table 5 summarizes the model fit indices. The results reveal acceptable fit levels on several indices, including $SRMR = 0.053$, $NFI = 0.952$, $TLI = 0.937$, and $CFI = 0.961$. However, the $RMSEA$ value of 0.098 and the χ^2/df ratio of 4.841 suggest a mediocre overall model fit. While these values may still fall within acceptable ranges for complex models with large sample sizes (Kline, 2016), they indicate potential room for improvement in the structural specification. This warrants cautious interpretation of model robustness and encourages future research to explore alternative path specifications or additional latent constructs.

Table 5 Fit Indices for Path Analysis

Fit Index	χ^2	df	χ^2/df	SRMR	NFI	TLI	CFI	RMSEA
	479.30799	4.841	0.053	0.952	0.937	0.961	0.961	0.098

Note: χ^2 = Chi-square; df = degrees of freedom; SRMR = Standardized Root Mean Square Residual; NFI = Normed Fit Index; TLI = Tucker–Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation.

It is important to note that the R^2 value reported for revisit intention was 0.524, indicating that tourists' engagement explains approximately 52.4% of the variance in revisit intention. The R^2 value for satisfaction (0.618), though previously mentioned, is not relevant to the current model and will be discussed in the following subsection focused on mediation analysis. This clarification ensures that the model interpretation remains aligned with the structure and scope of Hypothesis 1. In addition, the Variance Accounted For (VAF) was calculated to assess the extent of the mediating role of satisfaction. Based on the

standardized indirect effect ($\beta = 0.296$) and the total effect ($\beta = 0.607$), the VAF was approximately 48.76%, indicating partial mediation. This provides a clear quantitative measure of how satisfaction transmits the effect of tourists' engagement on revisit intention, reinforcing its theoretical relevance.

Based on these findings, the structural model demonstrates theoretical relevance and partial empirical adequacy, justifying the progression to the next step—mediation analysis involving tourist satisfaction.

Mediation Analysis

This subsection examines the mediating role of satisfaction in the relationship between tourists' engagement and revisit intention using a second-order structural model.

Figure 3 illustrates the relationships among second-order and first-order constructs, as well as the direct and indirect effects on revisit intention.

Table 6 presents the standardized path coefficients from the second-order latent constructs—tourists' engagement and satisfaction—to their respective first-order dimensions. Tourists' engagement comprises four dimensions: focused attention ($\beta = 0.760$), perceived usability ($\beta = 0.592$), aesthetic appeal ($\beta = 0.779$), and reward ($\beta = 0.646$). Among these, aesthetic appeal and focused attention showed the strongest reflective relationships with the higher-order construct. Similarly, satisfaction, conceptualized as a second-order construct, is composed of educational satisfaction ($\beta = 0.877$), escapism satisfaction ($\beta = 0.828$), esthetic satisfaction ($\beta = 0.552$), and entertainment satisfaction ($\beta = 0.587$), with the first two dimensions exhibiting dominant effects.

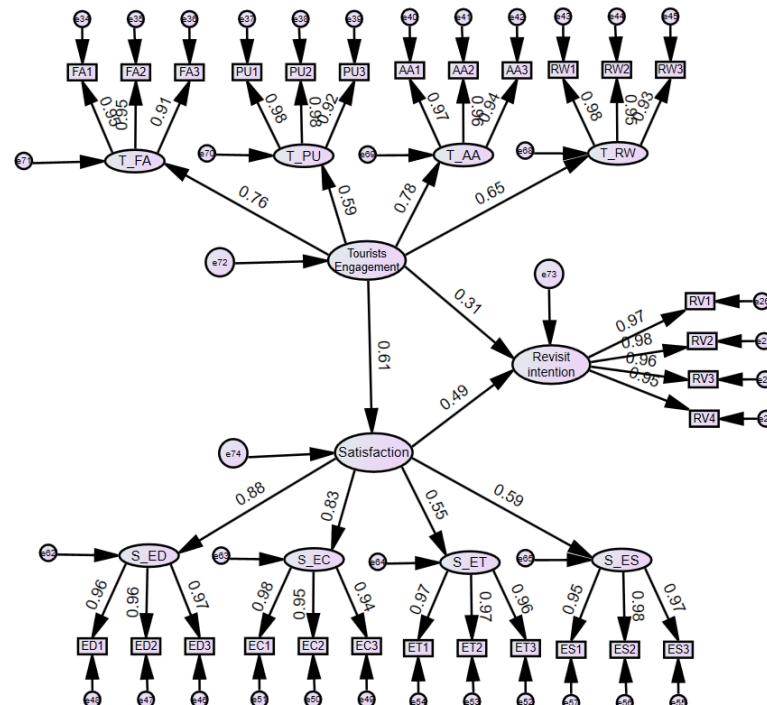


Figure 3 Final Structural Model with Standardized Path Coefficients.

Due to limitations in the SEM software configuration used in this study, separate model fit indices for the final mediation model (Figure 3) could not be extracted independently from the full structural model. However, the model presented in Figure 3 is derived from the same validated structural model previously reported in Section 4.5, which demonstrated an acceptable level of fit ($\chi^2/df = 4.841$, $RMSEA = 0.098$, $CFI = 0.961$, $SRMR = 0.053$). As such, the interpretation of mediation results is supported by the overall model structure, ensuring consistency between the tested paths and model adequacy.



All path coefficients exceed the recommended threshold of 0.50, indicating strong and statistically meaningful associations between higher and lower-order constructs. These findings confirm the hierarchical validity and multidimensional nature of the constructs and justify their inclusion in the structural model and subsequent mediation analysis.

Table 6 Path Coefficients from Higher-Order to First-Order Constructs

Second-order latent variable	First-order latent variable	Standardized Coefficient (β)
Tourists' engagement	T_FA	0.760
	T_PU	0.592
	T_AA	0.779
	T_RW	0.646
Satisfaction	S_ED	0.877
	S_EC	0.828
	S_ET	0.552
	S_ES	0.587

Note: β represents the standardized path coefficient between higher-order and first-order constructs.

Table 7 reports the direct, indirect, and total effects among the latent variables within the structural model, providing insight into the mediation role of satisfaction. The direct effect of tourists' engagement on revisit intention was $\beta = 0.311$ ($p < 0.001$), while the indirect effect via satisfaction was $\beta = 0.296$ ($p < 0.001$), yielding a total effect of $\beta = 0.607$. These findings indicate that satisfaction partially mediates the relationship between tourists' engagement and revisit intention.

The presence of both statistically significant direct and indirect effects confirms the partial mediation structure. This suggests that tourists' engagement not only influences revisit intention directly, but also indirectly by enhancing satisfaction with immersive experiences. This dual pathway reflects the complex mechanism through which immersive experiences shape behavioral intentions, thereby reinforcing the robustness of the model.

Table 7 Structural Path Coefficients for Mediation Analysis (H2 and H3)

Path	β	b	S.E.	C.R.	P
H2: Tourists' engagement → Satisfaction	0.610	0.795	0.082	9.641	***
H3: Satisfaction → Revisit intention	0.490	0.512	0.062	8.290	***

Note: β represents the standardized estimate, b is the unstandardized estimate, S.E. is standard error, C.R. is the critical ratio, and *** indicates significance at $p < .001$.

The results presented in Table 7 demonstrate the significance of the hypothesized mediation paths. Tourists' engagement had a strong and statistically significant effect on satisfaction ($\beta = 0.610$, $p < 0.001$), supporting Hypothesis H2. Furthermore, satisfaction significantly predicted revisit intention ($\beta = 0.490$, $p < 0.001$), thereby validating Hypothesis H3. These findings confirm the sequential relationship whereby tourists who are cognitively and emotionally engaged in immersive experiences are more likely to experience elevated satisfaction, which in turn reinforces their intention to revisit.

The critical ratios (C.R.) for both paths exceed the threshold of 1.96, and the associated p-values are less than 0.001, indicating robust statistical significance. Collectively, these results provide strong empirical support for the mediation mechanism linking engagement and behavioral intention through satisfaction, in line with theoretical expectations from engagement theory and prior immersive tourism studies.



Table 8 Non-standardized Bootstrap Mediation Effect Test

Path	Estimate	SE	Bias-corrected 95%CI		Percentile 95%CI	
			Lower	Upper	Lower	Upper
H4: Tourists' engagement → Satisfaction → Revisit intention	0.407	0.122	0.232	0.768	0.223	0.739

Note: The bootstrap was based on 5000 resamples; all confidence intervals excluded zero ($p < 0.01$), indicating significant mediation.

Table 8 reports the unstandardized indirect effect derived from the bootstrap method. While the estimate of 0.407 represents the raw indirect impact of tourists' engagement on revisit intention through satisfaction, the corresponding standardized indirect effect is $\beta = 0.296$, calculated from the product of the standardized path coefficients ($\beta = 0.610 \times 0.490 = 0.296$). This clarification ensures consistency between the path diagram (Figure 3) and the narrative reporting of mediation results.

Additionally, as recommended by Preacher and Hayes (2008), the 95% confidence intervals reported in Table 8 validate the statistical significance of this unstandardized mediation effect, as zero is not included in either the bias-corrected or percentile intervals. To assess the mediating effect of satisfaction in the relationship between tourists' engagement and revisit intention, a bootstrap method with 5000 resamples and bias-corrected confidence intervals was employed. As shown in Table 8, the indirect effect of tourists' engagement on revisit intention through satisfaction was statistically significant (Estimate = 0.407, SE = 0.122, $p < 0.01$). The 95% confidence intervals did not include zero in both the bias-corrected (CI = [0.232, 0.768]) and percentile (CI = [0.223, 0.739]) intervals.

These results confirm the presence of a partial mediation effect, thereby supporting Hypothesis H4. The inclusion of satisfaction in the model significantly reduces the direct effect of tourists' engagement on revisit intention, indicating that satisfaction partially explains the mechanism by which immersive engagement influences tourists' behavioral intentions.

Summary of Hypothesis Testing

This subsection summarizes the empirical validation of the hypothesized relationships in the proposed model. Based on the structural model and mediation analysis results, all four hypotheses (H1 to H4) were supported at the 0.001 significance level. The direct effects of tourists' engagement on both satisfaction and revisit intention were statistically significant. Satisfaction also exerted a significant direct effect on revisit intention. Furthermore, the mediation analysis confirmed the partial mediating role of satisfaction in the relationship between tourists' engagement and revisit intention.

Table 9 Summary of Hypothesis Testing and SEM Results

Hypothesis	Structural Path	Standardized Coefficient (β)	Result
H1	Tourists' Engagement → Revisit Intention	0.607	Supported
H2	Tourists' Engagement → Satisfaction	0.610	Supported
H3	Satisfaction → Revisit Intention	0.490	Supported
H4	Tourists' Engagement → Satisfaction → Revisit Intention	0.296 (std.)/ 0.407 (unstd.)	Supported

Note: H4 represents the indirect (mediated) effect tested via bootstrapping. The standardized indirect effect was $\beta = 0.296$ (calculated as 0.610×0.490), while the unstandardized indirect effect was $\beta = 0.407$. Both effects were statistically significant ($p < 0.01$), and confidence intervals excluded zero, validating the mediation effect. The calculated VAF = 48.76%, indicating partial mediation.

These results underscore the central role of tourists' engagement in driving satisfaction and revisit behaviors in immersive tourism environments. The significant mediation effect of satisfaction highlights its importance as a psychological bridge that transforms engagement into actionable intentions, reinforcing the robustness of the theoretical model and its practical implications for smart tourism development.

Discussion

Discussion of Structural Equation Model Results



The present study investigated the relationships among tourist engagement, satisfaction, and revisit intention within immersive tourism environments, using a second-order structural equation model grounded in Engagement Theory. The empirical results offer several noteworthy insights.

First, tourist engagement significantly and positively influenced satisfaction, indicating that higher levels of cognitive absorption, perceived usability, aesthetic appreciation, and emotional reward are associated with greater satisfaction with the immersive tourism experience. This finding is consistent with prior research asserting that multidimensional engagement is a critical antecedent of satisfaction in technology-mediated environments (O'Brien & Toms, 2008; Hollebeek et al., 2014).

Second, tourist engagement also exerted a significant direct effect on revisit intention, confirming that engaging experiences in immersive settings are capable of fostering tourists' behavioral intentions to return. This result supports earlier studies that emphasize the behavioral consequences of deep experiential engagement in tourism (So et al., 2014; Harrigan et al., 2017). Notably, revisit intention derived from immersive experiences may differ in quality from conventional revisit motivations. Rather than being driven by familiarity or service efficiency alone, such intentions are often grounded in emotionally resonant, memory-rich experiences that tourists desire to relive or explore further. The personalized, multisensory nature of immersive environments can create a deeper psychological attachment to the destination, enhancing feelings of presence and identity, factors found to reinforce loyalty behavior in previous studies (Tussyadiah et al., 2018; Han et al., 2024).

Third, tourist satisfaction positively predicted revisit intention, reaffirming its established role in shaping loyalty-related outcomes in tourism (Chen & Chen, 2010; Prayag & Ryan, 2012). However, in the context of immersive tourism, satisfaction appears to operate at a deeper and more emotionally anchored level. Unlike satisfaction based on service quality or convenience, immersive satisfaction is driven by heightened presence, novelty, and emotional engagement. These elements contribute to stronger memory encoding and a greater desire to re-experience the destination. This perspective aligns with research suggesting that emotionally intense and novel experiences lead to more memorable tourism outcomes and higher revisit intentions (Skavronskaya et al., 2020).

Most importantly, the mediating role of satisfaction was empirically confirmed. The indirect effect of engagement on revisit intention through satisfaction was statistically significant, supporting the hypothesized mediation model. This finding highlights satisfaction as a psychological bridge that converts short-term immersive engagement into long-term behavioral commitment. In the context of immersive tourism, such satisfaction arises not merely from service quality but from deep emotional resonance, cognitive absorption, and multisensory interaction. This conversion mechanism contributes to the theoretical understanding of tourist loyalty formation by suggesting that immersive experiences strengthen the satisfaction–revisit intention pathway through heightened emotional intensity and memory anchoring (Rasoolimanesh et al., 2019; Kim et al., 2021; Han et al., 2024; Skavronskaya et al., 2020).

Together, these findings validate the study's conceptual framework and provide empirical support for a comprehensive understanding of how immersive technologies shape sustainable tourist behavior. Unlike conventional tourism, immersive experiences offer multisensory stimulation, interactive narratives, and emotional engagement that enhance not only satisfaction but also strengthen revisit intentions through deeper psychological anchoring (Tussyadiah et al., 2018; Han et al., 2024). This study adds a nuanced perspective by illustrating how engagement and satisfaction interact dynamically in immersive settings, offering a model of tourist behavior formation that is particularly relevant in digitally mediated environments. Moreover, the case of Pingtan Island demonstrates the strategic potential of immersive tourism in enhancing destination competitiveness and loyalty. These insights suggest that immersive technology is not merely an innovation in experience delivery but a mechanism that can sustainably shape tourist behavior through emotional and cognitive pathways.

Theoretical Contributions

This study makes several significant theoretical contributions to the literature on immersive tourism, visitor engagement, and behavioral intention.

First, the study advances Engagement Theory in the context of smart tourism by conceptualizing tourist engagement as a second-order construct composed of four key dimensions: focused attention, perceived usability, aesthetic appeal, and reward. While prior studies have largely adopted engagement as a unidimensional or context-specific construct (Brodie et al., 2011; Hollebeek et al., 2014), this research integrates multiple facets of engagement into a holistic model, offering a more nuanced framework for understanding how tourists interact with immersive experiences. Specifically, this multi-dimensional



conceptualization captures both cognitive (e.g., focused attention), functional (e.g., usability), and affective-motivational aspects (e.g., aesthetic appeal and emotional reward) of engagement—components that are particularly salient in immersive environments where presence, interaction, and meaning-making are central (Neuhofer et al., 2014). This provides a superior theoretical lens compared to earlier engagement models, which may not fully account for the complexity of digitally mediated tourism experiences.

Second, the study provides empirical validation of satisfaction as a key mediating mechanism linking engagement to revisit intention. Although satisfaction has been widely studied in tourism behavior research (Chen & Chen, 2010; Prayag & Ryan, 2012), its mediating role within digitally immersive environments has received limited attention. This study advances the theoretical understanding of satisfaction in immersive tourism by showing that satisfaction is not merely an affective reaction to service quality, but emerges from immersive-specific attributes such as presence, interactivity, and sensory richness. These immersive characteristics may alter how tourists process engagement into satisfaction, making it more emotionally charged and cognitively encoded, which in turn strengthens its role in forming revisit intention. This conceptualization helps bridge the affective–cognitive–behavioral gap and extends theoretical models of post-experience behavior into technology-enhanced tourism contexts (Rasoolimanesh et al., 2019).

Third, the research contributes to behavioral intention theory in smart and immersive tourism by demonstrating that tourist engagement and satisfaction jointly explain revisit intention. This integrated model advances traditional theories by incorporating experiential and affective components that are often overlooked in utilitarian or purely cognitive models. Specifically, it highlights how tourists' behavioral intentions are shaped not just by perceived service quality, but by the richness, interactivity, and emotional resonance of immersive experiences. By positioning engagement and satisfaction as dual experiential anchors, this study offers a more comprehensive lens through which revisit intention in immersive settings can be theoretically understood. This aligns with the broader shift toward experiential consumption frameworks (Pine & Gilmore, 1999; Tussyadiah et al., 2018) and supports the notion that immersive experiences constitute a distinct form of value creation in tourism.

Lastly, this study underscores the importance of contextualizing theoretical models in digitally mediated tourism settings. By applying the engagement–satisfaction–revisit framework to Pingtan Island, a designated National Smart Tourism Pilot Zone, the findings illustrate how immersive technologies reshape conventional understandings of visitor behavior. Specifically, the results suggest that antecedents to tourist loyalty, such as emotional involvement and perceived value, may exert a stronger influence in immersive contexts than in traditional settings. This calls for theoretical refinement of existing behavioral models to better reflect the role of sensory richness, interactivity, and presence in shaping post-visit intentions. In this way, the study offers context-based theoretical extensions that are grounded in real-world smart tourism applications (Neuhofer et al., 2015; Guttentag, 2010).

Together, these contributions offer a theoretically grounded and empirically supported model that deepens the academic understanding of tourist behavior in immersive digital settings and provides a foundation for future theory development in technology-mediated tourism research.

Practical Implications

First, destination managers and tourism operators should prioritize the design of immersive experiences that stimulate multiple dimensions of tourist engagement, particularly focused attention, perceived usability, aesthetic appeal, and psychological reward. These dimensions not only enhance the visitor experience but also align with the principles of the experience economy, where staging memorable and emotionally resonant experiences becomes the core offering rather than merely delivering functional services (Pine & Gilmore, 1999). To achieve this, user-centered design and interactive storytelling should be employed not just as design techniques but as tools for co-creating value with tourists, allowing them to actively shape their experience through interaction, personalization, and emotional involvement (Prahalad & Ramaswamy, 2004). When immersive experiences are designed with this approach, they can foster higher levels of satisfaction and increase the likelihood of revisit intention, thereby sustainably promoting destination loyalty.

Second, experience designers and immersive content developers are encouraged to integrate multi-sensory and emotionally resonant elements into AR/VR/MR tourism platforms. The empirical evidence underscores the importance of engagement in shaping post-visit behavior, implying that digital content must go beyond novelty to create meaningful and memorable interactions. According to sensory marketing theory, activating multiple senses, such as sight, sound, and touch, can significantly enhance emotional intensity and memory retention in consumer experiences (Krishna, 2012). In immersive tourism, this can



be achieved through the careful design of virtual textures, ambient audio, and spatial dynamics. Moreover, embedding culturally grounded narratives into immersive environments can promote deeper engagement through narrative transportation, whereby tourists feel psychologically immersed in story-driven experiences that connect personally and emotionally to the destination (Escalas, 2004). For instance, gamified missions, real-time feedback loops, and heritage-based storylines can elevate perceived usability and personal reward, thereby reinforcing affective bonds and revisit intentions.

Third, tourism policy makers and smart tourism planners should recognize the strategic role of immersive technologies in advancing sustainable tourism. The study demonstrates that satisfaction mediates the relationship between engagement and revisit intention, suggesting that immersive environments delivering emotionally satisfying experiences can foster repeat visitation, reduce marketing costs, and promote long-term destination viability. Economically, immersive experiences can strengthen destination competitiveness by reducing dependence on costly promotional campaigns. Socially, they provide a platform for cultural expression, enhancing tourists' understanding and appreciation of local heritage. Environmentally, immersive or virtual alternatives can help alleviate overtourism at sensitive sites, supporting sustainable resource management. Policy frameworks should therefore not only support innovation ecosystems but also ensure active community participation, equitable benefit-sharing, and cultural authenticity in the development of immersive tourism initiatives—principles emphasized in community-based tourism models (Moscardo, 2008). This integrative approach ensures that smart tourism projects align with broader regional development and sustainability goals.

Finally, this study highlights the need for continuous monitoring and evaluation of immersive tourism experiences using robust measurement tools that can effectively capture engagement and satisfaction. Adapted frameworks such as SERVQUAL can be modified to assess perceived quality in digital experiences by incorporating dimensions such as interactivity, presence, and sensory immersion (Parasuraman et al., 1988; Neuhofer, 2016). In addition, applying iterative development principles from agile service design, such as rapid prototyping, real-time feedback collection, and user co-creation, can enhance the responsiveness of immersive offerings to evolving tourist expectations. As technological trends and user behavior shift rapidly, evaluation systems must not only assess current satisfaction but also anticipate emerging needs and emotional drivers of revisit intention. Embedding this adaptive feedback loop into smart tourism systems can improve service relevance, personalization, and long-term visitor loyalty.

Conclusion

This study examined the structural relationships among tourist engagement, satisfaction, and revisit intention within the context of immersive tourism experiences on Pingtan Island, China—a designated National Smart Tourism Pilot Zone. Drawing on Engagement Theory and employing Structural Equation Modeling (SEM), the results confirm that tourist engagement significantly influences both satisfaction and revisit intention. Satisfaction acts as a psychological mechanism that transforms engagement into favorable behavioral outcomes, playing a dual role as both a direct predictor and a mediator in the engagement–intention relationship. These insights underscore the importance of cognitive and emotional engagement in shaping tourists' affective responses and loyalty-related behavior.

Importantly, the study advances sustainable tourism research by demonstrating that immersive technologies, when designed to cultivate meaningful engagement and satisfaction, can foster repeat visitation without excessive reliance on marketing interventions. The findings provide actionable guidance for destination planners and policymakers seeking to align immersive tourism initiatives with broader sustainable development goals, particularly in the context of smart tourism zones.

Recommendation for Future Research

To strengthen future studies in immersive tourism and build upon the current research, several methodological and conceptual directions are proposed.

First, researchers are encouraged to adopt probability sampling techniques, such as stratified or systematic sampling, to improve the representativeness and reduce sampling bias.

Second, comparative studies across different types of destinations and immersive technologies (e.g., AR, VR, MR) in diverse cultural and geographical contexts would help reveal how engagement and satisfaction vary depending on situational factors. Such an approach aligns with tourism theories emphasizing the role of contextual variables in shaping visitor behavior.



Third, mixed-method designs, incorporating observational techniques or in-depth interviews, are recommended to capture the emotional and cognitive depth of immersive experiences that quantitative surveys alone may overlook. This integration allows for a richer understanding of how tourists construct meaning and attachment during immersive encounters. Fourth, the implementation of longitudinal research designs would allow researchers to track the evolution of engagement, satisfaction, and revisit intentions over time. This is especially important for generating causal relationships and understanding how immersive experiences influence long-term behavioral outcomes. Together, these recommendations contribute to the advancement of robust and context-sensitive research in smart and immersive tourism development.

Limitations

Despite offering valuable insights into tourist engagement and revisit intention in immersive tourism contexts, this study has several limitations that warrant consideration.

First, the use of non-probability (convenience) sampling limits the representativeness and generalizability of the findings, as the sample may not fully reflect the broader population of immersive tourists.

Second, data collection was restricted to a single location—Pingtan Island—which may constrain the applicability of results to other destinations with different cultural, technological, or environmental characteristics.

Third, the reliance on self-reported data introduces the possibility of social desirability bias or inaccurate recall, particularly when participants evaluate subjective experiences such as satisfaction or emotional engagement. Fourth, the study adopted a cross-sectional design, which restricts the ability to observe temporal variations or causal developments in tourist behavior. Additionally, the data were collected during a specific season, raising potential concerns about seasonality effects on tourists' attitudes and behaviors. Addressing these limitations in future research would enhance both the internal validity and external applicability of findings in the field of immersive tourism.

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