

Exploring the Impact of Immersive Technology on Travelers Experience: A theoretical perspective on Tourist at Indian Heritage Sites

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ABSTRACT

Heritage tourism research has always been faced with an interpretive dilemma: standard interpretive techniques like static signage, printed brochures, and standardized audio guides are inherently limited in terms of their ability to communicate the rich layers of history, spirituality, and culture that make up complex heritage settings, especially in the knowledge-diverse and post-colonial context of India. The present theoretical study seeks to investigate whether Extended Reality (XR) offers any substantial solution to the interpretive problem not from the perspective of the technology's ability to enhance visitor satisfaction levels but as a means to achieve heritage interpretation in its broader sense as defined by Tilden: fostering curiosity, uncovering meaning, and forging a personal link between the tourist and history. With a conceptual framework inspired by the Heritage Interpretation Theory, the Authenticity Theory, Contested Heritage studies, and the Stimulus-Organism-Response structure, the study posits a model which tries to determine the way in which XR can make people feel connected with their roots. Six theories have been offered in this study, and four major gaps in the context of Indian heritage Tourism have been mentioned. They include the lack of awareness about the importance of visitors' curiosity to heritage interpretation, controversies over the concept of existential authenticity at living sacred places, discrepancies between the knowledge of oral communities and archaeologists, and the absence of a postcolonial approach to heritage design using XR technology. The study further mentions the factors that will allow heritage site managers to conserve the religious and communal values of these sites while ensuring their existential authenticity..

Keywords Immersive Technology; Indian Heritage Tourism; AR/VR Image; Psychological Curiosity; Perceived Convenience; Immersive Tourism Experience; Content Quality; Advocacy Behaviour; Destination Memorability; Extended Reality (XR)...

INTRODUCTION:

Every heritage site has its own share of story. The story contains weight of everything that once happened there. For most travellers, they visit the site, roam around the surroundings and head back to home without knowing the importance of the site, resulting in tourist not often visiting again. Immersive technology, consisting of Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), oftentermed Extended Reality(XR), has the potential to change the perception of tourists. By digitally restoring the destructed constructs, narrating the story of the site through animated characters, the XR has the ability to time travel and take the traveller to a different era.

India hosts forty UNESCO World Heritage Sites, over three thousand seven hundred centrally protected monuments managed by the Archaeological Survey of India (ASI), and thousands more protected at the state

level. Yet the facilities available to help travellers understand what they are witnessing remains boring. Signboards and detailed inscriptions often provide minimal information and many of the signboards are inaccurate and tourists often do not want to take out time to read the full story on inscription. Research have implicated that this kind of expectation-experience mismatch directly results in tourists' dissatisfaction, and reduces their chance to visit the site again thereby reducing visitor engagement. [Tussyadiah, I., Wang, D., & Jia, C. H. (2018), Assens-Serra, P. (2019), Uzzell, D. (1998)].

The introduction of XR in tourism has grown substantially over the past few years, demonstrating that immersive technology can meaningfully improve visitor engagement, emotional response, and behavioral intentions at heritage destinations [ung, T., tom Dieck, M. C., & Rauschnabel, P. A. (2021), Li, X., Li, X., & Wang, Y. (2023). However, there has been very limited work in bringing this technology to heritage sites.. Domestic

visitors, who outnumber international visitors by a wide margin, often arrive with rich prior cultural knowledge, personal or community connections to the site, and strong expectations about how it should look, feel, and be represented.

This paper fills that gap and proposes a model framework that tries to determine how three key antecedents, the image of AR/VR technology as perceived by the traveller, the traveller's psychological curiosity toward immersive exploration, and the perceived convenience of the XR encounter, collectively shape the quality of immersive tourism experience. Content Quality acts as the moderator that determines whether technological

investment enhances the traveller's experience. The framework is based on the Stimulus-Organism-Response (SOR) model, and Expectation-Confirmation Theory (ECT). The Paper addresses some critical research question such as What are the motivators for travelers to adopt the use of immersive technology (AR/VR) in Indian heritage destinations? Is it possible to achieve an improvement in the travel experience while promoting sustainable tourism growth by using immersive technology in Indian heritage destinations?

The following are the objectives of research of this study:

Research Objective 1: To identify unique factors that lead to the acceptance of Immersive Technology among heritage sites.

Research Objective 2 (RO2): To conduct a critical analysis to show how the role of Content Quality of Immersive technology helps in enhancing Travellers experience of a Indian Heritage Site.

Literature Review and Research Gaps

The review below synthesizes the theoretical and empirical contributions most relevant to the proposed framework across six thematic domains. References are drawn exclusively from the fifty-source structured literature review compiled for this study. The section concludes by identifying four research gaps that motivate and shape the framework.

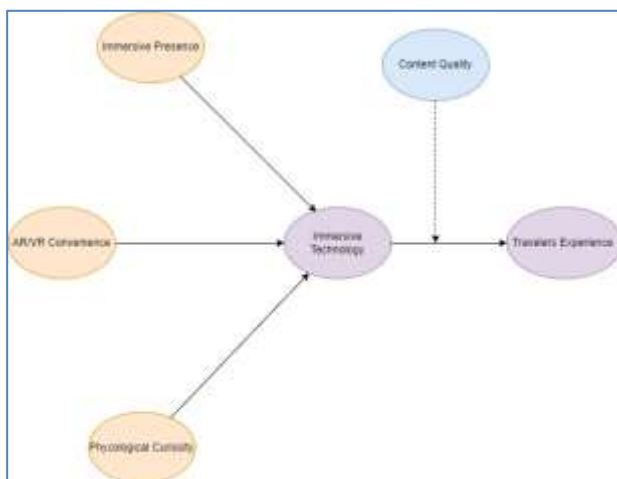


Figure 1: Proposed Conceptual framework

Figure 1 presents the proposed conceptual framework. Immersive Tourism Experience is the central mediating construct, sitting between three XR antecedents and two behavioral outcomes. Content Quality moderates the relationship between each antecedent and the mediator, determining whether the experiential potential of each antecedent is realized or diminished.

Immersive Presence and the Psychology of XR Engagement

In every exciting XR experience, there is one common element which is immersive presence (Moinnereau, M. A. 2022, Oliveira, W, Araujo, R., & Paula, M. 2025). Presence is defined as the sensation that the user is in an environment, and this illusion created by the technology is what allows users to believe that they are somewhere else and not in their own rooms with virtual equipment. Immersive Presence need to use clear visuals, fast and accurate tracking, and spatial audio in order to convince people's brains that what they are seeing is indeed reality [Aquino, P., & Varun, D. (2024), Billinghamurst, M., Kato, H., & Poupyrev, I. (2024)].

In the field of heritage tourism, however, presence is particularly important. It goes without saying that the idea behind traveling to such locations as Hampi or Ajanta is the wish to connect with something from the distant past. However, ruins cannot give people much except shapes and stones. By using AR and VR technologies, however, one can put life back into these places by coloring old stones and bringing movement back into empty courtyards [Lee, H. (2025), Aquino, P., & Varun, D. (2024)]. Neurosciences tell us that presence is processed by our brain as the actual physical experience, and thus the emotions will be real and the memory will stay.

Studies across gaming, education, and heritage contexts consistently find presence at the top of the list when it comes to predicting whether someone engages with a technology, enjoys it, and comes back to it [1,3]. The practical message for heritage managers is simple: a VR experience that genuinely makes visitors feel present will do things a sign or an audio guide never can [Lee, H. (2025) and Marasco, A., Santoro, G., Petruzzelli, A. M., & Miglietta, N. (2024)]. The person who stood inside a virtual reconstruction of the Ajanta Caves and felt something will carry that memory differently than the person who read the panel outside. That difference is what presence is for.

AR/VR Image: Technology Perception as a Gateway to Engagement

Even before tourists plug headphones into their ears or scans an artifact through the smartphone lens, they already have preconceived notions about what XR entails and how much they can trust its delivery capabilities. This pre-existing perception, based on media publicity, friends' stories, or their own direct or indirect interactions with the technology, is referred to in academia as AR/VR image, a multifaceted construct encompassing evaluations of technical excellence, brand reputation, and social desirability [Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2022)]. Building on the

Technology Acceptance Model and Innovation Diffusion Theory, studies have proven that the AR/VR image significantly influences perceptions of ease of use and usefulness, which, in turn, determine the extent of engagement users will undertake [Fan, X., & Wang, J. (2022)]. Having an established and reputable platform image minimizes the psychological cost of adopting new technology, the personal bargaining process between novelty and danger each XR newbie goes through [Zhao, Y., Su, C., Lu, S., & Chen, H. (2023)].

Critically, AR/VR image is not static. Social media content, peer travel narratives, and influencer endorsements continuously reshape how potential visitors perceive XR platforms [Aquino, P., & Varun, D. (2024)]. Heritage site authorities that invest in pre-visit digital communication, short videos, interactive previews, authentic user testimonials, can meaningfully strengthen platform image before the physical visit even begins [Billinghurst, M., Kato, H., & Poupyrev, I. (2024)].

Psychological Curiosity: The Motivational Engine of Exploration

Curiosity is, at its most fundamental, the desire to close a knowledge gap, to resolve uncertainty, discover the unknown, and explore the unfamiliar. As a motivational driver, it predates technology by millennia; but in the context of XR, it finds a particularly powerful activation environment [Litman, J. A. (2008)]. The interactive, discovery-oriented architecture of well-designed XR systems speaks directly to the curiosity instinct, prompting users to step forward, try new interactions, and persist through novelty rather than retreating to the familiar [Kidd, C., & Hayden, B. Y. (2015)]. High-fidelity visuals, spatial audio, and haptic feedback create a sensory richness that continuously stimulates cognitive appetite, turning passive observation into active inquiry (Mussweiler, T., & Epstude, K. 2009).

The neuropsychological evidence for the curiosity-engagement link is striking. Research shows that curiosity activates the caudate nucleus and associated dopaminergic reward circuits, the same neural pathways engaged by pleasurable immersive experiences [Gruber, M. J., Gelman, B. D., & Ranganath, C. (2014)]. This overlap means that curiosity does not merely initiate engagement; it amplifies it, and crucially, it intensifies memory formation for everything encountered during the curious state [Kang, M. J., Hsu, M., Krajbich, I. M., Loewenstein, G., McClure, S. M., Wang, J. T., & Camerer, C. F. (2009)]. XR platforms that layer discovery, hiding historical details behind interactive triggers, animating architectural evolution across centuries, personalizing narrative based on user choices, sustain curiosity and deepen immersion far more effectively than linear, one-way presentations [Kang, M. J., Hsu, M., Krajbich, I. M., Loewenstein, G., McClure, S. M., Wang, J. T., & Camerer, C. F. (2009)]. This finding carries particular weight for Indian heritage sites, which are almost universally characterized by symbolic and iconographic complexity that rewards the curious visitor and overwhelms the passive one [Kashdan, T. B., & Silvia, P. J. (2009), Litman, J. A. (2022)].

Perceived Convenience: Removing the Barriers to Immersion

Regardless of how well-designed the XR experience is, it will ultimately fail to engage the travellers if it is simply too hard for them to access, navigate, and physically tolerate for extended periods of time. Convenience in XR refers to device mobility, user-friendliness, ease of learning and use, language inclusiveness, responsiveness of the platform itself, and overall physical comfort of interacting with the technology [Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016)]. Convenience is an important factor in both the Technology Acceptance Model and UTAUT (Unified Theory of Acceptance and Use of Technology) models [Li, Y., Wang, X., & Chen, L. (2023)].

It is a consistent finding that the process of XR adoption will never reach its peak in attracting visitors who would typically exclude themselves from the experience due to various factors such as age, language barriers, limited technology knowledge, and educational differences [Park, E., Kim, E., & Suh, A. (2021)]. Greater convenience perception has been proven to be positively correlated with longer visitation times, higher intentions to repeat the experience, and increased satisfaction [Tseng, S. Y., & Lee, T. C. (2023)]. With the advancements in technologies such as standalone VR headsets and mobile AR applications, it is now possible to deploy convenience-driven strategies for the XR experience even in remote and technologically underdeveloped historical locations [Hussain, M., Qaisar, S., & Akram, U. (2022)]. This aspect assumes particular importance in the Indian context. The types of visitors who attend ASI-managed cultural locations exhibit characteristics related to age, education, and familiarity with technology on both ends of the spectrum.

Immersive Technology, Travellers' Experience, and the Role of Content Quality

The application of XR in tourism has the potential to profoundly transform the way travellers interact with their destinations. Instead of merely viewing an artefact in a state of decay and ruin, a tourist in the area of Hampi, for example, can have the experience of seeing the city as it existed when the Vijayanagara Empire was thriving, with fully formed temples, bustling courts, and the atmosphere of the time period and culture as it lived and breathed [Huang, Y. C., Backman, S. J., Backman, K. F., & Moore, D. (2017)]. Such temporal connections make for a strong emotional connection, a better cognitive experience, and lead to more satisfaction and retention [Wang, D., Xiang, Z., & Fesenmaier, D. R. (2023)]

However, there are limitations that apply to the link between immersive technology and travel experience. The quality of the content being delivered through XR technology is a vital moderating boundary condition. Quality content that is rooted in history, culturally rich, and visually accurate serves to enhance all that XR technology can provide, adding depth and substance to experiences of authenticity, informativeness, and personal relevance [Hosany, S., & Gilbert, D. (2010)]. Conversely, content that is historically incorrect, culturally irrelevant, and visually generic results in a disconfirmation effect,

which leads to a loss of trust and reduces the experiential value regardless of the advanced technological medium used [Tussyadiah, I., Wang, D., & Jia, C. H. (2018)]. This issue is especially crucial in India because of the extensive previous knowledge that the Indian domestic travellers hold about the site visited, and are likely to spot any representational shortcomings on their part. Indeed, there is empirical proof of the significant predictive influence that high-quality content coupled with immersion exerts on travel intentions, advocacy activities, and destination loyalty [30, 32].

Research Gaps

Gap 1: Lack of specificity in Indian heritage context:

There is extensive literature available on immersive tourism that highlights the benefits of XR in terms of engaging tourists and increasing their presence and behavioral intention to perform specific actions. However, most of this literature originates from laboratory studies and general tourism contexts rather than active heritage sites located in complex cultural environments of developing nations [Jung, T., tom Dieck, M. C., & Rauschnabel, P. A. (2021), Li, X., Li, X., & Wang, Y. (2023), Tussyadiah, I., Wang, D., & Jia, C. H. (2018)]. The requirements associated with XR in the Indian heritage sites, such as historical accuracies, religious sensitivities, multilingual needs, and infrastructure limitations, are often neglected in XR tourism literature.

Gap 2: Immersive technology as an add-on rather than an integral part of experience: Heritage tourism literature exploring immersive technology usually considers it as a supplementary element of an already existing experience, rather than investigating how the quality of technology and its content reshape the definition of 'heritage experience' for tourists [Civera, C. (2024), Hosany, S., Prayag, G., & Odeh, K. (2017), Kim, J. H., Ritchie, J. R. B., & McCormick, B. (2012)]. This theoretical gap exists regarding how the quality of digital heritage reconstruction influences the definition of heritage authenticity, especially at live heritage sites where traditions and modernity co-exist.

Gap 3, Conditions for Failure and Experience Breakdown:

Current research has been heavily devoted to success conditions, which are those that ensure the success of XR. On the contrary, there has been little work done in studying the conditions that could cause failures, particularly in culturally sensitive settings, where visitors have high expectations and mistakes made in the creation of XR content can be costly [Hussain, M., Qaisar, S., & Akram, U. (2022), Park, E., Kim, E., & Suh, A. (2021), Li, X., Li, X., & Wang, Y. (2023)]. This gap is particularly important since it is necessary to understand the dynamics of experience breakdowns when designing for India's extremely diverse visitor pool.

Gap 4, Discrepancies between Expectations and Experiences in Indian Heritage Sites:

The most significant of all the gaps is the lack of research into a model that examines the relationship between traveller expectations and XR-experience at Indian heritage sites. Travellers, particularly domestic travellers that have some cultural or spiritual connection to the place, come with highly developed and personally specific expectations.

Advances in Consumer Research

Any disconfirmation caused by an XR content provider not meeting their expectations for accuracy, aesthetic appearance, or storytelling is going to be even more severe. [Jung, T., tom Dieck, M. C., & Rauschnabel, P. A. (2021), Wang, D., Xiang, Z., & Fesenmaier, D. R. (2023), Dastane, O., Aggarwal, S., Jha, S., & Aw, E. C.-X. (2025)].

Heritage-Specific Boundary Conditions for XR Implementation

Despite the above sub-sections laying out the technical, behavioural, and theoretical frameworks for XR in heritage tourism, relatively little research effort has gone into the understanding of the context-specific conditions that determine the success or failure of these implementations. Particularly within India, there are three conditions that have a significant theoretical and practical importance, namely the religion-based sensitivity of the site, the conflict between oral and written histories, and the post-colonial nature of heritage interpretation. Each condition represents a contextual constraint that influences how visitors experience, understand, and assess the XR implementation.

Religious Sensitivity and Living Sacred Spaces

The primary assumption that underlies much of the research done on XR heritage sites is that these sites are mostly historical artifacts. Sites that are considered historically significant in some ways depend mainly on the events that have occurred at these sites and have become important in shaping history, with the current purpose of serving to tell the story to the visitors. While this assumption holds some truth in regard to sites such as archaeological excavations or abandoned monuments, it certainly does not apply to most of the heritage sites in India. As Poria et al. (2003) demonstrate, the core of heritage tourism lies not in the physical attributes of a site but in the way that how an individual connects to Heritage Sites.

The XR applications at these locations encounter a boundary condition that the heritage technology research literature has not sufficiently addressed. Archaeologically accurate content could indeed offend against the devotional ethos of the space. Tilden, F. (1957) warned that interpretation should connect with the mind of the visitor, and at living sacred sites, this reference point for the visitor is devotional, not historical. For instance, a 3D simulation of a temple god as an archaeological relic, or of a restricted sanctum being accessible to all, might not elicit curiosity and fascination but rather disapproval and disbelief of a specific religious nature. Smith, L. (2006) emphasizes this by stating that heritage will always be a cultural practice in the present tense, while in living heritage sites, the present will include both past history and ongoing rituals. Similarly, Uzzell, D. (1998) argues that any interpretation that does not take into account the emotive and spiritual elements that visitors bring into a heritage experience will have difficulty creating a successful experience.

This implies that the quality of the content in living sacred heritage sites cannot be guaranteed solely on the basis of archaeological authenticity. This necessitates working in conjunction with the religious guardians, clergy and

devotees who have an affiliation with the location based on their faith. The XR developer who neglects this collaboration and opts for a purely academic or tourist-driven approach to interpretation may end up developing a technologically advanced product that is culturally inappropriate, thus creating community opposition that can threaten even the most robust technology heritage project.

Oral Traditions and the Limits of Archaeological Consensus

The second boundary condition relates to the epistemological pluralism of heritage knowledge in India. The mainstream paradigm in the creation of interpretative content within the context of heritage XR relies on information contained in historical literature and archaeological survey reports. The effectiveness of this model is contingent on there being a generally accepted and undisputed record and the fact that visitors have similar epistemological perspectives on how to interpret the history presented. Both conditions fail to hold true in India.

Many domestic visitors will carry an epistemic tradition informed by their family history, regional folklore, and mythology when they visit historical or culturally significant sites. According to Wang, N. (1999), what visitors see in heritage sites depends not only on their actual historical accuracy but also on how personally they relate to the experience through their personal identities. An Indian who comes to view a temple with an oral understanding of its origin story, patron deities, and even the events surrounding it would not come empty-handed as far as knowledge is concerned. He or she brings with him living heritage knowledge which the XR experience could support, reinforce, contradict, or completely disregard. If the latter is the case, then this would

not be an instance of a failure to personalize, but rather a form of epistemic discrimination leading to cultural dissonance.

This boundary condition implies that any successful deployment of XR technologies in India must entail what can be described as interpretive pluralism – the ability of the platform to provide a range of interpretations about the historical significance of a place, rather than a singular interpretation. This will no doubt prove to be a major design dilemma, both in terms of technological feasibility and political sensitivity, as it will require creators of the content to recognize the boundaries of academic consensus and provide room for interpretations of knowledge systems that have not always been considered valid by the fields of archaeology and academic history. Here again, the idea of authorized heritage discourse by Smith, L. (2006) comes to relevance. It is only by overcoming the monopoly of such authorized discourses that interpretative plurality can be achieved, so that XR can serve all sections of visitors in society, and not perpetuate existing hierarchies.

Postcolonial Reinterpretation as Opportunity and Obligation

According to Smith, L. (2006), the authorized heritage discourse still privileges certain time periods,

architectural styles, and political figures at the expense of others, with such privileging often being ideologically driven by colonial scholars as opposed to the people's own sense of identity in the community. Thirdly, there is a boundary condition which exists at the point where history, politics, and ethics intersect. Most of the heritage sites in India that have been officially recognized were categorized, recorded, and interpreted in their meanings within the context of the colonial era, specifically by the Archaeological Survey of India organization run by British administrators since the 1860s. It should be noted that the interpretative framework, aesthetic ranking, and historicity associated with this colonial heritage machinery have been very resilient in nature. In many cases, the interpretation of sites for tourists continues to favor specific time frames, specific architectural styles, and specific political actors while ignoring other elements that may have existed at the time of construction of these monuments and their usage.

The potential of XR technology in disrupting the hereditary interpretative system can be seen in how it allows the superimposition of different stories, restoration of parts that have been lost or even obliterated, and highlighting the view of communities that were otherwise sidelined in the interpretation process. A restoration that seeks to return the religious symbols of the temple to their rightful place, from the point of view of the original devotional group rather than that of a colonial-era administrator who recorded it, is more than a technical feat.

But this opportunity also carries a correlative responsibility that has yet to be addressed in the literature. Decolonised heritage narratives can't be created independently of the developers of the technologies themselves, no matter how virtuous their intentions may be. Community engagement in content creation, means by which communities have control over the representation of their heritage, and real accountability in instances of representation disputes must all be maintained. Otherwise, XR decolonisation runs the risk of simply shifting the externalising force from one that is historically rooted in colonialism to one that is similarly unconcerned with community sovereignty, and driven purely by profit motives. The critical threshold in this case is thus not technological or even necessarily cultural; rather, it is inherently political. Uzzell, D. (1998). observation that interpretation requires acknowledging the underlying values and tensions inherent in the concept of heritage is especially applicable here: XR content which is decolonised in its approach and overlooks internal conflict within communities regarding how their history is portrayed in an attempt to create an alternative narrative misses the point of critical interpretation in the same way. Wang, N. (1999) concept of existential authenticity provides even more impetus for such an approach: for descendants of the community from whose history XR content was created, the authentic experience of their heritage requires not just accurate portrayal, but recognition as the storytellers themselves.

These three conditions taken together reveal the necessity of using existing criteria such as usability, immersion, and satisfaction as a guide for practice within the context of

India; however, they remain insufficient for this purpose. An effective theoretical and practical account of the application of XR within Indian heritage tourism requires taking into consideration religious, epistemological, and political aspects of heritage as a cultural process rather than the concept of heritage as historical data to be communicated through technology

Theoretical Foundations

This study builds its analytical foundation on four interrelated theoretical traditions. Rather than treating Extended Reality purely as a technology adoption problem, the framework positions it as an interpretive instrument whose effects on visitor cognition, affect, and behaviour need to be understood through the lens of heritage theory, authenticity scholarship, and collective memory studies. These strands are then unified under the Stimulus-Organism-Response framework, which supplies the structural logic connecting XR design features to visitor outcomes.

Heritage Interpretation Theory

The conceptual starting point for understanding how XR mediates the visitor-heritage relationship comes from Tilden (1957) principles of heritage interpretation. He argued that the purpose of interpretation is not the transmission of factual information but the provocation of curiosity, the awakening of a desire to know more. His observation that information as such is not interpretation carries direct relevance to the design logic of XR applications in heritage settings. A technology that overlays a ruined temple with historically accurate three-dimensional reconstructions is not simply delivering data; it is, if designed thoughtfully, constructing meaning. This distinction matters for the present study because Psychological Curiosity is conceptualised as a central organism-level construct mediating the relationship between XR stimuli and behavioural outcomes. Tilden's framework provides the interpretive warrant for that positioning: curiosity is not an incidental by-product of XR engagement but its primary interpretive function.

Uzzell (1998) extended Tilden's principles into contested heritage settings, arguing that effective interpretation must engage visitors emotionally and personally rather than merely intellectually. In the Indian context, where heritage sites frequently carry layered histories of dynastic succession, colonial reformation, and postcolonial reappropriation, this emotional engagement is neither straightforward nor politically neutral. XR applications that reduce complex historical narratives to visually spectacular reconstructions risk what Uzzell described as hot interpretation failures, where critical engagement collapses under the weight of aesthetic spectacle. This concern motivates the inclusion of Content Quality as a moderating variable in the proposed model, ensuring that interpretive fidelity is analytically separated from technical immersiveness.

Authenticity in Heritage Tourism

Authenticity occupies a central and contested position in heritage tourism scholarship, and it acquires particular urgency when XR mediates the heritage encounter. Wang, N. (1999) influential typology distinguishes between

objective authenticity, constructive authenticity, and existential authenticity. The critical distinction for this study lies between object authenticity, referring to the physical and material integrity of the heritage site itself, and existential authenticity, which refers to the felt sense of genuine engagement and self-discovery that a visitor experiences regardless of the objective status of the objects encountered.

This distinction carries direct consequences for the study of XR at ruined or fragmentary sites, conditions that characterise a substantial share of India's UNESCO World Heritage inventory. When a visitor engages with XR at a partially collapsed temple complex and perceives it in its historical completeness, object authenticity is in one sense compromised because what they see is a digital reconstruction rather than original physical fabric. Yet Reisinger and Steiner (2006) argue that existential authenticity, the feeling of stepping into a lived past, can be powerfully enhanced precisely by such reconstructive technologies. The visitor's sense of being in history is intensified rather than diminished by the digital mediation. This argument provides the theoretical grounding for the claim that XR can generate high levels of Memorable Experience Formation even at sites where physical heritage is fragmentary or degraded. Poria et al (2003)

The implication for model construction is significant. The Memorability construct operationalised in the proposed framework should be understood not merely as a cognitive recall outcome but as an existential-authenticity response, a measure of the depth of personal and historical connection produced by the XR-mediated encounter. This reframing elevates Memorability from a simple memory variable to a theoretically richer index of experiential depth, consistent with Wang's existential framework and with the broader phenomenological dimensions of heritage engagement that the tourism literature has extensively discussed

Organism-Response Framework as Integrative Structure

The three theoretical traditions outlined above together specify the substantive content of the organism-level variables that mediate XR's effects on visitor outcomes. The Stimulus-Organism-Response framework, originally proposed by Mehrabian and Russell (1974) in environmental psychology and subsequently adapted across consumer behaviour and tourism research, provides the structural architecture within which these organism-level processes are located and connected to both antecedent XR stimuli and consequent behavioural responses.

In the present model, XR design features such as immersiveness, interactivity, content quality, and spatial presence function as environmental stimuli that activate a set of internal psychological states constituting the organism. These organism-level states, theoretically grounded in the frameworks elaborated in the preceding subsections, encompass Psychological Curiosity derived from Tilden's (1957) interpretive provocation principle, Existential Authenticity Perception grounded in Wang's (1999) and Reisinger and Steiner's frameworks, and Heritage Dissonance or Consonance structured by

Smith.L(2006) and Macdonald's contested memory scholarship. The responses that these organism-level states generate are the study's primary outcome variables: Advocacy Intention and Memorable Experience Formation. Content Quality operates as a moderator of the stimulus-to-organism pathway, consistent with SOR's established treatment of environmental conditions that shape the strength and valence of stimulus effects.

This integrative application of SOR is justified by the framework's capacity to accommodate both cognitive and affective mediating processes within a single structural model and by its demonstrated flexibility across diverse service and tourism research contexts. Crucially, the version of SOR employed here is not the thin, predominantly cognitive variant that has dominated technology adoption research. By populating the organism level with constructs drawn from heritage interpretation theory (Tilden, F. 1957, Uzzell, D. 1998), authenticity scholarship (Wang, N. 1999), and collective memory studies (Smith, L. 2006), the study proposes a culturally enriched SOR that is calibrated to the specific demands of XR-mediated heritage interpretation in complex, contested environments. In doing so, it responds to the call by Yung and Khoo-Lattimore (2019) for theoretically grounded frameworks in immersive technology tourism research, frameworks that move beyond adoption-intention modelling toward a deeper account of the experiential and interpretive processes through which technology transforms the visitor-heritage relationship

Methodological Implications for Empirical Testing

This paper is conceptual in nature. Validating its six propositions requires a carefully designed empirical program. This section recommends a methodological approach suited to the Indian heritage tourism context.

Recommended Research Design

In terms of testing strategy, a Quantitative Cross Section Survey with analyses using PLS-SEM is proposed as the principal research design to use. This is because of PLS-SEM suitability for testing multi-mediated structural models; ability to work effectively with non-normal data distributions typical of the field context; and ability to test both reflective and formative measurement structures. To test the moderating proposition P4 with better causal inference, an additional Experimental Supplementary Research Design is recommended, whereby content quality manipulation is carried out among groups of visitors to identify the content quality effect in isolation from technology factors.

Site Selection and Sampling Strategy

The test will have to be performed on a purposeful sample of Indian heritage sites that have significantly different typologies. For instance, testing at a World Heritage site that has high international footfall like the Taj Mahal (Agra) will give insights into the context where the level of expectation among the visitors will be extremely high along with the formation of their image in advance. Testing at a nationally protected monument where the visitors are predominantly domestic tourists like the Red Fort, Agra Fort will assess the ability of the proposed framework to measure the complex expectation of the

visitors having personal cultural affiliation with the heritage site. At least 150 visitors should be surveyed at each heritage site.

Scale Development and Measurement Approach

The constructs can be operationalized with multi-item scales that reflect existing measurements from other studies. Items pertaining to AR/VR images can borrow from measures in technology image and brand equity research. Curiosity items can borrow from valid curiosity measures adjusted for the context of heritage exploration. Items pertaining to perceived convenience can borrow from measures of ease-of-use based on UTAUT, but adapted for use in on-site conditions, including the ease of using the devices, queuing process, and physical convenience. Items pertaining to immersive experience will involve combining presence, flow, and emotions into one construct. Items pertaining to content quality will focus on the specific attributes of historical accuracy, cultural authenticity, visual fidelity, story depth, and representational sensitivity. Advocacy behavior scales will be adapted from word-of-mouth research.

DISCUSSION

There are a few more general implications raised by the proposed framework and propositions, which ought to be addressed before proceeding to drawing conclusions from the paper.

The first and perhaps most important theoretical insight provided by the model put forward in the paper is the incorporation of the concept of *psychological curiosity* as the primary antecedent of immersive tourism experience. The vast majority of frameworks for XR tourism experiences tend to consist mainly of variables that stem from the TAM approach such as *ease of use*, *perceived usefulness* and *enjoyment*. Those factors reflect attitudes towards the technology, but do not cover the motivational mechanisms driving the extent to which the traveller interacts with the XR environment [Kidd, C., & Hayden, B. Y. (2015), Litman, J. A. (2008), Mussweiler, T., & Epstude, K. (2009)]. Curiosity does that, explaining both engagement with the technology and its exploratory use. Given the peculiarities of Indian heritage sites – the most interesting features of which are often also the least accessible and hardest to understand without guidance – curiosity-driven design can open new perspectives on heritage interpretation.

The use of *content quality* as a moderator, and not as a predictor or as an effect, represents an improvement in conceptual clarity, one that is more true to the nature of the findings. It does not mean that content quality will always be decisive in any situation, but that it sets a limit to how far technology and motivation will take us [Tussyadiah, I., Wang, D., & Jia, C. H. (2018), Hosany, S., & Gilbert, D. (2010)]. There are significant practical ramifications to consider. An organization that commits substantial resources to XR equipment and delivery platforms while underinvesting in content production, failing to involve historians, archaeologists, digital artists, and community consultants in the creation of meaningful XR

experiences, risks disappointing rather than pleasing its visitors. This is especially true in India, where there are often high spiritual and cultural stakes at play in heritage representation.

6. Conclusion, Implications, and Future Research

The cultural heritage sites of India represent some of the most exceptional aggregations of human history. A number of these sites are also grossly under-experienced, attracting millions of visitors who depart with nothing more than an image-based perception. XR technology possesses the capability of transforming this situation, yet only if this technology is implemented with the same dedication, thoughtfulness, and academic rigor as that which the heritage sites embody. In this paper, we have attempted to develop a theoretical model for comprehending the design, and evaluation of XR technology with respect to its influence on travellers at Indian heritage sites and presented six research propositions.

Theoretical Contributions to Heritage Tourism Scholarship

Theoretical contributions of the model are as follows.

The model expands the S-O-R model by adding *psychological curiosity* as a motivational factor, alongside technology factors. This helps build a richer stimulus layer by incorporating a demand-side psychological variable, which is notably missing from most of the current research on XR tourism.

It defines *content quality* as a moderator rather than an independent or dependent variable. This enables better understanding of when and why certain XR technologies fail or succeed, based on the theory.

The proposed model includes both *behavioral* and *cognitive* impacts of the experience as the outcomes, creating a dual-outcome structure.

This study enhances the theory of Heritage Interpretation Theory through detailing how XR acts as an intermediary that mediates the link between stimuli at sites and meaning-making on the part of the visitor – a process that was not considered in Tilden's (1957) initial formulation.

This study merges Authenticity Theory(Wang, 1999) into the SOR framework, showing that existential authenticity can be mediated through technology without the need for object authenticity.

This study introduces Psychological Curiosity as a theoretically neglected antecedent in heritage tourism.

6.2. Practical Implications

For the Archaeological Survey of India and state tourism promotion agencies, the model makes a compelling case for equal technological investment in content development based on historical accuracy, cultural appropriateness, and narrative richness. The absence of quality content for an XR hardware application will result in disconfirmation. In the context of site management, the convenience proposition demands inclusive design considerations whereby the experience is made accessible to all visitors irrespective of their age, language, technology familiarity, or disability. In the case of XR

platform providers working in the Indian context, the curiosity proposition suggests that the architecture should be designed in a way that encourages discovery, layers of interaction, and personalization, thus ensuring sustained engagement over time. From the perspective of destination marketing, the advocacy and memorability propositions emphasize the significant organic marketing benefit that an immersive heritage experience can offer, benefit that cannot be easily achieved through any amount of promotional spend

Future Research Agenda

Testing of the six propositions in relation to various Variables of the model is clearly the most pressing need at the moment. Apart from proposition testing, it would be useful to first, conduct cross-cultural comparisons by looking at the differential impact of *curiosity*, *convenience*, and *AR/VR image* on domestic versus international visitors; second, study the role of personal and cultural identities in moderating the *content quality* - authenticity link, especially in case of visitors with a strong association with the heritage site in question; third, carry out longitudinal experiments using the expectancy confirmation theory framework to examine the impact of the expectations vs experience gap on visitors' authenticity perception; fourth, conduct participatory research on community-generated AR/VR content and its effects on perceived authenticity; and fifth, conduct accessibility studies in relation to the ways in which disabled and economically disadvantaged tourists experience AR-enhanced heritage sites.

This study enhances the theory of Heritage Interpretation Theory through detailing how XR acts as an intermediary that mediates the link between stimuli at sites and meaning-making on the part of the visitor – a process that was not considered in Tilden's (1957) initial formulation.

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