

# Preserving the Intangible, Enhancing the Experience: A Conceptual Framework for Sustainable Digital Heritage Tourism in Southeast Asia

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## Abstract

Digital technologies are reshaping intangible cultural heritage (ICH) tourism in Southeast Asia by expanding opportunities for cultural interpretation, enhancing visitor engagement, and supporting destination competitiveness. However, their use may also intensify commodification, weaken community control, and decontextualize living traditions when cultural safeguards and governance arrangements are inadequate. This article addresses the absence of an integrative framework for examining how digital strategies influence the sustainability of ICH tourism in the region. Drawing on an integrative conceptual review, it synthesizes scholarly and policy literature together with published case evidence on ICH safeguarding, sustainable tourism, smart tourism, co-creation, experience management, immersive technologies, digital storytelling, AI-assisted visitor management, and heritage governance. The analysis identifies five recurring digital strategy typologies: immersive AR/VR, Smart Tourism Technologies, dedicated ICH digital platforms, digital storytelling, and AI-assisted visitor management. The findings indicate that these strategies contribute to sustainable tourism and business value when they preserve cultural meaning, support community participation, align with local technological capacity, and operate within accountable governance. The article therefore proposes the Digital Cultural Heritage Sustainability (DCHS) Model, comprising Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment, as an integrative framework for assessing culturally grounded and sustainably competitive digital heritage tourism in Southeast Asia.

**Keywords:** Intangible cultural heritage, Digital heritage tourism, Sustainable tourism, Southeast Asia, Cultural authenticity

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## Introduction

Southeast Asia offers an unusually rich setting for heritage tourism. Living traditions, rituals, crafts, oral histories, performing arts, festive events, foodways, and shared community knowledge continue to attract visitors who are looking for cultural depth rather than spectacle. These traditions are not simply tourism products. They are the social practices through which communities hold on to identity, memory, and the transmission of knowledge from one generation to the next. The central question for destinations, then, is how to expand cultural tourism without undermining the living cultural systems that give it meaning in the first place.

That question has grown more pressing as digital transformation reworks the tourism sector. Smart tourism systems now draw on digital infrastructure, data, and mobile services to improve destination management and the visitor experience (Gretzel et al., 2015). Augmented and virtual reality are being taken up to enrich heritage interpretation and engagement (Lee & King, 2025), and technology-enhanced experiences can support personalization and memorable encounters when they are aligned with what visitors need and what destinations can offer (Neuhofer et al., 2014). The same tools, though, carry real risks: cultural knowledge can be stripped of its context, sacred practices can circulate without consent, and authority over how heritage is represented can drift away from the communities that hold it.

A paradox sits at the heart of digital heritage tourism. Technologies that make culture more visible can also intensify its commodification. Platforms that amplify community narratives can expose those narratives to appropriation. Data-driven management can quietly concentrate authority in agencies, firms, or technology providers. The tension matters most for intangible cultural heritage, which stays viable only as long as communities keep practising, reinterpreting, and transmitting it under conditions they themselves regard as meaningful.

Existing scholarship offers valuable but scattered insight. Lee and King (2025) read immersive technologies as a means of safeguarding intangible heritage through richer interpretation, and Nguyen et al. (2026) trace the same potential in immersive reconstructions at Vietnamese heritage sites. Smart tourism research takes a different angle. Buhalis and Amaranggana (2015) foreground personalization and destination performance, while Neak (2025) links smart tourism technologies to heritage site image and visitor loyalty. ICH

scholarship, in turn, keeps its attention on community participation and the risks of commodification: Kim et al. (2019) argue the point from the perspective of heritage practitioners, and UNESCO (2015) codifies it in its ethical principles for safeguarding. Much of this literature, though, gives precedence to technological effectiveness or visitor experience and treats cultural integrity, community agency, and governance accountability as secondary. This article responds by developing the Digital Cultural Heritage Sustainability (DCHS) Model as a way of evaluating sustainable digital heritage tourism in Southeast Asia.

### Methodological Approach

This study uses an integrative conceptual review to synthesize knowledge on sustainable digital intangible cultural heritage (ICH) tourism in Southeast Asia. The approach is appropriate for developing a conceptual framework by connecting literature from heritage studies, tourism management, digital transformation, cultural governance, and business theory.

The review involved three stages. First, academic and policy sources were identified from scholarly databases, journal websites, conference proceedings, institutional repositories, and policy archives. The search covered ICH, digital heritage tourism, smart tourism, immersive technologies, digital storytelling, AI-assisted visitor management, sustainability, authenticity, co-creation, stakeholder theory, experience management, and heritage governance. Regional documents were included to situate the analysis within ASEAN's digital and creative economy agendas (ASEAN Secretariat, 2025), Southeast Asia's smart tourism readiness (Weltman et al., 2024), and UNESCO's heritage and sustainable development framework (UNESCO, 2025a).

Second, the sources were screened for relevance, regional applicability, and analytical value. Third, the selected materials were analyzed through thematic synthesis, focusing on digital strategy types, authenticity, community participation, technological appropriateness, governance, digital inequality, cultural intellectual property, value creation, and sustainability outcomes. Published cases from Thailand, Indonesia, Vietnam, Malaysia, and Cambodia were used as illustrative evidence. This synthesis informed the Digital Cultural Heritage Sustainability (DCHS) Model, comprising Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment.

## Literature Review and Theoretical Foundations

Intangible cultural heritage (ICH) refers to the practices, expressions, knowledge, skills, and cultural spaces that communities recognize as part of their heritage, including oral traditions, performing arts, rituals, festive events, knowledge of nature, and craftsmanship (UNESCO, 2003). Unlike tangible heritage, ICH lives through practice, memory, apprenticeship, and community recognition. In tourism, its sustainability therefore depends not only on visitor satisfaction or economic return, but also on the continuity of cultural meaning and intergenerational transmission (ICH NGO Forum, 2024; Kim et al., 2019). Authenticity theory adds an important caution: tourism can turn living culture into staged or commodified representation (MacCannell, 1973), a risk that becomes sharper in digital contexts where heritage may be compressed into short-form content, immersive simulation, or marketable narratives detached from social context (Song et al., 2025).

Digital transformation has expanded the tools available for heritage interpretation, visitor engagement, destination management, and cultural communication. Smart tourism relies on digital infrastructure and data systems to enhance destination performance and visitor experience (Buhalis & Amaranggana, 2015; Gretzel et al., 2015). In heritage settings, AR, VR, digital platforms, storytelling, and AI-assisted systems can broaden access and deepen engagement. However, these technologies often prioritize efficiency and visitor satisfaction over cultural ownership, ethical representation, and community governance, which are central to ICH sustainability.

Co-creation and experience management perspectives explain how value is produced in heritage tourism. Value emerges through interaction between providers, visitors, and other actors (Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2008). In ICH tourism, this process shapes both the visitor experience and the representation of heritage itself. Experience economy perspectives further show how cultural encounters become memorable when they are staged as meaningful experiences (Pine & Gilmore, 2011; Richards, 2001), but such staging should not reduce ICH to entertainment or consumption.

Stakeholder theory and governance perspectives extend the analysis to power, rights, and accountability. Digital heritage tourism involves communities, tourists, governments, cultural agencies, destination organizations, and technology developers, whose interests may differ (Freeman, 1984). Effective governance therefore requires coordination, institutional capacity, and accountability in managing heritage destinations (Rivero-Moreno et al., 2021),

especially in Southeast Asia, where governance arrangements remain uneven (Bui, 2025). Taken together, these perspectives support the need for an integrative framework. The DCHS Model responds by linking Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment in a single account of sustainable digital heritage tourism.

### Comparative Synthesis of Theoretical Perspectives

The reviewed perspectives each explain part of digital heritage tourism, but none is sufficient on its own. ICH safeguarding, cultural sustainability, and authenticity theory emphasize cultural continuity, community recognition, ethical representation, and the risks of commodification and decontextualization. Experience management explains how meaningful visitor experiences are created through engagement and participation (Pine & Gilmore, 2011), while co-creation theory highlights how value emerges through interactions among multiple actors (Prahalad & Ramaswamy, 2004).

Stakeholder theory broadens the analysis to actors, interests, rights, and power relations (Freeman, 1984). Smart tourism further highlights the role of digital infrastructure and data systems in tourism development, as discussed by Gretzel et al. (2015). Rivero Moreno et al. (2021) extend this perspective by emphasizing institutional coordination and accountability within smart governance. Together, these perspectives justify the DCHS Model as an integrative framework linking Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment in sustainable digital heritage tourism.

**Table 1** Comparative Theoretical Foundations for the DCHS Model

| Theory /<br>Perspective    | Main Focus                                                    | Contribution to<br>This Study                                     | Related DCHS<br>Dimension               |
|----------------------------|---------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------|
| ICH safeguarding           | Living heritage,<br>community<br>recognition,<br>transmission | Protects cultural<br>meaning and<br>community-defined<br>heritage | Cultural Integrity                      |
| Cultural<br>sustainability | Continuity of<br>cultural practice                            | Positions ICH as<br>central to<br>sustainable tourism             | Cultural Integrity;<br>Community Agency |

**Table 1** Comparative Theoretical Foundations for the DCHS Model (Continued)

| Theory /<br>Perspective     | Main Focus                                | Contribution to<br>This Study                                    | Related DCHS<br>Dimension                                   |
|-----------------------------|-------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------|
| Authenticity theory         | Commodification,<br>decontextualization   | Highlights risks of<br>staging and digital<br>spectacle          | Cultural Integrity;<br>Technological<br>Responsiveness      |
| Experience<br>management    | Memorable and<br>meaningful<br>experience | Explains culturally<br>grounded visitor<br>experience            | Technological<br>Responsiveness                             |
| Co-creation theory          | Interactive value<br>creation             | Supports<br>participatory design<br>and shared<br>interpretation | Community Agency;<br>Technological<br>Responsiveness        |
| Stakeholder theory          | Actors, interests,<br>rights, power       | Supports inclusive<br>governance and<br>benefit-sharing          | Community Agency;<br>Governance<br>Alignment                |
| Smart tourism<br>governance | Digital systems and<br>coordination       | Explains technology<br>management and<br>accountability          | Technological<br>Responsiveness;<br>Governance<br>Alignment |

## Digital Strategies in Southeast Asian Heritage Tourism

### Regional Context

ASEAN has increasingly prioritized digital transformation in tourism, the creative economy, and cultural heritage management. The ASEAN Digital Masterplan 2025 frames digitalization as a regional development priority (ASEAN Secretariat, 2021), while the ASEAN Tourism Outlook and the ASEAN Tourism Sectoral Plan 2026–2030 emphasize recovery, competitiveness, regional cooperation, and sustainability (ASEAN Secretariat, 2026; Rillo et al., 2025). Digitalization can improve visitor services, destination competitiveness, cultural access, and tourism resilience (Weltman et al., 2024). However, uneven digital infrastructure, literacy, and institutional capacity continue to shape which communities can benefit from digital heritage tourism (Sefrina, 2024).

In heritage tourism, digital transformation changes how cultural information is produced, interpreted, circulated, governed, and monetized. For ICH, these changes are especially significant because cultural knowledge is often tacit, embodied, sacred, community-specific, and transmitted through practice. Digital strategies should therefore be assessed not only by technical performance or visitor appeal, but also by their effects on cultural meaning, community authority, and long-term sustainability.

### **Five Digital Strategy Typologies**

Five digital strategy typologies commonly appear in ICH tourism across Southeast Asia. Each supports heritage interpretation and destination management, while also creating specific trade-offs and risks.

**Immersive experience technologies (AR/VR/XR):** Immersive technologies extend engagement with ICH beyond physical access. Vietnam’s “Finding the Lost Imperial Palace” at Hue’s Ngo Mon Gate, for example, uses AR glasses to reconstruct Nguyen Dynasty court ceremonies and deepen heritage interpretation (Nguyen et al., 2026). These tools can enhance education, memorable experience, destination differentiation, and perceived value, but their benefits decline when technological spectacle overshadows living cultural practice.

**Smart Tourism Technologies (STTs):** STTs improve visitor experience and destination management. Evidence from Cambodia’s UNESCO World Heritage Sites links STT adoption to better visitor experience and destination loyalty (Neak, 2025), while Thailand’s smart city initiatives show how digital infrastructure can support cultural economy development and visitor services (Digital Economy Promotion Agency, 2024). STTs can strengthen accessibility, personalization, safety, and competitiveness, but may concentrate data and decision-making in institutions or firms rather than heritage-bearing communities.

**Dedicated ICH digital platforms:** Dedicated platforms support cultural education, documentation, and visibility. Indonesia’s iWareBatik demonstrates how a platform can function as a cultural tourism guide, e-learning tool, and preservation instrument (Permatasari, 2022; Permatasari et al., 2020). Such platforms can connect heritage products, learning, creative industries, and tourism markets, but they also raise concerns over cultural intellectual property, data sovereignty, platform dependency, and community control.

**Digital storytelling:** Digital storytelling strengthens community voice and interpretive depth by turning heritage from a passive attraction into a relational experience. UNESCO’s work on sustainable tourism with ICH in ASEAN waterway cities shows how community-driven

digital tools can amplify local traditions while supporting heritage safeguarding (UNESCO, 2025a). Runchavanont (2024) similarly links digital storytelling to local voice and visitor interpretation in community-based tourism, while Bin Azizan et al. (2025) show its role in reframing authenticity and heritage branding in Melaka. Its success, however, depends on communities retaining editorial authority over how their culture is represented.

**AI-assisted visitor management:** AI-driven systems can support monitoring, crowd analytics, demand forecasting, and personalized services, improving operational efficiency, destination responsiveness, and visitor satisfaction at cultural sites (Ask Mona, 2025). However, they also raise ethical and representational risks, particularly where governance, bias control, and regulatory readiness remain uneven (Rajah, 2026). UNESCO (2025c) likewise emphasizes the need for safeguards in cultural applications of AI. For ICH tourism, AI must therefore be carefully governed so that predictive efficiency does not reduce complex, embodied, and community-specific cultural meanings to algorithmic.

### Critical Perspectives and Conflicting Evidence

Digital strategies can support visitor experience and ICH safeguarding, but their effects remain conditional. Malekar et al. (2026) emphasize technology–context fit, Song et al. (2025) highlight cultural memory, and Wang et al. (2026) stress community participation.

Immersive tools may deepen interpretation, but weak design can turn culture into spectacle. STTs can improve efficiency, yet uneven digital capacity may reproduce inequality (Sefrina, 2024). Community-based heritage approaches are therefore needed to keep cultural tourism under local control (Thavorn & Charoensuk, 2025).

Platforms, storytelling, and AI-assisted systems can strengthen visibility and responsiveness, but they also raise risks around ownership, consent, bias, and ethical representation. These tensions show that digital heritage tourism should be governed as a cultural and institutional process, not merely as a technical intervention.

## Selected Digital Heritage Tourism Initiatives in Southeast Asia

Table 2 Selected Digital Heritage Tourism Initiatives in Southeast Asia

| Country/<br>Region | Initiative/<br>Case                                         | Main<br>Technology                            | ICH/<br>Heritage<br>Focus | Community<br>Involvement                                 |
|--------------------|-------------------------------------------------------------|-----------------------------------------------|---------------------------|----------------------------------------------------------|
| ASEAN<br>Regional  | UNESCO Waterway<br>Cities ICH Project                       | Digital<br>storytelling,<br>social media      | High                      | Community voice<br>and cultural<br>storytelling          |
| Cambodia           | UNESCO World<br>Heritage Sites Smart<br>Tourism Initiatives | Smart Tourism<br>Technologies                 | Moderate                  | Visitor experience<br>and destination<br>management      |
| Indonesia          | iWareBatik Platform                                         | Mobile/web<br>platform,<br>e-learning         | High                      | Heritage learning,<br>documentation,<br>promotion        |
| Malaysia           | Melaka UNESCO<br>Heritage City Digital<br>Branding          | Social media,<br>digital branding             | High                      | Destination<br>branding and<br>community<br>storytelling |
| Thailand           | DEPA Smart City<br>Initiatives                              | IoT, data<br>analytics,<br>mobile<br>services | Moderate                  | Smart destination<br>and cultural<br>economy support     |
| Thailand           | Amazing Thailand<br>Application                             | AI-supported<br>mobile<br>services            | Moderate                  | Visitor service<br>integration and<br>market access      |
| Vietnam            | Finding the Lost<br>Imperial Palace, Hue                    | AR glasses,<br>VR<br>reconstruction           | Moderate                  | Immersive<br>interpretation                              |
| Vietnam            | Quang Tri Heritage<br>Digitization                          | AR/XR,<br>digital content                     | Moderate                  | Digital heritage<br>access and<br>interpretation         |

Table 2 shows that Southeast Asian initiatives vary in strategic purpose, technological intensity, and community involvement. Immersive and smart tourism initiatives mainly strengthen visitor experience and destination competitiveness, but require higher investment and institutional capacity. In contrast, digital storytelling and dedicated ICH platforms are more closely linked to community agency and cultural interpretation, though they require careful governance of cultural IP and narrative control. Overall, short-term competitiveness often comes from convenience and novelty, while long-term value depends on co-creation, authenticity, trust, cultural differentiation, and inclusive local benefit.

### Comparative Analysis of Five Digital Strategies

The five typologies differ in technological form, cultural risk, managerial demand, and business implication. No single strategy fits every ICH tourism context; each involves trade-offs among experience enhancement, cultural safeguarding, cost, community control, scalability, and destination competitiveness.

**Table 3** Comparative Analysis of Five Digital Strategies in ICH Tourism

| Digital Strategy                | Main Value Proposition                   | Key Benefits                                           | Trade-offs and Risks                                              |
|---------------------------------|------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------|
| Immersive AR/VR/XR              | Engaging and immersive interpretation    | High cost, maintenance, spectacle risk                 | Supports differentiation but needs investment and cultural review |
| Smart Tourism Technologies      | Efficient visitor service and management | Data control, exclusion, weak community influence      | Improves competitiveness but needs inclusive governance           |
| Dedicated ICH digital platforms | Documentation, learning, visibility      | Cultural IP risk, platform dependency, loss of control | Builds brand and market access but needs data sovereignty         |
| Digital storytelling            | Community voice and visitor connection   | Narrative simplification, editorial bias               | Strengthens identity but needs community control                  |

**Table 3** Comparative Analysis of Five Digital Strategies in ICH Tourism (Continued)

| Digital Strategy               | Main Value Proposition               | Key Benefits                              | Trade-offs and Risks                                    |
|--------------------------------|--------------------------------------|-------------------------------------------|---------------------------------------------------------|
| AI-assisted visitor management | Personalized and adaptive management | Bias, privacy risk, cultural stereotyping | Enhances responsiveness but needs ethical AI safeguards |

Read as a whole, the comparison suggests that digital strategies create lasting business value only when they are culturally grounded and well governed. Technology-driven satisfaction may carry short-term competitiveness, but it is community agency and cultural authenticity that are more likely to sustain differentiation, trust, repeat visitation, branding, and inclusive local benefit over time.

### Discussion: Enablers, Barriers, and the DCHS Model

#### Key Enablers

Sustainable digital heritage tourism depends on five connected enablers. First, policy coherence and institutional alignment are needed because digital heritage tourism cuts across tourism, culture, digital economy, education, local development, and creative industries. Without coordination, even strong initiatives can remain fragmented.

Second, community-centered co-design supports authenticity and sustainability. Communities should help set goals, select content, shape interpretation, retain narrative control, and share benefits. Third, equitable digital infrastructure is essential so that rural and indigenous communities are not excluded by weak connectivity, limited devices, low digital skills, or unaffordable access.

Fourth, cultural intellectual property and data sovereignty frameworks are needed to prevent digital extraction by clarifying ownership, reuse, benefit-sharing, and continuing consent. Fifth, SDG alignment anchors digital heritage tourism in wider accountability for decent work, reduced inequality, sustainable communities, cultural continuity, and partnerships. Ibrahim et al. (2025) show the growing importance of SDG-related digital heritage tourism, while the UNESCO World Heritage Centre (2026) links heritage management to sustainable development goals.

### **Key Barriers**

Five barriers limit sustainable outcomes. The digital divide restricts community participation through weak infrastructure, limited devices, high data costs, and uneven digital literacy. High implementation costs also keep advanced tools such as AR, VR, smart platforms, AI systems, and high-quality digital content beyond the reach of many community actors.

Cultural authenticity can be weakened when technologies are used without genuine community agency. Digital tools may simplify complex traditions, highlight only marketable elements, or detach practices from ritual, social, and historical contexts. Weak institutional capacity and fragmented governance further reduce accountability, especially when responsibilities among cultural agencies, tourism authorities, technology providers, local governments, communities, and businesses are unclear.

Ethical and legal ambiguity around AI-generated content, digital reproduction, and cultural data ownership creates additional risk. AI may produce inaccurate or stereotyped interpretations, while platforms may enable commercial reuse of community knowledge without adequate consent. These barriers show that digital heritage outcomes are conditional. Digital strategies safeguard ICH only when grounded in community authority, cultural safeguards, appropriate design, and accountable governance.

### **Framework Development Process**

The DCHS Model was developed through integrative conceptual synthesis rather than from a single theory or case. Malekar et al. (2026) sharpened the focus on technology–context fit in rural tourism. Suseno et al. (2025) informed the link between ICH preservation and digital governance. Wang et al. (2026) reinforced the importance of community participation and cultural authority.

The synthesis followed three steps. First, the reviewed sources were coded for recurring concerns, including cultural representation, community participation, technology use, institutional coordination, data governance, and visitor experience. Second, these themes were compared across five typologies: immersive AR/VR, Smart Tourism Technologies, dedicated ICH platforms, digital storytelling, and AI-assisted visitor management. Third, they were consolidated into four conditions for sustainable digital heritage tourism: Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment.

These dimensions reflect the most persistent theoretical and practical concerns across the literature and cases. Cultural Integrity draws from ICH safeguarding, authenticity,

and cultural sustainability. Community Agency draws from participatory governance, co-creation, stakeholder theory, and community-based tourism. Technological Responsiveness draws from smart tourism, experience management, task–technology fit, and digital interpretation. Governance Alignment draws from smart governance, cultural policy, data sovereignty, ethical AI, and cross-sector destination management.

### **The Digital–Cultural Heritage Sustainability (DCHS) Model**

The DCHS Model provides practical guidance for policymakers, destination managers, and technology developers. ASEAN Secretariat (2025) offers a regional creative economy framework, while Leong et al. (2024) show how smart tourism can support sustainable development in ASEAN. UNESCO (2003) and UNESCO (2015) establish safeguarding principles for community-informed heritage representation. UNESCO World Heritage Centre (2026) further links heritage management to the SDGs, and Ibrahim et al. (2025) show the growing importance of SDG-aligned digital heritage tourism.

Dimension 1: Cultural Integrity. This dimension treats ICH as a living practice rooted in community meaning, social relationships, ritual context, and intergenerational transmission. Digital representation should therefore remain accurate, contextualized, ethical, and faithful to community-defined meaning.

Dimension 2: Community Agency. This dimension emphasizes communities as co-designers, co-owners, co-interpreters, and co-beneficiaries. It requires participatory decision-making, editorial control, benefit-sharing, cultural IP protection, and local capacity building.

Dimension 3: Technological Responsiveness. This dimension argues that technology creates value only when it fits local needs, capacities, infrastructure, cultural norms, and interpretive goals. Digital tools should enhance interpretation and visitor experience without overwhelming communities or distorting cultural meaning.

Dimension 4: Governance Alignment. This dimension requires cross-sector coordination, transparent accountability, cultural data sovereignty, intellectual property protection, ethical technology governance, and alignment with the SDGs.

### **Theoretical Relationships among the Four Dimensions**

The four dimensions are interdependent rather than additive. Cultural Integrity depends on Community Agency because communities define, protect, and transmit ICH meanings. Community Agency also shapes Technological Responsiveness, since technology is

appropriate only when communities influence its design, content, and governance. Technological Responsiveness requires Governance Alignment because platforms, AI systems, and data-driven tools need accountability, transparency, privacy protection, and fair benefit-sharing. Governance Alignment, in turn, protects Cultural Integrity through cultural policy, ethical regulation, IP protection, and safeguards against digital extraction.

The DCHS Model therefore functions as a dynamic system, not a checklist. Weaknesses in one dimension can undermine the others: AR may fail without community agency, storytelling may stall without appropriate technology, and smart tourism may erode cultural integrity if governance is weak. Sustainable digital heritage tourism requires all four dimensions to work together.

|                                                                                                                                  |                                                                  |                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Dimension 1<br/>CULTURAL<br/>INTEGRITY</b><br>FPIC-based design<br>Contextual embeddedness<br>Intergenerational vitality      | ↕ <i>Integrity–Agency</i>                                        | <b>Dimension 2<br/>COMMUNITY AGENCY</b><br>Co-design & co-ownership<br>Benefit sharing<br>IP protection                |
| ↔ <i>Integrity–<br/>Responsiveness</i>                                                                                           | <b>DCHS Model<br/>(Sustainable Digital Heritage<br/>Tourism)</b> | ↔ <i>Agency–Governance</i>                                                                                             |
| <b>Dimension 3<br/>TECHNOLOGICAL<br/>RESPONSIVENESS</b><br>Task technology fit<br>Cultural appropriateness<br>Ongoing evaluation | ↕ <i>Responsiveness–<br/>Governance</i>                          | <b>Dimension 4<br/>GOVERNANCE<br/>ALIGNMENT</b><br>Cross-sector policy<br>Transparent governance<br>SDG accountability |

**Figure 1** The Digital–Cultural Heritage Sustainability (DCHS) Model

### Comparison with Existing Frameworks and Novelty of the DCHS Model

Existing frameworks explain digital heritage tourism only in part. Smart tourism frameworks emphasize infrastructure, data, personalization, and visitor experience, but give less attention to cultural ownership, community consent, cultural IP, and digital commodification. UNESCO-based safeguarding frameworks stress community participation, cultural continuity, and ethical safeguarding, but remain less explicit about digital platforms, AI, and smart destination systems in tourism management (UNESCO, 2025b).

Community-based and experience-oriented frameworks add further insight. Richards (2001) explains how cultural attractions generate memorable experiences. Thavorn and Charoensuk (2025) show how community-based heritage supports coastal cultural tourism.

Zhu et al. (2025) link authenticity to the experience economy in heritage settings. The novelty of the DCHS Model lies in integrating these perspectives into a digitally specific framework for sustainable ICH tourism. Rather than assessing digital heritage tourism through sustainability, visitor experience, smart destination performance, or participation separately, the model evaluates it through four interrelated dimensions: Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment.

**Table 4** Comparison between the DCHS Model and Existing Frameworks

| Existing framework                         | Main limitation in digital ICH tourism                                                            | Contribution of the DCHS Model                                                     |
|--------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Sustainable tourism / triple bottom line   | Culture may be treated as a secondary social issue and may not capture living heritage continuity | Positions Cultural Integrity as a core dimension                                   |
| Smart tourism framework                    | Often prioritizes efficiency and visitor experience over cultural rights and consent              | Links technology with cultural appropriateness and community agency                |
| UNESCO ICH safeguarding framework          | Less explicit about digital platforms, AI, and smart tourism systems                              | Extends safeguarding into digital tourism governance                               |
| Community-based tourism framework          | May understate data ownership, platforms, and AI-mediated representation                          | Strengthens Community Agency through co-design, co-ownership, and data sovereignty |
| Experience economy / experience management | May treat heritage as consumable experience content                                               | Connects experience with cultural meaning and integrity                            |
| Stakeholder theory                         | Too broad without digital ICH-specific guidance                                                   | Specifies governance, accountability, and value-sharing roles                      |
| DCHS Model                                 | Requires empirical validation                                                                     | Provides an integrated framework for sustainable digital ICH tourism               |

The DCHS Model offers a theory-grounded framework for sustainable digital heritage tourism in digitally mediated ICH contexts. It assesses digital heritage tourism not only through visitor engagement, competitiveness, or innovation, but also through cultural continuity, community authority, ethical representation, and governance accountability.

### **Policy, Business, and Managerial Implications**

Digital heritage tourism should be integrated into tourism planning, cultural policy, AI governance, digital economy strategy, and sustainable development frameworks. At the regional level, the ASEAN Tourism Sectoral Plan 2026–2030 supports alignment between tourism development, sustainability, and regional cooperation (ASEAN Secretariat, 2026). UNESCO (2025c) emphasizes AI governance that protects cultural diversity and cultural rights, while the UNESCO World Heritage Centre (2026) links heritage management to the SDGs. Governments should therefore strengthen cultural data sovereignty, community free, prior, and informed consent (FPIC), intellectual property protection, ethical AI use, and support for digitally constrained rural and indigenous communities.

For destination managers and local governments, digital investment should be treated as a strategic decision rather than a promotional tool. Technologies should be selected according to destination positioning, cultural fit, visitor needs, community capacity, and long-term sustainability. AR and VR may support immersive interpretation, digital storytelling may suit community-based destinations, and STTs or AI may assist congestion management and service integration. Community-centered co-design, digital literacy, benefit-sharing, and evaluation beyond visitor numbers remain essential to culturally sustainable competitiveness.

For tourism businesses and technology developers, digital heritage tools should operate as systems of value co-creation. Communities should participate not only as content sources but also as co-designers and co-beneficiaries through community licensing, revenue-sharing, local content production, cultural IP agreements, and training. These measures function as both ethical safeguards and strategic assets. Technology design should prioritize cultural appropriateness, accessibility, low-bandwidth usability, transparency, and maintainability, especially where AI may introduce bias or misrepresentation.

### **Limitations of the Study**

This study rests on an integrative conceptual review of secondary literature, policy documents, and published case evidence, without primary data from heritage communities,

destination managers, tourists, policymakers, or technology providers. Community perspectives are therefore not represented directly, and the DCHS Model remains a conceptual framework awaiting empirical validation. The selected cases also reflect the availability of documented English-language evidence rather than full coverage of every ASEAN member state, so the examples from Thailand, Indonesia, Vietnam, Malaysia, and Cambodia are illustrative rather than representative. The study does not, finally, offer a quantitative assessment of the effectiveness of particular technologies or of visitor outcomes.

## Conclusion

Digital transformation brings both opportunity and risk to Southeast Asian ICH tourism. It can enrich interpretation, deepen visitor engagement, lift destination image, widen cultural visibility, and improve tourism management; without cultural safeguards and accountable governance, it can just as easily intensify commodification, weaken community authority, simplify living traditions, and skew the capture of value. The main contribution of this article is the DCHS Model, which draws Cultural Integrity, Community Agency, Technological Responsiveness, and Governance Alignment into one framework for evaluating digital heritage tourism. The model holds that digital strategies should be judged not by adoption or visitor satisfaction alone, but by whether they sustain cultural meaning, strengthen community authority, fit local context, and operate within accountable governance. Alongside that conceptual claim, the study sets out practical implications for policymakers, destination managers, tourism businesses, and technology developers. Future research should test and refine the model across diverse ASEAN contexts, drawing on qualitative, comparative, quantitative, and participatory approaches.

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