Towards a Collaborative Sustainability Model for Cultural Heritage Preservation in India

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Abstract

India has long been limited by colonial-era path-dependency and scattered, top-down governance structures that approach traditional heritage conservation as silent echoes rather than living socio-economic assets. This paper identifies the systematic silos within current blueprints and suggests a Collaborative Sustainability Model (CSM) as an innovative solution, using the latest national roadmaps from NITI Aayog (2024) and the economic "Experience Economy" findings of KPMG and PHDCCI)2024), that weaves an all-around strategy with the use of advanced digital technologies such as 3D laser scanning and laser-mapping with social equality through the enlistment of traditional craftspeople.

The paper shows how establishing focused management teams, such as the Tamil Nadu Archaeology Policy (2024 – 2025). can translate theory to practice, thus enabling India to safeguard its history while nurturing the growth of modern cities and the well-being of local communities. It shows that treating heritage as an asset rather than a liability can help India preserve its history while still supporting the development of urban areas and the needs of local communities.

Keywords: *Cultural sustainability; Heritage preservation; Collaborative model; Digital documentation; Community engagement; India.*

INTRODUCTION

Cultural heritage refers to the tangible and intangible legacy of a nation that is used to define its character and the social togetherness that comes from it, but which is threatened by rapid urbanization, environmental degradation, and the pressures of globalization. Although the Archaeological Survey of India has preserved physical structures through conventional conservation efforts, it has traditionally treated heritage as a silent monument, ignoring the socio-economic aspects necessary for long-term sustainability.

The 1923 Marshall Manual from the colonial era is being successfully replaced by the current official vision, the National Policy for Conservation of Ancient Monuments and Archaeological Sites and Remains (NPC-AMASR). The NITI Aayog Working Group Report (NITI Aayog, 2024) strongly supports this new framework, which promotes a dynamic conservation process. To truly ensure both scientific and social sustainability, it introduces formal "Work Audits" and incorporates indigenous skills through the region-wise inclusion of traditional craftspeople. Furthermore, in order to create a 'Digital Insurance Policy' to protect from physical deterioration, the national roadmap now requires a shift toward high-precision documentation and suggests that each national monument undergo 3D laser scanning within a three-year period.

With these advancements being significant, there is still a gap in the framework to integrate economic viability with community participation. According to a recent industry analysis by KPMG and PHDCCI (2024), heritage is no longer a cost centre, but the driver for the Experience Economy, where heritage preservation can be a foundation for sustainable development. Despite India having a rich heritage, the absence of inclusion of local stakeholders means that the growth of self-sustaining ecosystems often falls through the gaps, as was the case with Hampi World Heritage Area, which suffers from broker stewardship and a lack of shared agency. But when the state moves from a policing approach to a facilitating partnership, for example, Tamil Nadu Archaeology Policy 2024–2025 (GoTN, 2024), then the gaps between oversight and agency can be bridged

through academic collaborations (e.g., IITs for advanced scientific dating and remote sensing), and heritage can become a self-renewing process that provides a roadmap for policymakers to ensure that India's countless cultural identities remain intact.

With this in mind, this study proposes a Collaborative Sustainability Model (CSM) that aims to address these systemic challenges, where heritage is viewed through the lens of multi-stakeholder partnerships and the use of demonstrated digital tools, such as the Rajdharaa GIS Gateway, to convert preservation into process of self-renewal, with the ultimate goal of developing a strategic policy framework to ensure that the plurality of cultural identities in India remain vibrant and sustainable.

METHODOLOGY

Using a qualitative research design, this study employs a multiple-case study approach to understand the transformation from traditional conservation to a collaborative sustainability foundation in India by analyzing the interaction between community-wide participation and long-term survival.

Research Design

A multiple-case study method was chosen to study hands-on conservation practices, which is an appropriate method for heritage studies, as it opens the door to the thorough examination of the complex relationships between government agencies, private entities, and local communities at geographically and culturally distinct sites.

Data Collection and Sources

By layering multiple secondary sources, this study produces a more reliable and trustworthy picture. This study analyses the 2024 NITI Aayog technology guidelines (NITI Aayog, 2024) and the National Policy for Conservation (ASI, 2014), along with the Tamil Nadu Archaeology Policy (GoTN, 2024), to trace how these measures correlate in practice, combined with economic pulse of the 'Experience Economy' and heritage tourism as mapped in the KPMG white papers (KPMG and PHDCCI, 2024) and organizational frameworks based on authorized ASI publications, UNESCO directives on Cultural Landscapes (UNESCO, 2025), and 2024 community-based management reports from Hampi (HWHAMA, 2024).

Analytical Framework

The results are organized in terms of four analytical pillars: Institutional Synergy (efficiency of Public-Private Partnerships and the transition from policing to facilitating governance): Technological incorporation (the application of digital tools such as LIDAR and 3D Scanning as outlined in the NITI Aayog road map): Socio-Economic bonds (relating conservation to local livelihoods and the enlistment of traditional crafts persons) and Environmental strength (the sustainability of materials used for restoration and the management of Outstanding Universal Value).

LITERATURE REVIEW

The study around cultural heritage preservation has evolved from monument-centric approaches to more inclusive and sustainability-driven models (Lahiri, 2013). While foundational, such studies tended to treat preservation as an administrative and engineering problem, largely detached from the living socio-cultural context (Vyas, 2024). This gap is further reflected in the separation between tangible and intangible heritage, where the emphasis of traditional conservation of often physical structures rather than active cultural practices (Vyas, 2024). Foundation scholars such as Bridget Allchin, F.R. Allchin, and B.K. Thapar highlighted the importance of an interdisciplinary approach to Indian conservation, and N.L Batra offered technical information on the protection of cultural property to resist structural decay.

Later studies, however, widened this focus to also include the intersection between heritage and environmental and developmental demands. Conservation often becomes less efficient because it lacks unified planning and effective governance structures (Gupta and Gupta, 2020). Development pressures often compete with conservation in rapidly urbanizing contexts. The NITI Aayog (2024) report aims to address this by establishing a national goal of 3D laser scanning every national monument within three years, which includes Photogrammetry and LIDAR to ensure that detailed architectural details and murals are archived with pinpoint fidelity, so as to move toward a transparent, data-driven e-governance model.

Furthermore, the new national policy recognizes a shift away from the 100 -year - old conservation manual by John Marshall (Marshall, 1923) towards a National Policy for Conservation (ASI, 2014), which will move towards the use of indigenous craftsmanship and region-wise formal integration of local artisans as opposed to structural patching. In this way, the state will be able to guarantee restoration is scientifically accurate and socially inclusive through the use of Work Audits and community-based skills. UNESCO emphasizes that protecting the monument alone is not sufficient; the entire surrounding environment must be managed as a Cultural Landscape with a view to preserving its integrity. (Mitchell *et al.*, 2009).

A new theme, Sustainable Heritage Management, has emerged in the last decade and literature posits that sustainability must reach beyond physical durability to also integrate economic viability (KPMG and PHDCCI, 2024). While heritage tourism provides an important catalyst for employment. (Singh, 2023). Alongside this, Community engagement is also recognized as a key success factor: participatory planning fosters more inclusive outcomes (Razem and AlHalalsheh, 2024). and hierarchical governance frequently lacks local legitimacy (Smith, 2022), which is often associated with the Authorised Heritage Discourse, a persistent colonial framework that places monumental heritage above everyday cultural manifestations (Vyas, 2024). As UNESCO notes, the protection of a monument is inadequate, and the entire surrounding environment needs to be governed as a Cultural Landscape.

However, despite these advancements, a major research gap remains, as the existing literature classifies technological

innovation, community engagement, and economic viability as isolated pockets and lacks synthesized research on how a multistakeholder collaborative model could unify these dimensions. In this study, to fill this void, we propose a Collaborative Sustainability Model (CSM) that can bridge the gap between theoretical conservation and practical management in the Indian context.

The study tests the cross-typological applicability of this model using digital datasets from four UNESCO sites that include rock-cut monastic complexes and monumental temples as well as functioning urban transit hubs, to assess the impact of integrated governance on bridging the gap between theoretical conservation and practical management.

CULTURAL HERITAGE CHALLENGES:

In India, the shift to a sustainable and collaborative heritage framework is constrained by a number of systemic challenges that represent a siloed approach to governance, treating the environmental, economic and social dimensions as independent variables instead of as a unified ecosystem. Management of heritage involves a Cultural Landscape approach, as outlined in international management guidelines (UNESCO 2025), which asserts that protecting a monument in isolation is not enough, and that the entire surrounding environment and its Outstanding Universal Value must be managed.

Conservation Policy Gap

As a result, India's heritage sites are now at greater risk from man-made climate change and localized pollution, as evidenced by the particular matter-induced pigment degradation of the Taj Mahal and the hydro-climatic erosion at Hampi. The main challenge is the conservation-policy gap, as identified in the NITI Aayog (2024) report, in which existing regulations do not provide the adaptive resilience for heritage sites, considering environmental protection as a secondary concern rather than as a fundamental part of the conservation lifecycle.

The Urban-Heritage Conflict

The tension between modern infrastructure and historic integrity escalates in the setting of rapid, unplanned urbanization, as seen at Meenakshi Amman Temple and Brihadeeswarar Temple, where commercial encroachment has compromised structural stability and cultural safeguard zones.

Economic Imbalance

In the case of tourism, which is one of the primary revenue sources for the site, the model at the site of Amer Fort suffers from over-tourism and a deficit of carrying-capacity assessments, which leads to resource depletion (a failure of sustainability) due to the lack of a Circular Economic Model. In the absence of high-quality interpretation centres and visitor facilities, the Experience Economy does not deliver direct economic benefits to the local community. (KPMG and PHDCCI, 2024).

Social Marginalization

The centralized nature of conservation is also a systemic barrier in India, as government agencies often consider a monument as a passive object, and this creates a sense of alienation among local residents (Razem and Alhalalsheh, 2024), for which the solution is to incorporate Traditional Knowledge (TEK) into official plans. Indigenous Knowledge of how natural materials such as lime and resin respond to the local climate is often more sustainable than modern chemical interventions. The traditional water structure projects in Jhunjhunu treat the local people as primary stakeholders and guardians, and they offer a level of protection that no government force can match.

Diversified Funding

State departments are often heavily relied upon to fund preservation, especially at Tier-II sites, and the stagnation in restoration at Fort Kochi demonstrates the vulnerability of government-only funding. Although Tamil Nadu has addressed this, at least to some extent, by earmarking specific funds for Old Forts and Palaces in the Tamil Nadu Archaeology Policy (GoTN, 2024), there is a national-level barrier in the lack of formalized incentive-based mechanisms, such as tax credits, to encourage regular private sector and CSR investment.

Synthesis

A sustainable model needs to be integrated into urban planning, which considers both development and preservation. The environmental, urban, economic, and social challenges are interdependent; addressing them in seclusion leads to symptomatic instead of systemic relief. Therefore, a collaborative sustainability model serves as an integrator to break down these fragments and form a participatory, self-sustaining ecosystem.

RETHINKING HERITAGE PRESERVATION

Moving beyond legacy-driven conservation rooted in top-down, state-centric, colonial frameworks that treat heritage as passive artifact and are guided mainly by the 1923 Conservation Manual (Marshall, 1923), resulting in fragmented efforts led by the Archaeological Survey of India, which is insufficient to address the triple threat of atmospheric variability (e.g., the atmospheric corrosion of the Taj Mahal), unregulated urban sprawl (e.g., encroachment at the Meenakshi Amman Temple, Madurai) and cultural uniformity, which calls for a shift towards proactive integrated management as envisioned in the National Policy for Conservation by viewing a monument as an active and integral part of the surrounding landscape.

Creating the Collaborative Sustainability Model (CSM)

The proposed collaborative Sustainability Model is based on three interlined pillars to forge self-sustaining ecosystems with heritage sites. Digital resilience is more than just a photograph: it is a Digital Insurance Policy. The NITI Aayog (2024) road map suggests that there needs to be a shift in national heritage management to high-precision archiving through 3D Laser Scanning and Photogrammetry, which offer millimetre-perfect records of sites, such as the Ajanta Caves, capturing architectural details and murals that cannot

be captured in manual drawings. LIDAR and Drone Surveys enable monitoring of inaccessible areas, which provides an important baseline for condition assessment. The Tamil Nadu Archaeology Policy (GoTN, 2024) has executed this through specific projects for the documentation of heritage sites. Drawing from the Hampi governance model, this pillar advocates for a Unified Digital Gateway, which would bring together disparate databases and GIS master plans to move from isolated data policing to a Digital Facilitation Platform that synchronizes 3D scans and urban planning bylaws into a single transparent e-governance framework.

Social Equality and Community Agency

The monument functions as a repository of collective identity, granting local inhabitants the agency mandatory to change from passive neighbours into active custodians. Traditional Craftsmanship: This model transitions from centralized contracting and adopts the NITI Aayog recommendation for region-wise empanelment of traditional crafts persons, integrating indigenous skills with formal Work Audits, safeguarding that rehabilitation is not only scientifically accurate but socially inclusive. The Tamil Nadu model emphasizes on living history, including site museums and path-breaking discoveries (Keezhadi) to generate public pride. Sustainable development demands a community-based approach to housing and heritage lodging, as reflected in the Hampi World Heritage Area Management Authority (Amendment) Act, 2023 (HWHAMA, 2024) and the conduct of Traditional Building Crafts workshops that translate high-level policy into practice, training residents in techniques appropriate to a site's OUV (Sharma, 2024).

Circular Heritage Economy

In order to operationalize this Circular Economy within the Indian legal framework, the model proposes the establishment of Special Purpose Vehicles or Site-specific Heritage Trusts, which ring-fence the revenue, so that money generated by tourism can be reinvested in the site for maintenance and community welfare without the delays in the administrative absorption of the funds into centralized state exchequers, creating a transparent, accountable, and self-sustaining financial loop. Crucially, these Special Purpose vehicles are designed to prioritize the formal employment of traditional craftspeople, directly linking the site's economic revenue to the social equality goals of the regional empanelment model.

PRACTICAL EVIDENCE AND CASE ANALYSIS

The Collaborative Sustainability Model (CSM) has been applied in two different frameworks in India: the historical urban texture of the cities and the traditional resource management system of rural areas.

Urban Heritage and Structural Form

The case of Amritsar Heritage in the Walled City of Amritsar is not limited to the Gold Temple, but extends to the entire Urban Morphology, the traditional houses, historical markets and street patterns. These sites face significant pressure from real market pressures and a lack of infrastructure. In these cases, government-led conservation usually treats them as static artefacts, not the living city. As regional urban studies have shown, the process of planning development must be collaborative, with the history and geography of the city analysed holistically. Heritage can also act as a foundational core for urban renewal, the CSM suggests, as local business owners take part in preserving the city fabric and prevent the displacement of local communities, while the historical character helps to fuel a local economy.

Water Structures in Jhunjhunu

Rural sites, such as the Stepwells of Jhunjhunu, Rajasthan, are under systemic abandonment in comparison the pressures from real estate in urban areas, but these structures present a unique opportunity for Functional Sustainability. These structures are engineering solutions to water-scarce climates. The restoration of these ancient wells, accomplished through a model of local water committees and traditional craftsmen, restores the wells physically, using original materials and achieving Climate Resilience while also being self-sustaining because the community now has a useful water source, and local stakeholders have a direct incentive to.

Digital Pillar of the Model

The example of the Ajanta and Ellora Caves illustrates the digital pillar of the model. The move toward millimetric archiving has now become a national priority; the NITI Aayog (2024) reports codifying a timeline for 3D Laser Scanning of all national monuments within three years. The technical execution includes a three-phase workflow: i. digital 3D modelling using terrestrial laser scanning, ii. converting data into Building Information Models (BIM), and iii. using high-resolution captures for VR Exhibitions.

Example of State-Level Implementation

One of the best examples of this interdisciplinary approach is the Tamil Nadu Archaeology Policy: 2024 – 2025 (GoTN, 2024). For instance, involving the IITs and Anna University for advanced remote sensing and setting aside specific funds for the conservation of old forts and palaces illustrates how academic partnerships can preserve regional heritage that often escapes national oversight. By bridging the gap between high-end academic research and regional preservation, this case serves as a functional validation of the CSM's Digital Pillar (GoTN, 2024).

This evidence synthesizes that whether on the bustling streets of Amritsar or in the tranquil stepwells of Rajasthan, the formula for survival is to transition from a state-only project to a community-driven process.

POLICY RECOMMENDATIONS FOR STAKEHOLDERS

This model has to be sustained, and the following strategy is suggested:

- *Digital Autonomy*: Move national and state departments toward an in-house technological setup for documentation. Using the NITI Aayog (2024) roadmap, a three-year time-bound target of 3D Laser Scan for every national monument must be established to create a

permanent digital record against environmental and urban threats.

- *Administrative Streamlining*: Using e-governance Single-Window systems for regulatory approvals, like the Rajdharaa GIS gateway, will minimize the administrative delays that currently obstruct urgent restoration works.
- *Economic Inclusivity*: Heritage has to be part of the Experience Economy (KPMG and PHDCCI, 2024), with Work Audits to ring-fence a fixed percentage of site revenue for local community welfare and training of traditional crafts persons.
- *Landscape Management*: Conservation must extend beyond the walls of the monument and embrace a Cultural Landscape approach (UNESCO), with farming, forestry, and urban policies aligned with the OUV of the site.

CONCLUSION

This study finds that the traditional hierarchical approach to heritage management, which is based on colonial-era path dependency and structural boundaries, is insufficient for the rapidly changing socio-economic landscape of India, and that the CSM, with its concept of heritage as a living resource rather than a static relic, provides a new way forward by managing heritage as an asset for Nurturing Vitality instead of Managing deterioration. With this holistic approach, in which the state, the private sector, and the community collaborate and share, as illustrated by the Tamil Nadu models, India's heritage can serve as a catalyst for sustainable development and national distinctiveness. Finally, the Collaborative Sustainability Model shows that heritage preservation is an investment in India, not a liability to the nation.

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Conflict of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/ or falsification, double publication and/or submission, and redundancy, have been completely observed by the author.

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