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Tourism and Tradition: Heritage Conservation Practices and Challenges Amid Mass Tourism in Kathmandu Valley

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Abstract

The increasing popularity of prominent tourist destinations has raised significant concerns about the adverse impacts of mass tourism on cultural heritage sites and their surrounding environments. This study explores the cultural heritage conservation practices and challenges in Kathmandu employing a cross-sectional descriptive and explanatory design. Data was collected through surveys using structured questionnaires and interviews. Systematic random sampling was employed to select local community members, while purposive sampling was used for interviews with government officials, cultural experts, and tourism authorities. The study's sample size is 395 with valid responses from respondents. Latent class analysis indicated three main visitor types: heritage enthusiasts, spiritual seekers, and urban explorers. Thematic analysis of seven interviews with key stakeholders revealed seven major impediments to effective heritage conservation: inadequate management, insufficient monitoring and evaluation, lack of financial resources, minimal stakeholder involvement, the pressures of urbanization, weak governmental commitment, and the impacts of vandalism and illicit trafficking. The findings from the multi-method analysis suggest that the cultural heritage sites in Kathmandu Valley are at risk unless supported by robust conservation strategies, including comprehensive site management plans, research-driven policies, and increased stakeholder and community participation. The study emphasizes the need to integrate heritage conservation with sustainable development initiatives, advocating for enhanced promotion of conservation practices as a means to achieve both economic and social sustainability. The research offers evidence-based policy recommendations aimed at mitigating the effects of mass tourism and safeguarding the cultural and historical integrity of Kathmandu's heritage sites.

Keywords: Conservation strategies, cultural heritage, environmental impact, urbanization, sustainable development

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Introduction

Heritage represents the legacy we inherit from the past, cherish in the present, and preserve for future generations. Cultural heritage, whether tangible or intangible, holds intrinsic value as an irreplaceable source of identity, inspiration, and continuity. UNESCO (2005) describes heritage as our touchstones, offering a sense of belonging and a means to understand our place in the world. Cultural heritage encompasses physical artifacts, traditions, and values passed down through the years kept alive now and protected for the next generations (Kurin, 2003; Bolin, 2019). Bleibleh and Awad (2020) describe cultural heritage as monuments, such as archaeological structures, sculptures, and architectural works, as well as buildings and sites with global aesthetic, architectural, anthropological, ethnological, or historical significance. Heritage helps people, groups, and communities feel connected, enriches their worldview, and gives them purpose (UNESCO, 2007).

In the Nepalese context, cultural heritage reflects the diverse social, economic, political, and religious conditions of its population, which boasts a rich history, cultural diversity, and over 123 living languages spoken by various ethnolinguistic groups (Chapagain, 2008). As a country endowed with such a profound heritage, Nepal struggles to protect its cultural assets while adapting to the pressures of globalization. The fear of cultural homogenization in this era of globalization has spurred the development of strategies to preserve distinct cultures that may otherwise be at risk of extinction (Pietrobruno, 2009; Nesbeth, 2013; Karki, 2024). In this regard, safeguarding cultural heritage has become a priority, aligning with the vision of creating a sustainable cultural future (Levi-Strauss, 2013). Respecting the cultural and physical significance of heritage items, conservation encompasses reconstruction, restoration, adaptation, and preventive preservation (ICOM-CC, 2008). In Nepal, ancient monuments and structures serve as testaments to a deep historical legacy, with their continued presence reflecting centuries-old practices of maintenance and repair, often initiated by royal families, ministers, or community organizations (Banerjee, 1970). The guthi system—a traditional trust for the upkeep of communal buildings—played a pivotal role in sustaining heritage sites for generations.

While heritage preservation was not a pressing issue during Nepal's isolation before the 1950s, the country's subsequent opening to the world brought about rapid changes. Organizations like the Department of Archaeology (DoA), established in the 1950s, took on the formal role of managing conservation efforts (Banerjee, 1977). The Ancient Monuments Preservation Act of 1956 laid the legal foundation for safeguarding Nepal's cultural heritage (DoA, 1956). Over the years, Nepal has received international support from UNESCO and other agencies, resulting in the formulation of conservation policies and the nomination of seven monument zones in the Kathmandu Valley as UNESCO World Heritage Sites. Despite these efforts, Nepalese authorities have struggled to coordinate conservation activities effectively, as demonstrated by fragmented restoration initiatives, overlapping roles of various organizations, and conflicting approaches to heritage management (Subedi & Sharma, 2023; Dahal et al., 2023). Yet successful models like the Bhaktapur Development

Project (BDP) illustrate how integrating urban development with heritage conservation can promote both economic growth and the preservation of cultural identity (Parajuli, 1992; Karki, 2018). Such efforts offer valuable lessons for overcoming the challenges of heritage conservation in Kathmandu Valley.

However, even with the rich historical and cultural heritage of Nepal, its sustainability is threatened by mass tourism, developmental pressures, lack of awareness, inappropriate conservation practices, and natural deterioration. Cultural heritage sites face physical, chemical, and anthropogenic threats that undermine their long-term viability (Eken et al., 2019). The lack of sufficient scholarly work on cultural heritage conservation, particularly in South Asia, further exacerbates these challenges. This study seeks to address this gap by exploring the cultural heritage conservation practices and challenges in Kathmandu Valley, emphasizing the urgent need for effective preservation strategies.

Literature Review

The standardization and homogenization of cultural heritage, particularly in the context of globalization, have profound implications for local communities, their identity, and their socio-cultural fabric. As Herzfeld (1991) argues, heritage is not merely a relic of the past but serves as a vital channel for creating the future. How indigenous societies offer their cultural heritage to outsiders significantly influences how they envision their collective future. This dynamic has been found in various ethnographic studies (Olwig, 1999; Babb, 2012). The representation of cultural heritage, particularly when standardized for broader consumption, often reflects existing socio-political hierarchies, resulting in diverse opinions among community members (During, 2011). This tension can weaken community cohesion, creating socio-political rifts that, in extreme cases, lead to individuals abandoning the community, constituting a breach of their cultural rights.

To address such challenges, assessments should identify threats to specific cultural heritage elements, providing a foundation for safeguarding or revitalization efforts. One emerging alternative is digital preservation, which Koiki-Owoyele et al. (2020) define as the process of digitizing materials and transferring them to a computer for storage and dissemination. Digital preservation has proven to be a practical solution, especially where physical conservation is constrained by financial or technical limitations. By making cultural heritage accessible through digital platforms, costs and logistical barriers to accessing archives, museums, or libraries are reduced (Moseti, 2016; Karki et al., 2021). Furthermore, digital preservation offers a long-term fix for problems including deterioration, conflict, natural disasters, and theft, ensuring the availability of heritage resources for future generations of scholars and academics.

The conservation of cultural heritage emphasizes the preservation of "living" cultural elements—those that are actively practiced and hold contemporary relevance. Natural and human factors, including developmental pressures, conflicting stakeholder interests, theft, and inappropriate conservation practices, often undermine conservation efforts (Czermak et al., 2003). Local communities, as Truscott (2000) argues, may sometimes fail to appreciate the

value of preserving their cultural heritage, viewing it as a hindrance to their modernization and access to economic opportunities. This perception can erode the cultural character of the community, leading to a loss of heritage continuity. Thus, it is crucial to build systems that respect minority cultures while fostering awareness among local communities of the value of their cultural treasures (Munjri, 2000).

Rapid urbanization, mass tourism, insufficient funding, inadequate project selection, and a lack of traditional knowledge among conservation professionals have all contributed to the underperformance of heritage conservation initiatives (Roy & Kalidindi, 2017; Shrestha et al. 2022). Additionally, poor governance, corruption, and misguided conservation policies exacerbate the threats facing cultural heritage (Berhanu, 2018). Other significant issues include lack of local participation, heritage trafficking, cultural deterioration, and insufficient care from government authorities (Wharton, 2005). Navaneethakrishnan (2013) highlights the importance of addressing indigenous claims to cultural ownership and ensuring the integrity of heritage sites, which are often threatened by land development projects, resettlement programs, and urbanization.

Wars and conflicts have also had devastating effects on cultural heritage, as evidenced by the widespread destruction of heritage sites across the Middle East, including in Syria, Iraq, Libya, and Yemen. Brosche et al. (2017) document how religious sites, historical monuments, and material culture collections have become targets during interstate and civil conflicts. Iconic examples include the six World Heritage sites in Syria, such as the Site of Palmyra and the Ancient City of Damascus, which have suffered irreparable damage due to armed conflicts (Cunliffe et al., 2014; Muddie, 2018).

Further compounding these challenges, UNESCO (2005) reports a global shortage of qualified professionals capable of leading and participating in heritage preservation efforts. Ensuring the survival of cultural heritage in an increasingly globalized world requires thoughtful management and partnerships between governments, NGOs, private tourism sectors, and local communities (UNESCO, 2008). As Xulu (2007) notes, sustainable conservation management is contingent upon mutual understanding and shared interest among stakeholders, particularly those from local communities. Stakeholder attitudes and awareness regarding conservation are crucial in fostering a feeling of shared responsibility and promoting cultural tourism (Mohd. Ariffin et al., 2015).

Community-based tourism provides a valuable framework for fostering direct engagement between the heritage tourism sector and local communities, enabling cultural assets to be sustainably developed as tourism products (Eleonora, 2007). Active community involvement is essential in managing and safeguarding cultural heritage, as they are the most capable of ensuring its continuity and future viability (ECTP, 2008). According to UNESCO-ICOMOS (2011), each community, drawing on its consciousness and collective memory of the past, bears the responsibility for identifying and managing its heritage. The participation of indigenous communities and groups is particularly crucial, as they are integral to the creation, maintenance, and dissemination of intangible cultural heritage.

Beyond stakeholder involvement and community participation, other mechanisms such as resource mobilization, ecotourism activities, and corporate fundraising can contribute to conservation efforts (Jamieson, 2004). UNESCO has emphasized that safeguarding cultural heritage requires both national and international cooperation, as enshrined in its conventions (Boonyakiet, 2011). These conventions underscore the role of communities as the main factors of cultural heritage, while also highlighting the importance of state policies in either supporting or undermining preservation efforts (UNESCO, 2007). The challenge lies in ensuring that subsequent generations have the prospect of experiencing the cultural legacy of their predecessors while engaging with communities to preserve this heritage in a manner that respects their rights and traditions.

The literature reveals that cultural heritage preservation is a complex and multifaceted endeavor, influenced by socio-political dynamics, economic pressures, and environmental factors. Effective conservation requires a holistic approach that integrates local community participation, digital preservation strategies, and robust governance mechanisms. Only through coordinated efforts among all stakeholders can the rich cultural heritage of communities like those in Kathmandu Valley be safeguarded for future generations.

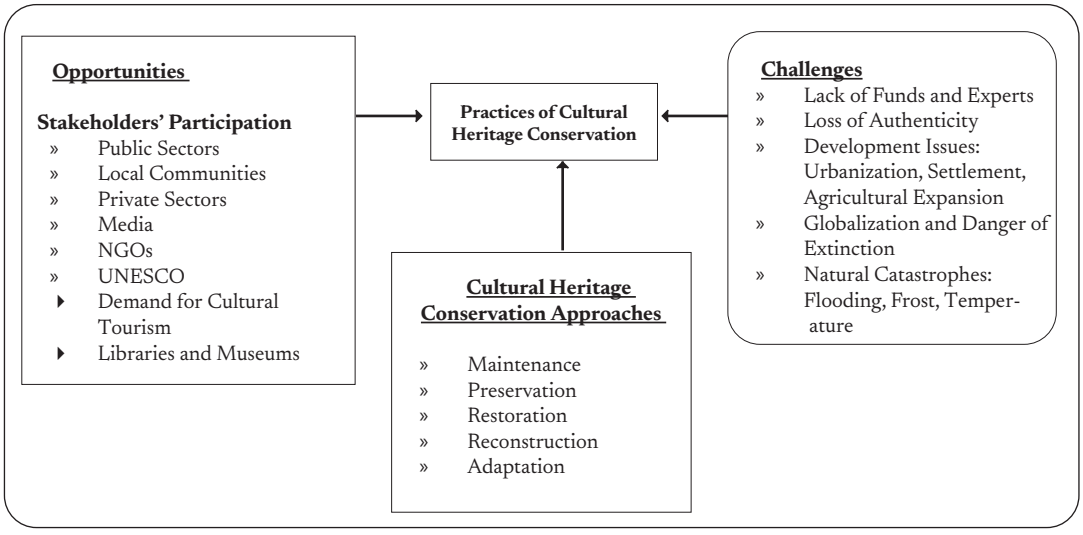
Theoretical Framework of the Study

The domain of heritage conservation has garnered significant attention from both academia and practitioners, with a growing recognition of its importance in conserving historical legacy and cultural identity (Gursov et al., 2019). A key tenet emerging from the discourse is the integration of community-based practices, which prioritize the wellness of the local communities and empower them by utilizing their indigenous knowledge and skills (Sinamai, 2018, Dahal et al., 2020). Conservation efforts should strive to maintain the heritage's original purpose whenever possible. When such continuity is not feasible, alternative uses should be sought that align with the heritage's historical context and minimize alterations to its structure and significance (Tadesse, 2012). A key aspect of this approach is the principle of minimal intervention—conservation techniques should prioritize repair over replacement, and efforts must be made to preserve as much of the historic fabric as possible, as these elements serve as tangible connections to the past.

A significant challenge to heritage conservation is posed by both anthropogenic (human-induced) and natural factors. Human-induced threats include conflicting interests over ownership, contestation rooted in cultural politics, negligence, illicit trafficking, unprofessional conservation practices, urbanization, large-scale agriculture, and developmental projects (ICOM-CC, 2008; Sinamai, 2018, Bhandari et al., 2021). Additionally, natural factors like wind pressure, climate change, rainfall, solar radiation, and natural disasters like earthquakes, floods, and thunderstorms pose significant risks to cultural heritage sites (Eken et al., 2019). Biological threats from invasive species and pests like rats also contribute to the degradation of heritage materials.

In response to the various threats posed to heritage sites, a range of conservation approaches have been developed, each tailored to the specific level of impact on the heritage in question. One key approach is maintenance, which involves the constant caring of the heritage site's setting to prevent deterioration, ensuring that the site remains in good condition over time (Gursov et al., 2019). Preservation focuses on maintaining the heritage in its existing state, with the primary goal of preventing further decay or deterioration of the site's materials (Umar, 2018). Restoration aims to return the heritage site to a known earlier state by avoiding later additions or reassembling current components, all while without adding new materials, thereby maintaining the authenticity of the site's original structure (Vaccaro, 1996). In contrast, reconstruction involves reintroducing new materials to recreate a heritage site and bring it back to a known earlier state, especially in cases where the original structure has been significantly altered or destroyed (Umar, 2018). Lastly, adaptation focuses on modifying a heritage site to suit its current or proposed use, while ensuring that its historical integrity is preserved, allowing the site to continue serving a purpose within a contemporary context (Yazdani Mehr, 2019). By grounding this study in these theoretical constructs, a conceptual framework is developed as shown in Figure 1.

Figure 1
Theoretical Framework of the Study



This framework recognizes the dynamics of heritage conservation and aims to provide a structured approach to preserve cultural heritage for future generations.

Research Methods

Study Area Description

The Kathmandu Valley, situated in central Nepal, is a cultural and historical epicenter, home to some of the nation's most significant heritage sites. The valley encompasses the capital city of Kathmandu and neighboring cities such as Bhaktapur and Patan, all of which boast a rich fusion of Hindu and Buddhist traditions. These traditions are reflected in the region's

distinctive architecture, ancient monuments, and vibrant cultural practices (Chapagain, 2008). The Kathmandu Valley has been chosen as the study area due to its extraordinary concentration of UNESCO World Heritage Sites, which include ancient temples, palaces, and stupas that highlight the valley's historical prominence as a center of art, religion, and culture.

The valley is noted with medieval-era relics such as the Swayambhunath Stupa (commonly referred to as the Monkey Temple), the sacred Hindu temple of Pashupatinath, Patan Durbar Square with its intricately designed palaces, and Bhaktapur Durbar Square, renowned for its well-preserved ancient architecture. Additional key heritage sites include the massive Boudhanath Stupa, one of the largest in the world, and the Changu Narayan Temple, considered one of the oldest Hindu temples in Nepal. These cultural and historical treasures, coupled with the valley's role as Nepal's political and economic heart, make the Kathmandu Valley an ideal location for the study of heritage conservation and the effects of modern tourism.

Research Approach

A cross-sectional design incorporating both descriptive and explanatory methods was used. The descriptive design was employed to illustrate current heritage conservation practices and the challenges faced by the valley's cultural sites. The explanatory design was applied to assess the effects of various predictors anthropogenic (human-induced) and natural- on the conservation of cultural heritage. A structured survey was used to collect quantitative data, while qualitative data was gathered through interviews, document analysis, and field observations. This multi-method approach as suggested by Devkota et al. (2023) ensured that the study captured both statistical trends and contextual insights, offering a holistic view of the heritage conservation landscape.

Data Collection

Using random sample methods, 425 households in local communities were given a self-administered questionnaire, of which 395 valid responses were received. Interviews were conducted with key stakeholders to gather in-depth insights into their roles, perspectives, and challenges. A total of seven purposively selected individuals from organizations like; the Nepal Tourism Board (NTB), Nepal Association of Tours & Travel Agents (NATTA), Hotel Association of Nepal (HAN), the Federation of Nepalese Chambers of Commerce and Industry (FNCCI), and Trekking Agencies' Association of Nepal (TAAN) were interviewed. These interviews were conducted through a combination of note-taking and audio recordings, which were later transcribed for analysis. Document analysis was employed to collect secondary data, including conservation action plans, procedures, guidelines, and heritage management policies from relevant offices.

Data Analysis

The quantitative data were evaluated employing descriptive statistics such as frequency, mean, percentage, and standard deviations. Furthermore, inferential statistics including correlations, exploratory factor analysis, and regressions were applied to examine relationships between variables. The qualitative data were thematically analyzed employing content analysis to find patterns and main themes related to heritage conservation.

Reliability and Validity

The validity of the study was evaluated by adapting standardized questionnaires and interview checklists from relevant literature (Wharton, 2005; Gursov et al., 2019). These instruments were further reviewed by experts. To assess content validity, 15 questionnaires were allotted to experts in the tourism industry, who provided important feedback on the content, layout, and structure of the questionnaire.

The reliability of the research instruments was examined using Cronbach's alpha to test inter-item homogeneity. Internal consistency is often established with a Cronbach's alpha value of 0.70 or higher, and reliable measures are indicated by inter-item correlations of 0.30 or higher (Taherdoost, 2016). Only the items meeting these thresholds were included in the analysis, guaranteeing a robust and reliable dataset. The Cronbach's alpha coefficients for this study were as follows: Status (0.741), Practices (0.802), Challenges (0.735), and Stakeholders' Role (0.752). With values ranging from 0.735 to 0.802, these results demonstrate an acceptable level of internal consistency for the survey instruments.

To account for potential heterogeneity among individuals, this study employs the Latent Class (LC) Model, a statistical approach that allows for the identification of distinct subgroups or classes within a population. The LC model assumes that individuals can be categorized into a predefined number of K classes, with each class characterized by a unique set of parameters. For each class, the structural utility is defined by the following equation:

$$\mathbf{V}_{ic} = \Sigma_n \beta X_{in} \quad \text{---------- (i)}$$

where β_{nc} is the utility parameter of attribute n in class c, X_{in} is the value of alternative i on attribute n, and c = 1,2,...K.

The choice of probability is:

$$\boldsymbol{P_{ic}} = \frac{\boldsymbol{exp}\,(\boldsymbol{V_{ic}})}{\sum_{\boldsymbol{i \in S}} \boldsymbol{exp}(\boldsymbol{V_{ic}})}$$

Piqc the likelihood that a member of class c will select option i.

Latent class analysis estimates both the class probabilities and the utility parameters for each class simultaneously. The number of latent classes K is predefined, and the optimal number of classes is determined using the AIC (Akaike Information Criterion). The AIC criterion helps in selecting the model with the best balance between goodness-of-fit and model complexity, minimizing overfitting (Kamakura & Russell, 1989).

Results and Analysis

Respondent Profiles

Out of the 425 distributed questionnaires, 395 valid responses were obtained, resulting in a response rate of 92.9%. The majority of the respondents were male, comprising 218 individuals (55.2%), while female respondents accounted for 177 (44.8%) (see Table 1). The data further revealed that the largest age group consisted of young adults between 18 and 35 years old, representing 178 respondents (45%). This suggests that younger individuals constitute a significant portion of the population living and working near cultural heritage sites, highlighting their potential role in implementing and supporting heritage conservation efforts. The higher number of respondents 158 (40%) have educational level of bachelor's degree (See Table 1).

Table 1
Demographic Profiles of Respondents (N = 395)

Demographic Variables	Category	Frequency	Percentage (%)
Gender	Male	218	55.30
	Females	177	44.70
Age	18–35	178	45.06
	35–50	147	37.22
	> 51	70	17.72
Education Level	Elementary School	32	8.10
	Secondary School	54	13.67
	Bachelor's Degree	158	40.00
	Master's Degree and Above	151	38.23
Place where the Respondent Living in	Kathmandu	146	36.96
	Lalitpur	114	28.86
	Bhaktapur	92	23.29
	Outskirt Valley	43	10.89
Means of Livelihood	Agriculture	48	12.15
	Trade	44	11.14
	Tourism and Hotel	63	15.95
	Government Employee	98	24.81
	Private Employees	142	35.95

Note. Field Survey (2024)

In terms of place of residence, 146 respondents (36.96%) resided in or around heritage sites in Kathmandu, 114 (28.86%) in Lalitpur, and 92 (23.29%) in Bhaktapur. A smaller proportion, 43 respondents (10.89%), lived in the outskirts of the Kathmandu Valley. Regarding livelihood strategies, the majority of respondents were employed in private offices (35.95%), followed by those working in government offices (24.81%). Others were engaged in the tourism and hospitality sectors, accounting for 15.95% of respondents (see Table 1).

Cultural Heritage Conservation Practices

The results of this study indicate that there is a noticeable gap in the effectiveness of conservation efforts on cultural heritage in the Kathmandu Valley. A substantial portion of respondents: 12.15% strongly disagreed, and 30.89% disagreed, regarding the adequacy of heritage conservation attempts in the region. Only 33.92% agreed and 7.34% strongly agreed that conservation efforts were sufficient, suggesting a clear insufficiency in the measures taken to preserve the cultural heritage of the area. This finding aligns with challenges seen in other developing regions, such as in Africa, where cultural heritage sites face unplanned, poorly managed conservation efforts that fail to account for sustainable use (Ekwelem et al., 2011).

While some studies emphasize the positive impacts of preserving cultural heritage, such as fostering historical and cultural continuity, promoting social cohesion, and enabling societies to visualize their past and envision the future (Ekwelem et al., 2011), the current findings reveal that Kathmandu's heritage conservation efforts fall short. Furthermore, Sterling (2020) argues that conservation should shift from object-oriented approaches to those that treat heritage as a socio-cultural process, emphasizing its role in fostering identity, social cohesion, and cultural pride. These perspectives highlight the necessity of viewing heritage conservation not only as a means of economic value generation but also as a process that sustains social and cultural bonds.

Encouragingly, the study found that the local communities in Kathmandu Valley have an intense feeling of belonging and identity tied to the heritage sites. This sentiment was reflected in the responses, with 34.43% agreeing and 6.84% strongly agreeing that cultural heritage is a significant part of their community identity. This heightened sense of community awareness and connection to heritage sites could be a crucial factor in fostering stronger, more effective conservation practices (Tan et al., 2018; Karki, 2017). However, the research revealed that the current conservation practices are not sufficiently research-driven. As shown in Table 2, a significant proportion of respondents; 16.2% strongly disagreed, and 38.48% disagreed, that conservation efforts in the area are informed by thorough research. This suggests an urgent need for comprehensive studies to inform the development of effective conservation guidelines and activities. As Garrod and Fyall (2000) pointed out, conservation activities must emphasize both managerial prudence and timelines, allocating funds early to avoid future high costs and implementing parallel strategies to prevent further deterioration.

Additionally, Oevermann (2019) introduced the "Good Practice Wheel" framework, which highlights key criteria for successful conservation, including management, reuse, community engagement, sustainable development, education, and urban planning. These criteria should be integrated into the conservation practices in the Kathmandu Valley to ensure a holistic approach. An expert from the Department of Archaeology (DOA) emphasized in an interview that political leaders often push for conservation without adequate research and analysis, which undermines the long-term effectiveness of these efforts. In a personal interview, a representative from the Nepal Tourism Board (NTB) also identified the lack of original materials for restoration and the unavailability of raw materials that resemble the originals as major challenges. The interviewee also pointed out that the shortage of skilled conservationists further exacerbates the vulnerability of Nepal's heritage, putting it at risk of irreversible damage.

Moreover, the study found that regular follow-up on the status of conservation efforts is lacking, with 21.01% strongly disagreeing and 38.23% disagreeing that continuous monitoring is in place. Capacity-building training for local communities, conservationists, and other key stakeholders is also largely absent, with a total of 65.82% of respondents expressing disagreement or strong disagreement on this point. Only 16.96% of respondents indicated some level of agreement regarding the adequacy of training (see Table 2).

Table 2
Practices of Cultural Heritage Conservation

	Respondents' Level of Agreement										Mean; SD
	Strongly Disagree		Disagree		Undecided		Agree		Strongly agree		
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Cultural heritage conservation efforts are ongoing.	48	12.15	122	30.89	62	15.70	134	33.92	29	7.34	2.83; 1.211
Locals feel a strong connection to their cultural heritage.	42	10.63	106	26.84	84	21.27	136	34.43	27	6.84	3.10; 1.242
Conservation activities are research-based.	64	16.20	152	38.48	90	22.78	72	18.23	17	4.30	2.66; 1.210
Originality of buildings is prioritized during conservation.	40	10.13	118	29.87	90	22.78	120	30.38	27	6.84	2.83; 1.225
Regular status checks are conducted for heritage preservation.	83	21.01	151	38.23	60	15.19	88	22.28	13	3.29	2.42; 1.254
Capacity-building training on conservation is provided periodically.	107	27.09	153	38.73	68	17.22	32	8.10	35	8.86	2.44; 1.113

Note. Respondents Level of Agreement

These findings emphasize a critical need for improving the current practices of heritage conservation in Kathmandu. Heritage conservation experts stress the importance of three key elements: the training and expertise of maintenance staff, proper financial planning, and the development of a comprehensive conservation plan (Idrus et al., 2010). Regular monitoring of heritage sites, which includes condition assessments, risk evaluations, and strategic planning, is essential for ensuring the sustainability of conservation efforts. This requires the establishment of an inventory system that facilitates ongoing monitoring and informed decision-making (Heras et al., 2013). While there are financial advantages to tourism in historic cities, mass tourism often causes significant challenges such as overcrowding in public spaces, urban landscape degradation, traffic congestion, increased crime, destruction of natural habitats, and reduced resident well-being (Giannoni, 2009; García-Hernández et al., 2017; Neuts & Vanneste, 2020).

An interview with an expert from the Travel Association of Nepal (TAN) revealed that despite some efforts to mitigate these impacts, current measures fall short of addressing the specific needs of different visitor segments, highlighting a critical gap in managing urban heritage tourism sustainably. This issue adds to the difficulties encountered in heritage conservation practices, underscoring the need for tailored strategies that account for both community involvement and visitor management to ensure the conservation and sustainable use of cultural heritage sites.

Challenges in Cultural Heritage Conservation

This study sought to identify the key challenges hindering effective cultural heritage conservation and management for sustainability. EFA was applied to extract and group significant factors from a total of 22 identified variables after confirming the reliability of items through a pilot survey. These variables included: 1. No positive attitude toward cultural heritage by locals; 2. Lack of concern for cultural heritage by the community; 3. Population growth impacts heritage; 4. Stakeholder conflict over safeguarding heritage; 5. Non-professional conservation practices; 6. Illegal trafficking of cultural items; 7. Low promotion of heritage; 8. Farming around cultural heritage sites; 9. Insufficient budget for conservation; 10. Little government/local authority concern for heritage; 11. Lack of professional commitment to conservation; 12. Media fails to highlight heritage issues; 13. Negligence by travel agents/tour operators; 14. Inappropriate conservation methods; 15. Insufficient buffer zone around heritage spots; 16. Natural disasters and climate change damaging heritage; 17. Development projects harm heritage sustainability; 18. Overcapacity of heritage sites during events; 19. Lack of funding agency support; 20. Lack of monitoring in heritage sites; 21. Vegetation growth over heritage sites; and 22. Biological threats to heritage (e.g., rats)

Exploratory Factor Analysis (EFA) validated the relationships between these variables and their adequacy for the study sample. The descriptive statistics found that all 22 factors had mean values exceeding 3, ranging from 3.32 to 3.86 across the 395 valid responses. There

were no missing data points. The KMO (Kaiser-Meyer-Olkin) test of sampling adequacy and Bartlett's measure of Sphericity validated the eligibility of the sample for factor analysis. The KMO score of 0.857 and a significance value of 0.000 ($p < 0.001$) indicate that the sample was adequate and patterns of correlation were sufficiently compact to yield reliable factor results. According to Kaiser (1974), values above 0.5 are considered acceptable, further supporting the validity of the current data. Additionally, the commonalities values, ranging from 0.443 to 0.775 (see Table 4), showed that the selected variables had acceptable relationships with each other, confirming that the sample size was sufficient for factor analysis.

Factor Extraction and Variance Explained

The factor analysis extracted seven factors that together explained 60.52% of the total variance, all with Eigenvalues > 1. The Rotation Sums of Squared Loadings indicated that the first factor accounted for 18.22% of the variance, followed by the second factor with 10.77%. The third and fourth factors contributed to 8.91% and 7.89% of the variance, respectively. The fifth, sixth, and seventh factors contributed 6.13%, 5.79%, and 2.81% to the overall explained variance in cultural heritage conservation (see Table 3).

Table 3
Factor Extraction & Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.631	22.665	22.665	4.631	22.665	21.554	3.32	18.222	18.222
2	2.117	9.879	32.544	2.117	9.879	31.433	2.16	10.765	28.987
3	1.606	7.246	39.79	1.606	7.246	38.679	1.847	8.914	37.901
4	1.498	6.524	46.314	1.498	6.524	45.203	1.761	7.886	45.787
5	1.327	5.744	52.058	1.327	5.744	50.947	1.681	6.134	51.921
6	1.184	4.899	56.957	1.184	4.899	55.846	1.543	5.785	57.706
7	1.014	4.674	61.631	1.014	4.674	60.52	1.261	2.814	60.52
8	0.989	4.136	65.767						
9	0.901	4.115	69.882						
10	0.843	3.781	73.663						
11	0.781	3.418	77.081						
12	0.721	3.125	80.206						
13	0.654	3.102	83.308						
14	0.633	2.718	86.026						
15	0.553	2.444	88.47						
16	0.547	2.224	90.694						
17	0.497	2.105	92.799						
18	0.476	2.004	94.803						
19	0.398	1.556	96.359						
20	0.377	1.338	97.697						
21	0.34	1.211	98.908						
22	0.30	1.092	100						

Note. Principal Component Analysis Using Extraction Method

Factor Rotation

The rotated factor matrix (component matrix), displays the factor loadings for each variable on the extracted factors. These factor loadings represent the degree of association between each variable and its corresponding factor. In this analysis, values below 0.40 were suppressed to simplify interpretation, ensuring that only significant factor loadings were shown, and these were arranged by size. Varimax rotation, was employed under the assumption that the variables were independent of one another (Field, 2009).

Several factors significantly loaded upon the first component before rotation, accounting for 22.67% of the variance, leaving the other factors with little variance explained. However, after rotation, the distribution of variance among the factors became clearer, with seven distinct factors emerging, each explaining a more balanced portion of the total variance. This rotation technique improved clarity by distributing the loadings more evenly across the factors.

Using Principal Component Analysis (PCA) with Varimax rotation, the underlying structure of the 22 items that represented the difficulties in cultural heritage conservation was evaluated. Assumptions of independent sampling, normality, and moderate correlations between variables were checked and met. The rotated component matrix revealed the following seven factors that influence the management of cultural heritage conservation:

Table 4
Rotated Component Matrix and Component Loadings of Factors (N = 395)

Items	Component loadings				Commonality		
	1	2	3	4	5	6	7
X1. No regular monitoring of heritage status (mean = 3.69)	0.792						0.581
X2. Vegetation growth over heritage sites (mean = 3.49)	0.789						0.542
X3. Lack of funding agency support (mean = 4.49)	0.775						0.581
X4. Biological threats to heritage (e.g., rats) (mean = 3.80)	0.737					0.429	0.576
X5. Media fails to highlight heritage issues (mean = 3.79)	0.682		0.434				0.575
X6. Overcapacity of heritage sites during events (mean = 2.81)	0.682						0.581
X7. Negligence by tour/travel agents (mean = 2.97)	0.594						0.483
X8. Population growth effects heritage (mean = 4.69)		0.798					0.632
X9. Stakeholder conflict over safeguarding heritage (mean = 4.80)		0.783					0.607
X10. Non-professional conservation practices (mean = 4.69)		0.696					0.613

X11. Little concern of government/local authority (mean = 4.66)			0.988				0.724
X12. Lack of professional commitment to conservation (mean = 4.38)			0.984				0.715
X13. Lack of concern for cultural heritage by the community (mean = 2.96)				0.732			0.634
X14. Heritage not promoted for sustainable tourism (mean = 3.92)				0.749			0.582
X15. Illegal trafficking of cultural items (mean = 3.39)				0.821			0.509
X16. Lack of buffer zone around heritage sites (mean = 3.85)					0.793		0.634
X17. Inappropriate conservation methods (mean = 3.93)					0.784		0.443
X18. Farming around cultural heritage sites (mean = 3.79)						0.771	0.733
X19. Natural catastrophes/climate variations damage heritage (mean = 3.87)						0.682	0.563
X20. No positive attitude toward cultural heritage by locals (mean = 2.95)							0.775
Eigenvalues	5.051	2.277	1.972	2.302	1.578		
	1.455	1.012					
% of Variance	18.222	10.765	8.914	7.886	6.134	5.785	

Note. Values Greater than 0.40 were Considered

- Factor 1 (18.22% variance explained): This factor comprises 7 items related to inadequate monitoring, management, and assessment practices.
- Factor 2 (10.77% variance explained): This cluster includes three variables associated with insufficient participation of stakeholders and challenges posed by population settlements around heritage sites.
- Factor 3 (8.91% variance explained): This factor consists of 2 items related to insufficient government attention and a lack of professional commitment to heritage conservation efforts.
- Factor 4 (7.89% variance explained): This group of three items addresses community disengagement, illicit trafficking of cultural objects, and inadequate promotion of heritage for sustainable tourism.
- Factor 5 (6.13% variance explained): Composed of two items, this factor relates to poor destination management and ineffective conservation practices.
- Factor 6 (5.79% variance explained): This factor includes two items that focus on the impacts of natural catastrophes and agricultural practices on heritage sites.
- Factor 7 (2.81% variance explained): It contains a single variable highlighting the lack of a positive attitude towards cultural heritage among local communities.

Table 4 illustrates the factor loadings for these rotated components, with (L < 0.40) removed for clarity. Consistent with previous studies, this research aligns with findings that heritage sites are vulnerable to the impacts of mass tourism, including overcrowding, wear and tear, physical handling, changes in environmental conditions (humidity and temperature), burglary, and graffiti (Garrod & Fyall, 2000).

Mathematical Representations of Factor Loadings

Similar to regression analysis, a linear model can be employed to represent the relationship between variables and the underlying factors in factor analysis. The factor loadings, denoted by the coefficients (b's), indicate the power of the relationship between each variable and its respective factor. According to Field (2009), the equation for estimating a factor (Fi) is:

$$\mathbf{Fi = b_1 X_{1i} + b_2 X_{2i} + b_2 + b_n X_{ni}}$$

Where:
Fi is the estimate of the i^{th} factor. $b_1, b_2, ..., b_n$ are the factor loadings for variables $X_1, X_2, ..., X_n$ and n is the number of variables in the model.

In this study, seven factors were identified that influence cultural heritage conservation practices. For each factor, an equation could be developed based on factor loadings of the measured variables.

For instance, Factor 1, which explains 18.22% of the variance, can be represented as:

$$\mathbf{Factor\ 1 = 0.792(X_1) + 0.789\ (X_2) + 0.775\ (X_3) + 0.737(X_4) + 0.682\ (X_5) + 0.682\ (X_6) + 0.594(X_7)}$$

Substituting the mean values of each variable (survey question) into the equation, we can calculate the approximate contribution of Factor 1:

$$\mathbf{Factor\ 1 = 0.792*(3.69) + 0.789*(3.49) + 0.775*(4.49) + 0.737*(3.8) + 0.682*(3.79) + 0.682*(2.81) + 0.594*(2.97) = 18.222}$$

Similarly, for Factor 2, which explains 10.765% of the variance, the equation is:

$$\mathbf{Factor\ 2 = 0.798(X8) + 0.783\ (X9) + 0.696(X10) = 0.798*(4.69) + 0.783*(4.8) + 0.696*(4.69) = 10.765}$$

By applying the same approach to the remaining factors, we can sum the explained variance for all seven factors. The total variance explained by these factors is 60.25%. This result closely matches the 60.52% variance reported in the "Total Variance Explained" section of Table 3, with only a minor difference. This discrepancy may be attributed to rounding or

the suppression of factor loadings below 0.40. After performing EFA and identifying the 7 factors, multiple linear regression (MLR) was used to know which are the most significant factors affecting cultural heritage conservation practices.

Correlation Analysis

The Pearson correlation analysis (see Table 5) demonstrated a significant relationship among the study variables at the 5% level of significance. But, some variables, such as limited stakeholder involvement, settlement issues, weak destination management, and negative local attitudes toward heritage, did not show significant correlations with conservation practices (r = 0.068, p = 0.313; r = -0.019, p = 0.569; r = 0.027, p = 0.521, respectively). Consequently, these factors were excluded from the regression model for further analysis.

Table 5
Correlation of Potential Challenges for Cultural Heritage Conservation

	DV	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**	**X7**
DV: Practices of Cultural Heritage Conservation	1							
X1: Poor management and monitoring	-0.265 **(0.026)**	1						
X2: Limited stakeholder involvement and settlement issues	0.068 (0.313)	-0.355 **(0.001)**	1					
X3: Government apathy and low professional commitment	-0.229 **(0.038)**	0.581 **(0.000)**	0.363 **(0.000)**	1				
X4: Community neglect, trafficking, and lack of sustainable promotion	-0.338 **(0.002)**	0.489 **(0.000)**	0.498 **(0.000)**	0.317 **(0.003)**	1			
X5: Weak destination management and conservation	-.0.019 (0.569)	0.084 (0.082)	0.098 (0.218)	0.078 (0.222)	0.077 (0.215)	1		
X6: Natural disasters and farming impact	-0.116 **(0.003)**	0.429 (0.095)	0.294 **(0.002)**	0.347 **(0.000)**	0.339 **(0.002)**	-0.059 (0.364)	1	
X7: Negative local attitudes toward heritage	0.027 (0.521)	-0.002 (0.516)	0.388 **(0.000)**	0.042 (0.448)	0.201 (0.079)	0.291 **(0.005)**	-0.041 (0.312)	1

Note(s). Correlations [r (sig value = 0.05)]; Significant Relationships are Highlighted by Bolded Values less than 0.05 (P < 0.05).

Regression Results

Table 6 showed that the factor with the highest Beta (β) value was the strongest predictor of cultural heritage conservation. Community negligence, trafficking, and the lack of sustainable promotion emerged as the most significant factor negatively affecting heritage

conservation practices (β = -0.324, p < 0.05). Natural disasters and farming impacts also played a significant role, negatively influencing heritage conservation (β = -0.264, p < 0.05). Furthermore, limited stakeholder participation and settlement issues had a significant but smaller positive effect (β = 0.197, p < 0.05). These findings suggest that there is a negative association between cultural heritage conservation practices and the issues of community negligence, trafficking, and natural disasters.

Table 6
Coefficients of Determination

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	3.498	0.338		10.45	0.000		
Poor management and monitoring	-0.036	0.078	-0.038	-0.357	0.74	0.0767	1.6
Limited stakeholder involvement and settlement issues	0.197	0.067	0.227	2.656	**0.006**	0.764	1.44
Government apathy and low professional commitment	-0.035	0.045	-0.076	-0.867	0.38	0.762	1.44
Community neglect, trafficking, and lack of sustainable promotion	-0.324	0.086	-0.284	-3.165	**0.001**	0.766	1.43
Weak destination management and conservation	-0.001	0.086	0.000	0.000	1	0.959	1.17
Natural disasters and farming impact	-0.264	0.095	-0.159	-2.358	**0.013**	0.863	1.27
Negative local attitudes toward heritage	-0.025	0.035	-0.032	-0.328	0.76	0.899	1.24
R = 0.892	R-Square = 0.681	Adjusted R Square = 0.492	Std. Error of Estimate = 0.856				
Durbin-Watson = 1.798			F = 4.636	Sig. = 0.001			

Note. P < 0.05 are Shown in Bold to Illustrate the Significant Impact; DV: Cultural Heritage Conservations Practices

The F-test demonstrated the model's goodness of fit. The introduction of the independent variables significantly improved the model, with the regression indicating a level of significance (p = 0.001). This confirmed that the model was well-suited to explain the variation in cultural heritage conservation practices. The model summary also showed that the independent variables collectively accounted for 68.1% of the variance in cultural heritage conservation (with an adjusted R-square value of 0.492). The results provided further support for this conclusion, indicating that several extracted factors were significant in explaining the variance.

Discussions

The results of this study align with prior research, reinforcing the understanding that both environmental and human-induced factors have detrimental effects on heritage conservation efforts (Bhattarai et al., 2024). Previous studies have shown that issues such as air pollution, invasive biological interventions, humidity, and vandalism are primary contributors to the degradation of heritage sites (Pereira et al., 2021). Similarly, Irandu and Shah (2016) highlighted that cultural heritage conservation in Kenya was hindered by factors such as inadequate funding, land seizing, poor policy enforcement, and a lack of experts. The current study corroborates these findings, further suggesting that global warming, climate change, and extreme weather cases are growing challenges that compound the already strained efforts of heritage conservation (Pereira et al., 2021).

Additionally, this study identified land use as an emerging issue impacting heritage conservation, particularly in terms of urbanization and urban renovation. The study emphasized the need for robust environmental conservation policies, adequate planning, and effective land use strategies at both local and national levels to mitigate these challenges. These results resonate with prior research by Eken et al. (2019), which emphasized the importance of public participation and governmental strategies in preventive conservation efforts. Eken et al. found that while local communities often possess an awareness of the significance of heritage sites, they may lack practical knowledge about how to preserve them, and there are difficulties in ensuring regular maintenance. Similar issues were raised in this study, particularly in terms of government disintegration and a lack of effective collaboration between federal and local authorities.

Further insights were drawn from stakeholder interviews, which revealed structural challenges within heritage authorities, such as a lack of skilled personnel, inadequate funding, and unclear proclamations and guidelines regarding private heritage conservation. These challenges were compounded by the scarcity of authentic materials for restoration and maintenance, as highlighted by Azizi (2016). Interviewees also pointed to urbanization as a major issue, with urban growth encroaching on heritage sites and complicating conservation efforts. These challenges align with previous studies that have emphasized the difficulty of balancing urban development with heritage conservation, particularly in rapidly growing cities (Pereira et al., 2021).

Moreover, the findings identified limited stakeholder involvement and settlement issues as significant challenges to heritage conservation ($\beta = 0.197$, $p = 0.006$). Ismail et al. (2014) similarly identified the lack of collaboration between local authorities and other stakeholders as a significant hurdle in managing heritage assets. In particular, the adaptive reuse of historic structures, as they take on new functions, presents challenges in maintaining indoor quality and efficiency while ensuring the preservation of heritage value (Pereira et al., 2021; Ghimire & Karki, 2022). To address these issues, it has been suggested that stakeholder collaboration, community empowerment, and the adaptive reuse approach can enhance tourism demand and receipts, thereby fostering job creation and supporting conservation efforts (Chong & Balasigam, 2019; Bires & Raj, 2020).

Finally, the study pointed out that cultural heritage sustainability depends heavily on education and training that can produce skilled professionals capable of protecting and promoting heritage sites (Berhanu & Raj, 2020). However, this remains a significant challenge, as the cultural heritage sector faces a shortage of trained professionals, especially in the areas of maintenance and technical conservation. Interview data from heritage officials further reinforced this, highlighting the lack of skilled manpower, insufficient funding, and the difficulty of conserving heritage sites in urban settings due to competing development priorities.

The study underscores the multifaceted challenges that must be addressed to ensure the sustainability of cultural heritage conservation. These include environmental, organizational, financial, and technical issues, as well as the need for greater community involvement and government collaboration. As Tweed and Sutherland (2007) argued, heritage conservation is not only vital for preserving cultural identity but also for promoting the sustainability of the built environment, which shapes the character of a place. Addressing these challenges will require comprehensive strategies that integrate planning, stakeholder collaboration, and the development of human capital to protect and sustain cultural heritage sites for future generations.

Conclusion and Implications

Despite some efforts, cultural heritage conservation practices remain limited, highlighting a critical need for improvement to ensure the sustainability of cultural heritage. This study found that local communities view heritage as central to their identity, yet conservation efforts are inconsistent, lack regular monitoring, and are not informed by research or capacity-building initiatives. These issues, combined with a lack of resources, inadequate stakeholder involvement, and challenges such as natural disasters and urbanization, have hindered effective preservation. Latent class analysis revealed three distinct visitor segments: cultural attraction seekers, selective sightseers, and city life enthusiasts, each reflecting varied preferences in location choices. This segmentation underscores the need for strategic crowd management, such as implementing reservation systems, visitor capacity limits, and combined ticketing for both popular and less-visited heritage sites, to avoid congestion and enhance the visitor experience. The conservation challenges are multifaceted, including limited community engagement, stakeholder involvement, and governmental support, as well as the effects of natural disasters and human activities. These factors, compounded by political interference and inadequate institutional frameworks, exacerbate the threat to heritage conservation. As the study indicates, preserving cultural heritage requires a collaborative effort involving the government, local communities, tourism organizations, and various other stakeholders. For sustainable heritage conservation, proper land-use planning, robust conservation strategies, and effective management of heritage sites are essential. Cultural heritage must be valued not only for its historical significance but also for its potential to enhance socio-cultural ties, boost tourism, and improve the country's image. Therefore, a participatory approach in decision-making is critical to addressing these challenges and ensuring the long-term preservation of Nepal's cultural heritage.

To ensure effective heritage conservation, a robust system for evaluating, monitoring, and supervising sites must be implemented alongside annual inventories conducted by district authorities. Immediate government action, in collaboration with local communities, is crucial for heritage protection (Tilahun, 2019). Evidence-based conservation guidelines should be developed, guided by research, and carried out by qualified heritage management professionals. Adequate funding, training, technical support, and access to modern resources are essential to preserve the authenticity of heritage sites. A dedicated heritage conservation fund, managed institutionally, will support these efforts. Engaging local communities, private tourism offices, and government authorities in the planning, monitoring, and execution of conservation activities is equally important. Stakeholder collaboration platforms must be strengthened, addressing conflicts of interest (Aas et al., 2005). To address the issues of mass tourism in urban sites, visitor segmentation can help manage overcrowding. Personalized recommendations and a balanced distribution of visitors across different heritage areas can reduce pressure on major tourist sites while enhancing the visitor experience (Neuts & Vannaste, 2020).

Limitations and Future Research

While this study provides valuable insights, certain limitations should be acknowledged. The cross-sectional design may not fully capture long-term trends in heritage conservation, and expanding the research to include rural and less-explored heritage sites across Nepal could offer a more holistic perspective. Additionally, reliance on self-reported data might introduce bias, which could be mitigated by incorporating observational or experimental methodologies in future studies. Future research could explore the potential of digital technologies, such as virtual reality (VR) and geographic information systems (GIS), to enhance conservation efforts and visitor management. Examining innovative funding mechanisms, policy improvements, and international partnerships may also provide practical solutions to ensure sustainable heritage preservation.

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Conflict of Interest

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