

Urban Heritage At Risk: Sustainable Preservation Strategies For Constantine, Algeria

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Abstract

This study identifies systemic deterioration mechanisms that threaten Constantine, Algeria's multilayered urban heritage, and proposes an integrated preservation framework aligned with the Sustainable Development Goals. Combining archival analysis, spatial documentation of key landmarks (Ottoman mosques, colonial bridges, and the Ahmed Bey Palace), and diagnostic fieldwork, we identify compounding degradation drivers: environmental exposure, fragmented governance, funding deficits, and uncoordinated revitalization efforts. The 2015 "Constantine: Capital of Arab Culture" initiative exemplifies implementation failures stemming from the exclusion of evidence-based strategies. We advance eight priorities: (1) adaptive reuse protocols, (2) craft-tourism integration, (3) science-led restoration, (4) heritage policy reform, (5) investment incentives, (6) participatory governance, (7) dedicated funding mechanisms, and (8) transnational knowledge transfer. As the first holistic framework for Constantine, this research repositions urban heritage as a sustainable development catalyst, offering transferable methodologies for Mediterranean and Islamic cities to balance conservation with contemporary needs. Policymakers are provided with an actionable roadmap leveraging heritage for economic resilience, cultural identity reinforcement, and climate-adaptive conservation.

Keywords: Urban heritage conservation; Sustainable preservation; Heritage governance; Constantine (Algeria); Adaptive reuse; Islamic urban heritage; Post-colonial cities.

1. Introduction

Urban heritage serves as a non-renewable repository of civilizational memory, embodying the cultural, social, economic, and architectural narratives that define urban authenticity (UNESCO, 2011). Globally, however, such heritage faces escalating threats from environmental degradation, governance fragmentation, and unsustainable development, accelerating its vulnerability to irreversible loss. This tension is particularly acute in Constantine, Algeria, a city with a multilayered historical landscape where Phoenician, Roman, Ottoman, and French colonial legacies converge. Despite Algeria's robust legislative frameworks for heritage protection, Constantine's urban fabric endures systemic neglect, exemplified by deteriorating Ottoman mosques, derelict colonial bridges, and marginalized vernacular structures.

The 2015 "Constantine: Capital of Arab Culture" initiative attempted revitalization but revealed critical gaps: its top-down implementation excluded evidence-based strategies, and projects failed to address compounding pressures such as climate exposure, funding deficits, and community disengagement. This underscores an urgent need to reconceptualize preservation through integrated sustainable frameworks that balance heritage integrity with contemporary urban needs.

This research seeks to:

1. Diagnose the primary degradation drivers (environmental, institutional, and socioeconomic) impacting Constantine's heritage landscape.
2. Propose the first strategic preservation framework specifically for the city, positioning its at-risk heritage as a catalyst for sustainable development.
3. Translate theoretical principles into actionable priorities, ranging from adaptive reuse to transnational knowledge transfer, that realign conservation efforts with Sustainable Development Goals (SDGs).

Employing a mixed-methods approach that includes archival analysis, spatial documentation, and diagnostic fieldwork, we focus on emblematic at-risk sites—including the Ahmed Bey Palace, Sidi Rached Bridge, and various Ottoman mosques—to model scalable solutions relevant to broader Mediterranean and Islamic urban contexts.

2. Theoretical Foundations for Urban Heritage Conservation

Urban heritage embodies a dynamic nexus of cultural memory, architectural legacy, and socioeconomic value within evolving urban landscapes. Contemporary theory frames heritage not as static artifacts but as living resources requiring adaptive management responsive to modern challenges (Harvey, 2001; Winter, 2013).

2.1. Urban Heritage as a Concept

The definition of urban heritage has expanded significantly within international discourse. UNESCO's Recommendation on Historic Urban Landscapes (2011) emphasizes its role as "the layering and interconnection of natural, cultural, and social values" across time. This encompasses not only monumental structures but also everyday urban fabric and intangible practices that collectively shape socio-spatial narratives (Bandarin & van Oers, 2012). Scholarship increasingly recognizes heritage as multi-scalar, manifesting at building, district, and city levels:

- **Architectural Heritage Assets:** These are individual structures of historical, archaeological, or social significance, including their material integrity and immediate environmental context.
- **Historic Urban Ensembles:** These refer to cohesive areas, such as historic districts or traditional neighborhoods, where morphology, function, and collective memory generate cultural value (UNESCO, 2011).
- **Cultural Landscapes:** These are sites that integrate built heritage with natural or constructed environments, forming territories rich with historical meaning (Taylor, 2016).

2.2. Theorizing Heritage Value

While heritage is often appreciated for its aesthetic and historical qualities, its broader socioeconomic dimensions are equally vital to understanding its full societal impact. A foundational framework for unpacking these dimensions is offered by Throsby's (2010) typology of cultural value, which continues to shape contemporary discourse. Throsby distinguishes four interrelated forms of value:

- The Cultural Value is grounded in authenticity, historical resonance, and the role heritage plays in shaping individual and collective identities.
- The Economic Value is Realized through tangible channels such as cultural tourism, creative industries, enhanced property values, and job creation—demonstrating heritage's contribution to local and national economies.
- The Social Value is manifested in strengthened community bonds, intergenerational transmission of knowledge and tradition, and the cultivation of place-based belonging and civic pride.
- The Symbolic Value is expressed through heritage's capacity to embody collective memory, affirm cultural continuity, and serve as a resilient symbol of identity in times of change or crisis.

In post-colonial contexts as North Africa, heritage serves as a vital instrument for reclaiming marginalized histories and asserting cultural agency in the face of homogenizing development paradigms (Meskell, 2018). Nowhere is this tension more palpable than in cities like Constantine, where colonial urban planning deliberately disrupted or erased pre-existing spatial, social, and cultural heritage systems, leaving enduring legacies that continue to shape contemporary struggles over memory, identity, and urban belonging.

2.3. Contemporary Threats to Heritage Integrity

The preservation of urban heritage confronts a complex web of challenges that unfold across multiple temporal and spatial scales. As Appadurai (1997) argues, heritage does not possess fixed or universal worth; rather, it circulates within dynamic "regimes of value" — frameworks that are continually negotiated, contested, and redefined by diverse actors and interests. This renders heritage preservation not merely a technical or aesthetic endeavor, but an inherently political and deeply contextual practice. The following are regarded as the most salient and deeply interconnected multi-scalar challenges:

- Climate change intensifies material decay through altered precipitation patterns, thermal stress, and salt crystallization, particularly threatening historic masonry in Mediterranean zones (Fatorić & Seekamp, 2017; Sesana et al., 2021).
- Rapid urbanization, speculative land markets, and weak regulatory frameworks fuel conflicts between preservation and new growth (Madanipour, 2019).
- Institutional fragmentation, persistent funding gaps, and exclusionary stakeholder processes often impede adaptive management (Silva, 2020; Rodríguez-Navarro et al., 2023).

2.4. Evolving Conservation Methodologies

Contemporary conservation has moved beyond the paradigm of static, monument-centered preservation toward dynamic, process-oriented methodologies that treat heritage as a living, evolving force within urban ecosystems (Feilden, 2003). No longer confined to safeguarding physical fabric alone, modern practice embraces adaptive stewardship — an approach that balances continuity with change, and embeds heritage within the social, economic, and environmental flows of the contemporary city. This shift is operationalized through four interrelated strategies:

- **Preventive Conservation** (Caple, 2019): Prioritizing long-term resilience by mitigating decay through proactive environmental monitoring, climate control, and routine maintenance (shifting focus from reactive repair to sustained care).
- **Adaptive Reuse** (Bertolin, 2019): Breathing new life into historic structures by repurposing them for contemporary functions, from housing to cultural hubs, while rigorously preserving their material integrity and symbolic meaning.
- **Evidence-Based Restoration** (Macdonald, 2015): Grounding physical interventions in meticulous archival research, materials science, and historical analysis to ensure authenticity and minimize speculative reconstruction.
- **Heritage-Led Regeneration** (Pendlebury et al., 2009): Harnessing the cultural and economic potential of heritage as a driver for inclusive urban renewal. This involves fostering not only physical revitalization but also social cohesion, local empowerment, and equitable development.

Together, these methodologies embody a broader philosophical shift: heritage is no longer seen as a relic to be frozen in time, but as a living practice that is continuously reinterpreted, reactivated, and reintegrated into the rhythms of urban life. This ensures not only its enduring relevance and resilience, but also its deep-rooted connection to the everyday experiences, identities, and aspirations of urban communities.

2.5. Policy Frameworks and Critical Debates

While global heritage charters and frameworks provide essential ethical and methodological foundations, their effective implementation demands careful contextual adaptation — particularly in diverse urban and post-colonial settings. These instruments have progressively expanded the conceptual boundaries of conservation, yet persistent gaps between policy and practice — especially in the Global South — reveal the limits of universalist approaches (Meskell, 2018). Key frameworks include:

- The *Venice Charter* (1964) and *Nara Document* (1994) established foundational principles of authenticity and minimal intervention while acknowledging cultural diversity in heritage.
- The *Burra Charter* (2013) emphasizes "cultural significance" as the fundamental basis for all decision-making in heritage management.
- UNESCO's *Historic Urban Landscape (HUL) approach* (2011) reframes heritage as an integral part of broader ecological, social, and economic systems. However, critiques note ongoing implementation gaps, particularly in Global South contexts (Meskell, 2018), highlighting the need for context-specific strategies.
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3. Geographic and Historical Context of Constantine: A Strategic Urban Analysis

Constantine's spatial configuration and historical evolution reveal a city whose strategic geographic positioning has fundamentally shaped its urban development and cultural identity. This analysis examines the city's regional significance and its historical transformation through successive civilizational layers.

3.1. Strategic Geographic Positioning in Northeastern Algeria

Constantine occupies a pivotal position within Algeria's northeastern region, functioning as a critical node between coastal Mediterranean networks and the Saharan interior. This strategic location has historically enabled the city to serve as a commercial and administrative hub, facilitating exchange between diverse geographical and cultural zones (Belarbi, 2018).

The city's distinctive topography—perched on a rocky plateau bisected by the Rhumel and Bou Merzoug valleys—has provided both inherent defensive advantages and unique urban planning challenges. This characteristic geography has profoundly influenced settlement patterns across successive historical periods, creating an unparalleled urban morphology that reflects its strategic military and commercial functions (Bouزيد, 2019).

Contemporary transportation infrastructure, including the East-West highway and radial road networks, further reinforces Constantine's role as a regional connectivity hub, linking it to both coastal urban centers and inland territories. This enduring strategic importance underscores the city's significant potential for heritage-led economic development within the broader regional context.

3.2. Historical Urban Evolution: From Defensive Settlement to Colonial Transformation

The historical development of Constantine reflects a complex interplay between defensive requirements, evolving cultural influences, and colonial interventions that have collectively shaped its urban fabric over two millennia.

3.2.1. Pre-Colonial Urban Morphology

Archaeological and historical evidence indicates that Constantine's origins trace back to ancient Numidian and Roman settlements, though scholarly debate continues regarding precise chronological details (Ben Ali Shughieb, 1980). The medieval Islamic city, particularly during Ottoman rule (1528-1837), established the foundational urban characteristics that define the historic core today.

The traditional Islamic city was characterized by:

- A compact, defensive urban form strictly confined to the rocky plateau.
- Integrated religious and civic architecture reflecting established Islamic urban planning principles.
- A dense residential fabric featuring multi-story dwellings typically arranged around courtyards.
- Limited public spaces and a network of narrow, winding streets.

This organic urban structure, covering approximately 30 hectares, was punctuated by four principal gates and embodied the architectural and social organization typical of Ottoman provincial cities in North Africa (Benidir, 2007).

3.2.2. Colonial Urban Transformation

French colonial occupation (1837-1962) introduced radical spatial interventions that fundamentally altered the city's urban structure. Unlike the gradual, organic growth of the pre-colonial period, colonial planning imposed a distinct European urban aesthetic through:

- The creation of l'Arbi Ben Mhidi Street literally bisected the historic core, separating upper and lower city sections.
- The establishment of European administrative buildings, contrasting sharply with existing Islamic architectural traditions.
- The construction of "Military and Civic Infrastructures", including the Kasbah military barracks (spanning 5 hectares) and prominent civic buildings such as the Prefecture (1849) and City Hall (1845).
- The spatial separation of European and indigenous populations, emerging as a defining feature of the urban core.

This colonial transformation resulted in a hybrid urban landscape that, while diversifying the city's architectural heritage, simultaneously disrupted traditional social and spatial relationships (Mazhoud, 1995).

4. Urban Heritage Inventory and Assessment

Constantine's multilayered heritage represents a unique repository of Mediterranean and Islamic architectural traditions, reflecting successive civilizations from the Hammadid and Ottoman periods to French colonial rule. The significant concentration of heritage assets within the historic rock-top core presents both immense conservation opportunities and complex management challenges.

4.1. Islamic Architectural Heritage: Ottoman Period Monuments

The Ottoman period (16th-19th centuries) yielded Constantine's most architecturally significant and culturally authentic heritage assets, particularly religious architecture that continues to define the city's cultural identity.

4.1.1. The Great Mosque (12th Century)

Originally constructed during the Hammadid dynasty (1136-1137 CE) upon Roman foundations, the Great Mosque stands as one of Algeria's earliest Islamic monuments. Despite colonial-era modifications—including the severance of portions during 19th-century street creation—the mosque's principal façade retains significant historical authenticity (Redjem, 2020), demonstrated in the following Figure:



This monument profoundly exemplifies the palimpsestic nature of Constantine's heritage, where successive civilizations have built upon and modified existing structures.

4.1.2. Sidi Lakhdar Mosque (18th Century)

Located in the Butchers' district, this Ottoman-era Mosque (1736-1754), commissioned under Bey Hussein bin Hussein, showcases sophisticated craftsmanship through its marble columns and intricately carved wooden mihrab and minbar. Its historical significance extends beyond mere architecture; it notably served as the headquarters for the Association of Muslim Scholars under Abdelhamid Ben Badis, underscoring the mosque's dual role as both a religious and intellectual center (Centre National de Recherche en Archéologie, 2017).

4.1.3. Hussein Bey Mosque (18th Century)

Adjacent to the Ahmed Bey Palace, this mosque—commissioned around 1720—represents the pinnacle of Ottoman architectural achievement in Constantine. Its architectural distinction is evident in the precisely carved domes that reflect advanced structural engineering, the stained-glass windows that demonstrate refined decorative arts, and the multicolored ceramic tiles, often imported from external sources, which enrich its visual complexity.



Figure 2. Hussein Bey Mosque (Note: Photo by Bouguebs, 2025)

Equally significant is its seamless integration within the broader palace complex, a feature that exemplifies the unified urban planning principles characteristic of the Ottoman period.

4.1.4. Sidi Elkettani Mosque (18th Century)

Constructed in 1776 under Ottoman Governor Saleh Bey ben Mustafa, this mosque exemplifies the cosmopolitan nature of Ottoman architectural patronage through its incorporation of imported Italian

marble and other premium materials. Its strategic location near the modern market reflects the integration of religious and commercial functions characteristic of traditional Islamic cities.

4.2. Colonial Architectural Heritage

French colonial interventions, although significantly disruptive to traditional urban patterns, simultaneously created a distinctive architectural layer that substantially contributes to Constantine's contemporary cultural landscape. Key colonial heritage assets include:

- Infrastructure such as bridges, roads, and expansive public spaces reflecting European engineering traditions;
- Administrative buildings comprising grand civic structures that imposed European architectural aesthetics;
- and Military architecture including fortifications and barracks designed to represent colonial power structures.

These colonial-era structures, though born from a period of cultural disruption, now constitute an integral and complex component of the city's multilayered heritage narrative.

4.2.1. Ahmed Bey Palace

Located within the historic core, adjacent to Hussein Bey Mosque, Ahmed Bey Palace represents the zenith of Ottoman architectural achievement in Constantine. Commissioned by Bey Hussein, the last Ottoman Bey of Constantine, its construction began in 1826 and concluded in 1835, just two years before French colonial occupation (Centre National de Recherche en Archéologie, 2017).

Spanning an impressive 5,609 m², the palace complex stands as a prime example of sophisticated Ottoman palace architecture, seamlessly integrating residential, administrative, and ceremonial functions within a unified composition. Ahmed Bey Palace's design centers around multiple courtyards, an ingenious traditional organization that facilitates both privacy and functional separation. The palace is further distinguished by its intricate stucco work, exquisitely carved wood elements, and stunning ceramic tile installations, all together reflect the era's highest artistic standards. This aesthetic grandeur is supported by advanced engineering solutions that were skillfully adapted to the city's challenging topography.



Figure 3. Ahmed Bey Palace (*Note: Photo by N. Bouguebs, 2025*)

The overall design of the palace demonstrates a thoughtful cultural synthesis, masterfully integrating local North African architectural traditions with broader Ottoman design principles. As one of Algeria's most significant Ottoman-era palaces, it remains a crucial testament to the political and cultural sophistication of the final Ottoman period in the region.

4.2.2. Bridges: Engineering Heritage Across the Gorges

Constantine's distinctive topography has necessitated the construction of numerous bridges, creating a unique category of heritage assets that profoundly distinguish the city from other Algerian urban centers. This extensive bridge infrastructure represents a chronological sequence of engineering achievements spanning Roman through modern periods.

a. Bab El Kantara Bridge

This ancient structure, originally constructed during the Roman period, is one of North Africa's oldest surviving bridge constructions. Its subsequent renovation during Ottoman rule by Saleh Bey in 1792 demonstrates the continuity of maintenance practices across civilizational boundaries (Kherouatou, 2016).



As presented in Figure 4, the bridge's enduring presence reflects both Roman engineering sophistication and Ottoman commitment to infrastructure preservation

b. Sidi Rached Bridge

Constructed between 1908 and 1912 during the French colonial period, Sidi Rached Bridge stands as one of the world's most remarkable stone arch bridges. This monumental structure, with a total length of 447 meters, features 27 arches spanning the dramatic Rhumel River gorge, the largest of which reaches a span of 70 meters. Built using robust stone masonry, it demonstrates the advanced colonial engineering capabilities of its time. See Figure 5:



Figure 5. Sidi Rached Bridge (*Note: By Nadira Bouguebs, 2025*)

As demonstrated in the above figure, Sidi Rached Bridge exemplifies the ambitious infrastructure projects undertaken during French rule, the bridge continues to serve contemporary urban connectivity needs (Pincent, 2008).

5. Contemporary Challenges in Urban Heritage Conservation

Despite its exceptional heritage value, Constantine's urban fabric faces significant conservation challenges that threaten the integrity of its multilayered cultural landscape. The 2015 "Capital of Arab Culture" designation, while providing temporary international recognition, inadvertently exposed systemic deficiencies in heritage management and implementation strategies.

5.1. Implementation Gaps in Heritage Programming

The 2015 cultural designation initiative generated numerous academic proposals and technical studies developed by university researchers and cultural institutions (Baziz, 2018). However, the glaring disconnect between scholarly recommendations and actual implementation highlights fundamental governance challenges:

- Evidence-based proposals from academic institutions were largely ignored, often in favor of politically motivated projects.

- A profound lack of coordination persisted between cultural authorities, urban planning departments, and academic institutions.
- Event-driven programming failed to establish sustainable, long-term conservation frameworks..

As of 2021, this pattern of incomplete implementation persists. Projects like the Sidi Elkettani Mosque rehabilitation remain ongoing, while other critical assets, including Sidi Lakhdar Mosque, continue to be closed and deteriorate due to inadequate or stalled intervention strategies.

5.2. Critical Conservation Priorities

The current state of Constantine's heritage assets reflects both the city's rich historical legacy and the pressing challenges of preservation in the face of neglect, uneven interventions, and structural vulnerability. This situation reveals several urgent conservation needs:

- Despite its exceptional historical and architectural significance, Ahmed Bey Palace remains largely untouched by systematic conservation efforts, leaving it vulnerable to progressive deterioration as demonstrated in the following Figure:



Figure 6. The Noted Deterioration in Ahmed Bey Palace (Note: By Nadira Bouguebs, 2025)

- Inconsistent maintenance and rehabilitation approaches within mosque complexes have created a two-tier system in which some Ottoman monuments receive attention, while others face abandonment and potential irreversible loss.
- Colonial-era bridges and other significant engineering works demand comprehensive assessment and intervention to prevent catastrophic failure while ensuring the meticulous preservation of their historical authenticity.

5.3. Systemic Management Challenges

The ongoing deterioration of Constantine's urban heritage is not merely the result of isolated neglect but rather reflects broader systemic shortcomings within Algeria's heritage management framework, where structural, financial, and institutional constraints converge to undermine preservation efforts. This situation is marked by several interrelated challenges, including:

- Chronic underinvestment in conservation projects severely limits the scope, quality, and sustainability of interventions.
- The insufficient supply of specialized expertise in traditional construction techniques and materials hampers the possibility of authentic restoration.
- Limited involvement of local stakeholders in heritage management decisions leads to a lack of ownership and missed opportunities for grassroots preservation.
- The absence of coordinated approaches linking heritage conservation with broader urban development planning exacerbates existing problems.

These challenges collectively contribute to a cycle of neglect that threatens the long-term viability of Constantine's unique cultural heritage, underscoring the urgent need for comprehensive reform of current management approaches.

6. Integrated Framework for Sustainable Urban Heritage Conservation

The preservation of Constantine's urban heritage necessitates a comprehensive, sustainable approach that addresses both immediate conservation needs and long-term development objectives. This framework

integrates technical, social, economic, and governance dimensions to ensure heritage assets meaningfully contribute to urban sustainability.

6.1. Adaptive Reuse and Community Integration

Sustainable heritage preservation must transcend static conservation approaches and instead adopt adaptive reuse strategies that safeguard historical authenticity while simultaneously addressing contemporary community needs (Bertolin, 2019). Such strategies emphasize a dynamic relationship between heritage and society, ensuring that historic assets remain relevant, accessible, and resilient in changing urban contexts. This approach rests on several core principles:

- a) Converting heritage buildings for compatible modern uses—such as cultural centers, small museums, or artisan workshops—while rigorously preserving their essential architectural characteristics.
- b) Actively engaging local residents in determining appropriate uses that genuinely reflect community values and needs.
- c) Ensuring that adaptive reuse projects generate sustainable revenue streams through heritage tourism, cultural activities, or commercial ventures.

This approach redefines heritage as more than passive objects of preservation, positioning it instead as an active contributor to urban vitality, cultural identity, and economic development.

6.2. Traditional Craft Revitalization and Cultural Economy

Constantine's rich tradition of artisanal crafts, including copper engraving, traditional embroidery, and rose distillation, represents an underutilized resource for heritage-led economic development. Strategic revitalization should encompass:

- Establishing robust apprenticeship systems that effectively link master craftspeople with younger generations.
- Creating diverse platforms for craft products through targeted tourism markets, online sales, and cultural festivals.
- Incorporating traditional crafts into heritage site interpretation and visitor experiences to enrich cultural understanding.

This strategy simultaneously preserves invaluable intangible cultural heritage while generating tangible economic opportunities for local communities.

6.3. Science-Informed Conservation Methodology

Effective heritage conservation necessitates an evidence-based framework that strategically integrates traditional craftsmanship with contemporary scientific methodologies (Caple, 2019).

Central to this framework is the formation of multidisciplinary teams comprising architects, archaeologists, materials scientists, and skilled craftspeople, whose combined expertise enables both cultural sensitivity and technical precision. Equally critical is the systematic documentation and diagnostic assessment of heritage assets, ensuring that interventions are informed by rigorous analysis of material conditions and structural vulnerabilities.

The synthesis of traditional restoration practices with advanced conservation science thus produces outcomes that are simultaneously historically authentic and technically robust, reinforcing the long-term sustainability of preservation efforts.

6.4. Governance Reform and Policy Innovation

Current heritage management challenges largely stem from fragmented governance structures and inadequate regulatory frameworks. Essential reforms should focus on :

- Developing comprehensive legislation that seamlessly coordinates heritage conservation with urban planning, tourism development, and broader economic policy.
- Creating dedicated heritage authorities with clear mandates, sufficient autonomy, and adequate resources.
- Formalizing and institutionalizing community involvement in heritage management decisions through transparent consultation mechanisms.

Such reforms directly address the institutional weaknesses revealed during the 2015 cultural designation initiative.

6.5. Investment Incentives and Economic Mobilization

Sustainable heritage conservation requires diversified funding mechanisms that effectively leverage both public and private resources. This may involve the following:

- a) Developing collaborative investment models, such as Public–Private Partnerships (PPPs), designed specifically to support heritage rehabilitation projects.

b) The strategic development of heritage tourism, which positions historic sites as compelling destinations capable of attracting sustained visitation and generating long-term revenue streams.

c) Rigorous economic impact assessments substantiate the value of heritage by systematically measuring indicators such as employment generation, tourism-driven income, and increases in property values. Collectively, these mechanisms reframe heritage from a perceived fiscal liability into a dynamic economic asset, firmly embedding conservation within broader frameworks of urban development and cultural sustainability.

6.6. Participatory Governance and Cultural Education

Effective heritage conservation necessitates broad-based community engagement and heightened cultural awareness:

- **Civic Heritage Organizations:** Actively supporting grassroots associations that promote local heritage awareness and stewardship.
- **Educational Integration:** Incorporating local heritage into school curricula and wider community education programs to foster early appreciation.
- **Public Communication:** Developing compelling heritage interpretation programs that connect historical significance with contemporary relevance for diverse audiences.

This approach not only builds strong constituencies for heritage preservation but also significantly strengthens cultural identity.

6.7. Dedicated Financial Mechanisms

Sustainable heritage management fundamentally requires predictable and adequate funding streams:

- **Heritage Trust Funds:** Establishing dedicated, ring-fenced financial mechanisms for ongoing conservation, maintenance, and emergency interventions.
- **Consistent Budget Allocation:** Ensuring reliable and sufficient government funding for heritage management agencies and their operational needs.
- **International Cooperation:** Proactively accessing global heritage funding sources and technical assistance programs through partnerships.

Such mechanisms provide the crucial financial foundation for long-term conservation success.

6.8. Transnational Knowledge Exchange

Constantine can significantly benefit from the adoption of international best practices in heritage conservation through:

- **Comparative Case Studies:** Systematically learning from successful Mediterranean and Islamic heritage conservation initiatives in the Mediterranean neighbourhood or the world.
- **Technical Collaboration:** Engaging international experts in capacity building programs and specialized project implementation.
- **Network Participation:** Actively joining global heritage conservation networks to access shared resources, research, and expertise.

This approach accelerates local capacity development while rigorously maintaining cultural authenticity.

CONCLUSION

Constantine's urban heritage represents a unique and irreplaceable repository of Mediterranean and Islamic cultural memory, embodying the rich tapestry of successive civilizations from Roman through Ottoman to French colonial periods. The city's distinctive topography and strategic location have together shaped a heritage landscape of exceptional richness and complexity, largely concentrated within its historic rock-top core.

Despite significant efforts, particularly during the 2015 "Capital of Arab Culture" initiative, preservation attempts inadvertently exposed fundamental gaps in implementation strategies, technical capacity, and governance coordination. The pervasive exclusion of evidence-based research proposals and the fragmented approach to heritage intervention clearly underscore the urgent need for comprehensive reform.

This research proposes an integrated framework that re-positions urban heritage not as a preservation burden but as a dynamic catalyst for sustainable urban development. The eight strategic priorities—adaptive reuse, craft integration, science-led restoration, policy reform, investment incentives, participatory governance, dedicated funding, and transnational knowledge transfer—collectively offer a robust roadmap. This roadmap aims to transform heritage conservation into a powerful driver of economic resilience, cultural identity reinforcement, and climate-adaptive urbanism for Constantine.

The successful implementation of this framework demands coordinated, sustained action from government authorities, academic institutions, local communities, and international partners. By actively re-positioning heritage as an invaluable asset for sustainable development, Constantine can emerge as a compelling model for other Mediterranean and Islamic cities striving to balance critical conservation imperatives with evolving contemporary urban needs. This holistic approach offers transferable methodologies that contribute significantly to the broader discourse on heritage-led urbanism, while unequivocally ensuring Constantine's irreplaceable cultural legacy endures for future generations.

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