

Museums, Tourism and Sustainable Green Development: The Case of Greece

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Abstract

This paper examines the interrelationship between museums, tourism, and sustainable green development in Greece. It is based on preliminary findings from an ongoing qualitative research project conducted with semi-structured interviews on museum professionals, as well as secondary analysis of tourism and cultural policy documents. The study explores how Greek museums engage with sustainability agendas, contribute to the United Nations Sustainable Development Goals (SDGs), and shape more responsible tourism experiences. The paper argues that museums can play a pivotal role in fostering climate literacy, strengthening local identity, and supporting resilient tourism development, while also identifying structural, economic, and governance challenges that constrain the effective integration of sustainability into museum and tourism policy.

Keywords: museums, sustainable tourism, green development, cultural heritage, Greece.



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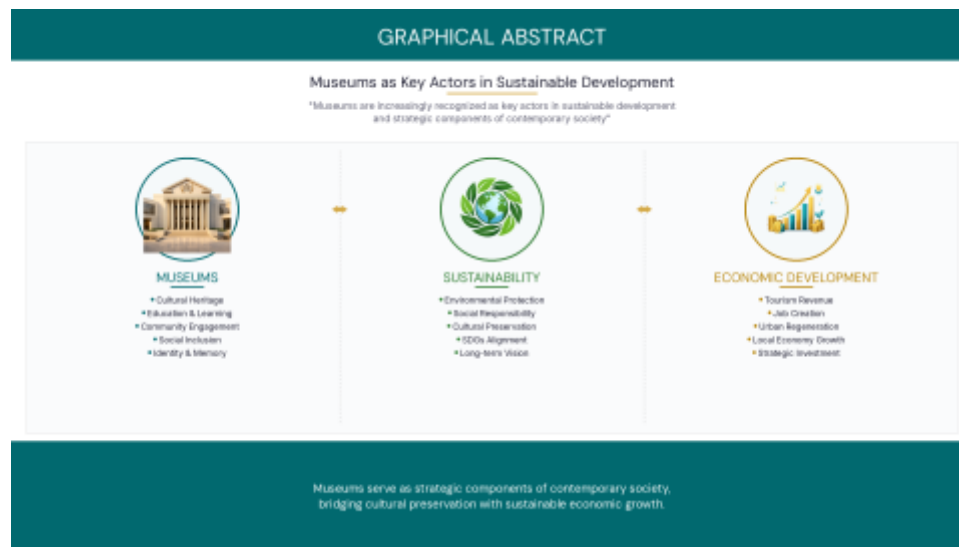
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Graphical abstract



1. Introduction

The accelerating climate crisis and the broader sustainability challenges of the twenty-first century have reshaped expectations of both cultural institutions and tourism systems. Tourism, as one of the world's largest economic sectors, faces increasing scrutiny regarding its environmental footprint, social impacts, and long-term contribution to local resilience (Drosos & Skordoulis, 2018; Bramwell & Lane, 2011). Within this context, museums emerge as particularly significant actors, operating simultaneously as cultural institutions, educational spaces, and core components of tourism destinations.

In Greece, where cultural heritage tourism represents a fundamental pillar of national and regional development, museums are deeply embedded in tourism flows, destination branding, and visitor experience design (Richards, 2018). Cultural tourism contributes substantially to the Greek economy, with tourism alone gaining 94 million euros annually from culture activities, while the augmented contribution of culture to the touristic product ranges from 18% to 30% in output, and from 12% to 38% in employment (Koumoutsea, et. al. 2005). At the same time, Greek museums operate within an environment characterised by environmental pressures, seasonality, limited resources, and complex governance structures. The challenges of overtourism and its impacts on cultural heritage sites demand careful visitor management and sustainable tourism practices that balance conservation with accessibility (DG Travel, 2025).

The dawn of the Anthropocene—the geological epoch in which human activity is the dominant force shaping the climate and the environment—calls for a radical redefinition of the purpose of museums. Their mission is collecting, preserving, and exhibiting, but it must be expanded to include the active use of their collections and spaces in response to existential environmental threats. Museums, as institutions dedicated to preserving the past

and shaping the future, are uniquely positioned to serve as critical agents of this transition.

Climate change is an unprecedented threat to cultural heritage worldwide. It is estimated that one in six cultural heritage sites is already at risk from climate-related hazards such as floods, coastal erosion, and extreme weather events (World Economic Forum, 2025). The loss of cultural heritage is linked to reduced social cohesion and lower climate resilience. Therefore, protecting heritage is in itself an act of climate resilience (European Geosciences Union, 2024).

Considering the above, this study has four objectives. First, to analyze how museums in Greece are currently engaged with sustainable and “green” development. This includes examining the extent to which they align with the United Nations Sustainable Development Goals and the adoption of environmentally responsible practices. Second, to examine the environmental, social, economic, and cultural factors that shape museums’ responses to sustainability challenges and climate risks. Third, to assess the role of museums as mediators of climate awareness and public engagement. In this context, museums are called upon to translate scientific knowledge into meaningful cultural narratives. Fourth, to assess institutional frameworks, governance structures, and policy needs. The goal is to identify paths for reform and to support the development of coherent, forward-looking sustainability strategies in the Greek museum sector.

Overall, this study examines how museums in Greece promote sustainable green development and how their role as tourism actors can be linked to environmental responsibility, social inclusion, and economic sustainability. The analysis places Greek museums within the broader frame of European and international discussions on cultural sustainability, recognizing that the transition of museums toward sustainability requires not only internal operational changes but also systemic policy reforms,

cross-sectoral collaboration, and stable funding mechanisms (ICOM, 2020).

1.1. *Museums, Sustainability and Tourism: A Conceptual Framework*

1.1.1. *The Evolving Museum Mandate: From Preservation to Active Sustainability*

The integration of sustainability into museum practice reflects a broader paradigm shift in cultural governance. Sustainability is no longer understood solely in environmental terms, but as a multidimensional concept encompassing environmental responsibility, social justice, and economic viability (OECD, 2019; UNESCO, 2015). This shift was institutionally consolidated with the adoption of the new museum definition by ICOM in Prague in August 2022: **"A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing."** This definition explicitly positions museums, including small museums (Avgousti & Papaioannou, 2023) and site museums (Papaioannou, 2022), as agents of sustainable development (ICOM, 2022).

Moving beyond their role as passive repositories, museums are increasingly recognized as laboratories for sustainable development. They integrate and promote the interconnection of environmental, social, and economic well-being. This institutional commitment reflects a broader recognition of the role of museums in society. Museums contribute to human dignity and social justice. They also support global equality and the well-being of the planet. They achieve this by following three fundamental pillars: environmental integrity, social equity, and economic sustainability. Putting this commitment into practice requires what has been termed "Sustainability Management in Museums" (SMM). This is a tailored management framework specifically designed for the context and needs of museums. It focuses on four areas of impact: People (the social dimension), Planet (the environmental footprint), Profit (the business dimension of sustainability), and Programme (the museum's mission) (ICOM, 2020).

1.1.2. *Internal and External Dimensions of Museum Sustainability*

In addition to their redefined mandate, museums are increasingly expected to operationalise sustainability along two interrelated dimensions: **internally**, by aligning their governance, infrastructures and day-to-day operations with low-carbon, socially just and economically viable models; and **externally**, by leveraging their educational, communicative and convening functions to foster climate literacy, pro-environmental behaviour and place-based sustainability narratives among diverse publics.

1.1.3. *Internal Sustainability: Operational Transformation*

Internally, this involves rethinking energy-intensive climate control systems, collections care protocols and building management practices in light of evolving, risk-based conservation standards and the possibilities offered by renewable energy sources and circular economy principles. The principle of **"do as you teach"** demands that institutions dedicated to preservation must first preserve their own environment, addressing the environmental, social, and economic dimensions of their daily operations.

Museums face significant challenges in reducing their carbon footprint. This difficulty stems from strict regulations regarding temperature and relative humidity. These conditions must be maintained within specific limits to ensure the preservation of collections (Grist, 2024). However, recent research offers a different perspective. It shows that preventive environmental measures can have a much greater impact on reducing carbon emissions. Managing climate conditions in storage spaces through risk-based approaches appears to be more effective than invasive conservation interventions themselves (IIC, 2024). Modern preventive conservation encompasses all measures and actions aimed at preventing or minimizing future deterioration or loss. These measures are applied at the level of the entire collection rather than to individual objects. This makes preventive conservation inherently more sustainable than invasive conservation (ICCROM, 2022). The Circular Museum Economy (CME) offers a transformative framework for redefining resource flows in museum operations. Its goal is to minimize waste and maximize value retention (Sustainability Directory, 2025). This approach involves designing exhibitions so that they can be easily dismantled and reused. It also prioritizes the use of recycled or other sustainable materials. Furthermore, it involves implementing comprehensive waste management programs. Finally, it promotes the collaborative sharing of resources among institutions. Museums can also enhance their sustainability through strategic procurement practices. They can collaborate with local artisans to create upcycled products. Such collaborations offer economic opportunities to local communities while simultaneously reducing dependence on mass-produced goods (Sustainability Directory, 2025, Derventi *et al.*, 2026). Therefore, it is imperative to adopt holistic management strategies, which are understood as the development of integrated planning frameworks that combine the protection of museums (cultural heritage) with broader objectives: sustainable cultural development, environmental protection, and social cohesion (Karagiannis *et al.*, 2026). Tools for measuring and managing museum carbon footprints have become increasingly sophisticated. The Gallery Climate Coalition (GCC) Carbon Calculator, launched in 2024, provides free online tools for art organizations and museums to estimate greenhouse gas emissions across energy usage, transportation, materials, waste, and digital operations (Gallery Climate Coalition, 2024). Such measurement capabilities are essential for museums to track progress, identify high-impact intervention areas, and publicly report their sustainability performance.

1.1.4. External Sustainability: Education, Advocacy, and Cultural Authority

Externally, museums activate their cultural authority to translate abstract scientific data into emotionally resonant narratives, support public debate on climate risks and policy responses, and contribute directly to SDGs such as Quality Education (SDG 4), Sustainable Cities and Communities (SDG 11), Responsible Consumption and Production (SDG 12), and Climate Action (SDG 13). The greatest power of museums lies in their **cultural authority** and their ability to shape public discourse, functioning as powerful platforms for education and advocacy.

Museums play a crucial role in fostering environmental awareness through authentic exhibits, diverse presentation methods, and environment-related programs, such as outreach and in-reach initiatives (Karrin & Fahra, 2022). They act as catalysts for change, combining innovative conservation strategies with engaging and interactive exhibits that empower visitors to take an active role as responsible stewards of the planet, turning awareness into action (Two Green Leaves, 2025). Research demonstrates that visitors' pro-environmental behavior in museums is influenced by cognitive, social, and emotional factors, with a sense of pride—shaped by the institution's ecological values and reputation—serving as a key determinant of sustainable choices. These choices include the intention to visit, the willingness to pay a premium price, and participation in positive word-of-mouth communication (Han *et al.*, 2021). In addition, museums promote sustainable tourism by educating and raising awareness among visitors about environmental and cultural conservation, promoting responsible travel practices through exhibitions and educational programs, supporting local economies through sustainable procurement practices, reducing their environmental footprint through resource-saving measures, and preserving cultural heritage for future generations (Sustainability Directory, 2025).

At the same time, they serve as hubs for local communities, hosting environmental initiatives, workshops, and awareness campaigns that inspire citizens' ongoing participation in environmental protection and conservation efforts, even after their visit to the museum has ended.

This work explores the multi-faceted role of museums in advancing sustainability, examining their internal operations, their external educational capacity, and their potential as catalysts for systemic change (Papaioannou, 2022).

1.1.5. Museums and Sustainable Tourism: Strategic Intersections

From a tourism perspective, museums function as anchor attractions that enhance destination competitiveness while offering opportunities to promote more sustainable forms of travel (Du Cros & McKercher, 2015; Richards, 2018). They promote the diversification of tourism products, encourage cultural immersion, and help extend the duration of visitors' stays and ensure a steady flow of

tourism throughout the year. In this way, they mitigate seasonality and the negative externalities associated with mass tourism (UNWTO, 2018; Bramwell & Lane, 2011).

Museums in Greece, particularly institutions such as the Acropolis Museum and archaeological sites like Delphi and Delos, serve as cultural ambassadors that blend heritage preservation with economic impact while facing the challenge of managing over-tourism (Douras, *et al.* 2024). Sustainable tourism experiences in Greece increasingly emphasize slow tourism and eco-friendly practices, with museums serving as educational platforms that encourage visitors to discover landscapes and ecosystems while minimizing environmental impact (Sustainable Greece, 2023). The integration of digital innovations, including virtual reality and online platforms, expands global access to Greek heritage while promoting sustainable practices that reduce physical visitor pressure on fragile sites (Sustainable Greece, 2023).

Recent research further highlights the role of cultural institutions in advancing climate awareness, pro-environmental behavior, and place-based sustainability narratives (Stylianou-Lambert *et al.*, 2016; Jones & LeBaron, 2020). By embedding sustainability narratives into exhibitions, educational programmes, and visitor services, museums can influence tourist behavior and promote responsible consumption patterns (UNESCO, 2022; Astara *et al.*, 2025; Falk & Dierking, 2016).

The integration of culture into sustainable development and climate change resilience is increasingly recognized at the international policy-making level. UNESCO's Culture 2030 Indicators help measure the contribution of culture to achieving the Sustainable Development Goals (Sustainable Development Goals – SDGs), while initiatives developed within the framework of the UN Climate Conference 2025 (COP30) monitor the integration of cultural heritage into global climate policies (World Economic Forum, 2025). At the same time, Traditional Ecological Knowledge (Traditional Ecological Knowledge – TEK), which is increasingly being incorporated into museum programs and exhibitions, constitutes a valuable repository of knowledge from indigenous peoples, accumulated over hundreds or even thousands of years of interaction with the natural environment. This knowledge offers important lessons regarding sustainable coexistence, harmonious relationships, and reciprocity between humans and nature, contributing to the understanding and promotion of environmentally responsible lifestyles (Cross' Mills Public Library, 2025).

2. Methodology

This paper draws on preliminary findings from an ongoing qualitative research project. The study employs semi-structured interviews with museum professionals, curators, and institutional stakeholders across Greece, aiming to explore perceptions, practices, and challenges related to sustainability and green development.

The empirical component is based on semi-structured interviews with museum professionals, curators and institutional stakeholders from a range of Greek museums,

conducted in 2025, focusing on their perceptions, practices and challenges regarding sustainability and green development. The interview sample includes professionals from national institutions, regional museums, and specialized museums (including environmental museums), ensuring representation of diverse institutional contexts, scales of operation, and geographic locations across Greece.

The research is currently at a preliminary stage; nevertheless, the early findings provide valuable insight into how museum professionals conceptualise their institutions as potential "laboratories for sustainable development" and as catalysts for more responsible tourism experiences. The qualitative methodology enables exploration of the nuanced ways in which sustainability is understood, prioritized, and operationalized within specific institutional and policy contexts, capturing the tensions, aspirations, and constraints that characterize museum practice in Greece.

At the same time, an analysis of secondary sources was conducted, covering national and regional tourism strategies, cultural policy documents, and sustainability frameworks, to contextualize museum practices within broader governance and policy environments. This analysis included European Commission documents on sustainable development, Greece's national tourism strategies, UNESCO's sustainability frameworks, as well as international guidelines from ICOM and other professional organizations. This qualitative approach allows for an in-depth understanding of how sustainability is interpreted and implemented in museums, particularly in relation to tourism pressures and environmental constraints. This study is situated within the broader theoretical framework of cultural sustainability and sustainable tourism development, drawing on interdisciplinary perspectives from museum studies, tourism management, cultural economics, environmental sociology, and heritage conservation. This multi-level approach reflects the complexity of the sustainability challenges facing museums and recognizes that effective solutions require the integration of knowledge across the boundaries of individual academic disciplines and policy fields.

2.1. Museums as Agents of Sustainable Tourism Development in Greece

2.1.1. Shifting Perceptions: From Infrastructure to Active Agents

Empirical findings indicate that Greek museum professionals increasingly perceive their institutions as active contributors to sustainable tourism development rather than passive cultural infrastructures. Museums are understood as mediators between visitors, local communities, and cultural landscapes, translating complex historical, social, and environmental knowledge into accessible narratives (Richards, 2018; Falk & Dierking, 2016). This shift in self-perception represents a fundamental evolution in professional identity, moving from a custodial role focused primarily on preservation to

an activist role engaged with contemporary social and environmental challenges.

Museums are uniquely positioned to foster **climate change literacy**. They connect environmental degradation to human history, culture, and material culture, offering multi-sensory experiences that foster empathy and spur action (Papadopoulou *et al.*, 2026). Exhibitions on climate change, biodiversity loss, or water scarcity move beyond statistics to show real-world impacts on cultures and ecosystems. Museums also promote Indigenous Knowledge by collaborating with Indigenous communities to integrate Traditional Ecological Knowledge (TEK) into their narratives, recognizing these sustainable practices as vital lessons for the Anthropocene.

In addition, museums increasingly function as informal learning environments that enhance sustainability awareness, environmental literacy, and responsible behaviour among visitors, complementing formal education systems (Lampropoulos *et al.*, 2021; Kallou & Kikilia, 2021). Museum environments, when designed with attention to visitor well-being and meaningful engagement, can foster stronger connections to broader social activities and cultural habits, potentially creating long-term impacts on visitor attitudes and behaviors (Ferilli *et al.*, 2017)

2.1.2. Emerging Practices: Greek Museum Sustainability Initiatives

Examples from Greek museum practice highlight emerging sustainability-oriented initiatives, including energy-efficiency upgrades in museum buildings, educational programmes focused on climate change and heritage preservation, and collaborations with local tourism stakeholders. Large national institutions, such as the Acropolis Museum, have incorporated sustainability principles into visitor management, accessibility, and educational outreach, while regional and local museums increasingly align their activities with cultural routes, slow tourism initiatives, and community-based tourism models (UNWTO, 2018; OECD, 2019).

Specific initiatives observed across Greek museums include:

- **Energy efficiency retrofits:** Installation of LED lighting systems, smart HVAC monitoring, and passive climate control strategies in historic buildings
- **Renewable energy adoption:** Solar panel installations and participation in community or government green energy schemes where feasible
- **Sustainable exhibition design:** Modular exhibition systems designed for reuse, sourcing of local and recycled materials, and reduction of single-use exhibition components
- **Educational programming:** Development of curricula, workshops, and public programs explicitly addressing climate change, biodiversity, and sustainable development
- **Community partnerships:** Collaborations with local environmental organizations, schools, and civic groups to co-create sustainability-focused programs

- **Sustainable procurement:** Adoption of ethical partnership policies and green procurement guidelines for museum operations, retail, and catering
- **Digital access expansion:** Investment in virtual tours, online collections, and digital learning resources that reduce the need for physical travel while expanding global reach

At the policy level, museums support national and regional tourism strategies aimed at diversifying cultural tourism, decentralizing visitor flows, and strengthening local identity and resilience. These practices align with European and international policy frameworks that promote the integration of culture into sustainable development and green growth strategies (European Commission, 2019; UNESCO, 2015). Furthermore, the European Commission's recommendations for the inclusion of museums in Europe's sustainable transition underscore the need for policy coherence, funding for infrastructure to improve the energy efficiency of buildings and strengthening the role of museums as valuable allies in efforts to inform and raise public awareness about climate change (COM, 2020). In this way, museums function not only as institutions for the preservation and promotion of cultural heritage, but also as active agents in promoting sustainable development, contributing both to environmental education and to the social and economic resilience of local communities.

Furthermore, information technologies play a strategic role in shaping tourism systems, visitor flows, and destination management, enabling more efficient and sustainable tourism practices (Papagrigoriou *et al.*, 2017). Additionally, digital technologies offer significant opportunities for cultural heritage institutions to enhance sustainability education and community engagement (Astara *et al.*, 2025). Digital platforms foster community engagement through features such as forums and social media integration, allowing visitors to share experiences and participate in ongoing cultural dialogues beyond the physical museum visit (Berbić, 2024).

2.1.3. Contributions to Sustainable Development Goals

Museums contribute directly to SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Museums possess an unparalleled ability to convene diverse stakeholders: from local government officials and corporate leaders to schoolchildren and global tourists. This convening power can be leveraged for systemic change through policy influence, the use of collections as evidence of environmental change, and leading by example through publicly announced sustainability targets that inspire visitors, peers, and suppliers to adopt similar practices.

Natural history collections, with their meticulously documented specimens collected over centuries, offer irreplaceable data for scientists tracking shifts in species distribution, phenology (timing of natural events), and genetic diversity in response to climate change. Museum collections thus serve not only as historical records but as active scientific resources supporting contemporary climate research and adaptive management strategies.

Museum partnerships for future earth, coordinated through international networks such as the Coalition of Museums for Climate Justice and the Museums and Climate Change Network, accelerate action toward the SDGs through effective partnerships between academics, NGOs, and the public (UN SDGs, 2020). These networks organize conferences, facilitate knowledge sharing, and connect diverse stakeholders for collective benefit, amplifying the impact of individual institutional efforts.

2.1.4. Multidimensional Sustainability Challenges

Preliminary analysis of the interview material suggests that Greek museum professionals perceive sustainability not as a singular technical goal but as a multidimensional transition that cuts across conservation practices, economic models, social roles and strategic planning. Four clusters of concerns emerge in particular from their narratives: the conflict between strict conservation standards and energy efficiency; the tension between economic viability and short-term, visitor-driven planning; the imperative of social equity, community relevance and staff well-being; and the difficulty of operationalising change in the absence of coherent, organisation-wide sustainability strategies and adequate resources.

These four dimensions represent interconnected challenges that cannot be addressed in isolation. Progress on environmental sustainability (such as reducing energy consumption) may be constrained by economic limitations (lack of capital for infrastructure investments), which in turn are influenced by governance structures (short-term funding cycles) and social factors (staff capacity and training needs). Museum professionals thus emphasize the need for holistic approaches that recognize these interdependencies and address sustainability challenges systemically rather than piecemeal.

2.1.5. Challenges and Constraints

Despite growing awareness and commitment, museum professionals identify persistent challenges in integrating sustainability into museum operations and tourism-related activities. These challenges can be grouped into four interconnected dimensions that reflect the complexity of achieving long-term sustainability in contemporary museum practice. Each dimension presents distinct but interrelated obstacles that must be navigated simultaneously for museums to realize their potential as agents of sustainable development.

2.1.6. The Conflict Between Conservation and Energy Efficiency

This is frequently cited as the most significant practical challenge. Museum buildings are typically **energy-hungry** due to the need to maintain tightly-controlled environmental conditions (temperature and relative humidity) for preserving sensitive collections. A central issue concerns the tension between conservation requirements and energy efficiency, particularly in historic or listed buildings, where strict environmental controls often lead to high energy consumption (ICOM, 2022). Museums face what has been described as an existential paradox: institutions dedicated to preserving cultural

treasures for future generations simultaneously contribute to climate change through their energy-intensive operations (Grist, 2024).

The standard conservation specifications (e.g., maintaining 50% Relative Humidity and 20 degrees Celsius Temperature) often require expensive, high-energy Heating, Ventilation, and Air Conditioning (HVAC) systems. These specifications, established in the mid-twentieth century, were based on limited scientific evidence and have become entrenched as professional standards despite their environmental costs. Museum professionals are increasingly questioning these strict, historical standards, advocating for a **risk-based approach** and accepting broader, more flexible environmental fluctuations. This shift, backed by emerging conservation science, aims to reduce energy consumption without compromising the long-term stability of most collections. The concept of "**acceptable fluctuations**" is gaining traction, challenging the traditional, highly restrictive, and energy-intensive conservation standards.

Contemporary conservation science increasingly supports the view that many collections can tolerate broader environmental ranges than previously assumed, particularly when fluctuations occur gradually rather than abruptly. Risk-based conservation methodologies assess the specific vulnerabilities of particular materials and objects, tailoring environmental controls to actual preservation needs rather than applying blanket standards. This approach can achieve substantial energy savings – in some cases reducing HVAC energy consumption by 30-50% – while maintaining appropriate preservation conditions for collections (IIC, 2024).

Innovative solutions include passive climate control, enhanced insulation in historic buildings, smart monitoring systems, and transitioning to **renewable energy sources** (solar panels, geothermal energy). Energy-efficient and economical climate control systems can be achieved through measures focused on ventilation systems, heat and cooling production, component activation, and LED lighting retrofits. For example, installation of LED lighting systems can deliver energy savings of up to 75% annually, substantially reducing museum CO₂ emissions (Resource Space, 2025). Museums must also address waste management and circularity, moving towards a **circular economy model** by designing exhibitions for demountability and re-use, prioritizing recycled or sustainable materials, and implementing comprehensive composting and recycling programs.

Collections storage itself must be sustainable, focusing on **preventive conservation** which is inherently less resource-intensive than interventional conservation. Preventive conservation strategies, including improved storage conditions, eco-friendly transport methods, and blending conservation techniques, have been shown to have far greater carbon reduction impacts than direct treatment interventions (IIC, 2024). However, implementing these approaches in Greece faces additional challenges due to the prevalence of historic buildings with heritage protection status that limits structural modifications, the

Mediterranean climate with seasonal extremes requiring substantial cooling in summer months, and limited financial resources for capital-intensive infrastructure upgrades.

2.1.7. Economic Viability and Short-Term Planning

Financial stability is considered a **prerequisite for sustainability**. An economically unsustainable museum cannot fulfill its mission to future generations. Economic constraints further limit the capacity of museums to invest in long-term sustainability measures. Dependence on short-term funding, project-based financing, and fluctuating visitor numbers often leads to reactive rather than strategic decision-making (OECD, 2019). This fundamental challenge creates a vicious cycle: museums lack stable funding to invest in efficiency improvements that would reduce operational costs, while high operational costs consume resources that might otherwise support sustainability transitions.

Uncertainty in government or foundational funding often forces institutions into **short-term obsessional behavior** (e.g., chasing high visitor numbers or rapid, one-off grants), which directly contradicts the **long-term vision** required for sustainability. The pressure to maximize visitor numbers can conflict with sustainability goals in multiple ways: increased visitation intensifies wear on facilities and collections, requires greater energy consumption for climate control and services, and may prioritize revenue-generating activities over conservation and education. Museum professionals argue that sustainable museums must **diversify income** to ensure resilience, **invest in efficiency** (e.g., LED lighting, better building management systems) to reduce high operational costs in the long run, and **focus on core business**, sometimes suggesting institutions should "do less, but do it better" to avoid over-extended, under-funded expansion.

Economic sustainability ensures the museum's long-term health, allowing it to continue its mission without being unduly reliant on unstable funding streams. This involves developing diversified income models (e.g., membership, sustainable retail, consulting) and making smart, long-term investments in energy-efficient infrastructure that reduce recurrent operational costs. However, the business case for sustainability investments often faces institutional barriers: upfront capital costs, long payback periods (typically 5-15 years for major energy efficiency investments), and accounting frameworks that privilege short-term expenditures over long-term operational savings.

Greek museums face particular economic challenges given the broader context of economic austerity, public sector budget constraints, and competition for limited cultural funding. The economic impacts of tourism on Greek museums demonstrate both opportunity and challenge: while cultural tourism generates substantial revenue (94 million euros annually according to recent estimates) (Koumoutsea *et al.*, 2025), this income is unevenly distributed, concentrated in major national institutions and peak tourism seasons, leaving regional and specialized museums with chronic financial vulnerability.

Some museums are exploring innovative financing mechanisms, including energy service companies (ESCOs) that cover upfront investment costs for efficiency improvements and are repaid through the resulting energy savings, green bonds and sustainability-linked financing for capital projects, corporate partnerships focused on environmental responsibility, and social enterprise models such as sustainable museum shops and consulting services. However, these approaches require institutional capacity, governance flexibility, and risk tolerance that many Greek museums currently lack.

2.1.8. Social Equity and Community Relevance

Sustainability is not possible without **social justice and deep community engagement**. Social sustainability also emerges as a critical concern, as museums are increasingly expected to function as inclusive civic spaces that engage local communities while simultaneously catering to international tourist audiences (Matsali *et al.*, 2023). This dual mandate creates tensions between local community needs and tourism-driven priorities, between preservation of local cultural identity and presentation for global consumption, and between community accessibility and revenue generation from international visitors.

Museum professionals emphasize that a museum's social contract is fundamental to its continued existence. A sustainable museum is a socially just museum. Museums must move beyond being mere repositories to become **active civic centers** and **spaces for dialogue**. Museums are not neutral spaces; they present political and social constructions of the world that have historically reflected Western colonial perspectives (SMEA UW, 2022). Decolonization of museums involves critically examining power dynamics, sharing authority with BIPOC and local communities, and allowing people to tell their own narratives and represent their cultures on their own terms.

Key issues include ensuring **equitable access** for diverse audiences, both physically and intellectually; addressing issues of representation in collections and staffing through **decolonisation** and diversification, critically examining collections and narratives to ensure they are diverse, representative, and co-created with local and indigenous communities; fostering an inclusive workplace; and ensuring **staff well-being** through fair labor practices and professional development that integrates new sustainability expertise.

Inclusive museum community engagement is about bringing as many people as possible together to provide educational experiences relevant to the museum's focus, starting with content creation that relates to community interests and current events, and extending to marketing, events, and interactive experiences that allow community members to connect with content in meaningful ways (DoubleKnot, 2022). Museums that prioritize social sustainability report stronger community relationships, more diverse audiences, enhanced institutional legitimacy, greater staff satisfaction and retention, and increased resilience during economic or political challenges.

Museums must engage in **community co-creation**, collaborating with local populations to develop programs and narratives that are relevant and empowering, moving beyond traditional top-down approaches to knowledge production and cultural representation. Examples of effective community engagement in Greek museums include collaborative exhibitions with local artisans showcasing traditional sustainable practices, educational programs co-designed with schools addressing local environmental challenges, partnerships with immigrant communities to document and celebrate diverse cultural heritages, and accessibility initiatives ensuring physical and intellectual access for people with disabilities.

However, social sustainability efforts face constraints including limited staff time and capacity for genuine community engagement, institutional cultures resistant to sharing authority and co-creation, language barriers in multicultural communities, physical and financial barriers to access (admission fees, transportation, operating hours), and tensions between community-serving mission and revenue-generation pressures from tourism.

2.1.9. Operationalising Change and Lack of Coherent Strategy

While there is a high level of awareness and ethical commitment to sustainability, many professionals feel their actions are **piecemeal** and lack a systemic framework. Museum professionals think that the main roadblock is often the **lack of a coherent, integrated strategy** and the **resource deficit** required to implement large-scale change. This challenge represents perhaps the most fundamental barrier: without strategic integration, well-intentioned sustainability efforts remain fragmented, under-resourced, and vulnerable to changing institutional priorities.

For sustainability to move beyond rhetoric, it must be embedded across museum governance, operational practices, and strategic planning. Professionals emphasize that **management buy-in** is essential: sustainability must be integrated into the museum's **strategic plan** and governance, not left to isolated "green teams." When sustainability is treated as an add-on responsibility rather than a core institutional value, it becomes marginalized during budget decisions, strategic planning, and daily operations. Several Greek museums report the phenomenon of enthusiastic but isolated staff members championing sustainability initiatives without institutional support, leading to burnout, limited impact, and difficulty sustaining momentum.

Museum professionals call for the development of **Key Sustainability Indicators (KSIs)** – shared, measurable metrics to monitor progress across environmental, social, and economic dimensions. Such indicators might include carbon footprint per visitor, percentage of renewable energy use, diversity metrics for staff and governance, community engagement hours, accessibility measures, local sourcing percentages, and waste diversion rates. However, developing meaningful, context-appropriate indicators requires resources, expertise, and institutional commitment that many museums lack.

Attention to **supply chain ethics** is increasingly recognized as essential, including reducing waste from temporary exhibitions through design for re-use and requiring ethical sourcing for museum retail and construction materials. The environmental impact of touring exhibitions, in particular, has come under scrutiny, with new tools such as the GCC Carbon Calculator helping museums measure and reduce emissions from shipping, materials, and installation processes (TEO Exhibitions, 2025). Some museums are experimenting with exhibition-sharing networks, modular exhibition systems designed for multiple venues, digital exhibition components reducing physical shipping, and local fabrication using regional materials and labor.

Cross-sectoral collaboration between museums, local authorities, tourism organisations, and environmental agencies is essential for sustainability to be effectively operationalised at the destination level and aligned with broader tourism strategies. However, such collaboration is hampered by fragmented governance structures (different ministries responsible for culture, environment, and tourism), lack of coordination mechanisms and regular communication channels, competing priorities and institutional silos, and absence of integrated policies linking cultural heritage, sustainable tourism development, and environmental protection.

International networks and umbrella organizations addressing climate change in the cultural sector provide crucial support, enabling mutual sharing of skills, knowledge, and expertise. Organizations such as the Network of European Museum Organisations (NEMO), the International Council of Museums (ICOM), and the Gallery Climate Coalition offer guidelines, training, peer learning opportunities, and advocacy platforms. However, Greek museums' participation in these networks remains limited due to language barriers, resource constraints, and limited awareness of available support.

3. Discussion

3.1. Potential and Paradoxes: Museums as Sustainability Catalysts

The Greek case illustrates both the potential and the limitations of museums as catalysts for climate action and sustainable tourism development. Museums possess significant cultural authority and public trust, enabling them to shape visitor perceptions and contribute to sustainability-oriented narratives (UNESCO, 2022). This cultural authority derives from museums' historical role as guardians of authentic knowledge, their perceived political neutrality (though increasingly questioned), their educational mission serving public good, and their position as civic institutions embedded in community life.

Museum professionals increasingly envision institutions that decouple growth from resource consumption, whereby operational footprints are progressively reduced while social impact, educational reach and community relevance expand. This aspiration – that the future of museum sustainability lies in reducing operational footprint while increasing social impact and relevance – reflects a fundamental shift from quantitative to

qualitative measures of institutional success. Rather than measuring success by visitor numbers, exhibition square meters, or revenue growth, sustainable museums prioritize metrics such as depth of engagement, diversity of audiences, community impact, educational outcomes, carbon intensity reduction, and contributions to social and environmental well-being.

However, the effective realisation of this potential requires coherent governance frameworks, stable funding mechanisms, and stronger integration between cultural, tourism, and environmental policies. This vision, however, remains constrained by entrenched organisational routines, fragmented governance frameworks and the persistence of mass-tourism logics in many destinations. The tension between sustainability aspirations and institutional realities creates what might be termed a "sustainability gap" – the distance between what museums know they should do and what they are structurally and financially able to accomplish.

3.2. Systemic Requirements for Sustainable Transition

For sustainability to move beyond rhetoric, it must be embedded across museum governance, operational practices, and strategic planning, and aligned with destination-level tourism strategies. Cross-sectoral collaboration between museums, local authorities, tourism organisations, and environmental agencies is therefore essential. Museums must successfully reconcile the traditional demands of conservation with the urgent demands of a changing planet, overcoming internal systemic inertia and securing long-term funding to truly enact their role as catalysts for sustainable living.

Achieving this transformation requires action at multiple levels:

Institutional level: Strategic planning integrating sustainability across all operations, governance structures ensuring accountability, staff training and professional development, investment in infrastructure and systems, measurement and public reporting of sustainability performance.

Sectoral level: Professional networks enabling knowledge exchange and mutual support, shared standards and best practices, collective advocacy for policy change, collaborative resource sharing and project partnerships.

Policy level: Coherent frameworks integrating culture, tourism, and environment, stable long-term funding mechanisms, regulatory incentives for sustainability investments, support for infrastructure upgrades and capacity building, recognition of museums' contributions to sustainable development goals.

International level: Participation in global networks and initiatives, access to technical expertise and resources, alignment with international frameworks (SDGs, Paris Agreement, UNESCO conventions), learning from comparative experiences in other countries.

The Greek context presents both opportunities and obstacles for this multilevel transformation. Greece's rich cultural heritage and established position as a leading

cultural tourism destination provide strong foundations, while international policy frameworks (EU Green Deal, UNESCO sustainability initiatives) offer supportive contexts and potential funding sources. However, economic constraints, fragmented governance, and mass-tourism pressures create substantial headwinds that must be navigated strategically.

4. Conclusions

4.1. Museums at the Sustainability Crossroads

Museums in Greece are increasingly positioned at the crossroads of tourism and sustainable green development. While structural, financial, and governance challenges persist, museum professionals demonstrate a growing awareness of their role in promoting sustainability through education, community engagement, and responsible tourism practices. This growing awareness represents an essential first step, creating the foundation for more substantive institutional and systemic changes.

Regarding sustainable tourism development, its future lies not so much in quantitative expansion as in strengthening cultural significance, environmental responsibility, and social value. Museums, as trusted and enduring institutions deeply embedded in both local communities and global tourism networks, are uniquely positioned to support this transition, provided that their business models, governance structures, and funding mechanisms evolve in line with the requirements of long-term sustainability. This repositioning requires that museums adopt new and expanded roles: as platforms for dialogue and collaboration on sustainability, as models for implementing sustainable practices in their operations, as educational institutions that enhance citizens' climate literacy, as advocates for systemic changes toward a more sustainable society, and as strategic partners in the design and implementation of sustainable development policies at the destination level. Through these roles, museums can make a substantial contribution to shaping a new model of tourism development, one that emphasizes not only economic performance but also the protection of the natural and cultural environment, the participation of local communities, and the creation of long-term social value.

Museum professionals see themselves as uniquely positioned to be **catalysts for climate action** and sustainable living through their educational role and trusted public authority. However, to truly enact this role, they must overcome internal systemic inertia, secure long-term funding, and successfully reconcile the traditional demands of conservation with the urgent demands of a changing planet. The sustainability transition is not merely a technical challenge of implementing energy-efficient systems or risk-based conservation protocols; it is fundamentally a cultural transformation requiring museums to reimagine their purpose, relationships, and operations in the context of planetary crisis.

4.2. Pathways Forward: Recommendations for Policy and Practice

Based on the preliminary findings of this research, several pathways emerge for strengthening the integration of museums into sustainable tourism strategies:

1. **Policy coherence and integration:** National and regional policies should explicitly recognize museums' contributions to sustainable development and align cultural, tourism, and environmental policy frameworks. This includes integrating museum sustainability into national climate action plans, regional tourism strategies, and cultural heritage protection frameworks.
2. **Sustainable funding mechanisms:** Shift from short-term, project-based funding toward stable, long-term financial support that enables strategic planning and infrastructure investment. This might include dedicated sustainability funding streams, incentives for energy efficiency investments, and valuation of museums' non-market contributions to social and environmental well-being.
3. **Capacity building and training:** Invest in professional development programs that build museum staff capacity in sustainability management, risk-based conservation, community engagement, and climate communication. This includes support for participation in international networks and access to technical expertise.
4. **Measurement and accountability:** Develop sector-appropriate sustainability indicators and reporting frameworks that enable museums to measure progress, benchmark performance, and demonstrate impact. Public reporting of carbon footprints and sustainability commitments enhances accountability and inspiration for peer institutions.
5. **Cross-sectoral collaboration:** Establish formal mechanisms for collaboration among museums, tourism organizations, environmental agencies, and local authorities. This includes integrated destination management approaches that position museums as strategic partners in sustainable tourism development.
6. **Community engagement and social justice:** Prioritize inclusive, participatory approaches that center community voices, address historical inequities, and ensure that sustainability transitions are socially just. This includes decolonization efforts, accessibility initiatives, and co-creation of programs with diverse communities.
7. **Innovation and experimentation:** Support pilot projects, demonstration initiatives, and experimental approaches that test new models for sustainable museum operations, exhibition design, and visitor engagement. Lessons learned should be widely shared to accelerate sector-wide learning.

4.3. Research Limitations and Future Research Directions

Although this study provides important insights and useful conclusions regarding the relationship between museums, sustainability, and tourism development, it has certain limitations that should be considered when interpreting its findings. Given that the research is still in its preliminary stage, the findings should be considered exploratory rather

than conclusive. Future research, based on larger samples, comparative cross-national analyses, and mixed-methodological approaches, could contribute to further validation and expansion of the conclusions drawn from the present study. In addition, the research relies on the self-reported perceptions and experiences of museum professionals, which may be influenced by social desirability bias, particularly when discussing practices and commitments related to sustainability. Consequently, there are likely to be discrepancies between stated intentions and actual organizational practices in museums.

Further research will expand the empirical analysis and support the development of evidence-based policy pathways for strengthening the integration of museums into sustainable tourism strategies, contributing to a more resilient, equitable, and environmentally responsible cultural tourism sector in Greece and beyond. Specific research priorities include:

Longitudinal studies tracking Greek museums' sustainability transitions over time, comparative analysis with museum sustainability practices in other Mediterranean and European contexts, evaluation of specific interventions (e.g., risk-based conservation, circular exhibition design), investigation of visitor responses to museum sustainability initiatives, economic analysis of sustainability investments and their returns, governance studies examining effective models for cross-sectoral collaboration, and assessment of policy frameworks supporting or hindering museum sustainability.

The urgency of the climate crisis and the pivotal role of cultural heritage for Greek identity and the economy make it essential to maintain a constant focus on these priorities in research and public policy. Museums have the potential to transcend the role of institutions that merely respond to external challenges and emerge as active agents in shaping more sustainable, equitable, and meaningful relationships between society, cultural heritage, and the natural environment. Realizing this vision requires strategic commitment, adequate funding, and deeper institutional and systemic reforms. However, both the scale of the challenges and the significance of the opportunities at stake make it necessary to take ambitious and decisive initiatives.

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