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HERIT ADAPT

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Abstract

The feasibility study on sustainable tourism, led by the Regional Tourism Committee of Occitanie (CRTL) as part of the HERIT ADAPT project, is part of a broader strategy aimed at strengthening the resilience of tourist destinations. This initiative addresses two major challenges: the impact of mass tourism and the effects of climate variability on the natural and cultural heritage of Mediterranean regions, where tourism is a key economic driver. The project focuses on developing solutions that promote tourism while ensuring the sustainable and adaptive preservation and enhancement of these heritage sites.

Project Partners

Organization	Abbreviation	Country
Region of Western Greece	RWG	GR
ATHENA, Research and Innovation Centre in Information, Communication and Knowledge Technologies, Industrial Systems Institute	ATHENA	GR
European Public Law Organization	EPLO	GR
Sapienza University of Rome	SDR	IT
Municipality of Genoa	COMGE	IT
Dubrovnik Development Agency DURA	DURA	HR
Limassol Tourism Development and Promotion Co Ltd	LTC	CY
Old Royal Capital Cetinje	PCT/ORCC	ME
University of Granada	UGR	ES
Regional Tourism Agency Occitanie	CRTL	FR
Ministry of Tourism of the Republic of Bulgaria	MTRB	BR

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Territorial Working Groups	TWGs
Sustainable Tourism Model	STM

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INTRODUCTION:

The feasibility study on sustainable tourism, led by the Regional Tourism Committee of Occitanie (CRTL) as part of the HERIT ADAPT project, is part of a broader strategy aimed at strengthening the resilience of tourist destinations. This initiative addresses two major challenges: the impact of mass tourism and the effects of climate variability on the natural and cultural heritage of Mediterranean regions, where tourism is a key economic driver. The project focuses on developing solutions that promote tourism while ensuring the sustainable and adaptive preservation and enhancement of these heritage sites.

Objectives of the Study

The study aims to design a sustainable tourism model that is both adaptable and transferable. This model is intended to be implemented not only at pilot sites in Occitanie but also in other Mediterranean regions facing similar challenges. The goal is to balance the economic benefits of tourism with the need to preserve the ecological and cultural integrity of these sites. The model is based on key principles of sustainability, inclusivity, and adaptability to local specificities.

Data and Information Collected *(Source: Progress Meeting in Rome)*
To develop the model, data collection focused on four main categories:

1. Environmental Data: Assessment of tourism's environmental impact, including carbon footprint, water resource management, energy consumption, and biodiversity preservation.
2. Cultural and Heritage Data: Analysis of the condition of cultural sites and monuments, their visitation levels, and their vulnerability to tourist pressures.
3. Socio-Economic Data: Examination of tourism’s social and economic impacts, such as local employment, revenue generation, and interactions between tourists and local communities.
4. Tourism Flow Management Data: Information on visitor capacity, seasonality, transport infrastructure, and strategies for managing tourist flows.

Role of Pilot Sites (Source: HERIT ADAPT Project Document)

The selected pilot sites represent a variety of heritage types, including UNESCO sites, historic town centers, and protected natural areas. These sites offer a representative sample to test the model in diverse geographical and heritage contexts. Each site is analyzed based on its specific characteristics and challenges, enabling the customization of measures and the collection of valuable insights for the broader model.

Strategic Alignment

This study aligns with the objectives of the Interreg Euro-MED program, which promotes a transnational approach to developing resilient tourism models. It aims to encourage the adaptation of tourism practices to the ecological and social priorities of each region, leveraging the Quadruple Helix framework—a stakeholder engagement method involving the public sector, businesses, researchers, and citizens. The insights gained from this study will contribute to creating a transferable model applicable across other Mediterranean regions, fostering a collaborative and sustainable approach to tourism in the area.

In summary, this feasibility study, led by the CRTL, seeks to establish a robust knowledge base and an operational framework for sustainable tourism. Ultimately, it could serve as a guideline for regional and transnational tourism strategies across the Euro-Mediterranean space.

ANALYSIS OF THE PREVIOUS POINTS:

This analysis is based solely on the work conducted within the framework of action A.1.2.

1. Legal and Policy Frameworks

Common Points:

- All sites benefit from robust legal frameworks for the protection of cultural and natural heritage, often aligned with European and international standards (e.g., UNESCO conventions).
- National and local policies promote sustainability and climate change adaptation.

Differences:

- Dubrovnik: Strong integration of local policies with EU directives (e.g., "Respect the City" Action Plan) but faces inconsistencies with broader European objectives such as the Green Deal.
- Rome and Genoa: Advantage of national frameworks like the "Tourism Code" and well-defined local strategic initiatives.
- Western Greece: Strong national laws, but overlapping responsibilities at local, regional, and national levels cause delays in execution.
- Limassol and Cetinje: Ongoing policy adjustments lead to recurring implementation and regulatory coherence issues.
- Occitanie: Well-structured through the "Green New Deal Occitanie," but shared responsibilities across multiple governance levels slow progress, despite notable initiatives such as the GRAND SITE operation in Villefranche-de-Conflent.

2. Infrastructure and Tourist Flow Management

Common Points:

- Most sites experience significant tourist influxes during peak seasons.
- Gaps in transport and accommodation infrastructure negatively impact tourist experiences and sustainability.

Differences:

- Dubrovnik: Advanced flow management via the "Dubrovnik Pass," though transport and access challenges remain.
- Rome: Public transport and modern visitor signage are insufficient despite a robust tourist offering.

- Genoa: Despite public transportation, the site is poorly accessible (in terms of dense urban layout and architectural barriers).
- Limassol: Limited tourism infrastructure, particularly in rural and coastal areas.
- Villefranche-de-Conflent (Occitanie): Tourist numbers are not yet quantified.
- Granada: Weak rail and air connectivity to the city center.
- Western Greece: Inadequate transport and access to historical sites.

3. Stakeholder Engagement

Common Points:

- There is a general willingness to involve local communities and public-private sectors in decision-making processes, but engagement levels vary.

Differences:

- Dubrovnik: Participatory platforms like VOXPOPULI enhance inclusive governance.
- Rome : Effective collaboration between public and private sectors (e.g., Zètema for Rome).
- Genoa: Effective collaboration between public and private sectors (e.g., “Genoa City Pass”) but, in the specific case of the UNESCO site, difficulty in engaging the private owners of some of the Rolli Palaces.
- Western Greece and Limassol: Struggles to balance local community interests with those of tourism businesses.
- Villefranche-de-Conflent (Occitanie): Advanced approach through the Canigou Grand Site initiative, which involves public and private stakeholders.
- Cetinje: Limited dialogue with local stakeholders, leading to communication and prioritization issues.

4. Climate Resilience Strategies

Common Points:

- Climate mitigation and adaptation strategies focus on reducing emissions, preserving natural sites, and implementing nature-based solutions.

Differences:

- Dubrovnik: Strong action with the SEACAP Plan but increasing threats from rising sea levels.

- Genoa: Clear objectives reported by the plan but significant challenges in adapting the urban site to climate change impacts (architectural constraints and limited pedestrian-friendly ways).
- Western Greece: Integration of green roofs and shaded spaces, though resources for protecting vulnerable sites are limited.
- Limassol and Granada: Vulnerable to heat waves and sea-level rise, limiting resilience at tourist sites.
- Villefranche-de-Conflent (Occitanie): Advanced climate planning via the "Regional Climate Change Adaptation Plan" and the "Regional Water Plan."
- Cetinje: Limited actions, with a need to accelerate climate resilience integration.

5. Seasonality and Tourism Diversification

Common Points:

- Overdependence on peak tourist seasons, leading to challenges in resource management and sustaining flows during the off-season.

Differences:

- Dubrovnik: Development of off-season offerings to ease summer pressure, with limited success.
- Genoa: First attempts to alleviate over-reliance on peak tourism seasons, which cause great pressure on resources and infrastructure.
- Villefranche-de-Conflent (Occitanie): Opportunities for diversification through the Canigou Grand Site initiative.
- Granada: Heavy reliance on ski and summer seasons, with underutilized areas during the off-season.
- Rome: Efforts to reduce seasonality through year-round cultural events.
- Western Greece: Overconcentration on summer months with limited off-season options.

6. Technology and Data

Common Points:

- Potential for integrating smart technologies to manage tourist flows, monitor environmental impacts, and enhance visitor experiences remains underutilized.

Differences:

- Dubrovnik: Use of technologies like Smart Parking, though lacking a coherent digital transformation strategy.
- Rome: Limited use of data for strategic planning.
- Genoa: insufficient data collection and evaluation/monitoring of social, environmental and economic performance of tourism.
- Western Greece: Opportunities to adopt apps that promote less-visited areas.
- Villefranche-de-Conflent (Occitanie): Introduction of tools to monitor tourism and climate impacts, leveraging existing observation systems (Occitanie Tourisme Observation).

Key Opportunities:

1. **Policy Harmonization:** Align local strategies with European standards to overcome inconsistencies.
2. **Tourism Diversification:** Develop products suited to low seasons and promote secondary destinations.
3. **Digital Transformation:** Leverage technologies to better manage tourist flows and environmental impacts.
4. **Climate Resilience Reinforcement:** Accelerate the adoption of nature-based solutions and climate-resilient infrastructure, identifying risks and vulnerabilities to act accordingly.
5. **Alternative Financing:** Pursue access to European funds and relevant public-private partnership initiatives.

Conclusion:
While each site faces unique challenges, coordinated actions around the identified common areas could maximize efficiency and ensure balanced, sustainable tourism development.

TABLE OF TECHNOLOGICAL SOLUTIONS BY SERVICE/DOMAIN

This analysis is based solely on the work conducted within the framework of action A.1.3.

Service / Domain	Objectives	Technology	Recommended Tools	Concrete Examples
📌 **Conservation and Restoration of Heritage**	Restore, protect, and document historical sites and artifacts	- Artificial Intelligence (AI) - Computer Vision - Super-Resolution Algorithms - Deep Learning	- **Google DeepMind** (AI applied to restoration) - **Stable Diffusion & NeRF** (3D modeling from images) - **Pix2Pix GAN** (Image inpainting/restoration)	- Digital restoration of frescoes and ancient paintings (e.g., Masolino da Panicale) - Reconstruction of damaged sculptures using AI
📌 **Documentation and Research in Archaeology and History**	Analyze, archive, and interpret artifacts and monuments	- OCR and NLP (Text Recognition) - Computer Vision - Machine Learning (ML)	- **Tesseract OCR** (Optical Character Recognition) - **Google AI Vision** (Heritage image analysis) - **AutArch** (Automation of archaeological object cataloging)	- Automatic transcription of ancient manuscripts - Automatic detection of lost inscriptions on tombstones
📌 **Accessibility and Inclusion**	Make heritage more accessible to visitors (people with disabilities, etc.)	- Speech Synthesis - Interactive Voice Interfaces - Augmented Reality (AR)	- **Microsoft Azure Speech-to-Text** (Speech recognition) - **Google Assistant / Chatbots** (Interpretation and voice guidance) - **Seeing AI**(Application for visually impaired users)	- Interactive audio guides for visually impaired individuals - Automatic translation and description of monuments in multiple languages
📌 **Public Engagement and Interaction**	Provide an immersive and interactive experience in museums and cultural sites	- Virtual Reality (VR) - Augmented Reality (AR) - Holograms - Interactive Touchscreens	- **Microsoft HoloLens** (Augmented reality headset) - **Unity 3D & Unreal Engine** (VR and AR development) - **Blippar & Vuforia**	- Immersive experiences such as the VR reconstruction of the Alhambra - Museums with interactive holograms

			(Mobile AR applications)	(e.g., Library of Trinity College Dublin)
📌 **Environmental Monitoring and Protection**	Monitor the impact of weather conditions and visitor activity on heritage sites	- IoT and Environmental Sensors - Remote Sensing (Satellites and Drones) - Thermal Imaging - Digital Twins	- **LiDAR 3D Scanning** (Precise mapping and modeling) - **Copernicus / Sentinel Satellites** (Remote sensing of sites) - **DJI Phantom Drones with Multispectral Sensors**	- Detection of moisture and stone degradation in historical monuments - Pollution tracking on archaeological sites like Pompeii
📌 **Tourist Flow Management**	Control overcrowding, optimize visitor experience, and reduce environmental impact	- GIS (Geographic Information Systems) - Visitor Tracking via WiFi/GPS - Big Data Analytics and AI Prediction	- **Flux Vision Tourism (Orange)** (Tourist flow analysis via mobile data) - **QGIS / ArcGIS** (Tourism flow mapping) - **LSTM Neural Networks** (Crowd forecasting)	- Crowd management in Dubrovnik to prevent excessive tourism - Monitoring visitor entries/exits in closed sites like Mont-Saint-Michel
📌 **Urban Planning and Heritage Management**	Preserve site integrity and improve coexistence with urbanization	- Digital Twins - 3D Modeling - Predictive AI Analysis	- **Autodesk Revit / Rhino 3D** (3D modeling of historical buildings) - **Digital Twin Solutions** (Heritage infrastructure monitoring)	- Digital simulation to anticipate renovation impact on the Colosseum in Rome
📌 **Climate Adaptation and Heritage Preservation**	Minimize climate change effects on monuments and tourist sites	- Advanced Climate Models - IoT Sensors - Data Science	- **CMIP6 Climate Model** (Climate impact analysis on heritage) - **IoT Weather Stations** (Environmental sensors on historical sites)	- Simulation of rising sea level effects on ancient coastal cities

KEY ELEMENTS

1. Feasibility

- **Data and Methodology:**
  The data collected (environmental, cultural, socio-economic, and tourist flow management) is essential to assess the impacts of tourism and inform decision-making. Comprehensive collection and rigorous analysis of these data underpin the feasibility of the model.
    - **Example (Occitanie):** Internal monitoring tools are used to measure the impacts of tourism and climate.
- **Pilot Sites:**
  The diversity of sites (UNESCO heritage sites, historic centers, natural areas) ensures that the model is adaptable to different geographical and heritage contexts.

2. Key Considerations

- **Sustainability and Climate Resilience:**
    - Understanding risks and vulnerabilities is crucial to developing tailored strategies.
    - Nature-based solutions (e.g., green roofs, water resource conservation) play a key role in enhancing climate resilience.
    - **Example:** Villefranche-de-Conflent implements the "Regional Climate Change Adaptation Plan" and the "Water Plan."
- **Monitoring and Tourist Flow Management:**
    - Managing peak-season tourist flows and promoting off-season tourism are necessary to reduce pressure on infrastructure and resources.
    - Technology is underutilized for flow management and infrastructure improvements.
    - **Example:** Dubrovnik employs an advanced flow management system through the "Dubrovnik Pass."
- **Stakeholder Engagement:**
    - Involvement of local communities, businesses, public authorities, and researchers in planning and execution is vital (Quadruple Helix approach).
    - Participatory approaches help mitigate conflicts of interest.
    - **Example:** The VOXPOPULI platform in Dubrovnik fosters inclusive governance.

3. Points of Attention (Areas for Exploration)

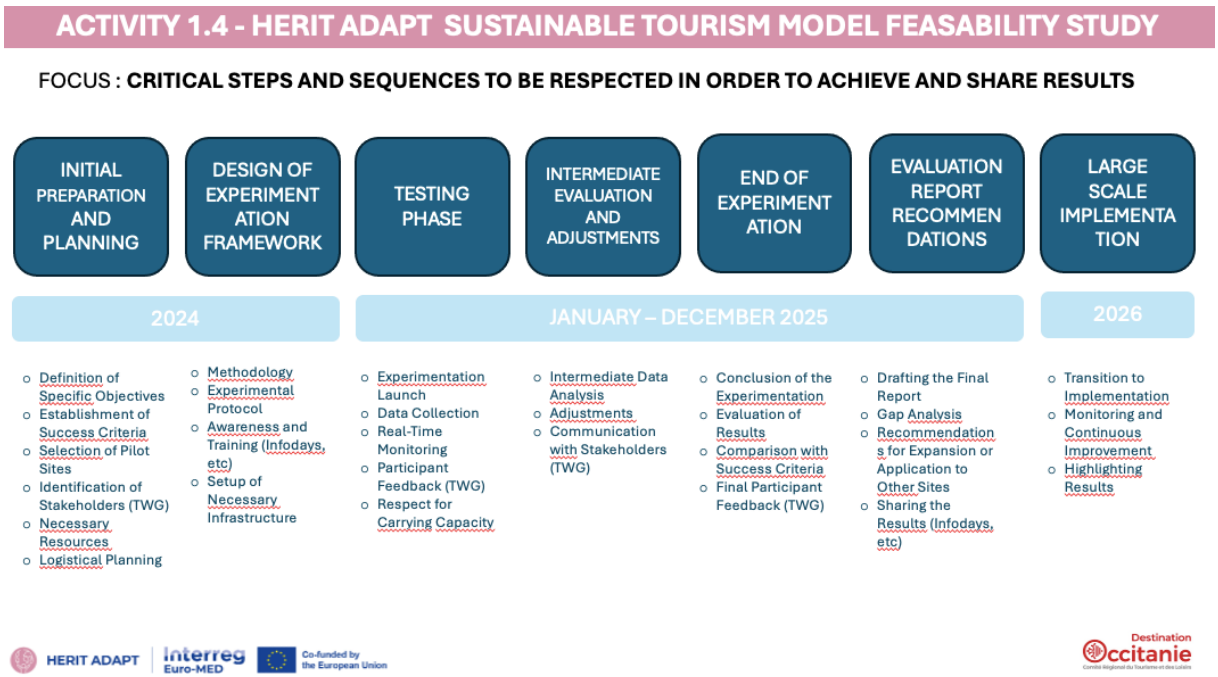
- **Infrastructure and Accessibility:**
    - Improvements in transport and accommodation infrastructure are necessary to support sustainable tourism.
    - Specific gaps, such as rail links, public transport, and visitor signage, have been identified.
- **Diversification and De-Seasonalization:**
    - Diversifying tourism offerings can help distribute tourist flows throughout the year.
    - Opportunities exist to expand off-season activities (culture, nature, events).
- **Technology and Data:**
    - Accelerating the adoption of digital tools is critical for tracking tourism and climate impacts (e.g., apps to relieve congestion in popular areas).
    - Existing databases should be leveraged for strategic planning.
- **Regulatory Coherence:**
    - Addressing regulatory inconsistencies across governance levels (local, regional, national) is necessary to speed up implementation.

Conclusion

Site experiments can rely on the following foundational elements:

1. **Rigorous Data Collection:** To analyze risks and vulnerabilities at pilot sites.
2. **Accurate Monitoring:** Tailored to local specifics, integrating climate-resilient solutions and effective tourist flow management.
3. **Stakeholder Engagement:** Prioritizing local community involvement in planning and decision-making processes.
4. **Tourism Offer Diversification:** To maximize economic benefits while minimizing negative impacts on natural and cultural resources.

CRITICAL STEPS



1. Design of the Experimentation Framework (2024)

Activities:

- Define the methodology and experimental protocol.
- Conduct awareness and training sessions (e.g., workshops, informational meetings).
- Establish the necessary infrastructure.

Objective:
Lay the foundation for a structured and rigorous experimentation phase.

2. Testing Phase

Activities:

- Launch the experiment and begin data collection.
- Conduct real-time monitoring.
- Gather participant feedback through the Technical Working Group (TWG).

- Ensure the systems tested operate within their capacity limits.

Objective:
Implement and oversee the experimentation process.

3. Mid-Term Evaluation and Adjustments

Activities:

- Analyze the data collected at the midpoint.
- Make adjustments based on initial findings.
- Maintain communication with stakeholders through the TWG.

Objective:
Course-correct to ensure the experiment remains aligned with its goals.

4. Conclusion of Experimentation

Activities:

- Conduct a comprehensive evaluation of results.
- Compare outcomes with predefined success criteria.
- Collect final feedback from participants via the TWG.

Objective:
Conclude the experiment and validate key insights.

5. Recommendations and Final Evaluation Report

Activities:

- Draft the final report.
- Analyze discrepancies and provide recommendations.
- Propose potential applications or extensions to other contexts or sites.
- Share results using formats such as infographics.

Objective:
Summarize conclusions, share key learnings, and guide future initiatives.

Large-Scale Implementation (2026)

Key Activities:

1. **Transition to Full Implementation:**
    - Shift from the experimental phase to the comprehensive integration of tested processes.
2. **Monitoring and Continuous Improvement:**
    - Track progress to ensure objectives are met.
    - Identify and implement refinements to optimize results.
3. **Showcasing Results:**
    - Communicate and share achievements through reports, presentations, and other formats.

General Objective:
Deploy validated results at scale while continuously refining processes to ensure sustainable success.

Pilot sites / Territorial Working Group

HERIT ADAPT Pilot Site - Canigou Grand Site / Villefranche de Conflent

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Part 1: Issues Related to Tourism Activity

1. **Tourism Flow Management:**
    - The lack of precise data on visitor numbers and patterns creates challenges in managing peak tourism seasons and regulating visitor flows.
    - Over-tourism risks damaging the cultural and natural heritage, especially in areas with limited infrastructure for high visitor numbers.
    - Coordination between local and regional stakeholders is necessary to implement effective flow regulation and ensure sustainable tourism practices.
2. **Infrastructure and Accessibility:**
    - Villefranche de Conflent's mountainous location presents logistical challenges for mobility and transport.

- Improvements are needed in transportation infrastructure to ensure smooth visitor access while minimizing environmental impact.

3. **Stakeholder Engagement:**
   - Raising awareness among local communities, regional authorities, and visitors is crucial to fostering support for sustainable tourism practices.
   - Collaboration between local, departmental, and regional entities is required to align tourism offerings with sustainability goals.
4. **Economic and Cultural Opportunities:**
   - The site offers potential for economic growth by attracting responsible tourism.
   - Promoting the site as a destination with a focus on sustainability and cultural heritage can enhance visitor engagement and benefit local communities.

Part 2: Issues Related to Climate Change

1. **Water Resource Management:**
   - The region faces challenges related to water scarcity, exacerbated by climate change and increasing visitor demand.
   - Addressing water management issues is a priority to ensure both sustainable tourism and the preservation of local ecosystems.
2. **Vulnerability Assessment:**
   - The mountainous terrain and surrounding ecosystems are vulnerable to the impacts of climate change, including biodiversity loss and extreme weather conditions.
   - The pilot project emphasizes conducting risk analyses to identify and mitigate these vulnerabilities effectively.
3. **Raising Awareness of Climate Impacts:**
   - Efforts are needed to educate stakeholders and visitors about the implications of climate change on the site and its surroundings.
   - Connecting climate issues with tourism management can help align local actions with broader climate adaptation goals.
4. **Sustainable Practices and Monitoring:**
   - Tools like "Adaptour" and OTO are being tested to monitor risks and vulnerabilities, focusing on integrating climate resilience into tourism planning.
   - Reducing environmental impacts, such as carbon emissions and biodiversity disruption, is integral to the site's long-term sustainability.

Synthesis of Goals and Solutions

1. **For Tourism Activity:**
    - Develop advanced monitoring tools to regulate visitor flows and optimize mobility.
    - Promote tourism offerings that emphasize cultural heritage and sustainability.
    - Engage stakeholders at all levels to implement coordinated strategies.
2. **For Climate Change:**
    - Conduct detailed climate risk assessments and integrate findings into site management plans.
    - Address water scarcity through sustainable resource management and education.
    - Implement technologies and tools to connect climate resilience with tourism practices, ensuring the site's preservation and adaptability.

HERIT ADAPT Pilot Site - Temple of Apollo Hylates, Limassol, Cyprus

Part 1: Issues Related to Tourism Activity

1. **Accessibility and Infrastructure:**
    - The site faces accessibility challenges due to limited pedestrian-friendly infrastructure and inadequate transport options, particularly for individuals with disabilities.
    - Public transport in the Limassol region has limited routes, making it difficult for tourists to access the site.
2. **Visitor Impact and Site Management:**
    - Increased foot traffic from tourists leads to physical damage to the site and environmental degradation.
    - A lack of regulations for tourism management exacerbates the risk of over-tourism and its negative impact on the site's integrity.
3. **Enhancement of Visitor Experience:**
    - The use of digital tools, such as 3D modeling, can provide immersive experiences to visitors, enriching their understanding of the temple's historical and cultural significance.
    - Developing guided tours and thematic experiences could attract more visitors while educating them about the site's importance.
4. **Economic and Social Outcomes:**
    - Promoting the site as a cultural and natural heritage destination can stimulate local businesses and increase regional income.
    - Engaging stakeholders, including local and national authorities, is critical to establish sustainable tourism policies and strategies.

Part 2: Issues Related to Climate Change

1. **Environmental Risks and Deterioration:**
    - The temple is highly susceptible to natural erosion caused by rain, strong winds, extreme heat, and fluctuations in humidity.
    - Climate change exacerbates these issues, accelerating structural degradation and posing long-term risks to the site's preservation.
2. **Human Impact:**
    - Physical damage caused by unrestricted tourist access contributes to the wear and tear of the temple.
    - Poor waste management systems lead to environmental degradation around the site.

3. **Sustainability and Resilience:**
    - Addressing water management issues and promoting energy-efficient solutions are critical to reducing the site's environmental impact.
    - Raising awareness about the effects of climate change and promoting innovative preservation techniques, such as climate-resilient infrastructure, is vital for long-term sustainability.
4. **Monitoring and Technological Integration:**
    - Leveraging drone-based imaging and terrestrial laser scanning enables precise documentation and monitoring of the site's structural vulnerabilities.
    - Digital campaigns and educational outreach can raise public awareness about the impacts of climate change and the importance of heritage preservation.

Synthesis of Goals and Proposed Solutions

1. **Tourism Management:**
    - Implement strategies to regulate visitor flows and prevent over-tourism, including improved access and transport infrastructure.
    - Enhance visitor experiences through immersive technologies like 3D modeling and thematic guided tours.
2. **Climate Resilience:**
    - Conduct a comprehensive environmental risk assessment to address challenges related to water management, waste, and structural degradation.
    - Utilize advanced tools like drones and photogrammetry to document and preserve the site.
3. **Stakeholder Engagement and Education:**
    - Collaborate with local and national authorities to develop sustainable tourism policies.
    - Promote public awareness campaigns to educate visitors and stakeholders about climate change impacts on cultural heritage.
4. **Long-Term Outcomes:**
    - Develop high-resolution 3D models for scientific research and conservation planning.
    - Foster economic growth by increasing tourist interest in sustainable ways that benefit local communities and protect the site.

By addressing both tourism and climate-related challenges, the Temple of Apollo Hylates pilot site can serve as a model for sustainable heritage preservation and adaptive tourism practices.

HERIT ADAPT Pilot Site - Temple of Apollo Epicurius, Greece

Part 1: Issues Related to Tourism Activity

1. **Accessibility and Infrastructure:**
    - The temple's remote mountainous location makes it difficult to access, limiting its appeal to mainstream tourist flows.
    - The lack of well-developed transport infrastructure hinders visitor mobility and restricts the site's visibility in tourism itineraries.
2. **Tourist Flow Management:**
    - The historical significance of the temple is underutilized in attracting visitors. Efforts are needed to redirect tourist flows from more popular sites, like Ancient Olympia, to the temple.
    - Special monitoring tools are required to manage visitor numbers and ensure the temple's sustainability.
3. **Enhancing Visitor Experience:**
    - Using advanced technologies, such as 3D modeling and immersive tools, can provide tourists with a deeper understanding of the site's cultural and architectural importance.
    - Educational outreach and thematic tours can further enhance the site's attractiveness to school groups and cultural tourism segments.
4. **Economic and Social Impact:**
    - Promoting the temple within mainstream tourism can stimulate economic growth in neighboring municipalities.
    - Supporting local businesses and engaging the community in conservation efforts can create positive social outcomes, leveraging the region's intangible heritage, such as gastronomy and craftsmanship.

Part 2: Issues Related to Climate Change

1. **Environmental and Structural Vulnerabilities:**
    - The temple is particularly vulnerable to extreme weather conditions, including sudden temperature changes and heavy precipitation, which cause erosion and damage to its limestone structure.
    - Freeze-thaw effects and thermoclasty exacerbate existing cracks and structural weaknesses.
2. **Risk Management and Resilience:**
    - The site's forested location exposes it to risks of wildfires, necessitating proactive measures for fire prevention and response.
    - The pilot project aims to integrate climate-resilient strategies, such as real-time monitoring and predictive modeling, to safeguard the temple.
3. **Preservation and Technology Integration:**
    - Advanced tools like drones, photogrammetry, and AI-powered algorithms are being tested to document and assess structural damage.
    - High-resolution 3D models will aid in restoration planning, conservation strategies, and public awareness campaigns.
4. **Raising Awareness and Sustainable Practices:**
    - Public campaigns and digital outreach can educate stakeholders and visitors on the impact of climate change on the temple.
    - Promoting water-efficient and energy-saving practices at the site will minimize its ecological footprint.

Synthesis of Goals and Proposed Solutions

1. **Tourism Enhancement:**
    - Develop infrastructure and transport services to improve accessibility to the temple.
    - Use digital tools to create interactive and educational experiences that attract diverse visitor groups.
2. **Climate Resilience:**
    - Implement monitoring systems and predictive algorithms to address climate risks, such as wildfires and structural erosion.
    - Conduct detailed environmental assessments to prioritize conservation measures.
3. **Stakeholder Engagement:**

- Collaborate with local and national authorities to integrate the temple into regional tourism strategies.
- Involve local communities in promoting the site and preserving its cultural significance.

4. **Technological Integration:**
    - Create high-resolution 3D models for scientific research, restoration, and public engagement.
    - Archive comprehensive datasets to serve as a foundation for future studies and technological advancements.
5. **Educational and Social Outcomes:**
    - Use the temple's story as a tool to educate visitors about sustainable tourism and climate resilience.
    - Highlight the economic and social benefits of preserving cultural heritage to gain community support.

By addressing the intertwined challenges of tourism and climate change, the Temple of Apollo Epicurius project aims to create a replicable model for sustainable heritage preservation and adaptive tourism development.

HERIT ADAPT Pilot Site - Roman Houses of Celio Hill, Rome, Italy

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Part 1: Issues Related to Tourism Activity

1. **Accessibility and Visitor Inclusion:**
    - The steep slopes and uneven terrain of Celio Hill create significant accessibility challenges, especially for visitors with disabilities.

- Many tourists bypass the Roman Houses of Celio Hill in favor of more prominent attractions like the Colosseum, limiting their visibility and importance in visitor itineraries.

2. **Tourist Flow and Site Management:**
    - Inconsistent tourist itineraries cause the Roman Houses to be underutilized, while nearby sites face overcrowding.
    - The lack of promotional efforts and integrated tourist routes diminishes the potential to attract a more substantial visitor base.
3. **Visitor Experience Enhancement:**
    - The site's historical and cultural significance remains under-communicated. Innovative technologies, such as Extended Reality (XR), could enrich the visitor experience.
    - Guided tours lack immersive elements that could better highlight the site's importance and attract diverse visitor groups.
4. **Economic Opportunities:**
    - Increasing visitor numbers could generate revenue for ongoing conservation and excavation efforts.
    - Enhanced tourism offerings may lead to job creation in site management, guiding, and XR application development.

Part 2: Issues Related to Climate Change

1. **Environmental and Structural Vulnerabilities:**
    - The site faces environmental challenges such as water infiltration, which damages frescoes and accelerates structural deterioration.
    - Hypogeal microclimatic conditions contribute to biodeterioration, posing risks to the site's long-term preservation.
2. **Energy-Efficient Solutions:**
    - Employing energy-efficient XR devices and virtual access technologies can reduce the site's environmental impact.
    - These solutions also minimize physical wear and tear by limiting direct visitor interactions with fragile areas.
3. **Raising Awareness and Promoting Sustainability:**

- Educating visitors about the environmental challenges and climate risks faced by the Roman Houses is vital for fostering public support for sustainable tourism practices.
- Redistributing tourist flows through curated itineraries can alleviate pressure on nearby overcrowded attractions while promoting sustainable exploration of the Celio Hill area.

4. **Resource and Funding Challenges:**
    - Securing consistent funding for preservation and excavation efforts remains a persistent issue.
    - Redirecting visitors to the Roman Houses can improve financial sustainability, enabling long-term conservation initiatives.

Synthesis of Goals and Proposed Solutions

1. **Tourism Management:**
    - Introduce curated itineraries to integrate the Roman Houses with nearby attractions and promote the site as a key starting point for exploring the Celio Hill area.
    - Organize promotional campaigns and pop-up events to raise awareness about the site's significance and attract new visitors.
2. **Technological Integration:**
    - Develop immersive XR interventions to provide virtual access to inaccessible areas and enhance visitor engagement.
    - Utilize virtual tours to showcase fragile artifacts, reducing physical strain on the site while maintaining educational and cultural outreach.
3. **Sustainability and Conservation:**
    - Implement energy-efficient XR technologies to minimize the site's carbon footprint.
    - Leverage revenue from increased visitor flows to fund excavation and conservation efforts.
4. **Accessibility Improvements:**
    - Design inclusive itineraries and provide virtual access options for visitors with mobility challenges.
    - Train staff to use XR technologies, ensuring seamless visitor interactions with the new tools.

5. **Economic and Social Benefits:**
    - Increase site revenue through enhanced visitor experiences and new tourism products.
    - Strengthen community engagement by fostering a deeper connection between locals, tourists, and the site's historical narrative.

Expected Outcomes

1. **Enhanced Visitor Experience:**
    - Deploy XR technologies to make the site more engaging, accessible, and educational.
    - Improve visitor satisfaction and understanding of the site's historical and cultural significance.
2. **Tourism Diversification:**
    - Redistribute tourist flows to alleviate pressure on overcrowded attractions like the Colosseum while enhancing the prominence of the Roman Houses.
    - Increase visitor numbers through tailored itineraries and marketing campaigns.
3. **Sustainability Achievements:**
    - Promote responsible tourism practices to minimize environmental impacts.
    - Secure funding for long-term conservation and excavation through increased site revenue.
4. **Community Impact:**
    - Foster economic growth by creating job opportunities in tourism and technology.
    - Build public awareness about the importance of preserving cultural heritage in the face of climate challenges.

This pilot project showcases the potential of combining technological innovation, sustainability practices, and community engagement to preserve and promote cultural heritage sites like the Roman Houses of Celio Hill.

HERIT ADAPT Pilot Site - Rector's Palace, Dubrovnik, Croatia

Part 1: Issues Related to Tourism Activity

1. **Tourist Flow Management:**
    - The Rector's Palace is located in Dubrovnik's historical core, which experiences significant visitor traffic, particularly during peak tourism seasons.
    - Managing visitor flows within the palace and surrounding areas is essential to minimize congestion and ensure a balanced distribution of tourists across the site.
2. **Preservation and Tourism Balance:**
    - High visitor traffic contributes to wear and tear on the structure and artifacts, emphasizing the need for effective monitoring and regulation of tourist numbers.
    - Adapting tourism offerings to align with conservation priorities can help ensure sustainable site usage.
3. **Visitor Experience and Engagement:**
    - Using advanced technologies, such as 3D modeling and interactive digital tools, can enhance the visitor experience by providing rich, immersive content about the palace's history and architecture.
    - Offering virtual access to restricted areas allows visitors to explore the site while protecting fragile spaces.
4. **Economic Impact:**
    - Increased visitor engagement and improved offerings can boost revenue generation for the palace and surrounding businesses.
    - Promoting the site as a cultural heritage destination contributes to local economic growth and job creation.

Part 2: Issues Related to Climate Change

1. **Environmental Vulnerabilities:**
    - The palace faces risks from its coastal location, including environmental challenges like temperature and humidity fluctuations caused by proximity to the sea.
    - Reflections and refractions from sunlight on the sea surface can complicate data collection and preservation efforts.
2. **Environmental Monitoring:**
    - IoT-enabled sensors currently installed at the site monitor temperature, humidity, and air quality. Analyzing this data helps identify patterns and risks that may impact the building's structure and artifacts.

- Predictive AI tools can provide early warnings about environmental conditions, enabling proactive conservation measures.

3. **Sustainability Practices:**
   - Integrating climate change considerations into preservation strategies helps safeguard the palace against long-term impacts like rising temperatures and humidity-induced degradation.
   - Using non-invasive technologies, such as drones and photogrammetry, ensures minimal environmental impact during conservation and monitoring activities.
4. **Awareness and Advocacy:**
   - Educating visitors and stakeholders about the effects of climate change on cultural heritage is vital for building support for sustainable practices.
   - Highlighting the role of technology in addressing these challenges can inspire broader adoption of innovative solutions.

Synthesis of Goals and Proposed Solutions

1. **Tourism Management:**
   - Implement visitor flow regulations to balance tourism and conservation.
   - Offer virtual tours and immersive digital content to manage physical access to fragile areas while enhancing visitor engagement.
2. **Technological Integration:**
   - Develop high-resolution 3D models for preservation planning and educational outreach.
   - Use AI-driven predictive tools to monitor environmental risks and suggest preventive measures.
3. **Climate Resilience:**
   - Analyze environmental data to understand how climate factors impact the palace, using IoT sensors for real-time monitoring.
   - Incorporate climate-responsive measures into conservation strategies to mitigate risks from temperature and humidity fluctuations.
4. **Visitor Experience and Accessibility:**
   - Use digital dashboards to provide museum staff with real-time insights into environmental conditions, helping them safeguard the site during extreme weather events.

- Create accessible and engaging visitor experiences through technology, making the site inclusive for diverse audiences.

5. **Economic and Social Outcomes:**
   - Increase site revenue by improving tourism offerings and leveraging advanced technologies to attract more visitors.
   - Strengthen the local economy by creating job opportunities in site management, guiding, and technology implementation.

Expected Outcomes

1. **Enhanced Visitor Engagement:**
   - High-resolution 3D models and predictive monitoring tools improve the quality of the visit experience.
   - Immersive content and virtual tours offer greater access and educational value.
2. **Sustainability and Conservation:**
   - Real-time environmental monitoring supports proactive preservation efforts.
   - AI-driven tools provide early warnings about critical conditions, protecting the site's structure and artifacts.
3. **Economic Growth and Awareness:**
   - Increased visitor numbers and enhanced engagement contribute to higher site revenue and support local businesses.
   - Public awareness campaigns foster appreciation for cultural heritage and the importance of sustainable tourism practices.

This pilot project illustrates how combining advanced technologies, sustainability practices, and public engagement can protect and promote cultural heritage sites like the Rector's Palace, ensuring their preservation for future generations.

HERIT ADAPT Pilot Site - Monumental Complex of Alhambra and Generalife, Granada, Spain

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Part 1: Issues Related to Tourism Activity

1. **Tourist Flow and Overcrowding:**
   - The Alhambra faces significant over-tourism, with excessive foot traffic contributing to structural wear and strain on the surrounding environment.

- A major goal is to redirect some tourist flows to lesser-known areas in Granada, such as the Nasrid watchtowers, to balance visitor distribution.

2. **Promotion of Lesser-Known Sites:**
   - The project seeks to enhance the visibility of under-visited cultural sites in the region, many of which are historically and culturally linked to the Alhambra.
   - Activities such as thematic tours and workshops aim to spark interest in these areas, contributing to economic and cultural benefits.
3. **Visitor Experience and Engagement:**
   - Current offerings at the Alhambra and surrounding areas lack thematic narratives and interactive experiences that could deepen visitor engagement.
   - The introduction of virtual and immersive experiences, including virtual recreations of Nasrid-era communication systems, aims to enrich the visitor experience.
4. **Economic and Social Opportunities:**
   - Encouraging tourists to explore lesser-known areas can stimulate local economies through increased spending on local services, artisans, and accommodations.
   - Engaging local communities in tourism activities ensures economic inclusion and fosters cultural pride.

Part 2: Issues Related to Climate Change

1. **Environmental Degradation:**
   - High levels of tourist activity in rural areas around Granada increase risks to biodiversity and disrupt local ecosystems.
   - Semi-arid conditions in Granada, compounded by climate change, result in water scarcity, presenting challenges for sustainable tourism and conservation efforts.
2. **Conservation and Climate Resilience:**
   - Rising temperatures, extreme weather, and erosion threaten both natural landscapes and cultural heritage structures.
   - Implementing sustainable water management and energy-efficient practices are key components of the project's environmental strategy.
3. **Awareness and Sustainable Practices:**

- Raising awareness of environmental challenges among tourists and stakeholders is essential for fostering sustainable tourism behaviors.
- Promoting eco-tourism activities, such as guided hiking and cycling tours, helps minimize environmental impacts while diversifying tourism offerings.

4. **Preservation of Intangible Heritage:**
    - Generational gaps and insufficient documentation risk eroding the Nasrid Kingdom's intangible heritage, including oral traditions and traditional crafts.
    - Efforts to integrate these elements into tourism activities can preserve cultural practices while educating visitors about their significance.

Synthesis of Goals and Proposed Solutions

1. **Tourism Management:**
    - Redistribute tourist flows from overcrowded sites like the Alhambra to under-visited areas, such as the Nasrid watchtowers.
    - Offer thematic tours and workshops focusing on the Nasrid Kingdom's history, architecture, and water management techniques.
2. **Climate Resilience and Sustainability:**
    - Introduce energy-efficient infrastructure, renewable energy sources, and sustainable water management practices to minimize environmental impact.
    - Design shaded walking trails and green spaces to mitigate rising temperatures and enhance visitor comfort.
3. **Cultural Engagement and Education:**
    - Develop virtual recreations of historical systems, such as the Nasrid communication network, for use in museums and educational platforms.
    - Include local communities in tourism activities, such as workshops, guided tours, and exhibitions, to promote intergenerational knowledge transfer.
4. **Economic and Social Benefits:**
    - Stimulate local economies by promoting rural guesthouses, local artisans, and eco-tourism services.
    - Create job opportunities in tourism, cultural preservation, and sustainability-focused sectors.

Expected Outcomes

1. **Enhanced Visitor Experience:**
    - Enrich tourism offerings through immersive virtual recreations and interactive thematic tours.
    - Promote lesser-known sites linked to the Alhambra, offering unique narratives that attract diverse visitor groups.
2. **Environmental Sustainability:**
    - Implement sustainable practices in tourism and conservation to minimize water usage, energy consumption, and waste production.
    - Preserve biodiversity through eco-tourism initiatives and habitat protection measures.
3. **Cultural Preservation:**
    - Raise awareness of Nasrid heritage through innovative storytelling and digital tools.
    - Document and disseminate intangible cultural practices to ensure their long-term survival.
4. **Economic Growth and Community Impact:**
    - Boost local businesses by directing visitor spending toward rural areas and artisan markets.
    - Increase community involvement in tourism-related activities, fostering a sense of ownership and pride in cultural heritage.

This project serves as a model for balancing cultural preservation, sustainable tourism, and climate resilience in heritage management. By redistributing tourist flows and integrating advanced technologies, the Alhambra pilot site demonstrates how innovative solutions can protect cultural and natural heritage while enhancing visitor experiences.

HERIT ADAPT Pilot Site - Žabljak Crnojevića Fortress, Montenegro

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Part 1: Issues Related to Tourism Activity

1. **Accessibility and Visitor Management:**
    - The site is difficult to access during high water levels, as the surrounding areas are flooded, limiting tourist access by road.

- There are no established pathways, signage, or infrastructure to guide visitors to the fortress, which further restricts its attractiveness as a tourist destination.

2. **Tourism Diversification and Flow Management:**
   - The fortress remains underutilized as a tourist attraction despite its rich historical significance. This poses a challenge in attracting visitors and balancing tourism flows to reduce pressure on other Montenegrin sites.
   - Guided tours, educational programs, and eco-friendly tourism packages are proposed to diversify tourism offerings and draw attention to the fortress.
3. **Visitor Experience and Engagement:**
   - There is significant potential to develop thematic tours and cultural workshops that focus on the history of the Crnojević dynasty and the fortress's role during medieval times.
   - Digital tools, such as virtual recreations and augmented reality, can enhance the visitor experience and provide access for those unable to visit the site physically.
4. **Economic Opportunities:**
   - Promoting the fortress as a cultural heritage site could generate revenue for local businesses and create job opportunities in tourism, hospitality, and cultural preservation.
   - A strategy to promote the site via online platforms and local partnerships aims to increase visibility and visitor engagement.

Part 2: Issues Related to Climate Change

1. **Environmental Vulnerabilities:**
   - Rising water levels during winter and spring seasons make access to the fortress challenging and can accelerate structural deterioration.
   - Fluctuations in temperature, humidity, and seasonal flooding threaten the long-term preservation of the fortress and its surrounding environment.
2. **Sustainability and Preservation:**
   - Infrastructure development, such as eco-friendly pathways and signage, is critical for minimizing environmental impact while improving access.
   - Plans for waste reduction and sustainable transport options, such as energy-efficient vehicles and electric boats, align with environmental goals.
3. **Cultural and Natural Heritage Protection:**

- The fortress's unique position as a cultural and natural heritage monument requires integrated strategies to balance visitor access and ecological preservation.
- Climate-resilient measures, such as using digital models to monitor and plan for environmental changes, are essential for long-term conservation.

4. **Community Awareness and Education:**
   - Promoting educational initiatives for visitors and local communities about the fortress's environmental challenges and cultural significance is vital.
   - Programs to engage local NGOs and community groups in preservation activities foster collective responsibility for the site.

Synthesis of Goals and Proposed Solutions

1. **Tourism Management and Accessibility:**
   - Improve accessibility by developing clear pathways, signage, and eco-friendly transport options to reach the fortress.
   - Create brochures and digital resources to guide visitors and provide educational content about the fortress's history and cultural importance.
2. **Sustainability Practices:**
   - Use LIDAR drones to create detailed 3D models of the fortress, aiding in conservation planning and monitoring structural vulnerabilities.
   - Introduce renewable energy solutions and eco-tourism packages to minimize environmental impact and promote responsible tourism.
3. **Cultural Engagement and Community Involvement:**
   - Offer immersive experiences, such as virtual reality recreations of the fortress and its historical communication systems, to attract a broader audience.
   - Involve local communities in preservation efforts and tourism activities, providing economic benefits and fostering cultural pride.
4. **Climate Resilience and Preservation:**
   - Implement water management strategies, such as sustainable drainage systems, to mitigate flooding impacts.
   - Develop shaded walking trails and green spaces to improve visitor comfort and reduce environmental stress on the site.

Expected Outcomes

1. **Enhanced Visitor Experience:**
    - High-resolution 3D models and virtual recreations provide an interactive and educational experience for visitors.
    - Thematic tours and cultural workshops highlight the fortress's history and ecological significance.
2. **Sustainability and Conservation:**
    - Climate-resilient infrastructure and monitoring tools ensure the fortress is protected against environmental risks.
    - Eco-tourism initiatives reduce the site's ecological footprint while promoting sustainable visitor practices.
3. **Economic and Community Impact:**
    - Increased visibility and accessibility attract more visitors, boosting local business revenue and creating jobs.
    - Community involvement in tourism and preservation activities strengthens local engagement and fosters pride in cultural heritage.

By addressing both tourism and climate-related challenges, the Žabljak Crnojevića pilot project demonstrates how innovative technologies, sustainability practices, and community engagement can preserve and promote cultural heritage sites in a climate-resilient manner.

HERIT ADAPT Pilot Site - UNESCO Site of Genoa: "Le Strade Nuove and the System of the Palazzi dei Rolli," Italy

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Part 1: Issues Related to Tourism Activity

1. **Visitor Flow and Crowding:**
    - The Palazzi dei Rolli are highly concentrated in Genoa's historic city center, leading to overcrowding during peak tourism seasons, especially with cruise ship visitors.
    - Only a few palaces are open year-round for visitation, concentrating tourist activity and creating periods of high density.

2. **Promotion and Accessibility Challenges:**
    - Communication and promotion of the site, including its unique historical and architectural features, are inconsistent and require modernization to attract diverse audiences.
    - Accessibility challenges arise from the lack of flexibility in visitation hours and limited options for visitors who cannot handle peak temperatures or crowded conditions.
3. **Diverse Offerings and Visitor Experience:**
    - Current offerings are limited to seasonal events like the "Rolli Days" and sporadic guided tours, which fail to fully leverage the potential of the UNESCO site.
    - Expanding visitation options to include off-peak times and thematic tours could enrich the visitor experience and attract a wider audience.
4. **Economic Impact:**
    - Expanding access to more palaces and offering extended hours can enhance economic opportunities for local businesses and artisans.
    - Developing tourism around the Palazzi dei Rolli could stimulate local economies while preserving cultural authenticity.

Part 2: Issues Related to Climate Change

1. **Environmental Risks:**
    - The Palazzi dei Rolli, built between the 15th and 17th centuries, are increasingly vulnerable to extreme weather events like floods, heatwaves, and strong winds.
    - Air pollution, despite pedestrianization efforts in much of the area, continues to threaten the structural integrity of these historic buildings.
2. **Climate Adaptation Strategies:**
    - Monitoring the effects of climate change on the facades of the Palazzi is essential for planning conservation measures.
    - Awareness campaigns about the impact of climate change on cultural heritage can encourage sustainable tourism and local engagement.
3. **Sustainability Practices:**
    - Expanding public mobility options and diversifying tourism flows could reduce concentrated environmental pressure in the city center.

- Promoting outdoor and natural tourism experiences in the surrounding hills and coastal areas can alleviate pressure on the UNESCO site while highlighting Genoa's broader cultural and natural heritage.

4. **Education and Engagement:**
    - Innovative storytelling methods, such as digital and augmented reality experiences, can educate visitors about the Palazzi and the broader impacts of climate change on cultural heritage.
    - Collaboration with local communities can foster an appreciation for sustainable tourism practices.

Synthesis of Goals and Proposed Solutions

1. **Tourism Flow Management:**
    - Expand visitation hours for key palaces to reduce crowding during peak times and provide a more comfortable experience for visitors, particularly during hot summer months.
    - Introduce thematic tours and off-peak experiences to attract diverse audiences and distribute visitor traffic.
2. **Climate Resilience and Monitoring:**
    - Implement climate monitoring systems to track the effects of weather and pollution on the Palazzi facades.
    - Collaborate with local and international experts to develop adaptive conservation measures that address both immediate and long-term risks.
3. **Enhanced Visitor Experience:**
    - Utilize digital tools, such as the Genoa City Pass, to offer seamless booking for tours and experiences.
    - Develop immersive digital content to engage visitors with the history, architecture, and fragility of the Palazzi del Rolli.
4. **Sustainable Tourism Promotion:**
    - Promote cultural and natural tourism experiences beyond the city center, such as hillside walks and coastal activities.
    - Leverage local businesses and artisans to create authentic tourism experiences that support the local economy.

Expected Outcomes

1. **Tourism and Visitor Management:**
    - Increased visitor satisfaction through extended opening hours and reduced crowding.
    - Enhanced awareness of Genoa's cultural heritage through targeted storytelling and thematic tours.
2. **Sustainability and Resilience:**
    - Improved conservation of the Palazzi dei Rolli through climate monitoring and adaptive preservation measures.
    - Reduced environmental impacts from tourism, including lower emissions and better waste management practices.
3. **Economic and Community Benefits:**
    - Stimulated local economies through expanded tourism offerings and engagement with local artisans and businesses.
    - Strengthened community involvement in heritage preservation and sustainable tourism initiatives.

This pilot project showcases a comprehensive approach to balancing tourism growth, cultural heritage preservation, and climate resilience in Genoa. By addressing both tourism and environmental challenges, it sets a precedent for sustainable and inclusive urban tourism management.

SUSTAINABLE TOURISM MODEL

A Sustainable Tourism Model is a framework that guides tourism development in a way that balances economic growth, environmental conservation, and socio-cultural integrity.

The goal is to ensure that tourism contributes positively to local communities and ecosystems while providing meaningful experiences for visitors.

Different aspects should be covered, if possible, by the model, to be adapted to the different tourism destinations, cultural or natural heritage sites:

- **Environmental Responsibility** – Minimizing negative impacts such as pollution, conserving biodiversity, reducing carbon footprint, reevaluate water management, promoting eco-friendly infrastructure, prevent overtourism, anticipate negative impacts due to climate change, etc.

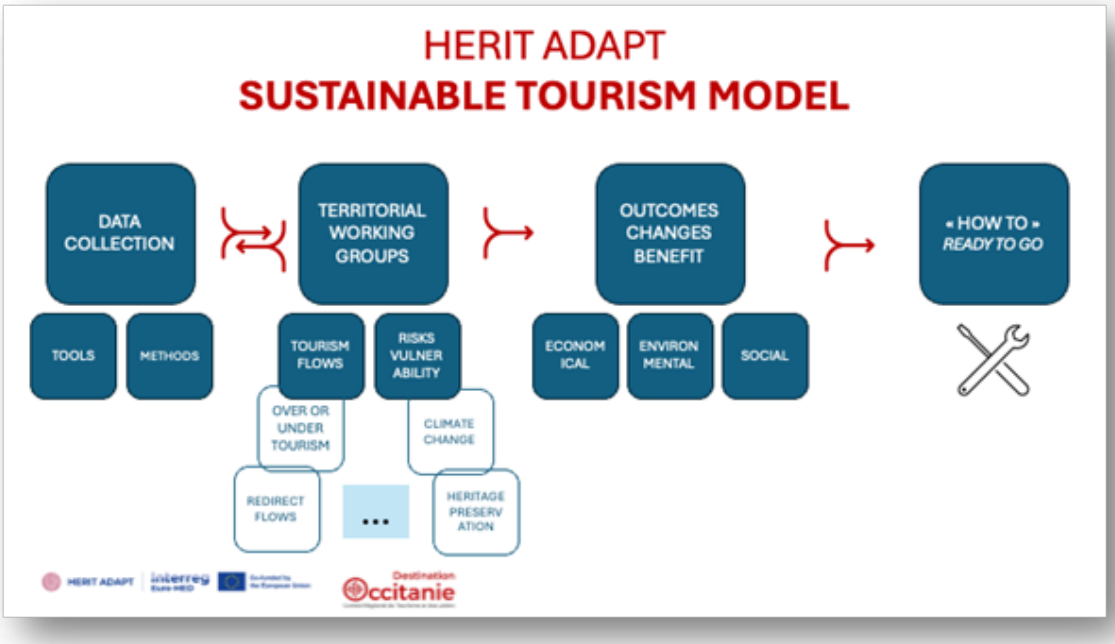
- **Economic Viability** – Supporting local businesses, ensuring fair wages, and creating long-term economic benefits for host communities. Creating tourism experiences, help businesses to stay competitive and resilient, limit over tourism by regulating or redirecting the flows.
- **Social & Cultural Respect** – Protecting cultural and natural heritage, respecting indigenous and local traditions, and engaging communities in active tourism planning. Develop tourism without barriers. Support local producers and promote proximity tourism. Preserve heritage.
- **Visitor Experience & Education** – Encouraging responsible behavior and fostering environmental awareness. Promoting low-impact tourism experiences like ecotourism, cultural tourism, and adventure tourism with minimal environmental harm.
- **Resource Efficiency** – Optimizing energy, water, and waste management to reduce tourism's ecological impact.
- **Monitoring & Evaluation**: Continuous assessment of tourism's impact on the environment, economy, and society to ensure improvements over time.

The Herit Adapt Model: A Sustainable Approach to Tourism in the EuroMed Region

The **Herit Adapt Model** is designed to address the urgent need for increased awareness and integration of sustainability principles within **tourism policy-making in EuroMed countries**. Its primary focus is on achieving a **balanced management of tourism flows** while ensuring effective **adaptation to climate change**. The model is particularly relevant for **cultural and natural sites**, whether they are **highly protected** or **widely dispersed**.

To ensure successful implementation and **replicability across different EuroMed countries**, the model emphasizes the use of the **right tools and methods**. By systematically **gathering data, understanding site-specific challenges, and engaging stakeholders**, the model fosters informed decision-making and proactive adaptation.

The Herit Adapt Model is structured around **three interconnected pillars**:



1. Data Collection: Understanding Risks & Impacts

Effective **data collection** is the foundation of the model, providing the necessary insights to analyze **risks and vulnerabilities** affecting heritage sites. This includes:

- **Tourism Flow Monitoring**: Measuring visitor numbers and their environmental and socio-economic impact.
- **Risk & Vulnerability Assessment**: Evaluating how climate change and over-tourism affect fragile sites.
- **Innovative digital Heritage data**: Utilizing digital tools to document and preserve heritage sites at risk.
- **Tailored Data Analysis**: Ensuring that collected data is actionable, supporting decision-making for climate-resilient tourism and better visitor management.

2. Territorial Working Groups: Engaging Stakeholders

To create long-term resilience, the **active involvement of local stakeholders** is essential. **Territorial Working Groups (TWGs)** serve as platforms for dialogue and collaboration between policymakers, local communities, conservation experts, and tourism operators. Key objectives include:

- **Stakeholder Awareness & Training**: Raising awareness on tourism impact and climate challenges.
- **Collaborative Decision-Making**: Encouraging inclusive discussions to define sustainable strategies.

- **Tourism & Climate Adaptation Planning**: Ensuring a **collective** approach to resilience, where all stakeholders work together to implement **practical solutions**.

3. Outcomes, Change, and Long-Term Benefits

The goal of the model is to drive **positive transformation** within tourism management and site preservation. Key outcomes include:

- **Diversification of Tourism Offers**: Reducing pressure on sensitive sites by developing alternative tourism options.
- **Training & Capacity Building**: Educating stakeholders on the importance of balancing tourism development with heritage preservation.
- **Resilience Strategies**: Establishing a sustainable equilibrium between **economic growth, environmental protection, and social well-being** to mitigate tourism's negative effects on heritage sites.

Transferability & Replication

The **Herit Adapt Model** is designed to be **adaptable** and **scalable**. Insights gained from pilot sites across different **EuroMed countries** will contribute to a **collection of best practices**, tools, and methodologies.

The final version of the model will emphasize **a practical, hands-on approach**, ensuring that it can be effectively **replicated in diverse tourism contexts** worldwide.

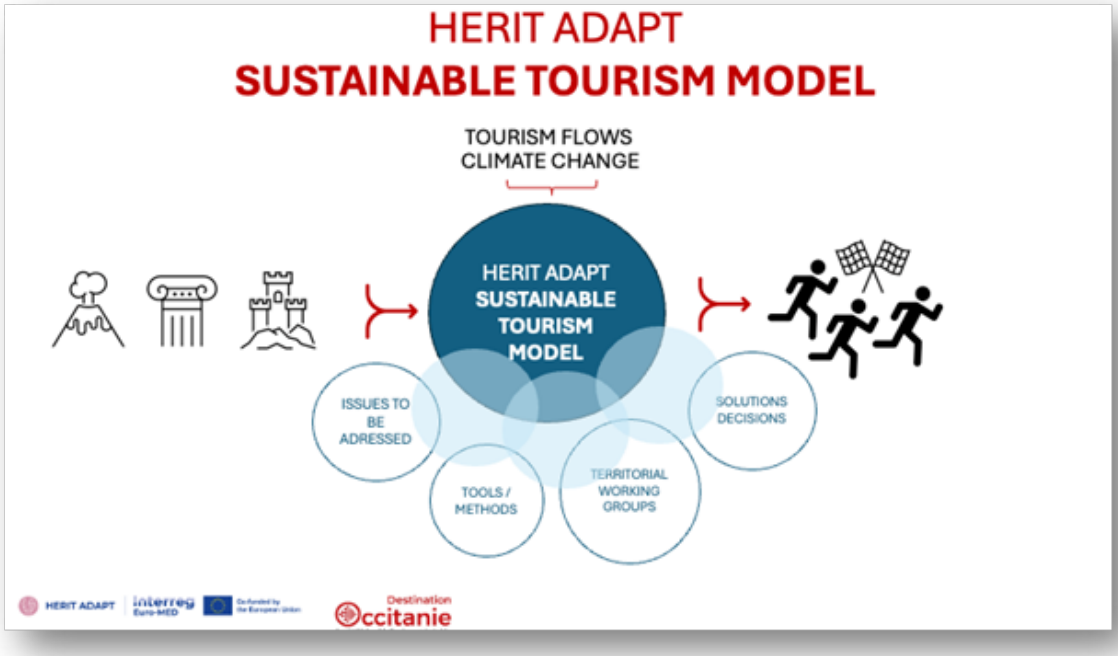
Challenges of the Herit Adapt Sustainable Tourism Model

The model will help to identify the problems, help to understand the situation the sites are facing, highlight solutions in certain contexts (best practices), and provide methods and steps to be respected.

The aim is that other sites take action, thanks to the Model. Use the model like a guideline or just picking ideas of how to proceed or which questions to address first.

The challenges addressed within Herit Adapt:

- **Capacity of resilience** (stakeholders, integration into the tourism destination with good management, regulations, reactivity, etc.)
- **Management of tourism flows** of overcrowded as well as of undercrowded sites
- **Exposure of the monuments themselves** (vulnerabilities, tourism flows, etc.)
- **Effects due to geographical areas** (mountainous, coastal, hinterland, city centers, etc.)


HERIT ADAPT
SUSTAINABLE TOURISM MODEL
TOURISM FLOWS
CLIMATE CHANGE
HERIT ADAPT SUSTAINABLE TOURISM MODEL
ISSUES TO BE ADRESSED
TOOLS / METHODS
TERRITORIAL WORKING GROUPS
SOLUTIONS DECISIONS
Destination Occitanie

Objectives and Key Performance Indicators (KPIs)

Objectives	Concrete Actions	Monitoring Indicators
Reducing Environmental Impact	- Limiting the number of visitors per time slot (e.g., Dubrovnik Pass) - Promoting low-carbon transport (electric buses, bike lanes, eco-friendly shuttles) - Installing IoT sensors to monitor air quality and site erosion	✅ Reduction of CO_2 emissions from the tourism sector (kg CO_2 per visitor) ✅ % of visitors using sustainable transport ✅ Evolution of pollution and erosion indicators
Managing Tourist Flows	- Developing an **online ticketing system with quotas** to control visitor numbers - Creating **alternative routes** to reduce congestion in sensitive areas - Encouraging **off-season tourism** through cultural events	✅ % of visitors in low season vs. high season ✅ Occupancy rate of alternative routes ✅ Average time spent on-site and visitor density
Preserving Cultural and Natural Heritage	- **Real-time monitoring** of sites (drones, humidity sensors) - **Digitization of heritage** for virtual preservation and remote access (e.g., VR visits) - Restoration and maintenance using **eco-friendly materials**	✅ % of sites equipped with monitoring systems ✅ Number of restorations and maintenance operations per year ✅ Number of accessible virtual visits
Engaging Local Communities	- Creating a **"Responsible and Local Tourism"** label to promote short supply chains and local products - Organizing **local consultations** with residents and associations - Supporting **local employment** in the tourism sector	✅ % of establishments labeled **"Responsible Tourism"** ✅ Number of jobs created in sustainable tourism ✅ Number of community events and consultations held
Resilience to Climate Change	- Integrating **nature-based solutions**: green roofs, sustainable water management - Creating **shaded areas and installing fountains** to combat heat islands	✅ % of sites with integrated climate solutions ✅ Number of climate alerts tracked and corrective measures applied

	- **Climate monitoring and infrastructure adaptation**	✅Reduction in water and energy consumption

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