

ECTP Heritage & Regeneration

FP9 2021-2027 POSITION PAPER

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Published in February 2018

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1. INTRODUCTION

A living Cultural Heritage makes Europe attractive for its inhabitants and visitors, and stimulates economic competitiveness and a better quality of life.

European Cultural Heritage is the testimony of our shared past and the root of our identity. It is a non-renewable & no-relocatable resource that enriches the collective memory, enabling Europe's future to be more humane for its population, so it should be conserved with care. Cultural Heritage not only provides people with a sense of identity and belonging, it also brings a large impact to many economic sectors such as tourism, cultural industries, urban planning, regional planning, arts and design. It enhances European competitiveness through technical innovation and traditional skills preservation and can also contribute to improving the EU's relations with other regions. The importance of cultural wealth can be measured in socioeconomic and environmental terms, such as growth in quality employment, increasing of well-being in unified communities, and reduction of CO2 footprint.

Cultural Heritage represents an important part of the cultural and creative industries, which provide jobs for 8.5 million people in the EU (producing approximately 26.7 indirect jobs for each direct job¹) and contribute up to 4.5% to Europe's GDP. Spending on conservation of Cultural Heritage by public and private bodies in Europe is worth an estimated €5 billion a year. Figures published by OECD show that 40% of worldwide tourism has a cultural dimension²: 609 million tourists in Europe by 2015, 15% yearly increasing³.

Cultural Heritage is a “niche market” in Europe: governed by the strict requirements of conservation principles, it is highly specialised and focused on very specific problems. Restorers, conservators and architects can hardly find appropriate solutions in the market because most of the existing industrial systems cannot be employed in Cultural Heritage and the solutions on the market have been usually designed for more general purposes. This means that this market is a typical market for SMEs who can provide individual solutions case by case. On top of that, Cultural Heritage has a high societal importance: quality of life in cities, the feeling of social safety and cultural identity are closely related with the presence of heritage and heritage buildings. It improves welfare and well-being of people in urban areas, and highly contributes to tolerance and cohabitation in multicultural societies. Indeed, through the Declaration of 2018 as European Year of Cultural Heritage⁴ the European Union has recognized that the ideals, principles and values embedded in Europe's Cultural Heritage constitute a shared source of remembrance, understanding, identity, dialogue, cohesion and creativity for Europe.

Built heritage not only refers to well recognized monuments around Europe, but also historic and valuable buildings of cities, including housing. 24% of European residential buildings are pre 1945, and about half of these are of historic value⁵. For this reason, the European construction industry may enlarge its market as well as better satisfy societal needs if they would contribute to the protection and enhancement of Cultural Heritage, and adaptive re-use of existing buildings.

¹ T. M. Nypan (2005), Directorate for Cultural Heritage, Norway; <http://www.nba.fi/tiedostot/b425fd75.doc>

² Europa Nostra (2013): Europa Nostra support creative Europe. Position paper prepared by the Europa Nostra Board http://www.encatc.org/media/544-europa_nostra_creative_europe.pdf

³ European Commission. Internal Market, Industry, Entrepreneurship and SMEs http://ec.europa.eu/growth/sectors/tourism/offer/cultural/index_en.htm

⁴ https://ec.europa.eu/culture/european-year-cultural-heritage-2018_en

⁵ Housing Statistics in the European Union 2010, Ministry of the Interior and the Kingdom relations. Sept. 2010

2. CULTURAL HERITAGE IN THE CONTEXT OF THE EUROPEAN CITY

The city is a strong determinant of where and how almost everyone lives, works and enjoys, and urban environment makes up citizen's way of life. It can be said that all business and social activities rely on the city. Indeed, Europe was born under the city concept, based on the ancient Greek political organisation in "polis". The ancient European city is the actual basis of the European identity and singularity, and the history of Europe can be read through the archaeological sites and old cities from the early European cultures until now.

Considering that, on average, people nearly spend 90 % of their lifetime indoor, in either dwellings, educational buildings or offices, their conservation condition to guaranty a good indoor environment is highly relevant for the quality of life.

The importance of the city to stop poverty, protect the planet, and ensure prosperity for all has been recognized by United Nations, in Goal Nr. 11: Sustainable cities and Communities: Make cities inclusive, safe, resilient and sustainable 6. Some key figures supporting this fact are:

- Half of humanity – 3.5 billion people – lives in cities today
- By 2030, almost 60 % of the world's population will live in urban areas
- The world's cities occupy just 3 % of the Earth's land, but account for 60-80 % of energy consumption and 75 % of carbon emissions

Unlike Latin America or Asia, where big megacities are predominant, Europe is conformed by consolidated small and medium size cities, acting as a network of well interconnected poles. This singularity of European cities is a consequence of the legacy of the ancient city concept. Indeed, according to Habitat III conclusions⁷, only Europe has any tradition of "associating urban policies and territorial cohesion with specific programs that try to build on the role of intermediary or mid and small-sized cities" to ensure high quality of life, while allowing implementation of sustainable urban policies. European cities are particularly characterized by their historic building stock, with more than 40% of it built before 1960, and around 12% with historical value, 73% of these included in urban areas⁸. The rate at which new buildings either replace this old stock, or expand the total stock, is about 1% a year⁹. This means that our present cities should be adapted to the new socioeconomic, environmental and cultural trends, while preserving integrity and authenticity. This enormous challenge, even higher when addressing to Cultural Heritage buildings, can be only tackled by research & innovation.



*Fig. 2.1: Skyline of Santiago de Compostela
Source: EFFESUS project*

⁶ <http://www.un.org/sustainabledevelopment/cities/>. United Nations, NY (USA), (2015)

⁷ Habitat III. United Nations Conference on Housing and Sustainable Urban Development (17-20 October 2016), Quito (Ecuador).

⁸ World Urbanization Prospect-The 2009 Revision. United Nations. Population division. Department of Economic and Social Affairs <http://esa.un.org/unpd/wup/index.htm>

⁹ Boosting building renovation: what potential and value for Europe? ITRE Committee. European Parliament (2016)

3. THE NEEDS AND GOALS

The importance of Cultural Heritage research has been recognized over the years in the EU framework programs by the European Commission, and a high number of methodologies, systems, technologies and materials used at present to protect Cultural Heritage arise from previous EC research. Main topics consisted in the development and assessment of diagnostic knowledge and technologies, intervention materials and techniques, preventive conservation methodologies, ICT-based services, and, more recently, improvement of energy efficiency. A holistic technical and methodological framework needs to be developed for Cultural Heritage maintenance, building bridges of understanding and compatibility between the existing building stock with cultural value, and the current requirements of safety, habitability, environmental sustainability, support for the elderly, preservation of identity and tolerance. But protection of Cultural Heritage is in continuous evolution in terms of concepts, scope, approaches, methodologies and technologies. Cultural Heritage is no longer about restoration of symbolic (iconic) heritage or the importance of a single asset, but the ancient concept of consider monuments should be enlarged to include historic buildings and cities, cultural landscapes, modern architecture and other elements responsible of our European identity and history. They must become an essential part of the living environment and the fulfilment of societal needs in a changing world, where Cultural Heritage should be adapted to reach the citizen's requirements, in continuous evolution, while preserving its authenticity and integrity. Considering Cultural Heritage as an essential part of our life, new approaches and definitions are needed: definition of Cultural Heritage in contemporary global environment with special attention to its integration into the natural and urban environment, through space planning, re-evaluation of current values of Cultural Heritage, implementation of heritage understanding into practice, and holistic approach to heritage protection that takes into account the interaction of immovable and movable heritage with the intangible heritage.

Preventive conservation is especially relevant with regards to deep restoration processes, following the same evolution as human health, that prioritize prevention and prediction to intervention. To implement this strategy, increased knowledge about ancient and abandoned techniques and materials, predictive decay models, monitoring technologies, non-destructive techniques, intensive 3D digitizing & modelling, and integral management systems should be developed. Increasing environmental loads, due to climate change, make preventive conservation, considering mitigating measures, even more necessary.

A holistic understanding of Cultural Heritage must be incorporated in the physical, political, public and professional society. Indeed, it is necessary to develop appropriate strategies to understand culture as a new economic sector that should be developed at local level, and constitutes our most valuable sign of identity. Cultural Heritage contributes to a new knowledge-based economy that could significantly improve the global European economy recovering our cultural and society values.

Moreover, the contribution of Cultural Heritage for better environment should be considered, as it brings environmental benefits and the environmental protection through a reduction in raw materials consumption, pollution and waste, and increased energy saving. However, it should be also considered that climate change may significantly hinder Cultural Heritage.



Fig. 3.1: 3D Sta. María de Mave (Palencia)
Source: Cartif

4. RESEARCH TOPICS AND EXPECTED IMPACTS

Considering the above-mentioned needs, the main topics to be addressed by the Heritage & Regeneration Committee of the ECTP, have been categorized in 9 priorities, divided over 4 themes, and including a transversal area to address socioeconomic needs:



*Fig. 4.1: Priority areas in cultural heritage research
Source: Own elaboration*

4.1 Low carbon buildings: resource efficiency in cultural heritage maintenance and use

Historic buildings and cities were built before the development of energy efficient measures. On the other hand, they often include traditional knowledge for bioclimatic architecture and use of local materials. Historic buildings will only survive if maintained as living space, but this implies modern energy efficiency and comfort levels. Getting low carbon heritage building stock is challenging, but its environmental benefit is very high in Europe. Cultural heritage research could provide best practice examples, sustainable traditional and new materials and restoration methods to re-use and improve existing buildings and their specific elements, such as windows, etc. The use of such solutions would generate an enormous saving of grey energy and an adaptive renovation to a better energy standard to protect the visibility and use of our cities and build heritage.

Priorities:

- Promotion of sustainable local, unconventional, traditional, recycled and/or natural materials and techniques, with reduced CO₂ footprint and grey energy saving, and improved durability for long lasting solutions
- Improvement of new technologies, products and systems, simulation and modelling, intelligent monitoring and control to rise energy efficiency, and integration of RES to reduce energy consumption and CO₂ emissions
- Advanced/innovative eco-compatible and sustainable conservation materials with improved durability for long lasting solutions, with significantly lower need for replacement
- Implementation of life cycle approach strategies to evaluate the environmental impact of heritage maintenance and use

- Product surveillance technologies both for incoming base materials and provided conservation products, as well as the ability to adapt materials to different use cases. Open source data base of heritage relevant materials
- Cost-efficient retrofitting solutions for historic buildings to reduce the risk of cultural heritage loss
- Development of a monitoring campaigns to measure the influence of the massive tourism in the interior climate of built heritages
- Promotion of an SME driven industry for the provision of conservation materials and restoration

Expected impact by 2040: 27 % Reduction of energy consumption during the maintenance and use of Cultural Heritage buildings and historic urban environments. 27 % additional integration of RES in heritage buildings. 40 % reduction of CO₂ emissions, through the incorporation of more sustainable and local materials. The increase of the renovation rate of historic buildings by 1% point thanks to conservation compatible retrofit solutions would result in an additional yearly investment of 25 billion €/year in the EU.

4.2 Resiliency and climate change: preventive conservation and innovative maintenance

Built cultural heritage need a strong enhancement of its resilience more than any other buildings, due to its specific character and related preservation demand. In the past, decay was, except for acts of war, mainly due to natural weathering. During the 19th and 20th C, human actions related to industrial activities and traffic enhanced natural weathering. The scale of direct damage to heritage objects (e.g. vandalism, illicit trade) also increased. Now, in the 21st C, climate change is expected to even more increase environmental load on cultural heritage objects in many parts of Europe, and by this, to accelerate and intensify many damage mechanisms. At the same time, measures to mitigate climate change must be chosen carefully in order not to impair cultural heritage. Natural and man-made hazards, especially those occurring at relatively short time intervals in the same areas, will shorten the cycle of interventions, not only increasing costs but also potentially threaten heritage values as every intervention involves the removal of original materials. This asks for preventive conservation and effective maintenance including the mitigation of effects of foreseen climate change and man-made and natural hazards.

Priorities

- Efficient, reliable and cost-effective predictive models and simulation, permanent monitoring and evaluation techniques to determine de evolution of damage, assess the conservation level and evaluate the service life
- Recovering and adaptation of ancient construction techniques and materials for sustainable restoration
- Low impact restoration processes to reduce the disturbance of building works caused to the citizens, by promoting efficiency, competent management and awareness of environmental issues
- Novel materials, techniques and design codes to improve structural safety, proper conservation and permanent maintenance of cultural heritage (including industrial and modern heritage), with minimal intervention

- Fast and cost-effective restoration techniques to be used in post disaster phase, with limited impact on heritage value
- Strategies, protocols and tools for integrated management and predictive maintenance of various assets, for reducing vulnerability and improving resilience of heritage to natural disasters
- More extensive protection and preservation strategies of cultural heritage, including the prevention of illicit trade and loss
- Protection of cultural heritage sites and assets to violent man-made attacks and vandalism
- Improvement of the technological basis supporting heritage sector, through widespread introduction of suitable technologies, and delivery of EU knowhow and assistance, particularly to third countries where heritage is at risk

Expected impact by 2040: Improvement of the conservation conditions of European cultural heritage with a minimum intervention for, at least, 30 % reduction of heritage loss in Europe. 30 % reduction of repair works. 20 % cost reduction in conservation of cultural heritage. 50% reduction of aggressions to worldwide cultural heritage due to vandalism and violent attacks. Decreasing of international illicit trade and theft by 30 %. New market in cultural heritage preventive maintenance, estimated in 100 million €/year in the EU.



*Fig. 4.2: Structural reinforcement. Chalet Condessa d'Edla (Sintra)
Source : R. Moura, Texeira Duarte*

4.3 Smart Cities: recovering the importance of the historic city

With over half of the world's population now living in urban areas, the road to sustainable development passes through cities in every corner of the globe. Tangible and intangible heritage are integral parts of a city's identity, creating a sense of belonging and cohesion. Without culture, cities as vibrant life-spaces do not exist; they are merely concrete and steel constructions, prone to social degradation and fracture. It is culture that makes the difference. Culture embodies the soul of a city, allowing it to progress and build a future of dignity for all. More than ever, culture lies at the heart of urban renewal and innovation, and creativity and cultural diversity have been the key drivers of urban success. Achieving the whole power of cultural heritage as an enabler of sustainable development of cities requires a holistic technical and methodological framework of the whole urban area management, building bridges of understanding and compatibility between the existing building stock with cultural value and the current requirements of safety, habitability, environmental sustainability, support for the elderly, identity and well-being. The concepts of authenticity and new generation cities should be combined in the historic city by using research and innovation as key drivers of the enhancement of the historic city attractiveness for investment, living and leisure.

Priorities:

- Diagnostic methodologies and tools to understand the historic city and its environment as a whole, to allow the prioritization of interventions
- Socioeconomic regeneration of the historic city, based on the potentialities of Cultural Heritage, and dynamic assessment criteria and tools facilitating citizen's interaction
- Improving interaction with/for citizens, through implementation of the smart city concept in historic areas
- Habitable & accessible historic cities for the citizens and visitors, including disabled people
- Promotion of sustainable tourism strategies, compatible with authenticity and identity
- Integration of the historic city in its natural landscape and contemporary urban areas, with special attention to buffer areas

Expected impact by 2040: *At least, 50 % of the historic city is accessible for elderly and disabled people, including dwellings. Economic revitalization of the historic city up to 10 % through creation of new business. Reversal of the present trend to pull out the historic city and population raise over 10 %. Reduction of vehicle mobility by 20 %, through the recovering of the historic city socioeconomic dynamism.*



Fig. 4.3: Bolzano city center
Source: EURAC

4.4 Digitization: Cultural Heritage in the digital era

Digitization of cultural heritage contributes to the preservation of movable and immovable assets since their virtual reproduction can make them accessible for future generations (limiting the access to the originals when required), could facilitate the diagnosis and management, and could improve efficiency of the restoration process. In order to make cultural heritage more handily, usable, transferable and sustainable, a huge applied research is opened on affordable and accurate digitization methods, modeling, interoperability and usability of content, terminologies, long term preservation, and long term accessibility.

Making visible and accessible the European heritage assets on line needs to be met by effective access, so their value can be recalibrated and reinforced. Thus, a key objective is just using the potential of cultural heritage for developing new digital services not only for professionals, but also for the citizens, allowing more interactivity and collaboration by implementing new digital management systems and openness of software tools.

Priorities:

- Use of satellite, ICTs and standard data infrastructure for a complex management of cultural assets, with a territorial perspective
- New technologies, modelling, simulation and robots for detection, diagnosis, management, access and representation of cultural heritage assets, including inaccessible sites and underwater heritage
- Adaptation of BIM protocols to the whole process of Cultural Heritage, from the design of solutions to the long-term maintenance and management
- 3D digital reconstructions to make vulnerable heritage accessible for the public.
- Use of digital systems to involve stakeholders and citizens in monitoring and maintenance of CH buildings
- Creation of new cultural content in digital form and service industries
- Technologies for the smart heritage city management, compatible with cultural values

Expected impact by 2030: *Improvement of the conservation conditions of European Cultural Heritage at territorial level, for a zero loss of EU heritage assets. 50 % increase of conservation works of inaccessible sites. 3D modelling and BIM technologies fully incorporated in restoration, maintenance and management projects. Higher interaction of citizens with the city parameters and cultural assets, using novel technologies.*

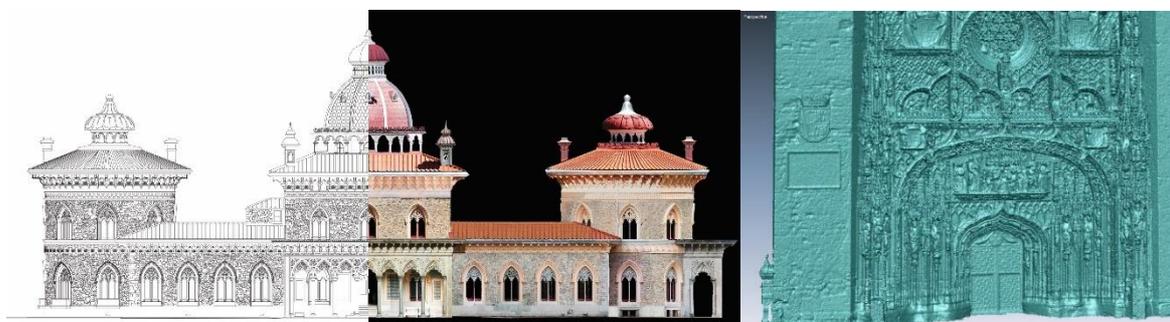


Fig. 4.4: Laser scanning Monserrate Palace (Sintra)
Source: R. Moura. Teixeira Duarte

4.5 Socioeconomic challenges

Culture and development have long had a reciprocal and interdependent relationship, although this has only gained momentum at the international level over the past 30 years. The evolution of holistic approaches is intrinsically linked with global debates, in particular, those around the concept of sustainability and socioeconomic issues. Culture, in its manifold expressions ranging from cultural heritage to cultural and creative industries, and cultural tourism, has thus proved to be both an enabler and a driver of the economic, social and environmental dimensions of sustainable development. But socioeconomic issues are evolving every day, and therefore, the role of culture and cultural heritage in a changing society needs to be continuously shaped. On top of that, today, we are witnessing a marked shift in the development paradigm. New models of partnership and governance are being shaped. And this also affects cultural heritage management.

The adaptation of these new paradigms requires a continuous innovation in technical and socioeconomic issues linked to cultural heritage, thus needing to develop new research priorities in terms of management, economic values, identity and multiculturalism, involvement of citizens and new generations, and moving from theory to practical application.

4.5.1 Integrated management and promotion of natural and cultural assets

Priorities:

- Strategies and tools for a harmonized and integrated management of natural, industrial archaeological and historical landscapes
- Promotion and recognition of vernacular architecture, as inspiration for new architecture
- Nature based solutions for Cultural Heritage, based on ancient technologies and solutions
- Sustainable tourism strategies at local, regional, national and transnational level, increasing local economic development, while respecting and improving citizen's way of life

Expected impact by 2030: *Enhanced local and regional development through cultural and natural values, increased quality of life and preservation of environment. 10 % rise of GDP and population in rural areas with high cultural and natural value. Economic rebound at local level, through new activities based on traditional skills. 10 % increase of cultural tourism. 70 % reduction of vernacular architecture loss.*

4.5.2 Enhancement of local and European identity and Cultural Heritage as a vehicle for multicultural tolerance

Priorities:

- Harmonized models for the assessment of heritage values
- New strategies for the use of Cultural Heritage as a vehicle to mitigate social pressures in multicultural environments and conflict areas
- Cost effective technologies and devices for widespread dissemination of Cultural Heritage to the citizens
- "Open sites" to citizens/tourists enabling the perception of the preservation interventions in monuments
- Involvement of new generations in the knowledge, conservation, valuation, use and economic activities of Cultural Heritage

Expected impact by 2030: Improved tolerance of multicultural societies through recognition and valorization of mutual Cultural Heritage. Increasing of budget for effective campaigns of social awareness and dissemination of citizens and young generations, based on novel technologies over 50 %. Highly aware society to respect and protect Cultural Heritage.

4.5.3 The economic value of Cultural Heritage

Priorities:

- Tools and models to assess socioeconomic values of Cultural Heritage, universally applicable
- Economic models and legal instruments for the public/private involvement in Cultural Heritage management and exploitation
- Novel strategies to increase well-being and economic prosperity of citizens living in cities or rural environment with high cultural values
- Promotion of creative economy and new sustainable business models based on Cultural Heritage
- Promotion of a global market for heritage-led sustainable innovation, through EU-wide evidence and increased awareness among investors, practitioners and society
- Creation of new specialized professionals and SME's, for the restoration/conservation market
- Strategies and tools for the adaptation of cultural heritage to new uses when no longer serving the original functions, maintenance the characteristics associated with the concerned values

Expected impact by 2040: Quantification of the revenues and economic market of Cultural Heritage conservation. New business models and innovative industries, allowing 15 % additional job creation in specific fields linked to culture and Cultural Heritage. New market niches for European industries, especially SMEs. 20 % increase of private investment in Cultural Heritage.

4.5.4 From research to practice

Priorities:

- Compilation and clustering of previous research results, including validation and industrial uptake into the market
- Identify specific domains and priorities where further research and innovation is needed, accounting also for the gender dimension
- Pre-normative research, additional standardisation and regulation activities
- New procurement mechanisms enabling incorporation of innovation into practice
- Education and training to incorporate innovation, as well as recovering traditional methods, specially addressed to SMEs



Fig. 4.5: Visby city (Sweden)
Source: EFFESUS Project

Expected impact by 2040: 40 % additional commercial exploitation and real application of innovations arising from research in Cultural Heritage. Better skills and technical knowledge of Cultural Heritage professionals, reinforcing European leadership. Improvement of European SMEs competitiveness in this field and 20 % increase of international activities, due to worldwide leadership.

5. PROPOSAL FOR FP9

The development of the research topics mentioned above and their implementation into practice requires an ambitious research program aiming at tackling Cultural Heritage needs. We therefore strongly promote Cultural Heritage research and development in the coming FP9 with all the interdisciplinary fields of research defined above. The cross-cutting approach of Cultural Heritage and its consideration as the fourth pillar of sustainability will considerably contribute to a much broader scope: more prosperity for the citizens and better cohesion within the European society as well as a sustainable future for European cities.



*Fig. 5.1: Detail of capitals. Puglia
Source: ISAC-CNR*

