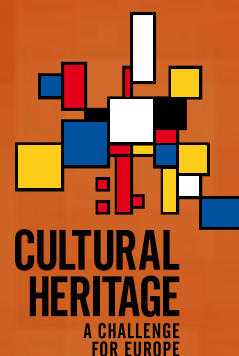




JPI Cultural Heritage
and Global Change

Strategic Research Agenda



Note

The JPI Cultural Heritage Coordination Unit thanks the many people who have contributed to this document and in particular, those who responded to the stakeholder consultation as well as the members of the JPI CH Governing Board (GB), Scientific Committee (SC) and Advisory Board (AB).

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Foreword

[3]

Europe's cultural heritage is one of the world's most diverse and rich patrimonies. It attracts millions of visitors every year to monuments, historical city centres, archaeological sites and museums. Moreover, this heritage is an important component of individual and collective identity. In both its tangible and intangible forms, cultural heritage contributes to the cohesion of the European Union and plays a fundamental role in European integration by creating links between citizens.

Apart from natural ageing, Europe's cultural heritage is exposed to many threats such as climate change and pollution, increasing urbanisation, mass tourism, human negligence, vandalism and even terrorism. It is a fragile and non-renewable resource, much of which has been irretrievably lost over the last century. Protection of cultural heritage in the face of global change is thus becoming a major challenge for decision-makers, stakeholders and citizens in Europe. Research into strategies, methodologies and tools is needed to safeguard cultural heritage against continuous decay. Before irreversible damage is done, concerted actions, based on sound science, are needed to protect, strengthen and adapt Europe's unique cultural patrimony.

The JPI Cultural Heritage and Global Change: a New Challenge for Europe (JPICH) was approved by the European Council as one of the three initial JPI proposals in December 2009 and launched in January 2010. The experience gained over the last 4 years in the development and implementation of the JPICH has been achieved by the active participation of 17 EU Member States and Associated Countries. The JPICH set up the Governance structure, which included the Governing Board and Executive Board, appointed the Scientific Committee and the Advisory Board, which is composed of international organisations including UNESCO, ICCROM, ICOM, Council of Europe ICOMOS, EUROPA NOSTRA and the European Technology Platform for Construction (ECTP).

The JPICH has already started joint programming actions through defining the Vision Document, the Term of Reference and the launching of calls by defining common topics and evaluation procedures.

The launch of the first pilot call on the research applied to the tangible, intangible and digital cultural heritage represented the ongoing commitment of EU Participating Countries to implement transnational research programmes. The Heritage Portal has, and will continue to be, an important instrument for communicating and disseminating stakeholders, researchers and citizens.

An essential milestone in the Cultural Heritage JPI has been the development of the Strategic Research Agenda, which identifies four major focus areas, a number of enabling activities and a structured, forward-thinking assessment of the possible future research landscapes. This Strategic Research Agenda will create a foundation for innovative research as well as inspiration for new researches and skills in the fascinating field of protecting and fostering our common tangible, intangible and digital cultural heritage.

Antonia Pasqua Recchia

Coordinator of the JPI Cultural Heritage

Executive Summary

[4]

Background

European cultural heritage is of exceptional importance. It enriches the lives of its citizens, contributes to the individual and mutual identity of European nations and has significant economic impact as it attracts millions of visitors a year from all over the world. Many of the nine million jobs in the tourism sector are linked to it directly or indirectly and it is estimated that tourism alone generates annual revenue of EUR 335 billion.

However, this heritage is being challenged in all its forms and from every side. Artefacts are being eroded and damaged, customs and practices are being lost and new heritage that is being created every day is in danger of being overlooked or ignored due to the inevitable pressures brought about by social, technological, economic and environmental change. Heritage is a resource that needs to be used and developed in a sustainable way.

Purpose

The EU Joint Programming Initiative, Cultural Heritage and Global Change (JPI-CH) is an innovative and collaborative research initiative that will streamline and coordinate national research programmes to enable more efficient and effective use of scarce financial resources, exploit synergies and avoid duplication. With seventeen Member States and eight Observer Countries participating, its Strategic Research Agenda will help to identify, address and tackle these research challenges not only to protect cultural heritage but also help Europe's future economic growth and jobs.

Strategic Research Agenda (SRA)

The SRA has been developed purposely with the aim to present cultural heritage as a holistic, integrated research area. Using the JPI-CH 2010 Vision document as

a starting point, input was requested from a wide range of stakeholders across Europe reflecting the three key facets of cultural heritage: the tangible, intangible and digital.

Identifying priorities

Every Member State participating in the JPI-CH set up a National Consultation Panel (NCP) of individual experts who did not represent any particular organization or discipline. Each Panel identified research areas, activities, gaps and needs across the key facets of tangible, intangible and digital cultural heritage. This input, supported by Foresight studies, further consultation and expert analysis, identified the priority research areas, future requirements and what will be needed to protect cultural heritage in all its forms in the 21st Century.

Priority Research Areas

The SRA declares that different types of cultural heritage cannot be seen as separate entities. The tangible, intangible and digital facets are just as important as evidenced by the digitization of material, web technologies and the increasing amount of born digital material, which present numerous opportunities and challenges for cultural heritage research.

The SRA also recognizes the importance of values and how cultural heritage research should reflect values in society. These are addressed by encouraging researchers to ask the core questions of what is worth preserving and how to make choices.

The four priority research areas represent the research areas, gaps and needs identified as part of the consultation. These have been grouped into themes which reflect the broader issues of the cultural research landscape.

- **Developing a reflective society.** This is broadly based on recognition that the world is changing and that research questions, approaches, methods and reporting need to reflect this change.
- **Connecting people with heritage.** This concentrates on exploring access by addressing themes and issues that enable people and communities to connect with heritage, underpinned by sustainable management plans.
- **Creating knowledge.** This involves deepening our understanding of the context in which cultural heritage exists and is formed, and developing innovative approaches, applications and tools that will create added value for society from cultural heritage.
- **Safeguarding our cultural heritage resource.** This explores how we can protect our heritage and the research that is required to support protection.

Enabling Activities

The NCPs identified a number of priorities that are superior in their influence over and above individual drivers. These overarching elements that are essential for the new research landscape to be successful include Capability and Capacity, Management Strategies, Knowledge Sharing and Research Infrastructure.

Future Research requirements

A Foresight study provided a structured, forward-thinking assessment of the possible future research landscapes. It was guided by two underpinning beliefs: (1) changes in technology, society, the environment and the economy will be seminal in shaping the future context for cultural heritage and research; and (2) only by engaging with experts in the cultural heritage field can

a meaningful depiction of anticipated changes be created.

Delivery of the SRA

The overwhelming need is for research to be truly integrative and provide opportunities to explore the tangible, intangible and digital forms of cultural heritage. Future research should involve collaboration and work across boundaries - disciplinary, conceptual, theoretical, methodological and international.

Conclusion

There is genuine willingness to work together, to overcome the fragmentation of information on the state of research, to streamline national programmes to reduce duplication, to exploit synergies and to coordinate research in the cultural heritage arena. The SRA also opens up opportunities to create partnerships with the private sector in the creative, digital and other industries.

With sufficient and sustained investment, it will be possible to implement this Agenda for the protection and enhancement of European patrimony.





Italy | Paestum - Poseidon temple

Creating the Strategic Research Agenda

Prof. Koenraad Van Balen

[8]

The purpose of this Strategic Research Agenda (SRA) is to outline the priority research areas to be developed, the objectives, the outcomes and desired impacts, the types of intervention and resources available by Member States and sector of intervention. Using the Vision document that was produced in 2010 as our starting point, the SRA has been developed with input from a wide range of stakeholders across Europe to reflect the three different facets of cultural heritage: the tangible, intangible and digital.

As cultural heritage faces challenges on every front, the Joint Programming Initiative, Cultural Heritage and Global Change (JPI-CH) is both timely and welcome. It is an exciting and ambitious endeavour involving 17 Member States and eight Observer Countries. The JPI-CH will streamline and coordinate national research programmes to enable improvements to the efficient and effective use of scarce financial resources, exploit synergies and avoid overlaps. It will help to identify, address and tackle these challenges before any more of this heritage is lost forever.

The level of response and feedback was overwhelming, demonstrating the willingness in participating Member States to collaborate. The exercise was not straightforward as understanding the nuances of the common framework used by the experts on the national panels in different cultural contexts led to further challenges in interpreting the feedback.

A pan-European Scientific Committee of experts contributed their knowledge and expertise to the process of developing this Strategy which it wholeheartedly endorses. To help further our understanding of the time-scales and scope of the research needed, NCPs were invited to participate in a Foresight study in August 2012 which was commissioned to identify future events, probabilities and anticipated impacts.

The outcome of the work was that four priority research areas have been identified:

- Developing a reflective society
- Connecting people to heritage
- Creating knowledge
- Safeguarding the cultural heritage resource

As is the case in the world of cultural heritage, this SRA is just a starting point of a dynamic process that will lead to a continuous update of this agenda, the more it is cherished and shared the more it will contribute to the preservation and the enhancement of heritage in Europe through relevant and effective research. Future joint activities and European Research and Technology Development (RTD) work programs will help to implement this trajectory.

by Prof. **Koenraad VAN BALEN**,
chair of the Scientific Committee of the JPI-CH

- An overview of the Foresight Report is on while full details of study, the methods used and the insight gained can be found at www.jpi-culturalheritage.eu
- Details about the participating groups, the process and the how the priority research areas were chosen can be found in Annex A



Norway | Rock Art of Alta (detail)



[1] A new challenge for Europe

[11]

European cultural heritage is of exceptional importance. It enriches the lives of its citizens and contributes to the individual and collective identity of the Member States and Observer Countries. Its richness and diversity also has significant economic impact, as it attracts millions of visitors a year from all over the world. Many of the nine million jobs in the tourism sector are linked to it directly or indirectly and it is estimated that tourism alone generates annual revenue of EUR 335 billion.

However, it is a heritage that is being challenged from every side. Artefacts are being lost and damaged, customs and practices are being lost and new heritage that is being created every day is in danger of being overlooked or ignored due to the inevitable pressures brought about by social, economic and environmental change. There is now an urgent need to protect all forms of this unique cultural heritage before irreversible damage is done.

The cultural heritage sector has an active and well established research community working on a wide variety of projects at a national level across Europe. Whilst a lot of good research work is being undertaken by individual Member States, a holistic approach to research that underpins our understanding and recognition, as well as the protection and sustainable management of Europe's cultural heritage, will ensure that Europe's limited funds for public research and development can be used more effectively, that best practice will be shared more efficiently and implemented in a more harmonious way, efforts will be less fragmented and therefore have greater impact. The net result is a common research agenda to preserve cultural heritage for both current and future generations across the EU.

Looking forward

The common research agenda that emerges from the JPI-CH also opens up opportunities to partnerships with the private sector in the creative, digital and other industries. The sheer diversity of projects and areas of research in the cultural heritage arena means that the knowledge, skills and expertise of researchers is also helping the innovation of products, services and business models, all of which will help Europe's future economic growth and jobs. This is essential if we are to remain competitive in the global marketplace and improve the quality of life in Europe.

What is Cultural Heritage?

Cultural heritage exists in tangible, intangible and digital forms. Tangible heritage includes artefacts (for example, objects, paintings, archaeological finds etc), buildings, structures, landscapes, cities, and towns including industrial, underwater and archaeological sites. It includes their location, relationship to the natural environment and the materials from which all these are made, from prehistoric rock to cutting edge plastics and electronic products. Intangible heritage includes the practices, representations, expressions, memories, knowledge and skills that communities, groups and individuals construct, use and transmit from generation to generation. Digital heritage includes texts, databases, still and moving images, audio, graphics, software and web pages. Some of this digital heritage is created from the scanning or converting of physical objects that already exist and some is created digitally, or 'born digital'. Whatever its genesis, it needs constant maintenance and management to be retained.



France | The Cordouan lighthouse

[2] Cultural heritage research: a European perspective

[13]

The legal basis to preserve and enhance moveable and immovable cultural heritage of European significance was only established by the Treaty establishing the European Community in 1993. This enabled cultural heritage to be recognised as one of the priority areas of the EU. However, cultural heritage research featured in all EU Framework Programmes for Research since 1986, with the aim of reinforcing the scientific and technological basis for protecting and rehabilitating the European patrimony and setting up coherent methodologies, technologies and tools.

Since then about 140 projects have been supported linking more than 500 organisations across the EU and the Mediterranean area - from universities, research centres and heritage institutions to private companies - to develop and apply "state of the art" methodologies, technologies, new products and tools.

In the last three decades, valuable research has been done in certain areas of cultural heritage. Whereas the early years of the EU RTD Framework Programmes concentrated on damage to monumental cultural heritage and the impact of urban pollution in particular, more recently research has focussed on the impact of the indoor environment on cultural heritage such as sculpture, museum collections and archives, on underwater archaeology and latterly digital cultural heritage. With its early links to environmental research, cultural heritage has found synergies with the social, economic as well as environmental sustainability agenda and it has begun to address key global challenges such as climate change impacts and adaptation.

However, the research landscape remains fragmented for a number of reasons. Across Europe there is still a lack of research that will enable the development of a deeper and critical understanding of the whole object- the tangible- whether that is an artefact, collection, site or landscape. Apart from understanding its physicality, there is also its cultural context - the intangible - as well as the environmental challenges it faces in the 21st century. To further our knowledge and to reduce fragmentation, cross-disciplinary research and learning about other disciplines, their taxonomies and research methods requires a more in-depth collaborative approach.

At present, there is little encouragement to exchange knowledge with disciplines that may have relevant ethical research approaches such as nature conservation or medicine. Similar language and semantics among different disciplines can create misunderstandings that cause confusion and disrupt effective collaboration. These are some of the complex boundaries that must be negotiated but which can be compounded when working across the tangible, intangible and digital cultural heritage.

Such areas require innovative research approaches to be developed, which is why the JPI-CH and its SRA are uniquely important and timely initiatives.



U. Kingdom | Hadrian's Wall

[3] Research Priorities

[15]

This Strategic Research Agenda is about presenting cultural heritage as a holistic, integrated research area. It recognizes that different types of heritage cannot be seen as separate entities and thus the priorities identified in the SRA, cover (and aim to go beyond) the individual tangible, intangible and digital aspects.

The National Consultation Panel held many lively debates and following extensive consultation, four research priorities have been identified:

- Developing
a reflective society
- Connecting people
with heritage
- Creating
knowledge
- Safeguarding
our cultural heritage
resource



[3] Developing a reflective society

[17]

This research priority is broadly based on recognition that the world is changing and that research questions, approaches, methods and reporting need to reflect this. What are the consequences for cultural heritage in light of demographic changes as well as changes due to conflict or rapid development? What is chosen to represent 'our heritage'? How is it chosen and how might this change over time? Who is capturing the cultural heritage that is being created today?

The three main research areas are:

Identity and perception

- to improve knowledge of how the use of all forms of cultural heritage, the tangible, intangible and digital, contribute to identity at a personal, local, national, European, and/or global level.
- to question how narratives of cultural heritage are constructed on a micro, meso and macro scale.
- to recognise that people are both users and producers of cultural heritage.
- to understand why we care about cultural value and heritage; how we are motivated to produce, recognise and use heritage; the impact of context and histories on cultural heritage on how it is curated and managed, and how learning environments can contribute to our understanding and coproduction of heritage.
- to explore the links between tangible, intangible and digital forms of heritage.
- to investigate approaches for protecting cultural landscapes, seascapes and heritage, and the safeguarding of their associated intangible expressions (for example, crafts, trades, oral histories, song, etc); the effect of scale (regional, national, European, global)

Values

- to increase our understanding of the significance and the values that various kinds of cultural heritage hold for individuals and communities, from the [intrinsic] cultural values to the values it holds or represents societally and economically.
- to understand the meaning cultural heritage holds for people and therefore how they perceive, use and interact with it.
- to explore the socio-economic role and significance of cultural heritage.
- to examine forms of user interaction, involving interaction and dialogue with a range of heritage 'users'. One example is the co-production of activities around heritage for children and young people.

Ethics

- to investigate the changing rights and responsibilities around cultural heritage, particularly given the changing forms of access to heritage (for example digital) and new forms of heritage itself (digital-born).
- to examine the consequence for cultural heritage of demographic changes as well as changes due to conflict or rapid development.
- to evaluate the consequences of the changes in technology, questions over the ownership and responsibilities for heritage and who decides what happens to it.
- to investigate the balance between historical integrity and authenticity to ensure that the interpretations of different publics are taken into account.
- to ensure that new policies around the management of cultural heritage respect the different values and beliefs people hold.



Poland | Castle of the Teutonic Order in Malbork

[3] Connecting people with heritage

[19]

This research priority concentrates on access by addressing themes and issues that enable people and communities to connect with heritage. There will be implications for the broader tourism and transport industry as well as the social and cultural capital (for example through volunteering) it provides, as well as issues around sustainability. This also applies to developments in technology and their impact on cultural heritage in an increasingly digital age. Who owns the digital forms of cultural heritage and who decides who can create it, access and use it, how can it be protected from copyright infringement and how is Intellectual Property assigned in a digital world?

Four areas were identified:

Protection through use

- to explore the opportunities heritage presents for revitalisation and regeneration of artefacts, buildings and landscapes taking into account the values various kinds of cultural heritage hold.
- to discover what evidence is required by decision makers when deciding new or changed uses for cultural heritage.
- to examine ways for people to enhance their knowledge of all forms of cultural heritage and so connect to, and respect, their own and others' histories.

Sustainability

- to develop sustainability strategies, including cultural, social, economic and environmental approaches, for cultural heritage at all scales, from artefact to landscape.
- to fully understand the embodied energy in heritage materials and energy systems in heritage structures and assemblies in order to develop effective, sustainable management plans.
- to investigate how heritage is affected by changes in population demography, and by the rebalancing between the surrounding natural environment and societal developments.

Security

- to ensure that management strategies are developed to secure cultural heritage in all its forms.

Heritage information

- to make cultural heritage accessible to ensure the democratic right of everyone to share in its societal values.
- to fully explore the interaction between people and digital cultural heritage, both in terms of how people use digital cultural heritage and how it can in turn influence behaviours.



France | Dauphine face sans voiles - Toulon

[3] Creating knowledge

[21]

This theme is about deepening our understanding of the context in which cultural heritage exists and is formed, and developing innovative approaches, applications and tools that will create added value for society from cultural heritage.

The four main areas include:

Linking information

- to increase understanding of quantitative and qualitative heritage databases along spatial, temporal or other scales, using data mining and similar techniques.
- to integrate the available cultural heritage information in different fields of study including, but not limited to, art history, science, digital heritage, conservation and maintenance, in order to move the field towards truly interdisciplinary heritage studies.
- to explore how processes can be exploited to generate new knowledge around cultural heritage.
- to advance use of reference collections of materials and data through better characterisation, cataloguing and improved accessibility, thus establishing links between disparate contents for knowledge and management, taking into account different spatial and other frameworks.

Change

- to understand changes and their consequences for heritage objects, sites or landscapes, with special emphasis on getting insights into material decay by modelling and investigation of damage mechanisms.

Methods and measurements

- to develop non-invasive, remote, imaging and non-destructive measurement and testing methods, techniques and instruments, for improved diagnostics, surveying and understanding of historical and technological contexts of art and heritage.
- to build on environmental assessment and monitoring technologies and systems, integrated with assessment of impact of agents of change on cultural heritage.

Integrating risks

- to integrate risk assessment methodologies, protocols and open source tools for efficient and responsible management of heritage.



Norway | Urnes stavkirke

[3] Safeguarding our cultural heritage resource

[23]

This theme is about how we can protect our heritage and the research that is required to support this. What measures are needed to safeguard the tangible, intangible and digital cultural heritage as a whole? Environmental and anthropogenic effects including climate change will have an impact on cultural heritage in the 21st Century and research is required to identify and manage the vulnerability of cultural heritage to environmental and other changes.

Two main areas were identified

Conservation

- to develop materials, technologies and procedures for long-term maintenance, secure access, conservation and in-situ preservation of cultural heritage which takes into account sustainability criteria and includes, but is not limited to, traditional, modern and contemporary art and heritage materials, as well as digitized and born digital contents.

Adaptation and mitigation

- to understand material, site and structural change in the context of different environments and global change.
- To mitigate the effects of climate change on all forms of cultural heritage, taking into account the values it holds for people and respecting its historic integrity.

Further reading:

- A summary of the priorities from each NCP can be found at Annex B.
- A summary of the Real-time Delphi study which provided insight into the drivers is available at Annex C.



[4] Enabling Framework

[25]

During consultation, a number of priorities were identified that were considered to have an influence over and above the individual drivers. These are the overarching elements that are essential if the new research landscape is to be successful. These have been organised as an enabling framework and include:

Capability and Capacity

- to cover the provision of training to enable researchers to work across disciplines and all forms of heritage, support is required by researchers at different stages of their careers.
- to identify best practice to increase the capacity and scope of cultural heritage research.
- to develop strong leaders that inspire a new generation of cultural heritage researchers across Europe.

Management Strategies

- to ensure that the technological, organisational and institutional structures are in place to enable cultural heritage to be managed efficiently and effectively.

Knowledge sharing

- to build a culture that enables researchers to share their findings not only with researchers in other disciplines, but also with international managers such as NGOs and users of cultural heritage, other industries and the wider public.
- to develop a range of methods and educational tools to engage the broader public.
- to share the results of cultural heritage research with a wide variety of audiences.

Research Infrastructure

- to examine the infrastructure needed for each form of cultural heritage and where it crosses over, for example from the tangible to the digital, to ensure continued preservation and access.

Policy, Laws and regulations

- to map out the policies, laws and regulations within and beyond the EU;
- to assess the consequences of various political frameworks and legal interventions and minimise any conflicts.



[5] Future research requirements

[27]

How can we build on the richness of our current research base? A Foresight study was commissioned to provide a structured, forward-thinking assessment of the possible future landscape. The study was guided by two key principles: (1) changes in technology, society, the environment and the economy will be formative in shaping the future context for cultural heritage and research, even if the precise nature of such impacts cannot be predicted with certainty; and (2) only by engaging with experts in the cultural heritage field can a meaningful picture of anticipated changes be created. There were three elements in the study:

- Review of technological, social, economic, political, legal and environmental drivers of change;
- Real-Time Delphi Study of experts from around Europe that gathered judgements on anticipated impacts of drivers and the changing environment for cultural heritage research;
- Scenarios Workshop with cultural heritage experts, based on the Futures Literacy/Hybrid Strategic Scenario Method, was held at the UNESCO Headquarters in Paris.

Views on key drivers and the research environment

Around 100 participants from 16 Member States provided their judgements and feedback on a range of technological, social, environmental, political, legal and economic drivers of change that had been analysed in a previous part of the Foresight study. By asking these experts to comment and rank the group of 20 drivers included in the survey, a picture emerged of their potential impact and implications. Likert scale questions (1-10) were used to capture these judgements (and their own expertise in these areas).

The two drivers/themes judged to have the greatest impact were Tourism and Transport, and Digitisation of Society. The other two drivers that make up the 'Top 4' – with average scores across the cohorts of above 7.0 – were Social Capital, Mutuality and Volunteering, and Global Migration and Mobility.

Strategic Scenarios: Futures Literacy Workshops

A two-day scenario workshop was held to explore potential conditions and strategic options for cultural heritage research. The three-stage Futures Literacy method which was used started by exploring current norms, assumptions and preferences, before re-imagining conditions for cultural heritage research at different times in the future. The concluding stage of the workshop focused on strategic options and decision-making now – based on the exploration of the rich potential of the present.

Four Strategic Considerations for Cultural Heritage Research Policy

1. **Empowerment:** how can cultural heritage research support empowerment and democratisation within society? There are two distinct dimensions to the social empowerment question. The first is giving people permission to act – by removing constraints e.g. allowing people to access artefacts/conservation. The second is enabling ownership in the research process.

2. **Co-creation:** how can policy be designed in a way that genuinely uses the knowledge and capacity distributed in society? Engagement in this sense is not disseminating the results of (closed) research processes after they have finished but rather co-creating research and knowledge through a distributed and participatory model of enquiry and practice.

3. **Importance of values:** how can the crucial role of values be recognised? Without the societal recognition and valuing of cultural heritage, discussions on options for cultural heritage research will be largely futile. Cultural heritage research needs to address the intrinsic value of cultural heritage in society generally.

4. **Valuing knowledge and the allocation of resources:** what new methods of evaluating research are needed? Evaluation of research outputs and decisions on research funding need to be done on the basis of producing net new content/knowledge rather than simply looking at citations.

Further reading:

- A summary of the Real-time Delphi study can be found at Annex C.
- A full copy of the Foresight Study can be found at www.jpi-culturalheritage.eu







[6] Delivery of the SRA

[31]

The overwhelming need is for research to be truly integrative and provide opportunities for research to explore all forms -the tangible, intangible and digital- of cultural heritage. Future research should involve collaboration and work across boundaries - disciplinary, conceptual, theoretical, methodological, and international.

More specifically, support for large collaborative research projects, networking activities and support for new researchers is necessary, including opportunities for researchers to spend time working in other organisations, with other disciplines, etc. Research should explore new areas, and where appropriate, include creative or innovative approaches.

Researchers should be encouraged to explore and employ a range of approaches in cultural heritage research across the tangible, intangible and digital. This can include applying and embedding new technologies and tools, and also the use of other approaches, some widely used, some not, including for example, the use of oral histories, understanding of craft practices, comparative work, visualisations and scenario building.

Although it will be necessary for research to be undertaken in partnership with heritage agencies, the private sector and practitioners, consideration should also be given to providing specific support for research to underpin the development of policies, charters and guidelines as well as business development strategies within institutions.

Priority areas for delivery include:

- Collaborative and transdisciplinary/interdisciplinary research
- Knowledge exchange (experience and best practice)
- Involvement of partners
- Applying and embedding new technologies and tools
- Exploring new methods/research
- Strategies/Policies



[7] Conclusion

[33]

The Commission Recommendation (2010/238/EU) of 26th April 2010 stated: 'Member States are encouraged to develop a common strategic research agenda establishing medium to long-term research needs and objectives in the area of preservation and use of cultural heritage on the context of global change.'

Thanks to the active participation of a great number of people across many Member States and sectors who have contributed to this JPI-CH Strategic Research Agenda, we have been able to draw up an agenda that will deliver wider societal, cultural, economic and environmental impacts to strengthen Europe's leadership and competitiveness.

This exercise has shown that there is a real willingness to work together, to overcome the fragmentation of information on the state of research, to streamline national programmes to reduce overlaps and exploit synergies and to coordinate research in the cultural heritage arena. With sufficient funds and further and sustained investment, we will be able to implement this Agenda for the protection and enhancement of European patrimony.



[*] Annexes

[35]

Annex A:
Creating the Strategic
Research Agenda

Annex B:
Summary of individual
NCP priorities

Annex C:
Real-Time Delphi Study
on the Future of Cultural
Heritage Research - a summary



[A] Creating the Strategic Research Agenda

[37]

Putting together the team

Steering Committee

The Steering Committee was comprised of beneficiaries of the JHEP, JPI Executive Board members and Associated Participants. This group provided high-level decisions and guidance on the development of the SRA.

Scientific Committee

The Scientific Committee includes 12 experts from the participating Member States and beyond, selected by peer-review. Their function is to support the JPI Consortium and to provide scientific advice and guidance. They also contributed scientific input to the creation of the Common Framework and provided an external review of the process and input into the Strategic Research Agenda itself.

Expert Group

An Expert Group composed of two members of the Scientific Committee and two external experts was established at the start of the JHEP. They had a highly operational role and provided the expert view in developing the Common Framework and analysing the inputs from the National Consultation Panels.

National Consultation Panels

Each country participating in the JPI set up a National Consultation Panel by either issuing a Call for Expres-

sions of Interest or by using already established national strategic research groups or other advisory groups. Each member sat on the panel as experts, rather than as representatives of a particular organization or discipline. Each panel identified research areas, activities, gaps and needs across the field of tangible, intangible and digital cultural heritage.

Establishing a Common Framework

The Expert Group established a framework to obtain information on research areas, gaps and needs under the drivers 'Use', 'Access', 'Interpretation', 'Protection', 'Recognition', 'Change/Transformation' and 'Management'. The drivers chosen were based on information drawn from the JPI description. Information on 1) the activities/instruments required to address these areas/gaps/needs, 2) the benefits of the research to cultural heritage and 3) societal, economic and environmental criteria (impacts/risks) was also captured by the framework.

Defining the drivers for the research areas and interpretation of various drivers was complex and the Scientific Committee requested that it be made clear what is meant by 'criteria' and 'drivers'. The following schematic was produced and included in the guidance to demonstrate both the definitions of, and the relationship between, the drivers, research areas, gaps and needs and the criteria:



A two stage ranking procedure (one based on priorities as determined by the 'National Consultation Panel' (i.e. research areas that are national priorities) and one based on priorities in terms of 'European collaboration' (i.e. research areas which would benefit from EU collaboration)) was agreed to be the most appropriate option.

Requesting feedback

Following validation and approval by the Coordinators and the Scientific Committee the Common Framework was sent out to all Partners for distribution to the NCPs.

NCPs were requested to:

- Review the template and information provided;
- Add additional, high priority research areas, gaps and needs as required
- Review all research areas and rank in terms of a) the NCP priorities and b) requiring European collaboration (top 12 only).

The response: National Consultation Panel Input

NCP input from 16 participating Member States was received: UK, Ireland, Netherlands, Norway, Spain, Poland, Sweden, Italy, France, Belgium, Czech Republic, Denmark, Cyprus, Romania, Slovenia and Slovakia.

Most Member States ranked both NCP priorities and those requiring European collaboration exactly the same thereby resulting in one ranked list per Member State.

Many Member States did not feel able to complete columns such as societal, environmental and economic impacts, activities/instruments, benefits of research area to cultural heritage etc. For this reason, analysis concentrated on the research areas, (including gaps and needs).

Process for Analysis of National Consultation Panel Input

The Expert Group discussed both the content and the ranked lists submitted by each NCP.

Step 1

The top 12 ranked (European collaboration) research areas were grouped initially into the following categories:

- Methods, materials and measurement;
- Material change and decay;
- (Changes in the) use and role of CH;
- Historical context and integrity;
- Value and memory;
- Linking CH information through digital means;
- Sustainability and energy;
- Ethics, identity and diversity;
- In situ testing/preservation;
- Natural resources;
- Management strategies and consequences;
- Policy, regulations and frameworks;
- Modern and new CH;
- Conceptual issues;
- GIS etc;
- Adaptation to and consequences of global change;
- Ownership, rights and responsibilities;
- Cross-cutting issues.

Step 2

For each research area the individual ranking assigned to it by each NCP was included and a simple 'count' of the rankings (the number of Member States that included a particular research area in their priority list) was totalled.

Research areas were ranked as follows:

- by the broad categories in the list above and then by count. This was to retain all the detail and to give the group a starting point for discussion. They were then sorted by the 'sum of ranks'. As highest to lowest priorities were ranked from 1 to 12 respectively, the lower the sum of ranks for a research area, the higher up on the priority list it would appear.
- by count *irrespective* of the broader categories that were originally used (in step 1) to group the research areas.
- by 'sum and count': the sum of ranks multiplied by the count (e.g. Sum of ranks = 53, count = 7, ranking = 371).

Research areas were then re-grouped using the broader categories (as in step 1) *then* ranked using the total 'sum and count' for each grouping.

Formula used

As highest to lowest priorities were ranked from 1 to 12 respectively rankings were recalculated as $13-X$, where X = the original ranking to allow research areas to be ranked by priorities in numerical order of high to low (e.g. if a country scored a research area 12, i.e. lowest in their priority list, the recalculated value ($13-12=1$) would appear lower on this list and vice versa for those higher

up on a Member States' priority list with a low value of 1,2,3 etc. Research areas were then ranked by the new 'sum and count' using the new 'sum of ranks' based on the recalculated values.

Step 3

Research areas were *then* re-grouped using the broader categories (as in step 1) *then* ranked using the new total 'sum and count' for each grouping (based on the recalculated values).

Step 4

The Expert Group refined the research areas and removed any redundant or duplicated areas.

Step 9

Research areas were assigned to four 'priority areas': Access, Interpretation, Protection and Recognition, before being assigned to the following more refined areas:

- Digital interaction;
- Protection through use;
- Security;
- Change;
- Linking;
- Measurement & methods;
- Sustainability;
- Integrating risks;
- Conservation;
- Global and climate change;
- Ethics;
- Identity and perception;
- Values;
- Knowledge sharing;
- Policy, laws and regulations;
- Research infrastructure.

In addition, certain research areas were highlighted as being 'pre-conditions' and not research, such as 'IP rights and copyright issues', 'Policy development, framework conditions and management'. These 'pre-conditions' were later described more accurately as an 'enabling framework' by the Scientific Committee.

Step 10

Research areas were then ranked according to 'sum of ranks' only, and *without* the impact of count.

Adding Foresight

The final part of the process included three activities under the broad title of Foresight study. This was undertaken by Dr. Martin Rhisiart and his team at University of Glamorgan and Mr Meirion Thomas from CM International.

- **Analysis of trends and drivers:** Drivers and trends information was identified across a range of fields that were relevant to cultural heritage. The headings used to collect and analyse the drivers and trends included 'evidence for the trend', 'potential implications and impacts, risks, opportunities etc'. Drivers included demography, globalisation, Internet of Things, Big Data, climate change, learning, gamification, security technologies, philanthropy, crowd funding etc.

- **Real-Time Delphi:** (this online survey was open Oct-Nov 2012). The Delphi method is a widely used forecasting tool consisting of one or two rounds of questionnaires, set by forecasting experts and sent out to experts of the field of interest in question (in this case, cultural heritage). In order to gain the optimum spread of information and the best insights and expert views we invited over 200 people to participate, including members of all national consultation panels and members of the JPI Scientific Committee. Results were interpreted by the foresight team at the University of Glamorgan.

- Details about the Real-Time Delphi Report are in Annex C

- **Scenario Workshop:** The workshop took place over 2 days (19 – 20 November 2012) at the UNESCO Office in Paris. The workshop consisted of a relatively small group of people (13) with a broad range of expert knowledge from the research/practitioner and/or policy community. The 2 days consisted of not only a challenging exercise but also a creative and participatory process to develop strategic scenarios and a rigorous 'imagining' of different conditions and also included a section on broader social and technological changes relevant to cultural heritage. The two days were also globally focused and not confined to EU.



The image shows a close-up of an open medieval manuscript. The left page has a large, ornate initial 'S' in blue and red, followed by text in two columns. The right page also has a large initial 'S' in blue and red, with text in two columns. The parchment is aged and yellowed, and the binding is visible in the center.



Ireland | Traditional Irish Music in St. Patrick's Cathedral - Dublin

[B] Summary of individual NCP priorities: Top 12 Priority Research Areas National and European*

This is a summary of the priority research areas submitted by each National Consultation Panel (NCP). Both the membership of the NCPs and the full responses from each NCP can be viewed at: www.jpi-culturalheritage.eu





Belgium

EUROPEAN

1	Cultural interpretations of heritage
2	Interdisciplinary approaches to cultural heritage
3	Cultural Heritage ethics and identity
4	Research infrastructure
5	changing uses for cultural heritage
6	Linking quantitative & qualitative data around cultural heritage; updating the classical sciences like art history and moving to integrated heritage studies, including data mining, etc.
7	Rights and responsibilities around cultural heritage
8	Value of Cultural Heritage / The plurality of values of cultural heritage and the interaction between the different logics
9	Energy efficiency of historic buildings
10	Environmental assessment and monitoring (pollution, climate change, seismic risk) and their impact on cultural heritage
11	Protective Intervention
12	Mitigation of climate change



Cyprus

EUROPEAN

1	Reference collections
2	Dissemination of cultural heritage knowledge
3	Cultural Heritage ethics and identity
4	Interdisciplinary approaches to cultural heritage
5	Interaction with digital cultural heritage
6	Linking quantitative and qualitative data around cultural heritage
7	Value of Cultural Heritage
8	Digital content
9	Rights and responsibilities around cultural heritage
10	New uses for cultural heritage
11	IP rights and copyright issues (also for new media)
12	Cultural interpretations of heritage

[45]

NATIONAL

1	Dissemination of cultural heritage knowledge
2	Management strategies for secure access to objects
3	Cultural Heritage ethics and identity
4	Revitalisation of built and landscape heritage
5	Value of Cultural Heritage
6	Security technologies and systems in museums, libraries, archives and historic buildings
7	Geographic Information System on tangible and intangible cultural heritage
8	Interdisciplinary approaches to cultural heritage
9	Rights and responsibilities around cultural heritage
10	IP rights and copyright issues (also for new media)
11	Materials, technologies and procedures for maintenance and conservation of cultural heritage
12	Reference collections



Czech Republic

[46]

EUROPEAN

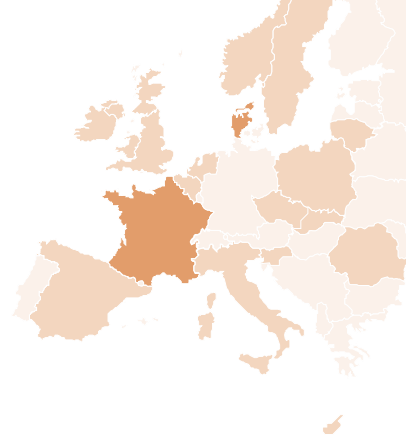
1	Understanding and modelling of decay (development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors)
2	Investigation of damage mechanisms (multidisciplinary approach on the interactions between environment and materials)
3	Non-invasive testing (development of non-invasive and non-destructive testing methods for immovable and moveable cultural heritage)
4	Research infrastructure
5	Materials, technologies and procedures for maintenance and conservation of cultural heritage (long-term effects of conservation treatments, carried out at present and in the past, on historic materials, objects and sites)
6	Materials, technologies and procedures for maintenance and conservation of cultural heritage (protection, exposition, conservation and restoration of cultural heritage)
7	Risk assessment
8	Intervention
9	Environmental assessment and monitoring (pollution, climate change, seismic risk)
10	Sustainability
11	Cognitive-perceptual theory
12	Cultural Heritage ethics and identity (how does the use of cultural heritage contribute to identity at a personal, national, European and/or global level?)

NATIONAL

1	Investigation of damage mechanisms (Interactions between specific environmental factors and complex artefacts made of different materials)
2	Understanding and modelling of decay (development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors)
3	Materials, technologies and procedures for maintenance and conservation of cultural heritage (Long-term effects of conservation treatments, carried out at present and in the past, on historic materials, objects and sites)
4	Investigation of damage mechanisms (multidisciplinary approach on the interactions between environment and materials)
5	Materials, technologies and procedures for maintenance and conservation of cultural heritage (protection, exposition, conservation and restoration of cultural heritage)
6	Non-invasive testing (development of non-invasive and non-destructive testing methods for immovable and moveable cultural heritage)
7+	Measurement instruments
8	Sustainability
9	Intervention
10+	Research infrastructure
11+	Lighting
12+	IP rights and copyright issues (also for new media)



U. Kingdom | Stonehenge - prehistoric monument



Denmark

EUROPEAN

[48]

1	Policy and identity
2	Value of Cultural Heritage
3	Policy, laws and regulations
4	Cultural Heritage ethics and identity: How does the use of cultural heritage (material and immaterial) contribute to identity at a personal, national, European, and/or global level?
5	Mediated cultural heritage
6	Climate change
7	Heritage scales, synergies and dissonances
8	Material and immaterial cultural heritage and natural resources
9	Revitalisation of built and landscape heritage
10	Interaction with digital cultural heritage
11	New uses for cultural heritage
12	Cultural Heritage ethics and identity: Is there an ethical or cultural boundary to what you can do with cultural heritage?

France

EUROPEAN

1	Cultural interpretations of heritage
2	Rights and responsibilities around cultural heritage
3	Digital content
4	Linking quantitative and qualitative data around cultural heritage
5	Geographic Information System on tangible and intangible cultural heritage
6	Measurement instruments
7	Interdisciplinary approaches to cultural heritage
8	Business development, finding new ways to engage with target groups and donors
9	Investigation of damage mechanisms (interactions between specific environmental factors and complex artefacts made of different materials)
10	Cultural Heritage ethics and identity (is there an ethical or cultural boundary to what you can do with cultural heritage?)
11	Digital collections
12	Reference collections



Ireland

EUROPEAN

1	Dissemination of cultural heritage knowledge
2	Cultural interpretations of heritage
3	Spatial and temporal data on tangible and intangible cultural heritage
4	Linking quantitative and qualitative data around cultural heritage and related areas
5	Cultural heritage ethics and identity
6	New uses for cultural heritage
7	Global change adaptation
8	Revitalisation of built and landscape heritage and cultural spaces
9	Digital content
10	Landscape heritage
11	Interdisciplinary approaches to cultural heritage
12	• Historic integrity and modern use of built heritage, cultural landscapes, maritime heritage and cultural space • Historic integrity and modern use of oral and intangible heritage • Public interpretations of historic integrity and their prioritisation of it in relation to other demands.

[49]

NATIONAL

1	Dissemination of cultural heritage knowledge
2	Spatial and temporal data on tangible and intangible cultural heritage
3	Cultural interpretations of heritage
4	New uses for cultural heritage
5	Linking quantitative and qualitative data around cultural heritage and related areas
6	Digital content
7 ⁺	Industrial heritage & Maritime heritage - tangible and intangible
8	Landscape heritage
9	Revitalisation of built and landscape heritage and cultural spaces
10 ⁺	Deinstitutionalisation of cultural heritage
11	Cultural heritage ethics and identity
12	• Historic integrity and modern use of built heritage, cultural landscapes, maritime heritage and cultural spaces • Historic integrity and modern use of oral and intangible heritage • Public interpretations of historic integrity and their prioritisation of it in relation to other demands



Italy

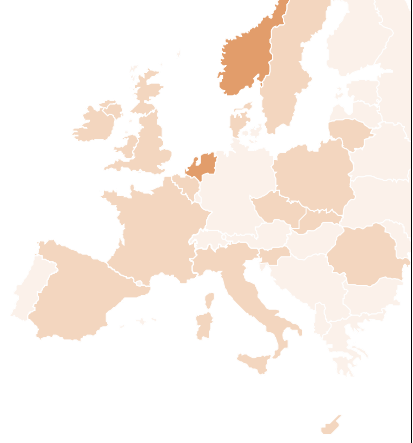
[50]

EUROPEAN

1	Climate change
2	Environmental assessment and monitoring (pollution, climate change, seismic risk)
3	Materials, technologies and procedures for maintenance and conservation of cultural heritage (protection, exposition, conservation and restoration of cultural heritage)
4	Measurement instruments
5	Interaction with digital cultural heritage
6	Energy efficiency of historic buildings
7	Investigation of damage mechanisms (multidisciplinary approach on the interaction between environment and materials)
8	Understanding and modelling of decay (development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors)
9	Management strategies for secure access to objects (materials and techniques for safe exhibition, storage, handling, packing and transport of the artefacts with related monitoring systems and guidelines)
10	Security technologies and systems in museums, libraries, archives and historic buildings (integrated systems for effective detection, prevention and reaction to risk situations)
11	Management strategies for secure access to archaeological sites and cultural landscapes
12	Tele-survey of tangible cultural heritage

NATIONAL

1	Materials, technologies and procedures for maintenance and conservation of cultural heritage (protection, exposition, conservation and restoration of cultural heritage)
2	Climate change
3	Environmental assessment and monitoring (pollution, climate change, seismic risk)
4	Measurement instruments
5	Interaction with digital cultural heritage
6	Energy efficiency of historic buildings
7	Investigation of damage mechanisms (multidisciplinary approach on the interaction between environment and materials)
8	Understanding and modelling of decay (development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors)
9	Management strategies for secure access to objects (materials and techniques for safe exhibition, storage, handling, packing and transport of the artefacts with related monitoring systems and guidelines)
10	Security technologies and systems in museums, libraries, archives and historic buildings (integrated systems for effective detection, prevention and reaction to risk situations)
11	Management strategies for secure access to archaeological sites and cultural landscapes
12	Tele-survey of tangible cultural heritage



Netherlands

EUROPEAN

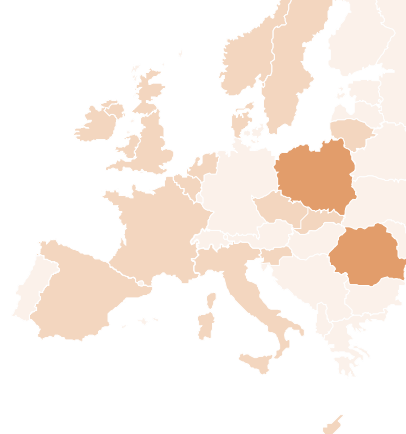
1	Values and valuation
2	Young cultural heritage
3	Use and re-use
4	Heritage concepts and theories
5	Research on deterioration
6	Preservation in situ
7	Ownership and appretation
8	Sustainability and durability
9	Different effects of climate change
10	Risk management of all kinds of heritage
11	Access to heritage
12	Overview on immaterial heritage

[51]

Norway

EUROPEAN

1	Consequences of land use changes for cultural heritage in urban and rural areas (knowledge of urban development and urbanisation processes)
2	Policy development, framework conditions and management
3	Climate change
4	Cultural diversity and identity
5	Non-invasive testing
6	Links between cultural heritage and natural resources
7	Underwater cultural heritage
8	Consequences for cultural heritage of demographic changes as well as of conflict and development
9	Protection of cultural heritage through use, with a focus on value creation
10	Revitalisation of built and landscape heritage
11	Value of Cultural Heritage
12	Materials, technologies and procedures for maintenance and conservation of cultural heritage



Poland

EUROPEAN

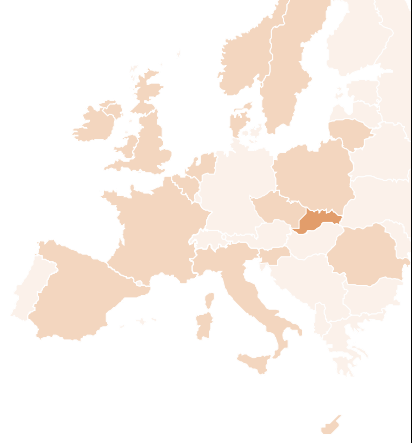
- 1 Value of Cultural Heritage
- 2 Risk assessment & risk management
- 3 Understanding and modelling of decay & investigation of damage mechanisms
- 4 Multi-criterial studies: Diagnosis, dating and comparative studies
- 5 New uses for cultural heritage
- 6 Management strategies for secure access to objects
- 7 Measurement instruments: Development of new instruments
- 8 Materials, technologies and procedures for maintenance and conservation of cultural heritage
- 9 Transdisciplinary approach to the conservation of modern and contemporary art.
- 10 Cognitive-perceptual theory
- 11 Revitalisation of built heritage, sites and landscapes
- 12 Technical art history

[52]

Romania

EUROPEAN

- 1 Revitalisation of built and landscape heritage
- 2 Interdisciplinary approaches to cultural heritage
- 3 Materials, technologies and procedures for maintenance and conservation of cultural heritage
- 4 Landscape heritage
- 5 Research infrastructure
- 6 Management strategies for secure access to archaeological sites and cultural landscapes
- 7 Historic integrity and modern use of built heritage and cultural landscapes
- 8 Global change adaptation
- 9 Cultural Heritage ethics and identity
- 10 Understanding values
- 11 New uses for cultural heritage
- 12 Technical recognition of moving and still images



Slovakia

EUROPEAN

1	Landscape heritage
2	Cultural Heritage ethics and identity (how does the use of cultural heritage contribute to identity at a personal, national, European and/or global level?)
3	Historic integrity and modern use of built heritage and cultural landscapes
4	Dissemination of cultural heritage knowledge
5	Understanding values (systematic research into value systems, including economic values and increased quality of life)
6	Investigation of damage mechanisms (multidisciplinary approach on the interactions between environment and materials)
7	Global change adaptation
8	Revitalisation of built and landscape heritage
9	Built heritage
10	Industrial heritage
11	Deinstitutionalisation of cultural heritage
12	Digital content



Slovenia

[54]

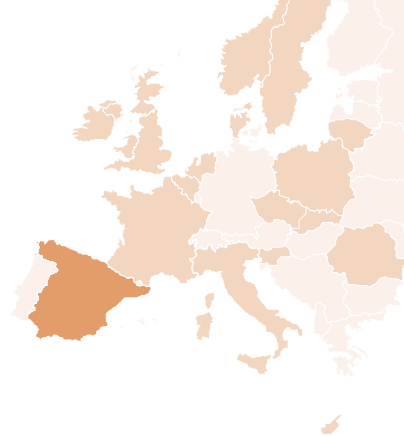
EUROPEAN

1	Linking quantitative and qualitative data around cultural heritage
2	Revitalisation of built and landscape heritage
3	Dissemination of cultural heritage knowledge
4	Geographic Information System on tangible and intangible cultural heritage
5	Understanding values (systematic research into value systems, including economic values and increased quality of life)
6	Cultural Heritage ethics and identity (how does the use of cultural heritage contribute to identity at a personal, national, European and/or global level?)
7	Materials, technologies and procedures for maintenance and conservation of cultural heritage (long-term effects of conservation treatments, carried out at present and in the past, on historic materials, objects and sites)
8	Cultural interpretations of heritage
9	Value of Cultural Heritage (to understand the perceptions and aspirations of people for cultural heritage)
10	Protection and conservation of modern materials used in contemporary art and architecture
11	Historic integrity and modern use of built heritage and cultural landscapes
12	Interdisciplinary approaches to cultural heritage

NATIONAL

1	Dissemination of cultural heritage knowledge
2	Understanding values (systematic research into value systems, including economic values and increased quality of life)
3	Linking quantitative and qualitative data around cultural heritage
4	Cultural interpretations of heritage
5	Interdisciplinary approaches to cultural heritage
6	Revitalisation of built and landscape heritage
7	Cultural Heritage ethics and identity (how does the use of cultural heritage contribute to identity at a personal, national, European and/or global level?)
8	Historic integrity and modern use of built heritage and cultural landscapes
9	Geographic Information System on tangible and intangible cultural heritage
10+	Management strategies for secure access to archaeological sites and cultural landscapes
11	Materials, technologies and procedures for maintenance and conservation of cultural heritage (long-term effects of conservation treatments, carried out at present and in the past, on historic materials, objects and sites)
12+	Investigation of damage mechanisms (multidisciplinary approach on the interactions between environment and materials)

Spain



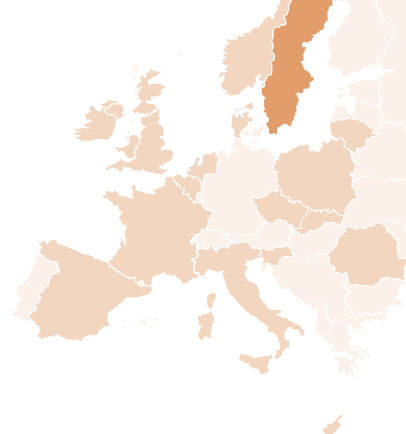
EUROPEAN

1	Linking quantitative and qualitative data around cultural heritage
2	Non-invasive testing (development of non-invasive and non-destructing testing methods for immoveable and moveable cultural heritage)
3	Investigation of damage mechanisms (multidisciplinary approach on the interactions between environment and materials)
4	Digital content
5	Understanding and modelling of decay (development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors)
6	Security technologies and systems in museums, libraries, archives and historic buildings (integrated systems for effective detection, prevention and reaction to risk situations)
7	Measurement instruments
8	Cultural Heritage ethics and identity (is there an ethical or cultural boundary to what you can do with cultural heritage?)
9	Materials, technologies and procedures for maintenance and conservation of cultural heritage (protection, exposition, conservation and restoration of cultural heritage)
10	Environmental assessment and monitoring (pollution, climate change, seismic risk)
11	Understanding values (systematic research into value systems, including economic values and increased quality of life)
12	Technical art history (knowledge of art, craftwork and heritage materials and forms)

[55]

NATIONAL

1	Linking quantitative and qualitative data around cultural heritage
2	Investigation of damage mechanisms (multidisciplinary approach on the interactions between environment and materials)
3	Non-invasive testing (development of non-invasive and non-destructing testing methods for immoveable and moveable cultural heritage)
4	Measurement instruments
5	Materials, technologies and procedures for maintenance and conservation of cultural heritage (protection, exposition, conservation and restoration of cultural heritage)
6	Security technologies and systems in museums, libraries, archives and historic buildings (integrated systems for effective detection, prevention and reaction to risk situations)
7	Digital content
8	Understanding and modelling of decay (development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors)
9	Environmental assessment and monitoring (pollution, climate change, seismic risk)
10	Intervention
11	Technical art history (knowledge of art, craftwork and heritage materials and forms)
12	Cultural Heritage ethics and identity (is there an ethical or cultural boundary to what you can do with cultural heritage?)



Sweden

EUROPEAN

[56]

1	Heritage information: Information processes, staging and digitisation
2	Interaction and dialogue with heritage users and civil society: User interaction
3	The significance of cultural heritage: knowledge enhancing the value of the cultural heritage
4	Wisdom of the crowd, social tagging
5	The state of cultural heritage: management and conservation science
6	The state of cultural heritage: risk assessment
7	The state of cultural heritage: heritage documentation methods
8	The significance of heritage: from inventory to landscape analysis
9	The significance of cultural heritage: the existential value of the cultural heritage
10	The significance of cultural heritage: valuation and selection
11	Steering instruments: development of regulatory instruments
12	Terms and conditions for heritage management: Heritage for the future

UK



EUROPEAN

1	Managing material, site and structural change in the context of different environments and global change
2	Ethical implications for new forms of access to cultural heritage
3	Understanding and modelling of material decay
4	Linking of cultural heritage information
5	Investigating the appropriate balance between historical integrity and authenticity and the different imperatives
6	Digital content and security and object preservation
7	Cultural memory and value
8	Investigation of damage mechanisms and mitigation
9	Cultural interpretations of heritage and the historical context for it
10	Changing socio-economic role of cultural heritage
11	Using technical analysis to understand historical context and meaning of collections
12	Using new technologies to establish links between disparate digital contents for knowledge and management, taking into account different spatial frameworks

[57]

NATIONAL

1	Managing material, site and structural change in the context of different environments and global change
2	Linking of cultural heritage information
3	Investigating the appropriate balance between historical integrity and authenticity and the different imperatives.
4	Investigation of damage mechanisms and mitigation
5	Cultural memory and value
6	Understanding and modelling of material decay
7	Digital content and security and object preservation
8	Ethical implications for new forms of access to cultural heritage
9	Using technical analysis to understand historical context and meaning of collections
10	Changing socio-economic role of cultural heritage
11*	Effects of population demography on cultural heritage
12*	Link existing quantitative data and qualitative interpretation around Cultural Heritage, entailing the interdisciplinarity required



[C] Real-Time Delphi Study on the Future of Cultural Heritage Research - a summary

[59]

Foresight methods have been used by the JPI to provide a structured, forward-looking assessment of the possible landscape for cultural heritage research over the next decade and beyond. The Real-Time Delphi Study is one of the Foresight methods used to assess the potential changes in technologies, society, the environment and the economy

Views on key drivers

Participants in the Real Time Delphi study were asked to provide their judgements and feedback on a range of technological, social, environmental and economic drivers of change that had been analysed in a previous part of the Foresight study. By asking the experts to evaluate the group of 20 drivers included in the survey, a picture emerges of their potential impact and implications. Likert scale questions (1-10) were used to capture these judgements along with free text questions. Participants were also asked to rate their own expertise in these areas (scale of 1-10).

Some of the results are presented according to the profile of respondents:

- Primary area of cultural heritage (if their work was directly related to cultural heritage): Tangible; Intangible; Digital;
- Primary Profession: Research; Government; Practitioner; Funding Agency; Other.

The two drivers/themes judged to have the greatest impact were Tourism and Transport, and Digitisation of Society. It should also be noted that these are the two drivers where participants expressed the highest levels of expertise (1st= digitisation of society; 2nd= tourism and transport). The other two drivers that make up the 'Top 4' – with average scores across the cohorts of above 7.0 – were Social Capital, Mutuality and Volunteering, and Global Migration and Mobility.

Respondents' views on these four highest-ranking drivers are summarised below.

The full report on the Real-Time Delphi Study, including further detail on the top 4 drivers can be found at www.jpi-culturalheritage.eu

Table 1 | TOP 4 DRIVERS – FUTURE IMPACT FOR CULTURAL HERITAGE AND PARTICIPANTS' LEVEL OF EXPERTISE

		Impact	Expertise
1	Tourism and transport	7.97	6.03
2	Digitisation of Society	7.93	6.31
3	Social capital	7.08	5.55
4	Global migration, mobility	7.08	5.17

Tourism and Transport (#1)

Developments in tourism and transport will have a significant impact on cultural heritage.

Tourism and transport is the highest-ranked driver for its future impact. Many respondents emphasise the clear, established links between cultural heritage tourism and transport. Cultural heritage has long been viewed as an economic driver of tourism and travel. It is anticipated that this will continue to be the case over the coming years.

Future Impact Results by Respondent Profile

Tourism and transport was highly ranked amongst all respondent profiles (average of 7.97), see table 1.

Table 1



The highest average ranking was given by the Practitioner group (9.0) whilst the lowest was given by the Digital group (7.15).

One of the assumptions underpinning most of the responses is the travel will remain relatively cheap and affordable in the next decade or so (e.g. cheap air travel in the European context). Participants refer to increased demand for cultural heritage sites as a result. Whilst broadly supporting access to cultural heritage sites – promoting awareness and appreciation of cultural heritage – a common thread running through responses is the danger of physical stresses and degradation. A suggested response – cited frequently – is the constant monitoring and researching of cultural heritage sites. Another mechanism for avoiding congestion and degradation in cultural heritage ‘hot spots’ would be to encourage tourism around lesser known sites (libraries, archives, small museums) and ‘to cities / towns / places other than the usual “art cities”’.

Although the aggregate view of the group was that tourism and transport would have a very significant impact on cultural heritage, some alternatives were presented.

With the advances in digital technologies and increases in energy prices, one participant stated that ‘tele and virtual tourism will take the place of much physical travel’.

Research implications

- Physical and economic impacts of cultural heritage, e.g.

“Research should include an examination of current problems with cost-effective, easily-implemented mitigating programmes followed by awareness campaigns for tourism and transport providers.”

“More understanding of the tourism and transport sector is needed to develop sustainable cultural heritage strategies.”

- Research on ‘empowering local communities in deal-

ing with heritage, not necessarily having “profit” from tourism is needed’

- Research topic “Economy of Culture” as one of the research priorities.
- In situ conservation and restoration of CH and open access to the public are crucial in this area

Digitisation of Society (#2)

The digitisation of society will have a significant impact on cultural heritage.

The digitisation of society was the second highest ranked-driver in terms of future significance. This view is strongly reinforced by the tenor of textual responses that support these assessments. Many participants point the existing impact of digitisation on cultural heritage, and anticipate that this will continue and become even stronger in future.

This is summed up by one participant's response:

Digitization is already impacting upon all aspects of cultural heritage and will continue to do so.

Future Impact Results by Respondent Profile

The average score for the driver across respondent profiles was 7.93. The highest average ranking was given by the Funding Agency group (9.0) whilst the lowest was given by the Intangible group (6.79), see table 2.

cultural heritage. 'It (digitisation) is inherently democratic but an assurance of sustainability will be essential' (Participant). The point about the sustainability and durability of digitised cultural heritage was raised by several participants and 'the possibility of other imminent technological solutions to encoding and preservation of material culture should not be ruled out.'

The increasing number of 'born digital' project presents new challenges in accessing and archiving vast amounts of digital data.

- Interpretation

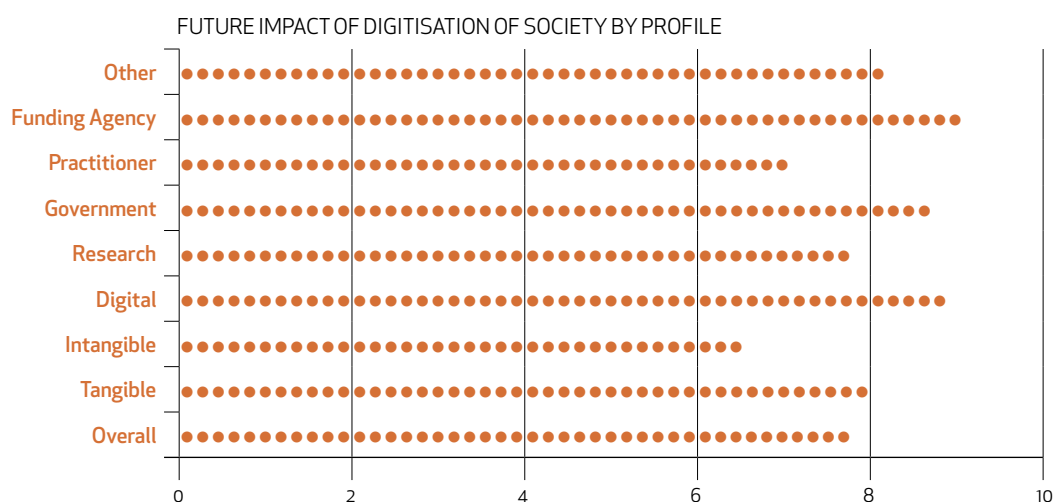
The third main theme is the impact of digitisation on the way cultural heritage is interpreted. The 'digital revolution will be reflected in all aspects of life, including what we perceive as heritage.'

[61]

The digital is already as much part of our cultural heritage as the physical.

- Timing of impacts: several respondents thought that digitisation of cultural heritage is still in its early stages. One suggested that the impact would be much greater 10 years from now, including developments in

Table 2



The comments made on digitisation and its impact are broadly positive, but with some qualifying remarks. Participants cite a core set of significant issues for digitisation and cultural heritage. These have been clustered into three (related) themes:

- Democratisation and access

Digitisation has a 'fundamental role in the democratisation of cultural heritage' (participant). Participants pointed to the positive nature of democratisation as a principle. Some went further in suggesting that 'digitisation may well be the saviour of many forms of cultural heritage'. In addition to the preservation and communication of cultural heritage, digital technologies have an important role in engaging users and 'audience participation' (participant).

- Sustainability and durability, archiving

There were some notes of caution in the broad welcoming and recognition of the democratisation effects of

virtual reality. Over this period, it is also anticipated that there will be a decrease in the proportion of people that are not computer literate.

The generations with increased digital literacy will hit museums post-2020.

Other suggested that it was very difficult to look beyond 2020 given the potential (and uncertain) developments in technology.

- Implications for cultural heritage research:

The main implications raised for research are summarised as follows:

- Increased efficiency, enabling large-scale projects and teamwork
- Emphasis on analyzing large data sets and answering big questions

- Stimulating and enabling new research areas and inter-disciplinary work
- Participation of users, enabling access and knowledge transfer
- Interdisciplinary research with living digital artists
- IPR and copyright issues related to the reuse of DCH; 'Technologies should be developed to protect the copyright with respect to duplication of works of art.'
- Appropriate data management and storage strategies

Some responses flagged the strategic research responses that would be appropriate to address the digital agenda:

The perspective of how to utilize digital media should be more prominent on the research agenda of public and private funders, and in the strategic planning of heritage institutions

Digitisation is a heavy transformation of our approach and of our capacity to have a broad access to cultural heritage, but it underlines in the same time the importance of authenticity and originality: so, we cannot imagine that digitisation will be the only answer to heritage issues

Integration of digital resources from multiple CH organisations will enable new research questions to be addressed.

A minority of respondents did not believe that digitisation had special implications for research, for example, 'Less than many imagine. Since digitisation is relatively new, its impact is often overrated'. Several respondents acknowledged the opportunities afforded by digitisation but emphasised the need for 'conventional research. One noted that 'qualitative heritage research will remain important if we want to catch all cultural variations, impact of globalisation on localities, people, events or objects'.

Social Capital, Mutuality and Volunteering (#3)

Social capital, mutuality and volunteering will have a significant impact on cultural heritage.

The importance of social capital and volunteering is clearly articulated in the participants' responses. *One stated that: Social capital and volunteering has at most times in our history been a major factor in heritage preservation.*

Some participants conveyed the sense of an intrinsic relationship between social capital/volunteering and cultural heritage – 'volunteers and mutuality have always underpinned the valuation and conservation of heritage'. It seen as a social embedding of cultural heritage in everyday life.

Future Impact Results by Respondent Profile

The average score for the future impact of social capital, volunteerism and mutuality was 7.08. The highest average score was given by the Practitioner and Government groups (8.6), whilst the lowest was given by the Funding Agency group, see table 3. With a future-oriented lens, participants anticipated a

Voluntary work varies a lot over Europe: sometimes it plays a very large role, sometimes it seems to be non-existent. The question is how long we will be able to maintain voluntary work, how we can give volunteers the impression we need them, how long our society can deliver work without pay.

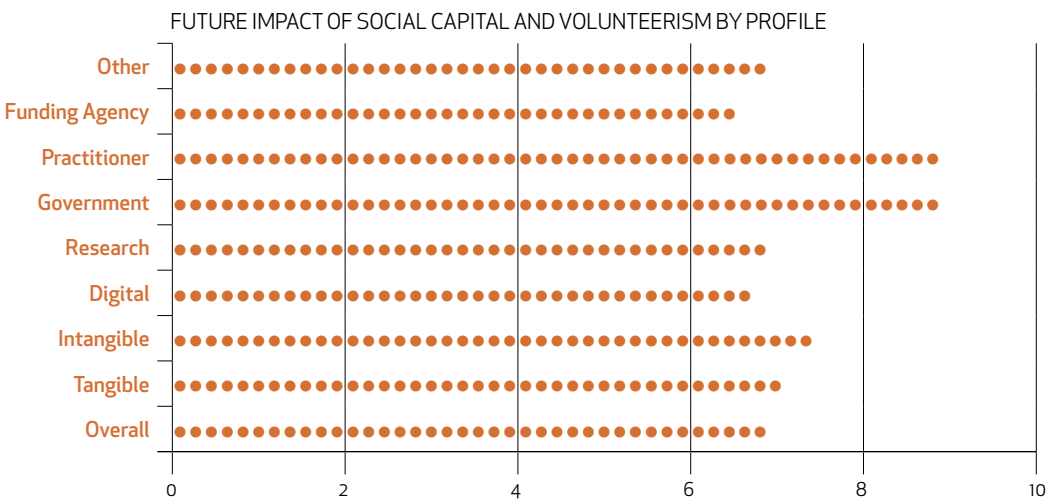
Whilst acknowledging the importance of social capital and volunteering, one respondent made the point that protection and conservation of cultural heritage should 'remain in the responsibility and supervision of the National/Regional/Municipal administration'.

Research implications:

Participants suggested some broad principles and more specific research needs for social capital and volunteering. The overall ethos and approach to research with communities was emphasised strongly by one respondent: *Research must be relevant, be context-based, in touch with communities, and collaborative as opposed to a top-down rules-based approach to communities and to all those who live with and care for cultural heritage on a daily basis.* The role of social capital was described by one participant as a 'huge blind spot in modern cultural heritage research'. This captures in one sense the broader comments that there should be a stronger research focus

[63]

Table 3



very significant role for social capital and volunteering. Beyond the historical associations and benefits, one of the assumptions that emerges in the responses is that there will be fewer Government resources for cultural heritage. One respondent commented:

This is a very important factor for example in Sweden, where there has been a huge dependency on the public financing. Public financing will most likely not increase in the future.

Social capital and volunteering are expedient ways of filling the gap that will be left by real-terms public reduction of funding for cultural heritage. Some remarks were cynical or critical of the push towards volunteering (for example, the Big Society concept in the UK). It is unsurprising that this was an area of concern for many. *The sector is already reliant on volunteers to an alarming extent.*

on social capital and civil society issues. Such research might include:

- Outreach skills;
- Understanding the motivation of volunteers – research on what makes people more engaged in heritage;
- Preventive conservation; and
- How professional and volunteer communities could work together more effectively.

Questions about “how to involve local communities” in the preservation of tangible CH (churches, monuments etc...) have to be researched in the context of interdisciplinary (psychology, sociology, behavioural sciences)

With a general awareness of reduced Government spending on cultural heritage research, there is a need to understand how volunteering can function to support research.

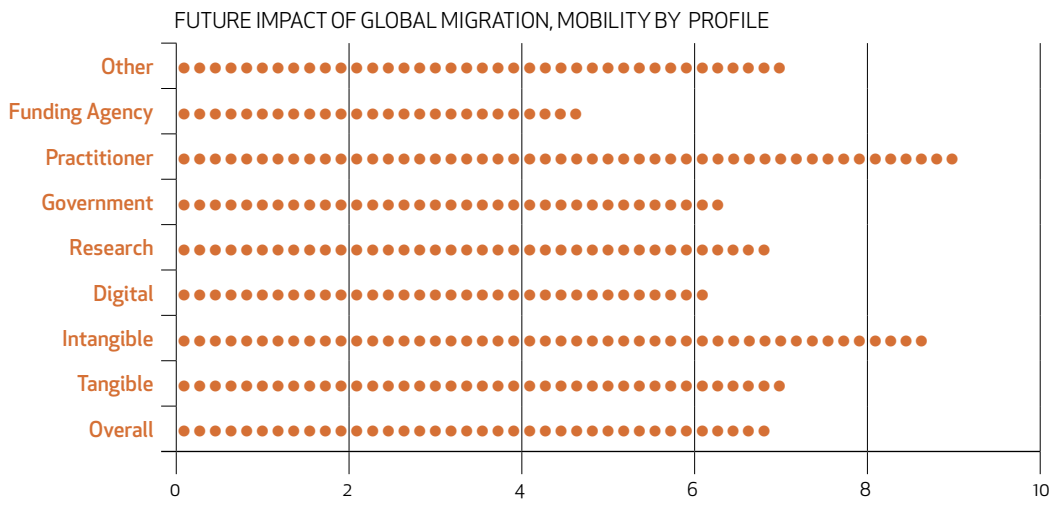
Global migration, mobility (#4)

Global migration and mobility will have a significant impact on cultural heritage.

Future Impact Results by Respondent Profile

The average score for the driver across respondent profiles was 7.08, see table 4.

Table 4



The highest average score was given by the Practitioner group (8.66) whilst the lowest was given by the Funding Agency group (5.5).

This theme is deeply connected with the interpretations and representations of cultural heritage (whose cultural heritage is being represented?) There are some existing signals of change – which participants anticipate will be amplified in the decades ahead. Evidence of this includes the creation of heritage foundations based on people's places of origin and the creation of migration museums. This is 'already an important area as heritage becomes detached from historic national boundaries'.

As the present migration becomes part of both, history and present citizenry, it also becomes part of heritage.

One response summarised some of the key uncertainties and complexities regarding global migration and cultural heritage:

Less certain about this, as recent political developments have shown that cultures may be quite rigid and immovable. Also, global migration has always happened, so I am not sure that in the short term we are to expect any great changes, except if climate change drives migration due to food shortage in certain areas of the world. On the other hand, many EU countries are retrenching in terms of immigration laws, so the trends may reverse.

Several people referred to issues of inclusivity, identities

and ownership. One respondent stated that it 'may lead to greater positive interest in the past of other culture' whilst another suggested that 'migration will have to make us think about shared values, new imported values'. This will have major implications because it challenges notions of heritage and identity and dichotomies between us and them

Research implications:

Global migration could have a very significant impact in setting agendas for cultural heritage research.

- More international focus in cultural heritage research: respondents identified this as one of the key implications for the research agenda. Diversity and the interface between different cultures and peoples are likely to alter the meaning and practice of cultural heritage.

Migration and mobility will eventually change everything! The global becomes local and vice versa, so that dichotomy will need to be reviewed, and issues of 'ownership/belonging' and identity will need review: not only national but possibly sub-national claims of particular heritages will fade.

Cultural heritage has been discussed as a social integrator – functioning as a bridge between cultures and traditions. Some suggested avenues for research include:

- New skills needed to understand the role CH could play in intercultural relationships and to understand how migration affects valuation of heritage
 - Need to become much more aware of the value and significance of cultural heritage for "new" citizens.
 - New research fields will open up looking at migration of culture across lands
- Challenge to develop research into different cultural uses and interpretations of heritage & different ways to make heritage available.
- Need for better heritage policies for 'new' groups in societies.

The majority view expressed by the group was that cultural heritage research agendas need to reflect the

changes caused by global migration. One respondent was sceptical as to the degree of 'interference' of the processes of migration on 'scientific research':

Scientific research has no political boundaries and I believe that it should not be affected by migration.

Views on the cultural heritage research environment

Participants were also asked to give their judgements on anticipated changes in the cultural heritage research environment. The key results are summarised below.

Movement towards cross-disciplinary research: there was a high level of consensus amongst respondents that cultural heritage research will become more cross-disciplinary. This is already an established approach which is likely to continue and become more significant in future.

Impact and instrumentality: participants thought that cultural heritage research would become increasingly linked to achieving economic and social goals. This view was stronger for economic goals for policy – where there would be economic or commercial returns for investment in research.

Europe to assume the mantle for funding cultural heritage research: Participants were asked to judge the significance of a range of identified funding sources for cultural heritage research – both the present/recent situation and that anticipated in future. The most significant funding sources at present for the group are, in order: national; regional/municipal; EU. Participants anticipated that national and regional/municipal funding would become proportionally less significant in the future, whilst the EU would become more significant than at present – and the most significant of all sources. They also thought that Private giving, Business and industry, and International Foundations would become significantly more important in future.

Involving users in research: respondents anticipated an increase in the involvement of users in cultural heritage research. Overall, this was regarded as a positive development

Concerns over education and training: it is clear from the scores provided that most respondent groups do not feel that there is an adequate supply of education and training for cultural heritage research. Some of the key factors identified are: lack of inter-disciplinarity/cross-disciplinarity; lack of dedicated programmes for cultural heritage researchers; and inadequate funding for participants to take up programmes available.

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[66]

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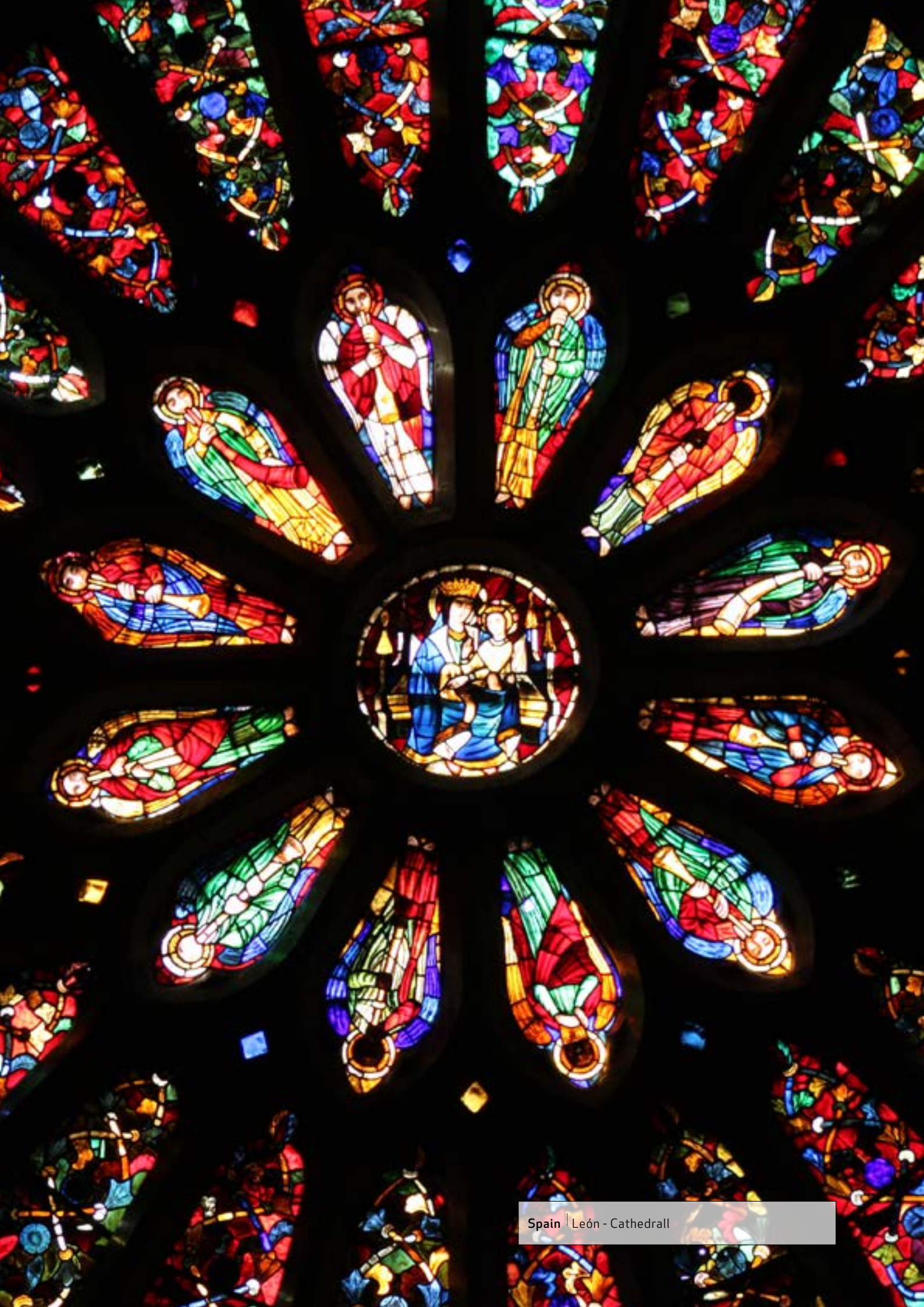
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