NORWAY - NCP INPUT

The Common Framework was the template used to provide input to the Strategic Research Agenda (SRA) for the JPI Cultural Heritage and Global Change. These are inputs to the Common Framework from the individual participating country named above. To find out more about the process involved in the creation of the SRA, please go to www.jpi-culturalheritage.eu.

Main driver (as identified in the DoW)	Additional drivers	Identifier	Addition? Include new identifier	PRIORITY	Research area	Research gaps	Research needs
Use		U.1			Linking quantitative and qualitative data around cultural heritage	Quantified /systematic approach to information generated from the fields of history, art history, archaeology, geography.	Applying semantic and automated techniques to these data, processing large quantities of digitized data to give new insights and involve new users in cultural heritage
Use		U.2			Geographic Information System on tangible and intangible cultural heritage	Web mapping and Web GIS tools for the tele-monitoring and remote control of archaeological sites and cultural landscapes	Adaptation of existing schemes to the needs of cultural heritage field.
Use		U.3		10	Revitalisation of built and landscape heritage	Sustainable strategies for built heritage and landscape use/management	Development of policy and strategies.
			U.3b			Protection and transformation of old building complexes and sites, including industrial complexes, through use.	Issues linked to land use planning, building volume and materials, pollution and energy etc.
Use		U.4			New uses for cultural heritage	Influence of new uses of landscapes (for example management techniques) and built heritage on their tangible and intangible cultural heritage values	Development and exploration with new management techniques of built heritage, sites and landscapes; in balance with the activities/wishes of the local people.
Use		U.5			Business development, finding new ways to engage with target groups and donors	Understanding the position of cultural heritage in society and the benefits of cultural heritage institutions to society.	Defining what makes cultural heritage institutions different from other institutions and determining whether this requires a specialised management approach.
Use		U.6			Wear and tear	Understanding of wear and tear of moveable and immoveable heritage	Development of models and theoretical concepts.
Use			U.6b			How to prevent wear and tear on cultural heritage and cultural environments, especially in connection with World Heritage Sites/tourism on a large scale.	Issues associated with, for example, the development of models to involve the tourist industry in the safeguarding of cultural-historical values.
Use			U.7a	2	Policy development, framework conditions and management	Knowledge of cultural heritage management, its framework conditions and actors.	How legislation and management organisation at different levels affects the use and protection of cultural heritage and cultural environments. The value added of broad participation and co-determination in all kinds of processes: different actors and population groups, ownership, relevance and legitimacy, power and influence.
Use			U.7b			Knowledge linked to the interaction of policies, statutory acts and regulations.	Interaction and conflict in the legal framework applying to cultural heritage. This includes consequences for the cultural heritage of indigenous peoples and minorities.
Use			U.7c			Knowledge of the extent and importance of the trade in and destruction of cultural heritage.	How to increase ethical awareness in connection with looting, and how to reduce the destruction of cultural heritage, for example during warfare and conflicts. How to increase ethical awareness of cultural heritage in order to reduce unlawful trade.
Use			U.8a	1	Consequences of land use changes for cultural heritage in urban and rural areas	Knowledge of urban development and urbanisation processes: the consequences for cultural heritage and cultural environments of land use changes due to growing development pressure.	General understanding of heterogeneous urban and urban settlement environments vis-a-vis local development to best preserve cultural-historical values from different eras. Knowledge of methods and processes for early integration and use of cultural heritage in physical planning and urban development. Comparative research linked to areas in a rapid process of change.
Use			U 8b			Knowledge of changes in rural landscapes - change processes, causes, effects, consequences and their significance for cultural heritage and cultural environments.	Knowledge of methods and processes for early integration and use of cultural heritage in physical planning and development. Consequences of demographic changes and vegetation alteration.
Use			U.9	9	Protection of cultural heritage through use, with a focus on value creation	Knowledge of cultural heritage's potential in environmental, cultural, social and economic value creation locally and regionally.	Cultural heritage as a driver of innovation and as a basis for economic activity. The link between cultural heritage and natural resources as a basis for value creation and life quality. Knowledge of what kinds of cultural heritage can be used as a basis for value creation. What are the consequences for cultural monuments and sites in active use as opposed to those not in active use? Knowledge of cultural heritage and tourism; consequences of tourism for the development of local communities.
Use			U.10	6	Links between cultural heritage and natural resources	Interdisciplinary and general research on the links between cultural heritage, cultural landscapes and natural resources.	
Access		A.1			Dissemination of cultural heritage knowledge	(Interactive) methods and education tools to increase the legibility of sites and landscapes	Development of (interactive) methods and education tools for a broad public.
Access			A.1b				What opportunities and consequences does the use of digital media entail for access to and awareness and understanding of cultural heritage?

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Access		A.2a			Semantic linking of cultural heritage information	Development of the concept of hybrid collections: material and their digital representations, development of digital platforms promoting creative processes	Automated application of domain or object specific knowledge.
Access		A.2b				Improving the intellectual, sensory and physical access to heritage through human-maching interactions	Development and evaluation of human-machine interactions.
Access		A.3			Visualisation of heritage	Increase in amount and complexity of data used on smaller interfaces	Develop understanding of how to visualise complex, unstructured and semantically rich data.
Access		A.4			Interaction with digital cultural heritage	The ways users interact with digital cultural heritage	Acquiring knowledge of the changing behaviour with digital cultural heritage compared to physical digital heritage.
Access		A.5			Technical recognition of moving and still images	Moving and still images are not searchable	Development of techniques that identify images rather than textual representations.
Access		A.6			Technical recognition of handwritten text	Images of handwriting are not searchable	Development of algorithms applicable over wider ranges of text.
Access		A.7			User interaction	Value proposition of social tagging	Automated evaluation techniques; reconsideration of authority.
Access		A.8a			Tele-survey of tangible cultural heritage	Advanced systems for the tele-survey, remote sensing and laser techniques to investigate terrestrial and underwater cultural heritage	Development of systems for underwater investigation.
Access		A.8b				Innovative devices for the tele-survey of movable artefacts	Development of systems for distant survey.
Access		A.9a			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	Development of better materials, techniques and systems.
Access		A.9b				Strategies and techniques for using the new media complex	Development of recommendations and guidelines related to safe use of new media.
Access		A.10a			Security technologies and systems in museums, libraries, archives and historic buildings	Integrated systems for effective detection, prevention and reaction to risk situations such as fire, theft, vandal attacks	Development of systems for effective protection.
Access		A.10b				Techniques to support the identification of fakes or stolen artefacts, as well as the related data bases, with special reference to the insurance issues	Development of adequate techniques and databases.
Access		A.11			Management strategies for secure access to archaeological sites and cultural landscapes	Techniques/approaches for sustainable management, mechanims for public presentations and access of sites and landscapes	Development and exploration of access policy of built heritage, sites and landscapes.
Access		A.12			Deinstitutionalisation of cultural heritage	What is the role of cultural heritage institutions in a digital world?	Defining where cultural heritage sits in a digital world and determining whether there is a need for a new kind of institution.
Access		A.13			Tagging and tracking	Wireless micro tagging solutions for real-time tracking	Technology development.
Access		A.14			Haptics	Development of haptic systems for remote tactile access to heritage	Technology development.
Access		A.15			Lighting	Development and understanding of new lighting solutions, including the effect of light on materials	
Access		A.16			IP rights and copyright issues (also for new media)	Legal studies in public domain for digital cultural heritage	Adjusting legislation to a digital environment.
Access			A. 17	14	Accessibility of cultural-historical data	Knowledge of new technology, development of standards and use of collections.	Importance of new technology in planning, registration and dissemination. Use of source material and collections as the basis of management, research, knowledge development and dissemination. Joint standards for digital archiving and presentation.
Interpretation		I.1			Cultural interpretations of heritage	Understanding factors that shape our understanding of cultural heritage	Determining how local communities and tourists shape the questions asked about cultural heritage.
Interpretation			I. 1b			Knowledge of cultural heritage as an identity-creating factor, particularly in terms of local identity.	
Interpretation		I.2			Wisdom of the crowd, social tagging	Value proposition of social tagging	Better understanding of the knowledge of the crowd: automated decision of trustworthiness.
Interpretation		I.3			Measurement instruments	Diagnosis, dating and comparative studies	Development of new instruments, methodologies and open source databases.
Interpretation		I.4			Research infrastructure	Coherent methods and instruments	Integration of research infrastructure accessible for cultural heritage sector.
Interpretation		I.5			Language technology	Development of language technologies for the interpretation of cultural heritage.	Integration of existing techniques and development of new methodolgies for language recognition (e.g. Text mining, sentiment mining, OCR augmentation, changes in diachronic corpora, speech recognition).

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Interpretation		I.6			Reference collections	Development and characterisation of reference heritage and art material libraries, systems for their cataloguing and data accessibility, including GIS	Development of databases.
Interpretation		I.7a			Technical art history	Knowledge of art and heritage materials and forms	Development of databases.
Interpretation		I.7b				3D hyperspectral imaging (using various parts of the EM spectrum) of objects and works of art, with standardisation protocols	Development of technologies, protocols, databases.
Interpretation		I.8			Natural history	Development of genomic and metabolomic databases of natural history collections for better understanding of past environments, natural and social	Development of technologies, protocols, databases.
Interpretation		I.9			Digital collections	Development and standardisation of concepts of authentication for digitally born materials	Theoretical concepts and standards.
Interpretation		I.10			Historic integrity and modern use of art and objects	Improving our understanding of the artist's or maker's intent	Improving our understanding of the artist's or maker's intent and determining the effectiveness of modern application of traditional craft skills to cultural heritage?
Interpretation		I.11			Historic integrity and modern use of built heritage and cultural landscapes	Balance between historic integrity and modern use of buildings, cultural landscape, including tourism and lifestyles	Improving our understanding of the origin and intention of the architects/planners and determining the effectiveness of modern application of traditional uses to cultural heritage.
Interpretation		I.12			Balancing intervention with aesthetics	How might we relate the unknown impact of intervention to society's need to appreciate the aesthetic?	Development of methods.
Interpretation		I.13			Interdisciplinary approaches to cultural heritage	Developing an interdisciplinary approach to understanding cultural heritage	Development of research frameworks or methodologies that draw on a range of evidence on cultural heritage – oral, aural, visual and written.
Interpretation			I.14a	13	Identity and societal development	Knowledge of cultural landscapes and cultural environments as a result of interactions between people and the natural environment over time.	The cultural landscape's layers of meaning. How can the understanding of the landscape and its cultural content be influenced?
Interpretation			I.14b			Knowledge of cultural heritage, way of life and governance as a basis for identity development.	How is our relationship to cultural heritage influenced in an everyday perspective? How is cultural heritage used in Europe as opposed to globally? How can cultural heritage be used in societal development in terms of the development of identity and minority policies?
Protection		P.1			Risk assessment	Lack of integrated web-based risk assessment tools	Development of web-based software.
Protection		P.2			Energy efficiency of historic buildings	Strategies for improving the energy efficiency of indoor environments.	Development of economic, energy-efficient and user-friendly systems for indoor environments.
Protection			P.2b			Knowledge of the adaptation of built heritage to new framework conditions.	More effective energy use, consequences for cultural heritage values.
Protection		P.3			Digital content	Long-time preservation of digitised and born-digital cultural contents	Value assessment; risk assessment costs; format knowledge; aspects of look and feel; software (applications like games. digital installations etc.) preservation; web preservation.
Protection		P.4a		12	Materials, technologies and procedures for maintenance and conservation of cultural heritage	Protection, exposition, conservation and restoration of cultural heritage, taking into account the criteria of durability, minimal intervention, reversibility, compatibility and retreatability	Development of material and techniques.
Protection		P.4b				Long-term effects of conservation treatments, carried out at present and in the past, on historic materials, objects and sites, including modelling and simulation of these effects, in order to improve the materials and procedures of the conservation practice	Development of evaluation methodologies.
Protection			P. 4c			Maintenance of modernism's cultural heritage, use of materials and choice of construction, sustainable upgrading.	Identify specific material challenges, strengthen knowledge of materials, and develop protection measures and strategies.
Protection		P.5			Protection and conservation of modern materials used in contemporary art and architecture	Identification, conservation and protection of contemporary materials such as plastics, ceramics, information carriers, concrete and other composite objects and constructions, electronics, new alloys, glasses, dyes, mortars and other, as well as of objects made of them	Development of models, theoretical concepts, novel tools, methods and materials for conservation of contemporary arts.

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Protection		P.6			Industrial heritage	Protection of industrial heritage	Development of strategies towards protection of industrial heritage.
Protection		P.7			Built heritage	Stabilisation of historic structures endangered by adverse changes in hydrogeological conditions in the ground	Development of technologies for stabilising.
Protection		P.8		15	Landscape heritage	Protection of cultural landscape and heritage.	Development of strategies towards conservation of cultural heritage; new forms of governance.
Protection			P. 8b			Research linked to green spaces in a cultural-historical perspective	Knowledge of materials, development of vegetation and maintenance. Knowledge linked to continuous change processes, use and protection.
Protection		P.9a			Understanding and modelling of decay	Development of models for reliable prediction of the behaviour of materials, objects and assemblies under various combinations of stressors (chemical, physical, biological)	Development of models and theoretical concepts.
Protection		P.9b				Understanding and modelling future risks of biological decay due to spread of species (mould, insects, rodents etc) with climate change	Development of models.
Protection		P.10			Defining and understanding damage	Developing and defining the concept of useful lifetime for various forms of heritage	Development of models and theoretical concepts.
Protection		P.11a			Investigation of damage mechanisms	Multidisciplinary approach on the interactions between environment and materials	Understanding of interactions between environment and materials/objects/collections; development of new tools.
Protection		P.11b				Interactions between specific environmental factors (temperature, moisture, …) and complex artefacts made of different materials	Understanding of interactions between environment and materials/objects/collections; development of new tools.
Protection		P.11c				Degradation of chemically unstable materials	Understanding of material transformation.
Protection		P.12a		5	Non-invasive testing	Development of non-invasive and non-destructive testing methods for immoveable and moveable cultural heritage	Development of models and technologies.
Protection		P.12b				Development of non-invasive real-time condition monitoring technologies and software support systems for immoveable and moveable cultural heritage, including new photonic sensors integrating colour and 3D vision	Development of models and technologies.
Protection			P. 12c			Development of new methods of monitoring, mapping, diagnosing and managing cultural heritage using new technologies and non-invasive methods. Development of decision support tools for risk assessment and prioritisation of protection.	
Protection		P.13			Intervention	Development of new environmentally-friendly materials and processes for conservation (consolidation, cleaning, restoration …) based on new technologies, e.g. nanotechnology, photonic technologies, rapid prototyping	Development of new services and products.
Protection		P.14			Environmental sensing and dosimetry	Development of sensing systems to detect and control active biodeterioration	Development of new services and products.
Protection		P.15a			Climate change mitigation and adaptation	Development of decision-making tools for a climate-proof heritage, including extremely-long-term monitoring solutions	Development of models and concepts.
Protection		P.15b				Understanding of rebound effects ('unintended consequences') of climate change mitigation and adaptation strategies	
Protection			P. 16	7	Underwater cultural heritage	Knowledge of cultural heritage in freshwater and saltwater.	Mapping, monitoring and interdisciplinary research on underwater cultural heritage. Development of decision support tools and in situ preservation strategies. Scientific research on materials in shipwrecks and cargoes. Development of a coordinated international in situ protection strategy.
Recognition		R.1a			Cultural Heritage ethics and identity	Is there an ethical or cultural boundary to what you can do with cultural heritage?	Raising awareness of/proficiency in digital possibilities (ranging from understanding processes to actual coding).
Recognition		R.1b				How does the use of cultural heritage contribute to identity at a personal, national, European, and/or global level?	Determining how cultural identity can contribute to the wellbeing of a community, including recovery from conflict.

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Recognition		R.2a		11	Value of Cultural Heritage	Cultural value of treatments, interventions	Development of an approach/methodology/new theoretical concepts.
Recognition		R.2b				To understand the perceptions and aspiration of people for cultural value	Application of existing knowledge and approaches to this area.
Recognition			R. 2c			How cultural heritage and cultural environments are attributed value on the basis of environmental, cultural, social and economic assessments, and what value concepts and criteria are applied?	What is preserved and why? What consequences do these choices have for use, preservation and development?
Recognition		R.3			Value of Cultural Heritage	Changing values/meanings of physical heritage in a digital world	Development of an approach/methodology/new theoretical concepts.
Recognition		R.4			Cognitive-perceptual theory	Lack of knowledge of how we perceive aspects of cultural heritage	Application of existing and development of new knowledge and approaches to this area, perception research.
Recognition		R.5			Rights and responsibilities around cultural heritage	Individual rights, collective responsibilities and the balances between public and private domain	Insights in the attitude to cultural heritage by different stakeholders.
Recognition		R.6a			Understanding values	Systematic research into value systems, including economic values and increased quality of life	Development of models, new theoretical concepts and understanding of of non-financial benefits of cultural heritage.
Recognition		R.6b				Policy research into the added value of heritage science	Development of models.
Recognition		R.7			Sustainability	Understanding embodied energy in heritage materials, structures and assemblies	Development of models, theoretical concepts.
Recognition			R. 7b			Importance of cultural assets in sustainable societal development.	
			R. 8	4	Cultural diversity and identity	Knowledge of how cultural diversity contributes to increased awareness and understanding of cultural heritage and cultural environments.	How indigenous peoples and minorities develop stories, and how the stories communicate with the remainder of society: locally, nationally, regionally, and in a European and global context in terms of population groups and diversity.
Change		C.1			Environmental assessment and monitoring (pollution, climate change, seismic risk)	Development of integrated resource and environmental management/monitoring systems based on optimally balanced environmental costs and conservation benefits. For example, development of new sensors and sensing systems for pollutants (including microbiological) of particular concern to cultural heritage: H2S, acetic acid, NOx, particulates, including smart (nano) sensors, lab-on-a-chip technology, nanorobotics etc.	Understanding of synergic interaction and influence of the pollutants with materials and environments.
Change		C.2			Mitigation of climate change	Mitigation of the negative effects of climate change on materials and structures	Development and implementation of adequate technologies.
Change		C.3			Measurement instruments	Non-invasive instruments and methodologies for diagnosis and monitoring	Development of new instruments.
Change		C.4		3	Climate change	Understanding of the effects of climate change on built, archaeological, coastal, submerged heritage	Development of models and concepts.
Change			C. 4b				More effective energy use, consequences for buildings deemed worthy of protection with special emphasis on wooden buildings. Water management including flooding, management of surface water and groundwater conditions, and consequences for cultural layers, buildings and landscapes (JPI Water).
			C. 4c			How to safeguard cultural heritage in terms of conflicting societal interests linked to climate initiatives.	General, interdisciplinary research, risk assessments and design of remedial measures.
Change		C.5			Global change adaptation	Opportunities for sites and cultural landscapes in reducing the effects of climate change	Knowledge global/climate change and effects on local scale.
Change			C. 6b	8	Consequences for cultural heritage of demographic changes as well as of conflict and development	Knowledge of demographic changes across ethnic, language and cultural borders.	How will demographic changes affect attitudes to and safeguarding of cultural heritage?
Change			C. 6c			Knowledge of cultural heritage linked to conflict, conflict resolution and regime change.	Research on cultural heritage in connection with warfare and conflict: material and immaterial cultural heritage, collective memory, etc. How can cultural heritage be used in work on reconciliation and conflict resolution? How does the practice and use of cultural heritage change after political regime changes?