

Paper 4E - Public
Europeana Foundation
Governing Board Meeting

21 September 2018
9h30 – 16h45 CEST
Deutsche Nationalbibliothek
Adickesallee 1 / 60322
Frankfurt am Main

**Europeana Innovation Task Force - Agenda for research and innovation
Progress report**

Action proposed: For information and discussion

Progress report September 2018

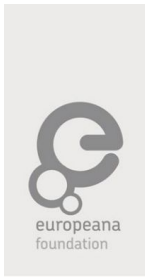
Prepared by Rasa Bocyte and Johan Oomen
The Netherlands Institute for Sound and Vision

SCOPE

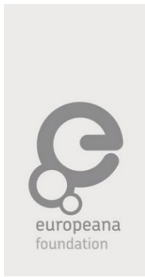
The Europeana Innovation Task Force was established in April 2017 in response to the call for an “innovation agenda for the digital cultural heritage domain” identified in the *Final Report on Horizon 2020 Results Analysis*. The report indicates the necessity to investigate research and innovation needs in the digital cultural heritage sector and advocate for their implementation within European dimensions. Europeana with its extensive network is very well-placed to deliver this and become a prominent advocate for innovation.

The main purpose of the Task Force is:

- to define the research and innovation needs for the digital cultural heritage sector;
- to set-up a framework for inclusion of innovation topics in the EU’s funding programmes: Horizon 2020, CEF, Creative Europe, Joint Programming Initiative and others.



There is a strong feeling of urgency to keep up with the fast-paced technological developments and changing end-user needs as well as respond to societal and environmental challenges. Finding a place for research and innovation within the European funding programmes will be paramount to support these needs and keep the cultural heritage sector at the heart of the sustainably growing and technologically advanced society.



Step 1: Defining Research topics (completed)

The work of the Innovation Task Force initially commenced with the appointment of Task Force members from the Europeana Foundation Board and discussion of preliminary ideas and desired outcomes.¹ In March 2018 initial topics were formulated from an comprehensive literature review of innovation and research trends within the cultural heritage sector. These were complemented with ideas from the wider Europeana community gathered during the EuropeanaTech conference in May 2018.²

Following is the list the most prominent research and innovation topics resulting from this research.³ The broad variety of challenges and opportunities they touch upon showcase the scope of innovation that cannot be limited to technological stimulation only. Topics are clustered around four large areas, however, more often than not, they overlap and need to be addressed and implemented simultaneously.

1. INSTITUTIONAL STRATEGY AND IMPACT

1.1. Skills for Cultural Heritage Professionals

Sustainable development of digital skills for the cultural heritage professionals is the driving force behind innovation in the heritage sector. There is a great demand for practical workshops on the use and implementation of linked open data and the building of open source applications and tools. Policies that support continuous nurturing of talents should be developed to help organisations keep up with the fast-paced changes in the sector.

1.2 Opening Up and Reaching Out

Innovation actions should foster an environment where cultural organisations are stimulated to open up their collections and reach out to external partners. Cultural policies should encourage organisations to break out of institutional silos and promote the integration of efforts on European level projects as well as partnerships with outside communities and businesses. To remove the barriers for collaboration, there is a need to provide support in legal areas and the implementation of interoperable standards which will ease the entry into to the shared European heritage landscape.

¹ See *Europeana Foundation Governing Board Meeting* document <https://docs.google.com/document/d/14oyPa2fWajnZwdLF-G96N2aTMM2RPagQ6m4O5wHZf3o/edit?usp=sharing>

² Participants were asked to share their ideas for innovation in the digital cultural heritage sector via a postcard. See analysis of the results in *Topics for Innovation Agenda* document https://docs.google.com/document/d/1pTR9ETbjKqjOm9cnHpS_cZMN05DLFrw20iFKPP-gc0/edit?usp=sharing

³ See Appendix 1 for a more extensive description of the topics.

1.3 Frameworks for Sustainable Collaboration

With the cultural sector increasingly relying on collaborative digital platforms, there is an urgent need for frameworks that help to foster partnerships and encourage the distribution of knowledge. The sector should invest in the creation of shared knowledge hubs that allow individual stakeholders to effectively exchange and share their competences. Such infrastructures should focus on making collaborative culture attractive to individual institutes and help them benefit from participation.

1.4 Maximising Audience Engagement

Research actions are required to bring the audiences closer to the cultural heritage. There is a demand for tools that can anticipate and predict user needs and analyse how cultural assets are being used. It is equally important to deliver more diverse content, especially the currently underrepresented mediums and formats, such as performing arts or complex multimodal objects, in order to reach new users. Organisations are keen to engage their audiences in the development of tools and services to increase their impact and encourage wider cultural participation.

2. TECHNOLOGICAL INNOVATION

2.1 Digitisation and Digital Durability

The sector needs tools that will automatise the digitisation process for massive volumes of heterogeneous artefacts and develop non-invasive technologies that can deliver high-quality results. Coordination actions are required to oversee and support the implementation of digitisation processes across cultural institutes. Large-scale digitisation of multimodal cultural assets will be a crucial step towards realising the vision of the shared European heritage that works for everyone.

2.2. Data Quality, Usability and Retrieval

Cultural policies should stimulate research into the methods that can enhance the quality, usability and retrieval of complex digital data. Machine learning and Artificial Intelligence will play a crucial role here offering innovative solutions for automatic extraction of detailed metadata and optimisation of content searchability. In particular, tools are needed for the enrichment and discovery of multilingual materials, 3D models and audiovisual content. The sector needs to coordinate its actions and promote the interoperability of standards and tools to ensure the usability of data across platforms for diverse purposes.

2.3 Digging into Data

The sheer volume of digital objects, the diversity of metadata categories and the granular level of detail available ask for new approaches and tools that can effectively connect datasets from different contexts and extract valuable insights from them. The heritage sector needs to develop tools for the management, curation and analysis of big data. More support is needed for digital humanities projects that investigate novel data mining and visualisation techniques which enable end-users to discover new perspectives from heterogeneous datasets.

2.4 Storytelling and Immersive Experiences

The availability of high quality interlinked data opens new gateways for presenting cultural heritage and intensifying its impact. To take full advantage of this, research actions should focus on unleashing the potential of novel technologies such as VR, AR, 360 videos and 3D modelling to offer full-body, immersive and personal encounters with the cultural heritage. Institutes should experiment with these new storytelling capabilities and develop platforms and tools that allow audiences to visualise the past from yet unexplored perspectives.

2.5 Infrastructure for Secure, Trustable and Shareable Content

Distributed architectures capable of handling large volumes of data in a secure and effective way are needed to foster advancement towards a truly shared heritage across Europe. Research actions should investigate how the sector could take advantage of distributed vendor platforms such as Blockchain to guarantee the security of content and services. New methods are required to increase the efficiency and quality of sharing and improve data management workflows so that stakeholders would be incentivised to contribute.

3. SOCIAL CHANGE

3.1 Activating the Social Impact

Cultural heritage plays a major role in shaping inclusive societies and promoting social cohesion and integration. The sector should maximise its social impact by investing in innovative projects that reflect on the challenges that matter most to the European citizens. This includes topics such as social injustice, integration of migrants and gender issues. Cultural institutes need to find ways to foster cultural diversity and engage different social groups in the construction of their representation through cultural heritage.

3.2 Cultural Heritage for Education

Cultural institutes need support for executing projects and developing services that reach diverse age groups and create conditions for lifelong engagement with heritage.

Exploiting the potential of digitisation and immersive storytelling, innovative solutions are needed to embed cultural assets into education programmes and platforms. Ease of access to diverse sources and the ability to create engaging narratives from big data is key to fosters the appreciation for heritage from an early age as well as help audiences to reconnect with and discover European culture.

4. ECONOMIC INNOVATION

4.1 Valorisation of Cultural Assets

Research actions are needed to explore how to harness the economic potential of cultural heritage that stimulates growth and employment across diverse industries. European policies should promote experimentation with innovative methods that can turn cultural heritage assets into sustainable sources of revenue. Large-scale digitisation and online platforms offer creative opportunities to exploit this potential and boost the attractiveness of the sector.

4.2 New Routes to Funding

Research actions should investigate how alternative funding options such as crowdfunding, donation-based initiatives and impact investment could be implemented to make the heritage sector more responsive to economic challenges. Policies that promote and coordinate private sector investments into individual cultural institutions as well as large-scale European projects are needed. Incentivising financial support from such alternative sources can play a vital role in providing sustainable support for the sector and allowing it to seize the opportunities for growth and innovation.

The exact formulation of the list is still under consideration and requires some revision. These topics will form the foundation for the Innovation Agenda around which the advocacy for research and innovation will revolve.

Step 2: Evaluating the topics (ongoing)

The topics listed above cannot be considered in a vacuum - a strong infrastructure, effective operational and business planning and policies are needed to maximise their potential. Assessment of achievability and relevance will help determine what role these topics should play in shaping the cultural heritage sector.

For this reasons, an evaluation matrix was chosen to assess the urgency and impact of each topic (see figure 1).⁴ Preliminary evaluation conducted amongst the Task Force members immediately revealed emerging trends:

- **ACT NOW** on the development of skills for cultural heritage professionals (topic 1.1), stimulation of an open and collaborative sector (1.2), improvement of data quality, usability and retrieval (2.2) and exploitation of cultural heritage assets (4.1);
- **KEEP VIGILANT WATCH** on infrastructures for secure and trustable content (2.5);
- **REVISIT** immersive storytelling and personalised encounters with cultural heritage (2.4) **LATER**;
- Sustainable collaboration within the sector (1.3) should **INFORM STRATEGY**.⁵

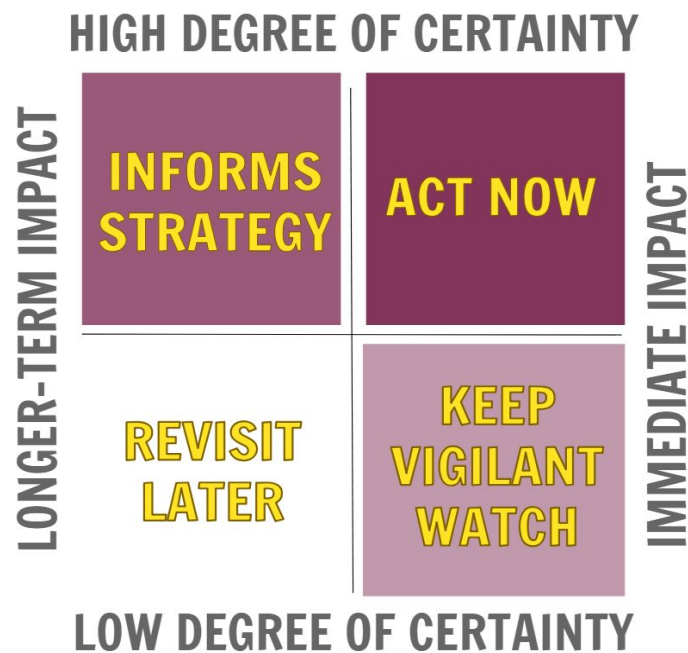
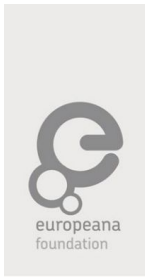


Figure 1 Evaluation matrix

⁴ The matrix was borrowed from the 2018 Tech Trends Report by Future Today Institute. See <https://futuretodayinstitute.com/2018-tech-trends-annual-report/>

⁵ For an extensive analysis of the voting results refer to *Evaluation of Innovation Agenda* document <https://docs.google.com/document/d/1Ts3aoaZM2WJk94NpaA0HXwn88EvD1dq2cEgG6iq3abs/edit?usp=sharing>



The next step to be taken is to perform a similar assessment on a larger scale. After the exact wording of topics is finalised, a survey will be distributed to the Europeana Network asking members to evaluate each topic using the same matrix. **[Action 1: Discuss the role of the EuropeanaTech community, especially given the ongoing [discussions on how to activate the network](#). Action 2. Evaluate the topics in the Europeana Network]** Input from the wider Europeana community will aid in clearly defining the impact the Innovation Agenda should have in the cultural heritage landscape and determine future actions that could be taken to maximise its potential in the areas where it is most needed.

Step 3: Aligning the Agenda with Europeana Policy (ongoing)

Aligning the Innovation Agenda with Europeana's vision and creating synergies with other European cultural policies is a crucial component framing the direction of the Innovation Task Force. A cohesive approach that builds on other leading strategies in the cultural heritage sector needs to be presented to the decision-making bodies to ignite a sense of urgency around the innovation needs and their inclusion in the European funding programmes. For the context of the Innovation Agenda, the most relevant strategies to be referred to are:

- Europeana Impact framework⁶
- Europeana Strategic Plan⁷
- Virtual Multimodal Museums (ViMM) manifesto⁸
- Horizon 2020 Programme⁹
- Horizon Europe¹⁰
- Multiannual Financial Framework: Digital Europe programme¹¹

⁶ <https://pro.europeana.eu/post/europeana-strategy-2015-2020-impact>

⁷ <http://strategy2020.europeana.eu/update/>

⁸ <https://www.vi-mm.eu/2018/06/18/vimm-draft-manifesto/>

⁹ <https://ec.europa.eu/programmes/horizon2020/>

¹⁰

https://ec.europa.eu/info/designing-next-research-and-innovation-framework-programme/what-shapes-next-framework-programme_en

¹¹ https://ec.europa.eu/info/law/better-regulation/initiatives/com-2018-434_fr

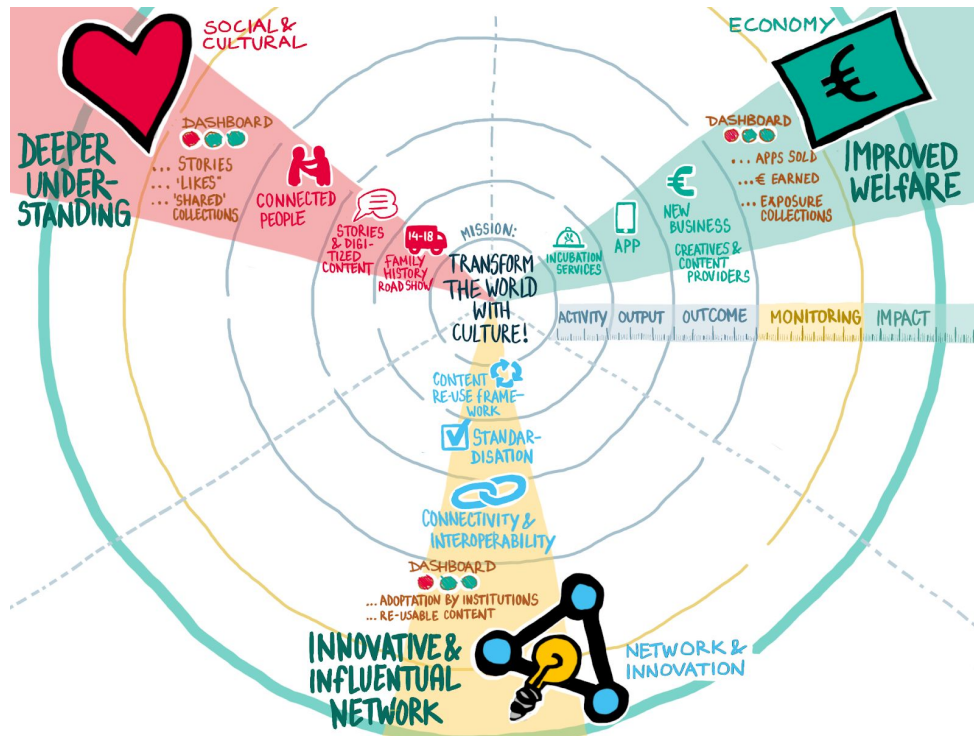


Figure 2 Europeana Impact Framework

Continuing with the assessment of impact, the Europeana Impact Framework (figure 2) offers a different perspective on how the innovation topics could be clustered (figure 3).¹² Using the desired impact as the main reference point, the framework accentuates the tangible effects on all the parties involved - socio-cultural benefits to the user communities, improved welfare of stakeholder institutes and widening opportunities for the cultural heritage network as a whole. **[Action 3: Review the mapping]**

¹² The distribution of topics presented here is not finalised yet and still needs further discussion.

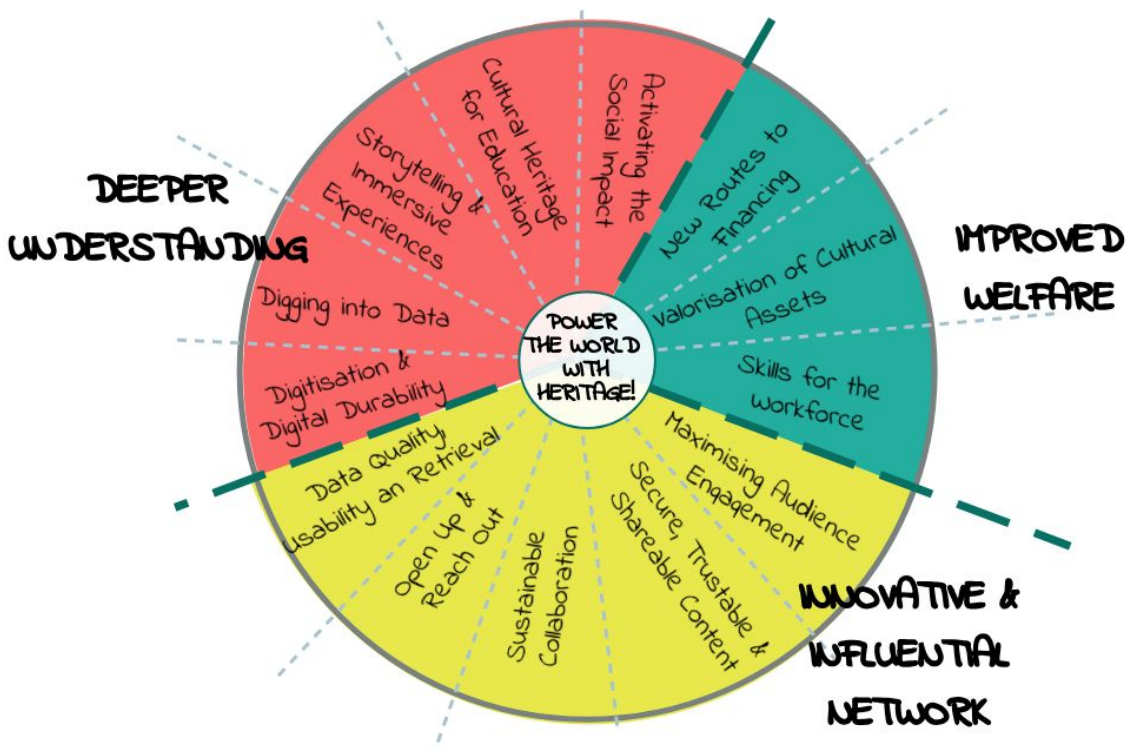


Figure 3 Aligning innovation topics with Europeana Impact Framework

DEEPER UNDERSTANDING - SOCIAL & CULTURAL IMPACT

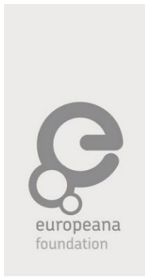
Expected Impact: Shape European identity

Cultural heritage is a powerful asset that can help foster the sense of belonging and cohesion for all citizens. As such, it should be employed to represent all individuals and groups despite socioeconomic, demographic or geographic boundaries. Especially in the light of recently increased migration flows and the rapidly changing socioeconomic mechanisms and technology, cultural heritage is needed as a source for advancing inclusive, innovative and reflective societies. Using cultural heritage to reflect on the past and current societal challenges (topic 3.1) and offering a deeper understanding of complex and topical issues will be paramount to shaping the identity of European societies.

Relevant Horizon 2020 Calls:

- DT-TRANSFORMATIONS-11-2019: Collaborative approaches to cultural heritage for social cohesion
- TRANSFORMATIONS-08-2019: The societal value of culture and the impact of cultural policies in Europe
- ICT-30-2019-2020: An empowering, inclusive Next Generation Internet

Expected Impact: Intensified engagement with cultural heritage



For cultural heritage to achieve its full potential, innovative solutions should be explored to bring audiences closer to artefacts from the past and create opportunities for making much more personal connections. New technological innovations such as VR, AR and 3D modelling can enable such personalised storytelling experiences (topic 2.4). The ease of access and reuse that digitisation provides should be taken as an opportunity to embed cultural heritage into the education for all age groups and foster lifelong engagement with it (topic 3.2). To successfully engage different social groups, organisations need to gain more insight into the needs of their audiences and understand how the content is being used in order to deliver better tools and services (topic 1.4).

Relevant Horizon 2020 Calls:

- INFRAIA-01-2018-2019: Integrating Activities for Advanced Communities
- ICT-25-2018-2020: Interactive Technologies
- ICT-27-2018-2020: Internet of Things

Expected Impact: Research on an unprecedented scale, detail and complexity

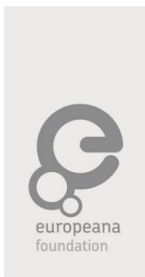
Using technological innovations, the sector should bridge the knowledge gaps and continuously seek for ways to provide new insights into the shared European past. Digitisation is a key factor here facilitating access and sharing opportunities on an unprecedented scale (topic 2.1). However, on its own, digitisation is not enough to connect diverse cultural resources and produce a seamless knowledge flow. Methods that can improve data quality, retrieval and interoperability (topic 2.2) are paramount, in particular when it comes to bridging the gaps between artefacts in different media types and languages, as well as processing the vast corpus of handwritten materials. This will enable a truly big data analysis and curation. Techniques that allow researchers to dig into this data (topic 2.3) on a large scale or in very minute detail and discover new relationships between diverse datasets will be essential to unlock a deeper understanding of the European heritage and explore how it continues to shape the present.

Relevant Horizon 2020 Calls:

- DT-TRANSFORMATIONS-12-2018-2020: Curation of digital assets and advanced digitisation
- ICT-12-2018-2020: Big Data technologies and extreme-scale analytics
- ICT-26-2018-2020: Artificial Intelligence
- ICT-29-2018: A multilingual Next Generation Internet

INNOVATIVE & INFLUENTIAL NETWORK - IMPACT ON NETWORK & INNOVATION

Expected Impact: Sustainable and inclusive collaborative projects at the European level



With the growing focus on collaborative efforts and projects that cross any borders, infrastructures that enable seamless collaboration and interoperability between policies, standards, workflows and tools (topic 1.3) are needed. To eradicate any barriers and maximise this collaborative potential, individual organisations require support that would encourage them to open up their collections and expertise and reach out to find partners to collaborate with on international projects (topic 1.2). There is a strong demand for frameworks that would demonstrate the mutual benefits of collaboration and help to sustain long-lasting relationships. Here individual institutions, in particular, small and medium organisation with limited resources, need encouragement and assistance (topic 1.1) for navigating the rights management issues and sustainably developing skills and services to keep up with the larger actors in the field.

Relevant Horizon 2020 Calls:

- DT-GOVERNANCE-13-2019: Digitisation, Digital Single Market and European culture: new challenges for creativity, intellectual property rights and copyright
- INFRAINNOV-01-2019: Stimulate the innovation potential of SMEs
- INFRASUPP-01-2018-2019: Policy and international cooperation measures for research infrastructures

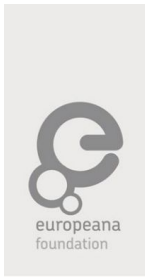
Expected Impact: Shared knowledge and expertise frameworks

Successful realisation of research and innovation projects depends on the availability of expertise and support from organisations across the sector. Shared knowledge hubs enable the implementation of international and inter-disciplinary synergies and open opportunities for growing together in an efficient and sustainable way. The sector is in need of such infrastructures that can address sector-wide issues and provide platforms for developing interoperable and collaborative standards as well as exchanging expertise (topic 1.1, 1.3). These frameworks will empower smaller actors to become more competent thus increasing the overall competitiveness and productivity in the sector.

Relevant Horizon 2020 Calls:

- INFRADEV-03-2018-2019: Individual support to ESFRI and other world-class research infrastructures
- INFRAEOSC-04-2018: Connecting ESFRI infrastructures through Cluster projects
- INFRAEDI-03-2018: Support to the governance of High Performance Computing Infrastructures
- DT-ICT-05-2020: Big Data Innovation Hubs

Expected Impact: Groundbreaking ICT solutions



The driving forces behind the majority of currently funded European research projects are innovative technological solutions that have opened unprecedented opportunities for engaging with cultural heritage. In particular, the currently developing technologies that can create immersive and personalised experiences (topic 2.4) and significantly improve data quality, retrieval and interoperability (topic 2.2) deserve thorough investigation and experimentation to achieve truly disruptive results. Responding to the increasingly decentralised and collaborative profile of the sector, an infrastructure that addresses the challenges of sharing content in a secure and trustable as well as efficient (topic 2.5) and reliable way needs to be developed.

Relevant Horizon 2020 Calls:

- INNOSUP-03-2018: Blockchain and distributed ledger technologies for SMEs
- INFRAEDI-01-2018: Pan-European High Performance Computing infrastructure and services (PRACE)
- ICT-24-2018-2019: Next Generation Internet - An Open Internet Initiative

IMPROVED WELFARE - ECONOMIC IMPACT

Expected Impact: Sustainable growth of the sector

Maximum impact can only be achieved with the sustainable investment in infrastructures that support research and innovation. Keeping up with the changing socio-economic climate and technological advances requires long-term investment into, maintenance and development of skills, expertise and collaborative relationships. Practical hands-on training programmes for cultural heritage professionals (topic 1.1) that focus on interoperable standards and emerging technological solutions will develop a skilled and confident workforce across the sector that is needed to drive the innovation and research forward and foster a competitive field. Organisations that are ready to take on innovation challenges will be able to create a stronger socioeconomic impact across the sector.

Relevant Horizon 2020 Calls:

- TRANSFORMATIONS-01-2018: Research for inclusive growth: addressing the socioeconomic effects of technological transformations
- INFRADEV-03-2018-2019: Individual support to ESFRI and other world-class research infrastructures
- SC5-19-2018: International network to promote cultural heritage innovation and Diplomacy

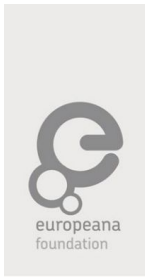
Expected Impact: Sustainable business and financing models

Cultural heritage sector needs to be ready to face financial challenges without sacrificing its research and innovation needs. Rethinking the current business models, discovering new

routes for financing and exploring potential revenue avenues will play a large role in the coming years. Initiatives to find alternative funding from public and private sector as well as from more experimental solutions like crowdfunding will foster a more competitive sector and build new partnerships with outside partners (topic 4.2). Digitisation, improved quality of data and open and interoperable standards play a key role here making the sector more financially attractive and increase its potential for exploitation by outside actors. Promoting and harnessing this increased economic value of digital heritage (topic 4.1) will make the organisational business models more secure and resistant to financial fluctuations.

Relevant Horizon 2020 Calls:

- CE-SC5-05-2018: Coordinated approaches to funding and promotion of research and innovation for the circular economy
- INNOSUP-07-2019: European Open Innovation network in advanced technologies
- INNOSUP-06-2018: Supporting experimentation in innovation agencies
- INNOSUP-09-2018: Design and development of a tool to support and improve the decision making process of investors for financing high-growth potential innovative SMES
- DT-GOVERNANCE-13-2019: Digitisation, Digital Single Market and European culture: new challenges for creativity, intellectual property rights and copyright



Future Work

Action 1: discuss the role of the EuropeanaTech community, especially given ongoing discussions on how to activate the network.

Action 2. Evaluating the topics in the Europeana Network (survey to network members after the formulation of the topics is finalised (perhaps in September?))

Action 3: Review the mapping (alignment with Impact Framework and Horizon 2020/Horizon Europe projects)

Appendix 1: Revised Innovation and Research Topics

1. INSTITUTIONAL STRATEGY AND IMPACT

1.1. Skills for Cultural Heritage Professionals

Fast-paced digitisation, new technologies and changes in the socioeconomic landscape constantly pose new demands on the workforce who is expected to implement and keep up with them. Lack of sufficient training and capabilities often becomes a barrier to carrying out experimental projects and competing with larger cultural organisations and the commercial sector.

The sustainable development of digital skills will be the driving force behind innovation in the heritage sector. There is a great demand for practical workshops on the use and implementation of linked open data and the building of open source applications and tools. Policies that support continuous nurturing of talents and skills should be developed. This will enable institutes to not only keep pace with innovation but also cultivate the culture for experimentation that will push it forward.

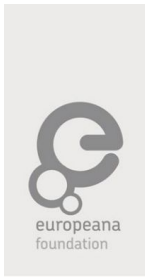
1.2 Opening Up and Reaching Out

The digital turn has prompted opportunities to aggregate knowledge and build shared cultural heritage platforms as well as instigated interest from external partners in creative and commercial industries. The advancement in this direction, however, is often compromised by the lack of incentive to collaborate within and without the sector. The benefits of contributing cultural assets and expertise to collaborative projects are often outweighed by the costs, legal risks and efforts of participation that SMEs cannot afford to invest in.

Cultural policies should encourage the heritage sector to break out of institutional silos and promote the integration of efforts on European level projects as well as participation in partnerships with outside communities and businesses. Innovation actions should be taken to foster an environment where cultural institutes feel stimulated to open up their collections and reach out to external partners. To remove the barriers for participation, there is a need to provide support in legal areas and the implementation of interoperable standards that will ease the entry into to the shared European heritage landscape.

1.3 Frameworks for Sustainable Collaboration

With the cultural sector increasingly taking advantage of the flow of information in the digital single market, collaborative platforms are becoming more and more prominent. However, often the barrier to successful partnerships is the lack of common ground.



Individual organisations hold extensive knowledge in their expertise areas but often that knowledge is not shared or communicated in accessible forms.

Innovative solutions are needed to sustain lasting relationships that are driven by the interest in growing shared expertise. The sector should invest in creating shared knowledge hubs that allow individual stakeholders to effectively exchange and distribute their competences. Such infrastructures should focus on making collaborative culture attractive to individual institutes and help them benefit from participation.

1.4 Maximising Audience Engagement

Digital platforms have opened unprecedented possibilities to engage with wider audiences and instantaneously deliver content to them. Yet it is not always clear whether their needs are matched. There is a lack of understanding of how to enable end-users to take full advantage of cultural assets. This asks for strategies that would help institutes to deliver the right content to the right audiences.

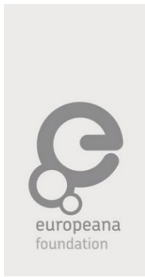
Research actions are required to bridge this gap between the cultural heritage and end-users. There is the demand for tools that can anticipate and predict user needs and analyse their use of cultural assets. It is also necessary to deliver more diverse content, especially the currently underrepresented mediums and formats, such as performing arts or complex multimodal objects, in order to reach new users. Institutes are keen to engage their audiences in the development of such tools and services to increase their impact and encourage cultural participation.

2. TECHNOLOGICAL INNOVATION

2.1 Digitisation and Digital Durability

Due to the digitisation, cultural heritage assets are no longer restricted by geographic or temporal barriers. However, the impact of digitisation in Europe still has not reached critical mass - it is primarily limited by the absence of technologies that can transform heterogeneous cultural artefacts into usable digital representations in a sustainable, efficient and cost-effective manner.

The sector needs tools that will automatise the digitisation process for massive volumes of heterogeneous artefacts and develop non-invasive technologies that offer high-quality results. Coordination actions are required to oversee and support the implementation of digitisation processes across cultural institutes. Large-scale digitisation of multimodal



cultural assets will be a crucial step towards realising the vision of the shared European heritage that works for everyone.

2.2. Data Quality, Usability and Retrieval

With the availability of large volumes of complex data comes the challenge of transforming it into accessible and usable digital objects. The current workflows are not equipped to accommodate multilingual materials, 3D models and audiovisual content according to the FAIR (findable, accessible, interoperable and reusable) data principles. The absence of powerful tools for data enrichment and discovery prevents the sector from taking the full advantage of the linked open data opportunities and puts barriers for end-users who want to engage with digital assets.

Cultural policies should stimulate research into methods that can enhance the quality, usability and retrieval of complex digital data. Machine learning and Artificial Intelligence will play a crucial role here offering innovative solutions for automatic extraction of detailed metadata and optimisation of content searchability. The sector needs to coordinate its actions and promote the interoperability of standards and tools to ensure the usability of data across platforms for diverse purposes.

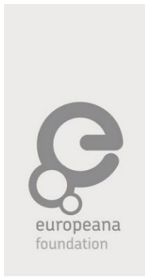
2.3 Digging into Data

Curation and management of cultural assets are challenged by the complexity of data. The sheer volume of digital objects, the diversity of metadata categories and the granular level of detail available ask for new approaches and tools that can effectively connect datasets from different contexts and extract valuable insights from them. The heritage sector needs to develop tools for managing, curating and analysis big data. More support is needed for digital humanities projects that investigate novel data mining and visualisation techniques which enable end-users to discover new perspectives from heterogeneous datasets.

2.4 Storytelling and Immersive Experiences

The availability of high quality interlinked data opens new gateways for presenting cultural heritage and intensifying its impact. To take full advantage of this, the heritage sector needs to implement innovative technological solutions for reaching dispersed audiences in an way that encourages deep engagement and further exploration.

Research actions should focus on unleashing the potential of novel technologies such as VR, AR, 360 videos and 3D modelling to offer full-body, immersive and personal encounters with cultural heritage. Institutes should experiment with these new storytelling capabilities and develop platforms and tools that allow audiences to visualise the past from yet unexplored perspectives.



2.5 Infrastructures for Secure, Trustable and Shareable Content

The increasingly interconnected and decentralised cultural heritage sector lacks horizontal technologies that would ensure trust and efficiency of services within the network. Distributed architectures capable of handling large volumes of data in a secure and effective way are needed to foster advancement towards a truly shared heritage across Europe.

Research actions should investigate how the heritage sector could take advantage of distributed vendor platforms such as Blockchain to guarantee the security of content and services. New methods are required to increase the efficiency and quality of sharing and improve data management workflows so that stakeholders would be incentivised to contribute.

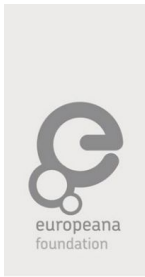
3. SOCIAL CHANGE

3.1 Activating the Social Impact

Cultural heritage plays a major role in shaping inclusive societies and promoting social cohesion and integration. Especially during times of political and social turmoil, culture can serve a binding agent bringing different communities and perspectives together into a dialogue. To take full advantage of this, the heritage sector needs to take a more prominent stance in the social sphere and invest in innovative projects that reflect on the challenges that matter most to European citizens. This includes topics such as social injustice, integration of migrants and gender issues. Cultural institutes need to find ways to foster cultural diversity and engage different social groups in the construction of their representation through cultural heritage.

3.2 Cultural Heritage for Education

With cultural participation being one of the factors that greatly contributes towards the well-being of European citizens and their sense of belonging to the society, it is essential to create conditions for lifelong engagement with heritage. Cultural institutes need support for executing projects and developing services that reach diverse age groups. Exploiting the potential of digitisation, big data and immersive storytelling, innovative solutions are needed to embed cultural assets into education programmes and platforms. Ease of access to diverse sources and the ability to create engaging narratives from them is key to fosters the appreciation for heritage from an early age as well as help audiences to reconnect with and discover European culture.



4. ECONOMIC INNOVATION

4.1 Valorisation of Cultural Assets

Cultural heritage is an important economic driver for Europe stimulating growth and employment across diverse industries. The sector is no longer seen as a burden on the economy but rather as a financially attractive resource. However, in many cases opportunities to valorise cultural assets are missed due to the lack of experience and support in this area.

Research actions are needed to explore how to harness this economic potential of cultural heritage. European policies should promote the experimentation with innovative methods that can turn cultural assets into sustainable sources of revenue. Large-scale digitisation and online platforms offer creative opportunities to exploit this potential and boost the attractiveness of the sector.

4.2 New Routes to Funding

The urgency for innovation within the sector is high, yet the lack of resources often stand in the way of implementing it. SMEs that rely primarily on public funding to realise small-scale project for local communities are particularly susceptible to this. They need business models that would make them less vulnerable to financial pressures.

Research actions should investigate how alternative funding options such as crowdfunding, donation-based initiatives and impact investment could be implemented to make the heritage sector more responsive to economic challenges. Policies that promote and coordinate private sector investments into individual cultural institutions as well as large-scale European projects are needed. Incentivising financial support from such alternative sources can play a vital role in providing sustainable support for the sector and allowing it to seize the opportunities for growth and innovation.

Circulation:

Europeana Foundation Governing Board Members, Observers and the DCHE Expert Group

Classification:

Public

Relevant Sources

Cultural Heritage Counts for Europe

<http://blogs.encatc.org/culturalheritagecountsforeurope/outcomes/>

Cultural heritage Digitisation, online accessibility and digital preservation

http://ec.europa.eu/information_society/newsroom/image/document/2016-43/2013-2015_progress_report_18528.pdf

Cultural Heritage in the Changing World book

<https://link.springer.com/book/10.1007%2F978-3-319-29544-2>

Culture is Digital

<https://www.gov.uk/government/publications/culture-is-digital>

Data On the Web Best Practices

<https://www.w3.org/TR/vocab-dqv/>

Digital Culture 2017. Arts Council England

<http://www.artscouncil.org.uk/digital-culture-2017>

Digital Production Partnership 2018 Predictions

https://dpp-assets.s3.amazonaws.com/wp-content/uploads/2018/02/HomeTruths_11.pdf

Digital Strategies for Audience Engagement

http://resources.riches-project.eu/wp-content/uploads/2016/06/RICHES-D6.1-Access-Participation-Learning-Digital-strategies-for-audience-engagement-with-cultural-heritage-in-museums-and-libraries_public.pdf

European Framework Programmes

<https://www.scienceeurope.org/policy/policy-areas/framework-programmes/>
<https://ec.europa.eu/info/node/71880>

Experimental Culture A Horizon Scan

<https://www.nesta.org.uk/publications/experimental-culture-horizon-scan-arts-and-culture-sector>
http://www.artscouncil.org.uk/sites/default/files/download-file/Experimental_Culture_summary_150318.pdf

Gamification 3.0

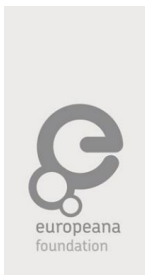
<https://www.cognizant.com/InsightsWhitepapers/gamification-3.0-the-power-of-personalization-codex1020.pdf>

Getting Cultural Heritage to Work for Europe

<https://publications.europa.eu/en/publication-detail/-/publication/b01a0d0a-2a4f-4de0-88f7-85bf2dc6e004>

Horizon 2020. European Commission

http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-societies_en.pdf



IFLA Global Vision Report

<https://www.ifla.org/node/11607>

Innovation in Cultural Heritage Research

<https://publications.europa.eu/en/publication-detail/-/publication/1dd62bd1-2216-11e8-ac73-01aa75ed71a1/language-en/format-PDF/source-66949536>

MELA Project (European Museums in an age of migrations)

<http://www.mela-project.polimi.it/>

New European Media. Digital Innovation Hubs

https://nem-initiative.org/wp-content/uploads/2018/03/nem-dei_dih-wg-december-2017.pdf

New European Media. Position on Next Generation Internet

<https://nem-initiative.org/wp-content/uploads/2018/03/nem-ngi-wg-january-2018.pdf>

New European Media. Research and Innovation Priorities 2016

<https://nem-initiative.org/wp-content/uploads/2016/05/NEM-Research-and-Innovation-Priorities-2016.pdf>

Participatory Governance of Cultural Heritage

<https://publications.europa.eu/en/publication-detail/-/publication/b8837a15-437c-11e8-a9f4-01aa75ed71a1>

Reproduction of Arts and Cultural Heritage, V&A

<https://vanda-production-assets.s3.amazonaws.com/2017/12/15/14/49/22/a743acd8-6522-48ce-8700-7b78e59c8bf2/ReACHDeclaration.pdf>

RICHES Project

<http://resources.riches-project.eu/>

SXSW Tech Trends. Future Today Institute

https://www.dropbox.com/sh/myhm2grchy4yery/AAydd5qemSFG7XCY_V8oRrja?dl=0
<https://futuretodayinstitute.wetransfer.com/downloads/a2986375c303086b355e3505d4cb6f7620180309173832/3b92d1>

The growing AI industry in UK

<https://www.gov.uk/government/publications/growing-the-artificial-intelligence-industry-in-the-uk>

Time Machine Flagship

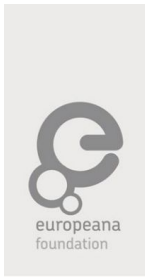
<http://timemachineproject.eu/>

Towards a New Audiovisual Think Tank

<https://www.beeldengeluid.nl/en/knowledge/hub/av-think-tank>

Trendwatch 2017. Centre for the future of museums

<https://aam-us.org/docs/default-source/center-for-the-future-of-museums/trendwatch-2017.pdf>



Virtual Reality and its Potential for Europe

https://1jzp3z22udm91mv3si18pugq-wpengine.netdna-ssl.com/wp-content/uploads/2017/11/1Ecorys_Potential_of_VR_v05_DoublePages_Bleed.pdf

VIMM Manifesto

https://www.vi-mm.eu/wp-content/uploads/2018/06/ViMM_Manifesto_Draft_Ver_2.1_7-June-2018-1.pdf