Towards a heritage-led triple transition in Europe: Europeana and the common European data space for cultural heritage

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Established in 2008 by the European Union at the request of six Heads of State[1], Europeana is Europe's most ambitious and financed digital heritage project to date (Capurro/Plets/Verheul 2023). The Europeana Initiative[2] supports the digital transformation of Europe's cultural heritage sector by developing expertise, tools and policies that enable heritage institutions to embrace digital change. As of 2021, the Europeana Initiative is deploying the common European data space for cultural heritage, a EU flagship funded under the Digital Europe programme to accelerate the sector's digital transformation and foster the reuse of heritage content. The data space builds on the accomplishments of the Europeana Initiative, notably in terms of open data, community building and data aggregation, but also challenges it to grow and adapt.

Shifting needs and paradigms in Europe's digital cultural heritage sector: Europe's pursuit of strategic autonomy

The development of Europeana and Europe's digital heritage sector can be understood as taking place in three different phases, each responding to shifting sectoral needs and policy paradigms: from a *portal* to make cultural heritage *accessible online* (2000 to 2010), to a *platform* to make digital heritage *reusable* in different contexts and by different audiences (2010 to 2020), to a *data space* in a search for *sovereignty* and control of how digital heritage data is made available (2020 to today). This article explores the latest developments of the heritage sector as of 2020 and their implications for the future of digital heritage.

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1   This request was made through a letter addressed to the Presidency of the Council of the European Union and the European Commission, dated 28 April 2005, and signed by the Heads of State of France, Italy, Poland, Germany, Italy, Spain and Hungary (European Commission, 2014).

2   The Europeana Initiative is formed by three interlinked organisations: the Europeana Foundation, the Europeana Network Association and the Europeana Aggregators‹ Forum.

Today the need and potential for accelerated digital transformation in the heritage sector is broadly acknowledged, particularly spurred on by the COVID-19 pandemic.[3] As a result, digital cultural heritage holds a prominent position on the EU political agenda, evidenced by the vast amount of funding made available through an increasing diversification of EU programmes[4].

Yet despite progress, digitisation efforts across Europe remain uneven, with a persistent digital divide between countries with robust digital heritage strategies and those without. As of June 2024, only 60 percent of EU Member States have dedicated digital heritage strategies in place (European Commission 2024). The digital divide also affects institutions, and staff within institutions. These divides were exacerbated by the COVID-19 pandemic (Edson/Visser 2020; Network of European Museum Organisations 2020). In addition, current trends anticipate that AI-powered efficiency might become a fourth dimension of the digital divide (Imec digimeter 2023). In this challenging context, heritage institutions struggle with growing public expectations to engage with major societal challenges such as climate change, while also confronting issues related to algorithmic biases and misinformation (Europeana Initiative 2024).

The rise of new technologies, particularly AI, presents new challenges and opportunities for the sector. AI can support data management through the automatisation of processes, enhance personalised and interactive cultural experiences, improve data collection, or generate multimedia content (Caramiaux 2024). Yet it is also susceptible to biases, often lacks transparency, and raises concerns around misinformation, misrepresentation, manipulation, homogenisation and authenticity (European Commission 2022). Heritage institutions struggle to adopt this fast-evolving technology while maintaining human-centred and ethical standards in its use. They must balance the opportunities and risks of AI while developing a strategic vision and a thorough understanding of its implications. This includes recognising power dynamics in AI development and deployment, and critically evaluating the claims of tech-solutionism that suggest AI can solve all problems (Keller 2024; Thiel/Bernhardt 2024).

On the global stage, the EU is pursuing greater *strategic autonomy*, emphasising the significance of digital sovereignty. This is a new policy approach to enhance Europe's ability to act independently in the digital world, actively defend and promote European values, and reduce dependence on non-European technology and data sources (European Parliamentary Research Service 2020). At the same time, the EU has responded with its first-ever legal framework on AI, the EU AI Act[5]. Against this backdrop, there is a pressing need to develop a model that empowers individuals and organisations to maintain control over their data, influence how their digital environment functions, and actively participate in its creation and use.

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3   Research shows that COVID-19 not only increased online cultural consumption, but also the quality of the associated experiences and more mature behaviours among online audiences (Bonel et al. 2023).

4   For example through Digital Europe, Horizon Europe (with an unprecedented amount of 110 million Euro allocated from 2023 to 2025 to the European Collaborative Cloud for Cultural Heritage), the European Regional Development Fund, the European Structural and Investment Fund, and the Recovery and Resilience Facility, among others.

5   See https://artificialintelligenceact.eu/

In an effort to enhance the EU's strategic autonomy in the digital sphere, the European Commission's 2020 Data Strategy proposed creating 14 common European data spaces in various strategic sectors and domains of public interest ranging from health and energy to manufacturing. The common European data space for cultural heritage, being deployed by the Europeana Initiative, is one of them.

The common European data space for cultural heritage: an unprecedented opportunity for our sector

By positioning cultural heritage alongside 13 other economically strategic sectors and domains of public interest, the European Commission elevated its ambitions for the sector, reflecting its importance in fostering innovation, economic growth, and societal wellbeing. For some actors in the sector, the introduction of the data space places the cultural heritage sector at the doorstep of a catalytic change (Dobreva et al. 2020), offering an unprecedented opportunity to advance a socially and environmentally responsible digital transformation, for example, through initiatives to protect open access and work to reduce the environmental impact of digitisation. This section examines the data space paradigm through policy, conceptual, and operational perspectives.

The data space for cultural heritage is embedded in the EU's digital policy landscape: it is central to the European Data Strategy and Europe's Digital Decade. The strategy, development, and governance of data spaces are supported by a harmonised legal framework including the Data Act[6], the Interoperable Europe Act[7], the Data Governance Act[8] and the Artificial Intelligence Act[9] (Europeana Initiative 2024).

Additionally, its foundations and main features are provided by the 2021 European Commission recommendation on a common European data space for cultural heritage. This Recommendation sets ambitious targets for Member States and their cultural institutions, aiming to jointly contribute 40 million high-quality and diverse types of assets to the data space by 2030. It also encourages Member States to develop their own digital strategies and make public funding for heritage digitisation conditional on sharing digitised content in Europeana and the data space (European Commission 2021).

An important feature is its new emphasis on 3D. The Recommendation encourages Member States to digitise all monuments and sites at risk and half of the most physically visited in 3D by 2030. Thus, it paves the way for a richer, more multidimensional, connected, and interoperable content and metadata in the data space.

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6   Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act).

7   Regulation (EU) 2024/903 of the European Parliament and of the Council of 13 March 2024 laying down measures for a high level of public sector interoperability across the Union (Interoperable Europe Act).

8   Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act).

9   https://artificialintelligenceact.eu/

The data space provides the sector with a high-performance, state-of-the-art digital environment that would be otherwise unaffordable to develop and maintain on its own (Edson 2023). It offers an unprecedented opportunity to accelerate digital transformation, advance the public mission of democratising access to culture, promote open innovation, and enhance Europe's creative capital (European Initiative 2024).

The success of the data space will largely depend on sustained political and financial support from the European Commission and Member States. This includes continued and increased investment under the next Digital Europe Programme for 2028–2034, the development of national aggregators, alongside robust digital heritage policies that foster the creation, production, dissemination and reuse of cultural content. It is worth noting that this success relies on the voluntary cooperation of the Member States, as the 2021 Recommendation is not binding.

At the same time, the digital heritage landscape is getting richer; multiple initiatives are to coexist and collaborate. These include the Collaborative Cloud for Cultural Heritage,[10] EIT Culture & Creativity,[11] the Time Machine Organisation,[12] the European Heritage Hub[13] and the Competence Centre for 3D[14], to name a few. The data space is challenged to devise and sustain meaningful connections with these initiatives while demonstrating its distinct contribution and impact.

Demystifying data spaces: a conceptual framework

Although the notion of data spaces is not new – it was introduced in computer science over 15 years ago – it gained political visibility with the advent of the common European data spaces by the European Commission (Otto 2022; Europeana Initiative 2024). While the idea itself is well established, its practical implementation through the European Data Strategy is still evolving. The Data Space Support Centre (DSSC)[15] has established common guiding principles for all data spaces to comply with, yet these also allow some flexibility for development according to sector-specific needs.

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10   The Cultural Heritage Cloud is funded under the Horizon Europe programme, with a total budget of €110 million over 5 years. Its main aim is to develop a workspace to advance cultural heritage sciences.

11   The EIT Culture & Creativity is a Knowledge and Innovation Community that aims to build connections between culture and creative industries. It has a budget of over 500 million Euro over ten years.

12   Time Machine aims to create a collective digital information system mapping the European economic, social, cultural and geographical evolution across times.

13   The European Heritage Hub is an EU funded pilot project bringing together European heritage stakeholders and initiatives to support the ›triple transition‹ in the heritage sector. The project will run for an initial two-year period from May 2023 to April 2025.

14   The Competence centre is funded under the Digital Europe Programme as a two-year project to support the sector in accelerating 3D digitisation. The project is expected to kick-off early in 2025.

15   The Data Spaces Support Centre is funded by the European Commission to support the development of the common European data spaces, define common requirements, establish best practices and act as a platform for collaboration across data spaces (DSSC, 2023).

In its simplest term, the data space is a *framework that supports data sharing within a data ecosystem*. In the specific context of cultural heritage, the data space can be conceptualised as encompassing the following elements: a standardised, consistent, and reliable infrastructure for sharing data sets; a collection of high-quality heritage data products; diverse audiences, such as those in education, research, and the creative industries, who use the data; a suite of frameworks and standards that support interoperability; a data space community that contributes to and benefits from the data space; and a governance framework that guides and regulates all operations taking place in the data space (Europeana Initiative 2024).

A data space is designed to support *data sovereignty* (DSCC 2024) and create a *shared data marketplace* that enables participants to share costs, foster joint innovation and work towards the greater common good (Otto 2023).

The data space in practice: sovereignty and decentralisation as key differentiators

The data space paradigm emphasises the concepts of *sovereignty* and *decentralisation*, creating an attractive model for the EU to achieve strategic independence from large, for-profit organisations typically based outside of Europe (Europeana Initiative 2024).

In the data space context, *sovereignty* refers to the capability of data providers – institutions or individuals who share data sets through the data space – to determine and execute usage rights when it comes to their data (Otto 2022). This means that data providers – as opposed to platforms – keep control of their data and what can be done with it and by whom (Europeana Initiative 2024).

Decentralisation, on the other hand, refers to the distribution of power and decision-making among multiple participants instead of a single central entity (Page/Cecconi 2023). At a practical level, decentralisation means the adoption of a new operational model that facilitates the delivery of data products – or digital heritage objects –, through a broader array of actors, diversified data sharing pipelines and new participatory and collaborative mechanisms. This approach aims to make the data space an inclusive environment for all professionals and users within the cultural heritage sector (Europeana Initiative 2024)[16].

The concept of decentralised data sharing is frequently associated with the broader »Web3«-movement which seeks to transform how information is stored, shared, and owned on the web, shifting towards communal control by its users (McKinsey and Company 2023). This concept also aligns with the so-called »Culture 3.0«, wherein the distinction between cultural producers and users is increasingly blurred (Sacco 2012).

Participation in the data space enables heritage institutions to reach audiences that may be challenging to reach independently through data brokerage on scale. This includes, for example, tourism stakeholders through the tourism data space. It also al-

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16 Decentralisation in the common European data space for cultural heritage will continue to be explored further, including through a dedicated Europeana Initiative Working Group on Innovative Operating Models.

lows them to jointly advocate towards policy makers and other professional, sectoral, and commercial bodies that might otherwise be inaccessible to single institutions. It provides opportunities to leverage collective knowledge within the data space community (Europeana Initiative 2024).

To fully leverage this potential, the digital heritage sector requires a deeper understanding of its implications and operational implementation. This entails intensifying research in the domain of human-centric infrastructures, with a focus on decentralisation, trusted data sharing, governance and economic models (Dobreva et al. 2020; Curry 2020). It will also require substantial upskilling of professionals to effectively use its tools and services (Dobreva et al. 2020; Europeana Initiative 2024).

The way forward: a triple transition powered by digital cultural heritage

Europe, and indeed the entire world, is currently undergoing rapid and system-wide transformations. These include a severe climate crisis with significant human, economic, and environmental tolls, as well as socio-political challenges that threaten the very foundations of our democracies. Additionally, the most recent wave of the digital revolution is reshaping every aspect of our lives. With forward-looking policy frameworks like the European Green Deal and its Just Transition[17] as well Europe's Digital Decade[18], the EU has expressed a bold ambition to master these changes in a concerted way: a holistic *triple transition*[19] with interlinked green, social and digital dimensions.

The digital cultural heritage sector must *adapt* and *actively contribute* to Europe's triple transition to maintain relevance. The common European data space for cultural heritage provides an unprecedented opportunity for our sector to take these actions. The following section outlines how digital heritage and the data space can contribute to advance Europe's triple transition, and the key questions this raises[20].

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17   The European Green Deal policy package aims to make Europe the first climate-neutral continent in the world by 2050. It is paired with a Just Transition mechanism to support a socially fair and just transition to a green economy.

18   The Digital Decade policy programme sets out the EU digital ambitions for the next decade, aiming at advancing a human-centric and sustainable vision for digital society.

19   The OECD defines the ›Triple Transition‹ as a systemic approach that places the interconnections of the environmental, social and digital aspects of development at the core.

20   This reflection is informed by a strategic foresighting exercise carried out by the Europeana Initiative from March – June 2024 to anticipate future trends that might impact the data space and the sector in the coming years.

A digital transition with values, people and culture at its core

In Europe's Digital Decade[21] and the European Declaration on Digital Rights and Principles[22], the EU acknowledges that digital infrastructures alone are no longer enough to define our digital future. There must be a human-centred and value-based approach to technology (European Commission 2021, 2022; Europeana Initiative 2024).

To advance this vision in the global scene, Europe must ensure its strategic digital independence. This is not only an economic issue: it is crucial to protect Europe's interests and values in the digital realm, to promote and ensure compliance with European standards and the ethical use of technology. While the data space paradigm attempts to advance this goal, many challenges remain. Emerging trends foresee a new era of geotechnology centred around connectivity (Mettler 2019), predominantly shaped by the U.S.A. and China. Faced with increased security threats, Europe will be challenged to navigate and lead in digital governance, ethical standards and cyber security (Europeana Initiative 2024).

For the heritage sector to fully grasp the potential of the data space to advance a digital transition with values, people and culture at its core, it must collectively respond to the following crucial questions. What exactly is *digitality* – the condition of living in a digital culture; how is it shaped and by whom? On which principles is and should it be based? How can Europe develop an open, democratic and trusted environment in the face of growing algorithmic bias and threats of disinformation? How can it address the spread of disinformation accelerated by AI? How does this translate to our sector? What does a healthy digital public space look like? How is this space collectively governed to serve the public interest?

Digital culture as public good in a just social transition

Evidence shows that cultural participation enhances civic engagement, democracy, social cohesion and wellbeing (European Commission 2023). For this potential to be fully realised, ensuring the basic right to access cultural heritage is essential. For digital heritage to fulfil its societal purpose, it should be seen as a collective, shareable resource that needs to be stewarded as a public good (Europeana Initiative 2024).

Emerging trends threaten these principles: from increased protectionism, nationalism and populism in EU Member States, to the rise of policies that put pressure on open data and limit the public domain. An increasing fragmentation of virtual identities and rising polarisation threaten societal cohesion in the digital age. Europe will be challenged to promote open values and diverse cultural narratives in a context of technological developments that support growing disinformation and misinformation and a shrinking civic space (Europeana Initiative 2024).

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21   Digital Compass: the European way for the Digital Decade

22   Issued in 2022 by the European Commission, the Declaration on Digital Rights and Principles presents the vision and commitment of the European Union to a digital transformation that puts people at the centre, in line with EU core values and fundamental rights.

To harness the opportunities of the data space as a tool for advancing social cohesion, the cultural heritage sector must first collaboratively address several critical questions. What does cultural heritage mean in the digital era? Whose heritage is being represented? Who defines cultural heritage? Whose worldviews and priorities are reflected, and who benefits from its preservation and use? How can we bridge the social and technological divide between those who have access to and feel welcomed by digital cultural heritage and those who do not? How can our sector leverage advanced technologies in a socially responsible manner? What ethical standards should our sector uphold? Which actors in the sector will make these decisions?

A green transition for and with digital cultural heritage

Europe's ambition to become the first climate-neutral continent by 2050[23] requires resolute action across all sectors, including digital cultural heritage. Heritage digitisation relies on energy-intensive processes that contribute to climate change (Paschalidou et al. 2022). However, our sector also has the potential to be a positive agent of change in the green transition, which will require first and foremost a change in mindsets, behaviours and consumption patterns.[24]

Emerging trends anticipate an aggravated climate crisis, and a real possibility of reaching a critical juncture where the effects of climate change become uncontrollable (Mettler 2019). This will define all spheres of our economies and societies, calling on the EU to lead in developing sustainable technological solutions to reduce environmental impact and reduce carbon emissions.

To remain relevant amidst the climate crisis, the digital heritage sector and the data space must minimise their environmental impact and leverage their resources to promote climate awareness and action. The questions that emerge include: How can the benefits of digitisation be balanced with its environmental footprint? How can digital practices in the heritage sector be more sustainable? Which role can the cultural heritage sector play in the green transition and what should be the level of its ambitions? How can the exploitation of cultural heritage data support a green transition? How can we better understand and mitigate the environmental impact of big data and other types of data?

Conclusions

The evolution of Europe's digital heritage sector over the past two decades has yielded significant insights that are central principles for digital transformation sectoral policies. Europeana, as a leading actor and policy instrument, has made substantial contributions

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23   As called for by the European Green Deal.

24   Evidence shows that active cultural participation can foster prosocial individual behaviours including mobilisation and the adoption of environmentally responsible practices through awareness-raising, life-long learning and the acquisition of soft competencies and skills (Sacco, 2012).

to these developments, which now need further expansion and adaptation in view of the new data space paradigm. We would like to highlight four key principles.

Firstly, that digital transformation in the cultural heritage sector is not an end state with predefined performance indicators. Instead, it is an *ongoing journey* where definitions of success evolve, heavily influenced by the prevailing paradigm of the time (Europeana Initiative 2024). Alongside providing clarity by defining digital transformation for the heritage sector and establishing clear targets to measure its success, the data space paradigm opens new opportunities to address the evolving needs of our sector, and to align these with wider EU policy objectives such as a growing need for Europe's strategic autonomy and digital sovereignty in the global sphere.

Secondly, the need for an emphasis on *quality* rather than a quantitative approach to heritage digitisation and data creation. The understanding of heritage data quality is continuously evolving to meet changing expectations for data reuse and accessibility. For instance, quality in our present context has evolved to encompass new considerations like data carbon footprint (Europeana Initiative 2024). The data space must update, develop, and govern new frameworks and standards to ensure the trustworthiness and high quality of the data, tools, and resources it offers. Simultaneously, it is essential to assist Member States in achieving the quantitative data targets established by the European Commission in its 2021 Recommendation, which will require large-scale data creation. While automated approaches, such as AI technologies, offer promising solutions for addressing data creation and quality issues at scale, their implementation must adhere to rigorous ethical standards.

Thirdly, adopting a *pan-European networked approach* is paramount. Europeana has facilitated the development of a digital heritage network that supports the exchange of best practices and know how through cross-national collaboration, fostering what Capurro and Plets (2020) call a »European mindset grounded on shared digital competencies«. While this network is a solid foundation to build on, the data space must involve a larger and more diverse pool of stakeholders. This expansion requires defining new roles and responsibilities for participating actors, and establishing clear cooperation agreements to ensure the good governance of the data space. This governance system must align with the data space core principles of *sovereignty* and *decentralisation*. It must promote community ownership and inclusive participation, as well as enhanced distributed accountability, scalability, and impact.

Fourthly and lastly, there is a growing recognition that the digital transformation of the heritage sector extends beyond the sector itself, contributing to broader EU policy objectives in areas like education, tourism, social cohesion and economic competitiveness. This reflects policy evolution in the broader cultural heritage sector, which is now widely recognised as a cross-sectoral domain[25]. A significant milestone was reached with

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25   As evidenced by the principles of *mainstreaming* and *integrated* approaches embedded in major sectoral policy instruments includingthe European Commission Communication ›Towards an integrated approach to cultural heritage for Europe‹ COM(2014) 477; the Council conclusions on the need to bring cultural heritage to the fore across policies in the EU (2018/C 196/05), the 2019 European Framework for Action on Cultural Heritage of the European Commission.

the establishment of the common European data space for cultural heritage at the centre of Europe's pursuit of a flourishing data-driven society.

Ensuring the success, sustainability and return of investment of the data space will not come without challenges. It will require the alignment of visions and expectations from a broad stakeholdership – including the Data Spaces Support Centre, the European Commission and the Member States, the professional community and the general public-, as well as their active participation and contribution (Europeana Initiative 2024). Sustained political and financial support from the EU and its Member States is essential. In addition, the data space, and the Europeana Initiative as its steward, must collaborate with and complement existing and emerging digital heritage initiatives. While improving understanding of the data space among the professional and policy communities, it should also clearly convey its distinct value proposition amid competition for time, data, attention, and resources.

For the data space ecosystem as a whole to flourish and support Europe's strategic autonomy in the digital sphere, regulatory ambitions must be matched with substantial investment. The EU and its Member States must commit to creating, financing, and maintaining a public infrastructure for the data spaces over the long term. This will require joint stewardship and strategic resource sharing (Keller 2021). Additionally, it is important to recognise the data space ecosystem as a political paradigm put forward by the previous Ursula von der Leyen Commission. As such, continuity in support and investment cannot be assumed, given the potential for shifts in political landscapes and new political and financial priorities.

A more ambitious and holistic policy framework and significant investments in technological solutions, including AI, skills development and cybersecurity are also needed. This must not be a one-off effort but rather a multi-annual, multi-billion investment plan to keep Europe competitive and sovereign in the digital sphere. In short, data spaces should not be seen in isolation, but rather as an integral component of a larger ambition to build Digital Public Spaces that reflect European values (Keller 2021).

With the advent of the data space, Europe has elevated its ambitions for digital cultural heritage. The data space presents our sector with an unprecedented opportunity to accelerate its digital transformation and to do it in a socially responsible and environmentally sustainable way. Nevertheless, achieving these aspirations demands overcoming significant challenges through unified and concerted efforts. It is now imperative for our sector and Europe to rise to this challenge.

References

BMDV (2022): Digitalstrategie Deutschland: Kultur und Medien, https://digitalstrategie-deutschland.de/kultur-und-medien/ [20.09.2024]

Bonel, Elena/Capestro, Mauro/Di Maria, Eleonora (2023): How COVID-19 i.mpacted cultural consumption: an explorative analysis of Gen Z's digital museum experiences, https://link.springer.com/article/10.1007/s43039-023-00071-6, [20.09.2024]

Capurro, Carlotta/Plets, Gertjan (2021): Europeana, EDM, and the Europeanisation of Cultural Heritage Institutions. DCS | Digital Culture and Society. Vol. 6, Is-

sue 2, https://www.academia.edu/57466929/Europeana_EDM_and_the_Europeanis ation_of_Cultural_Heritage_Institutions, [20.09.2024]

Capurro, Carlotta/Plets, Gertjan/Verheul, Jaap (2023): Digital heritage infrastructures as cultural policy instruments: Europeana and the enactment of European citizenship, in: International Journal of Cultural Policy, 30(3), 304–324, https://doi.org/10.1080/1 0286632.2023.2193401

Caramiaux, Baptiste (2024): AI with Museums and Cultural Heritage in AI in Museums Reflections, Perspectives and Applications by Sonja Thiel and Johannes C. Bernhardt (eds.), https://www.transcript-verlag.de/media/pdf/24/88/01/oa9783839467107.pdf, [20.09.2024]

Curry, Edward (2020): Real-time Linked Dataspaces, Springer, https://link.springer.co m/book/10.1007/978-3-030-29665-0, [20.09.2024]

Curry, Edward/Scerri, Simon/Tuikka, Tuomp/Lopez Vallejo, Irene (2022): Common European Data Spaces: Challenges and Opportunities, https://www.researchgate.n et/publication/363391611_Common_European_Data_Spaces_Challenges_and_Oppo rtunities, [20.09.2024]

Data Space Support Centre (2023): Mission, https://dssc.eu/space/Mission /45285499/Mission#:~:text=The%20Data%20Spaces%20Support%20Centr e,digital%20transformation%20in%20all%20areas, [20.09.2024]

De Marez, Lieven/Sevenhant, Robbe/Denecker, Floor/Georges, Annabel/Wuyts, Gilles/ Schuurman, Dimitri (2024): Imec.digimeter.2023. Digitale trends in Vlaanderen. Imec, https://www.imec.be/sites/default/files/2024-03/imec%20digimeter%202023 %20Rapport.pdf, [20.09.2024]

Dobreva, Milena/Krassen, Stefanov/Ivanova, Krassimira (2022): Data Spaces for Cultural Heritage: Insights from GLAM Innovation Labs in From Born-Physical to Born-Vir- tual: Augmenting Intelligence in Digital Libraries. 24th International Conference on Asian Digital Libraries, ICADL 2022, Hanoi, Vietnam, November 30 – December 2, 2022

Edson, Michael Peter/Visser, Jasper for the Europeana Foundation (2020): Digital trans- formation in the time of COVID-19. Findings and outcomes of phase 1 of Europeana's sense-making process (unpublished).

Edson, Mike (2023): Visions for and about the Europeana Initiative and the Data Space for Culture, commissioned by the Europeana Foundation (unpublished)

EUR-Lex (2018): REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIA- MENT AND THE COUNCIL on the evaluation of Europeana and the way for- ward. COM/2018/612 final, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=C ELEX%3A52018DC0612, [20.09.2024]

EUR-Lex (2020): COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COM- MITTEE AND THE COMMITTEE OF THE REGIONS A European strategy for data, COM/2020/66 final (2020), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=C ELEX%3A52020DC0066, [20.09.2024]

European Commission (2011): COMMISSION RECOMMENDATION of 27 October 2011 on the digitisation and online accessibility of cultural material and digital preserva-

tion (2011/711/EU), https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2 011:283:0039:0045:EN:PDF, [20.09.2024]

European Commission (2014): POLICY AND LEGISLATION. Timeline of digitisation and online accessibility of cultural heritage, https://digital-strategy.ec.europa.eu/en/lib rary/timeline-digitisation-and-online-accessibility-cultural-heritage, [20.09.2024]

European Commission (2018): Cultural heritage: Digitisation, online accessibility and digital preservation. Consolidated progre.ss report on the implementation of Commission Recommendation (2011/711/EU) 2015–2017, https://digital-strategy.ec. europa.eu/en/library/european-commission-report-cultural-heritage-digitisation-online-accessibility-and-digital, [20.09.2024]

European Commission (2022): Opportunities and Challenges of Artificial Intelligence Technologies for the Cultural and Creative Sectors, https://op.europa.eu/en/pub lication-detail/-/publication/359880c1-a4dc-11ec-83e1-01aa75ed71a1/language-en, [20.09.2024]

European Commission, Directorate-General for Education, Youth, Sport and Culture, Hammonds, W. (2023): Culture and democracy, the evidence – How citizens‹ partic-ipation in cultural activities enhances civic engagement, democracy and social co-hesion – Lessons from international research, Publications Office of the European Union, https://data.europa.eu/doi/10.2766/39199, [20.09.2024]

European Commission (2024): Progress report on the European Commission Recom-mendation on a common European data space for cultural heritage (unpublished).

European Green Deal (2024): Council of the EU and the European Council, https://www .consilium.europa.eu/en/policies/green-deal/, [20.09.2024]

Europeana (2011): Europeana Licensing Framework, https://pro.europeana.eu/files/Eu ropeana_Professional/Publications/Europeana%20Licensing%20Framework.pdf, [20.09.2024]

Europeana (2012a): Europeana's huge cultural dataset opens for re-use, https://pro.euro peana.eu/post/europeanas-huge-cultural-dataset-opens-for-re-use, [20.09.2024]

Europeana (2012b): First public beta version of the Deutsche Digitale Bibliothek is live!, https://pro.europeana.eu/post/first-public-beta-version-of-the-deutsche-dig itale-bibliothek-is, [20.09.2024]

Europeana (2015): The Europeana publishing framework: The more you give, the more you get, https://pro.europeana.eu/post/the-europeana-publishing-framework-the-more-you-give-the-more-you-get, [20.09.2024]

Europeana (2017): Europeana DSI 2– Access to Digital Resources of European Heritage. Deliverable D4.4. Report on ENUMERATE Core Survey 4,https://pro.europeana.eu/ files/Europeana_Professional/Projects/Project_list/ENUMERATE/deliverables/DSI -2_Deliverable%20D4.4_Europeana_Report%20on%20ENUMERATE%20Core%20S urvey%204.pdf, [20.09.2024]

Europeana (2018): Landscape of national aggregation in Europe: Report. Europeana Professional, https://pro.europeana.eu/files/Europeana_Professional/Projectpartn er/EuropeanaCommonCultureProjectFiles/MS3%20Landscape%20of%20national% 20aggregation%20in%20Europe%20Report.pdf, [20.09.2024]

Europeana (2021): Defining digital transformation for the cultural heritage sector, https://pro.europeana.eu/post/defining-digital-transformation-for-the-cultural-heritage-sector,[20.09.2024]

Europeana (2023a): Glossary of Terms, https://pro.europeana.eu/page/glossary, [20.09.2024]

Europeana (2023b): Happy 10th anniversary to the Deutsche Digitale Bibliothek!, https://pro.europeana.eu/post/happy-10th-anniversary-to-the-deutsche-digitale-bibliothek, [20.09.2024]

Europeana Initiative (2020): Europeana Strategy 2020–2025, https://pro.europeana.eu/files/Europeana_Professional/Publications/EU2020StrategyDigital_May2020.pdf, [20.09.2024]

Europeana Initiative (2024): Visioning & business strategy 2030. Adapt. Adopt. Aspire. Achieve (unpublished).

Europeana statistics dashboard (2024), https://metis-statistics.europeana.eu/en/, [20.09.2024]

European Commission (o.D.): Europe's Digital Decade, https://digital-strategy.ec.europa.eu/en/policies/europes-digital-decade, [20.09.2024]

Google (2024): About, https://about.google, [20.09.2024]

Islam, Sharif/Weber, Andreas/Tóth-Czifra, Erzsébet (2022): From Green Deal to cultural heritage: FAIR digital objects and European common data spaces. Research Ideas and Outcomes, 8, e93815, https://www.researchgate.net/publication/362951620_From_Green_Deal_to_Cultural_Heritage_FAIR_Digital_Objects_and_European_Common_Data_Spaces, [20.09.2024]

Joint Research Centre (2023): European data spaces: Scientific insights into data sharing and utilisation at scale. JRC Science for Policy Report.Keller, Paul (2024) Museums and AI. Keynote at the »Innovation and Integrity: Museums paving the way in an AI-driven society« Conference organised by NEMO – Network of European Museum Organisations on 20 March 2024 in Brussels, Belgium.

Keller, Paul (2021). Five things I know about data spaces. Open Future, https://openfuture.eu/blog/five-things-i-know-about-data-spaces/, [20.09.2024]

Madiega, Tambiama for European Parliamentary Research Service (2020): PE 651.992. Digital sovereignty for Europe, https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/651992/EPRS_BRI(2020)651992_EN.pdf, [20.09.2024]

McKinsey and Company (2023): What is Web3? McKinsey Explainers, https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-web3#/, [20.09.2024]

Mettler, Ann for European Strategy and Policy Analysis System ESPAS (2019): Challenges and choices for Europe, https://ec.europa.eu/assets/epsc/pages/espas/, [20.09.2024]

NEMO – The Network of European Museum Organisations (2020): Survey on the impact of the COVID-19 situation on museums in Europe Final Report, https://www.ne-mo.org/fileadmin/Dateien/public/NEMO_documents/NEMO_COVID19_Report_12.05.2020.pdf, [20.09.2024]

McNeilly, Nicole for Europeana (2020: Europeana Network Association. Impact assessment report, https://pro.europeana.eu/post/impact-assessment-report-europeana-network-association, [20.09.2024]

OECD (2019): »A measurement roadmap for the future«, in Measuring the Digital Transformation: A Roadmap for the Future, OECD Publishing, Paris. Retrieved from www.oecd.org/going-digital/measurement-roadmap.pdf

OECD (2023): Towards a Triple Transition: Strategies for transformational European development action, https://www.oecd.org/dev/Strategies-transformational-European-development-action-Triple-Transition.pdf, [20.09.2024]

Otto, Boris (2023): In DSSC webinar: Understanding Data Spaces. 26 January.

Page, Martin/Cecconi, Gianfranco (2023): European data spaces and the role of data.europa.eu. Luxembourg: Publications Office of the European Union, 2023, https://data.europa.eu/sites/default/files/report/Data_Spaces_Panel_Report_EN.pdf, [20.09.2024]

Paschalidou, Evangelia/Fafet, Charlotte/Milios, Leonidas (2022): A Strong Sustainability Framework for Digital Preservation of Cultural Heritage: Introducing the Eco-Sufficiency Perspective, https://www.mdpi.com/2571-9408/5/2/58, [20.09.2024]

POST-PLATFORMS FOUNDATION (2024): The new secure and inclusive Web 3.0 Data Space ecosystem. Data ownership returned to users. No monopoly of platforms. Blockchain-free, https://postplatforms.org/, [20.09.2024]

Sacco, Pier Luigi (2011): Culture 3.0. Cultural participation as a source of new forms of economic and social value creation: A European perspective (2012), IULM, https://www.interarts.net/descargas/interarts2577.pdf, [20.09.2024]

Data Spaces Support Centre (2024): Data spaces blueprint version 1.0, Core Concepts, https://dssc.eu/space/BVE/357073747/2+Core+Concepts, [20.09.2024]

Thiel, Sonja/Bernhardt, Johannes C. (eds.) (2024): AI in Museums. Reflections, Perspectives and Applications, https://www.transcript-verlag.de/media/pdf/24/88/01/oa9783839467107.pdf, [20.09.2024]

Thylstrup, Nanna Bonde (2018): The Politics of Mass Digitization, Cambridge MA: The MIT Press

United Nations (2014): New economics for sustainable development. Creative economy. United Nations Economist Network, https://www.un.org/sites/un2.un.org/files/orange_economy_14_march.pdf, [20.09.2024]

United Nations (2018): Creative Economy Report 2008: The challenge of assessing the creative economy towards informed policy-making (UNCTAD/DITC/2008/2), https://unctad.org/system/files/official-document/ditc20082cer_en.pdf, [20.09.2024]