

# Museum connections during the COVID-19 pandemic

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## Abstract

*This paper aims to explore the so-called digital transformation of museums in 2020, reflecting on the long-term changes it might imply for digital strategies, skills, and engagement practices. It considers the experiences of 2020 and 2021 in the context of the history of museum digital practices, subsequently focusing on the digital divide that was emphasised by the pandemic, the perspectives for the development of new digital strategies and digital skills. Finally, it presents an overview of the main trends emerged from the digital initiatives launched by museums during the pandemic, highlighting the difficulties in evaluating their impact on audiences and in transforming these temporary solutions in long-term digital projects. In doing so, the paper aims to contribute to the discussion on the impact of the pandemic on museum digital practices.*

Open Access Peer Reviewed Keywords: museums, digital transformation, digital strategy, digital engagement, COVID-19

## Introduction

The COVID-19 pandemic has prompted a series of creative responses and critical reflections on museums digital activities, and this paper aims to contribute to the scholarly reflection on challenges and possible future developments in digital museum practices following the pandemic.

The pandemic has deeply affected museums in a range of areas, with dramatic consequences for the sector and its professionals. Museums around the world have been repeatedly closed in successive lockdowns or following other restrictive measures attempting to limit the circulation of the virus: according to UNESCO, during the first wave of the pandemic in Spring 2020, over 86,000 museums — corresponding to about 90,9% of museums worldwide — were closed (UNESCO 2020, p. 13). These closures have had a dramatic effect on museums' financial situation, with a broad fear of permanent closures: for example, 6,1% of respondents to a survey by ICOM in September/October 2020 feared their institution might cease its existence (ICOM 2020, p. 11). Besides, furloughs and redundancies have also affected museum professionals, and more cuts are expected in many countries; to this, it should be added also the loss of contracts for

freelance professionals, who could in the past rely on temporary contracts to deliver museum services. The loss of income (from visitor tickets and museum shops), the lack of sufficient financial support by national authorities, and the loss of a qualified and valuable workforce are extremely serious consequences of the pandemic on museums, whose impact will be felt across the sector for years. In parallel, museums had to quickly find solutions for the safeguard and management of their buildings and collections and for maintaining conservation assessment workflows during the period staff was working from home. The impact of the pandemic on conservation practices is also beyond the purposes of this paper, but it should be mentioned as another important consequence of the pandemic on the sector.

For the broader public, the most visible impact of the pandemic on museums has been their renewed online presence, in what has been called a 'digital turn'. This is the focus of this paper, in which I will unpack the notion of 'connectivity', at the core of this special issue of *Archeostorie. Journal of Public Archaeology*, in relation to the various challenges encountered in museum digital activities during this period. In doing so, I will also mention the range of digital content and projects proposed by museums during the pandemic (for

a more complete overview, see Zuanni 2021). In the following sections, I will first present my perspective on the notion of 'connectivity', before discussing it in relation to questions of digital access; museums as organisations; and museum engagement practices.

## Connectivities in the pandemic museum

Digital tools and methods have been seen as a resource for enhancing new connections, between objects, people, and institutions, for a long time. Since the advent of digital media, a virtual 'museum without walls' has been repeatedly proposed as a goal of digitisation: without printed reproductions (as Malraux meant the term, when he first proposed it between 1952 and 1954), but with access to a rich collection of digitised images and information, allowing us to explore cultural heritage on our desktops (Battro 2010). Famously, the first conference on museums and computers, in 1968, also pointed to the potential of computers for investigating artworks and enabling new research. In reviewing the conference, in 1970, Edward Fry wrote that:

*"the replacement of traditional catalog files with a computerized data bank would immediately create several important and useful secondary benefits, all of which, however, could be summarized as various forms of cross-indexing. [...] Also within this general area of cataloging is the linking of the data bank from within any single museum to an intermuseum computer network, thus joining many separate data banks into one overall index or repertory of works of art."* (Fry 1970, p. 358)

Indeed, I would argue that linked (open) data are still attempting to constitute this 'intermuseum computer network'. In short, the first digital museum practices were focused on connecting objects and collections for the benefit of further study and research. Digitisation and cataloguing continued to develop throughout the following decades, until the advent of personal computers and of the World Wide Web made possible also the development of new forms of digital connections. In the 1990s, digital technologies were used to reach the public — whether through the first websites, through digital presentations on physical supports (such as CD-ROMs, and later DVDs),

or through early virtual reconstructions. With the new millennium, the Web 2.0 and the advent of smartphones have expanded exponentially the possibilities for mediating content and interacting with the public and, consequently, research on the digital museum and its audiences expanded. Research in digital museums now ranges from the development and evaluation of applications and social media campaigns to the broader examination of the potential and limitations of participatory practices and digital engagement strategies, while encompassing the organisational, infrastructural, and policy contexts in which the digital transformation of museums happen. In short, if digital methods had first enabled the connection of information within single institutions and for the benefit of the staff, the advent of the internet and personal computers enabled new forms of connections, between institutions and their audiences. In the last 20 years, the development of solutions for connecting objects and their information, most recently through semantic web technologies, has proceeded in parallel to a variegated technological landscape of tools and methods for communicating this same information to different audiences.

This short historical introduction was pivotal to highlight that 'the digital' has been seen as a 'connective tissue' in museums for a long time, but the 'joints' being connected have been differently identified and — often — separately discussed. This paper aims to consider some of these possible connections, unpacking how different contexts and capacities might affect the digital connections built and exploited during the pandemic. In particular, the paper will focus around three major facets of 'connectivity'. First of all, it will consider the existence itself of a connection (infrastructural and skills aspects); secondly, it will discuss the possibility of promoting and exploiting these connections (organisational aspects); thirdly, it will consider the connections with museum audiences and communities (engagement aspects). In doing so, digital divide, organisation policies, and audience engagement will all emerge as facets of museum digital experiences in 2020.

## Digital barriers: infrastructures, equipment, and skills

Digital literacy and digital competences are a well-known issue and the last decade has further

highlighted how the ability of accessing social media and navigating the web is not sufficient when not combined with an increasing difficult critical observation of its contents. This section will observe how the so-called 'digital divide' was reflected in early research and debates around museum digital engagement during the pandemic.

According to the latest report on the state of digital uptake, 59.5% of the world population can access the Internet and over 53% of the world population is accessing social media platforms, most of them through mobile phones (We Are Social 2021). However, a more granular look at the situation shows that this access is very uneven due to differing capacities in relation to internet speed, data performance, and ability in using these online platforms. Furthermore, the lack of reliable connections in many areas, and the lack of equipment — besides smartphones — is also a major problem. While a mobile phone can facilitate everyday contacts with family and friends and allow accessing a range of apps for everyday life use, it also poses limitations for longer online sessions looking at non-responsive, more complex content. A prime example of this has been the challenges faced during the COVID-19 lockdowns by school students, who needed an individual laptop in order to access distant schooling activities (rather than a laptop shared with siblings or even parents, which they might have relied on in pre-pandemic times), a stable internet connection, and who, especially in early years classes, needed an increased supervision by an adult in addressing connection and tool-specific issues for accessing the online classroom (Lai and Widmar 2021).

Museums faced similar challenges in relation to lack of equipment, Internet connection, and access to digital services: according to UNESCO only 5% of museums in developing areas could move online during the pandemic. However, besides geographical differences, also the size and type of museum influenced their capacity to reuse or produce digital content during the pandemic. Museums, even in countries with a good digital infrastructure, faced difficulties in these regards: from reliable laptops for staff working from home to recording equipment for live-streaming of events and preparation of multimedia content, museums first challenge — especially for smaller ones — was the sourcing of this basic equipment.

Indeed, despite a growing interest for, and use of, digital media in museums, the effective uptake of different digital methods and approaches in museums is still very variable, depending on funding, skills, and management choices. Among recent sources on the state of digitisation in museums, it is worth citing the ENUMERATE surveys, which offer a snapshot of the digital transformation in European museums (for the period 2012-2017). National surveys offer also overviews of the digital transformation in European museums in the last decade: for example, the digital transformation of the British cultural sector is well charted in a series of annual reports by NESTA and ACE (since 2013); the online presence of Italian museums has been researched by a working group of ICOM Italia (Orlandi et al. 2019); and the Austrian Museum Association has conducted major survey of all the accredited museums in Austria (Museumsbund Österreich 2019).

Digitisation and availability of digital information about the objects is the first step towards the development of digital interpretation and mediation solutions. In these regards, the Digital Culture reports by Arts Council England and NESTA highlight how the digitisation of collections is considered a priority by most organisations (NESTA & ACE 2017). The last published ENUMERATE survey (Nauta, van den Heuvel & Teunisse 2017) revealed that 82% of GLAM institutions are engaged in digitisation activities; on average 58% of heritage collections have been catalogued in a collection database; and 22% of these collections have also been digitally reproduced. It also adds that museums are lacking behind other memory institutions in making available online descriptive metadata of their collections (museums are sharing metadata for 33% of items, in contrast to libraries at 76%). A further layer of complexity is the publication online of digitized information about the collections: for example, according to the already mentioned Austrian survey of 2019 only 18% of museums had published online their collections (Museumsbund Österreich 2019). While during the pandemic, a few museums reported further activities in this area, mostly drawing on pre-existing practices and extending their already available online collections (54% of museums surveyed in ICOM, 2020, p.17), only a small number of museums began working on the creation of online collections (7,7%,

ibid.). This work, involving the digitisation and online publication of collections, requires a range of equipment (cameras and, eventually, 3D-digitisation equipment, Collection Management Systems and/or Digital Asset Management, etc.) and skills (in digitisation, metadata enrichment, websites development, etc.), as well as long-term strategies supporting this work overtime. Thus, for museums without pre-existing experience and organisational support for this work, it was extremely difficult to start the process during the pandemic, even before considering the issues in digitising objects during a lockdown, while staff was working in home-office.

However, without the progressive collation, curation, preservation, and publication of data about the collections, museums lose a sustainable resource of information which could be relied upon also in other digital initiatives.

Video-streaming activities and social media, the two types of activities most pursued by museums during the pandemic would enormously benefit from a better and more detailed information, easily available, on which to draw for writing content for videos and posts. Streaming content was launched for the first time by 24,9% of museums and its use was increased for another 21,8% of organisations (ICOM, 2020, p.17), whereas only 3,8% of museums joined social media for the first time in 2020, most of them reporting either the same level of activity as before (47%) or an increased level (41,9%). Although these activities might have an easier learning curve than the digitisation and data enrichment of collections, they also require experiences with those platforms and eventually video-recording equipment and editing software. The need for more skill-training increases, of course, when looking at the outputs some of the bigger and more digitally mature organisations, produced during the pandemic. For example, the presentation of 3D models, also in online viewers such as Sketchfab, is notably increased in the last year: while photogrammetry and 3D scans are relatively easy to begin with, they require a notable amount of experience in order to realise good quality models, and to reuse these models in further applications (AR, VR, XR, gaming, etc.).

The development of digital skills and profiles has been the focus of few recent projects. For

example, in 2017, the *Mu.SA* project identified four key job profiles concerned by digital practices in museums: the Digital Strategy Manager, the Digital Collections Curator, the Digital Interactive Experience Developer, and the Online Community Manager, mapping their competences and subsequently developing online training resources (Mu. SA 2017). Similarly, the project *One by One* researched skill needs in British museum and identified guidelines for the development of such skills (Malde et al. 2019). In the Erasmus+ project *Digital Culture*, after surveying digital competences and needs in the cultural and creative industries, we identified a need also for further training in document management, online safety, and digital tools for project management and communication (DigiCulture 2021), as well as in social media communication and multimedia content production (esp. video), which were included in the final courses, part of the *DigiCulture MOOC*, alongside other digital training in mobile apps development, digital curation, virtual reality, etc.).

Finally, it should be assumed that audiences also faced similar challenges in relation to access, ability to use, and possibility to exploit the different digital resources prepared by museums in this period. Generally, it has been argued that the move online during the pandemic allowed museums to reach a broader range of publics than before: by increasing their online presence, museums have indeed reached new audiences and engaged with new communities, but it should be stressed how there is a lack of clear data on the actual reach and effects of museum digital practices on online audiences during the pandemic. Analytics from different museums are paralleled by a variety of comments on the contribution of online cultural activities to mental health and well-being during the lockdowns: however, this data have not yet been sufficiently collected and analysed, in order to gain a more granular understanding of the situation of online audiences during 2020.

To conclude this section, while there has been an undoubted increase in museum digital activities during the pandemic, it is important to consider who was able to create digital resources, both in terms of available infrastructures and equipment, and in terms of skills and personnel capacity, and who was able to access and benefit from this growth in digital

content. The next section will focus on the impact existing digital strategies and workflows had in promoting such growth, while a further section will focus on audience engagement.

### **Organisational barriers: leadership, strategies, and workflows**

The previous section discussed how museums approached the pandemic with different levels of digital infrastructures and skills, as well as different amounts of already-existing digital resources. The experiences of the pandemic prompted most museums to reconsider their work with 'digital': according to the NEMO survey, 83.2% of museums felt they needed "support in coping with digital tools and transition" (NEMO 2021, p. 16), considering one of their priorities to develop a digital strategy (41.5%), which should therefore support a more consistent, coherent, and sustainable range of digital practices in the sector.

The development and implementation of digital strategies in museums has been discussed multiple times in the past by the professionals involved in this process (e.g. Royston & Delafond 2014; Dafydd & Royston 2015; Brunner-Irujo 2018; Gries 2019). In parallel, there is a broad grey literature, often prepared in the form of guidelines or recommendations by agencies and practitioners in the field. For example, a comprehensive guide to the development of a digital engagement strategy has been developed by Visser and Richardson (2013); by AXIELL (2016); the agency Cogapp offers a guide to the elaboration of a digital strategy (Cogapp 2017); and the Wellcome Collection team has shared its experience and decision process in building a digital strategy (Henshaw 2020). Similarly, leading professionals have shared their insights on specific areas of work through blog posts and short articles: for example, social media communication (Dornan 2017; Koszary 2018).

Digital strategies not only help prioritising and guiding processes, but they also support the organisation of teams and professionals across the organisation. Digital professionals have historically been part of IT units (covering a wide spectrum of activities across all the museum), collection management teams, or of marketing and communication divisions. The project *One by One* (2017-2020) identified three main models of 'digital distribution' across British museums: centralised; hub and

spoke (a central team supporting and engaging other teams in their digital development); and distributive (Parry et al. 2018). Despite aspiring "for digital responsibilities to become more dispersed across the organization, a key marker of digital maturity" (Price & Dafydd 2018), museums still tend to operate with a centralised unit. Museums reacted to the pandemic by intensifying cross-departmental collaborations and by asking also other staff members to contribute to digital engagement activities, therefore involving more consistently members of staff previously not working closely with the digital team in their organisation. In particular, live streams of talks and social media saw the participation of professionals in different organisation roles and with different levels of digital experience.

Furthermore, the discussion on the location within an organigramme of digital specialists in museums is paralleled by the collaboration with external consultancies and the setup of temporary project partnerships to deliver digital outputs. For example, the *Google Arts & Culture* program has contributed to develop virtual tours of various museums, which have been widely promoted during the COVID lockdowns. In parallel, these experiences compounded by scepticism against commercial partners, financial constraints, and the need of developing in-house services have led to an increased attention to digital skill training in the sector. In the previous section, I discussed some recent studies (*Mu.Sa, One by One, DigiCulture*) researching digital competences needed in the sector, and indeed training emerged as one of the priorities for museums in all surveys related to the impact of the pandemic on digital practices. Whether this renewed attention for digital skills is going to lead the sector towards the creation of more positions similar to those identified by the Mu.SA project or towards what Ross Parry and colleagues call a 'distributive model' and a mature digital organisation remains to be seen and is, of course, dependent on museum leadership's choices.

However, when looking at data about museum activities during the pandemic, it is interesting to observe how museums with a pre-existing digital strategy, organisation, and established workflows fared in comparison to museums embracing many digital activities for the first time in this period. In particular, it is evident when looking at the range of initiatives

launched by museums that some could rely on existing digitised collections and practices to quickly produce new engaging digital content, whereas others relied on external applications that allowed them to produce content — but might not be as sustainable and effective in the long-term, if not adequately supported by a renewed digital strategy and an in-depth consideration of digital preservation issues. For example, digitisation and online collections activities require long-term projects, drawing on complex infrastructure and shared data standards. According to the ICOM survey, as mentioned above, 54% of museums continued or enhanced existing work on online collections, therefore being able to deploy existing workflows and a clear digital strategy (ICOM, 2020, p. 17). Instead, only 7,7% of the museums considered by the survey started to work on online collections after the lockdown, and it could be expected that this will lead to new thinking in relation to their digital strategy. Most museums who began a new digital activity during the pandemic, did so in the area of social media communication, an area of work in which there is less need of in-house infrastructures and could therefore be considered more accessible and immediate to all institutions, independently from their level of digital readiness.

At the same time, a few organisations made available a wealth of resources for museums wishing to develop new digital strands of work. For example, the Getty Foundation made available its *Animal Crossing Art Generator* (Getty, 2020), which allowed uploading in the popular Nintendo Switch game images of artworks, provided they had a IIIF manifesto. While this required already a degree of digitisation and technical capability, it also allowed museums with existing and IIIF-conform digital assets to enable the sharing of their artwork in the game. *Google Arts & Culture*, besides promoting its virtual tours of museums worldwide, shared a document summarising possible solutions for engage with the public through digital exhibitions and media (2020); the Audience Agency emphasised the need of understanding digital audiences and shared its surveys and guidelines for conducting digital visitor evaluation; sector-magazines included a long series of interviews and articles trying to collate initiatives and reporting expert digital professionals' advice and suggestions for

developing meaningful digital engagement. In this sense, although yet unproven with data and possibly ephemeral in character, new attention to best practices in the sector and possibilities of discussing and exchanging ideas became central to many experiences of the pandemic.

To conclude, museums with existing experience and more resources were advantaged in the shift to digital communication and presentation during the pandemic, and it should be noted that size of the organisation was also an important factor: 81% of large museums could increase their digital capacity, in contrast to 47% of small museums according to the NEMO survey (NEMO 2021, p. 16). At the same time, most museums are now interested in building on these experiences and exploring digital strategies and the long-term impact of these experiences might result in more digitally-mature organisations. However, maintaining these interests and increasing digital capacity of museum organisations will be possible only with adequate financial support and provision of resources and training in the sector.

### **Connecting objects, audiences, and communities**

The previous sections have reflected on the implications and impacts of the pandemic on museum professionals and, to a lesser extent, their audiences. This section is focusing on museums digital offer during the pandemic and it aims to briefly summarise the main trends emerging from the range of digital initiatives proposed by museums. It draws on a project aiming to collect, archive, and present these initiatives, so to record this moment in museum digital practices (available at <https://digitalmuseums.at/>). The project aimed to collect data on museum digital initiatives during the pandemic and make them immediately available to the public through an interactive map (Figure 1). In parallel, ongoing research is observing and recording the technologies and workflows used in these initiatives and conducting a series of short case-studies investigating public engagement with museums during the pandemic. Ultimately, we aim to develop an open documentation on museum digital projects in this period.

The dataset includes around a 1000 museum digital projects from over 45 countries, and groups these initiatives in a few macro-



categories, enabling filtering of the data (see Zuanni 2021). Overall, the range of activities could be discussed through four main frames: the choices in presenting the collections; the transfer to the digital sphere of the public programme; social media initiatives; and contemporary collecting projects.

As mentioned in the previous sections, only few museums began to work on online collections during this period, and few museums also developed online exhibitions, combining interactive websites, 3D visualisations, and audio-visual tours. Overall, the creation of online exhibitions, virtual tours, and 3D visualisations was a widely publicised digital practice emerging during the pandemic (see e.g. a list in Byrd-McDevitt 2020), however, there are little data on the sustainability of these efforts and their impact on the audience. All these projects involve a significant amount of work in infrastructure and data preparation: for the reasons mentioned above, it was difficult for museums without background experience in the area of digitisation, data enrichment, and online collections and exhibitions to get started in this area and smaller online exhibitions

(e.g. through dedicated websites, proprietary software for 3D processing and visualisation, or audio-visual material) poses many challenge for their digital preservation.

At the same time, there are no comprehensive data on the audience of these initiatives, although single institutions might have recorded number of visitors and page views through web analytics. The lack of metrics for measuring visitor engagement with online content is a barrier to more granular analysis of these projects, to which hopefully targeted projects will respond with both large-scale surveys and, crucially, in-depth qualitative studies. This research is necessary so to highlight the audience needs and evaluation of different forms of virtual museums, and it is therefore of primary importance for the future, so to guide strategy-development and investments in the field.

Two areas where museum audience interest could, at first sight, be more noticeable were the participation in public programmes and social media initiatives. Drawing on available videoconferencing and streaming services, museums launched online public programmes —

including 'live' streams and webinars — at times complemented by downloadable resources. This content was targeted at adults, families, and young students, comprising educational, entertainment, and well-being activities. Again, though, the number of participants in videoconferencing events is hardly accessible, so that there are not clear benchmarks supporting museums in prioritising form and content of their digital programmes.

Social media were already widely present in museums, so that only few museums joined them for the first time during the pandemic — most of them either maintaining or increasing previous levels of activities, or, in some cases, joining new platforms (e.g. TikTok). Besides exploiting the streaming possibilities of social media (e.g. Facebook live), there were numerous campaigns launched in 2020, from global hashtags to local initiatives. Hashtags like *#MuseumsFromHome* and *#MuseumsUnlocked* allowed users to share stories about museum objects, focusing on a different theme each day. While many users surely enjoyed these campaigns, a first look at the authors of the posts seems to show a prevalence of museum and heritage professionals; conversely, other social media challenges, such as the *#GettyChallenge*, witnessed a broader participation by the public. In this case, the challenge — inspired by the Dutch *#tussenkunstenquarantaine* — asked social media users to post photos recreating famous artworks, drawing on a limited number of everyday objects in their homes. In the case of these initiatives, more research is possible drawing on both digital ethnographic methods and data science ones. For example, Sabrina Melcher, in the context of a student project at the University of Graz (2020), conducted an analysis of around 1300 tweets related to this challenge, looking at the hashtag *#betweenartandquarantine*. Her results showed that most of the posts in the challenge were reproducing only a few very famous artworks, with the three painters most popular being Van Gogh, Vermeer, and Leonardo da Vinci. By comparing the museum hosting the painting and the location of the social media user participating in the challenge, it appears that the choice of the artwork to reproduce was independent from the proximity of the user to the museum; in other words, the notoriety of the artwork prevailed on any geographical affiliation with its origin and conservation

places.

Finally, an area in which audience participation was encouraged and which led to co-creation of new collections is represented by the numerous initiatives aimed at collecting memories and witnesses of the pandemic. A longer discussion of contemporary collecting, and its implications in a digital realm, exudes the scope of this paper — but it should be highlighted how this growth of projects aimed both at keeping in touch with audiences and documenting this historical period, thus contributing to the development of digital participatory, collecting and documentation practices in relation to 21<sup>st</sup> century heritage.

In conclusion, while there are some clear trends in audience engagement during the pandemic, it is still difficult to get valuable data on the reach and evaluation of different types of initiatives. The lack of information on audience participation in many of these projects represents a main challenge for the future, since this information is crucial in developing successful digital engagement solutions, and therefore I would argue that the suggestion by the Digital Culture Report by NESTA and ACE in December 2019: *“Understanding how to gather, analyse and interpret audience data is therefore becoming essential to developing effective audience engagement strategies”* (2019, p. 9) is particularly urgent today.

### **Conclusion: connected museum during and after the pandemic**

This paper has examined different types of connectivities in digital museum practice during the pandemic. First, I have discussed infrastructural and social barriers, which limited the possibilities of developing such connections. Secondly, I have discussed organisational barriers, limiting the possibilities of creating such connections. Thirdly, I have summarised the main types of activities proposed by museums during the pandemic, highlighting the challenges to a better understanding of audience engagement with all the digital content proposed by museums since March 2020.

The COVID-19 pandemic has surely prompted a big interest in digital practices, thus the development of digital strategies and digital content will become part of more museums in the future. However, once museums will start

to reopen they will also face the challenge of balancing these digital activities with their on-site practices. During the pandemic, museums will have reached new online audiences — which might not be able to be part of a museum's regular on-site audience (for geographical reasons, for personal reasons, e.g. disabilities, time availability, care duties, etc.). Maintaining a relationship with these new audiences, to continue and expand their accessibility, while — in parallel — developing solutions for their on-site audiences (e.g. new mobile applications) will further stretch museum digital capabilities. The possibilities to address these challenges will vary between museums of different sizes, administrative status, and geographical location, so that each museum will need to find a balance satisfying its audience needs, its digital capabilities, and its mission.

As I argued above, however, the need of more

comprehensive data on the type of possibilities and resources available for museums wanting to develop digital practices as well as shared data on audiences' responses to different types of digital tools and activities will be useful in guiding this process. The map of digital museum activities developed in the project informing this paper might be a first small step in this direction: although it will need to be further expanded and grounded in more visitor studies, as well as broader surveys (such as the ICOM, NEMO, and UNESCO ones). The long-term effects of the sudden shift to a digital world in 2020 cannot yet be evaluated, and only time will allow putting in perspective what might now seem as a digital turn. However, the data produced during these past months, on museum projects and their audiences, will remain as an important benchmark of the possibilities of digital solutions in museums.

## References

- Battro, A. 2010. From Malraux's Imaginary Museum to the Virtual Museum. In: R. Parry (ed.), *Museums in a digital age*, pp. 136-147. Abingdon: Routledge.
- Fry, E. F. 1970. The Computer in the Museum [Review of Computers and Their Potential Applications in Museums]. *Computers and the Humanities*, 4(5): pp. 358-361. <http://www.jstor.org/stable/30199388>
- AXIELL 2016. *Digital Transformation in the Museum Industry*. Available at: <http://alm.axiell.com/wp-content/uploads/2016/07/Axiell-ALM-Digitise-Museums-Report.pdf> (Accessed May 11, 2021).
- Brunner-Irujo, A. 2018. *Digitale Transformation und Digitale Strategie im Universalmuseum Joanneum*. Available at: <https://www.museum-joanneum.at/blog/digitale-transformation-und-digitale-strategie-im-universalmuseum-joanneum/> (Accessed May 4, 2021).
- Byrd-McDevitt, L. 2020. *The Ultimate Guide to Virtual Museum Resources, E-Learning, and Online Collections*. Available at: <https://mcn.edu/a-guide-to-virtual-museum-resources/> (Accessed May 12, 2021).
- Cogapp. 2017. *Digital strategy for museums. A practical guide for museums*. Available at: <https://www.cogapp.com/digital-strategy/> (Accessed May 4, 2021).
- Dafydd, J. & Royston, C. 2015. How to be a digital leader and advocate: The changing role of the digital department. *MW2015: Museums and the Web 2015*. Available at: <https://mw2015.museumsandtheweb.com/paper/how-to-be-a-digital-leader-and-advocate-the-changing-role-of-the-digital-department/> (Accessed May 6, 2021).
- DigiCulture 2021. *Digital Culture. Improving the Digital Competences and Social Inclusion of Adults in Creative Industries*. Available at: <https://www.digiculture.eu> (Accessed May 15, 2021).
- Dornan, R. 2017. *Should museums have a personality?* Available at: <https://medium.com/@RussellDornan/museumpersonality-87ab2112ee9e> (Accessed May 6, 2021).
- The Getty Foundation 2020. *Animal Crossing Art Generator*. Available at: <https://experiments.getty.edu/ac-art-generator/> (Accessed May 12, 2021)
- Google Arts and Culture 2020. *Connect to Culture*. Available at: [https://docs.google.com/presentation/d/e/2PACX-1vT0eVy4QGJPyMox1JY98PENfb4IeZdmkaonSerRwyECUi07Aqgrt5s1-GkBUOUyboRmXiexpmV7IB/pub?start=false&loop=false&delayms=3000&fbclid=IwAR35G\\_SASydrB L3xCL022Pz7DV8lFnXgy548Bfaqw9RC5Q3\\_SOlviPTmOhY&slide=id.g72e5b0b2d0\\_3\\_678](https://docs.google.com/presentation/d/e/2PACX-1vT0eVy4QGJPyMox1JY98PENfb4IeZdmkaonSerRwyECUi07Aqgrt5s1-GkBUOUyboRmXiexpmV7IB/pub?start=false&loop=false&delayms=3000&fbclid=IwAR35G_SASydrB L3xCL022Pz7DV8lFnXgy548Bfaqw9RC5Q3_SOlviPTmOhY&slide=id.g72e5b0b2d0_3_678) (Accessed May 12, 2021).
- Gries C. 2019. Das digital kompetente Museum - digitale Strategien für Museen. In: L. Pöllmann & C. Herrmann (eds.), *Der digitale Kulturbetrieb*. Springer: Wiesbaden. DOI: [https://doi.org/10.1007/978-3-658-24030-1\\_5](https://doi.org/10.1007/978-3-658-24030-1_5).
- Henshaw, C. 2020. *Digitisation Strategy 2020-2025*. Available at: <https://stacks.wellcomecollection.org/digitisation-strategy-2020-2025-c965dd77624f> (Accessed May 6, 2021).
- ICOM 2020. *Museums, museum professionals and COVID-19: follow-up survey*. Available at: <https://icom.museum/wp-content/uploads/2020/11/>

- FINAL-EN\_Follow-up-survey.pdf (Accessed May 6, 2021).
- Koszary, A. 2018. *Seven broad statements that may or may not help your museum do a bit better at social media*. Available at: <https://medium.com/@adamkoszary/seven-broad-statements-that-may-or-may-not-help-your-museum-do-a-bit-better-at-social-media-6173c3b3af0c> (Accessed May 6, 2021).
- Lai, J. & Widmar, N.O. 2021. Revisiting the Digital Divide in the COVID-19 Era. *Applied Economics Perspectives and Policy*. 43: pp. 458-464. DOI: <https://doi.org/10.1002/aep.13104>
- Malde, S., Kennedy, A. & Parry, R. 2019. *Understanding the digital skills & literacies of UK museum people – Phase Two Report*. University of Leicester. Available at: <https://hdl.handle.net/2381/43014>
- Melcher, S. 2020. *Projektseminar*. Unpublished essay, University of Graz.
- Mu.Sa 2017. *Museum professionals in the digital era. Agents of change and innovation*. Available at: <http://www.project-musa.eu/wp-content/uploads/2017/03/MuSA-Museum-professionals-in-the-digital-era-full-version.pdf> (Accessed May 6, 2021).
- Museumsbund Österreich 2019. *Das Museum im digitalen Raum. Zum Status quo in Österreich*. Available at: [http://www.museen-in-oesterreich.at/\\_docs/\\_statistiken/de/MOe\\_Museum\\_im\\_digitalen\\_Raum\\_2019.pdf](http://www.museen-in-oesterreich.at/_docs/_statistiken/de/MOe_Museum_im_digitalen_Raum_2019.pdf) (Accessed May 6, 2021).
- Nauta, J.G., van den Heuvel, W. & Teunisse, S. 2017. *Report on ENUMERATE Core Survey 4*. Available at: [https://pro.europeana.eu/files/Europeana\\_Professional/Projects/Project\\_list/ENUMERATE/deliverables/DSI-2\\_Deliverable\\_D4.4\\_Europeana\\_Report\\_on\\_ENUMERATE\\_Core\\_Survey\\_4.pdf](https://pro.europeana.eu/files/Europeana_Professional/Projects/Project_list/ENUMERATE/deliverables/DSI-2_Deliverable_D4.4_Europeana_Report_on_ENUMERATE_Core_Survey_4.pdf) (Accessed May 15, 2021).
- NEMO 2020. *Survey on the impact of the COVID-19 situation on museums in Europe. Final Report*. Available at: [https://www.ne-mo.org/fileadmin/Dateien/public/NEMO\\_documents/NEMO\\_COVID19\\_Report\\_12.05.2020.pdf](https://www.ne-mo.org/fileadmin/Dateien/public/NEMO_documents/NEMO_COVID19_Report_12.05.2020.pdf) (Accessed May 15, 2021).
- NEMO 2021. *Follow-up survey on the impact of the COVID-19 pandemic on museums in Europe. Final Report*. Available at: [https://www.ne-mo.org/fileadmin/Dateien/public/NEMO\\_documents/NEMO\\_COVID19\\_FollowUpReport\\_11.1.2021.pdf](https://www.ne-mo.org/fileadmin/Dateien/public/NEMO_documents/NEMO_COVID19_FollowUpReport_11.1.2021.pdf) (Accessed March 29, 2021).
- NESTA & ACE 2017. *Digital Culture 2017*. Available at: [https://media.nesta.org.uk/documents/digital\\_culture\\_2017.pdf](https://media.nesta.org.uk/documents/digital_culture_2017.pdf) (Accessed May 6, 2021).
- NESTA & ACE 2019. *Digital Culture 2019*. Available at: <https://media.nesta.org.uk/documents/Digital-Culture-2019.pdf> (Accessed May 6, 2021).
- Orlandi, S.D., Calandra, G., Ferrara, V., Marras, A.M. & Radice, S. 2019. *Web Strategy Museale*. Zenodo. DOI: <http://doi.org/10.5281/zenodo.3547149>
- Parry, R., Eikhof, D.R., Barnes, S. & Kispeter, E. 2018. *Mapping the Museum Digital Skills Ecosystem - Phase One Report*. University of Leicester. Available at: <https://hdl.handle.net/2381/41572>
- Price, K. & Dafydd, J. 2018. *Structuring for digital success: A global survey of how museums and other cultural organizations resource, fund, and structure their digital teams and activity*. Available at: <https://mw18.mwconf.org/paper/structuring-for-digital-success-a-global-survey-of-how-museums-and-other-cultural-organisations-resource-fund-and-structure-their-digital-teams-and-activity/> (Accessed May 15, 2021).
- Royston, C. & Delafond, S. 2014. *How To Introduce Digital Transformation To A Museum*. Museums and the Web 2014. Available at: <https://mw2014.museumsandtheweb.com/paper/how-to-introduce-digital-transformation-to-a-museum/> (Accessed May 6, 2021).
- UNESCO 2020. *Museums around the world in the face of COVID-19*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000373530> (Accessed May 2, 2021).
- We Are Social 2021. *Digital 2021: Global Overview Report*. Available at: <https://datareportal.com/reports/digital-2021-global-overview-report> (Accessed May 2, 2021).
- Zuanni, C. 2021. *Museum digital projects during COVID-19: from lockdown connections to digital transformation?*. In: *MW21: Museums and the Web 2021*. Available at: <https://mw21.museweb.net/paper/museum-digital-projects-during-covid-19-from-lockdown-connections-to-digital-transformation/> (Accessed May 2, 2021).