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DIGITISING MUSEUM MATERIALS
— TOWARDS VISIBILITY AND IMPACT

The increased exchange of immaterial goods and the profound changes in the way content is created and used are the characteristics of a digital society. Advances in information and communications technologies influence the way we work, think, and create – both as individuals and as a group.

Digital resources are becoming increasingly significant throughout society. This trend is also reflected in the museum sector, which is responsible for creating, managing, making accessible, and preserving digital knowledge capital related to cultural material and visual culture.

Just a decade ago, in 1990s, the driving force behind the digitisation of museum collections was collections management. The rise of the Internet as the key information seeking, learning, and experience-building environment has thrust online services and digital content that is provided by museums, libraries, and archives into the spotlight of cultural heritage and information society policies, both at the European Union level and in the individual EU member states. Digitising is increasingly being justified by the benefits of content use and reuse that are provided to society.

The activities of the European Union clearly reflect this shift. In the *i2010 Digital Libraries Initiative* (The European Commission 2005), the electronic information resources of scientific and public libraries, archives, audio-visual archives, and museums are, for the first time in the European Union's activities, at the core of the information society.

Based on these policy definitions, both the European Commission and the Council of the European Union have in recent years prepared a number of more in-depth and complementary documents that, alongside the digitisation of physical materials and the management of digital materials, increasingly emphasise the development of use- and user-centred electronic services. Ensuring the availability and usability of born-digital and digitised materials in the decades and centuries to come is a goal towards which both the

Commission and the EU member states are working. The Commission and the member states together have committed themselves to establishing a European Digital Library, *Europeana*.[1]

Currently, the European Union trend is to strengthen the role of cultural content as the foundation upon which knowledge and innovation are built. *Europe 2020 Strategy* (European Commission 2010) identifies active support for digitising Europe's rich cultural heritage as one priority leading to smart growth. It is, therefore, highly likely that the increased European Union interest in the digitising of cultural materials indicates both concrete EU-level measures that will enhance digitising and increased pressure for the member states to include digital cultural heritage in their political agenda also in the future.

Alongside arguments for economic growth, we should also study the impact of digitising by investigating the negative implications that failing to digitise key national cultural materials would have on various sectors of society. Both EU and national level digital agendas need more extensive research results than are currently available on the impact of digitisation and the online accessibility of museum materials.[2]

MUSEUM MATERIALS' SLOW JOURNEY TO THE INTERNET

Museums have a long way to go before they can provide online access to the vast collection potential that they have accumulated over the centuries. Museum materials are digitised less than the materials in libraries and archives. Of the digitised materials, far less museum materials are made available for free via online access than library and archive materials (CIPFA 2009).

Digitising museum objects is expensive. The physical characteristics of museum materials make them unsuited for mass digitising, and because of their uniqueness, creating descriptive metadata for museum objects is a painstakingly slow process. Developing copyright solutions that cover a wide range of museum materials is crucial so that more copyright-protected museum materials can be made accessible online.

Advanced Internet search engines link museum collections and make them available to users regardless of time and place. By using online services, museum professionals learn about various collections and their interrelationships. Increased knowledge of existing collections also enhances inter-museum loans of physical collections. Digital content can be used in a number of ways, for example in professional online services that support inter-museum exchanges, exhibitions, and educational online services.

The ways that people use to seek information and experiences on the Internet are constantly evolving, making it impossible to continue building online services based on an organisational hierarchy or collections, at least in a wider sense. In addition to national online services, European museums make content available for search through the digital European library *Europeana* (the European Digital Library Foundation 2010). This makes national content accessible in a wider European context. There is no doubt that *Europeana* – which receives content through numerous aggregators such as the national digital libraries of the EU member states as well as specific and cross-domain museums, archives, and library portals – will become one of the key access points to cultural heritage content on the Internet.

SELECTING MATERIALS FOR DIGITISING

When selecting cultural material for digitisation, museums typically prioritise materials based on technical criteria (physical condition of the original material), content criteria (representativeness, uniqueness), and use criteria (demand).

Digitisation is used to preserve fragile analogue cultural materials and to reduce wear and tear through use. Museums, libraries, and archives often concentrate digitisation activities on focus areas based on a combination of content and use criteria, such as the representativeness, significance, uses, and demand of the materials. A typical example includes digitising homogeneous, culturally or scientifically significant collections with characteristics that make physical handling difficult.

Questions related to the use of digital content go all the way back to the origins of the materials. It is, therefore, important to interact with various user groups when selecting materials to be digitised.

CHALLENGES OF DIGITISATION

The challenges of digitisation are manifold, covering large volumes of materials, increased complexity of materials, management of internal interrelationships between collection items, and future, unforeseen technological advances.[3] The technology used and metadata created in the process of digitising materials should meet all the use and long-term preservation demands in order to prevent the need for re-digitising the material later.

The type of the analogue material largely determines how faithful a replica the digitised version will be. Some object types, such as three-dimensional museum items, still need to be digitised as two-dimensional versions because 3D technology is fairly expensive and, therefore, not yet feasible for digitising large collections. However, advances in the digitising technology have created new ways to study materials, especially from a scientific point of view. One example of this is the image manipulation of scientific samples by dying and enlarging.

The museum sector is known for its numerous descriptive metadata standards (McKenna *et al.* 2009). However, the trend to separate user interface development from background systems makes it easier to develop search services that can make use of several metadata standards. The biggest problem with museum collection search engines is no longer the numerous descriptive metadata standards but rather the various deviations from the standards – still a regrettably common practice – that makes it more difficult to build the necessary search engine indexes and decreases the searchability of the collections.

Digital museum collections are mainly created so that they will also be accessible for future users. Preserving the stored information for a long time without compromising accuracy and integrity can only be achieved if sufficient administrative metadata is attached to digital objects. Administrative metadata in this context means technical metadata, metadata associated with long-term preservation, and access right data. Correcting deficiencies later is expensive, and sometimes even impossible, as the necessary data may no longer be available.

DIGITISING OPTIONS – IN-HOUSE, OUTSOURCED, OR WITH PARTNERS

Selecting the optimal digitising process depends on a number of factors, including the characteristics, physical condition, volume, and use of the materials that are to be digitised as well the profile and resources of the museum, and logistics.

When museums carry out digitising in-house, they develop institutional digitisation knowledge. However, both digitising equipment and software become obsolete fast, and investments cannot always be fully utilised. Outsourcing digitisation requires that the museum has adequate procurement and supplier management processes as well as quality control measures. The advantages of outsourcing are that museums do not need to make large

investments and museum staff can focus their activities on the core business instead of the technical aspects of digitising. New concepts where libraries, archives, and museums work together to create digitising services look particularly promising. Such partnerships help to optimise and share knowledge, software, and equipment, which is a huge advantage.

Recent years have seen a slight increase in co-operation projects on the digitising of cultural materials across Europe. Reports submitted by member states to the European Commission in 2010 indicate that the business partner involved in the co-operation projects was usually an IT or a web service company. Libraries in Belgium, Spain, the United Kingdom, France, and Germany, for example, have made agreements with *Google* for the digitisation of books and other materials.[4] Compared to public funding, however, co-operation project funding for the digitising of museum collections is still negligible.

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DIGITAL ONLINE CONTENT – BUT WITH WHOSE METADATA?

The increasingly digital society poses challenges to museums because, on the one hand, museums must maintain the integrity of museum collections while, on the other hand, they need to enable and support the creation of new information products and services.

Users will actively use digital museum collections only if the associated services have been created with users in mind.[5] However, the demand to empower users is leading to a situation where museums must set guidelines for how they use and display social metadata.

Using social metadata to describe materials is a delicate matter for museums. Users value digital content and services provided by museums, libraries, and archives primarily because they find them trustworthy. At the same time, they want to participate in the creation of information. The origin of social metadata should be clearly identified in the online services providing access to museum materials to ensure reliability. A badly implemented mixture of social and museum metadata will only discourage users. If implemented properly, social metadata will enhance and enrich digital museum content and services without compromising the trust of users.

CHALLENGES OF LONG-TERM PRESERVATION OF DIGITAL MATERIALS

Museums have a duty to preserve the core content of the information society, the permanently retained digital cultural heritage, in an accessible format for hundreds of years. Finding a solution for the long-term preservation of digital cultural material has become a hot national and international topic. During the first decade of the twenty-first century people have awakened to the fact that, without sustainable solutions for long-term digital preservation, our collective memory will gradually fade over the coming years and decades.

Digital museum collections will not be preserved without a long-term preservation system that can be used to manage all the risks associated with digital content. Long-term preservation systems ensure that digital content can be transferred from one media, software, and hardware generation to another without compromising integrity so that they will be accessible to future users. Even without a solid long-term preservation solution, museums can enhance the preservation of their collections in a number of ways. The most crucial ones are geographically distributed data replication and retention and sufficient metadata.[6]

The fact that we are still – with the exception of a few pioneer projects – looking for sustainable digital preservation solutions for museum collections works in our favour. If museums work together – or with libraries and archives – to develop joint solutions for long-term data preservation, they will achieve significant process benefits and cost savings as well as save natural resources. We will see, without a doubt, enthusiastic discussions on the ecological efficiency of digital preservation in the near future, which will be as fervent as the current discussions on the environmental impact of the storage conditions that are required by physical collections.

Although work on the practical solutions for long-term digital preservation is just beginning in many countries, digital preservation can be supported by creating a sufficient amount of accurate metadata during the digitising process, using up-to-data collection management systems, and storing backups in a geographically distributed manner.

Although permanently accessible digital content multiplies the positive impact of digitising, it also creates long-term costs. The entire museum sector would benefit greatly if the various cost models for long-term digital preservation were further developed as an internal co-operation project in order to meet the needs of museums, libraries, and archives.[7]

TOWARDS THE CENTRE

In order to serve today's museum visitors, digital content and the associated advanced online services and mobile applications are necessary. Easy-to-use digital content determines, to a great extent, the role that culture, history, and science play in people's daily lives and the kind of information used in research, education, and business.

The best way to prepare for the challenges posed by digitising museum materials and the management, distribution, and preservation of digital content is to ensure that museum collection policies and digitising strategies are up to date and to share information and experiences between museums, libraries, and archives. Digitising must be supported by joint and/or shared services, procedures, guidelines, and solutions. By joining forces, these holders, distributors, and preservers of core society information can secure their place at the centre of the digital society.

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ENDNOTES

1   See The European Commission 2005, 2008, and 2009, the Council of the European Union 2006 and 2008 and the European Digital Library Foundation (2010).

2   Interesting studies have been carried out in recent years in the Netherlands (Poort *et al.* 2009) and Great Britain (British Library 2004).

3   Several practical guides and professional online services are available to support the digitising of cultural material, including JISC Digital Media 2008a–d and the Canadian Heritage Information Network CHIN 2010. The handbooks and models (2010a and b) of the Digital Curation Centre (DCC) cover the entire lifecycle of digital content, from creation to long-term preservation.

4   The reports by the EU member states on the digitisation, online accessibility, and digital preservation of cultural material provide an interesting cross-section of the current state of affairs in Europe (Member States Expert Group (MSEG) 2010).

5   Interesting studies on material use and usability include CIBER 2008, Snow *et al.* 2008, and Tenopir *et al* 2009.

6   Useful tools and methods supporting long-term digital preservation include the self-assessment tool DRAMBORA (Digital Curation Centre DCC *et al.* 2010), the TRAC checklist (CRL *et al.* 2007), as well as the test bed software and planning and evaluation tools by Planets Consortium (2010). The OAIS reference model is widely used to describe the long-term preservation in archives and libraries (the Consultative Committee for Space Data Systems (CCSDS) 2002). Seamus Ross' article (2007) provides an interesting view of long-term preservation (2007).

7   For more information on the costs associated with the long-term preservation of digital information, see Ayris *et al.* 2008, McLeod *et al.* 2006, Blue Ribbon Task Force 2010, and the Nationaal Archief of the Netherlands 2005.

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