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Progress from National Initiatives towards
European Strategies for Digitisation

Seamus Ross

in

*Towards a Continuum of Digital Heritage:
Strategies for a European Area of Digital Cultural Resources*

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Just over three years ago the Lund Principles were agreed with an aim of bringing best practice, coherence, professionalism, and synergy to the digitisation initiatives designed to make accessible and visible the cultural heritage of Europe.[3] Moves to develop and encourage the adoption of the Lund Principles arose from a realisation among Member States that, as:

increased availability of high quality eContent would unlock the wealth of cultural and scientific heritage held in Europe's memory institutions it would thereby make possible new kinds of business opportunities, create resources for research, and provide materials for learning and teaching. If these resources are to be renewable and to serve as intellectual capital for the knowledge economy, their digitisation would need to be managed in ways that will ensure the eContent is of consistent quality, sustainable, interoperable, does not result from duplicate effort, can be made visible on the global networks and makes the most effective use of the labour and financial resources that were expended in the process of its creation. In achieving these objectives memory institutions such as archives, libraries, and museums across Europe all face similar problems with: funding, identification and selection of content for digitisation, knowledge of and access to appropriate technology for conversion, storage, asset management, and long term preservation.[4]

After three years of effort it is perhaps time to reflect on the impact that the Lund Principles have had on digitisation initiatives in Europe and on the accessibility and use of eContent. The Lund Principles, and hence this discussion, uses the term digitisation in its broadest sense to cover all aspects of eContent creation, use, and assessment from user needs analysis to selection, to conversion from analogue to digital form [5], to storage, presentation, use, preservation, and impact assessment.

1 I wish to thank the Dutch Ministry of Education, Culture and Science and in particular Marius Snyders for the opportunity to present this paper at the conference on *Towards a Continuum of Digital Heritage: Strategies for a European Area of Digital Cultural Resources* in context of the Netherlands EU Presidency 2004.

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3 Agreed 4 April 2001 in Lund (Sweden) http://www.cordis.lu/ist/directorate_e/digicult/lund_p_browse.htm

4 S Ross (Rapporteur), 2001, *Report of an Expert Meeting on European Content in Global Networks, Coordination mechanisms for digitisation programmes*, Lund, Sweden. 4 April 2001, <ftp://ftp.cordis.lu/pub/ist/docs/digicult/lund-report.pdf>. For further information on the development of the Lund Principles see also the following: S Ross (Rapporteur), 2001, *Report of the First Meeting of the National Representatives Group*, Brussels 11 December 2001 <ftp://ftp.cordis.lu/pub/ist/docs/digicult/nrg-1st-meeting-report.doc>; S Ross (Rapporteur), 2001, *Report of an Expert Meeting on Coordination of National Digitisation Policies & Programmes*, Brussels, 17 July 2001, ftp://ftp.cordis.lu/pub/ist/docs/digicult/brussels_report_17_july_2001.doc; S Ross (Rapporteur), 2000, *Report of an Informal meeting on European Digital Content for Global Networks and Co-ordinating Mechanisms, European Commission*, Luxembourg, 15 - 16 November 2000, ftp://ftp.cordis.lu/pub/ist/docs/digicult/lund_dossier.pdf (pages 26-38 or 22-34).

5 Throughout this paper we use the terms digitisation and digital representation interchangeably to describe this process.

It will not be surprising to most of you that initiatives similar to that promoted by Lund are not new. Indeed, they have a long history. On this occasion, a comparison might be drawn between the Carolingian Renaissance and current efforts to promote best practices in the creation of digital content. This year marks the eighth-hundredth anniversary of the death of Alcuin (c.735-804) the exceptional grammarian, theologian, and advisor and friend to kings, nobles, and leading figures in the Church of his day. Just over two decades before his death he travelled from York (in England) to join the court circle of Charlemagne at Aachen [6]. He played a key role in the cultural and intellectual revolution of the late eighth and early ninth centuries on the Continent, commonly referred to as the Carolingian Renaissance[7]. In many ways the success of this intellectual and cultural renaissance was predicated on education, standardisation, communication, and access to authenticated sources. Standardisation, for instance, played an important role as the scriptoria across Charlemagne's Empire, beginning in the 780s, adopted a new script, Carolingian minuscule, consisting of separated and regularly- and well-formed letters [8]. The accuracy and authenticity of their sources was of immense concern to late eighth- and ninth-century thinkers. In fact they were so concerned with the quality of their sources that those new copies of manuscripts which were created in accordance to the 'guidelines' (and I use the term loosely) were marked *ex authentico libro*. The concentration of the Carolingians on the creation of accurate and verified transmission arose in all likelihood from the realisation that the quality and accuracy of their sources was central to the quality of their understanding and the new knowledge they could create. Likewise, our digitisation work must result in quality resources which will help us to deliver better and better interpretations of our world and our past. It is illustrative to remember that the problems addressed by reforms and developments in the late eighth and early ninth centuries are similar to the kinds of concerns that face us today in considering issues involving digitisation of our cultural and scientific heritage.

The cultural and scientific heritage of Europe held in our memory institutions provides a source of raw materials for economic, intellectual, social, and cultural development in the 21st century. The value of these raw materials multiplies when they are available in digital form. In digital form they can, as is widely recognized, serve as sustainable and renewable resources that can be exploited in an ever-increasing diversity of ways. In their digital guise these materials provide core resources for enabling education, supporting life-long learning, underpinning the development of new products by creative industries, contributing to improvements in our quality of life, and through their virtual accessibility helping to foster tourism. In establishing the Lund Principles representatives of the Member States acknowledged that a continuation of approaches

6 The dynamic engagement of Charlemagne, his children, and other members of the court in intellectual discussion is mentioned in Einhard's *Life of Charlemagne* and celebrated in two contemporary poems one by Angilbert (Abbot of St Riquier) and another by Theodulf of Orleans both called *Ad Carolum regem*. This intellectual renaissance permeated well beyond the Court with communities encouraged to establish schools for 'boys' and monasteries pressed to cultivate learning.

7 On the Carolingian Renaissance see Rosamond McKitterick, 1983, *The Frankish Kingdoms Under the Carolingians* (London), 140-168 and 208-227. She also cautions about what might be meant by the term 'court school'.

8 Bernhard Bischoff, 1990, *Latin Palaeography: Antiquity & the Middle Ages* (Cambridge) and Bernhard Bischoff, 1965, 'Die Karolingische Minuskel', in Wolfgang Braunsfels, (ed), *Karl der Grosse: Werk und Wirkung* (Aachen). See also the essays in Rosamond McKitterick (ed), 1994, *Carolingian culture: emulation and innovation* (Cambridge).

to digitisation that had become entrenched in the 1990s was fostering fragmentation of effort and practice, reflected limited technological knowledge and skills on the part of many creators of digital resources, and did not reveal a harmony of policies and strategic activity that would be essential if there were to be any chance of maximising the potential of the eContent age. So, as you are aware, Member States in adopting the Lund Principles set out to:

- ◆ improve and reinforce the co-ordination of digitisation activities across Europe;
- ◆ enable the efficient and effective use of digitisation to open up Europe's unique and significant wealth locked in its cultural and scientific heritage;
- ◆ reduce, if not eliminate, redundancy and fragmentation of effort, divergence of technical approaches, and waste of financial resources;
- ◆ facilitate the creation of Europe's eContent industries;
- ◆ capitalize on the investment made in the creation of digital resources;
- ◆ ensure visibility, interoperability and discovery of digital resources;
- ◆ deliver digital assets that promote and reflect cultural diversity; and,
- ◆ bring cohesiveness and shared vision to what is currently a fragmented area of activity.

These are laudable objectives. Progress towards widespread adoption and take-up of the principles, that were established to deliver these outcomes, has, it is fair to report, been patchy. Before considering the shortcomings of progress in this area the range of high quality guidelines that has become available since 2001 should be noted. Among the excellent guidance in digital collection development that has become available during this period four pieces are worthy of mention, although the last (TASI) is more a dynamic knowledge-base:

- ◆ NISO Framework Advisory Group, (2004), *A Framework of Guidance for Building Good Digital Collections*, (Bethesda, MD: NISO Press), <http://www.niso.org/framework/framework2.pdf>
- ◆ The Humanities Advanced Technology and Information Institute (HATII), University of Glasgow, and the National Initiative for a Networked Cultural Heritage (NINCH), 2002. *The NINCH Guide to Good Practice in the Digital Representation and Management of Cultural Heritage Materials*. (Washington DC: NINCH), <http://www.ninch.org/guide.pdf>.
- ◆ North Carolina ECHO (*Exploring Cultural Heritage Online*). 2004. *Digitization Guidelines*. <http://www.ncecho.org/Guide/2004/toc.htm>.
- ◆ Technical Advisory Service for Images (TASI) funded by the Joint Information Systems Committee in the United Kingdom manages a growing compendium of advice and guidance in the area of digital representation. <http://www.tasi.ac.uk/>

In support of the Lund Principles, the European Commission funded project MINERVA, which works to develop a 'network of Member States' Ministries to discuss, correlate and harmonise activities carried out in digitisation of cultural and scientific content, for creating an agreed European common platform, recommendations and guidelines about digitisation, metadata, long-term accessibility and preservation'

has studied the published digitisation guidelines and produced lists of sources of guidance and identified competence centres within Europe [9].

It may be worth recalling that commercial companies and memory institutions are not the only creators of digital content. Increasing numbers of local projects and memory users are constructing digital resources. There are though precious few documents that provide them with the kinds of guidance on practice which they need to enable their work. *“Tell it as it is”*: *A guide to recording your Local Heritage Initiative Project*, an introduction to documenting community heritage projects funded jointly by the Countryside Agency and the Heritage Lottery Fund in the United Kingdom, is a rare example [10] of guidance designed to assist community led projects. There will be a growing demand for guidance of this kind.

At an anecdotal level conversations with librarians, archivists and museum professionals all suggest that the level of discussion on issues from project planning to sustainability in the area of digital representation has become much more sophisticated during the past three years, but what contribution, if any, the launching of the Lund Principles may have had in bringing this about can not be determined. Perhaps the more pervasive use of technology in society in general has played the major role in raising our awareness about the possibilities of digitisation and the rise of eContent industries.

Besides more accessible guidance about digitisation and increased activity has Lund had a positive impact on key issues in the creation of our digital landscape such as collaboration, sustainability, quality control, metadata creation, and long term access to digital assets? The scale of available content has grown substantially in the last three years with many cultural institutions finding the online environment an effective way to expose their collections. Too many of these collections are still delivered using static web pages, when they could be more effectively served up from content (or digital asset) management systems, an approach that would facilitate more flexible access to digital representations [11]. Too much of the effort has concentrated on medium and large collections and not enough has been done to help smaller institutions to make their holdings accessible and visible. Across institutions of all types and sizes metadata construction and usage remains a major obstacle to the creation and discovery of eContent. Searches of more recently developed collections in Europe demonstrated that many of the conclusions reached about the variability in the application of metadata standards in a review completed in 2000 of the Joint Information Systems Committee’s Image Digitisation Initiative (JIDI) still have validity [12]. Moreover they are applicable to projects across Europe.

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9 <http://www.minervaeurope.org/guidelines.htm>

10 <http://www.lhi.org.uk/docs/tiaais.pdf>

11 see Chapter 2 (pages 41-61) in S Ross, M Donnelly, and M Dobрева, 2003, *New Technologies for the Cultural and Scientific Heritage Sector*, (DigiCULT Technology Watch Report 1, European Commission) at <http://www.digicult.info> and also *Digital Asset Management Systems for the Cultural and Scientific Heritage Sector*, DigiCULT Thematic Issue 2.

12 S Ross, 2000. *Image Digitisation Management Models: An Assessment of the JIDI Programme*, (Report to the Joint Information Systems Committee). http://www.hatii.arts.gla.ac.uk/research/jidi_assessment/jidi_final_report.pdf.

(HATII)[13] in Glasgow and monitoring activities conducted by the European Commission funded Fifth Framework Support Action DigiCULT [14] into how the cultural heritage sector can and is using new technologies have provided some indications as to the current state of play in digitisation across Europe. In a number of areas the trends have been very disappointing. For example, for nearly a decade we have recognised that if content creation is to be successful we need to create coherent eContent programmes. Yet the great majority of initiatives, including those funded under such major national schemes as the New Opportunity Fund's nof-digitise [15](UK) promote discrete digitisation projects which are institutionally based and focus on the digital representation of a narrow range of material types. Furthermore, when we examine in more detail current trends we still see challenges that the Lund Principles aimed to address endemic within the cultural heritage sector. For instance, seven trends listed below provide ample evidence of outstanding challenges.

- ◆ eContent creation initiatives are not creating regional, national, or pan-European resources. They are still building institutional ones.
- ◆ eContent development initiatives rarely involve collaboration beyond a single institution.
- ◆ Strategic planning does not lie at the core of most eContent creation initiatives. More often than not initiatives appear in response to available financial resource and custodial whim, rather than user demand and strategic analysis of holdings and planning as to their exploitation.
- ◆ There remains tremendous variation in the approaches that different projects take to standards and technology. For example imaging standards vary, metadata models are tailored by projects and often do not support interoperability, and many projects do not adopt robust content (or digital asset) management approaches. This problem may, in part, arise because of the speed with which technical developments are currently taking place and the limited sources of high quality advice.
- ◆ From an informal survey of projects in preparation for this meeting (done in August 2004) it was not always clear (to me at least) that projects had considered the qualities of the source material(s) to be digitised and the impact that this might have had on the processes and technologies that they used or planned to use.
- ◆ Digital curation and preservation have become much more central to thinking within the cultural sector during the past three years, but still too few projects consider how they will ensure long-term availability and access to the eContent they are creating in the face of developing technology.
- ◆ While increasingly lip-service is being paid to questions of sustainability (e.g., income generation, business models) at the outset of projects, there are precious few sustainability models that have been demonstrated to work on-the-ground. (For many small and medium sized institutions collaborative action and shared platforms and services will probably provide the most viable sustainability options, but much more research is needed in this arena.)

13 <http://www.hatii.arts.gla.ac.uk>

14 <http://www.digicult.info>

15 <http://www.nof-digitise.org/>

These are not the only areas where progress has been slow and action remains necessary. *eContent* creators still appear to fail to appreciate the complexity of the processes, and in particular the need to define at the outset project workflow from conceptualisation to user needs analysis to use and sustainability mechanisms. Perhaps this difficulty arises because there are few off-the-shelf examples to which those conceptualising projects can refer as a starting point. In other cases many aspects of the workflow itself are poorly understood. As a result few *eContent* initiatives appear to have:

- ◆ used a formal mechanism to select items for digital representation;
- ◆ developed a coherent, transferable and consistent approach to metadata creation. And, this is even the case where they have adopted a coherent metadata model;
- ◆ established quality assurance procedures which are well-validated and tested, although many now recognise the critical role of quality assurance. Where these activities are included they are often confined to a statistically insignificant sample of the objects and almost never extended to include the metadata linked to the objects. A further problem in this area is that most emphasis has been on quality assurance and not enough has been on quality control. If projects were to emphasise the latter rather than the former they would reduce project costs;
- ◆ considered the demands of users for content or the needs of users for particular tools or interface designs to make their use of digital material easier and more effective. This is though an area where we are seeing real progress as the customer/client focus of institutions permeates down to their *eContent* creation and delivery activities; and,
- ◆ delivered educational resources that have an interactive focus and almost none that use a participatory model.

One promising trend has been the growth in education and training activities focused on digitisation and access to digitised materials. This trend has been noted in the United Kingdom where there is a plethora of training opportunities, and *DigiCULT.Info* reports each quarter on courses in other countries such as the programme held in Lithuania in 2004. Nearly all of these programmes are run as continuing professional development (CPD) activities and precious little education in digitisation takes place as part of undergraduate or postgraduate programmes of study in archival, library or museum studies. Even if education in digitisation continues to come mainly from CPD initiatives more attention should be given to ensuring consistency in this training across the European Union. If nothing else consistency in training would facilitate consistency in practice and standards, from capture to metadata creation to the 'look and feel' of interfaces to repository design. Perhaps by establishing a European *eContent* Creation Certificate (ECCC) the community might address this educational shortfall.

An area that will take on an increasingly central place to the delivery and long-term viability of content in digital form is *authenticity*. While this is a topic that could be the subject of much new research at both practical and theoretical levels here we can only draw attention to the issue. It is likely that only a few of the current generation of *eContent* creation projects could demonstrate they produce (or produced) authentic digital representations of original artefacts (whether these are documents or

archaeological objects) and still fewer could prove that they could maintain the authenticity of digital objects overtime. It is true that there is currently no body of data to support this conclusion, but as few digital representations provide clues to their authenticity we do not have any evidence to demonstrate beyond doubt that it is not the case. This problem arises from the fact that most digitisation initiatives have not put in place clear workflow models and defined (and published) policies and procedures governing their work. These two steps would go some way towards establishing mechanisms to support the creation of verifiably authentic digital representations. There are a number of issues that need to concern us about digital representations of analogue objects and their authenticity:

- ◆ As a user, how do I know that a digital representation is an authentic copy of the analogue original?
- ◆ Confronted with digital representations most users begin from a position which presumes authenticity ('Presumption of Authenticity'). They assume that unless there is evidence to the contrary if the creator of a digital object says that it is a digital representation of an analogue original, that it is.
- ◆ There are few ways that a user could even begin to determine whether a digital representation is what it purports to be where they have neither access to the analogue original nor to details of the process by which the digital representation was created. Of course, there are cases where minor features such as colour casts or poor image quality might indicate to the user that digital object is not an authentic representation of the analogue original. (In this example the lack of authenticity would probably have arisen not because of malice or ill-intent but as a result of the application of poor processes and procedures during the digitisation process.)
- ◆ Users need to be able to draw inferences from how the digital materials were created, handled, and maintained. They can only do this if institutions have adequately and transparently documented the processes of digital representation through making accessible statements of policy and procedure as well as details of audit mechanisms that they have in place to verify that these approaches are being followed.
- ◆ As authenticity depends upon 'establishing identity and demonstrating integrity'[16] users require background services to allow them to verify the inferences they have drawn about the status of materials and the documentation about how they were digitally represented.
- ◆ Mechanisms are needed to assist in the maintenance of authenticity. For example, users need to know who created the digital representation, in what manner it was created (e.g. under what conditions, using what technology), why was it created, where was it created, how was it created, and they need information as to how the digital object was maintained after its creation (e.g. was it maintained in a secure environment). Users also need evidence that the link between the digital representation and its metadata has remained secure since its creation.

16 InterPARES Authenticity Task Force, 2002, Authenticity Task Force Report in *The Long-term Preservation of Authentic Electronic Records: Findings of the InterPARES Project*, <http://www.interpares.org/book/index.cfm>

For many of these issues institutions that have established reputations as trusted creators of digital representations and trusted custodians, such as national libraries and archives will be at an advantage [17] as they will be assumed by users, almost by default, to be the creators and custodians of authentic digital objects. While there may be some truth in this assumption, it need not be true in all cases and at all times. Of course, a counter argument may be raised that users are not interested in authenticity. Indeed this argument could be stretched even further to suggest that the authenticity of digital representations for most users is personally derived and granted to the object by the user. There may be some merit to this claim, but this supposition, and the alternative assumption that independently verifiable authenticity matters to users, need to be tested by analysis of expectations, needs, and attitudes of users.

While approaches to authenticity and certification, developing new models for facilitating the sustainability of digital materials, and the definition of interoperability standards depends, like many other parts of the implementation of the Lund Principles, on concerted action at Member State level, there are many aspects to the creating high quality and sustainable digital representations that must begin at the local level. The local strategies that could underpin widespread success of the Lund Principles include:

- ◆ content creators paying more attention to the definition of selection criteria. In general insufficient consideration has been focused on establishing consistent and widely used metrics for documenting how material is selected [18]. In many instances projects are still driven by the desires of curators rather than the interests and needs of users. If digitisation initiatives are to produce sustainable and widely used resources they must be demand rather than supply driven.
- ◆ undertaking coherent long-term digitisation planning to reduce costs and to eliminate the practices of digitising the best treasures of a collection or ‘end of year’ digitisation to make effective use of unanticipated revenue savings elsewhere within the organisation.
- ◆ the definition of policies and procedures, workflow, standards, and infrastructure developments and implementations that can be consistently adopted across an organisation to ensure coherent approaches within an individual institution to eContent creation.
- ◆ the establishing of digital representation certification mechanisms (e.g., processes for demonstrating that a particular digital object is a faithful representation of the analogue original) to provide a way to verify the authenticity of a digital surrogate. These methods would also need to include mechanisms to support the re-verification on future occasions of digital surrogates delivered to users in response to requests for such verification.
- ◆ moves by institutions to limit the number of units within an organisation engaged in digitisation and in managing and providing access to their holdings of digital materials.
- ◆ establishing and adopting standards for the creation and representation of

17 S Ross, 2003, *Digital Library Development Review*, National Library of New Zealand, (Wellington), ISBN 0-477-02797-0, http://www.natlib.govt.nz/files/ross_report.pdf

18 S Ross, 1999, Strategies for Selecting Resources for Digitization: Source-Orientated, User-Driven, Asset-Aware Model (SOUAAM), in T Coppock (ed) *Making Information Available in Digital Format: Perspectives from Practitioners*, (Edinburgh: The Stationery Office), 5-27.

content across the organisation and implementing (and monitoring) policies and procedures to ensure these standards are adhered to.

- ◆ outsourcing of digitisation activities to achieve the economies of scale where an in-house service can not deliver acceptable cost models.
- ◆ establishing metrics to measure use and impact of the products of digitisation.

There appears to be awareness that in planning digitisation activities duplicate initiatives, such as digital representation of out-of-copyright brittle books that have been or are being digitised elsewhere, should be avoided. Even acknowledging this, the past three years has not demonstrated significant growth in co-ordination of digitisation activity, whether we look for that co-ordination at regional, national or pan-European levels. Still we face discrete projects rather than co-ordinated programmes. There are many areas where digitisation activity could produce for us resources that stretch across a diversity of types of institutions, national boundaries and categories of material culture. Unless we begin focusing on creating resources that include a diversity of content coming from institutions across national boundaries our activities to create, package and present eContent will re-enforce an intellectual framework which lies at the heart of national cultural heritage silos.

When undertaking digitisation it is essential for institutions to recognise that actual conversion of material from analogue to digital is only a small part of the programme of work. Too few projects begin with a consideration of the wide range of activities involved in any digitisation initiative. As a result these projects do not establish effective workflow models, fail to recognise that while digitisation creates new assets it consumes scarce resources to do so, and that at the heart of all successful digitisation initiatives is effective project management. Through planning, projects would better respond to user demand and focus on producing high-quality resources that were appropriately quality controlled, quality assured and evaluated. Moving from projects that can only be sustained by becoming a drain on the existing revenue resources of their hosts institutions to eContent creation of self-sustainable digital resources remains a challenging objective.

Many institutions still succumb to what is best described as the ‘lemming approach to digitisation’. This motivation provides insufficient justification for digitisation activity. Just because many other content holders are digitising their holdings is not reason in and of itself for an institution to begin a digitisation programme. Planning, and especially the identification of materials that will meet user needs and the establishing of co-ordinate programmes and cross-institutional collaborative initiatives, should lie at the heart of digitisation activities. Digital resources will prove difficult enough to sustain even if their development was well planned.

As a community we have so far failed to demonstrate the centrality of cultural services and the role of digital representations in underpinning the knowledge and creative economies of the 21st century. A groundbreaking study of the role that the arts, humanities and social sciences plays in creating national wealth was published by The British Academy (United Kingdom) early in 2004. *‘That full complement of riches’*:

the contributions of the arts, humanities and social sciences to the nation's wealth [19] charts the rich and essential impacts that these scholarly domains have had on economic growth in the United Kingdom. A similar study on a European level would be of value, especially as there is every reason to suspect that the findings in the United Kingdom would be replicated across Europe. The cultural and scientific heritage communities should consider adopting the model that underlies this report to make visible the impact that they have on the economic wealth of Europe. While raising awareness in the minds of politicians and the general public of the economic impact of the heritage sector on the growth in Europe's wealth, heritage professionals need to consider more broadly how the sector makes the information in its care accessible for economic exploitation and wealth creation. Key to Europe realizing the full potential of its public sector resources, and especially those held within cultural and scientific heritage institutions, is free and open access to public sector assets [20]. The public sector information directive (EU Directive 2003/98/EC) [21] published on the 31st of December 2003 provides exemptions for 'documents held by cultural establishments, such as museums, libraries, archives, orchestras, operas, ballets and theatres.' It would make sense for the sector to consider in the review of this directive, which must happen before the close of 2008, whether or not it would make economic sense to ensure open and free access to the information resources (e.g., databases and digitised materials) held by heritage institutions for commercial purposes.

After three years the Lund Principles still make sense. We need to do much more work to convince funding agencies and content owners of their sensibility. There remains much still to do if the Lund Principles are to bring real benefits to eContent creation and help Europe to maximise the value of its investment both in terms of economic growth and the enjoyment and educational benefit the European citizen gains from their cultural and scientific heritage. The Lund Principles could still lie at the heart of a 21st century renaissance, but we need more action to ensure their adoption and application at all levels within Europe, if not beyond.

19 <http://www.britac.ac.uk/news/reports/contribution/pdf/contribution.pdf>

20 Pointers to crucial studies in this area can be found in studies such as those conducted by PIRA International, 2000, *Commercial Exploitation of Europe's Public Sector Information. Final Report*, European Commission, Directorate General for the Information Society, ftp://ftp.cordis.lu/pub/econtent/docs/commercial_final_report.pdf and Peter Weiss, 2002, *Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts*, Washington DC, U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, http://www.weather.gov/sp/Borders_report.pdf. Nearly a decade ago Kathleen Eisenbeis (1995) reported in *Privatizing Government Information: The Effects of Policy on Access to Landsat Satellite Data* (Metuchen, N.J.: The Scarecrow Press, Inc) of the risks associated with restricting public access to public sector information resources.

21 http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_345/l_34520031231en00900096.pdf