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Further information on ERPANET and access to its other products is available at http://www.erpanet.org.

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server (http://europa.eu.int).

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ELECTRONIC RESOURCE PRESERVATION AND ACCESS NETWORK

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Executive Summary

The Office for Metropolitan Architecture (OMA) is an Architecture company with the objective to create architectural works of art adapted to the needs of its inhabitants. OMA considers its information products to be of long-term historical value, and therefore their goal is to preserve a complete record of their Architecture projects. Information products include models and other physical objects as well as a range of digital objects, which all need to be preserved in a hybrid archives. This hybrid archives poses a considerable challenge to archival management and long-term preservation.

The most salient challenge lies in involving OMA staff in preservation actions; after all they are the ones who create, document and select OMA's information products. The lack of staff involvement is mainly because of their limited time resources, as well as the rapid staff turnover. The turnover stems from OMA's work practice, where staff are employed on a project basis. Any elaborate preservation approach, which is time-consuming in implementation and hard to learn is thus not feasible. Therefore, to achieve maximum time-efficiency and practicability, OMA employs basic software tools for their active information management as well as the management of their archives. While these tools are not yet embedded in a comprehensive approach towards digital preservation, it is a first step, and OMA's information management staff continue in their attempts to ensure the long-term preservation of their information assets.

Chapter 1: The ERPANET Project

The European Commission and Swiss Confederation funded ERPANET Project[1] (Electronic Resource Preservation and Access Network) works to enhance the preservation of cultural and scientific digital objects through raising awareness, providing access to experience, sharing policies and strategies, and improving practices. To achieve these goals ERPANET is building an active community of members and actors, bringing together memory organisations (museums, libraries and archives), ICT and software industry, research institutions, government organisations, entertainment and creative industries, and commercial sectors. ERPANET constructs authoritative information resources on state-of-the-art developments in digital preservation, promotes training, and provides advice and tools.

ERPANET consists of four partners and is directed by a management committee, namely Seamus Ross (HATII, University of Glasgow; principal director), Niklaus Bütikofer (Schweizerisches Bundesarchiv), Hans Hofman (Nationaal Archief/National Archives of the Netherlands), and Maria Guercio (ISTBAL, University of Urbino). At each of these nodes a content editor supports their work, and Peter McKinney serves as a co-coordinator to the project. An Advisory Committee with experts from various organisations, institutions, and companies from all over Europe give advice and support to ERPANET.

[1] ERPANET is a European Commission funded project (IST-2001-32706). See www.erpanet.org for more details and available products.

Chapter 2: Scope of the Case Studies

While theoretical discussions on best practice call for urgent action to ensure the survival of digital information, it is organisations and institutions that are leading the drive to establish effective digital preservation strategies. In order to understand the processes these organisations are undertaking, ERPANET is conducting a series of case studies in the area of digital preservation. In total, sixty case studies, each of varying size, will investigate awareness, strategies, and technologies used in an array of organisations. The resulting corpus should make a substantial contribution to our knowledge of practice in digital preservation, and form the foundation for theory building and the development of methodological tools. The value of these case studies will come not only from the breadth of companies and institutions included, but also through the depth at which they will explore the issues.

ERPANET is deliberately and systematically approaching disparate companies and institutions from industry and business to facilitate discussion in areas that have traditionally been unconnected. With these case studies ERPANET will broaden the scope and understanding of digital preservation through research and discussion. The case studies will be published to improve the approaches and solutions being developed and to reduce the redundancy of effort. The interviews are identifying current practice not only in-depth within specific sectors, but also cross-sectorally: what can the publishing sector learn from the aeronautical sector? Eventually we aim to use this comparative data to produce intra-sectoral overviews.

This cross-sectoral fertilisation is a main focus of ERPANET as laid out in its Digital Preservation Charter.[2] It is of primary importance that disparate groups are given a mechanism through which to come together as best practices for digital preservation are established in each sector.

Aims

The principal aims of the study are to:

- build a picture of methods and match against context to produce best practices;
- accumulate and make accessible information about practices;
- identify issues for further research;
- enable cross-sectoral practice comparisons;
- enable the development of assessment tools;
- create material for training seminars and workshops; and,
- develop contacts.

Potential sectors have been selected to represent a wide scope of information production and digital preservation activity. Each sector may present a unique perspective on digital preservation. Organisational and sectoral requirements, awareness of digital preservation, resources available, and the nature of the digital

[2] The Charter is ERPANET's statement on the principles of digital preservation. It has been drafted in order to achieve a concerted and co-ordinated effort in the area of digital preservation by all organisations and individuals that have an interest and share these concerns. http://www.erpanet.org/www/content/documents/Digitalpreservationcharterv4_1.pdf

object created place unique and specific demands on organisations. Each of the case studies is being balanced to ensure a range of institutional types, sizes, and locations.

The main areas of investigation included:

- perception and awareness of risk associated with information loss;
- understanding how digital preservation affects the organisation;
- identifying what actions have been taken to prevent data loss;
- the process of monitoring actions; and,
- mechanisms for determining future requirements.

Within each section, the questions were designed to bring organisational perceptions and practices into focus. Questions were aimed at understanding impressions held on digital preservation and the impact that it has had on the respective organisation, exploring the awareness in the sector of the issues and the importance that it was accorded, and how it affected organisational thinking. The participants were asked to describe, what in their views, were the main problems associated with digital preservation and what value information actually had in the sector. Through this the reasons for preserving information as well as the risks associated with not preserving it became clear.

The core of the questionnaire focused on the actions taken at corporate level and sectoral levels in order to uncover policies, strategies, and standards currently employed to tackle digital preservation concerns, including selection, preservation techniques, storage, access, and costs. Questions allowed participants to explore the future commitment from their organisation and sector to digital preservation activities, and where possible to relate their existing or planned activities to those being conducted in other organisations with which they might be familiar.

Three people within each organisation are targeted for each study. In reality this proved to be problematic. Even when organisations are identified and interviews timetabled, targets often withdrew just before we began the interview process. Some withdrew after seeing the data collection instrument, due in part to the time/effort involved, and others (we suspect) dropped out because they realised that the expertise was not available within their organisation to answer the questions. The perception of risks that might arise through contributing to these studies worried some organisations, particularly those from sectors where competitive advantage is imperative, or liability and litigation issues especially worrying. Non-disclosure agreements that stipulated that we would neither name an organisation nor disclose any information that would enable readers to identify them were used to reduce risks associated with contributing to this study. In some cases the risk was still deemed too great and organisations withdrew.

Chapter 3: Method of Working

Initial desk-based sectoral analysis provides ERPANET researchers with essential background knowledge. They then conduct the primary research by interview. In developing the interview instrument, the project directors and editors reviewed other projects that had used interviews to accumulate evidence on issues related to digital preservation. Among these the methodologies used in the Pittsburgh Project and InterPARES I for target selection and data collection were given special attention. The Pittsburgh approach was considered too narrow a focus and provided insufficient breadth to enable full sectoral comparisons. On the other hand, the InterPARES I data collection methodology proved much too detailed and lengthy, which we felt might become an obstacle at the point of interpretation of the data. Moreover, it focused closely on recordkeeping systems within organisations.

The ERPANET interview instrument takes account of the strengths and weaknesses from both, developing a more focused questionnaire designed to be targeted at a range of strategic points in the organisations under examination. The instrument[3] was created to explore three main areas of enquiry within an organisation: awareness of digital preservation and the issues surrounding it; digital preservation strategies (both in planning and in practice); and future requirements within the organisation for this field. Within these three themes, distinct layers of questions elicit a detailed discovery of the state of the entire digital preservation process within participants' institutions. Drawing on the experience that the partners of ERPANET have in this method of research, another important detail has been introduced. Within organisations, three categories of employee were identified for interview: an Information Systems or Technology Manager, Business Manager, and Archivist / Records Manager. In practice, this usually involved two members of staff with knowledge of the organisation's digital preservation activities, and a high level manager who provided an overview of business and organisational issues. This methodology has allowed us to discover the extent of knowledge and practice in organisations, to understand the roles of responsibility and problem ownership, and to appreciate where the drive towards digital preservation is initiated within organisations.

The task of selecting the sectors for the case studies and of identifying the respective companies to be studied is incumbent upon the management board. They compiled a first list of sectors at the very beginning of the project. But sector and company selection is an ongoing process, and the list is regularly updated and complemented. The Directors are assisted in this task by an advisory committee.[4]

[3] See www.erpanet.org. We have posted the questionnaire to encourage comment and in the hope that other groups conducting similar research can use the ideas contained within it to foster comparability between different studies.
[4] See www.erpanet.org for the composition of this committee.

Chapter 4: the Office for Metropolitan Architecture

The Office for Metropolitan Architecture (OMA) was founded in 1975 in Rotterdam, the Netherlands. This contemporary architecture firm handles projects ranging from private residences to large scale urban planning. Major realised projects include: Nexus Housing, two apartment-blocks in Fukuoka, Japan (1991); the Kunsthal and its Museum Park in Rotterdam (1992); and the Embassy for the Netherlands in Berlin that opens February 2004.

Together with Ole Scheeren and Ellen van Loon, Rem Koolhaas is the driving force of OMA. An internationally recognised architect, he won the Pritzker Prize in 2000 and the Praemium Imperiale Award 2003. The OMA undertakes (alongside its design and consultation work) studies on the effect of architecture on issues such as organisation, culture and identity. It is also these precursory studies and considerations which constitute the value of OMA's information products.

About 100 architects and designers of multinational origin work for OMA. OMA has expanded to other continents with an office in the United States. In China OMA is currently engaged on its largest project; the construction of the headquarters for the Central Chinese Television (CCTV), a 550,000 square meter cultural centre in Beijing. This venture is to be completed in 2008 with an expected cost of 600 Million Euro.

The case study focuses on the information products created in the process of architecture and design projects, starting from precursory studies until the completion of the building.

Chapter 5: Details and circumstances of the interviews

Interviews for this case study were conducted at the OMA office in Rotterdam, in December 2002. Staff interviewed included the IT manager, an employee of the archives, as well as the Public Relations Officer. All three are permanent OMA staff[5].

[5] Many thanks to Mr. Jan Knikker for organising and for his contribution.

Chapter 6: Analysis

This section presents an analysis of the data collected during the case study. It is organised to mirror the sequence of topics in the questionnaire.

- Perception and Awareness of Digital Preservation
- Preservation Activity
- Compliance Monitoring
- Digital Preservation Costs
- Future Outlook

Perception and Awareness of Digital Preservation

OMA information management staff became aware of the digital longevity problem some years ago when they found that objects on a number of optical disks were inaccessible. Despite considerable effort this data was irrecoverable; among them were pictures that were needed for other projects and presentations. Fortunately some print-outs of the respective pictures and reports were available and these were re-digitised.

Accordingly, there is a fair level of awareness of digital preservation issues among the interviewed personnel - the communications officer, IT manager, and archive staff - who were involved in the retro-digitisation mentioned above. Senior management emphasises the value of OMA's information products and they initiated a policy of comprehensive preservation. However, they underestimate the detrimental effects of technological obsolescence. The actual architecture and design project employees display a rather low level of awareness of digital preservation issues.

The main problems

One problem at OMA lies in the diversity of their information products including pictures, plans and text in various formats. Planning and design is largely done using non-digital means, such as hand-drawings, or models made of clay, wood, or other materials. These physical objects are often referenced in related digital material. As their digitisation is often not feasible or plain impossible, OMA's archives are of a largely hybrid nature. The lack of adequate off-the-shelf solutions for OMA's requirements hampers the challenge posed by their hybrid archives. Another grave problem lies in the lack of staff awareness, as well as the rapid staff turnover.

Value of information and risk exposure

OMA's goal is to create buildings that fit in the specific context and that may positively influence their inhabitants. That background analysis may be referenced and reused in subsequent projects, and pictures and presentations are often reused in follow-up presentations, publications and exhibitions.

Moreover, OMA is not just an Architecture factory that designs buildings following a ready-made template. OMA rather endeavours to create art, which stands exemplary even in the far future. They therefore consider their products to be of long-term historical value.

With this in mind, OMA is keeping its archives well organised to facilitate reuse. In an even longer-term perspective, OMA intends to sell the archives to an Architecture museum.

OMA has to retain plans of buildings for at least ten years by Dutch law. For projects in other countries, national legislation has to be respected. As mentioned above, however, the reuse and the historical values call for a longer retention period. The information products created in the process of architecture projects are thus preserved for an indetermined period of time.

Preservation Activity

Policies and Strategies

While senior management is aware of the value of their information, a formal strategy for information management has not yet been developed. Off-the-shelf content management systems have been looked at, but not been implemented due to their complexity and cost. Instead the company embraces basic tools and procedures, such as shared document folders, because of their practicability.

Implementing elaborate guidelines or policies is difficult at OMA as the interviewees had already experienced in other situations. This lies mainly in the turn-over of architecture and design staff. Staff are usually hired on a project basis, i.e. a couple of years. Typically they are rather young professionals, seeking experience, and moving from one project to the next just as from one architecture company to the other. This fluctuation and the time-pressed working conditions during a project have detrimental effects on the implementation of corporate practices and on attempts to familiarising staff with guidelines.

Selection

As mentioned before, OMA endeavours to create smart architectural solutions and, essentially, art. In order to best preserve their historical value, the goal is to preserve a complete record of the work including its genesis.

Selection is overseen for each project separately by the responsible project leader, who is a senior staff member. S/he establishes what information objects are preserved and the form of documentation. While OMA's goal is to preserve everything produced in the course of a project, this is achieved with varying success, as the effort put into the selection of information for the archives is restricted by the (often tight) time targets of the project. As far as the digital information products are concerned, images and presentations are prioritised in the selection process for their immediate reuse value.

However, the ultimate goal remains the preservation of a comprehensive record of the material created in the course of a project. This yields a range of different information products to be preserved, both digital and physical, including initial sketches, plans, pictures, models, and emails. In addition to this hybrid nature of the archives, the digital objects have various formats including images in AutoCAD[6], Photoshop[7], or TIFF[8] formats; Office documents such as Microsoft Word or Excel; and emails.

[6] AutoCAD is a 2D and 3D design software by Autodesk (http://www.autodesk.com/); closer information on the AutoCAD DXF file format can be found in the AutoCAD Reference Manual.

Preservation

Digital objects are retained on CDs as well as duplicated to magnetic tapes. The CDs are currently kept on a small bookshelf in the Public Relations Office for immediate access. They are not stored in a climate controlled environment, and procedures for regular refreshing of the data to new storage media remain to be established. However, since only quality CDs have been purchased and they are rather young, interviewees consider the digital objects safe for some more years before they need to be migrated to fresh media.

There is no policy for migrating digital objects to standard formats or to assign (preservation) metadata to them. However, digital information is printed where viable, such as in the case of text-processing documents. These print-outs are incorporated into the archives along with models, plans, and other physical objects. Stored into two depots, these archives take a total of about 450 square metres and they are carefully maintained and organised. There are, however, problems in linking the digital objects to their physical counterparts. Interviewees are aware of these difficulties caused by the hybrid nature of OMA's archives, and they are considering systematic approaches to tackling this. [9]

Access

Images and presentations are often reused in other projects. Therefore, quick access to them was an important design criterion for the arrangement of the CDs. This is achieved through an index booklet containing printed thumbnails of images sorted according to project and chronology. This index gives you the exact position of the CD on colour-coded and labelled shelves.

Access to the original image files on CDs and tapes is restricted and their use is screened. After all, these images represent a considerable source of income. Formerly, paintings and models were sold at high prices. In the digital world the ease of copying raises the question what can be sold for how much, and also raises concerns regarding Intellectual Property Rights.

Compliance Monitoring

Without formal guidelines in place, OMA relies on personal communication for ensuring the adequacy of information management. The project leader oversees this in regular team meetings. The importance and form of documentation, for example, is established by the respective project leader. While communication between senior architects at OMA is good, there may hence be variations in the depth and form of documentation between different projects. Generally speaking, however, project leaders ensure the adequate and complete capture of a project's information products.

[7] Adobe Photoshop: http://www.adobe.com/products/photoshop/
the current Adobe Photoshop PSD file format specification is available in the Adobe SDK (Software Development Kit), and as a stand-alone document at: Adobe Photoshop v6.0 – File Formats Specification (November 2000). http://www.fine-view.com/jp/lab/doc/ps6ffspecsv2.pdf

[8] TIFF – Tagged Image File Format, Adobe Inc.; TIFF 6.0 Specification: http://partners.adobe.com/asn/developer/PDFS/TN/TIFF6.pdf

[9] cf. Chapter "Future Outlook"

Digital Preservation Costs

Costs are a concern; however, interviewed staff are confident that the money for migrating data to fresh media to avoid their physical deterioration will be available when necessary.

Future Outlook

In the near future, a better linkage between the physical and the digital archives will be addressed. To this end, implementing a central database of descriptive metadata for each information object is being considered. Along with better accessibility, this would provide a better overview of which digital and physical objects from the respective projects have been accessioned into the archives. Eventually, this may raise the amount and quality of a project's documentation.

Chapter 7: Conclusions

Interviewed staff and senior management at OMA are well aware of the value of OMA's designs and the necessity to preserve them. They are keen on any information or support that may help them tackle the problems. This is rather outstanding in the Architecture sector, where awareness is generally fairly low. The issue has only come to the fore in some of the larger companies that had actual problems or even lost specific data, such as in OMA's case.

OMA confronts a considerable challenge with the hybrid nature of their archives. While some redundancy between OMA's physical and the digital archive may actually be conducive to preservation, efficient management is desirable. Also organisations in other domains confronted with the management of hybrid archives may find this an outstanding challenge that calls for solutions dedicated to their specific usage patterns. For some organisations, for example, a digital photo of a wood model that conveys a rough impression of the object may be sufficient to achieve a central digital access gateway to their archives, while others must access the physical object and the depot is but a stone's throw away.

For many organisations in this situation it will be worthwhile to invest into a comprehensive content management system that accommodates hybrid archives. In OMA's case, however, the expense this entails in both costs and input of time is considered too high. Rather, the company turned to the use of basic systems, which are still considered the most reliable and the least time-consuming. OMA will further pursue this path with in-house development of additional tools. While this will of course cost additional staff time, the tools to be developed can be tailored to the companies needs.

OMA will attempt to embed these kinds of basic software tools in their organisational environment. They are aware that a systematic and consistent approach to achieve reliable long-term preservation of their information assets can only be achieved with accompanying measures. As part of this OMA staff needs to be aware of what is at stake and senior management needs to consistently press for the necessary actions to be implemented throughout the organisation.

Successful (i.e. systematic and consistent) procedures for the retention and access to digital objects of reuse value, including pictures and presentations, is implemented at OMA. In the future similar successful procedures need to be developed for those digital objects that are primarily of long-term historical value. While OMA information management staff endeavour to achieve this, their limited time resources puts a considerable strain on this, as do the limited time resources and lack of participation of other OMA staff. This shows the tension between the business pressure to deliver products on the one hand and the necessity for paying attention to adequate information management including preservation on the other, which can be observed in other organisations in any domain as well.

More communication between the various Architecture companies on the issues surrounding information management and digital preservation would possibly create important synergies for OMA. One such intra-sectoral initiative, the GAUDI[10] project, embarked on collating the state of content management and digital preservation at Architecture companies. GAUDI is a European Commission funded project with participating organisations from the field of architectural culture in various European

[10] GAUDI - Governance, Architecture and Urbanism as Democratic Interaction; see References.

countries. As such they have a high interest in adequate archives of Architecture companies, since they will most likely be the ones to take over in the future. In addition to a comprehensive survey into the requirements of Architecture companies, this project intends to establish guidance for adequate information management that may be very valuable for OMA and, indeed, provide a model for other sectors as well.

Appendix 1: References

The website of the *Office of Metropolitan Architecture*
http://www.oma.nl/

Great Buildings Online: Architect Rem Koolhaas
http://www.greatbuildings.com/architects/Rem_Koolhaas.html

Gary Wolf: Exploring the Unmaterial World
In: Wired Magazine, June 2000
http://www.wired.com/wired/archive/8.06/koolhaas.html

GAUDI project
GAUDI - Governance, Architecture and Urbanism as Democratic Interaction
http://www.gaudi-programme.net/

The survey on content management and digital preservation at Architecture companies is conducted in the framework of their work-package A2:
“Merge and develop archival collections on architecture and urban development”

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