

A Method Proposed for Adoption of Digital Technology in Architectural Heritage Documentation

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Abstract: This paper aims to present results of a research focused on defining guidelines for creation of a comprehensive digital archive and improvement of the procedures of filing, documentation, popularisation, management and protection of architectural heritage. The research presents a clear vision of the potential use of ICT in this field. The study focuses on the employment of the latest technologies in cultivating the architectural past, bringing this past to life and thus making the connection to the present and future.

1 INTRODUCTION

There were cases of sensitivity to the past in Europe as early as the 12th century (Boulting 1976); those reflected only the need for continuity, typical in the traditional society of that time. A sense of history was fundamental for the origins of heritage, and this did not fully develop until the Renaissance when people widely started to understand the dimension of historic time. The deliberate care and study of important historical documents, as well as other significant material works which, as a whole, depict the life of the past generations, has been part of the European civilisation since then. This preoccupation with the past was not immediately transformed into a sense of heritage. But the change came soon, and by the 1520s there appeared the first pictures showing ancient ruins for consciously emotional effect. This seems an important change as once people become emotionally committed to their built legacy they are motivated to preserve it. Generations of Europeans lived in an environment which integral part was built by their ancestors. The approach towards these structures fluctuated over centuries from hostility through pragmatism to sensitivity. The latter led to the modern concept of heritage formed during the 19th and 20th centuries. The term 'heritage' itself is, however, rather a new concept, which emerged and has been formulated since the 1970s. Earlier the terms 'cultural property' and 'historical monument' were applied more often to historical and cultural assets. It was the UNESCO's World Heritage Convention that gave birth to the term 'cultural heritage' international recognition. The formation of united Europe during the late 20th century has had an immense

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impact on the field of cultural heritage. With this process, heritage received new meaning and importance. Traditionally, cultural heritage was often seen as a source of national unity arising from the recognition of great architecture, monuments or achievements. For some thirty years, cultural heritage has been increasingly seen as a much broader phenomenon that can contribute to political ideals, to economic prosperity and to social cohesion. Especially, cultural heritage has been widely recognised as a vehicle of cultural identity. It became generally accepted that discovery of a common heritage, all the richer for its diversity, would be a platform for mutual recognition, understanding and acceptance of cultural diversity across Europe. In this light, architectural heritage is one of the most visible, tangible symbols of a European collective civilisation and culture.

2 BACKGROUND

It is assumed that the introduction of the personal computer (PC) in the early 1980s was the most significant change since the industrial revolution two centuries before (Currie 2000). The global information infrastructure (GII) which emerged in the 1990s is central to what is now referred to as the “information age” or “information society”. The advent of the Information Society is creating unprecedented conditions for access to and exploitation of public sector information including architectural heritage collections. Information and communication technologies (ICT) play a major role in creation and delivery of the new digital contents, which goes far beyond the traditional providing access to information about cultural heritage objects. For example, deeply immersive environments may make museum visitors dwell on in amazement in view of virtual worlds they could not experience anywhere than in the digital realm (Mulrenin 2002).

Europe’s cultural and memory institutions are, therefore, facing very rapid and dramatic transformations. These transformations are due not only to the use of increasingly sophisticated technologies, which become obsolete more and more rapidly, but also due to the re-examination of the role of modern public institutions in today’s society and the related fast changing user demands. These trends affect all functions of modern cultural institutions, from collection management and scholarly study through restoration and preservation to providing new forms of universal and dynamic access to their holdings. Being digital for many European archives, libraries and museums is no longer an option but a necessity (Mulrenin 2002).

2.1 Previous Research Dealing with the Subject

The use of computerised systems for built heritage documentation is not a novelty. The first methodical research in this field was conducted as early as the late 1970s. Results of one of the early research projects, published by Sykes in 1984, revealed that of eleven analysed built heritage institutions from the whole world, only three did not use computer database systems and among these were Poland and – surprisingly – Japan (Sykes 1985). With the development of a networked

environment, the issues related to data exchange and standardisation emerged. Fundamental work was done in the early 1990s in the USA by the Society of American Archivists (Walch 1995). Attempts leading to standardisation and deployment of digital technologies in the built heritage documentation were undertaken also in Europe on both academic and governmental levels (Council of Europe 1993, 1995). The advent of the Internet created unprecedented conditions for access to, and exploitation of, public sector information including architectural heritage collections. This resulted in a real explosion of researches and implementations of computerised systems addressed not only to the specialists but to a wider audience with the new aims of increased awareness and education. Since the mid 1990s, a number of projects have been developed and implemented by universities, museums and heritage documentation institutions across Europe. The international initiatives devoted to issues related to the impact of digital technology on the methods of heritage documentation emerged, such as MINERVA (<http://www.minervaeurope.org/>) or DigiCULT (<http://www.digicult.info/pages/index.php>). By the early 2000s the subject had become mainstream in the field of built heritage research activities, which may be exemplified by the UNESCO conference “World Heritage in the Digital Age” in 2002 (URL: <http://www.virtualworldheritage.org/>).

Concurrently, the major interest of research activities in the EU Member States is a development of a user-friendly information society. Research, stimulated by the Research, Technology and Development (RTD) Framework Programmes, focuses on the development of information technology and its various implementations. It is not surprising then, that there is a growing interest in employing the latest technologies in the field of cultural heritage. Also, architectural heritage is the subject of Information Technology (IT) projects aiming at improving its recording, protection, conservation and accessibility. The studies on common standards for digitising and archiving virtual collections are underway. Among other researches it is worth to mention these indicating the impact on the efficiency and effectiveness of conservation planning through the implementation and use of Internet multimedia database information systems (Angelides and Angelides 2000), or even going further and proposing three-dimensional interactive applications leading to creative, collaborative environments – such concepts are, however, beyond the scope of this research.

2.2 Recording of Architectural Heritage in Poland

In Poland the subjects related to the application of digital technologies for the built heritage remained relatively unexplored until the mid and late 1990s, when a few minor research projects were done at various academic institutions. There were also attempts at co-operation with foreign universities and research centres (Blaise and Dudek 1999). However, none of these scholarly activities went beyond experimentation.

The need for international co-operation in the field of digital technology deployment in the built heritage documentation had been, however, long recognised by the

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Polish institutions responsible for such activities. Until late 1980s the information exchange was, however, limited to other communist countries (Lenard 1987). More recently, the international project called HerO (Heritage Observatory) was planned by the National Centre for Historical Monument Studies and Documentation in cooperation with similar bodies from other European countries. Unfortunately, this ceased at the preliminary stage due to the lack of financing and insufficient involvement of European partners applying for the financial support from the Culture 2000 programme in 2003.

The current built heritage documentation practice in Poland does not fit to the present needs. The existing system of heritage recording and protection is based on a database of paper fiches. The database verification and upgrade is usually delayed, and moreover, the records do not include some information crucial for successful protection and regeneration of historical buildings, e.g. the urban context, urban planning regulations, etc. The lack of computerised heritage documentation system causes situations like this described below: In the late 2003 the Department for the Heritage Protection of the Ministry of Culture ordered an inventory of built heritage in Poland to be done by the State Conservation Offices in all provinces. The major purpose was to verify a number of historic buildings and complexes listed within the register, their present state, use and ownership. Special forms were prepared in the Microsoft Word format to be filled out by inspectors. Ministerial officers ordered, additionally, statistic reports which had to be done considering various criteria. As a result inspectors had to abstract required information from the above-mentioned forms. Then the occurrence of particular features was counted manually and put into other tabular forms, which along with written comments had to be printed and sent by post to the Ministry in Warsaw. The whole inventory took a few months (sic!) and the achieved results have been unreliable due to the high risk of human errors.

There are also other problems related to the successful recording. First, there is no legally binding standard for the built heritage recording. The historical buildings usually have documentation in form of so-called "white card", Their use is widespread but limited to the monuments from the "register". The same template is binding in a case of architectural complexes with exclusion of cemeteries for which separate recordings are used. The movable monuments are recorded using different template. As a result, heritage listings maintained by various responsible bodies may not be compatible, which in consequence may affect their merge in one comprehensive system. Secondly, the existing documentation of built heritage ("white cards") lacks reference marks to the corresponding documentation on urban complexes, archaeology, or movable heritage. Thirdly, there is a lack of reference to urban planning, and other regulations affecting heritage protection. Fourthly, the information on built heritage is dispersed, as at present a number of various institutions, including museums, libraries, and universities, gather and process data concerning built heritage. Fifthly, persons requiring information on particular buildings have a limited access to the information on their heritage status, and related data. Finally, there is no link between the guidelines of international conventions ratified by Poland and the heritage legislation.

It was rather unfortunate coincidence than a lack of foreseeing that records do not exist in digital version nor there is any comprehensive computer database, and it is important to stress that authors of the “white card” had the IT in their minds. This seems to be proved by the existence of the information system for documentation of movable heritage, which has been in use for some twenty years. This system lacks, however, integrity and its efficiency remains below the expectations.

It is, therefore, clear there is an urgent need for new methods of preparation, storage and distribution of information about a historic environment. Particularly, as Poland has accessed European Union that regards rising awareness of heritage as one of key activities towards the strengthening local identities and diversity within Europe.

3 PROJECT DESCRIPTION

All the above evidence reveals that Poland is not fully exploiting the potential of the new economy based on the ICT. The country is not moving fast enough into the digital age as compared with other European countries.

The use of the ICT for the heritage documentation would be an important step forward in solving most of the problems indicated in the previous section. What is more, an integrated information system on the built heritage would facilitate a creation of material for use in urban planning, education, promotion, tourism, and other related areas. It would also contribute to the community involvement in this process. Especially as the new Heritage Act introduced provisions for so-called Community Curators of Built Heritage (these may be either individuals or organisations), sharing the responsibility for the heritage protection with governmental and local authorities. This may be done through a number of publications, both printed and available on-line, promoting built heritage and related issues. This in consequence, requires the access to the resources in digitised form.

3.1 Project Principles

The above facts demonstrate the need for an Internet-accessed multimedia database holding information on the architectural heritage of Poland. Such a comprehensive set of data on built heritage gathered in one place would become particularly convenient resource (on-hand compendium) for variety of users, including: conservation officers; researchers; participants in building process – investors, architects / urban designers, officers responsible for issuing building consents, etc.; educational community; promotion market and tourism sectors.

Central to the research methodology was the belief that a computer aided documentation system for built heritage in Poland should be compatible and harmonised with similar European projects as a response to the needs of the emerging Information Society. To achieve that, standards and best practices in Europe were identified, analysed and compared with the current Polish system of heritage protection and management.

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The principal aim of the research was, therefore, to investigate and adopt knowledge, proven methods and tools. In other words this project aimed at outlining a framework for creation of a database, which scope may be broadly defined as: all primary material relating to built heritage in Poland; all secondary (interpretative) data, where the geographical coverage focuses on Poland. This remit covers an extremely diverse range of information types (described below). The core of the proposed database would be formed by the resources held by the Provincial Conservation Offices and National Centre for Historical Monument Studies and Documentation – principally record cards with necessary modifications imposed by the compatibility with European standards and requirements of proposed extended documentation system. This collection may be extended by a number of other digitised resources. Figure 1. shows the scheme of proposed database.

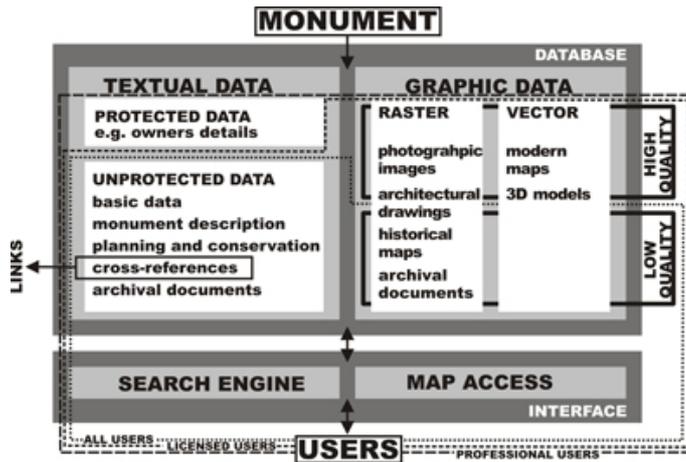


Figure 1 Scheme of proposed database

The database would be addressed to all types of users potentially interested in the built heritage in Poland. There are three levels of access proposed:

- All users (everybody can search general textual data on buildings and small, low quality, nonprintable images – “thumbnails”);
- Licensed users (those who bought access to images of higher quality, but still below the requirement of commercial use);
- Professional users (staff of Conservation Offices and Documentation Centres who have access to all resources including secured, password-protected data, such as: owners details, detailed description of valuable equipment or fittings, etc.).

All the users, despite their status, would have access to the database through the Internet via a search engine and, alternatively, via map (GIS search facility). It is worth mentioning here that the use of GIS may be beneficial in a number of ways, going far beyond providing access to the collections, e.g.: analysis of heritage in the

geographical space; interpretation of heritage data in a wider environmental context (spatial relationships among heritage objects, relationships to the natural environment, relationships to land-use, etc); decision support to the conservation procedures, and many more.

3.2 Addressed Issues

In the vision of general access to architectural heritage information on-line, mechanisms are needed for users to be able to find specific information in the open network environment by using electronic directories, for owners of information to be able to protect their Intellectual Property Rights (IPR), for charges to be made, for electronic publications to be able to make effective external references and linkages to information objects, to ensure that the user actually gets access to the information he/she asked for. Therefore, in order to realise this vision, the following issues had to be addressed: standards adoption; content; digitisation; metadata; database solution; accessibility and data retrieval (thesauri, multilingualism, IPR, etc.); digital preservation – longevity – sustainability of digital archives; e-commerce.

The most commonly used and officially accepted standards in Europe essential to adopt in Poland were analysed here and confronted with those already existing in Polish architectural heritage recording practice. It was revealed that the Polish recording system is far more extensive and detailed than that proposed by the Council of Europe in Core Data Index standard. Though there are also some mandatory Core Data Index data not included in the Polish record file. Therefore the mandatory built heritage recording system in Poland should be modified to comply with Core Data Index recommendations. In addition, other useful information should be provided, such as for example link to the local urban planning, or information on inventorial measurements and their availability (or optionally their digital surrogates). The modified record should, however, maintain its specific information, including a historic outline and extensive description.

Almost the entire resources on the built heritage in Poland need to be digitised. Thus, it would be unrealistic to expect the whole scope of material available on the built heritage in Poland to be digitised. As a consequence the priorities and criteria were also evaluated and prioritised, including such issues as: user-focused selection of material (the most often consulted material should be digitised first); future conservation requirements and preservation needs; public access and future use; appropriateness of content for digitisation and privileged domains (some collections are not suitable to be digitised, for example due to their fragility); the requirement of scalability (allowing an organisation to quickly and easily scale any application, from tens to tens of thousands of online users).

For data to be meaningfully processed, metadata associated with it must be present and accessible. It provides the information required to identify data of interest based on content, validity, sources, physical material, pre-processing, legal aspects or other selected criteria. With the growing number of on-line collections providing information on heritage, there is an urgent requirement for definition and use of common metadata standards among a large number of institutions as a means to

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facilitate synergy and information interchange. Although the discussion is still open and there is no uniform metadata standard adopted in Europe, there are indications that the Dublin Core Metadata Element Set may become the compromise solutions. What is more, its popularity is constantly growing, and it has already been officially adopted by some governments, including the UK, Denmark, and Australia.

A number of major issues should be addressed during the database system selection due to the nature of the project, including: ability to handle a wide variety of media types; scalable and accurate query and delivery capabilities; continuous data retrieval by multiple, concurrent users; simple, common access from various platforms and operational systems; the highest data security. Taking above into the consideration it was suggested that the database should be of the object-relational type. The systems inheriting relational model have been by far the most common types of databases today. Therefore, following experiences of European best practices, the Oracle Database system is proposed as an optimal solution for its extensive functionality, scalability, data security and other outstanding features. The system supports the requirements of the most demanding Internet-based applications, as well as the highest availability requirements. It is capable of handling all types of information for all types of applications.

Controlled vocabulary should be deployed in the proposed database for two major purposes: reduction of terminological confusion by controlling synonyms and near-synonyms and by “separating” homographs, and subsequently bringing related items together and separating unrelated items; facilitation of comprehensive searches by linking (through hierarchy or cross-references) terms with related meanings. The thesauri should be harmonised with widely recognised controlled vocabularies, such as Art and Architecture Thesaurus (AAT). This is also crucial for providing multilingual access to the resources.

To manage the IPR effectively, it is necessary to introduce licensing scheme. Special technologies for copyright management and protection as well as access control should be adopted to reduce a risk of unauthorised use and possible misuse of data. The latter is also necessary for the personal data protection and the most sensitive information should be available only to the narrowest class of users.

Technical discontinuity and obsolescence is a major problem particularly for institutions whose core business is the archiving and long-term preservation of digital cultural resources. The most important is to ensure continued access to electronic resources, through addressing issues related to the lifespan of the medium on which the file is stored, and the obsolescence of the format in which the file is stored. Therefore digital preservation methods should be adopted. The adoption of a sustainable approach to the digital technology is of crucial importance as the proposed system would be financed from public funds.

Hence, it is clear the issues involved in creating a digital resource are very much inter-related and a holistic approach is required. As a result of the research a comprehensive concept covering all stages of the adoption of digital technology in the architectural heritage documentation in Poland was developed (Figure 2).

Organisational policies for digitisation and related issues should be directed and coordinated nationally to set priorities and avoid the duplication of work. The adoption of centralised approach is important also for another reason: according to recent surveys 95 per cent of all cultural heritage institutions in Europe are not in the position to participate in any kind of digital cultural heritage venture, since they not only lack the financial resources, but also have a shortage of staff, essential skills, and the necessary technologies (Mulrenin 2002). The situation in Poland is without doubt similar or even worse. There is, therefore, a need for supportive infrastructure organisation managing the digital resources of many cultural heritage institutions similar to those analysed in the PhD research, SCRAN and RCAHMS in particular.

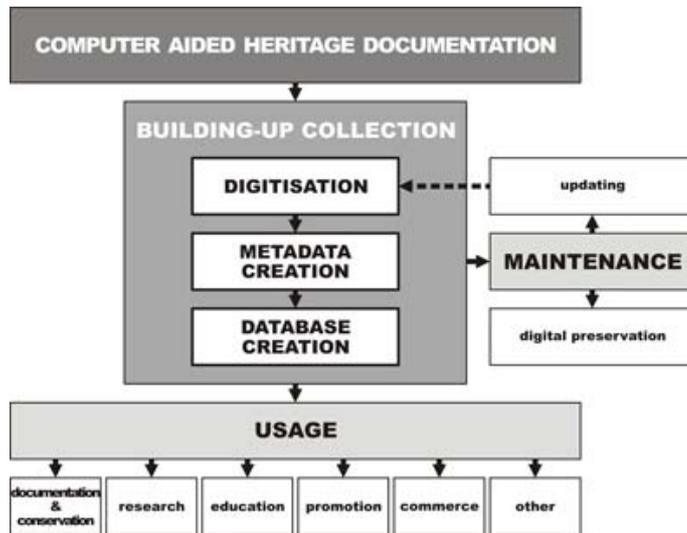


Figure 2 Proposed approach towards the adoption of digital technology in the architectural heritage documentation in Poland

4 CONCLUSIONS

The above-described concept is intended as a starting point for implementation of digital technology in recording and management of architectural heritage of Poland. It is believed that the research outcomes may become useful not only for the architectural heritage documentation and management, but also in the wider cultural heritage sector in Poland.

It is necessary to point out that during the work on this project it was tried to avoid common mistakes related to the deployment of IT in architecture, identified by Tom Maver (1995): “(...) it is almost impossible to find a PhD thesis which claims anything less than an all-singing, all-dancing, fully integrated, multi-disciplinary (design) decision support system which does the business as soon as you press the

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start button”. Author believes that she managed to keep away from such naive claims in this research – on the contrary, the study reveals that the proposed solution requires a multidisciplinary expert team including not only architects but also historians, IT programmers, lawyers, and even linguists. The study indicates, what is more, that the validity of any guidelines related to the digital technology has a limited lifespan, and therefore the proposed model for digitisation and recording data on architectural heritage in Poland, to be successful, requires constant, diligent review of the technology development.

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