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EPOCH

**Excellence in Processing Open
Cultural Heritage**

Network of Excellence

Information Society Technologies

D.2.1.1: Report on Stakeholders Needs

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'Heritage is best stewarded by outsiders in tandem with natives, and sharing heritage often serves to strengthen it.'

David Lowenthal

Executive summary

The main objective of WP 2.1 Stakeholder needs is to create a detailed inventory of all stakeholders within the Cultural Heritage domain. Once the IT needs of all these stakeholders within Cultural Heritage are defined, the Network can formulate a common research agenda that benefits the Cultural Heritage community.

This report reflects the results of an intensive stakeholder needs' research. A research that is based on multiple information sources:

- Collection and analysis of existing studies;
- Interviews with selected stakeholder representatives;
- Inventory of relevant regional or local policies and other documents concerning either a region as a whole, or specific sites;
- Input form outside specialists;
- Workshops with specialists;
- Discussion of the stakeholder needs during the VAST conference;
- Review by EPOCH partners (by putting the draft report on the community part of the EPOCH-website).

Preceding the description of the different stakeholder communities and their needs this report gives a brief definition of "Cultural Heritage" to mark out the scope of this report. Then the guiding principles of this report are outlined. The guideline for defining the stakeholder needs is the ICOMOS Ename Charter on the Interpretation of Cultural Heritage Sites from which the following themes are adapted and agreed among the partners of WP 2.1 to provide an important foundation for this report:

- Access and understanding
- Information Sources
- Authenticity
- Sustainability
- Inclusiveness
- Research, Education and Training

Seven main stakeholder communities have been identified:

- National and Federal Administrations
- Cultural Heritage Sites, Museums and other Cultural Heritage Organisations
- Associated Communities
- Tourism
- Educational entities
- Technology

Among each of these main stakeholder communities, several sub-categories with specific needs in IT tools were identified. The specific needs of each stakeholder community were defined along the following steps in the conservation and management process of Cultural Heritage:

- Management
- Research (data collection, structure and analysis)
- Conservation/Preservation/Restoration
- Legal protection in relation with ICT
- Interpretation/Education
- Valorization (Enhancement of the values)
- Training

After defining the stakeholder needs for each stakeholder community the following preliminary conclusions can be formulated.

- The EPOCH Network should be guided by the international conventions and charters on cultural heritage and allow the Cultural Heritage professionals to pilot the ICT projects.
- Cultural heritage needs ICT that can be easily implemented. Hereby the first priority should be to lower the cost of digitization. For the sustainability purpose, it is necessary to provide open source software. The technology is as important as the data itself. The data are in its digital form in serious jeopardy, so EPOCH needs to focus as much on data sustainability as the software/hardware.
- With reference to the Research Agenda, priority should go to a bottom up approach, starting with data collection and processing (pipeline).
- Much attention should be paid to the training and better information about technology for the cultural heritage community.
- EPOCH must be an open network if it is to succeed (open in time and in space)
- There is a need to examine the interaction between cultural heritage tourism ICT and visitor experiences.

In the next phase of the Work Package a more in depth analysis and prioritization of the needs of heritage professionals will be undertaken, i.e. through focused sessions where ICT experts could show a diverse suite of future scenarios and CH professionals could offer their feedback and input.

Table of contents

Table of figures

Table of tables

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I Introduction

1.1 Objectives of WP 2.1. Stakeholder needs

The goal of the EPOCH network is to develop and provide the proper ICT tools for the Cultural Heritage community and to improve the use and uptake of existing and new Cultural Heritage IT tools. The IT needs of all stakeholders within the Cultural Heritage community therefore first need to be defined and made public, so that the network can formulate a research agenda that benefits optimally the Cultural Heritage community, and that appropriate accompanying measures (training, brokerage, etc.) can be taken.

The first step to obtain such a common research agenda is to create an inventory of the needs of all stakeholders within the Cultural Heritage domain. As these needs are very diverse, it is important to create a detailed inventory of the needs of each stakeholder community—as identified by a consensus within that community itself.

1.2 Methodology

This report includes:

- The collection and analysis of existing studies on the topic.
- Interviews with selected stakeholder representatives.
- Inventory of relevant regional or local policies and other documents concerning either a region as a whole, or specific sites.
- Input from outside specialists:

  - ➢ Representatives of each stakeholder group were asked to suggest the top 10 problems and top 5 of opportunities shared by organisations within that stakeholder class.

  - ➢ Discussions and input from a broad range of experts in the field of heritage, spanning local to regional, national and international representatives from the leading international specialised organisations for cultural heritage (UNESCO's World Heritage Centre, ICCROM, ICOM, and ICOMOS).

- Organisation of a one-day workshop at IRPA (Royal Institute for Artistic Heritage) in Brussels in May 2004 and March 2005 and in at ICOMOS Paris during which the stakeholder needs draft report was presented and discussed to a panel of Cultural Heritage professionals and to an international panel (UNESCO, ICCROM, ICOMOS, ICOM…) and French specialists.

- Stakeholder needs was discussed in a two-day workshop organised by the Ename Center for Public Archaeology and Heritage Presentation in Brussels in October 2004. The objective was to provide a cooperative, multidisciplinary forum for discussion of general stakeholder needs by participants in EPOCH Work Package 2.1 and approximately thirty invited experts in the fields of Heritage Policy, Cultural Heritage Sites and Museums, Tourism, Education, and Technology. It was an opportunity for all the participants to exchange ideas, interact freely, and share their differing perspectives.

The main aim was to encourage a productive and creative interaction among all the working groups, to formulate a common understanding of the project's shared goals, and to identify synergies and conflicts.

▪ Stakeholder needs was discussed during the VAST 2004 conference.

II Definition of Cultural Heritage

2.1. Definition of Culture

There have been many attempts to define *Culture.* Williams (1958) claims that "*Culture is a way of life*" and champions culture for the masses saying that "*Culture is ordinary. Every human society has its own shape, purposes and meanings. Every society expresses these in institutions and in arts and learning*". The WTO (2001) defines *culture* as:

"*Other people's lifestyles expressed through their religion; festivals; costumes; arts and crafts; architecture; music and dance; folklore; and literature… Culture is manifested in both the living and dynamic aspects of a people's everyday life as well as in built heritage i.e. monuments and sites*".

To date no single definition has been accepted that encompasses every meaning of the term *Culture* without it becoming too general. In response to this, some authors suggest examining the *way* in which the term is used.

Williams (1983) identifies three categories in which the term *Culture* is used:

1. A process of intellectual, spiritual and aesthetic development
2. As indicative of a way of life
3. Works and practices of intellectual and artistic activity

Richards (1996) believes that usage has shifted away from the first category, towards the other categories. Therefore *Culture* can be viewed as a *process* which includes codes of conduct within a social group, or a *product* of individual or group activities to which meanings are attached. For example 'High culture' could refer to art. 'Low culture' could be referring soap operas. Viewing *Culture* as a product has been criticised by some for commoditising Culture. Tourism is identified by industry observers as a significant factor in commoditising *Culture*. From these alternate views of *Culture,* it appears that a central theme is different forms of expression, whether that is in terms of art, music, dance etc.

2.2 Definition of Heritage

The term *Heritage* was first used in the UK by the Museums Action Group for their 'National Heritage' programme which designated 'Heritage' coasts. The Heritage concept then spread across other countries. For example 1980 was 'Heritage Year' in France. *Heritage* became a buzzword during the 1980s.

Heritage has become a broad concept because it has been used to describe virtually anything with a link, however tenuous, with the past (Johnson and Thomas, 1995). The number of meanings for the term *Heritage* is increasing.

Ashworth and Tunbridge (1996) identified five commonly understood meanings of *Heritage*:

- Heritage places – objects, buildings, sites, towns, districts, regions.
- Memories – collective and individual
- Cultural and artistic production
- Heritage landscapes and heritage flora and fauna
- The Heritage industry – selling goods and services with a heritage component.

Drummond and Yeoman (2001) define *Heritage* as: "*What is or maybe inherited. This can include traditions, values, historical events, industrial machinery from a bygone era, historic houses, art collections, cultural activities and natural riches such as beaches, mountains, flora and fauna*".

The ICOMOS cultural tourism charter of Paris (1999) resulted in two classifications of *Heritage*:

- **Tangible Assets**: Natural and cultural environments including: landscapes; historic places, sites and built environments

- **Intangible Assets**: collections; past and continuing cultural practices; knowledge and living experiences.

Heritage is not static; it involves recording historic development over time. It is dynamic and grows and changes through continuous interpretation. Each generation redefines its heritage in response to new understandings, new experiences and new inputs. *Heritage* can also be viewed on an international, national, regional or local level.

Those managing *cultural* or *heritage* assets serve a number of different user groups including: tourists, school children, 'traditional owners' such as indigenous or ethnic community groups, local residents and experts. These groups may have different, often conflicting interests. This raises the question of "whose heritage?" (Teo and Yeoh, 1996).

According to Sofield and Li (2000) *Heritage* can have social and political dimensions:

- **Social**:   the key concept here is identity.   *Heritage* allows individuals, communities and nations to define who they are, both to themselves and to others. *Heritage* may provide a sense of 'belonging' to a culture or place.
- **Political**: refers to the selection of one site over another. Interpretation and presentation may be used to sustain or overturn a particular version of history. *Heritage* may promote certain political or social values.

Therefore it appears that there are two main types of *Heritage*: **produced by man and produced by nature.** *Heritage* is not static; it is evolving and belongs to many different groups of people.

The definitions of C*ulture* and *Heritage* seem to overlap somewhat.   Indeed definitions of *Culture* often include the word *Heritage* and vice versa. However they differ in the sense that *Culture* seems to imply **a way of life**. *Heritage* seems to refer to something that can be **passed from one generation to the next**.

2.3 Definition of Cultural Heritage

Cultural Heritage, as defined by international bodies from UNESCO to ICOM and ICOMOS, is commonly accepted to cover everything from Monuments to Museums and Sites.

UNESCO (2004) has listed the main types of cultural heritage. It includes:

Cultural Heritage Sites, Historic Cities, Cultural Landscapes, Natural Sacred Sites, The Underwater Cultural Heritage, Museums, The Moveable Cultural Heritage, Handicrafts, The Documentary and Digital Heritage, The Cinematographic Heritage, Oral Traditions, Languages, Festive Events, Rites and Beliefs, Music and Song, The Performing Arts, Traditional Medicine, Literature, Culinary Traditions, Traditional sports and games.

Cultural Heritage can be tangible or intangible (http://portal.unesco.org/)

2.3.1 Intangible Cultural Heritage

Intangible Cultural Heritage includes:

- Practices

- Representations

- Expressions

- Knowledge and skills that communities, groups and in some cases individuals recognise as part of their cultural heritage. It is sometimes referred to as living cultural heritage and is manifested in:

  ➢ Oral traditions and expressions including language
  ➢ Performing arts
  ➢ Social practices, rituals, festivals and events
  ➢ Knowledge and practices concerning nature and the universe
  ➢ Traditional craftsmanship

2.3.2 Tangible Cultural Heritage

Tangible Cultural Heritage involves all assets that have some physical embodiment of cultural values such as historic towns, buildings, archaeological sites, cultural landscapes and cultural objects or items of movable cultural property (McKercher and du Cros, 2002).

For the purpose of this study, we will consider the following assets:

<u>Monuments and Groups of Buildings</u>

"Monuments" include all structures (together with their settings and pertinent fixtures and contents) which are of value from the historical, artistic, architectural, scientific or ethnological point of view. This definition shall include works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and all combinations of such features.

A "group of buildings" includes all groups of separate or connected buildings and their surroundings, whether urban or rural, which, because of their architecture, their homogeneity or their place in the landscape, are of value from the historical, artistic, scientific, social or ethnological point of view.[1]

Example of an ICT project based on a monument

The Heidentor (Heathen Gate) is a roman ruin located in Petronell-Carnuntum Austria. Originally the Heidentor was not a gate but formed a double-passage arc, located at the intersection of two major roads. The purpose of the Heidentor may have originally been a tomb or triumphal arch.

This project involved constructing a 'virtual showcase' which consisted of monitors, a light projector, tracking system, touch pad etc. A scale model of the Heidentor is enhanced with virtual overlays such as using augmented reality to show the relationship between the ruin that can be seen today and a virtual model of the original condition of the building. The presentation is interactive and allows the user to point at parts of the presentation they are interested in using a laser pointer, head tracking, hotspots, buttons and 2D pointing using a trackball or touch screen.

Source: Ledermann and Schmalstieg, 2003, Presenting an Archaeological Site in the Virtual Showcase, in *VAST 2003 conference proceedings*

Museum institutions

The International Council of Museums (ICOM) definition of a museum is "*a non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment*".

The above definition of a museum shall be applied without any limitation arising from the nature of the governing body, the territorial character, the functional structure or the orientation of the collections of the institution concerned.

Holloway (1999) identifies six categories of museums:

1. National Museums: funded directly by a national or federal government.
2. Independent (charitable trust) museums: financed by turnover.
3. Independent non-charity museums.
4. Regional museums: funded by a mix of private and public sources.
5. Local Authority Museums.
6. Small private museums: which depend entirely on private funding.

Ambrose and Paine (1998) identify different museum classifications in terms of:

▪ *Collections*: general, archaeology, art, history, science etc.
▪ *Who runs them*: government, university, independent, commercial etc.
▪ *Area*: Local, regional, national.
▪ *Audience*: Education, specialist, general public
▪ *The way they exhibit their collections*: Traditional, open-air, historic houses

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[1] ICOMOS Statutes, II. Definitions, Article 3, http://www.international.icomos.org/e_statut.htm

In addition to institutions designated as "museums" the following qualify as museums for the purposes of the ICOM definition:

- Natural, archaeological and ethnographic monuments and sites and historical monuments and sites of a museum nature that acquire, conserve and communicate material evidence of people and their environment;

- Institutions holding collections of and displaying live specimens of plants and animals, such as botanical and zoological gardens, aquaria and vivaria;

- Science centres and planetaria;

- Non-profit art exhibition galleries;

- Nature reserves;

- International or national or regional or local museum organisations, ministries or departments or public agencies responsible for museums as per the definition given under this article;

- Non-profit institutions or organisations undertaking conservation, research, education, training, documentation and other activities relating to museums and museology;

- Cultural centres and other entities that facilitate the preservation, continuation and management of tangible or intangible heritage resources (living heritage and digital creative activity);

- Such other institutions as the ICOM Executive Council, after seeking the advice of the Advisory Committee, considers as having some or all of the characteristics of a museum, or as supporting museums and professional museum personnel through museological research, education or training[2].

Example of an ICT project for a museum

The goal of the CREATE project was to develop a reconstruction that could be used in a museum. The resulting interactive presentation involves the user reconstructing a temple from a number of pieces which fit together like a jigsaw. This application teaches the user about perspective, balance, proportion and scale.

Source: Roussou, M. and Drettakis, G., 2003, Managing the real with the virtual: a role for digital media recording in archaeological fieldwork, in *VAST 2003 conference proceedings*

Example of an ICT project at an archaeological site

The Çatalhöyük site near Konya, Turkey is currently being excavated by a large international team from Britain, the United States, Greece, Poland, Serbia, Sweden, Denmark, Germany and Turkey. The area is known for wall paintings, well preserved architecture and occupational deposits.

One member of this archaeological site team investigated using new technologies for the purpose of developing a richer set of recording methods to complement existing technology. Digital media technologies were found to offer many benefits to the recording of a site and support the management of collection images effectively.

Source: López M., 2003, Managing the real with the virtual: a role for digital media recording in archaeological fieldwork, in *VAST 2003 conference proceedings*

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[2] ICOM Statutes, *amended by the 20th General Assembly of ICOM, Barcelona, Spain, 6 July 2001, http://icom.museum/hist_def_eng.html*

<u>Sites</u>

"Sites" include all topographical areas and landscapes, the works of man or the combined works of nature and of man, including historic parks and gardens, which are of value from the archaeological, historical, aesthetic, ethnological or anthropological point of view.[3]

<u>Archives and Libraries</u>

Although part of cultural heritage, Archives and Libraries are covered in other current European programmes and as such are omitted from our scope here. Instead of initialising new steps, reference should be made to:

- DELOS, Network of Excellence on Digital Libraries
  http://www.delos.info/

- PULMAN Network, Public Libraries Mobilising Advanced Network,
  http://www.pulmanweb.org/

- AREA, Archives of European Archaeology
  http://www.area-archives.org/

- UNESCO Library Portal,
  http://portal.unesco.org/ci/en/ev.php-URL_ID=6513&URL_DO=DO_TOPIC&URL_SECTION=201.html

- UNESCO Archives Portal,
  http://portal.unesco.org/ci/en/ev.php-URL_ID=5761&URL_DO=DO_TOPIC&URL_SECTION=201.html

III Guiding Principles: the ICOMOS Ename Charter on the Interpretation of Cultural Heritage Sites

The drafting of the ICOMOS Ename Charter on the Interpretation of Cultural Heritage Sites (currently under review by the International Scientific Committees and National Committees of ICOMOS) is an important activity within the context of the EPOCH Network (work package 4.2) and this document contains a number of general principles of cultural heritage communication that may be equally valid for establishing criteria for stakeholder needs in all fields and all levels of heritage research and presentation. It was then agreed among the partners of WP 2.1 that the following themes (adapted from the Ename Charter principles) would provide an important foundation for this report:

- Access and Understanding

- Information Sources

- Authenticity

- Sustainability

- Inclusiveness

- Research, Education, and Training

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[3] ICOMOS Statutes, II. Definitions, Article 3, http://www.international.icomos.org/e_statut.htm

Each of these themes represents an agreed-upon "need" in the Cultural Heritage domain, that, if effectively addressed, can serve to improve standards and services offered in each Cultural Heritage IT sector—and in the field as a whole. Each of the above themes offer the range of general areas of concern in the Cultural Heritage domain that should be of interest to all stakeholders - and of primary concern to those undertaking surveys of stakeholder needs.

3.1 Access and Understanding

3.1.1 Improve and develop

The cultural heritage site presents information to the visitor in the form of a 'story'. Technology can enhance this interpretation process. For example using audio guides, visitors walk around sites listening to an audio commentary. As technology developed, users were able to enter the corresponding code number on their handheld device. Thus enabling them to select the segment of commentary they want to listen to. Wireless technology enables electronic tour guide devices to deliver a multimedia presentation in accordance with location, users' walking speed and time spent at the exhibit.

Applications of technology can enhance heritage interpretation. For example virtual tours allow the visitor to select the information they are interested in, instead of having to go through the whole presentation to find the information they require.

3.1.2 Recognise: access

Technology makes information more accessible to the public. For example allowing museum catalogues to be searched remotely over the Internet. This is particularly beneficial for physically disabled visitors. Text readers enable the visually impaired to access content.

Technology can incorporate multilingual presentations. This is vital for educating overseas visitors.

Technology now allows layering of information. This enables presentations to be delivered to different audiences such as children / adults, visitors who speak different languages, different educational backgrounds, comprehension levels etc.

3.1.3 Balance

Underlying all, it is essential that the values of heritage are balanced with those of technologic progress. Although presentation and interpretation can be exciting, the fundamental goal of conservation cannot be ignored or forgotten.

3.2 Information Sources

3.2.1 Communicate: information sources

With technologies such as Kiosks and the Internet, space is unlimited and therefore site managers are able to increase the amount and type of information and the number of exhibits presented to the visitor.

3.2.2 Co-ordinate: information sources

Digital technologies can ensure that the site has been comprehensively recorded in terms of taking digital images, aids categorisation (because fragments can be compared with other images stored in the computer) which makes the documentation process quicker and simpler. Furthermore databases manage the documentation process making it quicker and easier to search and retrieve items.

3.3 Authenticity

Creating digital images can assist the interpretation process. For example, displaying an image of an artefact on the web. However this raises the question of authenticity. The visitor is not viewing the actual artefact, but the digital image may entice the viewer to visit the site. A drawback to digital images is that they can be almost perfectly copied and modifications can be made with nothing to say that the new version is not the original (Keene, 1998). It is for this reason that people use digital watermarks.

3.4 Sustainability

3.4.1 Fragility of Heritage

Cultural Heritage is a fragile resource. This requires a serious awareness by all stakeholders of the conservation requirements: respect for authenticity and integrity, reversibility of interventions, visitor's management, etc…

3.4.2 Protect

Virtual reality presentations often mean that the visitor can examine an exhibit without physically being present. This is vital in sensitive areas. Digital cameras can speed up the process of recording and therefore reduce the exposure of the artefact to the elements.

3.4.3 Contribute

Technology can facilitate the sustainable conservation of cultural heritage sites by monitoring and limiting the number of people visiting the site at one time.

3.4.4 Sustainability of ICTs for Heritage

As valuable as new technologies are to heritage, they are worthless unless they are sustainable. Too many museums and sites have invested in new technology only to find their installation or digital data unusable a few short years later, either because of technology obsolescence, failure (lack of robustness or reliability), or lack of ongoing funding and support.

3.4.5 Feasibility

New technologies must be financially and logistically feasible for institutions from the small to the very large if they are to succeed. . "Potential users are not always interested in changes such as new information systems. They know what they have and know how to work it..." Unless a new system comes with training and long term support, overworked and under funded institutions are often better with existing, albeit less glamorous, tools.

3.4.6 Costs savings

Although the initial investment in technology may be expensive, in the long term, technology may generate cost savings. For example in view of the fact that most cultural attractions are labour intensive, technology may be used to replace staff. Information can be provided to visitors through touch screen devices. Furthermore cultural heritage sites are more likely to attract sponsorship with the implementation of new technology than if they tried to acquire money to cover day to day costs like personnel (Richards, 1996). However it must be stated that employing technology does not guarantee cost savings. The costs of purchasing and maintaining technology can be high. Technology can become obsolete. Therefore technology may not provide as good a return on investment as other methods.

3.5 Inclusiveness

3.5.1 Diversity of Heritage

Cultural Heritage is more than just archaeological sites. It spans museums to sites in all forms (from monuments to historic towns and cultural landscapes).

Cultural Heritage management spans the local to the regional and national. Each has different needs and requirements of ICT.

The professionals are as diverse as the heritage they work with, spanning site management to tourism, and often have divergent needs and interests, which will impact the use of ICTs.

3.5.2 Facilitate: inclusiveness

Technology can facilitate a wider public understanding and an appreciation for cultural heritage. Organising presentations in terms of layers of information facilitates communication with a wide range of visitors from children to adults, domestic and international visitors etc. Furthermore the Internet can connect disparate groups of people and inform them on their subject of interest.

3.6 Research, Education, and Training

3.6.1 Accessibility to information about technology / Technical skills

The majority of cultural heritage professionals do not have enough background in technology to be able to properly assess its possibilities for them. Solutions are often overlooked or outdated and inappropriate ones selected because of lack of knowledge. And yet without good information, fruitful co-operation with the ICT community is much more difficult. Past failures and insecurities create additional challenges. The heritage community is concerned that "the production of an ICT product is still dependent on the expertise of external firms rather than the cultural sector itself."

3.6.1 Edutainment and Infotainment

- Using interactive devices, the visitor becomes involved with the subject. They learn whilst being entertained – 'edutainment'. For example one interactive game allows users to reconstruct a temple. The user maybe unaware that they are being taught about perspective. They are being fed information whilst being entertained – 'infotainment'.

- Another benefit of interactivity is that it allows the visitor to select the subjects they wish to learn more about. Therefore presentations can now be personalised to some degree.

IV - Identification of stakeholders communities

For the purposes of the report, stakeholders can be defined as all professionals and non professionals, specialists and non-specialists, who, for either personal or professional motives, create, acquire, use, or maintain Cultural Heritage IT tools and applications. Seven main stakeholder communities have been identified:

- National and Federal Administrations
- Cultural Heritage Sites, Museums and other Cultural Heritage Organisations
- Associated Communities
- Tourism
- Educational entities
- Technology

Among each of these main stakeholder communities, several sub-categories with specific needs in IT tools were identified.

It should also be noted that intangible heritage has not yet been specifically taken into consideration. Specific stakeholder class needs in this important aspect of Cultural Heritage will be defined in the coming months.

4.1 National and Federal Administrations

This domain encompasses the drafting of legislation, official policies, charters, conventions, and recommendations relating to the protection and ownership of Cultural Heritage resources. The stakeholders are therefore primarily governments - EC, national, federal, regional, and local – public institutions and bodies, but also include international organisations and Cultural Heritage networks.

4.2 Regional and Local Authorities

The perspective of many local authorities in relation to cultural heritage is a wide one, given the range of services and activities for which a typical municipality can be responsible, albeit dependent upon its size and the national structure within which it operates. These services and activities operate at both strategic and service levels.

At a strategic level, a municipality will often assume a "leadership" role in relation to the local community, and will seek to establish partnerships with public, private and community organisations and is often involved with promotion of the locality in the widest sense. Internally, the municipality will also be responsible for staff training and development to ensure that there is adequate training of staff in all the latest IT tools and applications relevant to their work. Depending upon the specific local circumstances of a municipality, cultural heritage may feature significantly in all these higher level activities.

4.3 Cultural Heritage Sites, Museums and other Cultural Heritage Organisations

In this category of stakeholders are those professionals from any institution, organisation or association in all sectors of Cultural Heritage aiming at conserving, managing and / or giving access to Cultural Heritage: sites, monuments, historic towns, museums, archives, libraries, galleries, centres for research and education, temporary exhibitions, etc.

The stakeholders include Cultural Heritage organisation managers and curators who oversee or manage a site or a museum and are responsible for maintenance and upkeep, in addition to business activities such as marketing, planning and promotion. They also include staff of all levels involved in everything from conservation to content creation, technology, guiding, site maintenance, reception, and education.

4.4 Associated Communities

Associated communities refer to groups or individuals with special religious, cultural, or historical connections with a Cultural Heritage site or resource. They may be residents and taxpayers of a particular region or locality as well as remote communities. In the case of associated religious communities, their interests may be represented by officially recognised religious authorities. In other cases, such as aboriginal removal, forced exile, or ethnic cleansing, the desire of displaced groups to maintain their links with cultural heritage sites can be a contentious political issue that often places local and associated communities in conflict. Recognition and respect by both, for the rights of both, is an essential precondition for effectively assessing their stakeholder needs.

4.5 Tourism

This domain considers Cultural Tourism[4]. Cultural Tourism is a sub sector of tourism and can be defined as travel directed purposefully toward experiencing the arts, heritage and special character of a place. It needs to be recognized that although tourists may visit a cultural attraction as part of their itinerary, they are not necessarily cultural tourists, who tend to visit a place purposefully for engaging with Cultural Heritage.

Cultural heritage tourism is undertaken by both domestic and international visitors.

From the tourism demand side cultural heritage acts as a motivator or *Attraction* within the tourism system. An appreciation of the entire system should enable all stakeholders to understand the factors that determine visitation to cultural heritage sites as well as factors that will determine customer satisfaction and successful organisation of travel experiences.

4.6 Educational Entities

Schools and Universities as well as Education Policy makers and related administrations and organisations are encompassed in this category. The specific stakeholders are those who formulate heritage curricula, organise educational site visits, or are involved in heritage training programs for teachers.

V – Technology at use within Cultural Heritage

This section lists individual digital technologies – and the specific activities of IT specialists and technicians - involved today in Cultural Heritage. However, a basic distinction should be made between research groups and SMEs as their founding and involvement and the commercial market significantly differ.

5.1 Data Pipeline

The Cultural Heritage domain is best conceptualised as activity along a data *pipeline* which begins with the discovery or acquisition of an archaeological site, historical monument, or museum object. For the purposes of this inventory, all technology considered is digital, although it is wider than computer-based applications. Five major stages have been identified in this digital data pipeline:

1. Recording & Data Collection

Several techniques are used to create a digital representation of a museum object, an archaeological find or structure or a monument.

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[4] For additional detail about Tourism, Cultural Tourism, and Heritage Tourism, see Appendix 1

They include:

- Digital photography;

- Laser scanning, used for objects, archaeological remains, monuments. This technique creates a "point cloud" of position measurements on the surface of the object (the technique is based upon the time it takes for a laser pulse to hit the surface of an object and be reflected back to the scanner. The creation of the complete hull of an object requires several scans that have to be merged together and turned into a 3D digital surface. The most advanced scanners can also add color and texture to basic surface measurements.

- Laser line scanning: a laser beam sweeps over an object and the resulting profile is captured by a camera. The complete 3D model is generated by rotating the object on a turntable.

- Structured light scanning: this technique generates a 3D model by projecting a light pattern (such as lines or checkerboard) upon the object and capturing the resulting images. In the more sophisticated applications the color and texture of the object is added automatically.

- 3D from photographs: by taking an appropriate set of photographs of a scene or object from carefully selected angles, a 3D model can be created with the color texture linked automatically to the object. This technique can also be used for recording archaeological stratigraphy in three dimensions.

- Light field rendering: from a set of photographs, any point of view in between the recorded points of view can be created by the computer, thus creating the illusion of having a 3D model. This technique is useful for objects that are too large or difficult to be recorded as a 3D surface model, as, for example, large natural features or extensive landscapes.

- Tomography : scanners used in for diagnostic medical purposes can also be used to reveal the internal structure of objects or to distinguish restored parts from original parts (most usefully in the case of museum objects that have no restoration record)

- Digital photogrammetry: Total Station and other digital measuring devices used in field recording.

- PDA (hand computers) for portable digital field recording in archaeology

2. Data Organisation, Analysis, Processing

Having a digital representation of the surface of an object or structure is only the first step. For proper data organisation and processing, additional identifying information needs to be linked to the object, and the data has to be stored in a permanent way to facilitate ongoing analysis. This is the domain of databases, metadata, GIS (geographical information systems). Current developments in this field include:

- Stratigraphy tools : these tools create digital support for stratigraphy analysis in archaeology (such as the Harris matrix)

- Statistical analysis : powerful statistical analysis methods can reveal hidden patterning or regularities of data;

- 3D and temporal analysis in GIS: the display of visual relationships and interconnections (both synchronic and diachronic) offer an effective tool for the analysis of Cultural Heritage data;

- Structural analysis: in the recording and preservation of historic structures, the careful analysis of the physical characteristics of the original and secondary fabrics is essential. The significant data must be captured based upon the right 'vocabulary'.

3. Collection Integration and Archives

Once the data is stored and analysed, it must to be preserved for the coming generations, and made available to the community. At this stage of the data pipeline, there are several issues:

- Digital data conservation (particularly in regard to the permanence of storage media).

- Linking the data collections (and database structures) of distinct Cultural Heritage archives, institutions, and museums. In this domain, the Internet plays a major role in facilitating interconnectivity;

- Search engines that are specially designed for Cultural heritage use;

- Data standards (CIDOC, etc.)

- Providing open access to CH data while still protecting Intellectual Property Rights)

- Reducing illicit trade in movable Cultural Heritage by creating databases of stolen archaeological and museum objects, and putting this on the Internet (as done by Interpol and various museums with regard to looted sites and artifacts);

- Non-intrusive digital restoration: Damaged objects or wall paintings can be restored and completed by applying restoration techniques on 3D models or digital images, without altering the original object or wall painting.

4. Scientific Interpretation

When interpreting scientific data, technology can play a major role in the interpretation process:

- Virtual reconstructions of buildings, landscapes can be a multidisciplinary effort where iterative visualisation and testing of alternatives between different specialists can help determine the most probable reconstruction model(s).

- Geo-referenced 3D models of archaeological sites and corresponding virtual reconstructions can create powerful visual representations of the spatial link between object and its reconstruction,

- Augmented reality in which real images and virtual reconstructions are combined is instrumental in understanding the internal components and construction history of complex sites and monuments;

5. Public Presentation and Communication

When presenting cultural heritage to a larger public, it is essential to select the appropriate presentation methodology and user interface. In addition, user interfaces must be consistent, simple, and robust enough to enable visitors with little or no technological skill to operate the system easily.

The key factor in public presentation is intellectual and experiential engagement of the visitors with the Cultural Heritage resources. Obviously, technology must create and support this level of heightened visitor engagement and it has most often been done through the use of interactive applications.

The main systems of technology-aided public presentation include:

- Multimedia and virtual reality, in which museum objects can be recontextualised, and brought to life.

- Multimedia narrative construction (either sequential or user-constructed) in which scientific information can be communicated to the general public through the embedding of digital elements such as digital video (e.g. actors playing historical characters), interactive storytelling (based upon databases), and virtual humans (including reconstructions of clothing, tools, mannerisms)

An essential aspect of presentations for a wide general audience is the adaptability of content for specific visitor interests, educational background, and comprehension levels. This can be accomplished through the use of personalisation, information layering, and user profiling. Regarding the physical upkeep and management, technology-based presentation systems should be open and easy to update and should be owned and operated by the sector of the Cultural Heritage community most directly involved.

5.2 Fundamental benefits of computers

"The computer is a workhorse. It is generally capable of labouring 24 hours a day, does not ask for raises or coffee breaks, and will do the ten-thousandth task exactly the same way it did the first one – and without complaining of boredom" (Capron, 1990, pp 9).

Capron (1990) claims that there are three fundamental benefits of computers: Speed, Reliability and Storage Capability and three by-products of computers: Productivity, Decision Making and Reduction in Costs. This section investigates whether these benefits apply to technology used in cultural heritage. Two additional categories were identified in light of technological developments.

Speed

Technology was found to increase speed that an activity was performed in the following ways: Some technologies can speed up the recording process at the archaeological site, helping preserve at risk items. Using databases in the field allows objects to be compared for identification purposes, thus speeding up the documentation process. An automated system decreases the time spent reconstructing the original appearance of a vessel from a fragment.   Objects could be located quicker if their details are stored in a database than searching through archive boxes.

Interactivity allows the visitor to select the information they wish to receive. Interactivity can be used in three different visitor scenarios. Before they attend the site, the Internet can be used to plan their visit enabling them to identify the exhibits they wish to view; during the visit for example interactive exhibits enable the visitor to select subjects they wish to know more about; and after the visit using the Internet to gather follow up information. This makes the visit far more efficient in terms of time.

Reliability

The instant processing capability of digital cameras allows the field archaeologist to check that the photographs taken are usable, in situ. Thus they can ensure that the site has been fully recorded.

Within a visitor site, managers rely on technology in the form of visitor management systems to calculate availability and generate admissions tickets; monitoring safety and security.

Interpretation continuously evolves and when new information is uncovered, it needs to be added to the appropriate exhibits. A hazard of traditional paper based systems was that it was sometimes found to be unreliable as records were not updated as they should have been. Computerised systems enable records to be updated automatically.

Website technology enables global access to collections twenty four hours a day, three hundred and sixty five days of the year allowing visitors unrestricted access to information.

Visualisation techniques such as virtual and augmented reality ensure that visitors picture a subject in the same way. This is useful when it is very difficult to explain a subject using words either written or audible.   For example a virtual reconstruction shows visitors a hypothesis of what a construction may have looked like in its original condition.

Storage capability

The processing power and storage capacity of today's computers enables vast quantities of information to be stored and manipulated. Detailed images can be captured, compiled and then presented as a single image such as a 3D model of a sculpture.

Museums have limited room for displaying artefacts. Technologies such as the Internet or kiosks increase the amount of information that can be presented to visitors without taking up any further physical space.

Productivity

Storing information in a single source such as a database means that staff immediately knows where to start looking for information. Their response to visitor's information requests becomes quicker and therefore they can handle more requests within the same time. Furthermore a distinct advantage of technology is that it allows the visitor to answer their questions themselves. For example they may look up the answer to their questions on the Internet. This frees up staff time to concentrate on other duties.

Computerised documentation systems act as a catalyst for organising data, gathering information from a variety of sources into one. The purpose is to make it easier to reuse the information and if a member of staff has left, the information is still accessible.

Decision Making

Access to information in situ (within an excavation site) allows the Archaeologist to make decisions about what the object is and how it should be recorded.

Within a site computerised ticketing systems allow site managers to view attendance reports. The marketing department can monitor attendance at events.

Cashier reports show the members of staff who are the most / least productive. Visitors who support the site financially can be identified and rewarded. Therefore technology allows to the site manager to monitor activities and take decisions accordingly.

Reduction in costs

Often technology is characterised by a high initial expenditure and is compensated by a reduction in costs in other areas. Electronic tour guides reduces the need to pay staff costs in terms of Guides.

Additional fundamental benefit - Link and Learn

This has been inspired by the Internet and the way that information is linked. The visitor connects one piece of information with another which results in learning. In a cultural heritage context, on the web visitors can find out more information on a chosen subject such as the pyramids. The site presents the information on this subject but also links to other sites that can provide additional information. This is another instance of linking and learning.

The concept of linking and learning is not just confined to the Internet. For example using augmented reality, visitors can directly compare the current condition of a subject with a hypothesis of its original appearance and thus deduce how the appearance of the subject has changed over time.   Linking one image with another and learning from it.

In terms of interactive museum installations, the purpose is that the visitor becomes engaged in the subject, learning perhaps without realising it. One type of interactive museum installation is where the visitor is invited to play a game perhaps reconstructing a temple. By placing the pieces in their correct positions, the visitor can view what the temple originally looked like. In other words by linking the pieces together, the visitor learns what the temple originally looks like.

Some interactive museum installations allow the visitor to select the parts of the presentation that interests them. Thus they interactively link to one part of the presentation and learn in a more time efficient manner.

Technologies such as the Internet and wireless devices allow greater access to information. Guides could use a PDA to demonstrate a subject, or to use as an information resource to assist in answering difficult questions. Therefore the Guide is using wireless technologies to link to the information contained on the Internet to answer a question. This results in the Guide and visitors learning.

Linking allows for information layering. Visitors can engage in the subject on different levels, and from different perspectives such as age (child / adult), culture (domestic / international visitors) etc. The technology effectively filters information that is deemed not suitable for the relevant audience.

Tourism organisations such as inbound and outbound operators, TICs, destination management organisations etc can link to their clients by sending an email, or visiting their website or intranet to gain information. They can use the Internet to conduct competitor research, search for new suppliers, create new products, or obtain information to present a more comprehensive service to their customers. Websites can entice people to visit the establishment. The Internet connects disparate groups of people who have a common interest. Again linking and learning.

Additional by-product - Control

Technology can control visitor management, queues can be reduced by pre-booking facilities (reservation systems), and fragile exhibits can be protected from erosion by digitising the subject and presenting this to the visitor.

Computer systems can monitor the collection from the moment an object enters the institution to the time it leaves. Site managers can track objects on loan, and monitor the condition of artefacts.

Wireless devices allow the user to walk around an exhibition freely and choose the order in which information is presented to them, as opposed to following the order imposed by the site manager.   Thus control is devolved to the visitor.

Multimedia presentation devices can be accessed remotely and content can be dynamically adjusted not only to reflect location, but also according to user's walking speed and time spent at point of interest.   Therefore each visitor is receiving a personalised presentation.

VI - Detailed inventory of needs by stakeholder community

6.1 Conservation and Management Process

For the purposes of this inventory, stakeholder needs are those aspects of the Cultural Heritage domain in which technology can be used in more efficient, effective and sustainable ways.

This section proposes a comprehensive approach, covering the entire conservation and management process: recording, data collection and processing, legal protection, conservation/restoration techniques, archives, mediation, valorisation, presentation, interpretation, and training. Seven main phases of this process have been identified, according to commonly accepted conservation and management policies of museums, sites, and monuments.

6.1.1 Management

This includes administrative functions such as planning, evaluation, reporting, and monitoring of site or museum use. It also includes improvement of ICT related services offered and the management of those services.

6.1.2 Research (data collection, structure, and analysis)

Textual and digital technology used for the acquisition of information about the artefact or site. This includes inventories, documentation, field recording, excavation data, monitoring, and post-excavation research and analysis.

6.1.3 Conservation / Preservation / Restoration

Technology used for on site or remote monitoring of the appropriate conditions of conservation and restoration. This includes preventive and active conservation, monitoring, security, urban and regional planning, development impact studies, and damage assessment. Also tools for restoration and preliminary studies.

6.1.4 Legal protection in relation with ICT

This includes protection of the collected and processed data, intellectual property and copyrights, technologies to prevent and fight the illicit traffic of cultural properties, and the efficient inventorisation of protected or endangered cultural heritage resources.

6.1.5 Interpretation / Education

Technology can play a major role in the presentation and the interpretation processes. Joint use of all the multimedia and virtual reality tools, of augmented reality systems and virtual reconstruction.

6.1.6 Valorisation (enhancement of the values)

This topic covers the possible use of technology in the economic dimension of Cultural Heritage when it is considered as a resource for local development– as well as the enhancement of local, regional, national, or European identity.

6.1.7 Training

Technology can be used to provide appropriate, continuous training and coaching for professionals and to introduce the visitors to ICT.

6.2 Needs National and Federal Administrations

This section should include Policy and Guidance:

- Advice to owners
- Advice to professionals
- Advice to government
- Support to the sector

6.2.1 Management

- On-line access to official policy documents and reports from the international heritage policy community.

6.2.2 Research (data collection, structure, and analysis)

Research includes:

- Documentation (library, archives, …);
- Inventories;
- Field recording (photogrammetry, prospection, excavation);
- Analysis (including post-excavation).

In the field, the archaeologist aims to record as much information on the site as they can within the constraints of time and budget. It is a fundamental requirement of archaeologists that this task is carried out in a thorough and systematic way.

Documenting finds into handheld computers eradicates the need for manual systems using sheets of paper. Electronic logging systems automatically link images and text. Portable devices can also be used by archaeologists to assist them in other aspects of their work. For example access to databases in the field allows the archaeologist to call up other images to compare with objects found in the field for identification purposes.

Archaeologists are also aware that traditional technologies have their limitations. For example photographs using film are usually developed when the archaeologists are back in the office. If there were any problems developing the photos, this information is lost forever. Digital cameras ensure that an excavation site has been adequately recorded.

Technology can speed up the recording of information which is particularly useful when recording fragile finds that may quickly become damaged to through environmental conditions.

- Computerization formalises a system to combine all existing documentation sources into one system
- Improves and standardises documentation recording methods
- Facilitates amendments and updates
- Improves speed and quality response to enquiries

There is a growing trend of repeatedly using digital information for different purposes such as for websites, leaflets, displays etc. Therefore it is becoming increasingly important to store this information in an easily accessible manner to save time searching for the information.

- The development of technology research programmes, either through external funding or incorporated within the routine tasks of the institution itself.
- Need to define policies and strategies for preservation and storage of the heritage of digital information.

Examples

<u>Field Documentation</u>

Archaeological finds in the site are documented in order to build up information about the excavation.   However recording the finds is often quite a challenge due to the shear numbers involved.   A database can organise and manage this information.

Digital photography is useful for recording the stages of an archaeological dig. Digital recording can speed up the process of recording at risk items, which helps preserve them (Lopez, 2003).

Digital photographs can ensure that the site has been comprehensively recorded, for sometimes photographs taken with an ordinary camera can be lost. Moreover the printing of digital photos is relatively free and therefore the archaeologist is not limited in the number of images they take due to cost (Lopez, 2003).

<u>Reconstruction</u>

It is relatively rare for an object to be found whole, more often fragments are found. Virtual reconstructions enable the archaeologist to identify the object from a fragment for documentation and cataloguing purposes (Melero et al, 2003, Kampel and Melero, 2003).
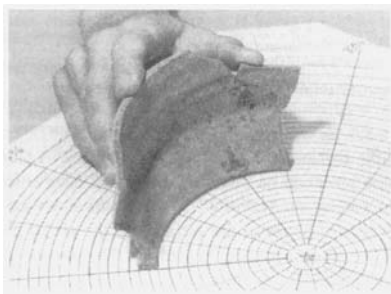
Manual diameter estimation   Result of automated system
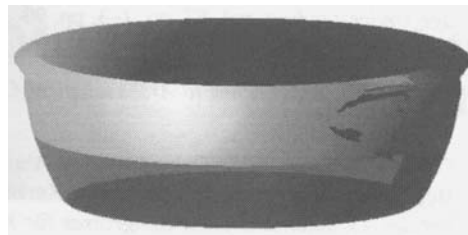
Figure 1 Source: Kampel and Melero (2003)

6.2.3 Conservation / Preservation / Restoration

This include Heritage Management
- Designation
- Permits
- Financial support
- Site monitoring
- Town and country planning

- Information applications to link on-going conservation / preservation / restoration projects with legislation and international standards to monitor their success factors and evaluate existing policy guidelines. This should include conservation of both immovable heritage and other Cultural Heritage resources such as archives, libraries, manuscript collections, and art work.

- The technological assistance to governmental organisations in fulfilling their legal responsibilities in the field of heritage (inventory, monitoring, classification).

6.2.4 Legal protection in relation with ICT

▪ Digitisation means that digital representation can be perfectly copied. Furthermore digital images can be manipulated with no way of telling that the new version is not the original. Licensing the use of images is a major source of income for sites.   Therefore protecting copyright is going to become an increasingly important issue. Keene (1998) presents the view that downloading images are no more of a threat than people scanning images from brochures. Commercial users will require a much higher resolution than what is available on the Internet.

▪ A policy on the use of ICT that defines best practices, encourages the use of open source technology, and establishes common technological standards.

6.2.5 Interpretation / Education

▪ Use of digital technology to inform the general public of new and existing heritage policies and stimulate public support for their implementation.

6.2.6 Valorisation (enhancement of the values)

▪ Data access to on-going public heritage projects to assess their compliance with official policies.

▪ Digital technology as a mean of soliciting and evaluating public response to propose heritage development plans: as an important component of policy decisions.

6.2.7 Training

▪ Professional training for members of the heritage policy community in data access and search, as well as digitalised glossaries of specific technical and legal terminology in all relevant languages.

CASE STUDY 1

The Center for Documentation of Cultural and Natural Heritage, CULTNAT, Egypt

The Center for Documentation of Cultural and Natural Heritage CULTNAT uses new developments in technology to document Egypt's cultural heritage. The project includes

- An interactive archaeological map of Egypt comprising three layers which can be selected to obtain information on regions, sites and monuments.

- Two Geographical Information Systems (GIS) one displaying nineteenth and twentieth century architectural heritage of Egypt and another containing detailed information on Flora, Fauna, geological formations etc relating to specific sites or protected areas.

- Databases documenting Egyptian Folklore and musical heritage of Egypt

- Collections of famous photographers are available on CD-ROM.

- An encyclopaedic electronic library of Scientific Islamic manuscripts

- A website depicting Egypt's cultural heritage, with 2D high-resolution images of artefacts, zooming capability, virtual tours, panoramic views of sites, 3D scanned objects and web cams. The website can be found at www.eternalegypt.org

- Culturama showrooms where a diverse range of exhibitions are shown using the most up to date technologies available including the Micro Gallery which displays information about the projects and activities undertaken at CULTNAT and the Culturama showroom which projects cultural topics on 180° screens.

6.3 Local Authorities

6.3.1 The Main Associated Stakeholders

At a service level, the municipality will be responsible for specific activities that will impact widely on cultural heritage, over and above specific municipal responsibilities for monuments, sites and museums. These services and activities include-

- **Town Planning and Transportation**: policy making, control of development and movements of people and vehicles where they impact on and relate to cultural heritage buildings, the impacts of pollution, etc;

- **Municipal Buildings of Cultural Heritage Value**: the management of the properties, repairs, maintenance, usage, etc;

- **Tourism**: promoting access to local cultural heritage through information and the interpretation of its history with the aim of attracting visitors and benefiting local people;

- **Education**: information and material about cultural heritage relevant to primary and secondary education, higher education studies and life long learning activities;

- **Business Development**: facilitating skills training programmes to ensure that specialist and traditional workforce skills are available to meet the requirements of cultural heritage; and

- **Public Safety**: the impact of pollution on cultural heritage buildings and of safety in those buildings and sites with regard to crime, health and fire.

At the strategic level, the stakeholders will include:

- Government at regional, national and EU levels and the local elected representatives on these bodies;

- Other similar and/or neighbouring local authorities;

- Local community groups, councils and special interest societies;

- Local business organisations, such as the Chamber of Commerce and the main employers;

- Suppliers of goods and services to the municipality;

- Major land and property owners;

- Other public bodies and organisations linked to cultural heritage.

At the individual service level of municipal activities, the following main stakeholders can be identified:

- **Town Planning and Transportation**: the owners of buildings, local residents, amenity societies, developers, building professions, contractors, regional authorities, bus and rail companies, car users, taxi firms, road haulage

companies, cyclists, pedestrians, airlines, the main sources of pollution, regional authorities;

- **Municipal Buildings of Cultural Heritage Value**: the occupiers of the buildings, local residents, amenity societies, developers, building professions and specialist contractors;

- **Museums, Sites, Archaeology and Monuments**: the owners and staff (managers, curators, guides, etc) of these facilities, the visitors, local residents, amateur researchers, donors of items, conservators, etc;

- **Tourism**: visitors, local tourist offices, the owners of cultural heritage attractions, the providers of accommodation of all kinds, restaurants and cafes, local people, travel and holiday companies, regional tourism authorities;

- **Education**: the schools and universities, their pupils and students, teachers and lecturers, governing bodies, training providers, central government;

- **Business Development**: the existing businesses, business support agencies and companies, training providers, chambers of commerce, regional authorities;

- **Public Safety**: Police and Fire services, health and safety advisors, health authorities, specific businesses, property insurers, the owners of cultural heritage buildings.

6.3.2 The Sources of Information and Uses of IT

The sources of information for the above activities and the uses to which IT is put in support of the work are:

- **Town Planning and Transportation**: records of listed heritage buildings, planning applications, land use plans and policies, the comments of the public and others, information on traffic volumes, patterns, origins and destinations, modes, etc. IT is used for database systems, GIS, modelling and forecasting of transport activities, analysis of surveys, simulation of impact of new buildings, etc;

- **Council Buildings of Cultural Heritage Value**: full data on the construction aspects of these buildings, the occupiers, the uses, and the heritage features, etc. IT is used primarily for database systems;

- **Museums and Monuments**: full records of the cultural heritage artefacts in these venues. IT is used for database systems and for repair/conservation, reconstruction and visualisation techniques and also for visitor information and interpretation e.g. touch screen databases, audio commentaries, etc;

- **Tourism**: full records of the attractions, accommodation, travel facilities, and promotional photos of the area. IT is used for database systems and also for promotional websites, online booking of accommodation, links to other relevant sites, etc;

- **Education**: information on pupils, the heritage aspects of the national curricula, teaching materials and aids, etc. IT is used for database systems and for surfing the world wide web for information, analysing data, writing up projects, etc;

- **Business Development**: information on cultural heritage related businesses, training providers, support agencies, the local Chamber of Commerce and other business groups, trades unions, etc. IT is used primarily for database systems; and

- **Public Safety**: information on fire, health and safety inspections of and emergency calls to buildings relating to cultural heritage i.e. museums, other attractions and visitor accommodation, plus data on crimes in or near such buildings. IT is used primarily for database systems.

6.3.3 Needs of Local Authorities

IT needs of the local authorities are for the most part related to their spatial planning and communication needs. Most European municipalities use at least some degree of digitisation of their spatial plans and use digital tools (websites) for their communication.

With the forthcoming implementation of the Valetta legislation some municipalities see a need arise for an increased use of IT (in this case mostly GIS and Location Based Information and Services (LBS) systems). However this need is not universal as some municipalities have already implemented GIS systems for their spatial planning. Digitising the (possible) archaeological sites and archaeological sites in this regard does not imply the need for specialized IT-products, but rather implies the more intensive use of existing technology.

However if digitisation of the archaeological sites and artefacts is taken up, the municipalities all indicate that it would be useful to connect the location of the sites/artefacts to background information. By providing information about the nature of the artefact, the uses it was put to, connected legends, relevant stories, pictures, the municipalities will be better able to generate interest and support among the local residents. Sites and artefacts become more then just objects if they can be connected to a shared history and society.

The municipalities all have monumental buildings inside their territory, although the amount differs per municipality. Some municipalities are owners of monuments, others are not. However the municipalities usually keep an inventory of the monuments and some municipalities indicate a need for digitisation of the location and especially digital presentation of the monuments. In this regard the relation of the monuments to local history, in the form of stories, pictures and other media is also brought forward as a need. Again this will enhance the support among local residents.

Overall the knowledge and implementation of IT technology for cultural heritage in municipalities differs considerably. Furthermore it is not clear if the systems and approaches used by the municipalities can be interconnected or adapted to connect to other systems and databases. This especially is an area which needs further research as the municipalities indicate that a connection with local knowledge, contained in for instance museums or historical societies, will considerably enhance the possibilities for the use of cultural heritage for communication.

Cultural Heritage is one of the assets mostly used in the creation of an 'image' for cities and regions. In this regard it's important to match the projected image with the reality of the city. Projected images which don't reflect the history of the city or region, in the long run won't help the identity of the city or region. One can not invent a cultural history, because visitors will immediately detect the discrepancy between the images projected and the images present.

To streamline the images to be projected, local expertise is needed. This calls again for instruments which facilitate the collaboration between local expert knowledge and local authorities. Thus the local knowledge 'contained' within the historical societies and other cultural organisation can be put to use in the communication of the image of a region or city. By using the local knowledge one can be sure that the image projected matches the real history and identity of the town.

The most relevant need for both local authorities and local communities is IT-instruments to integrate the knowledge and facilitate in the cooperation. For local communities it's important to have instruments that are easy to use, fool-proof and preferably non-expensive. These characteristics will make the difference between the implementation, or rejection of any system.

Better access and presentation of the available materials will help the cooperation between the organisations, especially in the selection of possible historical themes to use in the creation and promotion of the image of a city or region. Furthermore preservation and digitisation of collections can be more easily coordinated to prevent unnecessary duplication. In the end better (digital) access and presentation of materials can help the valorisation of the heritage.

Apart from the need of IT-instruments, a need for better information about the IT-possibilities can be seen. Organisations find it hard to see all the possibilities of IT and have a feeling that the implementation of IT means big budgets. Furthermore it is hard for organisations to asses a potential IT subcontractor in terms of value for money. An independent organisation could fill this gap by providing the needed information, together with suggestions for outside funding.

<u>Management</u>

- Need for instruments that allow for better cooperation between the different stakeholders. Both the local authorities and the local communities indicate the value of having systems that connect the knowledge contained within the organisations. As the local authorities move towards the implementation of the Valetta treaty, local expert knowledge can be put to use to validate the value of archaeological remains.

- The local knowledge is also important in constructing and projecting the image of the city or region, because, as it is of the utmost importance to match the projected image to the real history and identity of the city or region. The local knowledge can identify the true identity and history and furthermore can help to provide related stories and pictures.

- Need for instruments which allow the cooperation between local cultural organisations and educational institutes. The local cultural heritage is increasingly used in the educational program. IT instruments can be applied as tools to discover the local heritage in an attractive and interactive way. These instruments should also allow for local heritage expert to cooperate with the schools, so the information can be streamlined to the local situation.

- The need for instruments for better cooperation also comes to front when comparing the systems used to digitise and file the collections of the organisations. There is a great variety in systems and methodologies which might make future cooperation and interconnection difficult. Ideally all the organisations should use similar or connectable systems and methodologies, so data can be linked and compared easily.

- Internet applications to facilitate the establishment of networks of local heritage authorities to exchange information on founding sources and project planning experiences.

- Need to connect the different pieces of information in the communication. If set-up properly, databases can be linked, which allows for more information to be provided to the end users. This goes for instance for monuments and archaeological sites. The locations are recorded by the municipalities, but the local heritage organisations have the information that validates the value of the monuments and finds. By connecting the pieces of information, the communication about the objects can be streamlined.

Research (data collection, structure, and analysis)

- Digitisation of heritage resources and special archives or collections for planning purposes.

- Given the non-professional nature of most of the organisations this calls for easy to use, fool-proof and non-expensive systems and methodologies. In the end it would be of great value to have a system which allows for an integral search of collections and thus a comparison of materials. In this way the digitisation of valuable cultural heritage materials can be coordinated more easily and users can easily find materials of their needs.

- Use of GIS for integration of heritage properties in overall urban planning process.

Conservation / Preservation / Restoration

- Creation of database of endangered sites within the local authority with links to other local public services (electricity, road building, traffic management, etc.) for efficient planning of local conservation, preservation, and restoration budget.

Legal protection in relation with ICT

- Access to all relevant legislation, charter, guidelines, to aid in the classification and protection of local digitised heritage resources.

Interpretation / Education

- Need for direct communication with local community (web magazines, forums, and info), multiplying channels of accessible information.

- Need for anchoring interpretation technology within the relevant stakeholder groups and involved communities.

Valorisation (enhancement of the values)

- Central internet portals and information exchange to promote the special character of regional heritage resources as a basis for promoting awareness and pride in distinctive local or regional identities.

Training

- Professional training for members of the local heritage authorities in data access and search, as well as digitalised glossaries of specific technical and legal terminology.

- Adequate training for all levels of staff related to heritage issues in relevant ICT applications and tools.

6.4 Needs of Cultural Heritage Sites, Museums and other Cultural Heritage Organisations

- Need for better standards in data storage, data mark-up (metadata), multi-linguism, networking, and perhaps most importantly, the ethics of applying technology to heritage.

- The conservation community has high expectations for the application of ICT to cultural heritage. Yet it also has real concerns. Too often in the past technology research and funding has been brought to heritage without the guidance of the true stakeholders – *the heritage professionals* – resulting in distrust and disappointment. This report presents the views, needs and advice of heritage professionals to the developers of new technology.

- The ICT needs of the cultural heritage professionals are largely defined by their jobs. Thus museum managers tend to need museum management software, and historic building surveyors need digital survey and recording tools. It is also clear however that much deeper and more diverse needs exist. But defining them is not so easy. Without knowing what technologies are even out there, cultural heritage professionals have a hard time envisioning their digital future and how technology might help.

- The challenge of technology to the site manager is that most sites are funded by public organisations or universities. The site manager must justify spending scarce resources on technology, which can often represent a substantial investment. Therefore many technical innovations are adopted only by the more heavily-visited and well funded sites and museums. However as technological innovations become more cost-effective with the passage of time and wider use, it is expected that the use of technology at even modestly-funded sites and museums will become more commonplace.

- Cultural Heritage is presently a very fragmented sector, discouraging the even dissemination of knowledge of technological advances.

- Conflicts may arise between different Cultural Heritage specialists and ontologisms as their respective interests may be divergent (for instance between archaeologists and built heritage experts). Conflicts often arise between the tourism industry and the valorisation activities as Cultural Heritage is a fragile resource.

- Preference for a bottom-up approach, in order to better take the field work into consideration, give priority to new uses and the development of existing technologies.

6.4.1 Management

- Need to focus on interoperability, quality and standards.

- Close consultation and co-operation between end-users (site and museum managers) and IT-specialists from the very beginning of the project.

- Understanding the longer term implications of the technology is a key success factor.

- Site operators need to monitor trends in technology and aim to provide the same standards of service as other comparable sites.

- Need for flexible and open data warehouses for facilitating exchange of data between specialist teams throughout the entire process of project development.

- Technology should also support back office functions such as human resources; finance and accounting; operations; ticketing; marketing / sales / E-commerce.

- ICT should be used to share knowledge and tools; to exchange experience (success factors and failures); to promote results (studies, reports, guidelines); to avoid duplication of activities and waste of resources in simultaneous projects. Efforts should be merged, where possible, to maximise the impact on individual projects, creating a new and larger cultural community.

Examples

<u>Collection Management</u>

The increasing capabilities of information systems and global communications offers many opportunities to museums and galleries and it is becoming increasingly important to develop a common electronic repository to store text, images and multimedia for collection management activities, research and public access systems.   MUSIMS (http://www.ssl.co.uk/) supports acquisition, inventory management and cataloguing, developing and managing thesauri, image acquisition and watermarking, and public access facilities. Access can be via web, kiosk, workstation or CD-ROM.

Software has been developed to track an object from the moment it enters the institution, to the time it leaves, incoming and outgoing loans, condition reporting and items removed from catalogue (PastPerfect, http://www.museumsoftware.com, http://www.kesoftware.com/).

Mobile devices such as the Mobile Museum™ allow the curator to keep collection information at their fingertips to use for reference to when away from their desktop computer.
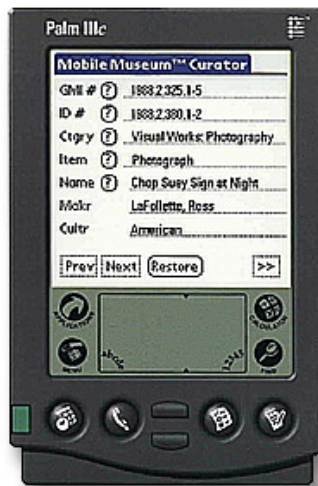
Figure 2 Source: http://www.willo.com/mimsy/mobile_museum.asp

Inventory management systems

An inventory management system can store all vendor names, contact details and other information relevant to purchasing items from their partners. Cultural Heritage Organisations can utilise intranets to communicate with suppliers (Buhalis, 2003) and are likely to reflect the trend towards developing closer relationships with suppliers through utilising technologies such as intranets.

Gift Shop management

Automated inventory systems monitor stock levels, informing the purchasing department when new items are required. If the attraction has a gift shop, the type of data that can be stored includes: item descriptions; numbers sold; received; on order; and pricing details. Additional facilities may include automatic and manual reorder and the ability to cancel orders not received or partially received. At the gift shop Point of Sale POS barcode scanning technology allows information to be collected as goods are being sold. Membership cards can be scanned to allocate discounts. The information gathered at the POS enables sales history to be tracked and for marketing information to be sent to those members who have purchased items. Systems can also be designed to allocate discounts to high spenders, staff etc. POS scanning can be used for price check and manager overrides for price and quantity to adjust inventory data (The Explorer System, www.expsoft.com).

Figure 3 Bar code scanner and printer. Source: www.expsoft.com

Reservations Systems

All cultural heritage sites will have a maximum number of visitors allowed in their site at one time for safety reasons. Therefore it is important for site management to know how many people have booked to visit at one time, in order to calculate availability. Reservations systems allocate time slots to those who have pre-booked, which guarantee entry to the attraction within a certain specified time limit. The time slot is based on an estimate of how long it would take the average person to go round the exhibition. This along with the maximum number of visitors allowed in the site at one time generates availability levels. Sometimes visitors may need to cancel or change existing reservations therefore the system must recalculate availability (The Explorer System, www.expsoft.com).

Sites often get popular at certain periods of the day for example mid morning, early afternoon and as a result of this, long queues form outside the site (Leask and Yeoman, 1999). Some sites manage this by actively encouraging their visitors to book over the telephone for example the Cabinet War Rooms, or the Internet for example the British Museum (www.thebritishmuseum.ac.uk). When the appropriate time arrives, the visitors are allowed to enter the site without having to queue.

This also enables the visitor to get the most out of their day as they avoid having to spend time queuing.

For those visitors that have not pre-booked (walk-ins) computerised reservations systems allow cashiers to instantly see information such as availability, times, and events offered by the site that day. Different pricing structures such as discounts for members can be instantly calculated, members only events restrict access to those with membership (Equisis, www.isis.be).

Galaxy Ticketing Point of Sale system involves generating admission tickets, allocating discounts, collecting demographic and revenue data and producing sales reports. The Galaxy system also enables credit card authorization, void transactions, point of sale touch screen support and online help. The system can process multiple ticket sellers and generates reports by cashier, booth, shift, location, company, etc. (www.gatewayticketing.com).

Figure 4 Ticketing Point of Sale system. Source: www.gatewayticketing.com.

Membership

A membership card that contains a bar code can be scanned, during which time the system automatically checks the expiration date and whether they qualify for free or member-discounted rates. The data generated from this process allows the site manager to record which members are attending and how often, and which are not.

The cashier could instantly renew membership by re-scanning the card. Visitors can also apply for membership at the site, receiving a temporary card until the permanent one arrives.

Management information

Automated booking and ticketing systems allows the site manager to run cashier reports, attendance reports, and marketing reports at the end of the day or after each cashier's shift (Equisis, www.isis.be).

Some reservations systems utilise advanced sales to generate business rules about pricing, events, performance times, admission categories, and discounts. For example organising events for specific days or times, some events may have different pricing for members and the general public, and members-only events (The Explorer System, www.expsoft.com).

Marketing Information promotions and events

Reservation systems allow the marketer to calculate attendance figures by date or event and track ticket sales against campaigns and promotions. This information allows the marketer to get to know their customers, which should lead to a better targeting of campaigns. Members can be tracked to see those which are attending and those who are not. Also the marketer can determine which events the key donors are interested in. The effectiveness of promotions can also be calculated on a cost versus revenue basis, thus the marketer can determine which promotional activities are worth continuing, and those that are not.

Staffing levels

Staff rotas can be allocated using appropriate computer programmes to maintain cover at all times and plan for annual leave. If this is linked with advanced ticket sales information, the site manager can alter the number of staff needed to operate the institution in accordance with projected attendance figures, which minimises costs. Volunteers can also be taken into account. Some systems record the number of visitors to specific attractions within the site and when they attended to measure popularity and in order to make informed scheduling decisions (The Explorer System, www.expsoft.com).

Employee records

Employee information is generally kept on computer for access by the personnel department. This would comprise contact information, performance appraisals, payroll details and any training received from a list of training providers.

Finance and Accounting

Specialist computer software can calculate payroll, accounts payable and receivable. Cashiers reports can include breakdowns for cash, cheques, credit cards, coupons, memberships sold, and refunds processed (Equisis, www.isis.be)

Membership

Membership is very important to the cultural heritage site as it provides a constant and reasonably predictable source of income (as opposed to donations which may fluctuate widely). In return for a small charge, members may receive benefits such as discounted (or free) entry, invitations to special events and even discounts on merchandise.

Computerised systems can manage membership efficiently, calculating the number of current members, how many have expired, or are about to expire. This is very useful to monitor in order to maximise revenue from membership (The Explorer System, www.expsoft.com).

Donations

Donations can be made on a regular basis and are usually small amounts in relation to income, or made on an occasional basis by individuals or firms and are usually large amounts. Each donor's level of giving, history of giving and museum attendance activity can be tracked. Therefore the marketer instantly knows which donors are due to make donations. Using historical giving patterns can also produce future revenue projections, increase the level of giving from current donors and therefore make the museum more profitable and successful in the long term.

Visitors' tickets

Some cultural heritage managers are against imposing fees to visit their institutions because they should be available to everyone. More commonly managers impose a token amount, which often does not cover costs (Garrod and Fyall, 2000).

Computerised reservation systems manage visitors in terms of ensuring that the site does not go over its limits in terms of visitor numbers and visits can be pre-booked to guarantee consumption and avoid queues.

Public sector support

Caulton (1999) observes that many heritage attractions are facing static or declining visitor numbers, alongside declining revenue budgets from the public sector. Furthermore organisations that are publicly funded have to justify to the public that they are spending public money effectively. Often new technologies are costly and would be difficult to justify in all but the biggest of establishments. Nevertheless the cost of technology generally falls over time (Bennett, 1999). Therefore it is expected that as the cost of technology lowers so more applications will appear in cultural establishments.

Private sector support

Dr Charles Saumarez Smith, Director of the National Gallery, observes the increased competition for both public and private funding: "*Over the last decade the arts world has become a far more competitive place with more organisations clamouring for both public and private funds… but there is only so much sponsorship and commercial activities can bring in*" (Saumarez Smith, 2003 pp 14).Richards (1996) observes that cultural heritage sites are more likely to attract sponsorship for technological applications than if the organisation tried to obtain finance to cover more mundane issues like personnel costs. Indeed some technologies generate income and visitor numbers for the site. For example the British museum is currently showing an interactive virtual mummy exhibit (www.thebritishmuseum.ac.uk/).

6.4.2 Research (data collection, structure, and analysis)

- Need to add additional information to the object. These data must be stored in a proper way and be preserved in a sustainable system.

- Digitalisation of various parts of the archive should always be carried out on a standard appropriate not only for its immediate use, but for its continued preservation and retrieval (suitably catalogued or recorded on appropriate systems). Attention should be given to means of updating and transferring the information to new supports as hardware and software become obsolete.

- Streamlined and organised data acquisition with clear objectives in the case of time constraints.

Examples

Knowledge
- Models management (EAD)

Data collection
- Digital photography (camera, scanner,…)
- Digital photogrammetry
- Sensing: geographic, dimensional, location, image, textual, environmental
- Tomography
- PDA based on field recording

Data organisation and analysis
- Databases: data standards, vocabulary tools (multi-lingual ontologies, descriptive systems, thesauri) and linking data over the boundaries of the cultural institution
- Internet accessibility: web accessible database
- Digital data conservation
- Stratigraphy tools
- 3D and temporal analysis in GIS
- CAD

Research

Many cultural heritage sites are making their collections available online using text, images and searchable databases (www.thebritishmuseum.ac.uk/) this enables staff or visitors to conduct research from within the institution or at remote locations (pastperfect, http://www.museumsoftware.com/).

eMuseum is one example of a product that provides a web interface that enables searching and displaying collection information such as objects, exhibitions, and related media: images; video; audio, etc. (http://gallerysystems.com/emuseum.asp)

6.4.3 Conservation / Preservation / Restoration

- Monitoring, anticipating, and planning restoration works will avoid long term destruction and reduce the risk of loss of authenticity (physical integrity and spatial setting) of a Cultural Heritage site.

- Permanent monitoring will allow regular maintenance and avoid expensive emergency restoration works.

- Respect for internationally accepted conservation principles and practices.

- Technology such as virtual reality can enable visitors to explore an area without physically being present. Therefore the impact on fragile sites can be minimised.

- Adoption of strategies and standards to ensure that heritage can be preserved for the long-term.

- Special respect for intangible heritage, which is often particularly sensitive and fragile.

Examples

- Monitoring tools (namely remote sensing)

- Digital and 3D restoration techniques

6.4.4 Legal protection

- Adequate attention to legal issues such as intellectual property and privacy and special respect for intangible heritage, which is often particularly sensitive and fragile.

- Adoption of common strategies and standards.

Examples

Protection of intellectual property rights

Merchandising is a form of revenue generation. Often sites have gift shops where visitors can buy items and the profits go back to the site. Often people buy images however if these can be accessed digitally, it can be difficult to maintain copyright. This is a valuable source of income to the cultural heritage site especially in terms of gift shop sales. Therefore copyright management is an important issue. To overcome this, some websites use watermarks on their images, containing copyright details. Visitors have to ask permission of the site owners to access higher quality images (Lopez, 2003).

Safety and security

It has become very important for museums to digitise their objects to help prevent theft. Having digital representations online has been proven to diminish the value of stolen objects in the illicit art trade.

The cost of exhibiting valuable objects is high, especially if the objects have to be transported, due to the insurance costs. Although an increasing number of museums have made significant investments in security and surveillance, theft of valuable objects still remains in existence, which impacts insurance fees. Technology allows objects to be presented but this does not necessarily mean that the real objects must be presented.

Collections accessible to the public by means of searchable databases need password protection to maintain the security and integrity of the collections. Users can be given different levels of access. For example researchers may be allowed to view the collections without the ability to add or edit records (http://www.museumsoftware.com/).

Mobile Museum™ Audit enables the operator to take collection data with them when performing inventories, or checking against damage to or theft of objects
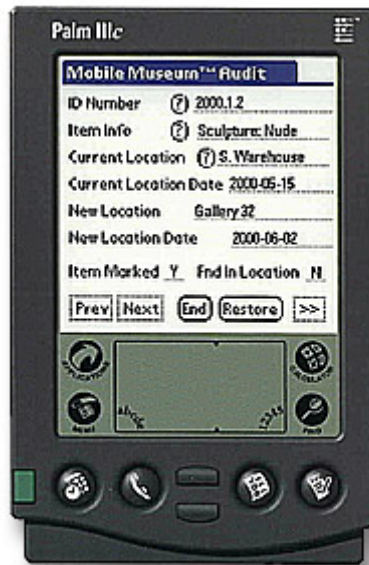
Figure 5 Source: www.willo.com/mimsy/mobile_museum.asp

Other security systems include:

CCTV	Monitors the site to prevent exhibits being stolen or defaced
Magnetic contact	- located on a window or display case if it gets broken the alarm is sounded - Alarm wire attached to a door or window that will be triggered if cut into
Vibration detectors	Set on doors, windows or display cases activated by abnormal levels of vibration
Break glass detectors	Detect patterns of breaking glass, windows display cases or roof lights
Passive infrared sensors	Detect body heat. When heat is detected an alarm goes off
Activity detection sensors	Microwave or ultrasonic sensors detect movement within an area. Can be used with Passive infrared sensors to provide cross checking, backup if one system fails
Database management systems	Store an inventory of items, which the site operator can check against to ensure they are still available

Table 5 Other security systems. Source: Ambrose and Paine (1998)

Other examples are on line databases of stolen objects, and insert of microchips in objects.

6.4.5 Interpretation / Education

- ICT can be used to disseminate Cultural Heritage towards a broad public (including general visitors, visitors with special interests, and experts)

- Need to foster dialogue between cultures.

- Need to assess the IT needs and expectations of the public.

- Need to ensure inclusiveness of all types of visitors (visually and hearing impaired visitors, visitors with limited mobility and those with learning difficulties, etc.)

- Site interpretation must promote the enjoyment of the visitor as well as impart relevant information for understanding the site and its context. This is particularly important for sites or museums used as educational resources.
- ICT should help to raise the visitors' awareness of heritage conservation issues before, during, and after the visit.

Examples

Display and Dissemination

"Even museums and art galleries that are developed to provide educational and cultural enlightenment have recognized that they are in the entertainment business and have arranged their displays accordingly (McKercher and du Cros, 2002 pp 29)"

It is argued that education is a central requirement of the Cultural Heritage visitor. New technologies such as Virtual Reality can enable the visitor to

"effortlessly study and learn while being entertained. In our experience immersive environments have a significant impact on the memorization of information and the contextual linking of entities and meanings discovered in a virtual tour, rendering VR an effective educational tool " (Papaioannou et al, 2003 pp 193).

Sometimes information can be difficult to communicate by words alone. A virtual reconstruction allows the visitor to visualise the exhibit exactly as was intended. This ensures that everybody forms the same impression of the subject (Roussou and Drettakis, 2003).
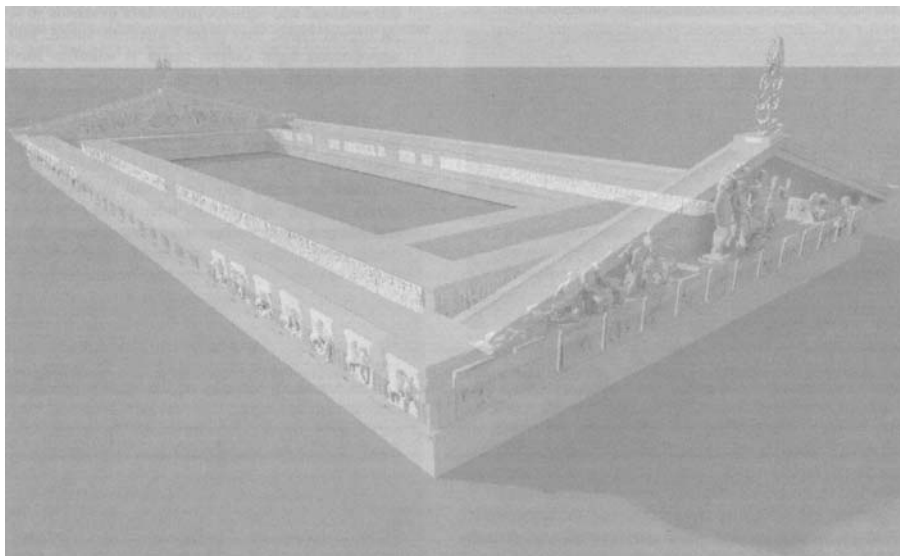
Figure 6 Digital reunification of Parthenon. Source: Stumpfel et al, 2003

Interactive exhibits allow for a hands-on experience and therefore the user becomes 'involved' with the subject under study. Interactive exhibits also allow the visitor to select what information they receive. Therefore the visitor is given control over the information presented to them.

Virtual museums give access to exhibits that are not currently on display in the museum (Tsekleves and Cosmas, 2003). This addresses the problem of "so much to show, so little room" (http://www.xebit.net/)

Digitisation (photographing, or 3D modelling) can reduce problems in displaying: fragile items because the object is not subject to the wear and tear involved in display; or hard to present objects because the best angles to present the exhibit are chosen. (http://www.xebit.net/).

Augmented reality where a virtual model of a subject demonstrating its original form is cut away to show an additional image depicting what it looks like today, helps visitors understand the relationships between how the subject appeared then and now (Ledermann and Schmalstieg, 2003).

Including an audio commentary on a website encourages visitors to stay longer and helps the visually-impaired to navigate around the site. Audio content can be downloaded for visitors to listen to on MP3 players, mobile telephones or PDAs (www.antennaaudio.com). Virtual tours enable the less able-bodied visitors to access areas with reduced accessibility (www.orpheo.org/).

Virtual games featured on websites such as the National Trust (www.nationaltrust.org.uk/) allow information to be disseminated in a fun yet informative way, particularly for children. Furthermore it can also be a means for site managers to generate repeat visits to the website.

Audio guides tell the story by voice, and can involve oral history which is where someone recounts their personal experiences of the subject. Period music and sound effects provide atmosphere to the presentation. Audio tours can comprise different presentations such as director's tours, family programs, foreign languages and special exhibitions. (www.antennaaudio.com)

Mobile multimedia solutions allow audio-visual interpretation on a handheld computer or PDA. Multi-media content such as images, audio, text and video can be accessed directly from the multimedia device. All or part of the content can be stored on a central computer server and sent to the device wirelessly using a wireless local area network (WLAN). Mobile multimedia tours deliver information the information visitors want, where and when they want it. Deaf visitors can view video footage of sign language with subtitles of finger-spelled names and key phrases on handheld computers (www.antennaaudio.com).

Additional capabilities include information-gathering activities such as:

- Gauging visitors reactions and thoughts
- Teachers questions which can then be answered
- Demographic information

Visitors can also communicate with one another:

- Making comments
- Bookmarking favourite exhibits
- Games

Multi-media guides can also provide practical information such as:

- Interactive maps and museum information
- Alerts such as site is closing in 15 minutes, Mr X please meet your party at the exit, fire…
- Wireless devices can track the location of visitors' devices and sound an alarm if they are outside of the tour area (www.antennaaudio.com)

Infrared audio guide systems include the Optima device where visitors can be immersed in a specific atmosphere. Unlike traditional audio guides, Optima is "keypad free" and "hands free" with messages being triggered by infrared transmitters. The Optima system incorporates multimedia technologies and is ideal for exhibitions with an extensive multimedia content (www.rsf-europe.com/).

Audio systems use loudspeakers to create a mood setting. Wide screen video projection or video walls (www.djwillrich.co.uk) and plasma screens (www.electrosonic.com) create dramatic presentations.

Examples of touch screen interactive games include: allowing visitors to buy and sell shares in canal companies, directing a canal boat through a lock. Personalised games based on the 'swipe' card design, each visitor is given their own LabPass on which is entered their personal information. The individual visitor's results from each interactive game fed back to central server using swipe cards. The server adds up and displays the scores (www.djwillrich.co.uk). Other touch screen systems providers include ATS Heritage (www.orpheo.org).

6.4.6 Valorisation enhancement of the values

- Avoidance of unrealistic or exaggerated assessments of the cultural value of sites or artifacts - to emphasise that the object or site and their history have a value independent of their presentation or marketed image.
- Need by European cultural institutions to use digitisation of cultural and scientific heritage as a means of preserving and valorising Europe's collective cultural and scientific patrimony; to safeguard sustainable and environmentally-conscious tourism; to support scientific research; and to contribute to the development of new digital content and service industries.

Exemple

- Digital ressources for commercialisation

6.4.7 Training

- Effective management in the complex and rapidly changing technological environment requires continuous guidance for those creating, acquiring, using, or maintaining digital resources. ICT- related functions and related training needs must then be identified and defined.
- More efficient access to ICT by Cultural Heritage professionals for improving their competencies and related training and coaching. This can be accomplished in steps: recognition of existing resources; dissemination of information; exchange and promotion of collected data and experience.

- On-site training programmes and courses should be developed with the objective of updating and informing heritage and interpretation staff of all levels of recent developments and innovations in the field.

Examples

- E-learning
- Digital supports

Cooperation is a key mission of the museum community. Tools for cooperation, collection sharing, data exchange and even interchangeable visitor entry for example are all needed
- Web catalogues
- Shared archives

CASE Study 2
The Interactive Museum, Greece
Virtual reality systems Kivotos and the Magic Screen, interactive CD ROMs and web pages provide knowledge, movies re enacting the Olympic Games in Greece, journeys of Greeks and well known and not so well known facts on the history of Hellenism, state of the art multimedia demonstration of the role of mathematics in the development of scientific thought, a multimedia exhibition of the Olympic Games.
Source: The Interactive Museum Leaflet produced by Foundation of the Hellenic World

6.5 Needs of Associated Communities

6.5.1 Management

- Open access and the ability to contribute to management systems by representatives of all relevant associated communities.

- Offer of informative and interactive IT services aimed at communication and participation of associated communities (forums, newsletters and Web bulletins, directed to particular user profile groups)

6.5.2 Research (data collection, structure, and analysis)

- Enhanced access to relevant cultural heritage data bases by members of associated communities and interested private heritage groups.

6.5.3 Conservation / Preservation / Restoration

- Public participation in the Environmental Impact Assessment through visualisations and analysis will enable the public to participate in the assessment of cultural heritage resources (Aarhus convent: considering of the use of electronic devices) and in the establishment in conservation / preservation / restoration priorities

6.5.4 Legal protection in relation with ICT

▪ Access to official heritage policy formulation with the opportunity to stress the specific perspectives of associated communities not directly involved in local or national decision making processes.

6.5.5 Interpretation / Education

▪ Need for tools by which the associated communities can provide their own perspective and understanding of heritage resources both to official heritage bodies and outside visitors (web magazines, forum…)

▪ Need for anchoring interpretation technology within the relevant involved communities.

6.5.6 Valorisation (enhancement of the values)

▪ In the planning process of heritage projects, groups and individual members of associated communities should have access to and input in the selection of sites and themes for valorisation in order to enhance the inclusiveness of heritage presentation and valorisation programmes.

▪ Need to better understand local context and issues to enhance more sustainable forms of community development.

6.5.7 Training

▪ Interested members of associated communities should take part in training programmes to familiarise themselves with ICT applications and tools.

▪ Access to information about employment opportunities in site management and education should be made available within local authorities.

▪ On-site training programmes and courses should be developed with the objective of updating and informing associated and host communities of recent developments and innovations in the field.

6.6 Needs of Tourism

Cultural heritage is one of the oldest and most important generators of tourism for Europe. It has been estimated that between 35-70% of international travellers partake in cultural tourism activities (McKercher and du Cros, 2002). This could be as many as 240 million international journeys. Yet the literature on the cultural tourism market is still in its infancy. The ATLAS cultural tourism project (in Richards, 1996) records a steady growth in cultural tourism over the last twenty years. This trend has been attributed to a widening interest in culture and also reflects the growth of the tourism sector. However increased demand from tourists can be seen as a double edge sword to cultural heritage managers. Increased visitation strengthens the case for further conservation activities and boosts financial resources.

However if visitation is left unchecked, it can lead to overuse, inappropriate use, or in some extreme cases, threatens the very survival of the assets.

Tourism is a subsection of visitation and is primarily concerned with domestic and international visitors rather than school / educational visits or local residents.

This section will deal with Interpretation / Education

6.6.1 Guides

Who they are

Guides provide spoken information to visitors regarding the nature of the site, lead crowds through a site and may deliver information on a specialised theme. They are usually self-employed, freelance professionals with a background in archaeology or history.

What they do

Guides may take visitors around a site, museum or art gallery, informing and interpreting exhibits, or they may be stationary and inform visitors about exhibits in one area. They often provide information in a number of different languages.

Guides also serve as custodians preventing the visitors from touching exhibits or taking photographs (Yale, 1997).   They may also provide awareness of conservation issues for example highlighting how fragile exhibits are.

According to Ambrose and Paine (1998) "*the guided tour is the oldest of all interpretation techniques and except in the hands of a very skilful guide is probably the least successful*".

What is their role in the tourism system?

Guides provide information to visitors on the subject of the site. Guides also answer questions in order that the visitor gets the maximum benefit from attending the site.   They can adapt their information provision according to visitor requirements, interests and background.

How can technology support the guides?

Guides can use technologies such as the Internet to promote their services. They can design their own website and / or advertise their services on specialist interest websites such as www.touristguides.co.uk which has been produced by the association of professional tour guides in the UK. Websites can also be accessed in order to gather information to use as material on their tours and in developing new itineraries.

Guides could utilise in-the-ear pieces. This works by the guide speaking into a microphone and this is transferred to earpieces worn by the visitors. Thus the visitor is able to hear the tour guide more clearly and they are not restricted to standing where they can hear/see the guide.

Other technologies that guides can use are portable handheld devices. These act as a source of reference for if further information is required, to ensure that they have given the correct information, and to undertake demonstrations.

Needs of guides

The guide's primary role of disseminating information means that they need to learn and explore the subject before they come into contact with the visitor. Usually guides have a background in a related field, such as history or the arts and often guide in different languages. If the guide works for a company such as a tour operator, they may be required to attend a short training course. The web can be a useful information resource to supplement their knowledge.   Communication is fundamental to guiding. Firstly guides have to be heard. In-the-ear phones avoid guides having to shout. This is especially important at popular sites where many guides may be taking visitors around simultaneously. Technologies can be adapted to presenting information in different languages. Audio visual technologies enable guides to demonstrate a representation of an artefact and show details.   For example ENAME have developed a plasma screen which guides can use to demonstrate the subject.

Guides can use mobile devices during a tour to gain access to further information, to demonstrate a subject visually and also access answers to difficult questions asked by the public.   Therefore technology enables guides to provide a better service to the visitors.

Challenges of technology to guides

The challenges of technology to the guide is that they can be expensive and therefore it is expected that guides who work for firms are more likely to have access to these resources because they have the capital to spend on these devices. Independent guides may not have access to these technologies unless are particularly interested in technological developments.

6.6.2. Visitors

Who they are

There is a general agreement in the literature that there are different types of cultural tourists who can be classified by their motivations to visit a site and the experiences they have whilst there (McKercher and du Cros, 2002; Munsters, 1996; Silberberg, 1995). Dean (1996) identifies three different types of visitor behaviour within a museum.   For the purposes of this report it is believed that these classifications could apply to visitors at monuments and archaeological sites.   Also visitors are likely to display different types of behaviour at different sites. It varies according to their interest in the subject.

	Category	Activity
1.	People who rush through a site and display exit orientated behaviour.	They spend little time closely examining exhibit objects or content. They wish to be seen as partaking in cultural activities, but often do not really appreciate the opportunities afforded them.
2.	Show a genuine interest in museums but do not spend much time reading, especially when text is too difficult or requires too much effort to understand.	Respond to visual stimuli. Objects are the main focus of attention. They absorb superficial information on an object and then move on in search of further stimulus. Attention is sporadically given in museum.
3.	Examine exhibitions with much more attention (Smallest group of visitors).	Willing and able to understand text no matter how technical. They spend a long time in galleries reading the text and labels and closely examine objects. Often frequent visitors to museums and require little enticement to visit.

Table 6 (Source: Dean, 1996)

What they do

Visitors attend the site or museum in order to see sights at first hand. There is something special about seeing an original object. Visitors are in effect saying to themselves (and sometimes others) 'I've done that' as they check it off the list of sights they want to see. Visitors are seeking 'experiences'. For example seeing the original Mona Lisa or visiting a Roman Palace to view a mosaic. It is a commonly held belief by many in the museum industry that visitors do not read labels, will not look at objects, do not change their views and continually look for the exit. However Dean (1996) argues that most visitors are looking for meaningful experiences.   Nevertheless visitors differ in their intentions when visiting a site. Some seek a deeper level of knowledge than others because they are experts in the field, or enthusiasts. Other visitors will visit a museum to cross it off their list, or are sheltering from bad weather.

Visitors may be looking for greater cultural awareness but they will have different perspectives. If they are part of the local community, they might know a great deal about the area, but wish to learn more.   International travellers may have a different cultural perspective than domestic visitors and look for information accordingly.

What is their role in the tourism system?

Visitors utilise the tourism resources that destinations have to offer.   In return visitors are a key source of income for many sites in different ways. They buy souvenirs from gift shops. Some attractions charge an entrance fee. This may be a 'token fee' which may not cover costs (Garrod and Fyall, 2000). In this case the site receives other sources of funding. Some attractions in the UK do not charge an entrance fee, but may ask for donations from visitors. Visitors may then become patrons of the site, donating on a regular basis or by bequeathing a sum of money. Sites are usually funded in some degree by the public purse and therefore are accountable to the public. If they do not justify the service they provide, funding could be reduced or stopped altogether.

How can technology support them?

In terms of interpretation different forms of technology (for example virtual reality, interactivity and touch screens) can 'involve' the visitor in the exhibit. They engage with the subject and learn from the consequences of their choices and actions (Durbin, 1996). For example the image below depicts a virtual reconstruction of Feidias' workshop. The user completes the statue using the virtual tools available.
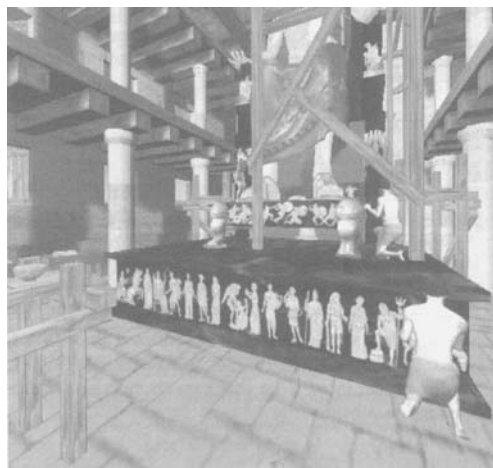

Figure 7 Virtual reconstruction of Feidias' workshop. Source: Papaioannou et al (2003)

People learn more when they are actively involved (Butler and Tanner, 1998). They learn more from experiencing something than from simply reading about it (Edson and Dean 2000).

Furthermore the longer visitors stay in front of a display, the greater the chance they might understand the message it is intended to convey (Miles et al, 1988).

Technology can show additional information that is difficult to describe using words. For example the augmented reality technique gives the visitor a direct comparison of what the site or artefact is thought to have once looked like, with how it looks today.
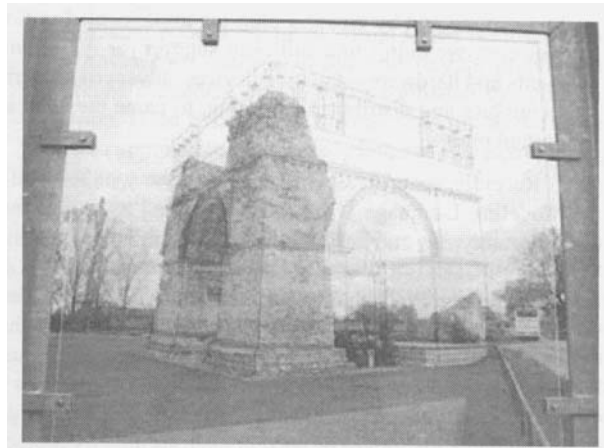
Figure 8 Augmented Reality image of Heidentor ruin, Austria. Source: Ledermann and Schmalsteig, 2003

Visitors can use portable electronic tour guides to acquire further information on exhibits. Recent technological initiatives include wireless devices using location based and personalised information and interactive technologies. In this situation, the presentation is tailored or 'personalised' to the user's own level of interest. Interactivity enables the user to select the information they wish to receive, the amount of information and whether they wish to repeat the information. Therefore interactivity effectively adapts to the visitor's speed of learning.

Visitors can use websites to get the most out of their visit. They can access the website before going to the site to plan their visit and use the website after their visit to supplement their knowledge. Furthermore some websites enable access to the site's catalogue for information and research purposes.

Needs of visitors

Visitors search for information in order to learn about what they see. However their depth of learning varies from individual to individual. Casual visitors require cursory information. Experts or enthusiasts will require more in depth information. An adaptive system should be utilised to manage different levels of demand and provide suitable information. People may visit from all over the world and therefore require information to be provided in different languages and with different cultural perceptions in mind.

Traditional interpretation methods such as exhibit displays, posters etc. require physical space, which is limited supply at the site. Technology can expand the information available to visitors. Objects not on display can be presented using kiosks or the Internet which require limited physical space, but, theoretically limitless information.

Visitors need assistance in order to get to the site and once inside, guidance around the site. Gradually technology is giving visitors more control over how they visit a site. For example the first audio guides played in a continuous loop. Then in displaying numbers by exhibits, visitors were able to select corresponding information. The latest technology involves wireless devices where the content presented adapts to the user's speed of walking round the site, and time spent viewing exhibits of interest.

Challenges of technology to visitors

According to Durbin (1996) not more than 30% of an exhibit audience will want to use computers at a site. This percentage is expected to have increased as the public have become more experienced with using computers. However people do walk past computers, perhaps this is because it requires some degree of effort of learning what is required of them to use the computer programme at the outset. Other people may only wish to view the actual artefacts, not a computer generated image. Wearable computing and location based services will enable the provision of flexible information in a natural environment.

Visitors may be reluctant to wear head mounted or hearing devices given out by guides because they are not used to them. This problem should be reduced over time as they become more commonplace.

Visitors are becoming more experienced travellers and today often compare sites with the best they have experienced in the world. Furthermore they often compare from their experience of other establishments that cater for leisure needs. If the comparison is unfavourable, i.e. there is too little technology (or too much), or the visitors do not find the technology to be useful, then they will be disappointed. This may result in the visitor not returning and spreading bad word of mouth publicity to other potential visitors.

6.6.3 Inbound operators

Who they are

Based in the country that the tourist is visiting, inbound operators represent the outbound tour operator in dealings with principals, tourists and local authorities. They develop tourism itineraries, organise and conduct sightseeing trips of local tours and provide interpretation in the language of the visitor. They are often coach operators. Most inbound operators are small to medium sized enterprises (Buhalis, 2001).

What they do

Inbound operators oversee the execution of tour packages at destination level. Their role encompasses hotel transfers, overnight accommodation, sightseeing and special arrangements and oversee the service that suppliers give. They often have exclusive right with tour operators to arrange sightseeing tours, which is a major generator of income for them.

What is their role in the tourism system?

Inbound operators undertake all the jobs that can be commissioned at the destination. They take on the responsibility of identification, negotiation contract and reservation of tourism products at destinations. Sightseeing trips give the visitor a sample of the destination's sights and sounds.

Cultural heritage is a primary source of material for sightseeing tours. Inbound operators play a key role in shaping the visitor's experience. For inbound operators decide which sites to include in their package tours, which are often the only source that visitors choose from. Inbound operators have an additional influence in that they select the information presented to visitors during the trips.

How can technology support them?

Inbound operators need to use technology to communicate with visitors and business clients. This is especially relevant to an inbound operator as outbound operators are in dispersed locations. Technology can reduce communication costs. Other businesses such as local tourism providers are thought to be numerous and therefore the Internet especially email can facilitate communication and co-ordinate delivery at the destination.

Inbound operators could utilise the web to gain local knowledge of the suppliers in their area such as attraction providers. Thus the web could assist in identifying and bundling local tourism products and also for itinerary development.

McKercher and du Cros (2002) state that often the knowledge of the tour guide is often limited. Inbound operators could utilise the web to research information on the subject of the tour and local attractions. This can be channelled to the tour guide who presents the information to the visitor.

Needs of inbound operator

Inbound operators need to be aware of the products that are available in the market and one of the places to acquire this information would be the web. They could also promote their services using this medium.

Challenges of technology to inbound operator

Challenges to the inbound operator are that resources are scarce in tourism and therefore inbound operators have to be sure that the capital outlay will generate a return.

Also inbound operators will have to prevent as much as possible investing in outdated technology or technology that is not compatible with other systems. Inbound operators must follow technical standards development to ensure that they are investing in technology that will not become obsolete.

6.6.4 Outbound tour operators

Who they are

Outbound tour operators range from large mass tourism operators, to smaller specialised tour operators. Large mass tourism operators use their purchasing power to function on a high volume, low margin business and supply the mass market. Smaller tour operators concentrate on niche areas and aim for producing a quality product.

What they do

Outbound operators amalgamate tourism products and develop packages that are sold to visitors from their country of origin. This includes combining at least two tourism elements usually accommodation and transport with other services (Yale, 2001) such as foreign currency, sightseeing trips or insurance as desired by the tourist.

What is their role in the tourism system?

The role of the tour operator is to pre book, and or pre-purchase separate tourism elements and combine them into a package, which they then sell onto customers, either through intermediaries or directly to customers. The tour operator buys in bulk securing discounts that would not normally be given to the customer if they purchased direct (Holloway, 1994). Increasingly tour operators are becoming wholesalers buying and selling in bulk and even producing individualised products.

How can technology support them?

Outbound operators can also use the web as a means of researching information on the destination for example historical, cultural, religious facts, which is then incorporated into the information outbound operators present to their customers on their website or other promotional literature. Thus providing an enhanced service to the customer. The web could also be used as a means of gaining competitor information. For example determining new product areas their competitors are developing.

Outbound operators can utilise websites to promote their business and source potential suppliers such as attractions who are operating in the area of interest. New products can be developed and are bundled into packages to sell to their clients.

The Internet could also be used to communicate with their suppliers, especially using email and perhaps intranets. Technology enables greater co-ordination of service delivery at the destination.

Needs of the outbound operator

There has been a great deal of consolidation within the tourism industry, with firms that span many countries and technology is used as a backbone to co-ordinate the tourism product. Due to the numbers of suppliers that outbound operators deal with, they need technology in order to assemble products and co-ordinate with their suppliers and those who are selling the products on their behalf.

Challenges of technology to the outbound operator

The Internet threatens to act as a substitute for the tour operator for now customers have the tools to package holiday items themselves. However technology also provides opportunities for the outbound operator as it prolongs the time span with which tourism products can be sold (Kärcher, 1997).

Competition between tour operators is fierce. Therefore the provider has to be sure that the capital outlay will generate a return.

Outbound operators will have to prevent as much as possible investing in outdated technology or technology that is not compatible with other systems. Outbound operators must follow technical standards development to ensure that they are investing in technology that does not become obsolete.

6.6.5 Tourism Information Centres (TICs) / Destination Management Organisations (DMOs) / Local Authorities

Who they are

TICs provide a network of tourism information points situated at transport terminals and popular tourism destinations. DMOs are responsible for promoting the destination and local authorities have tourism departments which concentrate on developing tourism in their region.

<u>What they do</u>

The TIC assists the traveller by supplying tourism information and advice, often making reservations and bookings on behalf of travellers. DMOs and local authorities generate tourism information in order to attract visitors to an area. The difference between these organisations is that TICs specialise in delivering information to the visitor whether at the destination or preparing for a trip. Local authorities are concerned with business and regional development. DMOs concentrate in promoting tourism businesses primarily using technology.

<u>What is their role in the tourism system?</u>

TICs provide a focal point of tourism activity and a network of establishments that visitors can attend to gather tourism information. TICs assist the visitor in orientation and diffusion in the tourism area. The poorly informed visitor contributes to traffic congestion and overcrowding because of a lack of knowledge about where to go (Cooper et al, 2000). The information that TICs produce is designed to attract visitors to an area and encourage greater consumption within the region. They also provide a link to attractions outside their destination.

A key role of the TIC is to promote Small to Medium Sized Enterprises (SMEs) who often do not have financial and personnel resources to perform this function individually. Also they aim to provide unbiased information.

DMOs and local authorities also aim to promote the tourism region, assist in visitor orientation and diffusion in the tourism area and encourage greater consumption of tourism resources. However they are not in such direct contact with visitors as TIC staff.

<u>How can technology support them?</u>

TICs use websites to promote cultural heritage attractions to draw visitors to the area. TIC staff enter a description of tourism products into a Destination Management System (DMS) in order to have a comprehensive information source to be used by both themselves and the tourists.

Kiosks that present tourism information can be used to enhance the service provided by the TIC, for they allow the visitor to search and retrieve information within the TIC if the staff member is busy serving someone else. They are also placed at key locations such as airports or hotels for self- service.

DMOs are responsible for developing DMSs which can be accessed by visitors and tourism staff alike. Local authorities use websites to entice potential visitors by promoting tourism businesses within the region.

<u>Needs of TICs, DMOs and Local Authorities</u>

The TIC and DMO compile tourist information for visitors to an area. Their aims are to ensure that they provide a comprehensive and up to date information service to visitors in order to facilitate bookings.

TICs, DMOs and Local Authorities need to be connected with tourism suppliers in order to gather information on tourism businesses to promote to visitors.

<u>Challenges of technology to TICs, DMOs and local authorities</u>

The challenge of technology to tourist offices and local authorities is that they are publicly funded (O'Connor, 2000) and therefore have to justify expenditure on IT. They find it difficult to adapt and modernise their past. It is likely that other sectors of the tourism industry will adopt technologies before they do. DMOs are privately funded however they will be cautious about investing in technologies that do not generate a viable return.

TICs will have to prevent as much as possible investing in outdated technology or technology that is not compatible with other systems. They must follow technical standards development to ensure that they are investing in technology that others are using.

6.7 Needs of Educational Entities

E-learning is a rapidly developing area, which has the potential to change methods of both teaching and learning. Cultural Heritage is already engaged (though in extremely fragmented and diversified ways) in creating e-learning programmes (from content creation to delivery system) and in studying the relationship between formal, informal and lifelong learning and the relationship between individual learners and organisations.

Education is formulated by competences in which knowledge, insights, skills and attitudes are related. It implies some shifts or evolutions in learning, such as:

- From specialisation to general training;

- From abstract knowledge to applied knowledge;

- From cognitive learning to harmonious learning;

- From specialised subjects to comprehensive education;

- From sequential learning to illustrative learning;

- From short-team learning to long-term learning.

Education is situated in 3 fields of development:

- The nucleus or basis development: positive self-image, motivation, and initiative;

- General development: communication, cooperation, autonomy, creativity, problem-solving, planning, and organising;

- Specific development: several study areas.

An important development in this domain is a shift from traditional learning to so-called 'new learning'. Traditional learning is based on the idea that adults know how reality works (a world divided in well-known parts, a clear idea of what is right and what is wrong, a world that is transparent and clear, in which everybody knows his place). In this perspective, children are 'consumers of knowledge'. Yet new learning is based on the idea that children have to produce their own knowledge and meanings, that they are 'producers of knowledge', who learn with and from reality. In this different approach to education, it is crucial that schools encourage children to learn how to formulate their questions rather than passively accept information.

There is a need for an integrated approach that creates useful links between local, national and international educational networks trying to synthesize, co-operate and implement mutual learning paths. Each network must be relevant and built up in a structured way.

6.7.1 Management

- Close collaboration and communication between learners, teachers, cultural content providers, policymakers and technology provider is crucial.

6.7.2 Research (data collection, structure, and analysis)

- Relationship between heritage education programmes and students performance in related discipline (history, science, art, etc.)

6.7.3 Conservation / Preservation / Restoration

- Technology can provide educators with more detailed information about conservation procedures and standards, useful for educational programmes.

6.7.4 Legal protection in relation with ICT

- Relevant for university level students in research is access to information on the wider legal and policy aspects of their work. This information should also be made available in the formation of curricula of all cultural heritage courses.

6.7. 5 Interpretation / Education

- Need for educational institutes to use the cultural heritage in their programs.
- Need to introduce digital tools to the class rooms. Ideally both cultural heritage and digitisation should be combined to give purpose to the use of digital tools and to enhance the attraction of cultural heritage for younger generations.
- Need to implement compatible standards for Cultural Heritage and education.
- Need to accompany the digital content with lesson plans, concrete teaching tips and pedagogical guidelines, fitting into the national curriculum, by taking into account all aspects such as technology, content, and pedagogy.
- Need to encourage and facilitate direct and active participation from student visitors.
- Informal learning should target the learning content to the specific needs, interests and pre-requisite knowledge of the individuals.
- Need for a democratic interactive open learning centre.
- Interactive systems should allow students to explore the past, experience it and reflect about it, as well as stimulate interest and learning.
- Need to enhance access for pupils of all ages, social contexts, physical and intellectual backgrounds - Need to assess multi-cultural interpretation and access.
- Need for efficient and effective multimedia presentations in the field of education without introducing information overload.

- For systems to be implemented successfully in an educational environment it is important to have a didactical background, which allows teachers to map and evaluate the progress of the pupils. Not all the systems available today can provide this background and implementation is not always successful.

- Therefore there is a need for digital systems with a didactical background. Although cultural heritage is an important subject, these systems should preferably also be suited to different subjects.

- Although teachers can relate to the general history of a region, the specific history of a town or a region and its cultural heritage assets is something completely different. The knowledge of local history is the domain of local historical societies and organisations. Systems that facilitate in the co-operation between schools and local heritage experts would greatly help the implementation of local cultural heritage in the educational system.

- Any system implemented in a school environment should be user friendly. Children should be able to help themselves, without interference of the teacher. The systems should be used to teach about a subject, it should be prevented that the teacher must instruct the children about the system. In other words: implementation of IT technology in an educational environment means: use to learn, not learn to use!

Example

In the CHIMER (Children's Heritage Interactive Models for Evolving Repositories) project we have seen the potential of the use of high-tech digital tools for new ways of cultural heritage education. Children were clearly captivated by being able to use the high-tech gadgets and by providing cultural heritage objects as subjects for documentation were clearly involved in their local history. http://www.chimer.org/

6.7.6 Valorisation (enhancement of the values)

- Need to engage in cross-curricular activities that go beyond the traditional confines of the subject, school, region and even country (promoting European Citizenship)

- Need to gain more insight in and access to the collections that are available by digitalisation of content and by virtual site visits.

- Websites should enable educational opportunities such as allowing the visitor to search catalogues remotely and present exhibits not currently on display in the museum.

6.7.7 Training

- Need for relevant and practical information and pedagogical advice to support less experienced users.

6.8 Needs of Technology

▪ Need to work in multi- and interdisciplinary ways alongside standard research activities (from the fieldwork to the lab and vice versa). The entire process of diagnosis, knowledge, preservation, interpretation and communication of Cultural Heritage must be linked.

▪ Need for a framework to guarantee interoperability among existing systems and facilitate data reuse.

▪ Need for more extensive knowledge sharing between cultural heritage professionals and technical providers.

▪ Need to encourage an open source approach.

▪ Need for sustainability in regard to the accelerating progress of technology (with its problems of rapid obsolescence and associated risk of losing the technological means to read the archived material)

▪ Need to develop appropriate 'front-end strategies' for technological systems and platforms.

▪ Need to get share information on new Virtual Reality systems among interdisciplinary teams, not just technicians or computer scientists. These interdisciplinary teams should study the process of memory transmission from different points of view.

▪ Need to maintain international standards.

▪ Need for robust technology and the development of devices whose durability is adequate for widespread use.

▪ Need to develop opportunities/mechanisms for the wider dissemination/sharing of good practices along with policies and strategies leading to enhanced standards of performance and professionalism in meeting stakeholder needs.

6.8.1 Management

▪ Need for maintenance.

▪ Need for continuous monitoring and on-site and remote support for rectifying problems quickly and effectively.

▪ Need to include public feedback and impact studies

▪ Need to make CHIAs more effective for users. The issue of usability has been poorly acknowledged and evaluated by CHIAs so far.

▪ Need to adapt existing evaluations methodologies to the need of CHIAs, taking into account their goals, their functionalities, their user profiles and their usage scenarios. The specific result should be a CHIA-usability evaluation package.

▪ Need to update information (website, etc.)

6.8.2 Research (data collection, structure, and analysis)

- Easily accessible and understandable information sources for Cultural Heritage.

- Overview of the Cultural Heritage digital resources.

- Need for the creation of a documented pipeline from source to presentation to improve data storage and data structuring.

- Attention to safeguarding scientific accuracy, by making a clear distinction between fact and hypothesis.

- Development of an appropriate integration framework for exploiting all available information sources.

- Development of better methodologies to assess digitisation quality at the scanning stage and to reduce this quality to the appropriate level for alternative uses.

- Design of standards for documentation in terms of the digitisation of historic documents/maps/photographs—especially three dimensional scanning of artefacts and buildings (documentation of portable artefacts via databases are well defined)

- Online access to cultural archives and intelligent agents to facilitate the collection of geographically dispersed information.

- Data structures that contain multiple domain information, created by a multitude of researchers, physically present at different locations.

- Need for new sources of information (i.e. new technologies like automatic processing of satellite images, GPS surveying, 3D scanning, etc.)

- Need for new access paradigms; current interface of CHIAs (Cultural Heritage Interactive Applications) and software architecture are mainly based upon "search" and "search refinement" mechanisms. Other access paradigms are seldom and occasionally employed (e.g. navigation, browsing, and semantic linking)

- Need for multiple access using several channels for accessing CHIAs (interoperability across channels)

- Need for sustainability in terms of the longevity of the technology and information concerning re-recording.

6.8.3 Conservation / Preservation / Restoration

- Need for additional research to make the digital restoration and interpretation widely applicable.

6.8.4 Legal protection in relation with ICT

- Provision of clear information on sources (copyright)

- Need to understand how to establish criteria for authenticity of digitised Cultural Heritage and development of appropriate policies and strategies to meet needs.

- Need to develop standards regarding the clear indication/communication of where technology is delivering or enhancing an authentic "artefact" and where it is not.

- Need for a digital certificate of the originating institution for digitised documents.

- Controlled access to digital archives, digital signatures and watermarking techniques, which can possibly be used together with other appropriate metadata descriptions that could be suitable for digital archives.

6.8.5 Interpretation / Education

- Need to understand the policies and strategies (towards access) of the organisations/ institutions from which collections are digitized.

- Need for long life cycle, adaptable and open interpretation systems.

- Need to build a set of innovative interface styles (for CHIAs) demonstrating new ideas and prototypes implementing innovative access paradigms.

- Need for considering interpretation and presentation from the very first stages of excavation or restoration onwards, using a wide range of sources (oral, written, research, local traditions), to create truly multidisciplinary study.

- Need for effective integration of ICT on-site.

- Demand for an affordable and easy content management system as the kernel of interpretation systems (creation and integration of CMS – Content Management System)

- Need for a new generation of presentation systems that deal with multifaceted, multiview, multiperiod data in a natural way and easy to construct and maintain.

- Need for research in the field of user modelling. Usability labs should be established for Cultural Heritage related technology.

6.8.6 Valorisation (enhancement of the values)

- Need to enhance multi-channel and multi-level presentations as well as cost and benefice analysis and pricing.

6.8.7 Training

- Need by Cultural Heritage institutions for new professionals in new fields with new skills on digital content creation, communication, and computer interfaces creation.

- Need for appropriate lifelong learning processes for Cultural Heritage professionals.

VII. Preliminary Conclusions

- The EPOCH Network and its researchers should be guided by the international conventions and charters on cultural heritage and allow the Cultural Heritage professionals to pilot the ICT projects. Parallel to the establishment of common technical standards, it is as important to observe the existing code of professional ethics.

- Cultural Heritage needs ICT that can be easily implemented. Although research almost by definition seeks out the more sophisticated problems, we encourage the technology community to look for simple and elegant 'grand challenges' that can be implemented easily and economically.

- The very first priority should be to lower the cost of digitisation. This is essential for the cultural institutions, given their lack of resources. This also could open new markets for ICT firms. Moreover, for sustainability purpose, it is necessary to provide open source software.

  - EPOCH needs to focus on how to keep the costs and risks of digital heritage technologies/resources/services manageable for Cultural Heritage institutions. The day to day operation of an installation and its updating are in practice more important than the initial implementation.

  - Long term access to software and hardware is essential. Free and open digital tools are of the highest importance to allow all the sites, especially the small-medium size institutions, to be creative in ICT implementation.

  - "... It seems likely that the digital surroundings will develop much faster that the cultural sector can adopt and employ them".

  - "Given the institutions "trilemma" of lack of funds, lack of human resources, lack of technical skills, there is little likelihood of small to medium-size institutions being able to participate in research and technological development projects, new prototypes applications and systems"

  - "When it comes to adopting, implementing and using ICT, size obviously matters. Small-medium size institutions are not able to match the large ones".

  - One essential aim of the EPOCH project should be to lower the costs of ICT, through "a stronger framework of international standardisation regarding compatibility of data and presentation tools".

- With reference to the Research Agenda that has been recently proposed at EPOCH's Heverlee 'Research Agenda' meeting, priority should go to a bottom up approach, starting with data collection and processing. The "pipeline" approach is quite appropriate, since it shows clearly the successive steps of any ICT development:

  - Research

  - Data collecting and processing

  - Digitisation

  - Technology research for Cultural Heritage must be driven by demand, and not supply. This implies training and cooperation first.

- We cannot overemphasize the importance of training and better information about technology for the cultural heritage community as a first step to building better bridges and bringing advanced technology to the problems of heritage.

  - Information and training sessions should be organised, within the EPOCH project or elsewhere, either at universities or in the field. "There will over the coming years be an increasing demand for supportive digital services centres and ICT training programmes".

- EPOCH must be an open network if it is to succeed:

  - Open **in *time*** (it should be open to new partners as new actors and priorities are identified)

  - Open **in *space*** (it should be open to partners outside of Europe) This also means that, for the purpose of research integration, the various European laboratories should be invited to work together in **open new calls of proposals**.

- Information Communication Technologies affect most functions in cultural heritage tourism, yet according to Sigala (2003) there has been little research into the interaction between cultural heritage tourism ICT and visitor experiences. This has resulted in little knowledge of how to use ICT tools to enhance the service provided to visitors of cultural heritage attractions

- As important as the technology is the data itself. Heritage has survived through the ages yet the data we are capturing about it in digital form is in serious jeopardy. EPOCH needs to focus as much on data sustainability as the software/hardware.

- A preliminary survey of regional and local authorities has found that "for small and medium size institutions, the benefit of most current and future ICT will need to be realised within national and regional initiatives".

- Without more concrete examples it was very hard for them to prioritize the technologies. In the next phase of this Work Package a more in depth analysis and prioritization of the needs of heritage professionals will be undertaken, i.e. through focused sessions where ICT experts could show a diverse suite of future scenarios and CH professionals could offer their feedback and input.

7.1 Guiding principles and values

The Technology needs of all stakeholders in all cultural heritage domains can be seen to reflect the general objectives expressed in the ICOMOS Ename Charter on the Interpretation of Cultural Heritage Sites, currently under review. This charter seeks to establish principles of cultural heritage interpretation in order to:

- **Facilitate understanding and appreciation** of cultural heritage sites and foster public awareness of the need for their conservation.

- **Communicate the meaning** of cultural heritage sites through careful, documentation of information and dissemination of information about their significance, including their tangible and intangible values, natural and cultural setting, social context, and physical fabric.

- **Respect the authenticity** of cultural heritage sites, by documenting and disseminating their natural and cultural values and the threats to their conservation.

- **Contribute to the sustainable conservation** of cultural heritage resources, through non-intrusive presentation methods, effective financial planning and the encouragement of environmentally sensitive economic activities that safeguard conservation efforts, enhance the quality of life of the host community, and ensure long-term maintenance and updating of the interpretive infrastructure.

- **Ensure inclusiveness** in the management and presentation of cultural heritage sites, by facilitating the involvement of all stakeholders and associated communities in the development and implementation planning.

- **Develop technical and professional standards** for the use of technology in the entire cultural heritage process. These technological standards must be appropriate and sustainable in their social contexts.

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Appendix 1

1. Tourism

The origins of leisure tourism can be traced back to the Babylonian and Egyptian empires. In 6th century BC a museum of historic antiquities was open to the public in Babylon. Whilst Egyptians held religious festivals that attracted not only the religious, but also people who wanted to see the well known buildings and works of art. From about the same time and notably from 3rd Century BC Greek, tourists travelled to visit sites of the healing gods (Holloway, 1998).

The origin of the term *'tourism'* is commonly attributed to the Grand Tour which originated in Britain during the 17th century (Richards, 1996). The first Grand Tourists were aristocrats who sought to augment their classical education. During the 1780s the professional middle classes began taking Grand Tours. They could choose between taking a Classical Grand Tour which concentrated on the culture of the ancient classical world and the Renaissance, or a Romantic Grand Tour which focused on romantic views of urban and rural scenery. Thus the emphasis of the Grand Tour had begun to shift away from education, to pleasure and entertainment.

The word 'museum' was first used in 15th century Florence. At first the idea of a museum was to view collector's items. Over time the approach evolved to where objects are presented within their context. Thus the definition of a museum has modified over time. One of the first public museums of note in the UK was the Ashmolean Museum, which opened in 1683. However it was not until the 18th Century that artefacts began to be collected from all around the world to be displayed at museums (Richards, 1996).

2. Cultural tourism

As explained above cultural tourism is not a new concept, indeed it has been taking place for centuries. However it was only recognised as a distinct form of tourism in the late 1970s (McKercher and du Cros, 2002). Although cultural tourism can be viewed as a niche market in the sense that tourists can choose sightseeing as opposed to beach holidays. It is expected that many more trips involve some level of cultural tourism. For example some people who purchase beach holidays take day trips to visit local attractions.

According to the American chapter of ICOMOS (1996) "*cultural tourism as a name means many things to many people and herein lies its strength and its weaknesses*". This has resulted in many definitions of the term *cultural tourism.* Yet McKercher and du Cros (2002) believe that the literature on the cultural tourism market is still in its infancy.

Silbergerg (1995) defines *cultural tourism* as:

"*Visits by persons from outside the host community motivated wholly or in part by interest in the historical, artistic, scientific or lifestyle / heritage offerings of a community, region, group or institution*".

In view of what was found in section 2.1 that culture seems to involve *expressions* of how we live. This definition could be revised to:

"*Visits by persons from outside the host community motivated wholly or in part by interest in the historical, artistic, scientific or lifestyle / heritage* **expressions** *of a community, region, group or institution*".

Richards (1996) believes that the desire to learn is what all cultural tourists have in common. Prentice (2001) perceives *cultural tourism* to be 'experiential' that is, people accumulate experiences rather than knowledge. They are looking for insight than formal learning. This falls in line with authors who question the extent that visitors really *learn*. In other words to what extent do they remember the information presented to them? This may be affected by for example the level of interest in the subject on display.

Those who are strongly motivated to seek out cultural education may be expected to make more of a conscious effort to learn than those who visit a cultural attraction on the spur of the moment (Silberberg, 1995; Munsters, 1996; and McKercher and du Cros, 2002).

The concept of visitors' learning can also be thought of in terms of *time*. It would be a mistake to equate length of visit with amount of learning. This is because some visitors actively target what they would like to see. They may take great trouble in retaining the information. In contrast another visitor could spend the whole day at a museum and not learn very much at all.

Furthermore in terms of time well-intentioned visitors, who have consciously retained what they have learnt from the establishment in the short term, may be inclined to forget, or be less sure of what they have learnt over a longer period of time.

International *cultural tourism* is increasing and is driven by the desire to see how others live their lives, or have lived their lives. People travel to gain insight into the cultures of others, but may also reflect on their own culture. According to Bachleitner and Zins another driver for cultural tourism is prestige (1999) "*In the age of mass tourism, culture is one of the few remaining sources where a visitor can still claim prestige socially*". Bachleitner and Zins are addressing the fact that it is no longer a source of prestige for a person to say they are going on holiday. However cultural tourism is still a source of prestige because the visitor is showing their friends, family and themselves that they are interested in educating themselves.

A key motivator in undertaking *Cultural tourism* is to see how others live their lives. However the extent to which they learn depends on individual circumstances.

3. Heritage tourism

Yale (1997) defines *Heritage Tourism* as "*tourism centred on what we have inherited which can be anything from historic buildings, to art works, to beautiful scenery*". Garrod and Fyall (2000) acknowledge the notion of *inheritance* as a central theme in heritage tourism literature. However they also identify sustainable development as a key, yet under researched concept in the heritage tourism sector.

According to Pearce (1992) [sustainable development is] "*a process which ensures that we pass onto the next generation a stock of [natural and built] capital assets no less than the stock we have now*". If sustainability is taken to the extreme and each generation does not use heritage *assets* because they are conserving them for future generations, they cannot fully appreciate their heritage.

Garrod and Fyall's research (2000) found that in practice, the mission of heritage establishments closely related to principles of sustainability.

Poria et al (2001) argue that *Heritage Tourism* is not necessarily about specific site attributes, but should focus on the tourist's motivations and perceptions. They define heritage tourism as *"a subgroup of tourism, in which the main motivation for visiting a site is based on the place's heritage characteristics according to the tourists' perception of their own heritage".*

Garrod and Fyall (2001) agree with Poria et al (2001) that tourism researchers tend to adopt definitions of *heritage tourism* that relate to site *attributes*. However they did not actually employ a definition of heritage tourism in order to allow the respondents to explore their own perceptions of sustainability. They then dispute Poria et al's (2001) definition of *heritage tourism*, with the view that it has been defined from the demand side (the visitors) when it should incorporate supply – in other words heritage tourism experiences.

In Garrod and Fyall's (2001) view there is a danger of spending too much time developing definitions to the detriment of what it signifies in practice. In their research, imposing definitions would have been to the detriment of their study.

A literature search undertaken by Poria et al (2003) resulted in identifying two main approaches (rather than definitions) to *Heritage Tourism*. The first and most frequent is to regard it as "tourism in places categorised as heritage or historic places". The second approach is centred on the "contents of a place". In their view heritage tourism is related to demand rather than to the artefacts presented. They investigated whether there is a relationship between tourists, their perceptions and their behaviour. They found that were "... *differences between heritage tourists and tourists at heritage places*" (Poria et al, 2003 pp 249). They found that there were differences between tourists based on their perceptions which led to differences in behaviour. There seems to be a general agreement that inheritance is a key concept in heritage tourism. However visitor perceptions of a site and its heritage attributes and the notion of sustaining heritage assets are important factors in heritage tourism research. The difference between *cultural tourism* and *heritage tourism* is that visitors want to experience the **expression** of another culture (cultural tourism). They wish to view assets that have (or can be) **passed from generation to generation**. Visitors can be cultural tourists and heritage tourists at the same site.
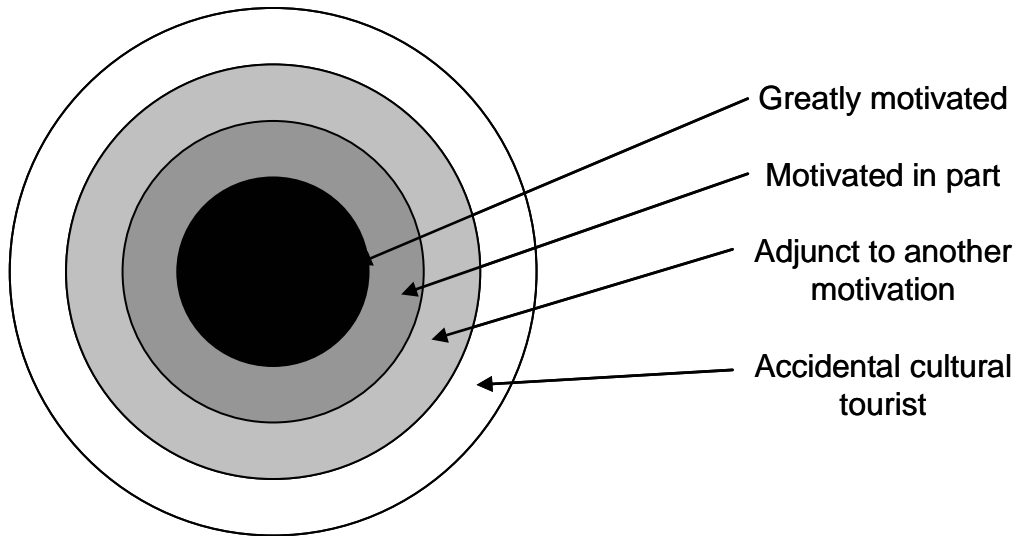
4. Determining classifications of cultural tourists
McKercher and du Cros (2002) identify five types of cultural tourist:

Cultural visitor type	Intention to visit
Purposeful cultural tourist	Cultural tourism is the primary motive for visiting a destination and the individual has a deep cultural experience.
Sightseeing cultural tourist	Cultural tourism is a primary or major reason for visiting a destination but the experience is more shallow.
Serendipitous cultural tourist	A tourist who does not travel for cultural tourism reasons, but who, after participating, ends up having a deep cultural tourism experience.
Casual cultural tourist	Cultural tourism is a weak motive for visiting a destination, and the resultant experience is more shallow.
Incidental cultural tourist	This tourist does not travel for cultural tourism reasons but nonetheless participates in some activities and has shallow experiences

Table 7 types of cultural tourist as defined by McKercher and du Cros (2002)

Silberberg (1995) identifies four types of cultural tourist:

Cultural visitor type	Intention to visit
Greatly motivated	People who travel to a city specifically because of its theatre opportunities, museums and cultural festivals.
Motivated in part	People who travel because of cultural opportunities and for example to visit friends or relatives
Culture is adjunct to another motivation	The main motivation for visiting the city might be non-cultural but while there visitors will plan to include cultural opportunities
Accidental cultural tourist	People travelling to a city who do not intend to go to a cultural attraction or event but find for example that friends or relatives they have visited take them along or the cultural opportunity is close to the hotel. Attendance is not planned, but is accidental

Table 8 types of cultural tourist as defined by Silberberg (1995)

5. The significance of monuments, archaeological sites and museums for tourism

According to Rojek (1997) visitors of all cultures want to go and view extraordinary sites. Thus ancient monuments and archaeological sites often become tourist attractions in their own right. New sites and finds are still coming to light, even to the present day. Objects of significance are removed from an excavation site, and added to museum collections.

There is a growing interest in cultural tourism with estimates of between 35-70% of international leisure travellers partaking in cultural tourism activities (McKercher and du Cros, 2002). Although the level of involvement in cultural tourism varies from tourist to tourist and from trip to trip.

Europe has always been regarded as a key destination for culture and works of art (Richards, 2002 and Bonfigli et al, 2004). Therefore cultural tourism is very important for Europe and is a growth market.

Furthermore the tourism industry has identified that some holidaymakers are suffering from "beach boredom" and are seeking education and experiences from the destinations in which they are staying. Cultural heritage tourism caters for this need.

Poon (1993) calls this trend "*New tourism*". "*Old tourism*" consisted of nervous groups of tourists who preferred to travel en masse. Travel was a novelty to them. It did not matter where they went, so long as they could tell others where they had been. "*New tourists*" are more experienced travellers, who demand better quality and better value for money. They demand variety, choice and individuality. They want to do more than just sit in the sun. However even to the present day there are still large numbers of people who purchase beach holidays. In theory people may decide to do old tourism i.e. a beach holiday, one year and new tourism the next. Therefore it would be not be correct to assume that old tourism is dying out.

In addition to changes in consumer preference, demographics are also affecting tourism patterns. The population is ageing, household size is decreasing and there is more income available per household. People's lifestyles are changing due to flexible working hours and more free time. People are taking shorter and more frequent breaks. These lifestyle changes create suitable conditions for cultural heritage tourism.

6. The structure of the tourism system and cultural heritage

Cultural heritage tourism is undertaken by both domestic and international visitors. It can vary from a visit to a local museum, to a tailor-made trip to explore the archaeological sites of Egypt for example. To best appreciate the role of cultural heritage in tourism, the ICT requirements for information seeking and purchasing of travel from the demand side and the promotion and attraction of tourism from the supply side, an analysis of the industry is provided.

From the tourism demand side cultural heritage acts as a motivator or *Attraction* within the tourism system. An appreciation of the entire system should enable all stakeholders to understand the factors that determine visitation to cultural heritage sites as well as factors that will determine customer satisfaction and successful organisation of travel experiences.

Figure 1 depicts the structure of the tourism system adapted from Leiper (1990), Cooper et al (2000) and Buhalis (2003). Leiper's model features three regions: the traveller generating region, the transit route region and the tourist destination region.

The **traveller generating region** depicts the place where the tourist's journey begins and ends. It is within this region that the tourist searches for information in order to choose and purchase their packaged, or self -assembled holiday.

The **transit route region** represents the period of travel where the incumbent feels they have left home, but have not yet reached their destination. The transit route region encompasses the intermediate places the visitor must travel through in order to reach the destination. This also includes places visited en route.

The transit route region also symbolises the bridge between the place of origin and the destination. Therefore it includes the intermediation system; including tour operators; travel agencies; tourism information centres and other intermediaries that provide destination information and facilitate reservations including the wide range of Information Communication Technologies that facilitate this process.

The transit route region also includes the transportation system that facilitates the physical movement of people from the place of origin to the destination and back.

The **tourist destination region** is the place where the tourist chooses to visit. Destinations consist of an amalgam of resources, facilities and services: resources include attractions etc.; facilities comprise hotels, restaurants etc; and services include tourist information centres, currency exchange etc. Together these form the total tourism product.

Figure 2 The Tourism System
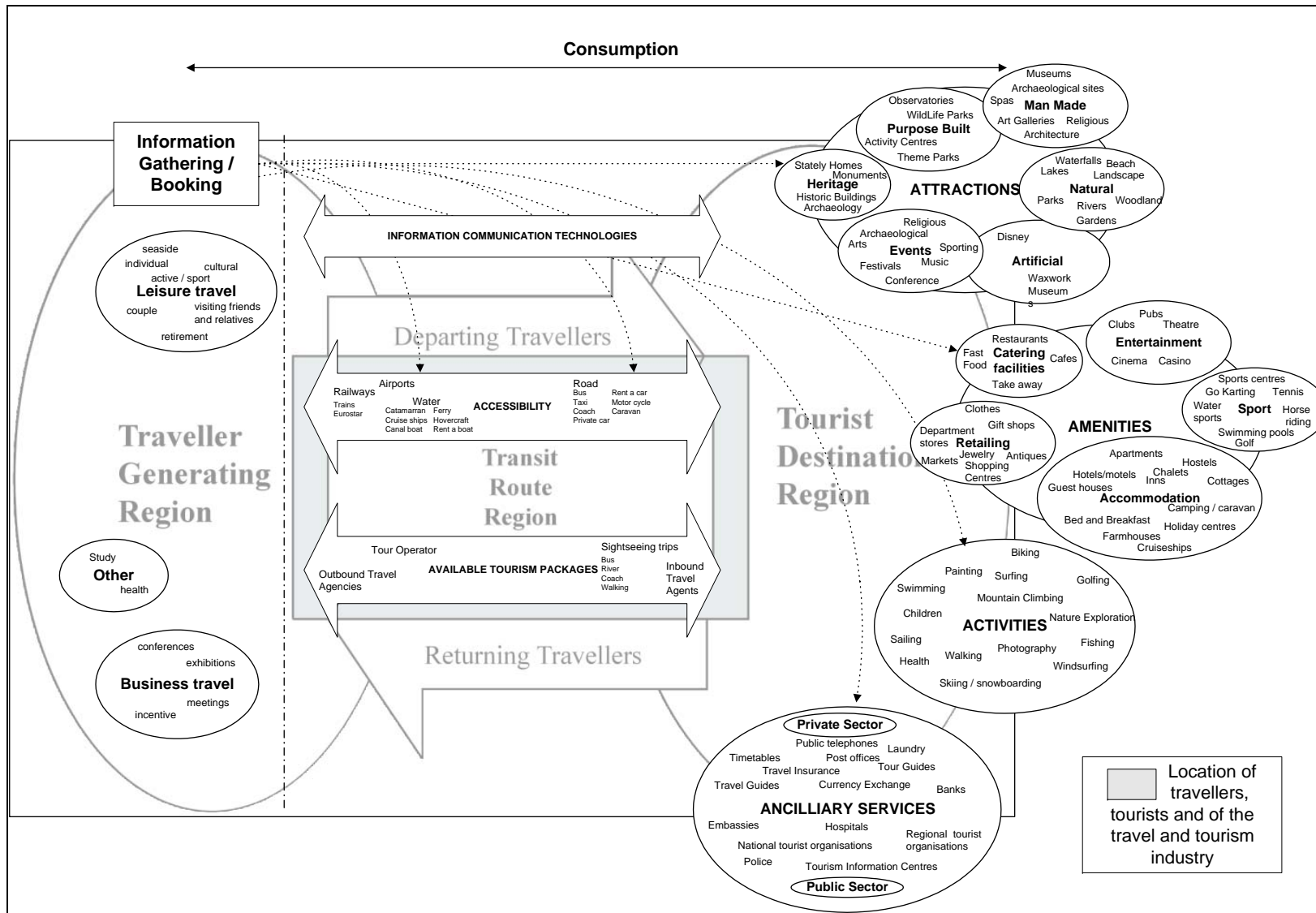
Adapted from Leiper, N., 1990, **Tourism Systems**, Massey University Printery pp 25
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6.1 Six A's of tourism destinations

The categories superimposed on the destination region in figure 1 have been taken from Buhalis' destination classifications (2003, pp 291). Adapted from Cooper et al (2000) tourism destinations are classified into six categories: Attractions, Accessibility, Amenities, Available Packages, Activities and Ancillary Services.

Attractions

Attractions are the primary motivator of tourism to a destination (Cooper et al, 2000, Holloway, 1998, Richards, 2002). Attractions may vary from destination to destination and this is reflected in the market segments that a destination can attract. *"The urge to travel to witness the extraordinary or the wonderful object seems to be deep in all human cultures"* (Rojek, 1997). There have been a number of attempts to classify attractions. Buhalis (2003) identifies six categories:

- Manmade: Museums, archaeological sites, art galleries and architecture
- Heritage: Stately homes, monuments, historic buildings
- Natural: Waterfalls, beaches, lakes, parks, rivers, landscapes, mountains
- Artificial: Disney, Waxworks museum
- Purpose built: Theme parks, activity centres, wildlife parks
- Special events: Sporting, concerts, festivals

Accessibility

Transport is an essential element in the tourism system because it provides the means to reach the destination and to travel within the destination. In some cases transport is part of the experience and is regarded as important, as the destination itself (for example cruising or Orient Express trains). According to Cooper et al (2000) there are four main categories of transport:

- Road: Motorbikes, cars, coaches, caravans, hired cars and bikes. Also buses, taxis and bicycles
- Rail: Trains and Eurostar
- Water: short sea ferry transport and ocean bound cruises. Also rent a boat, canal trips, long ferry trips, hovercraft and catamarans.
- Air: Airplanes, air taxis.

Apart from vehicle and mode of transport, accessibility also includes infrastructure such as routes, terminals, bus stops and sign posts. Accessibility often affects visitation to cultural heritage sites as it determines the degree of difficulty in approaching a site, the cost and convenience.

Amenities

Amenities provide essential services for the tourist's wellbeing. Accommodation is a necessary component of the tourism system, without which the tourist can only visit for a day (unless visiting friends or relatives). Tourists can choose from a variety of accommodation providers including hotels, guesthouses, bed and breakfasts, farmhouses, self-catering apartments, camping and caravans (Cooper et al, 2000). Other amenities include: catering, retailing, sport and entertainment.

- Catering: Restaurants, fast food outlets, pubs, bistros, and takeaways
- Retailing: Speciality shops, department stores, markets and shopping centres
- Sport: Sports centres, swimming pools, golf, walking, horse riding, and tennis
- Entertainment: Clubs, pubs, theatre, cinema, casinos.

Activities

This comprises all the activities available within the destination which the visitor can take part in. Often these may be of specialised interest, such as mountain climbing, walking, skiing, snowboarding, photography, health etc.

Cultural heritage related activities include:

Observing: displays of traditional dancing; natural occurrences such as geysers, mud pools etc; festivals celebrating music, comedy, art; re-enactments of battles; expressions of cultural traditions such as the changing of the guard.

Consuming: traditional foodstuffs and drinks perhaps within a restaurant that faithfully recreates a traditional setting.

Visiting: museums, art galleries, architecture, archaeological sites, religious buildings, exhibitions, zoos (to see native animals), wildlife sanctuaries, parks and gardens to view native wildlife, battlegrounds, forts, prisons, heritage theme parks.

Purchasing: Handicrafts, local produce, regional wines

Diving: to shipwrecks, coral reefs

Available packages

The distribution of tourism products is often undertaken by intermediaries that bundle tourism services into packages containing a number of tourism products and services.

Suppliers of tourism products (hotels, airlines etc) have traditionally utilised intermediaries for distribution. These can be private or public organisations.

Intermediaries that are privately funded

Tour Operators reserve and buy in bulk from suppliers, combining the tourism elements of transport, accommodation and other services into packages to be sold directly or by retailers also known as travel agents. Tour operators design products suitable for their market segment and often specialise in specific markets including cultural heritage.

The role of the outbound travel agent is to provide retail outlets that are convenient for the public to use and select tourism products for their customers to choose from. The retailer (the **outbound travel agent**) does not pre-purchase products from operators or principals and therefore carries no stock. Increasingly travel agents are moving to online distribution and allow customers to dynamically package their products and services according to their needs.

The **inbound travel agent** is often appointed by tour operators in order to carry out duties within the destination. Their role encompasses making arrangements for hotel transfers, accommodation and sightseeing. They are instrumental for cultural heritage sites and attractions as they organise excursions, undertake guiding duties and are in direct contact with local cultural heritage attractions.

It is not compulsory for tourism suppliers (known as Principals) to utilise every link of the distribution chain. Some principals may sell direct to the customer, or distribute through retailers. Moreover tour operators may omit the retailer and sell direct to customers. This enables the provider to maintain control over the product and avoid paying commission to the intermediary.

Destination Management Organisations

The distribution of tourism products is supported through the public sector, in particular national, regional, and local tourism organisations that have the responsibility for promoting tourism products and distributing information within their designated area and creating destination portals and developing brochures. One of the fundamental reasons why these organisations were set up was to assist the interests of Small to Medium Sized Enterprises (SMEs) who have limited resources to spend on marketing and promotion, but who may play a key contribution towards differentiating the destination. It could be argued that most monuments, archaeological sites and museums fit into the SME category and therefore public sector organisations play a valuable role in supporting them.

Internet as an enabler of distribution

Any explanation of distribution should now acknowledge the impact of the Internet, which has had a profound effect on the structure of tourism distribution. Suppliers can take advantage of lower booking costs: "*every phone booking can cost a company around £30 whereas an online booking can cost a company less than 75p*" (Davies, 2004) and direct access to customers. Most tourism actors have begun distributing over this medium (Buhalis, 2001). Furthermore a growing number of visitors use the Internet for information gathering and booking.

Perhaps one of the most interesting trends is to observe the development of online communities, blogs, chat rooms, often specialised in particular topics. Cultural Heritage related Internet sites provide often authored or authorised descriptions of sites, monuments and museums influencing the motivation of visitors to those cities.

<u>Ancillary Services</u>

Ancillary services can be described as those services not directly relating to tourism, but which the tourists within the destination may use. These can be classified into two sectors: public and private.

- Public sector services: hospitals, local, regional and national tourist offices and police
- Private sector services: telephones, timetables, post offices, launderettes, tour guides.

7. The significance of the cultural heritage site within the tourism system

Museums, monuments and archaeological sites can be classified as 'attractions' (section 3.1.1). Cooper et al, (2000), McKercher, and du Cros (2002) and Holloway (1999) all identify the significance of attractions in drawing the visitor to the destination. For example "*Attractions provide the single most important reason for leisure tourism to a destination*" (Cooper et al, 2000).

However not all attractions display the same level of importance to the visitor. Leiper (1990) and McKercher and du Cros, (2002) classify attractions into three main categories:

- **Primary**: influences the decision to visit a place
- **Secondary**: awareness of attractions pre-visit, but not significantly important to create an itinerary around the attraction
- **Tertiary**: discovered after arrival at the destination.

It is feasible for an attraction to be in all three categories if tourists have different reasons to visit and if they come from different ethnic and cultural backgrounds. Alternatively they may have been to a destination many times before.

According to the World Tourism Organisation (WTO) (2004) the tourism sector has grown on average 4.7% a year between 1975 and 2000. The WTO estimate that cultural tourism is growing at 15% a year (Richards, 1996). Explanations for this range from: cheaper airfares; a trend towards people taking more than one holiday a year; more disposable income and free time for leisure activity (Drummond and Yeoman, 2001 and Richards, 1996). In addition, there is a trend towards moving away from 100% relaxation holidays to a combination of rest and learning, pleasure and beach.

Cultural tourists are an attractive segment to the tourism industry because they are frequent travellers, tend to stay longer, spend more per trip, are more highly educated and have a higher than average annual income than the majority of tourists (Kerstetter et al, 2001; McKercher, and du Cros, 2002). However, it is recognised that there are people who choose to visit an attraction on the spur of the moment. Therefore they may not share the same characteristics as the cultural

tourists (where cultural tourism is a main factor in choosing their trip) described above.

There is an increase in consumer demand for heritage tourism (Munsters, 1996). This trend has been harnessed by tourism marketers who realise that culture can be a powerful differentiation factor in the marketing of tourism destinations and can be a tourist generator in its own right (Drummond and Yeoman, 2001; McKercher et al, 2004).

Cultural attractions run by cultural heritage managers, often see tourism as a "double edge sword". As they are often cultural heritage professionals charged primarily with scientific research and preservation. They tend to see visitors as an "essential beast". On the one hand they see the benefits of income generated by tourism. They can claim further support from their Ministry of Culture or similar organisations. However they may also foresee problems such as overuse, inappropriate use, or sometimes threatening the survival of the assets. Some cultural heritage managers see visitors as diverting their attention from their primary role of conserving cultural resources. However it is generally agreed in the literature that there is a need for a partnership between tourism and cultural heritage managers. This would encourage more of the right management techniques and the 'right' visitors, whose expectations are met, generate much needed income but would also respect the site (McKercher and du Cros, 2002; Drummond and Yeoman, 2001; Richards 1996).