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The LIGHT Operation: bringing to light the value of digital cultural heritage for Europe's regions

Final Report
December 2006

1   Introduction

The LIGHT Operation, funded under the EU INTERREG IIIC programme, has focused on promoting cultural heritage (CH) and strengthening its contribution to regional development. The main stated goals of LIGHT were to:

- strengthen the cultural identities of the participating regions
- raise public awareness of cultural resources
- support the regions in better exploiting their cultural heritage for educational, tourism and other regional development purposes on the Internet.

In achieving these goals, a key objective has been to facilitate public access to CH through the establishment of regional networks of relevant institutions, in particular libraries, museums, archives and cultural sites, in order to link up regional CH information and resources.

Based on an assessment of strategic priorities for regional development, the partners from 5 European regions (co-ordinated by Veria Central Public Library in Greece), have identified, specified and implemented a range of pilot services ranging from portals providing single entry points to regional cultural resources, to educational tools supporting IT skills development.

The regions concerned are:
- Békés (Hungary)
- Bologna (Italy)
- Lisbon (Portugal)
- Roskilde (Denmark)
- Veria (Greece)

These pilot applications demonstrate the benefits of integrated management and effective delivery of CH resources through targeted services to the general public and key user groups. In developing the pilot applications, close attention has being paid to evaluation, usability, business models and sustainability issues.

As an early part of the process, emerging regional development priorities and actions were reviewed in each participating region, taking particular account of the need for development of regional CH strategies, supported by agencies, co-ordinated partnerships and other mechanisms to underpin the necessary technical, infrastructural and skills requirements. To this end, LIGHT has sought to encourage, through the example of its partner regions, a more advanced level of cross-domain co-ordination within their cultural sectors and to assist in 'bridging the gap' between libraries, museums and archives.

The LIGHT Operation's commitment has been to provide certain key outputs to support exploitation of its results, including:

- evaluation and measurement of the impact and outcomes of LIGHT pilot services on targeted user groups;
- sustainable pilot services with a defined business model (1 per participating region);
- at least one potential new service per region identified for post-project development;
- implementation of mechanisms for inter-regional comparison and learning;
- assessment – and a strategic roadmap - for the transferability of learning from the LIGHT Operation across Europe

This Final Report of the LIGHT Operation summarises its achievements in terms of these goals and outputs. A wealth of more detailed documentation has however been submitted to the Commission and can be found on the LIGHT Operation website http://www.light-culture.net/.

2   Pilot applications

The online regional pilot applications in each region can be accessed through the LIGHT Operation website. The content and service foci of these applications vary significantly, ranging through the provision of local information based on GPS technology, to the cultural heritage of regional food, historic city 'timelines', combining old and new maps with cultural information etc The following is a brief summary of the pilot application(s) in each region.

Békés (Hungary)
The *Körös-Maros* pilot model has built up a new database and web-based services to strengthen regional cultural identity and to support the tourist industry, featuring the promotion of regional food and drink.

Bologna (Italy)
The Sala Borsa Library has implemented services, including digital reference services, digital archives and a web directory, which help to spread knowledge about different but interrelated aspects of the city's culture and history.

Lisbon (Portugal)
The Department of Libraries and Archives of Lisbon Municipality has established a portal to reveal more effectively the CH of the City of Lisbon to its inhabitants and to visitors. *Revelar LX* aims to promote cultural tourism on line, offering its users a glance at the history of Lisbon and inviting them to visit the city, using specific routes.

Roskilde (Denmark)
Roskilde Central Library has developed a portal for CH activities in the new Roskilde municipal area. This service will support the region's development plan, by exploring, digitising, organising and providing access to its CH.

Veria (Greece)
The VeriaGrid, established by Veria Public Library, is an innovative platform based on digital cartography linked to multimedia content which can be created using mobile devices and used by different audiences, for example in education and tourism promotion.

3 Regional development priorities

3.1 Baseline situation

During the first six months of the LIGHT Operation, the partners conducted regional situational studies. A comparative overview of these studies was also compiled. These documents were submitted to the Commission and are available on the LIGHT website

The regions participating in LIGHT represent a wide variety of demographic and economic circumstances, including two large and vibrant cities (Bologna and Lisbon), a rural county with a substantial population (Békés), and two smaller regions with an important town at their heart (Roskilde and Veria). One region (Lisbon) is a capital city whilst two others (Roskilde and Veria) are closely affected by their proximity to large national or regional capitals. Békés and Lisbon, in particular, are homes to populations of diverse ethnicity with significant national minorities. Bologna and Lisbon are notable centres of higher education. Average income levels in Bologna and Roskilde are rather higher than in the other three regions.

The relatively centralised strategic development model in Portugal means that Lisbon, the capital city, responds to a greater extent than other regions to national government policies. The other regions respond mainly to key regional strategic plans or laws governing the sector. However, a level of municipal and/or regional responsibility for local institutions is a common factor across all regions.

All regions have a rich set of cultural attractions capable of providing important support to the attainment of regional development priorities. Bologna, Lisbon and Roskilde enjoy well-established national and international status as cultural regions. Békés and Veria have to a greater extent sought to establish regional cultural identity in order to enable greater valorisation of their cultural assets.

Whilst the underlying institutional asset landscape is rich in all of the regions, substantial progress has been needed, perhaps especially in Békés and Veria, to optimise the value of this infrastructure. Policies for the digitisation of cultural resources, activities and the availability of funding are emerging at rates which vary significantly across the regions.

Internet penetration and levels of general online access remain relatively low in Veria and Békés. Bologna, Lisbon and Roskilde have established clearly established goals to improve the online availability of public services. Development of shared technical standards is needed in all regions.

Bologna and Roskilde had already developed relatively sophisticated, multi-faceted and advanced environments for access to cultural resources with relatively high levels of use, and which deployed state-of-the-art technologies in which public libraries play a key role. Lisbon also had ambitious development plans which acknowledged the need for greater inter-institutional co-operation.

3.2 Regional development priorities

Priorities shared by at least three regions included:
- education and skills development: three regions, Békés, Lisbon and Veria identified deficits in these areas as a key issue.
- familiarising people with their cultural heritage;
- modernisation (digitisation) of cultural assets.

The Portuguese Government had a programme for the educational and training area which incorporated several measures concerning education, training and life-long learning. It was considered that public libraries, museums and archives could play a very important role as educational and training programmes.

Social inclusion agendas were also a prominent priority in several regions. In Bologna, local policies were becoming focused on the development of actions and services that grant access to cultural heritage to all categories of citizens, especially: ethnic and linguistic minorities, older people and people with different abilities

Roskilde Public Library has newly gained responsibility for delivering material and acting as a consultant to the libraries in the "new" Roskilde municipality which from 2007 is an amalgamation of three municipalities

3.3 CH tourism and regional development

The most commonly shared explicit regional development priorities with a relationship to the cultural sector is the development of culture through tourism. The potential for exploitation of CH in the development of tourism was widely appreciated by all the regional partners, but co-ordination between cultural heritage institutions and the tourist industry in general required further development.

At least two regions, Békés and Veria (as part of the Central Macedonian region) have developed a regional typology of tourism for this purpose.

Table 1 – typologies of tourism

Békés	Veria (Central Macedonia)

Health tourism	Archaeological tourism
Village tourism – including horse-back	Cultural tourism (events and festivals)
Ecotourism	Religious tourism (Byzantine churches)
Gastronomy tourism	Educational tourism
Sport tourism including water sport	Agricultural tourism
	Mountain tourism and ecology
	Sports tourism
	Winter tourism (skiing)
	Conference tourism

3.4   Regional baseline SWOT analyses

Each regional study provided at the outset an overview in SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis format of the potential contribution of CH to regional development, as perceived by the lead partner organization in each region.

Table 2 Békés - SWOT

Strengths	Weaknesses
• Significant natural values, living waters • Good opportunities for developing tourism (Wellness) • Closeness to the borders of Romania and Slovakia results in intensive international mobility • High quality soil, quality agricultural production and food processing • The presence of minorities improves international relations	• Low educational level • Very high level of unemployment (17%) • Bad state of health • Especially bad accessibility (No motorway) • Weaknesses and unevenness of institutional structure • Bad industrial structure lacking 'high tech' • There is no coordinated developmental policy among the settlements • Low level of qualifications
Opportunities	**Threats**
• Natural values and natural raw materials are becoming more and more valuable • Cheap workforce can be attractive in the European division of labour • New bases of logistics can come into being beside the frontier • New technologies appear	• Growing migration • The ageing population will not be attractive to either investors or to services • The degradation of agriculture within the EU results in severe social conflicts • The county will not be able to enforce its interests even within the region

Table 3 Bologna SWOT

Strengths	Weaknesses
• Areas of excellence in culture, economy, administration • University and education system • Cultural and natural resources • Widespread, high level social and cultural services • Well developed IT infrastructure	• Perception of insecurity • Inadequate logistical and mobility infrastructures • Decrease in economic resources • Delay in developing shared guidelines for digital services
Opportunities	**Threats**
• Strategic position for many areas of development in Europe (Central Europe, Mediterranean, Balkans) • Development of tourism helped by traditional hospitality	• New economics and social scenarios • Tendency to localism • Decrease in competitiveness

Table 4 Lisbon SWOT

Strengths	Weaknesses
• Geographic location (Atlantic Capital of Europe) • Historic and cultural heritage • Weather conditions (soft climate almost all the year) • National and international offices located in the metropolitan area of the city	• Low rate of use of new technologies (29% of the population is below the medium Europe average) • Lack of cooperation between organisations, which leads to duplication of resources and creation of incomplete cultural websites • Lack of a strategic plan for the diffusion of cultural events
Opportunities	**Threats**
• Tourism development • Development of public and private investment • Operational Plan for Culture • Government Policy: to bring Portugal to the Society of Information, Innovation, Science and Technology. • Increasing offer and supply of web based services • New housing programs created by the City Council to attract young people to the centre of the city • Growing rate of immigration (Eastern Europe, Brazil, Palop's - Portuguese Official Language African Countries)	• Old population in the centre of the city • Proliferation of information about the city, with origin in unknown sources, that tires the users • Economic conjuncture of the country

Table 5 Roskilde SWOT

Strengths	Weaknesses
• Significant CH • Well documented • Strong institutions • Well organised • Cultural institutions promote CH • Digitisation in progress • Extended computer literacy • The basic conditions exist for digital promotion of CH	• Lack of network among institutions • Digital promotion of CH is weak • Registration of CH is random • Division of responsibility for CH between state, county and municipality within the geographic region
Opportunities	**Threats**
• Developing network and partnerships • Developing partnerships with the tourist industry in the Copenhagen area • Developing a project and innovation culture • Developing digital promotion/ dissemination • Strategic, focused registration of cultural heritage • Strengthen culture's role in the merging of municipalities	• Lack of funding • Merging of municipalities leading to de-prioritising of culture • Close to the capital of Denmark • Institutional thinking and traditions • Potential lack of ownership

Table 6 Veria SWOT

Strengths	Weaknesses
• Veria's rich history and contemporary culture • Extensive tourism resources • Geographical position in the centre of the region and close to Balkan countries • Rich natural environment • Qualitative agricultural products and an ancient agricultural tradition • Proximity to the Metropolitan city of Thessaloniki	• Unskilled human resources • Low technology deployment • Absence of a coherent cultural policy • Shortage of infrastructure • Shortage of financial resources able to support new initiatives • Absence of regional marketing policy

Opportunities	Threats
• Foundation of University Department • Financing through E.U. structural funds • Linkage of culture with various forms of tourism • Construction of a transport infrastructure • EU enlargement and increase of tourists from the neighbouring Balkan states	• Proximity to Thessaloniki • Immigration from Balkan states leading to unemployment • Leakage of manufacturing to neighbouring low cost states • Absence of entrepreneurship able to attract young educated people to the city

4 Evaluation and assessment

4.1 Methodology

Extensive monitoring and evaluation activities were conducted in relation to the pilot applications and their impact on the overall CH environment throughout the duration of the LIGHT Operation. The methodology employed and the results to September 2006 are summarised in a separate *Consolidated evaluation report* on all pilot regional services, which has been delivered to the Commission and is available on the LIGHT website.

For evaluation purposes, the broad objectives of the regional partners in the LIGHT Operation were as follows, although the emphasis on each of these broad objectives varied somewhat between regions as did the process chosen to achieve them.
   a) create one or more pilot applications;
   b) demonstrate the role of CH institutions in regional development and provide a model;
   c) improve cooperation between organisations with a stake in CH within and between regions;
   d) raise awareness of regional CH e.g. among tourists and local people;
   e) improve the CH information base and the ability to answer queries;
   f) improve regional IT skills/awareness: staff and public

A basic framework for inter-regional comparability relevant in particular to evaluation objectives d) and e) above was established in order to provide some significant indicators and to support inter –regional learning between the project partners. For this purpose, it was agreed to focus on the following three areas of evaluation:
• **Web statistics** to measure usage of pilot websites
• **User satisfaction:** scales for online and offline surveys
• **Usability:** approaches to organising tests and assessing usability of the pilot applications from the end user's perspective

Web statistics

The following were the agreed common inter-regional indicators, to be collected for all pilot applications:

1. **Unique Visits** (how many different people use the site) per day.

2. **Page Views Per Visit** (providing a sense of how interesting the site is).

3. '**Referrer log' data** – specifically a count of the sites from which visitors are linked to the site and how many visits are being referred from there.

4. **'Keyword' statistics**. A count of search terms used which provide an indication of what the visitor is looking for when they visit the site, according to the search terms they use.

User satisfaction

It was agreed that all regional partners would:

- adopt a similar 5 point scale for user satisfaction surveys, whether conducted online or offline
- aim for a minimum sample size of 500 users per pilot application
- use three 'mandatory' questions which in all satisfaction surveys (although all regional partners were free to add additional questions as long as a similar approach to data collection and reporting was used).

Usability tests

Designing a standard approach toward usability testing to be carried out in each region was considerably more complex to implement than the other two aspects of the framework for inter-regional comparison. However, several of the partners had previous experience of conducting usability testing through previous projects. The related principles of 'Accessibility' (according to W3C WAI guidelines) were also discussed. As a result of these discussions, four of the five regional partners (excluding Roskilde) carried out usability tests on their pilot applications. A full report on the evaluation methodology deployed has also been delivered.

4.2   General Assessment

The LIGHT Operation has perhaps been most successful in reinforcing the benefits of co-operation between stakeholder organisations in a variety of contexts, for example in times of economic stringency (Bologna), through sustainable strategic partnerships in cultural priority areas (Roskilde) and by establishing new links at local level (Békés, Veria)

In some regions LIGHT has clearly played a catalytic role in reinvigorating the local cultural scene and caused organisations to rethink their role, while establishing the

potential of the library for cultural leadership (Békés, Lisbon, and Veria). A significant amount has also been achieved in gaining and validating knowledge of regional user interest in CH (Veria).

All partners have, through the implementation of an impressive and innovative array of pilot applications on the web, succeeded in establishing mechanisms to increase the visibility of regional cultural heritage and bringing about the interconnection of electronic resources from a heterogeneous range of local sources. In regions such as Békés, Bologna and Lisbon, the information base has been significantly improved. Through their applications, Roskilde and Veria especially have contributed to the IT skills base of their communities and made important steps to develop the future role of the public library as an innovation base.

In summary, it is clear that people like to use ICT and to access digital resources in order to discover and investigate CH. The deployment of multimedia images, interactive maps and social networking software ('Web 2.0') such as blogs and map-based technology is likely to have a far reaching effect on the leveraging of CH for regional development. The LIGHT Operation has begun to show how this can be achieved.

4.3   Impact in each region

Békés

Békés County Library sought to improve the accessibility of cultural traditions in digitised form with the aim of enabling the entrepreneurial sphere (tourism, processing industries etc.) to use it for realizing their business purposes, and to improve the image of the library as well as business relations. The high quality work done in its digitisation department and the experience that has been gathered as an information provider on the European Union in recent years were both utilised during the implementation of the pilot project. Digital content for the pilot application service was created both from existing files and newly from the CH sphere.

Among the priority areas addressed were: agriculture in Békés County and the surrounding area including: fishery, pig-breeding, poultry-farming, indigenous animals, traditional and industrial methods of food processing industry, organic farming, the cultural traditions of national minorities, preserving of traditions in general, coexistence and cultural diversity.

The institution's holding the county's intellectual and physical CH, their resources; geographical location and history were inventorised through studies compiled by local experts. During the implementation of the programme, the library worked together with the enterprise development institutions in the county in areas such as tourism, training

and environmental protection as well as with CH institutions (archives, museum and community centres) and with the Publika Hungarian Library Association, as a libraries advisory organisation. The cooperation between these institutions was exemplary, demonstrating how important it is to define and explore the region's CH and to make it accessible for the general public.

Bologna

The Sala Borsa Library developed and implemented a set of new online pilot services in LIGHT with the aim of integrating, fostering and giving more visibility to the local CH. In cooperation with other local partners, the library, created new online services for the collection of various types of documents and information on local history, culture, society and territory. These services are now fully integrated within the set of services offered by the Library: they now form part of the daily work of the Sala Borsa librarians and are part of the mainstream services offered to users.

The project experience achieved two main objectives: to create and foster a cooperation network between local cultural institutions to maintain these new online services; and to offer new versatile online tools to citizens to help them to discover the city and its valuable CH.
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A questionnaire was sent to the directors of the libraries in Bologna and of the leading libraries in the Province. All responding professional colleagues demonstrated good knowledge of the website. There was high interest in several of the sub-services provided, in particular: *Suggested reading about Bologna; Timeline; Plaques Archive; Majors of Bologna;* and *Bologna in the movies* received the best rating.

Lisbon
Government action plans such as The Operational Plan for Knowledge Society (POSC – Programa Operacional da Sociedade do Conhecimento) http://www.posc.mctes.pt/
aim to establish Portugal as an advanced country through initiatives in areas such as Web access, Access, e-Government, digital culture, integrated innovation and consolidation of the Knowledge Society as an instrument for decentralisation.

By taking part in LIGHT Operation, the Department of Libraries and Archives of Lisbon City Council has encouraged the establishment of a network between several entities working in the area of culture in Lisbon City, thereby demonstrating their economic capacity and viability as entities capable of producing and disseminating content. Lisbon has also through its pilot application established a service which encourages cultural tourism, which can provide valuable support for regional development, potentially

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facilitating the creation of more employment opportunities and stimulating the local economy.

Roskilde

There are now two levels in the Danish structure of cultural agencies: The national level which is represented by Kulturarvsstyrelsen (the Cultural Heritage Agency) and the municipal level which is represented in LIGHT by the municipality of Roskilde.

Kulturarvsstyrelsen has four main goals in the period between 2004 and 2007:
- Preservation of the physical cultural heritage in museums
- Continued development of the agencies databases and of the use of the internet.
- Development of strategic partnerships and dialog with the surrounding world.
- Development of staff qualifications and competences.

It is a central part of Danish culture to be a member of one or several associations, usually based on the members' leisure interests, beliefs, political interests or hobbies. Associations are democratic by nature and they involve a very high level of voluntary activity. Often memberships form networks which bridge social classes. The work of LIGHT in Roskilde, in bringing together information about associations provides Kulturarvsstyrelsen them with the possibility of reaching a large slice of the Danish public though a small number of gateways, enabling the discovery of new and unknown CH and contributing to the preservation and dissemination of CH values.

From the Register of the *Cultural base* www.kulturbasen.dk 670 associations were identified with 'culture' as a subject interest attribution. The 233 of these who maintain a home page became the target group and were all invited to an information meeting, at which the vision for their involvement in LIGHT vision was explained. Their reactions were very positive and work has continued to further involve the associations and to support this through working with umbrella organisations.

The municipality of Roskilde has one major cultural strategy: Musikbyen Roskilde (Roskilde – the city of music) which seeks to develop Roskilde as a musical 'power centre' through the use of the city's rich music, creativity and knowledge. The municipality is making use of the local associations in its endeavour to brand Roskilde as the city of music, but has as yet made little effort to disseminate musical cultural heritage through the Internet. As a result of LIGHT, the municipality of Roskilde has now launched a web-site: http://www.musikhistorie.dk/ which disseminates the local musical history of Roskilde though background text, interviews and multimedia.

Veria

The Central Public Library of Veria developed an online service www.theVeriaGrid.org in order to meet the aims of the LIGHT Operation, to contribute to local development, increase the use of Information and Communication Technologies, support the tourist industry and assist CH organisations organising, digitising and disseminating cultural resources.

For this purpose a platform was developed based on digital cartography. The platform includes various functional or thematic areas such as: an interactive digital map of Veria, image gallery, video-clips, panoramic site photos and general information about the city of Veria including links various related services and websites. This interactive digital map of Veria town links multimedia content (video, audio, photos, texts, panoramic images, flash objects). The main content is created by experts but enable the contribution of content by users including children. The service targets various different usage profiles including culture, education and tourism.

The high visibility launch of The VeriaGrid service (e.g. covered on national television) is having a considerable impact on improving citizens', visitors' and children's awareness of Veria's CH resources. During the evaluation period of the service, both quantitative research (web statistics, library statistics, and questionnaire surveys) and qualitative research (interviews) indicated that the service has been received with strong, favourable interest by local public and private sector organisations, citizens end visitors.

The results suggest that the service provides useful information for its users and is a valuable tool in order for them to retrieve tourist information (hotels, restaurants, etc.), information about the city (bus timetables, the weather, history of the city, etc.), its cultural heritage (museums, libraries, churches, monuments, etc.) and activities and events that take place in the city of Veria and the county of Imathia

CPLV also conducted a survey on the awareness of residents towards the city's CH (specific monuments and sites) and also their opinions on which was the strongest attraction in their city, which revealed significant and useful information for future needs in service development.. In addition, they were asked to indicate if they were willing to use information technology in order to be informed on cultural issues, resulting in positive responses to the use of the Internet and mobile technology. A separate survey collected similar data from visitors to the city. Positive answers were also received on the use of ICT.

As a result, the CPLV has convinced cultural institutions, tourist agencies and local authorities:
- To rethink their position in terms of the growth in online access.

- That their rich collections in CH could be made more easily accessible to the public by organising, cataloguing, digitising and making them available via the Internet using devices such as laptops or mobile phones for the general public or for specific target groups.
- To interconnect the resources held by the different institutions despite their different forms as a network, making them more easily accessible to the public.
- That a good way to achieve the above is by compiling an inventory and other instruments which make them more useful to the public I an online environment

CPLV is planning to make a formal request to the Municipality to join forces in developing a cultural strategy for the region. The library is willing to undertake a more active role in order to increase the presence of the region over the Internet. A first step will be to reach agreement on developing a website focusing on providing information for travellers in the area. Continued efforts are also in train to raise awareness among organisations and institutions about the importance of developing services over the net.

CH Institutions, tourist agencies and local authorities with the assistance and coordination of CPLV now plan to digitise their collections and make them widely available in electronic format. There is strong potential for municipalities and libraries from other parts of Greece wish to achieve similar objectives by applying the VeriaGrid software to their own cities.

4.4 Pilot application statistics

The following tables provide an overall comparison of some key statistics of use of the pilot applications in the five participating regions in the period to 31 December 2006.More in depth information is provided in the *Composite Evaluation Report* submitted in September 2006.
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Table 7 unique visits to pilot application websites

Region	Visits to 31 December 2006
Békés	1065
Bologna	13137 (Ask the Librarian); 4461 (Bologna Online); archive 5725
Lisbon	32514
Roskilde	2215
Veria	4341

The figures in Table 7 demonstrate the substantial critical mass of usage now being achieved in the large cities of Bologna and Lisbon. They also show the potential for take-off in the newly developed prototype applications in Békés, Roskilde and Veria.

Table 8 How users discovered the pilot applications

	% Links from Internet search engines (e.g. Google)	% Links from other websites	% Direct addresses/bookmarks	% Other
Békés	5.3	80.3	14.25	0.15
Bologna	30.1	58.6	11.3	
Lisbon	19.7	31.6	35.3	13.4
Roskilde	33.6	18.4	47.9	
Veria	0.01	0.2	99.8	

Table 8 indicates that where the pilot services are integrated within a municipally provided web environment (Bologna, Lisbon) where referrals from one part of a regional site assist usage of another part, the scope for worldwide discovery through general search engines such as Google is considerable. The need to optimise international discovery as a next step by translating parts of sites currently available only in national languages (Békés, Veria) is also clear.

4.5 Cross-border and international use

In general, the largest number of visits to the pilot application sites was from home countries followed by those EU Member States.

During the period of live running within the LIGHT Operation:

- The Bologna pilot applications were visited by users 25 countries, including several in m Latin America and the United States as well as most European countries and many regions of Italy. Personal interest/curiosity accounted for 61.5% of visits according to a survey conducted by the Sala Borsa Library followed by pporfessional and educational use.

- Roskilde estimated that 45% of visits were made by tourists. Users of the site included tjose from Malaysia and the United States est 45% touritss
- Usere from more than 30 countries used the (Greek-language) VeriaGrid service with those from the United Sates second to those from Greece.

4.6 User satisfaction

User satisfaction ratings with pilot applications across all regions were almost uniformly positive. Specific areas of lesser satisfaction have been addressed through implementation

of the findings and recommendations for improvement emerging from the serious and highly professional usability testing conducted, especially in Bologna, Lisbon and Roskilde.

The following tables provide a comparison of user satisfaction ratings, based on the surveys conducted in each region:

Table 9 user satisfaction with general ease of use (%)

	Very Satisfied	Satisfied	Don't know	Dissatisfied	Very Dissatisfied
Békés	11.22	63.27	13.27	7,14	5.10
Bologna	42.9	50	4.8	2.4	
Lisbon	62.9	15.1	14.1	5	3
Roskilde*	86.1				
Veria	65	16		9	10

Table 10 user satisfaction with the usefulness of content/information discovered (%)

	Very Satisfied	Satisfied	Don't know	Dissatisfied	Very Dissatisfied
Békés	6.12	35.71	19.39	27.55	11.22
Bologna	52.4	33.3	9.5	4.8	
Lisbon	22	56	0	22	0
Roskilde*	81.8				
Veria	51	27		10	12

Table 11 user satisfaction with ease of locating information sought (%)

	Very Satisfied	Satisfied	Don't know	Dissatisfied	Very Dissatisfied
Békés	8.16	52.04	16.32	18.36	4.08
Bologna					
Lisbon	44	44	11	11	0
Roskilde*	71.2				
Veria	58	20%	---	10	12

* Roskilde data were results of an online survey.

4.7   Usability testing

Structured usability testing of the pilot applications was carried out in 4 of the 5 regions, during their development phase.

Békés
The participants approved of the existence of the website and the pilot application. They found it a useful way of getting information, and recommended further development and extension of the database. People taking part in the testing mentioned frequently the information sources they discovered while visiting the website. All of them made mention of gaining information about the cultural heritage of Békés County and about different kinds of programme. They considered the linkage with other institutions and databases – museums and archives – good.

Bologna
All participants in testing were easily able to use the Ask The Librarian Service. Similarly everyone utilised the functions of the database efficiently and with satisfaction. All of the librarians surveyed separately said they were satisfied with the usefulness and the easiness of the *Ask The Librarian* service.

Lisbon
Archives and library users were recruited for participating in usability evaluation sessions. The results of the analysis showed that users' overall satisfaction, capability of interaction with the website and access to contents is positive, although, some features were identified that should be changed to improve Revelar LX usability, in particular, 22% of users were not satisfied with the content presentation. This together with needs for specific improvements in terminology and screen design were also identified have been subsequently addressed.

Roskilde
Although formal usability testing was not conducted in Roskilde a discussion meeting about the regional partner web sites was organised with the intention to create a common base for the exchange of ideas and comments concerning the most effective way of disseminating information on regional cultural heritage issues. The meeting were also intended to inspire partners to contribute actively to the continued growth, development and usability of both the Roskilde LIGHT site and their own web sites.

Veria
The results of the analysis of a satisfaction questionnaire revealed that users' overall satisfaction towards the VeriaGrid system was positive, but expert users were significantly more satisfied than novice users. The findings from interviews gave a more

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in depth view of what users' liked or disliked most about the particular system and provided some user recommendations for improving the system. The detailed findings of the usability tests were translated into functions that need immediate re-design and areas requiring the provision of new functions/features. A set of remedial actions was proposed and implemented in each case

5 Sustainability of pilot services

Each regional partner was asked to complete a template to assist with the assessment of the financial sustainability, over a forward period of 3 years, of the pilot services implemented during the LIGHT Operation

Each region indicated that it planned to continue delivering the pilot applications as public services. In most cases, funding would be provided through mainstream budget allocations held by the regional or local authority.

Two of the regions (Bologna and Lisbon) did not have cost accounting systems which enabled the differentiation of costs – or budget lines which would be used - for maintaining their applications and were unable to complete the template. In these cases, the new online services implemented in LIGHT are now fully integrated within the set of services offered by the libraries and are part of the daily work of staff, so that additional or exceptional staff, software or overhead e costs cannot easily be identified. In these cases, following the initial involvement of external experts, maintenance and upgrading is done by in-house staff without requirement for outsourcing. The other regions were able to identify costs as shown in Table 12.

Table 12 Costs of sustaining pilot applications (amounts in Euros)

Region	Year	In-house staff cost	Outsourced labour costs	Software licenses	Hardware enhancement	Marketing and promotion	Total costs
Békés							
	Year 1	3000	1000	3000		1000	**8000**
	Year 2	3000	1000	2000		1000	**9000**
	Year 3	3000	1000	1000		1000	**6000**
Roskilde							
	Year 1	21000	3000		700	6000	**30000**
	Year 2	14000	5000		3500	6000	**28500**
	Year 2	14000	5000		3500	6000	**28500**
Veria							
	Year 1		1500	1500	1000	6000	**10000**
	Year 2		1500	1500	1000	6000	**10000**
	Year 3		1500	1500	1000	6000	**10000**

In most cases, these costs will be met from budget. In the case of Veria, it is planned to explore possibilities for funding of additional developments by the central government and local authorities. Special attention will be paid at the funding projects under the aegis of the Ministries of Culture and Education in order to secure financial support. In all

cases except Békés, it is planned that services would be made available free of charge to the end user

Table 6 Income sources to match costs (amounts in Euros)

Region	Year	Subscriptions and fees from users	Subscriptions and fees from partners	Advertising and sponsorship	Organisational budget	Surplus/ deficit
Békés						
	Year 1	500	1000	1000	3000	**-2500**
	Year 2	500	1500	3000	3000	**-1000**
	Year 3	800	1700	3500	3000	**+3000**
Roskilde						
	Year 1				30700	**0**
	Year 2				28500	**0**
	Year 3				28500	**0**
Veria						
	Year 1				10000	**0**
	Year 2				10000	**0**
	Year 3				10000	**0**

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6   Post-project development of new services

In order to build on the gains achieved in their regions through launching their pilot applications, each region has specified a new service which will be developed and launched in the period following LIGHT in order to maintain momentum. An outline description of the planned new services in each region follows. In the case of Bologna, this involves continuing development of its integrated service, Bologna Online.

6.1   Békés: Körös-Maros CH Service

Rationale and Objectives
- Development of cooperation with various cultural and educational institutions of the region including, local museums, the public archives, etc.
- To make cultural heritage information database access for local and regional users, increasing the regional cultural, economical situation

The main goal is to extend the service by increasing the scope and depth of user groups, so that the Körös-Maros CHP will be an effective instrument in promoting the tourism trade in the region e.g. to produce marketing information service for rural tourism. A great opportunity is foreseen to support the participation of regional and projects in Hungarian National Development Plan II in preparing and implementing the activities for the period 2007-2013, helping applicant organisations by giving them material about the historical and cultural background, and providing them with ideas, suggestions, which will improve their image and social acceptance.

In order to establish and introduce the services, the following forms of co-operation are considered important:
- Establishing a GPS-based, cultural and tourist information system together with the County Museum Organization and the County Archive.
- The utilisation of the county's castles, mansions and other historical monuments for cultural purposes and tourism together with the local municipalities and project firms.
- The utilisation of industrial history heritage (e.g. mills, pumping stations) together with the owners and tourist enterprises.
- Taking part in the cross-border programme of the Water Conservation Association of Settlements of Central Békés County in order to rehabilitate the Living Water Channel and Nádor Channel.

Target audience
Business and cultural management, User groups in trade, commerce, and marketing, in agriculture and food processing; persons interested in expanding their business or firm; Firms and individuals engaged in the tourism and leisure/wellness industry.

Content types and sources

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Collections of Békés Megyei Könyvtár, museums and archives, books, periodicals, audio-visual documents, photos, maps, etc.

Service provider and partners:
Békés County Library (Békés Megyei Könyvtár), Békés County Museum, Békés County Archive

Modes of delivery
Web portal

Technical approach
Jadox, Monguz, IBMx206 server

Work needed
Development of the database and software.

Estimated cost range
23000 Euro

6.2 Bologna Online

Rationale and objectives
Bologna Online is an open-source e-service consisting of a collection of digital documents providing users exhaustive information on Bolognese culture, economy, urban history, facilities, amenities and services available in the territory, all accessible at a single site. The collection includes a wide range of physical documents, such as books, photographs, prints, drawings, manuscripts, maps, sound files and moving images, held by local libraries and other institutions. The documents will be classified and arranged by Bologna Online according to subject pathways for easy user access. The reference service, "Ask the librarian", which is already web-accessible, will be further developed for synchronous communication (chat, videoconference) By end 2007 the system will be upgraded as all partners will be broad-band connected.

Target audience
Bologna Online provides free and open access through the Internet. Digital documents will be fully and freely available for personal and professional consultation and for study purposes. The service will provide a precious source of information for teachers, school librarians, students, and lifelong learners. It may be expected that this extensive e-collection will play an important role in circulating news and information about the city, its history and culture, promoting its heritage also among members of immigrant communities and hence contributing to local incoming policy for these new citizens

Content types and sources
Bologna Online documents are either already digitalised or will be digitised using specific resources and according to special programmes. Documents will be included on the basis of their historical, cultural and educational importance and relevance.

Service providers and partners

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In addition to other libraries in the territory, partners will include cultural institutions operating in the town and metropolitan area as well as further afield, such as records offices, the town's movie archives and film library, documentation centres, and the like. Especially interesting is the cooperation with the Informative Territorial Systems in order to enlarge the geographic databases with information about architectural and environmental assets and to make possible the production and the consultation of digital maps about these subjects.

Modes of Delivery

A web portal that offers an integrated access to different resources with a specific search engine operating on only kind of metadata also for resources of originally different formats. It will be a web portal for users with any skill level and it shall ensure the maximum usability. Images and texts have to be visible through web browsers. High-resolution images and enhanced texts accessible through freely downloaded viewers.

The reproduction and the professional use of high-resolution images could be tariffed and made purchasable online.

Technical approach

Attention to ensuring the integration among the different resources through the full interoperability of the data that will require common metadata and protocols.

Work needed

Definition of the policies of document selection and coordination between the producers and the administrators of the different digital resources. Analysis and definition of interoperability protocols.

Estimated cost range

The aim for the development and the sustainability of the project is the strictest cost control by: adopting open source software for the management of OAI-PMH compatible open databases organisable according to the kind of material, with customisable metadata, links to web sites and categories; committing the planning and the implementation to Information Technology and Library Science professionals active in non profit making associations also related to the University.

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6.3   Lisbon for Kids

Rationale and objectives

The new service proposed by the Department of Libraries and Archives - Lisbon Municipality is aimed to provide contents about Lisbon for children.

Target audience

Children until 14 years old.

Content types and sources

Contents, information and electronic resources about Lisbon.

Service provider(s) and partners

The Department of Libraries and Archives (Lisbon Municipality), School Libraries Network, Schools, Children.

Modes of delivery

Web portal

Technical approach

To divulge information about Lisbon ensuring the interactivity with the children.

Work needed

To define the information architecture.

To establish the co-operation agreements with the potential partners.

Estimated cost range

There are no costs associated because the contents will be produced by the Department of Libraries and Archives and the development work will be performed by the Department of Administrative Modernization and Information Management (Lisbon Municipality). There's no preview of work that has to be outsourced. The web portal will be allocated in the Municipality servers. The Department of Libraries and Archives will try to get co-financing for the project.

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6.4   Hudes Roskilde

Rationale and objectives

Digitisation, restoration and dissemination of 2.559 photos taken of Roskilde between 1895 and 1929 by the famous photographer Kristian Hude.

Target audience

Citizens of Roskilde – and others interested in cultural heritage and/or photography.

Content types and sources

Photos and text provided by the staff of the local archive. Project description (in Danish) and examples are already visible on http://www.hudesroskilde.dk/.

Service provider(s) and partners

The Local Archive of Roskilde.

Mode of delivery

Web portal.

Technical approach

The digitised photos will be presented with text on the web-site http://www.hudesroskilde.dk/. On the web-site a zoom device makes it possible to se even small details that have not been visible in the original photo.

Work needed

Fundraising is taking place. The web-site with examples is live at http://www.hudesroskilde.dk/. As soon as the financial aspects are in place the following work will be done: Scanning, picture processing, digital restoration, identification, registration and dissemination on web-site.

Estimated cost range

App. 85.000 €

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6.5 Veria: Learning Technology and DIGital Cultural Heritage Resources (LeTs Dig CHR)

Rationale and objectives

The service focuses on providing education for children and young people concerning the new technology and cultural heritage resources. Moreover, it aims to train educators, teachers, trainers and other professionals in order to obtain similar objectives such as the knowledge for providing lifelong learning educational programmes for young people about digital technology and cultural resources. More information about the CPLV can be found at http://www.libver.gr

Target audience

The broad target audience at present is everyone living in Greece, including the citizens of Imathia region in which Veria is located. Developing an English and a Japanese version of this interactive portal-digital map, will also advance the service by extending the target audience to English and Japanese speaking visitors and web users, increasing visitor numbers, tourism revenues, the number of visitors and the overall publicity, benefiting the citizens of Veria, the public sector and other regional cultural organisations with similar objectives.

The primary target audience will be children, young people, students, teachers, educators, citizens and visitors to the City of Veria. Educational bodies such as primary and secondary schools, universities, etc., research institutes, Cultural Heritage Organisations, Local Authorities, Municipalities, the Ministry of Culture, professionals involved in cultural heritage organizations and the tourist industry are also potential target audiences.

Content types and sources

The content will be mainly cultural heritage resources, cultural organisations such as museums and libraries, digitise resources, tourist information such as hotels, restaurants, local companies, travel information and text/descriptions provided by the staff of the library, the local archive, museums and experts on the subject.

The content will be mainly text, audio, video and images. The library's staff and experts on the subject will develop, provide and support the content of the service. The service will use a number of new forms of information provision such as mobiles, weblog, chat, GPS and the Web.

Service provider(s) and partners

The Central Public Library of Veria (http://www.libver.gr) will develop, provide and support the service. Potential partners are local and national Educational Bodies such as schools, universities, etc., Research Institutes, Cultural Heritage Organisations, Local Authorities, Municipalities, the Greek Ministry of Culture and the Ministry of Education, the Region of Central Macedonia, Libraries and Archives.

The CPLV aims to enhance the service by adding and developing resources from the municipality of Veria. At the moment, the Municipality of Veria plans to develop its own portal. The CPLV sees this development as an opportunity:

a) the municipality to support theVeriaGrid application in order to be developed further, or

b) theVeriaGrid application to become a part of municipality's new portal.

With such action the application will secure funding for its development and support in order to achieve its main goals. The CPLV has undergoing discussions with the municipality of Veria in order to finalise the nature of cooperation between the two organisations.

Modes of delivery

The Central Public Library of Veria has a well organised web structure. The service will be linked with the cultural map of the city http://www.theVeriaGrid.org.

Technical approach

A wide range of digitised content will be accommodated with text/descriptions, audio, video, images and comments provided by the staff and experts. The web pages of the service will provide useful information to partners and participants. The technical staff of the CPLV will support the website, while the library staff will support the content and the development of the service. The provision of links, interactive educational materials, download services, online support and information services as well as a vast amount of education and training materials will be the focal point of the service's web pages.

Using new technology and up to date communication tools, the service will try to attract young audience, locals, visitors, and web users. The service will eventually provide links and information via devices such as mobile telephony and GPS.

Work needed

The CPLV has organised a seminar about digital technology and cultural heritage resources. This seminar serves as a basis for organising this new service. Materials have already been produced by the Library staff. Part of the work needed is the further development of educational and other materials such as the development of additional audio, video and images, materials tailored for educators and other target audiences.

The development of web pages needs extra attention as well as the organisation of administrative support for the service. Finally, the service needs to develop a five year strategic management and promotion plan. Promotion events as well as evaluation of the service will take place.

Estimated cost range

Approximately 5.000 €. The low cost of development of the service is based on the fact that the Library already has obtained similar experience, organised a similar seminar, and has highly skilled staff that can support the service. Furthermore, the Library has achieved high standards of implementing Information Communication Technologies.

The estimated cost is segmented as follows:

- 2.000 € advertising and promotion,
- 3.000 € staff costs: e.g. development of web pages, implementing the service, developing new materials.

The Greek Government has adopted a new approach toward managing the structural funds from the Programme for Regional Development in Greece funded by the EC for the years 2007 to 2013. It will use a less centralised system allocating the funds, focusing on regional authorities. This may provide new opportunities for the CPLV to find extra funds to enhance and develop further the proposed service. Currently, the CPLV has based its business plan for developing the service entirely on its own budget.

7 Dissemination

Dissemination activities are covered in a separately delivered end-of project LIGHT *Evaluation of the dissemination activities: Consolidated report. Local dissemination (roadshows. Workhops etc)* have played *an* important role in developing intra-institutional co-operation within each region.

8 Valorisation and exploitation

8.1 LIGHT International Workshop

The work of LIGHT, together with other relevant initiatives, was discussed by a group of experts at a one-day International Workshop *'The role of digital cultural services in regional development: Creating innovative applications through local networks'* held in held at the Viking Ship Museum, Roskilde, Denmark, on 13 November 2006 ((see list of participants at Annex A). The event, a culminating activity for the LIGHT Operation, sought to make progress towards a development roadmap for cultural heritage and regional development, drawing on the experience gained in LIGHT.

Among the issues intensively discussed over two days by the participants were:
- The Future of libraries, archives in a cultural heritage perspective.
- The Light Pilot applications and their significance.
- Digital Cultural Heritage and the regional economy: how to attract cultural tourists.
- Promoting innovation and skills development through Cultural Heritage.
- Making online Cultural Heritage a personal experience: deploying Web 2.0 and other new technologies.
- Network and cooperation between Light and other institutions in the future.

Presentations from the event are available on http://www.light-culture.net/

8.2 Strategic planning roadmap

One of the major planned outcomes was to develop a strategic planning roadmap, building on the results of LIGHT, to optimise the use of integrated Cultural Heritage resources in regional development policies. The following areas were identified as key issues for future development and strategic planning.

Partners and support

Libraries and CH institutions need to build on existing good practice in the development of partnerships with organisations working on strategic and practical initiatives in key regional developments areas such as learning provision, social inclusion and economic development. The EU Lifelong Learning Programme, Interreg and the structural funds are among the opportunities available to demonstrate and disseminate approaches of this kind.

Funding/sponsorship
The identification of public and private sector co-funding opportunities at regional, national and European level to develop and raise awareness of promising approaches is a major priority.

The Librarian's role
A reassessment of the role of library staff and of the skills needed to work in the development and delivery of services relevant to regional development agendas in partnership with other agencies is needed and should be incorporated in recruitment policies.

Digitisation
Rapid digitisation of cultural resources held at local and regional level is needed as a prerequisite in order to make available a greater critical mass of CH content for use in packaging services relevant to regional development. Greater advantage should be taken of the rapidly emerging availability of affordable digitisation technologies and centres of competence should be established a regional level to offer services to smaller libraries and cultural institutions.

Making regional content available
A standardized infrastructure (metadata and repositories) should be developed across Europe in order that search engines and portal based services can discover regional CH content for re-use in service development. The European Digital Library Initiative, currently supported by the eContentplus and IST programmes, as well as at national level, provides an important context for the involvement of libraries and other CH services at regional level and for 'joining' up local services and portals .

Item ('object') level description
In order to enhance discoverability and usability of CH content, metadata needs to be generated and stored in metadata repositories at amore granular, item level rather than simply described as a collection.

Tourism impact

Requirements include more detailed study and assessment of the way in which CH services provided by libraries and their local partners' impacts on regional agendas for the development of tourism and a closer alignment of CH services and strategies with those of the tourism industry.

Libraries and Informal Learning

Greater clarity is needed on the precise roles and potential of libraries in providing services in the area of informal learning and skills development in the context of regional development agendas, in order to assist definition and recognition of the potential contribution of libraries to learning strategies.

Local/family history

The widespread public interest in local and family history could be better served in the contexts of tourism, migration, local/regional economies and learning through the wider availability of local content relevant to places and people, moving towards more joined up services across Europe, utilising the 'Geospatial Web'.

Web 2.0/ personalisation

The availability of services which enable people to create, share and use content and to enhance cultural 'conversation' could be greatly enhanced by the wider development and deployment of Web 2.0 based technologies (chat, blogs, Wikis, webspaces, Mashups, Global Positioning Services, mobile technologies etc) in the context of library services.

Language

Work to develop multilingual access to CH content (Machine translation, multilingual taxonomies etc) needs to be crystallized and deployed within CH services.

Rights

Agreement on the transparent expression of rights attached to the use of material generated and held by libraries and other CH agencies, together with easy licensing mechanisms (e.g. Creative Commons) , is needed in order to enable confident re-use of regional CH content by external services and by individuals.

9 Conclusion

Achieving these roadmap goals in the partner regions – and across Europe – requires further sensitisation of national, regional and local authorities and professionals, in order to ensure that public libraries are able to be more aware of, to absorb, adapt and

implement best practice and innovation from elsewhere and to develop their own centres of excellence.

This will involve the creation of identity for a European stakeholder network for local cultural services, around a strategic agenda and standards for service provision. Significant moves are underway currently to develop such a network under various EU funding programmes and the results of LIGHT, based on the evidence of practical experience are likely to be of considerable significance in terms of these developments.

Appendix 1 - Participants in the LIGHT International Workshop, Roskilde, November 2006

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