EUROPEAN COMMISSION / Research & Innovation / Environment

Survey and outcomes of cultural heritage research projects supported in the context of EU environmental research programmes

From 5th to 7th Framework Programme

STUDIES AND REPORTS

EUR 24490 EN

EUROPEAN COMMISSION

Directorate-General for Research and Innovation
Directorate I - Environment
Unit I.2 - Environmental Technologies

Contact: Michel Chapuis, Astrid Brandt-Grau

European Commission
Office CDMA 03/26
B-1049 Brussels

Tel. (32-2) 29-54106
Fax (32-2) 29-94249
E-mail: michel.chapuis@ec.europa.eu, astrid.brandt-grau@ec.europa.eu

EUROPEAN COMMISSION

Survey and outcomes of cultural heritage research projects supported in the context of EU environmental research programmes

From 5th to 7th Framework Programme

Directorate-General for Research and Innovation
Environment

2011

EUR 24490 EN

EUROPE DIRECT is a service to help you find answers to your questions about the European Union

Freephone number (*):

00 800 6 7 8 9 10 11

(*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed

More information on the European Union is available on the Internet (http://europa.eu).

Cataloguing data can be found at the end of this publication.

Luxembourg: Publications Office of the European Union, 2011

ISBN 978-92-79-16354-8
doi 10.2777/98555

Printed in Belgium

PRINTED ON ELEMENTAL CHLORINE-FREE BLEACHED PAPER (ECF)

CONTENTS

SUMMARY

This study represents a first attempt to synthesise the vast amount of information resulting from the cultural heritage research projects supported under FP5, FP6 and FP7 until 2010.

The study examines the outcomes and the global impact of these projects. Data for this purpose has been sourced using EC databases but relies largely upon the recent EU publication "Preserving our heritage, improving our environment, Cultural heritage research: FP5, FP6 and related projects" (Volume II) which includes a very valuable compilation of FP5 and FP6 cultural heritage research projects.

The following criteria were examined:

- Typology of networks by analysing the type of involved organisations,
- Geographic distribution of networks by analysing the involved EU Member States, Associated Countries and Third Countries,
- Typology of activities undertaken,
- Impact (political, economic, social),
- Gender issues.

It emerges from this analysis that the networking within and between project consortia, throughout the various Framework Programmes (FPs), has contributed towards improving the knowledge needed for preserving cultural heritage and created a European research community in the field of cultural heritage preservation.

Although the dissemination of project results is embedded in each project, there is room for improvement regarding knowledge transfer and commercial exploitation of results which would generally benefit from the help of specialists in this field. There is still significant fragmentation in research in this area. In line with the general approach of the European Research Area (ERA), further efforts are required to improve communication and coordination of research including strengthening links with policy and user needs. It is important that research leads to practical solutions for conservation experts and results in viable tools for the widest possible circle of end-users.

1. BACKGROUND AND CONTEXT

Europe's cultural heritage is the world's most diverse and rich patrimony that attracts millions of visitors every year to monuments, historical city centres, archaeological sites and museums. Moreover, this heritage is an important component of individual and collective identity. In both its tangible and intangible forms[1], it contributes to the cohesion of the European Union and plays a fundamental role in European integration by creating links between citizens.

European cultural heritage is of exceptional economic importance for the tourism industry, generating an estimated annual revenue of EUR 335 billion[2], and many of the 9 million jobs in the tourism sector are linked to it directly or indirectly. The market for conservation of this heritage is estimated at some EUR 5 billion per year.

But this immense and invaluable patrimony is fragile, and it is estimated that in the past, Europe has lost a great part of it, not only as a result of natural disasters, wars, negligence, vandalism and even terrorism, but also because of accelerating global change in its most general sense.

Pollution, urbanisation, deforestation, over-exploitation of water resources and other environmental changes all affect the European patrimony. Coastal erosion and increasing human activity at sea threaten prehistoric and historic coastal sites submerged by a sea level that has been rising since the end of the last ice age.

Mass tourism brings undoubted benefits but increases the risk of further degradation and of malicious acts. In the more recent past, climate change is becoming a very important damage factor, adding to the other risk factors and contributing greatly to the deterioration of cultural assets.

Protection of cultural heritage in the face of global change is thus becoming a major concern for decision-makers, stakeholders and citizens in Europe.

---

1 For the definition of "tangible and intangible cultural heritage", refer to: UNESCO, Convention concerning the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972; UNESCO, Convention for the Safeguarding of the intangible Cultural Heritage, Paris, 17 October 2003.

2 The Economy of Culture in Europe, a study carried out by KEA European Affairs for the European Commission, 2006, pp. 147-155 and pp. 303-306.

The necessity of safeguarding moveable and immoveable cultural heritage of European significance was only recognized by the EU Treaty of 1993 which specified that this area must be treated as a priority for the EU.

The new Lisbon Treaty or Treaty on European Union[3] emphases the importance of cultural heritage and encourages the Union among others to:

- "contribute to the flowering of the cultures of the Member States, while respecting their national and regional diversity and at the same time bringing the common cultural heritage to the fore";
- "foster the cooperation between Member States, if necessary, by supporting and supplementing their action for instance in areas such as conservation and safeguarding of cultural heritage of European significance";
- "foster cooperation with third countries and the competent international organisations in the sphere of culture, in particular the Council of Europe".

In fact, cultural heritage research has featured in all Framework Programmes since 1986, with the aim of reinforcing the scientific and technical basis for protecting and rehabilitating the European patrimony and setting up joint methodologies, technologies and tools[4].

After an initial series of measures related to cultural heritage as part of the European Commission (EC) cultural programme, the first real research initiatives for the protection of tangible cultural heritage started in 1986 - in parallel to the approval of the research environment programme on acid rain - and were then subsequently included in each of the successive Framework Programmes.

Since then about 140 projects have been supported linking together more than 500 organisations across the EU and the Mediterranean area - from universities, research centres, heritage institutions to private companies - to develop and apply "state of the art" methodologies, technologies, new products and tools.

From the start, where the projects focussed on studying the effects of air pollutants on materials of which the cultural assets were constituted (FP1-FP3), the scope of the projects broadened especially from FP4 (1994-1998) to cover more complex facets of heritage preservation.

---

[3] See in particular Title XIII Culture, Article 167.

[4] For all funded FP5, FP6 and FP7 projects see the following website: http://ec.europa.eu/research/environment/index_en.cfm?pg=cultural.

In FP5 (1998-2002), the "Energy, Environment and Sustainable Development" (EESD) Programme included a Key Action "City of Tomorrow and Cultural Heritage" aimed at improving urban sustainability through delivering real, noticeable benefits to citizens throughout the EU by 2010. This Key Action had thus been especially designed to ensure rapid, EU-wide take-up of practical new approaches to urban governance, planning and management. For the protection, conservation and enhancement of European cultural heritage, the research goals were related to improved damage assessment on cultural heritage, development of innovative conservation strategies and integration of cultural heritage in the urban setting.

In FP6 (2002-2006) the research area "Cultural Heritage and Conservation Strategies" was funded through the "Scientific Support to Policies" (SSP) Programme. The research goals were targeted precisely on needs coherent across the various Community policy areas and sensitive to changes in future policies.

The integration of cultural heritage research under FP7 (2007-2013) — where it once again was funded through the "Environment (including climate change)" Theme — was clearly supported by the EU Council and EU Parliament and led to a specific Sub-activity "Protection, Conservation and Enhancement of Cultural Heritage, including Human Habitat" under the Activity "Environmental Technologies".

This Sub-activity has targeted technologies for the environmentally sound and sustainable management of the human environment including the built environment, urban areas, landscape, as well as the protection, conservation and restoration of cultural heritage from environmental pollution. Research goals have focussed on environment impact assessment, models and tools for risk evaluation, advanced and non-destructive techniques for damage diagnosis, new products and methodologies for restoration, mitigation and adaptation strategies for the sustainable management of both movable and immovable cultural assets.

Furthermore, within the Public-Private Partnership on "Energy-efficient Buildings" (EeB), launched by the European Commission in cooperation with industrial partners as part of the European Economic Recovery Plan in 2008[5], solutions for improving the energy efficiency of historic buildings in urban areas are going to be developed.

[5] COM(2008)800 final.

It is also worth mentioning that the digital libraries and digital preservation funded by the ICT Programme deals with leading-edge information and communication technologies for expanding access to, and use of, Europe's rich cultural and scientific resources. It also investigates how digital content created today will survive as the cultural and scientific knowledge of the future. The research is closely aligned with the work of cultural and memory organisations (such as archives, libraries and museums) and contributes to the i2010 Digital Libraries Initiative, a flagship project within the European Commission's strategy to boost the digital economy.

At Commission level, beyond the Directorate-General for "Research and Innovation" (R&I) and Directorate-General for "Information Society and Media" (INFSO), other Directorate-Generals (DGs) support various kind of research activities related to the tangible, intangible and digital cultural heritage, especially DG for "Education and Culture" (EAC), and DG for "Regional Policy" (REGIO) through the "Structural Funds".

2. INTRODUCTION AND SCOPE

Due to the fragmentation of research funding in the EC Framework Programmes, it is not easy to have an overall coherent view of past and on-going actions and corresponding budgets.

Relying upon the recent EU publication "Preserving our heritage, improving our environment" (Vol. II)[6] which includes a very valuable compilation of FP5 EESD and FP6 SSP cultural heritage research projects and exploiting the EC FP5, FP6 and FP7 databases[7], we tried to assess the outcomes and the global impact of these projects.

As the supporting instruments used in FP5 and FP6 were quite similar, the criteria chosen for our analysis apply for both FPs.

We namely looked at the following criteria:

- Typology of networks by analysing the type of organisations involved,
- Geographic distribution of networks by analysing the EU Member States, Associated Countries and Third Countries involved,
- Typology of activities undertaken,
- Impact (political, economical, social),
- Gender issues.

To complete our analysis we included the results from the FP6 CHRAF project "Priorities and strategies to support cultural heritage research activities within ECTP and future FP7 activities"[8] on the assessment of results regarding technologies and impact of FP5 and FP6 projects on cultural heritage.

---

6 "Cultural Heritage research: FP5, FP6 and related projects", ISBN 978-92-79-09029-5, EUR 22050, OPOCE, 2009.

7 http://cordis.europa.eu/fp7/projects_fr.html
http://cordis.europa.eu/fp6/projects.htm
http://cordis.europa.eu/eesd/ka4/projects.htm

8 CHRAF (N° 44208) was a Specific Support Action (01/10/2006-31/03/2008). The main results of the Deliverable D14 "Mapping FP5-FP6 projects in Cultural Heritage and assessment of results regarding technologies and impact" are included in our study. We especially thank the authors of this study for the permission to publish here an extract.

We decided to introduce also the new ongoing FP7 cultural heritage research projects until 2010 to put the domain into perspective and to make recommendations for future orientations.

We hope that this study will provide valuable input to the "Focus Area Cultural Heritage" (FACH) of the "European Construction Technology Platform" (ECTP) which is presently being restructured and its objectives reviewed as the preparation of an Action Plan is underway for the coming years on the basis of its Strategic Research Agenda.

We also hope this study can serve as a valuable contribution to the FP7 ERA-NET "NET HERITAGE" project[9] on "European network on research programme applied to the protection of tangible cultural heritage" as well as to the new Joint Programming Initiative (JPI) on "Cultural heritage and Global Change: a new challenge for Europe"[10].

[9] ERA-NET project NET-HERITAGE (N° 219301) "European network on research programme applied to the protection of tangible cultural heritage" (1/10/2008-30/09/2011).

[10] Commission Recommendation on the research joint programming initiative "Cultural Heritage and Global Change: a new challenge for Europe", C(2010) 2535 final.

3. STUDY AIMS

The study aims at answering the six overarching questions:

- Q1: To which extent, and how, the participation in the EU Framework Programmes has a structuring effect in the targeted research field?
- Q2: Which direct/indirect benefits are generated through the EU Framework Programmes in the targeted research field?
- Q3: Which impacts have been generated through the EU Framework Programmes (political, economic and social) in the targeted research field?
- Q4: To which extent the gender issue is addressed?
- Q5: To which extent the "top down" approach of the Framework Programmes tends to avoid fragmentation?
- Q6: How far the clustering of projects helps better integration and cross-fertilisation?

4. METHODOLOGY AND COLLECTION OF DATA

To reach the above mentioned objectives, the following methodology was adopted:

- Collection of data for the assessment of project results,
- Establishment of criteria to be analysed,
- Data analysis regarding the different established criteria,
- Elaboration of recommendations.

4.1. Collection of data for the assessment of project results

Relying upon the recent EU publication "Preserving our heritage, improving our environment" (Vol. II) and with the help of EC FP5, FP6 and FP7 databases including CORDIS as well as administrative documents such as the Grant Agreements (GA) of the projects, we analysed projects from the period 1999 (start of FP5) until 2010.

For the exploitation of the results, we have constituted an EXCEL database for the FP5, FP6 and FP7 projects which contains the following information:

- Programme acronym
- Call title (Topic)
- Project acronym
- Project reference (Contract number)
- Project title
- Contract type
- EC Project funding
- Starting date
- End date
- Duration
- Name of coordinating organisation
- Country of coordinating organisation
- Type of coordinating organisation
- Gender of the scientific coordinator

- Name of partner organisations
- Country of partner organisations
- Type of partner organisations
- Gender of the person in charge of the scientific (S&T) aspects of the project in the partner organisation[11].

4.2. Establishment of criteria to be analysed

The collected data were exploited according to the following criteria:

- Type of organisation[12]
- Type of country[13]
- Type of instrument (contract) and funding[14]
- Type of main outcomes/impacts
- Average number of partners per project
- Average project duration
- Average project budget
- Percentage of women involved as coordinator and work package (WP) leader within the consortium.

4.3. Data analysis regarding the different established criteria

4.3.1. Inputs

Framework Programmes (FP) are the EU's main mechanism for funding research and development in Europe. Funding takes the form of a "grant to the budget". It consists of a reimbursement of the costs claimed by the participants on the basis of their cost declaration.

[11] This information was found in the Grant Agreement of each project.

[12] Nomenclature adopted for FP5 and FP6 projects: HE: higher education, RES: research, IND: industry, OTH: other. For FP7 projects the same nomenclature has been adopted to compare the data.

[13] Country codes according the ISO 3166 code (see list in annex).

[14] Nomenclature adopted for FP5, FP6 and FP7 projects.

The maximum EC financial contribution, funding scheme and expected impact are indicated in the annual Work Programme for each area (Activity/Sub-activity). For cultural heritage research, the areas and themes were defined as follows:

Table 1: Areas and themes for FP5 EESD, FP6 SSP and FP7 (until 2010) cultural heritage projects

FP	Areas	Themes
FP5	Protection, conservation and enhancement of European cultural heritage	- Improved damage assessment on cultural heritage; - Development of innovative conservation strategies; - Foster integration of cultural heritage in the urban setting.
FP6	Protection of cultural heritage and associated conservation strategies	- Assessment of air pollution effects on cultural heritage; - Sustainable impact assessment of protection and conservation treatments and their reversibility; - Effects of global change on cultural heritage; - Identification of durable ancient or traditional materials and craft technologies for application in modern conservation treatments of cultural heritage; - Cultural heritage and tourism.
FP7	Protection, conservation and enhancement of cultural heritage, including human habitat	- Consolidation and dissemination of results related to cultural heritage; - Damage assessment, diagnosis and monitoring for the preventive conservation and maintenance of the cultural heritage; - Development and application of methodologies, technologies, models and tools for damage assessment, monitoring and adaptation to climate change impacts (excluding extreme events); - EU cultural heritage identity card; - ERA-NET for the preservation of the tangible cultural heritage; - Framework conditions to enhance most promising prototypes; - Technologies for protecting cultural heritage assets from risks and damages resulting from extreme events (earthquakes, fires, storms); - Compatible solutions for improving the energy efficiency of historic buildings in urban areas (single building).

From FP6 onwards the focus was also put on the creation of a European Research Area (ERA) as a vision for the future of research in Europe. It aims at scientific excellence, improved competitiveness and innovation through the promotion of increased co-operation, greater complementarity and improved co-ordination between relevant actors, at all levels.

The promotion of partnering and collaboration is a central commitment of the EC. The overarching aim of the funding schemes or support instruments is to cluster the EU research efforts, to better structure the European Research Area (ERA) and to maximise outputs and impacts of the FPs.

The following support instruments were used in FP5 and FP6 cultural heritage research projects:

- Shared Cost Actions (FP5) and STREPs (FP6),
- Concerted Actions/Thematic Networks (FP5) and Coordination actions (FP6),
- Accompanying Measures (FP5) and Specific Support Actions (FP6).

4.3.2. Instruments

Shared Cost Actions (FP5) and STREPs (FP6)

Shared Cost Actions (SCA) and STREPs are projects dealing with objective-driven research. They are limited in scope. They may consist of:

- A research and technological development activity,
- A demonstration activity or,
- A combination of both types of activity.

Any legal entity can participate in a SCA or a STREP, but in practice primarily organisations active in the research field such as research institutes, universities and enterprises (including SMEs) are concerned.

SCAs and STREPs are based on a "project approach" oriented towards the resolution of one specific issue or problem. They have one single component, being "research/innovation" or "demonstration". In principle, they do not include any training activity.

Research activities are targeted and have precisely focused research objectives and measurable outcomes.

Innovation activities include activities relating to the protection/dissemination of knowledge, socio-economic studies, activities to promote the exploitation of the results and possibly "take-up actions".

Demonstration activities are designed to prove the viability of new technologies that offer a potential economic advantage, but which cannot be commercialised directly (e.g. testing of prototypes).

To promote applied research, the participants are asked to include industrial partners and namely SMEs in their research consortia, as the involvement of technology developers and producers helps to ensure that research leads to market oriented solutions and efficient up-take. Specific SME oriented projects were available under FP5 and FP6 as SME Specific Measures. Their main purpose was to promote the participation of SMEs. There were two instruments:

- FP5-Co-operative Research Projects (CRAFT): carried out by RTD performers for the benefit of a number of SMEs from different countries on common specific problems or needs.
- FP6-Collective research projects: carried out by RTD performers on behalf of industrial associations or industry groupings in sectors where SMEs are prominent to expand the knowledge base of large communities of SMEs.

Concerted Actions/Thematic Networks (FP5) and Coordination Actions (FP6)

Concerted Actions/Thematic Networks and Coordination Actions aim at promoting and supporting the co-ordination, co-operation or networking of a range of research and innovation projects or operators for a specific objective to achieve improved integration and co-ordination of European research for a fixed period of time. They do not provide support for research and development.

Any legal entity may participate, but in practice the participants are primarily organisations involved in research and innovation such as research institutes, universities, enterprises (including SMEs) and public administrations, as well as potential end-users and stakeholders.

Co-ordination activities intend to complement other Framework Programme instruments, consisting of a coherent set of components.

These activities cover:

- Studies, analyses, benchmarking exercises,
- Exchanges and dissemination of information and good practice,
- Exchange of personnel,
- Organisation of conferences, seminars, meetings,
- Setting up of common information systems
- Definition, organisation and management of joint or common initiatives,
- Joint memoranda of understanding,
- Pre-standardisation and standardisation activities in specific fields,
- Establishment of roadmaps for research in specific topics.

Training activities can cover the following issues:

- Exchange and dissemination of good practice,
- Use of common information systems,
- Management of common activities, providing they are in direct relation with the above co-ordination activities.

Accompanying Measures (FP5) and Specific Support Actions (FP6)

Accompanying Measures and Specific Support Actions are aimed at contributing actively to the implementation of the Framework Programme, the analysis and dissemination of results, or the preparation of future activities with the view to enabling the Community to achieve or define its strategic RTD objectives.

They may also be used to stimulate international cooperation, encourage and facilitate the participation of SMEs, small research teams, newly developed and remote research centres, as well as organisations from new Member States and Associated Candidate Countries in the priority thematic areas, in particular in Integrated Projects and Networks of Excellence. Specific Support Actions do not provide funding for research and development. They are more limited in scale than

co-ordination actions and may be carried out by one single participant, or a group of several partners.

Support activities may cover one or more activities such as:

- Organisation of conferences and seminars,
- Studies, analyses, benchmarking, mapping exercises,
- Dissemination, transfer and take-up of programme results,
- Development of research or innovation strategies,
- Organisation of high level scientific awards and competitions,
- Setting up of working groups and expert groups,
- Operational support,
- Information and communication activities.

In FP7 the main instruments are:

- R&D collaborative projects (Integrated projects and STREPS of FP6 become one single category entitled "collaborative projects"),
- Networks of Excellence,
- Coordination and Support Actions.

For cultural heritage research projects under FP7, only two instruments are applied at present: Collaborative Projects (CP) and Coordination and Support Actions (CSA).

Collaborative Projects

Collaborative Projects are research projects carried out by consortia with participants from different countries, aimed at developing new knowledge, new technology, products, demonstration activities or common resources for research. The size, scope and internal organisation of projects can vary from field to field and from topic to topic. Projects can range from small or medium-scale focused research actions to large scale integrating projects for achieving a defined objective. Projects may also target special groups such as SMEs.

Coordination and Support Actions

The aim of Coordination and Support Actions is coordinating or supporting research activities and policies (networking, exchanges, trans-national access to research infrastructures, studies, conferences, etc.). ERA-NETs are considered as Coordination and Support Actions.

4.3.3 Outcomes

4.3.3.1 Overview of cultural heritage funding

Table 2 summarises information on 41 cultural heritage research projects of the FP5 EESD Programme, 23 projects of the FP6 SSP Programme and 15 ongoing projects of the FP7 "Environment" Programme (until 2010).

Table 2 Information on FP5, FP6 and FP7 (until 2010) cultural heritage research projects managed by DG "Research" - Environment Directorate

Analysed data	FP5 EESD	FP6 SSP	FP7
Number of projects	41	23	15
Total number of partners (including coordinator)	322	183	180
Average number of partners	8	8	13
Average project duration (months)	35	31	36
Average EC funding /project (Euros)[15]	955.512	773.163	2.097.629
Total EC funding (Euros)[16]	**39.175.997**	**17.782.581**	**31.464.435**

As shown in Fig. 1, 2 and 3 here below, the main proportion of EC funding for cultural heritage research was dedicated to "Cost Shared Research" (CSR)

[15] For each call, EC introduces funding thresholds which will be applied as eligibility criteria.

[16] For each programme, there is an indicative budget given in advance.

represented by "Shared Cost Actions" in FP5 EESD, "Specific Target Research Projects" (STREP) and "Specific Targeted Innovation Projects" (STIP) in FP6 and "Collaborative Projects" (CP) in FP7.

In FP5, the relatively important percentage of CRAFT projects (10%) represents a significant involvement of SMEs. This can be compared with the STIP projects in FP6 (9%) more focused on demonstration activities to prove the viability of new technologies that offer a potential economic advantage (e.g. testing of prototypes).

Fig. 1: Type of instrument (%) for FP5 EESD CH projects

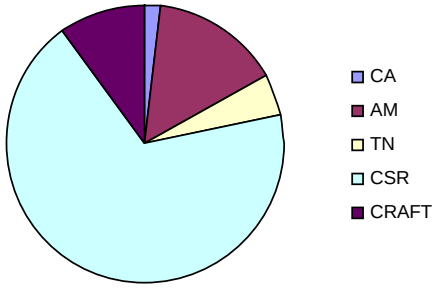


Fig. 2: Type of instrument (%) for FP6 SSP CH projects

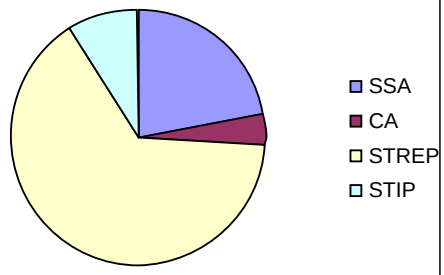
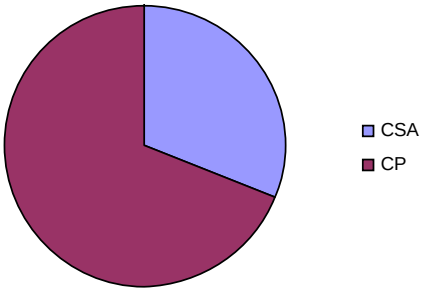


Fig. 3: Type of instrument (%) for FP7 CH projects



FP5

CA: concerted action
AM: accompanying measure
TN: thematic network
CSR: cost shared action
CRAFT: co-operative research projects

FP6

SSA: specific support action
STREP: specific targeted research project
STIP: specific targeted innovation project

FP7

CSA: coordination and support action
CP: collaborative project

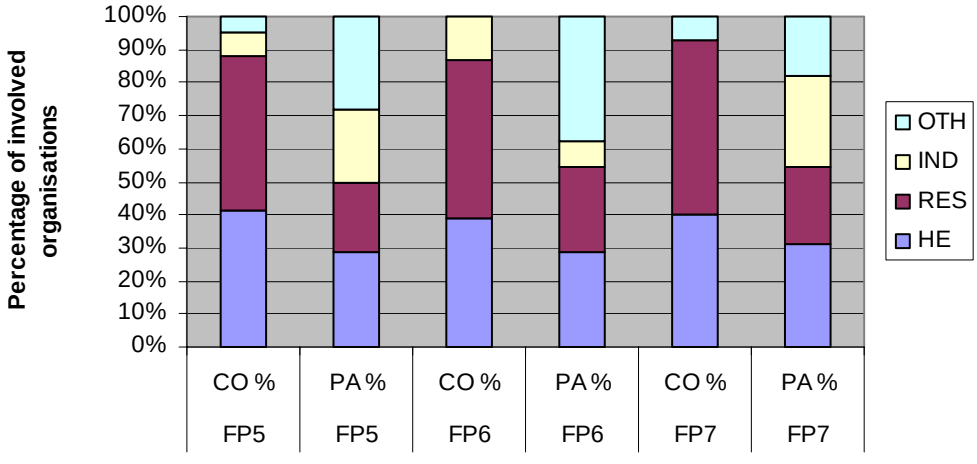
4.3.3.2 Typology of networks by analysing the type of organisations involved

Figure 4 gives an overview of the type of organisations involved. It shows that research organisations (public and private) and higher education institutions are fairly equally placed regarding project coordination (RES: 46% and HE 41% in FP5, RES: 48% and HE 39% in FP6, RES and HE: 46% in FP7).

The involvement of industrial organisations, including SMEs and consultants, as project coordinators is limited: 7% in FP5, 13 % in FP6 and 0% in FP7 (until 2010). Organisations classified as "others" mainly represent "users" and "stakeholders". Only a few participate as coordinators: 5% in FP5, 0% in FP6 and 8% in FP7.

Figure 4 shows that in FP5 and FP7 the participation of research organisations, higher education institutions, industry, users and stakeholders ("others") was fairly evenly distributed which demonstrated a good balance of competence overall. In FP7 it seems that industrial participation is growing which could be related to the evaluation criteria in FP7 calls. In FP6 industrial participation was not particularly strong due to the more policy orientation of the "SSP" Programme.

Fig. 4: Type of organisations involved in FP5, FP6 and FP7 CH projects



OTH: other IND: industry RES: research HE: higher education

The number of projects in which organisations are involved demonstrates their dynamism and workforce. The Italian "Consiglio Nazionale delle Ricerche" (CNR) and the English "University College of London" (UCL) have been particularly active since FP5 either as coordinator of projects or as partner.

Regarding the involvement as project partners, the French "Cercle des Partenaires du Patrimoine – Laboratoire de Recherche des Monuments historiques" (CPP-LRMH), the Slovenian University of Ljubljana and the Czech "Institute of Theoretical and Applied Mechanics" (ITAM) can also be considered as very active, followed by the German "Fraunhofer Gesellschaft zur Förderung der angewandten Forschung" (FhG), the French "Centre National de la Recherche Scientifique" (CNRS), the Spanish "Consejo Superior de Investigationes Cientificas" (CSIS) and the Norwegian "Norwegian Institute of Air Research" (NILU).

It is clear that these research organisations and universities have through their involvement in the FPs contributed to building a European Research Area in the field of cultural heritage. The EC conferences organised at regular two yearly intervals also highly contributed to reinforcing research networks in this area.

4.3.3.3. Geographic distribution of networks by analysing the EU Member States, Associated countries and Third countries involved

In FP5 the countries which had the highest percentage of coordinators (CO) were the United Kingdom (20 %), followed by Italy (15%), Germany (12%) and the Netherlands (10%). The countries with the highest percentage of partners (PA) were Italy (16%), the United Kingdom (11%), Germany (11%) and France (9%).

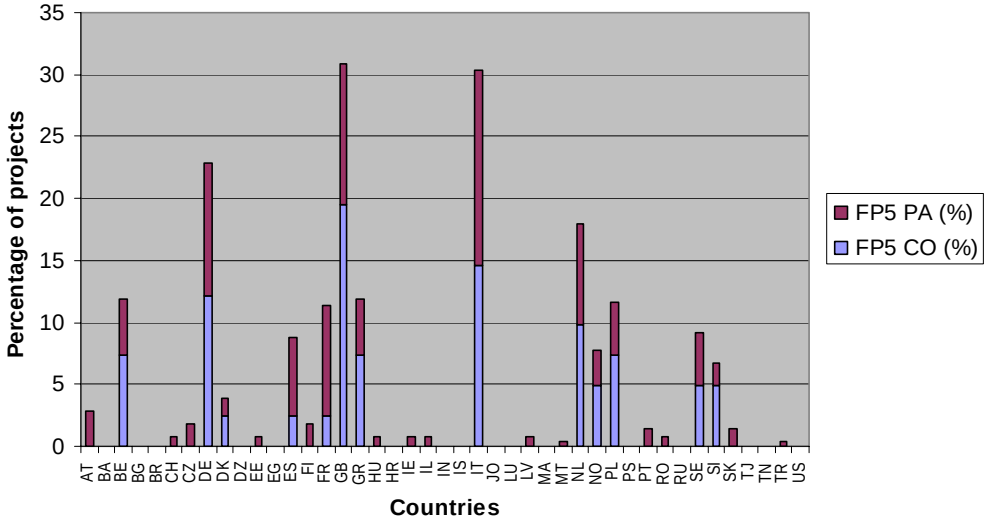
Under FP6, Italy became the leading country with respect to the highest percentage of coordinators (22%), followed by Belgium (17%) and Germany (13%). Regarding the highest involvement as partners, Italy was equally placed with the United Kingdom (13%) whereas France (11%), Germany (10%) and the Netherlands (9%) followed slightly behind.

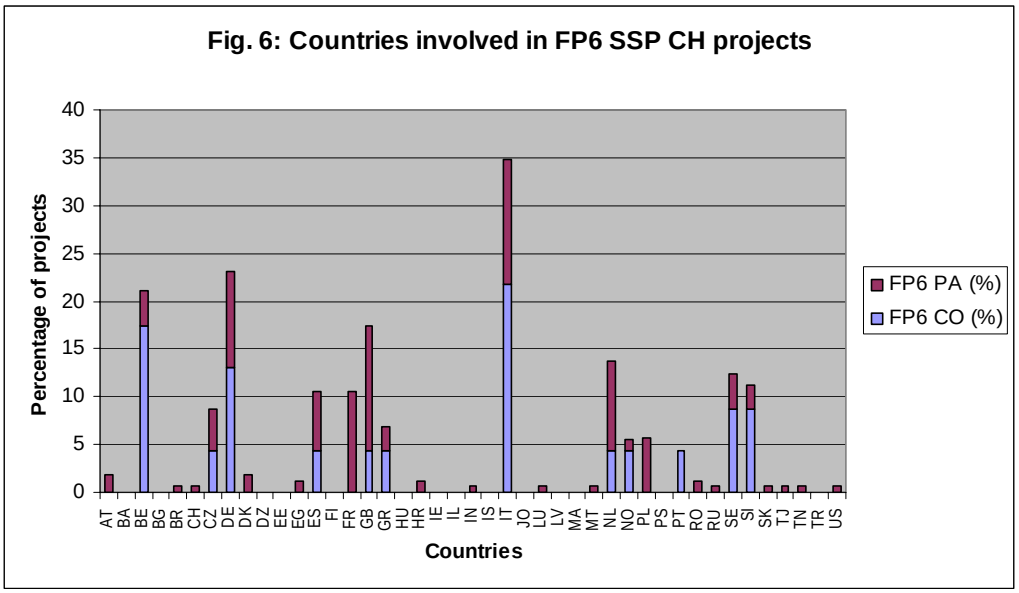
This trend is confirmed for Italy in FP7 projects (31% of coordinators), and Germany continues to maintain a strong participation of partners (13%). The Figures 5, 6, 7 summarise these findings for FP5, FP6 and FP7 cultural heritage research projects.

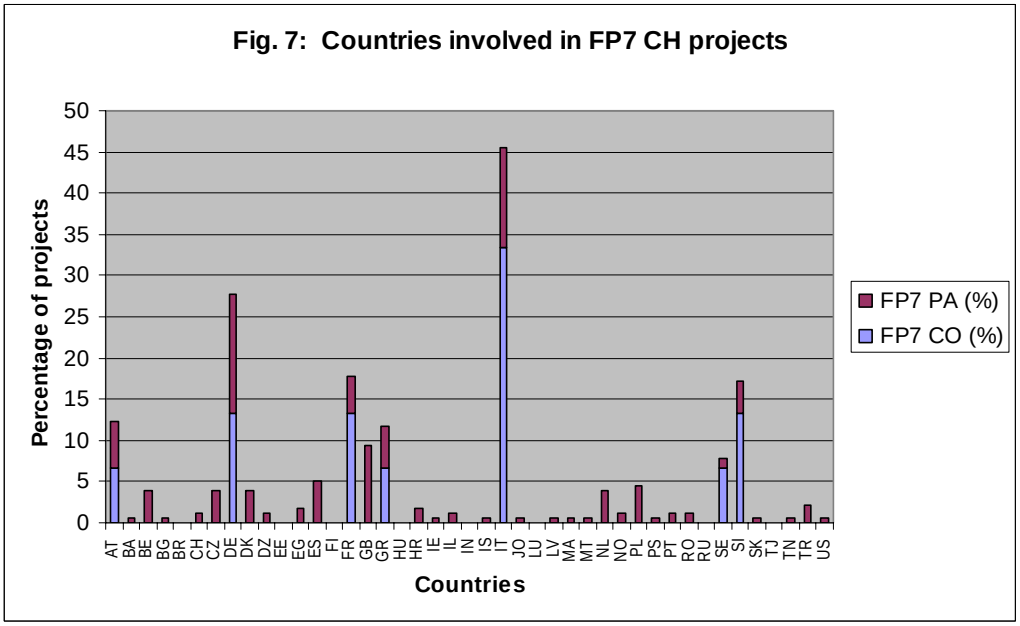
Among the 10 countries from Central and Eastern Europe which joined the EU in 2004, the most active are Slovenia and Poland, followed by the Czech Republic. For example, Slovenia coordinated 5% of the projects in FP5, 9% in FP6 and 15% so far in FP7.

The participation of partners from Associated Countries and Third Countries combined was 5 % in FP5 and 9% in FP6. There is a trend in the increase of Third Country participation (16% in FP7), namely for countries from the Mediterranean area. This proportion increases when including programmes other than the FP5 EESD and the FP6 SSP, namely the MPC and INCO-MED programmes.

Fig. 5: Countries involved in FP5 EESD CH projects







PA: partner CO: coordinator

4.3.3.4. Typology of activities undertaken

Table 3 summarises the topics and issues addressed by research projects under FP5, FP6 and FP7.

By analysing the percentages of projects dedicated to each topic, the following conclusions can be drawn:

- Atmospheric pollution and climate change impacts for cultural assets show a growing significance. This is most probably linked to the increasing vulnerability of tangible cultural heritage, especially the immovable heritage.
- Damage assessment mostly related to the immovable heritage has become a continuous challenge.
- Novel microbiological tools for conservation have not been identified as a priority topic under FP6 and FP7.
- The number of projects related to dissemination involving either the organisation of conferences, workshops or training courses has decreased, particularly in FP7, but as there are still several years to run, it is difficult to draw a final conclusion on this.
- The topic of "risk analysis and protection from extreme events" has been added in FP7 to reinforce the challenge of tackling climate change impacts on cultural heritage.
- In FP7 the cultural heritage research community has taken the opportunity to build on the networking nurtured under various initiatives of the former FP5 and FP6 programmes enabling the development of a co-operation framework and strategies within an ERA-NET project.

Table 3: Topics addressed in FP5 EESD, FP6 SSP and FP7 (until 2010) cultural heritage research projects

Topics Addressed	FP5		FP6		FP7	
	Nb of projects	%	Nb of projects	%	Nb of projects	%
Atmospheric pollution and climate impacts for cultural assets	2	**5**	3	**13**	3	**20**
Damage assessment and restoration of monuments and historical buildings & industrial heritage	9	**22**	5	**22**	4	**28**
Novel microbiological tools for conservation	6	**15**	-	**-**	-	**-**
Environment, cultural heritage and tools inside and for museums, archives and libraries, historical buildings, churches…	14	**34**	4	**17**	3	**20**
Foster integration of cultural heritage in the urban / rural setting, monitoring and archaeology	6	**15**	4	**17**	-	**-**
Marking and traceability of cultural heritage: infrastructure, advances training courses and other supporting initiatives	4	**9**	7	**31**	1	**6**
Risk analysis and protection from extreme events	-	**-**	-	**-**	3	**20**
ERA-NET	-	**-**	-	**-**	1	**6**

Table 4 illustrates the main outcomes of FP5, FP6 and FP7 projects. The distribution of outcomes is quite similar from FP5 to FP7 except for training seminars and conferences in FP7 as already stated.

Table 4: Main outcomes of FP5, FP6 and FP7 (until 2010) cultural heritage research projects

Main outcomes	FP5		FP6		FP7	
	Nb of projects	%	Nb of projects	%	Nb of projects	%
New instruments/software	11	**27**	6	**26**	4	**26**
New products/materials	8	**20**	4	**17**	3	**20**
New methodologies/strategies/ databases/guidelines	16	**39**	9	**39**	7	**47**
Training seminars and conferences	6	**14**	4	**18**	1	**7**

It can be seen that the majority of projects has led to the development of new methodologies/strategies/databases and guidelines, followed by new instruments and software development.

In acknowledgement of this and of the difficulties often faced by developers of products and tools in making the leap from prototype to market, which is indeed observed to be the case for some of the outputs of FP5 and FP6 cultural heritage research projects, a call (FP7-ENV-2008.1) especially dedicated to "Framework conditions to enhance most promising prototypes" was launched. The aim was to help provide a needed boost to researchers and developers in helping to overcome some of the remaining hurdles to further exploiting and commercialising the outputs of their successful research implemented under FP5 and FP6 projects.

4.3.3.5. Gender issues

Table 5 shows that the participation of women in FP5, FP6 and FP7 projects dedicated to cultural heritage research is relatively high compared to other fields of

research. In FP5 projects 32 % of coordinators were women[17]. In FP6 projects 39 % of the coordinators were women and 23% of work package leaders were also women. In FP7 projects so far, women represent 47 % of project coordinators and 24 % of work package leaders[18].

Table 5: Participation of women in FP5, FP6 and FP7 (until 2010) cultural heritage research projects

Participation of Women	FP5		FP6		FP7	
	Nb of Women	%	Nb of Women	%	Nb of Women	%
Coordinators	13	**32**	9	**39**	7	**47**
Work package leaders (Partners within consortium)	-	-	37	**23**	43	**24**

4.3.4. Impact

Regarding technological outcomes and impact of FP5 EESD and FP6 SSP projects in cultural heritage, the basis for this analysis is the FP6 CHRAF project study "Priorities and strategies to support cultural heritage research activities within ECTP and future FP7 activities"[19].

This study was based on two questionnaires (labelled as "A" and "B"), aimed to assess the impact of FP5-FP6 cultural heritage related projects, with regards to:

- Social impact, related to transferability of the project results,
- Economic impact for employment and industry,
- Environmental impact (considered only in the questionnaire "B"),
- Policy impact,

[17] For FP5, the analysis has been performed only on the base of the first name of the coordinator.

[18] For FP6 and FP7 projects, this analysis has been performed on the base of the Grant Agreement where male or female participation are clearly indicated.

[19] Deliverable D14 "Mapping FP5-FP6 projects in Cultural Heritage and assessment of results regarding technologies and impact" of the CHRAF project.

- Exploitation of the project results and benefits for the consortium,
- Synergies among scientific activities,
- Dissemination through the scientific community.

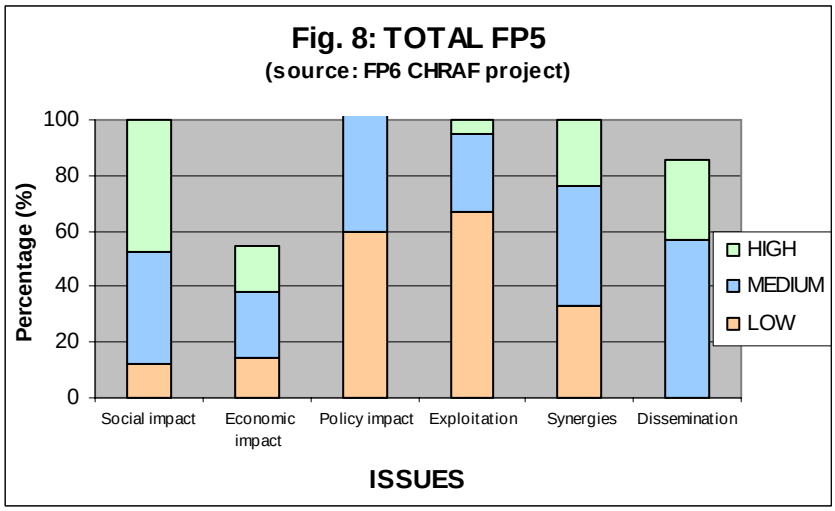
Although both questionnaires roughly contained similar information, some specific aspects were more detailed in one of the questionnaires. The main difference between each approach was that questionnaire "A" was filled in by the project coordinator and questionnaire "B" was filled in by LABEIN, the coordinator of the CHRAF project on the basis of the publicly available information provided by the EC in view of the compilation of FP5-FP6 projects[20]. For this reason, the "A" questionnaires were collected from the projects in which the coordinator agreed to collaborate with this study, and the "B" questionnaires were filled in for 41 FP5 and 23 FP6 cultural heritage research projects considered under this study.

The conclusions of the study were the following (Fig. 8 and 9):

- *"The results and further analysis of both types of questionnaires lead to similar results, which confirmed the methodology. This correlation has been found in all analysed cases, and it does not depend on the Framework programme, type of instrument or any other issues.*
- *The impacts obtained from the "A" questionnaires are, in general, slightly higher than those of the "B" questionnaires, due to the updated information in the "A" questionnaires.*
- *The charts of FP5 and of FP6 projects are quite similar, reflecting rather similar impacts in both cases. However, at the moment of preparation of this study, some FP6 projects were not finished, thus probably lowering the final impact.*
- *Most FP5 and FP6 projects have quite a high social impact, in terms of dissemination, communication and education activities relating to society in general and to the scientific community as these activities have frequently been strongly promoted in the majority of projects.*
- *The policy impact of FP6 projects seems to be higher than the policy impact of FP5 projects. This is most probably due to the policy focus of the calls for cultural heritage projects under the FP6 "Scientific Support to Policies" SSP Programme.*

[20] See reference in footnote 6.

- *The environmental impact is slightly higher in FP6 projects due to the growing importance of environmental issues, and its consideration in EU policies.*
- *The synergies among projects and/or networks have become a reality in both FP5 and FP6 projects.*
- *The low level of direct economic benefits for the consortium can be considered as a weakness, as the final result of many projects can lead to a commercial product. In most cases the exploitation strategy of the consortium doesn't seem to have been adequate to get the expected benefits. This can be sometimes due to the consortium characteristics, mostly involving scientists, with significant experience in dissemination of scientific results, but who are not adequately trained or experienced in commercial exploitation of project outputs. Consequently for many projects that may have the potential to lead to a commercial product, the consortium frequently neglects protection of IPR such as filing patents.*
- *As a result of the weak exploitation of the final project achievements, the potential economic benefits of the projects (in terms of improvement of the local economy, employment, etc.) are not adequately or directly addressed, thus illustrating another important weakness of these projects."*



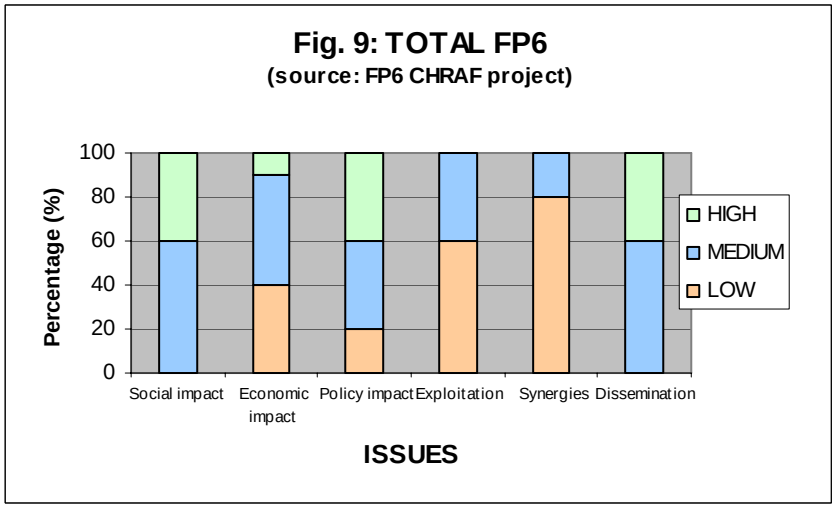


Fig. 8 and 9 are reproduced here with the kind authorisation of the authors of the CHRAF study.

5. LESSONS LEARNED AND RECOMMENDATIONS

The most positive benefit of FP5 and FP6 is the constitution of a real European Research Area in the field of cultural heritage research, generating new knowledge and sharing good practice.

The New Member States which joined the EU in 2004, and in 2007, are now fully integrated in research projects and have even gained a certain leadership. In addition, Associated Countries, like Norway, are very active in participating in FPs and Third Countries, especially from the Mediterranean area, are also becoming more and more involved as FP7 progresses.

As the promotion of partnering and collaboration is a central objective of the EC, this can be seen as a success. Nevertheless the fragmentation of this research area still needs to be addressed and should be overcome through better co-ordination with the help of FACH/ECTP, ERA-NET activities and the Joint Programming Initiative (JPI) on "Cultural Heritage and Global Change: a new challenge for Europe".

Although many promising products and tools have been developed in various FP5 and FP6 projects, the main weakness of cultural heritage research projects is the poor exploitation of otherwise promising results. Most of the projects have been launched by research organisations or higher research institutions and the final project achievements or outputs do not sufficiently address the needs of stakeholders and end-users.

In FP5 and FP6, the instruments for research and development projects were oriented towards the resolution of a specific issue or problem and the protection/dissemination of knowledge and promotion of exploitation, but not towards tackling barriers to the commercialisation of new products and tools.

For the exploitation of promising results of FP5 and FP6 projects, the following recommendations can be made:

- Researchers should be better informed about opportunities for exploitation of results (e.g. "spin-offs", licensing). Special seminars should be developed in this field.

- Further exploitation activities should be carried out with the help of specialists in intellectual property rights and market analysis[21]. Sources of further investment need to be addressed.
- Clustering of results from different research projects could be considered an effective way of achieving a greater critical mass in a given area such as in the area of sensor development.

For improved exploitation of future FP7 projects:

- Industrial organisations, including SMEs, as well as end-users and stakeholders should be actively involved from the start of the project especially in defining the market needs. If approriate, a business plan should be foreseen as an essential element of the project. These aspects should be addressed in the project proposal.
- Greater attention should be given to "Specific Support Actions" to foster the dissemination, transfer and take-up of programme results. One should reflect on the appropriateness of generating new ways of exploitation events in order to match offer and demand and to identify potential marketable project outcomes (products and services).
- Platforms like FACH/ECTP could help in fostering this issue. ECTP together with the "Energy-efficient Buildings" (EeB) Public Private Partnership (PPP) is well placed to identify industrial needs in terms of research and innovation, as a possible route to facilitate the exploitability of project results.
- The issue of standardisation should not be neglected and a better cooperation with the European Standardisation Organisation (CEN) is advised, especially in relation to the work Programme of CEN TC 346 dedicated to cultural heritage. The regulatory organisations also play an important role in the process of acceptance of new products and tools.
- Environmental technologies have still to be developed or improved to address the needs of the conservation community, as the threats to cultural heritage are increasing as climate change evolves. There is a need for easier and more user-friendly exploitation of important data (e.g. wireless systems).

[21] See in this respect the outcomes of the FP6 project PRORETT "Promotion of Renewable Energy Technology Transfer" addressing "Effectively supporting the commercialisation of research results".

This would enable SMEs that provide specialist services to better meet the needs of end-users in the field of maintenance and exploitation of historical buildings and sites as well as of museums, libraries and archives.

- With respect to movable cultural heritage, assessing the environmental impact of damage on assets should be strengthened, especially in the field of traceability.

6. OVERALL CONCLUSIONS

The various Framework Programmes have contributed to a better coordinated response of all stakeholders involved in preserving the cultural heritage at local, regional, national and European level.

While the significant economic value of cultural heritage itself is progressively more widely recognised, research in this area is also requested to contribute to innovation in Europe and to enhancement of the competitiveness of SMEs and industry.

Future challenges

The Europe 2020 Strategy for "smart, sustainable and inclusive growth"[22] implies that innovation should be both transformative — to radically change current unsustainable practices while stimulating growth — and responsible — to safeguard social cohesion and environmental assets. The societal challenges, explicitly highlighted in the Europe 2020 context, including climate change, resource efficient and environment friendly production methods, as well as sustainable land management, put eco-research and innovation at the heart of European initiatives.

Cultural heritage assets — which are not renewable by nature — may benefit from this new orientation on innovation, both in technological and socio-economic terms. This challenge driven approach will ensure high policy relevance and added value, and require solutions, especially with regard to the delivery of products, services and governance tools. Both public and private funding has to be mobilised at national and European level to fulfil this overarching goal.

In this respect two initiatives are expected to have a great impact on cultural heritage research in the future: the Joint Programming Initiative (JPI) on "Cultural Heritage and Global Change: a new challenge for Europe" and the "Energy-efficient Buildings" (EeB) Public Private Partnership (PPP).

[22] COM(2010)2020

The Joint Programming Initiative (JPI) on "Cultural Heritage and Global Change: a new challenge for Europe"

In line with the general approach of the European Research Area (ERA), further efforts to improve information, communication and coordination of research between Member States are needed to avoid fragmentation and overlapping.

The Commission Recommendation for Joint Programming in the field of cultural heritage research encourages Member States to "develop a common strategic research agenda establishing medium to long-term research needs and objectives in the area of preservation and use of cultural heritage in the context of global change". The new Joint Programming Initiative (JPI) on "Cultural Heritage and Global Change: a new challenge for Europe", in which at present 18 Member States and one Associated Country are committed, aims to improve interdisciplinary cooperation between sciences and humanities for the benefit of citizens. It is foreseen to organise joint work programmes and future calls for proposals for cultural heritage research in coordination with the European Commission.

This JPI will also consider major international key actors to be included in the Advisory Board, such as: the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the International Council on Monuments and Sites (ICOMOS), the International Committee of Museums (ICOM), the Council of Europe, Europa Nostra and the ECTP-FACH.

"Energy-efficient Buildings" (EeB) Public Private Partnership (PPP)

The "Energy-efficient Buildings" (EeB) Public Private Partnership (PPP) aims to decrease energy consumption and reduce CO2 emissions of buildings across Europe through innovative building and district concepts.

This Initiative will speed up research on key technologies and develop a competitive industry in the fields of energy-efficient construction processes, products and services. The main purpose is to reach the goals set forth for 2020 (20 % energy saving) and 2050 (energy neutral, zero CO2 emission) to address climate change issues and to improve EU energy independence. It will thereby transform these challenges into business opportunities.

Land occupation is mostly saturated in a highly populated Europe. Therefore, the major activity in the construction sector in Europe is the rehabilitation of existing buildings, representing in 2007 about 41 % of the European construction sector and making up about 75% of the building stock in 2050[23].

The Housing Statistics in the European Union 2004[24] shows that for the majority of EU countries, over 20% of residential buildings are pre 1945, and about half of these are of historic value.

Historic buildings form the core of most well known European cities. They are highly valued by those who live in them and are a key reason why many people visit European cities. However, they were originally designed for a historic context which had different patterns of use, different expectations of comfort, and a high carbon emission economy. The majorities of historic residences across Europe are in private ownership, and it is this stock that will be most susceptible to deterioration if fuel prices rise and owners cannot afford to keep them. Due to these new requirements, some historic centres have been abandoned[25] or are becoming highly socially degraded places, as citizens are moving to new buildings, which fit their comfort requirements.

While it is tempting to focus energy-efficient solutions on individual historic buildings due to their high public visibility, the biggest impact from limited resources can only be obtained by focusing on the largest number of common historic buildings in Europe, those in residential occupation, thus providing a district approach instead of a single approach[26].

The possibility to use generic solutions, widely applicable for a large number of historic buildings makes this urban or district approach very attractive for small and large companies, that could face the refurbishment of a global area with

---

23 http://www.synamob.com/index.php?option=com_content&task=view&id=348&Itemid=410. Market research of the architectural company Synamob.

24 Housing Statistics in the European Union 2004, National Boards of Housing, Building and Planning, Sweden (Boverket) and the Ministry of Regional Development of the Czech Republic (MMR), 2005, *Housing Statistics in the European Union 2004*, Boverket Pubikatiosservice, Karlskrona.

25 Many European dwellings are already vacant. For example, Spain has more than 3 million vacant houses, many of which are historic. (CENSUS, 2001)

26 The single approach has been already faced in the FP7 call EeB.ENV.2010.3.2.4-1 Compatible solutions for improving the energy efficiency of historic buildings in urban areas (Coordinated call on Energy Efficient Buildings – Economic Recovery Plan).

similar solutions, thus increasing the market volume, as well as reducing costs by using a large scale economy system based on replicable solutions.

- The development of new energy-efficient solutions in historic urban areas needs narrow cooperation between different bodies, covering the full added value chain: research organisations involved in the innovation needed to approach this new market and guaranteeing the compatibility of solutions with historic/architectural values of the districts;
- architects and/or designers to implement these solutions into the set of buildings, according to their similarities and specificities;
- refurbishment/construction companies (both large and SMEs) to implement the solutions into reality;
- municipalities and other management bodies in charge of historic city management, as main stakeholders involved in the process;
- population living in the historic cities, as main users of the developed technologies.

Cultural Heritage within the future Research and Innovation framework

The JPI on "Cultural Heritage and Global Change: a new challenge for Europe" on the one hand and the PPP on "Energy-efficient Buildings" on the other hand, are expected to gather the main concepts for the future of research and innovation in cultural heritage in Europe, such as innovation through the whole value chain, impact, mobilisation and engagement of stakeholder, efficient use of research funding instruments both public or private.

In February 2011, the Commission launched a public consultation — Green Paper on Common Strategic Framework — aiming to provide a streamline and more efficient set of funding instruments, that will complement national and regional funding better than has been the case in the past.

The Green Paper represents a shift in approach to dramatically streamline and simplify procedures, while at the same time ensuring a truly European approach to tackling societal challenges. It gives a big emphasis on impacts and results. We will have to demonstrate very clearly how we are doing things efficiently and how we are making the most efficient use out of every Euro spent.

EU research on cultural heritage is pioneering the future EU research, by its strong mobilization of public and private stakeholders and funding and by its strong research coordination efforts within Member States through the new JPI on "Cultural Heritage and Global Change: a new challenge for Europe".

Cultural Heritage is a non-renewable resource. Therefore we must take action now. Cultural heritage research and innovation is a science turned to the future which fully integrates the concept of sustainability for the benefit of current and future generations.

ANNEXES

ANNEX 1

ISO COUNTRY CODES RELATED TO THE COUNTRIES CITED IN THIS STUDY

Country names	ISO 3166-1-alpha-2 code
ALGERIA	DZ
AUSTRIA	AT
BELGIUM	BE
BOSNIA AND HERZEGOVINA	BA
BRAZIL	BR
BULGARIA	BG
CROATIA	HR
CZECH REPUBLIC	CZ
DENMARK	DK
EGYPT	EG
ESTONIA	EE
FINLAND	FI
FRANCE	FR
GERMANY	DE
GREECE	GR
HUNGARY	HU
ICELAND	IS
IRELAND	IE
ISRAEL	IL
ITALY	IT
JORDAN	JO
LATVIA	LV
LITHUANIA	LT
LUXEMBOURG	LU
MALTA	MT
MOROCCO	MA
NETHERLANDS	NL
NORWAY	NO
PALESTINIAN TERRITORY, OCCUPIED	PS
POLAND	PL
PORTUGAL	PT
ROMANIA	RO

RUSSIAN FEDERATION	RU
SLOVAKIA	SK
SLOVENIA	SI
SPAIN	ES
SWEDEN	SE
SWITZERLAND	CH
TAJIKISTAN	TJ
TUNISIA	TN
TURKEY	TR
UNITED KINGDOM	GB
UNITED STATES	US

ANNEX 2

LIST OF EU CULTURAL HERITAGE PROJECTS IN FP5, FP6 AND FP7 (UNTIL 2010) FUNDED WITHIN THE ENVIRONMENT PROGRAMMES

(see also website of the Environment Directorate: http://ec.europa.eu/research/environment/index_en.cfm?pg=cultural)

FP5 PROJECTS

APPEAR Accessibility projects - sustainable preservation and enhancement of urban subsoil archaeological remains

ASSET Assessment of suitable products for the conservation treatments of sea-salt decay

BACPOLES Preserving cultural heritage by preventing bacterial decay of wood in foundation piles and archaeological sites

BIOBRUSH Novel approaches to conserve our European heritage: Bioremediation for building restoration of the urban stone heritage in European states

BIODAM Inhibitors of biofilm damage on mineral materials

BIOREINFORCE Biomediated calcite precipitation for monumental stones reinforcement

CARAMEL Carbon content and origin of damage layers in European monuments

CATS Control and preventive strategies to avoid damage caused by cyanobacteria and associated micro-organisms in Roman hypogean monuments

CHEPRISS Cultural heritage protection in a sustainable society

COALITION Concerted action on molecular microbiology as an innovative conservation strategy for indoor and outdoor cultural assets

COLLAPSE Corrosion of lead and lead-tin alloys of organ pipes in Europe

COMPASS Compatibility of plasters and renders with salt loaded substrates in historical buildings

CURE(*) Centre for urban construction and rehabilitation: technology transfer, research and education

DEMOTEC Development of a monitoring system for cultural heritage through European cooperation – accompanying measure

DIAS Integrated tool for *in-situ* characterization of effectiveness and durability of conservation techniques in historical structures

FIRE-TECH Fire risk evaluation to European cultural heritage

FRIENDLY HEATING Both comfortable for people and compatible with conservation of art works preserved in churches

HISTO-CLEAN Intelligent measurement technology for laser cleaning of historical buildings and monuments

IDAP Improved damage assessment of parchment

IMPACT Innovative modelling of pollution and conservation thresholds

INKCOR Stabilisation of iron gall ink-containing paper

ISHTAR(*) Integrated software for health, transport efficiency and artistic heritage recovery

ITECOM Advanced study course: innovative technologies and materials for the conservation of monuments

ITER Isotopic technologies applied to the analysis of ancient Roman mortars

LASERACT Laser multitask non-destructive technology in conservation diagnostic procedures

LICONS Low intrusion conservation systems for timber structures

LIDO A light dosimeter for monitoring cultural heritage: development, testing and transfer to market

MASTER Preventive conservation strategies for protection of organic objects in museums, historical buildings and archives

MIMIC Microclimate indoor monitoring in cultural heritage preservation

MIP Transition metals in paper

MODHT Monitoring of damage to historical tapestries

MULTI-ASSESS Model for multi-pollutant impact and assessment of threshold levels for cultural heritage

ONSITEFORMASONRY *On-site* investigation techniques for the structural evaluation of historical masonry buildings

PANEURO 5th EC conference "Cultural Heritage Research: a pan-European Challenge"

PAPYLUM Chemiluminescence: a novel tool in paper conservation studies

PARELA Paper restoration using laser technology

ROCEM Roman cement to restore the built heritage effectively

RUFUS(*) Re-use of foundations for urban sites

SUIT Sustainable development of urban historical areas through an active integration within towns

SUSTAINABLE HERITAGE Advanced study course on science and technology of the environment for the sustainable protection of cultural heritage

VIDRIO Determination of conditions to prevent weathering due to condensation, particle deposition and micro-organism growth on ancient stained glass windows with protective glazing

FP6 SSP PROJECTS

ARCHAIA Training seminars on research planning, characterisation, conservation and management in archaeological sites

ARCHAEOMAP Archaeological management policies

AUTHENTICO Authentication methodologies for metal artefacts based on material composition and manufacturing techniques

CHEF Cultural heritage protection against flooding

CHRAF Priorities and strategies to support cultural heritage research activities within ECTP and future FP7 activities

COINS Combat online illegal numismatic sales

CONSIST Comparison of conservation materials and strategies for sustainable exploitation of immovable industrial cultural heritage made of iron and steel

CONSTGLASS Conservation materials for stained glass windows – assessment of treatments, studies on reversibility and performance of innovative restoration strategies and products

CULT-STRAT Assessment of air pollution effects on cultural heritage – management strategies

DESALINATION Assessment of desalination mortars and poultices for historic masonry

FING-ART-PRINT Fingerprinting art and cultural Heritage - *in situ* 3D non-contact microscale documentation and identification of paintings and polychrome objects

GRAFFITAGE Development of a new anti-graffiti system, based on traditional concepts, preventing damage to architectural heritage materials

MULTI-ENCODE Multifunctional encoding system for assessment of movable cultural heritage

NOAH'S ARK Global climate change impact on built heritage and cultural landscapes

PAPERTREAT Evaluation of mass deacidification processes

PICTURE Pro-active management of the impact of cultural tourism upon urban resources and economies

PROPAINT Improved protection of paintings during exhibition, storage and transit

SALTCONTROL Prevention of salt damage to the built cultural heritage by the use of crystallisation inhibitors

SAUVEUR Safeguarded cultural heritage - understanding and viability for the enlarged Europe

SENSORGAN Sensor system for detection of harmful environments for pipe organs

SPRECOMAH Seminars on preventive conservation, monitoring and maintenance of the architectural heritage

SurveNIR Near-infrared spectroscopy tool for collection surveying

Sustaining Heritage 6th European Commission conference "Sustaining Europe's cultural heritage: from research to policy"

FP7 PROJECTS (UNTIL 2010)

CHRESP 8th European Commission conference "Cultural heritage research meets practice"

NET-Heritage European network on research programme applied to the protection of tangible cultural heritage

POPART Strategy for the preservation of plastic artefacts in museum collections

SMOOH's Smart monitoring of historic structures

TEACH Technologies and tools to prioritise assessment and diagnosis of air pollution impact on immovable and movable cultural heritage

CLIMATE FOR CULTURE Damage risk assessment, economic impact and mitigation strategies for sustainable preservation of cultural heritage in the times of climate change

WRECK PROTECT Strategies for the protection of shipwrecks in the Baltic Sea against forthcoming attack by wood degrading marine borers

EU-CHIC European cultural heritage identity card

ROCARE Roman cements for architectural restoration to new high standards

MUSECORR Protection of cultural heritage by real-time corrosion monitoring

NIKER New integrated knowledge based approaches to the protection of cultural heritage from earthquake-induced risk

PERPETUATE Technologies for protecting cultural heritage assets from risks and damages resulting from extreme events, especially in the case of earthquakes

FIRESENSE Fire detection and management through a multi-sensor network for the protection of cultural heritage areas from risk of fire and extreme weather conditions

3ENCULT Efficient Energy for EU Cultural Heritage

MEMORI Measurement, Effect Assessment and Mitigation of Pollutant Impact on Moveable Cultural Assets – Innovative Research for Market Transfer

---

(*) The projects CURE, ISCHTAR and RUFUS were implemented through the Key Action "City of tomorrow and cultural heritage" but developed in the framework of the urban part of this Key Action and cover only partially cultural heritage issues.

European Commission

EUR 24490 — Survey and outcomes of cultural heritage research projects supported in the context of EU environmental research programmes - *From 5th to 7th Framework Programme*

Luxembourg: Publications Office of the European Union

2011 — 48 pp. — 17,6 x 25,0 cm

ISBN 978-92-79-16354-8
doi 10.2777/98555

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- via EU Bookshop (http://bookshop.europa.eu);
- at the European Union's representations or delegations. You can obtain their contact details on the Internet (http://ec.europa.eu) or by sending a fax to +352 2929-42758.

Priced publications:

- via EU Bookshop (http://bookshop.europa.eu).

Priced subscriptions (e.g. annual series of the Official Journal of the European Union and reports of cases before the Court of Justice of the European Union):

- via one of the sales agents of the Publications Office of the European Union (http://publications.europa.eu/others/agents/index_en.htm).

KI-NA-24490-EN-C

This study represents a first attempt to synthesise the vast amount of information resulting from the cultural heritage research projects supported under FP5, FP6 and FP7. The study examines the outcomes and the global impact of these projects. Data for this purpose has been sourced using EC databases but relies largely upon the recent EU publication - "Preserving our heritage, improving our environment", Cultural heritage research: FP5, FP6 and related projects" (Volume II) - which includes a very valuable compilation of FP5 and FP6 cultural heritage research projects.

It emerges from this analysis that the networking within and between project consortia, throughout the various FPs, has contributed towards improving the knowledge needed for preserving cultural heritage and created a European research community in the field of cultural heritage preservation.

However, there is still significant fragmentation in research in this area. In line with the general approach of the European Research Area (ERA), further efforts are required to improve communication and coordination of research including strengthening links with policy and user needs. It is important that research leads to practical solutions for conservation experts and results in viable tools for the widest possible circle of end-users.

Publications Office

ISBN 978-92-79-16354-8

9 789279 163548