

PROJECT FINAL REPORT

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¹ Usually the contact person of the coordinator as specified in Art. 8.1. of the Grant Agreement.

² The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: http://europa.eu/abc/symbols/emblem/index_en.htm logo of the 7th FP: http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos). The area of activity of the project should also be mentioned.

Jordan Conservation of Cultural Heritage in ERA – JOCHERA

Executive summary

The Jordan Conservation of Cultural Heritage in ERA – JOCHERA project was aiming at overall reinforcement of University of Jordan (UJ), Hamdi Mango Center for Scientific Research (HMCSR) in Jordan cooperation capacities for cultural heritage protection research in the context of the European Research Area and development to the conservation centre of excellence to respond to Jordan's socio-economic needs. The JOCHERA impact was to increase the capacities of the UJ in terms of (i) better research and innovation management, (ii) improved international science & technology cooperation and participation in FP7, (iii) enhanced cultural heritage protection research capacities, and (v) defined strategic development framework in order to increase UJ visibility and scope. Likewise, JOCHERA came with hope to increase the research and innovation linkages within Jordan in particular with SMEs, enable better opportunities to young researchers and enhance EU-JO RTD cooperation landscape. The project duration was 24 months, started in 1st December 2011 and ended in 31st November 2013.

The JOCHERA consortium brought together one Jordanian and four EU organizations representing a well-defined mix of expertise for strategic development, innovation management and technological foresight. The consortium developed around three universities (UJ, POLITO, and METU) one SMEs (REDINN) and one research and innovation centre (TECNALIA). The activities of the partners covered the two objectives of reinforcement capacities in the fields of (i) EU- Jordan cooperation and (ii) S&T research qualities on related to conservation of cultural heritage project topic. The consortium offered expertise and consultancy on applied research and international cooperation.

In order to ensure a coherent and well-organized structure and implementation of the project JOCHERA was consisted of five work packages (WPs). Every work package was under the responsibility of one WP leader. The work packages were subdivided into a number of tasks and subtasks, which were in turn related to concrete activities and deliverables. Each task was organised by a task leader and executed with the help of the consortium partners attributed to the task. Every task in the work package was handled with a significant degree of autonomy by the task leader. The work of the task leaders was crucial to the project since they were responsible for the organization of the work in the task and for the preparation of the deliverables in time and in good quality.

The JOCHERA Partnership contributed in a systematic exchange of information, experience and best practice in order to establish comparable principles and standardized processes for joint multilateral activities. Additionally, harmonized IPR regulations, evaluation standards, jointly elaborated training courses were established to run possible future co-executed multilateral activities. The impact of JOCHERA was expected to be felt in the international sphere. Through the implementation of work packages, the construction of a fully operational European Research Area on tangible cultural heritage preservation was fortified and enlarged.

A summary description of project context and objectives

JOCHERA project established and implemented a framework to reinforce the cooperation capacities and research activities in Jordan's Cultural Heritage protection sector by defining cultural heritage research priorities to respond to socio-economic needs, facilitating participation in European cultural heritage research initiatives and development of strategy for research centre based on thorough analysis of current situation, cooperation patterns, relevant actors, needs and opportunities.

The main objectives of the first year were to liaison and strategic representation of JOCHERA towards external entities by establishing a database of people and entities (e.g. other projects pursuing complementary objectives) which had been used for the strategic research agenda for Jordan's priorities in the cultural heritage questionnaire with particular attention to European joint initiatives and research programmes for European and Mediterranean countries. An analysis of the Jordan's innovation priorities and needs was made to identify their innovation capacities in cultural heritage research and the main topics for the training activities.

The main objectives of the second year were "to conduct a SWOT analysis" aimed to identify the strength, weakness, threats and opportunities of the Jordan research centre; "preparation of strategic development plan (SDP)" for incorporation of the UJ long term vision to become an excellence and reference centre for conservation technologies and research not only in Jordan but also for neighbouring countries and in general for the Mediterranean area; in addition "preparation of a technology exploitation plan" trying to match the economic and social Jordan real needs.

The specific objectives of the project for the two years were the following:

- Overview of Jordan's research and innovation priorities, needs and capacities in cultural heritage research
- Development of a strategic research agenda for Jordan's priorities in cultural heritage
- Establishment of a complementary strong collaboration EU/JOD along research topics of mutual interest in the cultural heritage field
- Organization of study tours in Italy and Turkey for UJ researchers, managers and students
- Participation in training workshops concerning the framework programme, cooperation and PEOPLE work programme, the evaluation, administration and managing procedures as well as means and ways to communicate project ideas and research results
- Applying independent auditing to evaluate UJ/HMCSR's performance
- Enlargement scope of research activities and capacity building of researchers
- Organization of Solid NMR training for UJ researchers and student in METU, and in UJ in cooperation with POLITO
- Development of dissemination infrastructure and materials such as project logo, project website, newsletters, brochures and other promo materials
- Coordination and management for smooth running of project activities and deliverables
- Achievement of the project deliverables within time and budget set out in the technical annex
- Establishment of a database for the analysis of the Jordan priorities, needs and capacities in cultural heritage

- Establishment of a complementary strong collaboration between UJ-HMCSR and POLITO and UJ-HMCSR and METU along research topics of mutual interest in the cultural heritage field

Achieving the previous set of objectives a coherent work plan, consisting of five work-packages (WP) had been established.

WP1 Project Management was attributed to project coordinator UJ/HMCSR and represented the coordination for a successful implementation of the overall project with its decision-making bodies and processes and the management tasks for a sound administration of JOCHERA, such as administrative and financial project management, reporting procedures and quality assurance. WP2, Twinning and Joint Research Plans, was aimed to perform an overall analysis and make an overview of Jordan's research and innovation priorities, needs and capacities for Cultural Heritage Research. The main objective of WP2 was to create a mutually complementary collaboration between the UJ and the POLITO and METU along with the research topics of interest, and establish an effective platform for future cooperation in FP7 and H20/20. The main rationale for WP3, Training Modules Development and Upgrading Infrastructures, was the realization of training workshops where the Framework programme, Cooperation and People programmes, the evaluation, administration and managing procedures as well as means and ways to communicate project ideas and research results were presented. WP4, Strategic Development of UJ and Enhance Innovation, was dedicated to (a) development of the UJ strategy for internationalisation of the research centre and (b) improve research and development performance in Jordan's cultural heritage sector through creation of framework for mobilization of innovation resources and engagement of cultural stakeholders while fostering links between research and private sector, national incubator and business angels networks and Enterprise Europe Network at Jordan Enterprise. Finally WP5, Network Facilitation and Dissemination, was dealing with two main aspects of the project work plan: (a) Facilitating networking activities between Jordan and European researchers in cultural heritage protection and (b) Spreading project activities and results as wide as possible, so as to reach the largest possible audience.

Work packages and their components

WP 1 - Project management

- T1.1 Administrative and operational management
- T1.2 Project liaison and strategic representation of JOCHERA towards external entities
- T1.3 Quality assurance and risk management

WP 2 - Twinning and joint research plans

- T2.1 - Analysis of Jordan's research and innovation priorities, needs and capacities
- T2.2 - Exchange of knowledge and good practices in organization of research process
- T2.3 - Joint research plans in priority fields and on-site professional trainings

WP3 - Training modules development, upgrading infrastructure

- T3.1 Development of training modules and delivery of dedicated trainings
- T3.2 Trainer for research managers with focus on Cultural Heritage relevant issues
- T3.3 Capacity building in FP7
- T3.4 One-to-one Sessions

T3.5 Contacting potential proposers

T3.6 Upgrading research capacities

WP4 - Strategic development of UJ and enhance innovation

T4.1 Setting up and operating external experts group (EEG) for guidance to sustainability of the business plan development

T4.2 SWOT analysis

T4.3 Development strategic development plan

T4.4 Foresight plan

WP 5 - Network facilitation and dissemination

T5.1 Development of dissemination infrastructures and materials

T5.2 Jordan's cultural heritage symposium

T5.3 Networking activities and contacts with other EU initiatives

T5.4 Final conference

The impact of JOCHERA was expected to be felt in the international sphere. Through the implementation of the work packages, the construction of a fully operational European Research Area on tangible cultural heritage preservation was fortified and enlarged.

The Project activities had been designed to fully contribute to the impacts listed in FP7 capacities work programme (Activity 7.6)

1. Contribution to RTD capacity building and management in the target country
2. Enhanced participation of the country in the Seventh Framework Programme
3. Increased visibility and scope (regional coverage, subjects, activities) of the centres with increased linkage with economic and social environment
4. Networking with other research centres in member states or associated countries (mobilising the human and material resources existing in a given field, disseminating scientific information as well as the results of research, facilitating communication between the centres having similar scientific interest).
5. Increased job opportunities that encourage gender equality in the country, in particular for young scientists (measures to avoid 'brain drain' phenomena: better career opportunities, better work conditions, access to research infrastructures).

In conclusion, the pillars of JOCHERA project's impact were:

- A set of coordination and support objectives elaborated by a consortium with long experience in supporting rural development and innovation, acquired in a wide set of EuroMediterranean cooperation projects.
- Networking, mobility and connection of Jordan, neighbouring countries and EU scientists to reinforce the local RTD potential, thus promoting the excellences in the specific research fields at the Jordan institutions and research centres.
- Continued interaction and dialogue with relevant stakeholders, whom were involved in JOCHERA during the whole project cycle.
- A specific attention to innovation and technology transfer to/from the cultural heritage sector.

- A specific effort to disseminate the project's results. This effort was expressed in the elaboration of specific training materials, in the participative preparation of the strategy plan as well in the capacity building activities

JOCHERA produced cooperation and support resulted in:

- Streamlining the capacity of UJ coordination activities with European partners, and actively participating in Framework Program activities. The project increased the institutional visibility and RTD excellence at National, Regional and International levels.
- Fostering the capacity of European partners to cooperate with Jordan research institutions. The FP7 workshops and the other international events permitted to bring together local, Mediterranean and European institutions and public/private enterprises. These events represented the opportunity to present UJ organization to external potential partners for future joint research projects and cooperation activities.
- Integration with other FP7 projects in the region, as foreseen in WP1; twinning with other EU ERA-WIDE Project as well as with funded project by other donors, was established. This activity was aimed to exchange information and perform common activities exploring the possibility to organize joint networking, dissemination events. In this way JOCHERA established synergic were affected.

For what about the external factors that may negatively affected the project;

Their influence was considered as very limited, as a matter of fact:

- The consortium included all required expertise, human capital and resources to lead the project successfully; the consortium members were top-level partners with experience, credibility and reliability.
- The proposed work plan was feasible and realistic, the management structure ensured adequate risk management and problems solving
- The project goals were consistent with the Jordan policies and R&D strategies.

European Added value

The nature of the proposed activity required action at the European dimension.

JOCHERA project intended to reinforce research and cooperation capacities of UJ in order to increase its competency and fund rising skills for a successful participation in the EU Research Framework Programme. This goal was achieved through a set of targeted capacity building measures (namely coaching and training events, including the support of a mobility scheme) as well as through the development of a sustainable comprehensive strategy to increase UJ regional coverage. This action required interaction with partners located in EU member countries specializing in RTD networking activities with Mediterranean countries, and in the scientific topics constituting the specialization of UJ.

The consortium members were capitalized by their privileged association with an institution, which was determined to raise their profile in the Scientific and Technological field, and also in the Framework Program.

For the dissemination activities, the JOCHERA consortium developed a set of tools and performed a set of actions that ensured efficient dissemination of the project's activities and results at a European and international dimension. JOCHERA dissemination activities were stand on three pillars: digital media (website, newsletters, and other digital promo materials); print media (brochures, leaflets, flyers, presentations); public relations (communication activities with public and mass media).

A description of the main S&T results/foregrounds

Work progress and achievements during the project

WP1: Project Management

The planned and realized objectives were:

- To ensure achievement of the project objectives within the time and budget set out in the technical annex;
- To ensure communication and coordination among the partners;
- To link the project to the European Commission and other ongoing projects and initiatives;
- To prepare and monitor partners' contributions to activities and financial reports (interim and periodic), assess cost statements and consolidate reports;
- To prepare and chair project and review meetings together with the other partners and/or the European Commission.

Following Tasks:

Task 1.1: Administrative and operational management

Management of the project, including the main coordination activities and contacts with the European Commission services, where the other partners had been involved in the preparation of report contributions, financial statements and other administrative requirements, as well as in the preparation of necessary support material prior to meetings.

Achievements:

The main objective of task1.1 was to manage the project, which had been done according to the following activities performed by the project coordinator (UJ):

- Transforming of the payments to the partners. Communicating with all the partners through e-mail and dropbox to follow up the performance of the tasks, the events and the deliverables that were related to the project. Preparing and scheduling of the project meetings. Drafting and submission of reports. Having Skype meeting with partners
- Holding the KoM on 30th of Jan 2012, the 2nd meeting on 7th of July 2012, the 3rd meeting on 17th of Nov 2012, the fourth meeting on 19th of June 2013, and the final meeting on 3rd of November 2013. Approving and sending all the deliverables to the QA task leadership (REDINN). Then submitting all the deliverables to the EC and finally monitoring and controlling all the other tasks and deliverables progress
- Building up and updating the data base of people and entities such as the Department of Antiquities (DoA), the Jordan University , Um Qais museum, the researchers in UJ, Yarmouk, Hashemite, and other jordanian universities, Jordan Museum, ACOR, Ministry of Tourism, Royal Botanic Garden, Royal Science Society, British Council, UNESCO... ext
- Having internal (UJ)/ HMCSR team meeting on weekly bases, distributing the work internally (UJ), constructing the Pre-financing budget
- Planning for the upcoming events that were related to the project inside and outside Jordan

Task 1.2: Project liaison and strategic representation of JOCHERA towards external entities

By linking the Project with specific activities which were instigated contact and implemented of arrangement with the European Commission, and with other external entities, in addition to

manage project links and ensure coherence of JOCHERA relationships with other entities and maximise the impact of the project

Achievements:

The following items were done

- Building and updating data base for people interested in conservation of cultural heritage from internet, websites, brochures, phone calls, workshops, and personal visits.
- Collaborating by discussion and analyzing the current conservation of cultural heritage situation in Jordan, meeting Jordanian policy makers, collecting the information of other similar and different projects through the period 2000-2012 and preparing a booklet for the projects financed by the European Commission in the conservation of cultural heritage sector in Jordan, and a review for the conservation materials and archaeometry techniques in Jordan for the period from 2000 to 2012
- Arranging and managing the contact of the project with other entities such as attending, two study tours in Turin (27th to 30th of March 2012) and (12th to 15th of Nov 2012), Barcelona's conference (31st of March to 4th of April 2012), the training and meeting in Brussels (8th to 14th of July 2012), training in Rome (8th to 11th of Oct), conference in Cyprus (28th of Oct to 3rd of Nov 2012), the 7th World Archaeological Congress held in Dead sea/ Jordan (January 2013), a study tours in Ankara/ Turkey (March 2013), Get Ready for Horizon 2020 workshop in Amman/ Jordan (April 2013), building communication and synergies between MEDSPRING and ERAWIDE projects in Amman/ Jordan (May 2013), PEOPLE Info Day/ International Incoming Fellowships IIF Call in Amman/ Jordan (June 2013), the 44th World Chemistry Congress in Istanbul/ Turkey (August 2013), Cultural heritage conservation conference in Paris/ France (Oct 2013)
- METU took part in JOCHERA project activities and discussions and tried to contribute to its dissemination during its own scientific activities related to cultural heritage by making some contacts: with conservation scientists in two international symposiums (2nd international conference on chemistry for cultural heritage ChemCH; July, 2012, in Istanbul-Turkey and 1st international conference of restorers; April 2012 in Tbilisi-Georgia .
- TECNALIA provided contacts for the JOCHERA database and helped to improve dissemination activities by participating in AR&PA Fair, with a high impact for the conservation field, which was held in Valladolid/ Spain (May 2012).

Task 1.3: Quality assurance and risk management

The Quality Assurance Plan had been presented during the kick-off meeting. It described the peer-review procedure for reviewing deliverables prior to delivery to the Commission; and included the evaluation report templates and specification of Risk Management principles.

Achievements:

A Quality Assurance plan showed quality criteria for deliverables and including risk assessment and conflict resolution that had been presented to and shared with partners during the JOCHERA kick-off meeting in January 2012. The quality assurance procedure for peer-reviewing deliverables and events had been set up and running for all deliverables submitted during the report period time. 24 deliverables had been submitted and accepted to the European Commission

WP2: Twinning and Joint Research Plans

The planned and realized objectives were:

- To perform an overall analysis of Jordan's research priorities, needs and capacitance in Cultural Heritage research
- To create a multidisciplinary and complementary cooperation between UJ and POLITO along the research topics of interest in the Cultural Heritage field
- To establish an effective platform for future cooperation in FP VII and future international cooperation project

Following Tasks:

Task 2.1: Analysis of Jordan's research and innovation priorities, needs and capacities.

Main priorities were identified and a roadmap for its future implementation through National, European and International research programmes was prepared. This included the specific topics to be developed, a brief state of the art on the current state, links with existing initiatives, estimated budget and time planning

Achievements:

Main objective of Task 2.1 was to analyse Jordan's research and innovation priorities, needs and capacities.

An extensive analysis of documents on cultural heritage research, in particular strategic research agendas, roadmaps and implementation action plans had been performed with the purpose of establishing a preliminary list of research priorities. Particular attention was given to the Strategic Research Agenda of the European Construction Technology Platform (ECTP) in the Focus Area of Cultural Heritage. After several consultations between partners, a first version of a questionnaire was produced with the objective of synthesizing main research priorities on cultural heritage and adapting them to the specific needs of Jordan.

A pilot questionnaire was launched to the University of Jordan's personnel external to the project, in order to verify the efficacy of the questions and responses and to have a feedback from participants.

A final version of the questionnaire was produced considering comments and suggestion received from the external participants. In order to promote the highest response rate, project coordinator, the University of Jordan and partners involved in this WP, sent the questionnaire by email to a list of key agents that gave specialized feedback in Cultural Heritage priorities. The questionnaire was also uploaded to the JOCHERA website.

The result of the analysis of the questionnaire was clear synthesis of the actual situation in Jordan in research activities concerning cultural heritage and the future needs of young researchers and all the actors in this field, both from the technical and management point of view. The analysis of the activities carried on by the JOCHERA consortium were compiled and described in detail in the Jordan's Strategic Research Agenda in Cultural Heritage. Two versions of this deliverable were submitted, as the survey was available on-line until the 15th of May 2012, in order to upgrade the preliminary results of the first version of the deliverable which was submitted to the EC at the end of April 2012.

This document was used as a basis for the Strategic Research Agenda Implementation Plan. The implementation action plan is a step towards a practical mid-long term organisation of the research needs and activities in Jordan (2012-2016) and explained how the topics related to the identified research activities should be implemented and gave information on the scope and objectives of each priority, the research areas, related projects developed with the participation of Jordanian entities, the future vision and the budget and time planning. It analysed the present situation in the cultural

heritage research field in Jordan by an overview of past and current projects and programmes, for the establishment and definition of future actions to be implemented.

Task 2.2: Exchange of knowledge and good practices in organization of research process

Three study tours had been organised, two of them were to POLITO in Italy (the first one for two researchers and the second was for three researchers and 5 students), while the third study tour to Turkey at METU for three researchers and three students. The tours were focused on exchange of knowledge and experiences in organization of research process. The description of collaboration in research directions and activities had been prepared after the study tours. Two general Memorandum of Understanding were prepared and signed between UJ and METU and UJ and POLITO. Also another agreement was prepared and signed between UJ and METU for exchange of students.

Achievements:

POLITO organised the **First Study Tour** in collaboration with UJ (March 2012). Prof. Abeer Al Bawab and Dr. Fadwa Odeh participated from UJ together with the POLITO researchers of the two departments (DELEN-DISMIC) who were involved in the JOCHERA project. This event lasted for three days and was mainly focused on exchange of knowledge and expertise both in the organisation and management of EU projects as well as on the technical and scientific aspects related to the conservation of ancient artefacts, in indoor and outdoor environments, in Jordan and Italy. All the activities were organised to allow a broad wide discussion on the research topics of interest in the cultural heritage field for UJ and POLITO researchers in order to establish future collaborations and identify international S&T cooperation programmes of interest for both sides.

The following contributions had been presented by the UJ participants:

- *Jordan needs in cultural heritage conservation* (Prof. Abeer Al Bawab)
- *Cultural Heritage Conservation Methods in Jordan* (Dr. Fadwa Odeh)

During the tour, POLITO presented the long-lasting experience in the cooperation activities and management of FP4 and FP5 - INCO-MED projects in the cultural heritage field; in particular, the main research results obtained in the following projects were presented:

- European INCOMED Project, FPV, **EFESTUS** (*Tailored strategies for the conservation and restoration of archaeological value Cu-based artefacts from Mediterranean Countries, 2003-2005*)
- European INCO-MED Project, FPVI, **PROMET** (*Developing new analytical techniques and materials for monitoring and protecting metal artefacts and monuments from the Mediterranean country, 2004-2007*)
- European SSA Project, FPVI, **MEDAL** (*Mediterranean conservation alliance - 2007-2009*)

According to the know-how of POLITO researchers the technical and scientific presentations and discussions mainly focused on the following topics:

- ❖ Monitoring issues in cultural heritage both indoor and outdoor by means of autonomous low-cost devices;
- ❖ Corrosion and protection via protective coatings both conventional and plasma based;
- ❖ Metrological characterizations development of portable instruments and innovative sensors for cultural heritage monitoring;
- ❖ PECVD and plasma sputtering processes for cleaning and protecting ancient artefacts.

A meeting with the Rector of Politecnico di Torino, Prof. Marco Gilli, was organised for discussing the opportunities offered to foreign students from the Mediterranean Countries to attend Master and PhD courses in Politecnico di Torino.

During the visit, a tour of the POLITO laboratories and facilities was also arranged together with a visit to the *Innovative Enterprise Incubator of Politecnico di Torino*.

Finally, a visit to the *Villa Della Regina*, a Savoy residence in Torino, was organised with the collaboration of the *Soprintendenza per i Beni Storici Artistici ed Etnoantropologici del Piemonte*. This is a UNESCO world heritage site where POLITO researchers had been involved in the restoration of the ancient mirrors of the *Villa* and in the development of an environmental monitoring system for temperature and humidity control.

A statement of collaboration describing the research directions and activities for exchange knowledge between UJ/HMCSR and POLITO was determined at the end of the tour.

POLITO & UJ agreed on the following future issue:

- Collecting materials regarding the review paper in conservation of CH using colloids science and nanotechnology.
- Listing the laws in DoA in Jordan to be compared with the ones in Italy.
- Evaluating the temperature and relative humidity sensors specifically designed by Marco Parvis and his research group (POLITO) for the in situ monitoring of CH and comparing their performance with the ones already employed in Jordan museums.
- Carrying out a literature survey to look at methods to preserve metallic objects, with the possibility of performing small researches using same methods on our artefacts.
- Comparing metal conservation strategies and methodologies in Italy and in Jordan
- Discussing the use of portable instruments for the characterization and the assessment of the conservation state of CH artefacts
- Designing papers and research projects which can be submitted in cooperation with POLITO to international journals and future EU call
- Preparing & sending the Scientific Research Priorities (highest & least priority) in Jordan for the years 2011-2020 to be delivered to TECNALIA

POLITO and UJ organised also the second study tour at Politecnico di Torino on November 2012. The tour was attended by Prof. Abeer Al-Bawab and Dr. Ramadan Abd-Alla and involved also one researcher and 5 students (B.Sc and M.Sc degree). This second visit to POLITO focused on the exchange of knowledge and experiences between two organizations in research process, on-site acquaintance with research infrastructure as well as research presentations and discussions. The analyses of the activities carried out during both tours have been compiled and are described in detail in the study tour report (Deliverable 2.3).

METU hosted the third study tour on March 2013. The tour was attended by Prof. Abeer Al-Bawab and Dr. Fadwa Odeh, also two researchers and two students (B.Sc and M.Sc degree) were involved in this tour. The visit focused on the exchange of knowledge and experiences in organization of research process, on-site acquaintance with research infrastructure as well as research presentations and discussions. The analyses of the activities carried out during the tour had been compiled and were described in detail in the study tour report.

Task 2.3: Joint research plans in priority fields and on-site professional trainings

POLITO provided on-site training and research opportunities for students and young researchers of UJ. The training visit and study tours have been organised in Torino, Italy by POLITO. The activities focused on:

- Exchange of knowledge and expertise in cultural heritage conservation
- Development of detailed research plans in cultural heritage conservation
- On-site trainings on various experimental and technological procedures

Achievements:

The main objectives of Task 2.3 were to develop joint research plans between UJ, POLITO and METU and to provide on-site training and research opportunities for students and young researchers. POLITO organized the task's activities to provide training research opportunities for UJ students and young researchers. Six UJ personnel were involved in these activities.

The second study tour, hosted and organized by POLITO, Italy, which was held on November 2012 included both a research & training visit. The merge of the two activities provided the possibility for UJ's young researchers and students to participate in international cooperation projects. POLITO researchers gave UJ attendees' information and experience in the field of cultural heritage conservation. POLITO's capabilities and laboratories equipment were introduced along with their applications and were discussed in details with the UJ's attendees.

The visit focused on the development of detailed research plans in specific topics of interest in the field of cultural heritage conservation. The following topics were discussed, in particular, between POLITO researcher and some invited speakers with UJ delegate:

- Corrosion mechanism and degradation of metallic artefacts: iron, bronze and silver.
- Polymeric coatings and plasma deposited thin films for the protection of metals and ceramic materials.
- *In situ* analytical techniques for cultural heritage monitoring.
- Measurements for cultural heritage: uncertainty and quality insurance.
- Restoration of buildings and stones and structural monitoring.

Four visits were organized to different sites where different types of CH are stored. Two visits were dedicated to two museums in Torino: Archeological Museum (an outdoor environment), and Egyptian Museum (an indoor environment). The other two visits focused on restoration sites where POLITO's researchers had operated. The visits were carried out in cooperation with Arch. Albanese to the “*Chiesa dei Santi Martiri*”, and to the “*Villa della Regina*”, Turino. A statement of collaboration describing future research directions and activities between UJ and POLITO was prepared at the end of this tour.

During the training course, some hands-on experience and laboratory activities were performed in the DISMIC laboratory on plasma deposition of protective coatings onto metallic substrates and on the assessment of their protective effectiveness by means of electrochemical measurements. Some plans were laid down to give UJ students the possibility to come to POLITO for longer periods of time and thus be able to work in POLITO laboratories, this will maximize the exchange of knowledge and expertise between POLITO and UJ/HMCSR as a mutual beneficial to strengthen capabilities in cultural heritage research.

METU organized the third study tour in addition to solid-NMR training to provide collaborative training and research opportunities for UJ students and young researchers. Six UJ people and seven METU researchers and graduate students have participated in these activities. The study tour in

METU (Ankara, Turkey) was held in March 2013. It involved visits to different research laboratories (METU Materials Conservation Laboratory, METU Central Laboratory, and NMR laboratory in Department of Chemistry) and field trips with a focus on cultural heritage conservation research and future cooperative studies between METU and UJ. A meeting with the head of METU Central Laboratory and another meeting with the head of the NMR laboratory in Department of Chemistry were held to discuss developments of HMCSR laboratories, mutual and future research opportunities.

The following topics were introduced and discussed by METU Conservation Laboratory researchers and UJ delegate:

- Materials conservation research in monuments and archaeological sites
- Non-destructive analyses and their use in diagnostic studies and evaluating efficiency of conservation treatments and monitoring studies
- Limestone decay in historic monuments and consolidation with nano-dispersive calcium hydroxide solutions
- Analysis of historical mortars and plasters and studies for the preparation of repair materials

The field trips were organized to the following sites:

- The historical town Beypazarı, Ankara for its traditional timber-framed houses and its local museums.
- The Anatolian Civilization Museum, Çengel Han Museum, Ankara Castle and traditional houses belonging to the Ottoman period.

This study tour provided opportunities for METU and UJ to develop joint research projects and make plans for student and researcher exchange in the context of cultural heritage protection.

METU and UJ prepared (i) a Memorandum of Understanding, and (ii) a student exchange agreement, in order to facilitate the exchange of students and collaboration in new research projects between the two institutes. Both agreements were signed/approved by the Presidents of the two institutes.

The future proposed projects between METU, UJ and POLITO as well as the mutual agreements prepared among those universities were among the achievements of the JOCHERA project to establish a strong background for collaborative studies in the future.

WP3: Training Modules Development, Upgrading Infrastructure

The planned and realized objectives were:

- To train researchers and research managers from UJ/HMCSR on FP7 main aspects – evaluation, administration, managing procedures, means and ways to communicate project ideas and results;
- Encouraging participants to register as evaluators and experts using the Research Participant Portal specific section;
- Foster the synergies with other ERA-WIDE projects in the region by delivering joint events

Following Tasks:

Task 3.1: Development of training modules and delivery of dedicated trainings

Training modules were created to build practical competencies in managerial and administrative topics related to IPR, Innovation Management and Technology Transfers.

Achievements:

Main objective of Task 3.1 was to organise training workshops in order to allow research entities in Jordan to better exploit and expand their results and to contribute to regional development by the collaboration with EU countries.

In order to improve international cooperation in cultural heritage research, especially related to innovative conservation methods and materials, several activities, including training, had been planned for the enhancement of high quality scientific research.

The aim of the training activities was to promote, plan, organise and deliver high quality training events by the participation of multiple actors involved in cultural heritage research in the form of short-term courses, adapted to audience needs.

The organisation of these courses ensured a high level of dissemination by the active involvement of relevant stakeholders and future international scientific and technical cooperation and participation in the Framework Programme.

Training workshops offered the opportunity to Jordanian researchers to experiment proposal writing and EU project management, thus enabling key personnel to look for EU funding opportunities, as well as improving knowledge on how research results can be exploited and bridging the gap between industry and academia.

TECNALIA, in coordination with REDINN, prepared the training material for the two workshops held in Amman on the 4th and 5th of June 2012, and 16th and 17th of June 2013. Training modules were adapted to the needs of Jordanian researchers and covered the following issues: FP7 overview; participation in an FP7 consortium; proposal preparation, financial and administrative issues; IPR; evaluation and negotiation process; communication and dissemination, Technology Transfer and start-up creation.

Task 3.2: Training for research managers with focus on cultural heritage relevant issues

This training included project management in FP7, project proposal preparation in FP7 and financial and administrative issues in FP7 projects.

Achievements:

One of the main objectives of JOCHERA project is to reinforce the University of Jordan (UJ) – Hamdi Mango Center for Scientific Research (HMCSR) cooperation capacities for cultural heritage protection research in the context of the European Research Area. In order to develop these capacities and support research and innovation activities at UJ/HMCSR, specific training modules have been designed to cover FP7 overview; participation in FP7 consortium; proposal preparation, financial and administrative issues, IPR and innovation management, by addressing research managers so as to improve their expertise on EU project management.

The main objectives of the training were to prepare participants on FP7 rules, regulations, funding schemes, project management, project proposal guidelines with a particular focus on how to select the scientific and/or technical aspects relevant to the topics of the call, how to describe the potential impacts of the proposal as well as how to implement it successfully and following the financial rules of the FP.

The aim of the training was to study how to write professional and competitive proposals for the EU's Framework Programme (FP) for Research and Technological Development. The course gave an

overview about the relevance of FP in EU policies, focusing on the common problems in proposal writing and the success criteria for proposals.

The first training was designed to address a broad spectrum of researchers, with young and inexperienced researchers are the main target group of this first module. The profile of participants registered for the training sessions was mainly with low or no experience in the Framework Programme. For this reason, in addition to innovation management and IPR protection which are the thematic areas of the sessions, a more general overview of administrative and financial aspects was given were one of the thematic areas discussed during the sessions,.

The second training sessions were entirely dedicated to research managers, focussing on the relationship between academia and industry. One of the main gaps identified by the SWOT analysis carried out during the project was the difficulty of the University in interacting with industrial partners. For this reason, experts both from academic research and industry were invited to give their overview and particular attention was given to the specificities of the Mediterranean region.

The sessions focused on the protection and exploitation of research results and their uptake to market. Contributions were also improved by case studies presentations in order to increase participants' interest and provide real examples on how research and industry can improve their relationship.

Task 3.3: Capacity Building in FP7

Two workshops were organised:

- Capacity Building in FP7 (4th June 2012) – it aimed at providing participants with knowledge in FP7 (rules, regulations, funding schemes, project management, project proposal writing) and stimulating project ideas generation and networking activities.
- IPR and Technology Transfer (17th June 2013) – it focused on IPR protection, commercialisation and valorisation of RTD projects' results, innovation life-cycle management and technology transfer.

Achievements:

The first workshop on Capacity Building in FP7 – 4th June 2012 was designed to include both theoretical and practical exercises. The morning session and part of the afternoon session was dedicated to the main aspects (legal, financial, administrative) of FP7 participation so as to have a common understating of funding mechanism. During the practical exercises, participants were divided into 4 groups according to different topics and were asked to prepare a concept note.

Both theoretical and practical exercise were organised to enhance participants' understanding on how funding mechanism works and how to apply for funding.

Thirty six participants attended the event; 16 of them requested a one-to-one sessions that was planned during the 2nd day of training – 5th June 2012. The training was a successful meeting and all participants' expectations were mainly met. A general appreciation for the event, materials provided and style/level of communication between speakers and participants has been registered.

The second workshop on IPR and Technology Transfer was held on 17th of June 2013. The training focused on IPR related issues. Case studies and initiatives to support and implement technology transfer were presented.

Seventy nine participants registered the first day while 33 registered for the second day. Participants appreciated the training and expressed their interest in attending similar events in the future.

Participants were able to interact with experts and build on their professional experience to acquire knowledge and gain a better understanding of the topics discussed during the one-to-one sessions of the 2nd day training.

Task 3.4: One-to-one Sessions

Two sets of one-to-one sessions were organised in conjunction with the workshops in June 2012 and June 2013. Their objectives were to:

- Understand participants' research interest;
- Discuss, in details, their project ideas;
- Give feedback and suggestions for the next steps

Achievements:

One-to-one sessions – First round June 2012. The training session was divided into two parts: the morning session was dedicated to proposal writing and evaluation while in the afternoon, participants were divided in 4 working groups to develop their own project ideas. The project ideas emerged during the workshop on the 4th June, 2012 were developed and discussed within the 4 groups then presented to REDINN and TECNALIA in the afternoon session. One-to-one sessions – Second round June 2013, focused on IPR related issues and was presented by REDINN and POLITO. Participants discussed their ideas with experts and received initial feedback on how to incorporate IPR regulation in their projects. Specifically, POLITO brought its expertise in the IPR issues connected to cultural heritage field where the different background of the involved participants (scientists, archaeologists, curators) required specific procedures.

Task 3.5: Contacting Potential Proposers

This was performed by establishing contacts with the various networks of the scientific area covered by the project and aimed at finding partners from organisations that will engage in direct proposal submission or at exposing the technological offer emerging from organisations to the partner searches issuing from projects

Achievements:

The Roadmap on consortia formation presents the connection between identified needs within cultural heritage protection research of the UJ/HMCSR and the main funding opportunities in FP7. D3.5 answered key questions about building consortium to participate in EU funded projects: a) How to develop networking activities; b) How to identify potential partners; c) How to involve/attract end user and local authorities.

Hints and tips were presented on how to set up its own network and how to write and promote institution's profile at European level so as to join international consortia.

Two project ideas resulted from the capacity building and one-to-one sessions. Under IRSES mobility program: an idea for a project suitable for this program was prepared during the training courses of JOCHERA held on the 4th and 5th of June 2012 in Amman (Jordan). The title of this project is "NANOCULT-MOBMED- this project will focus on exchange of knowledge on compatible mortars and plasters for conservation of cultural heritage using nano-sized additives". A list of potential partners was prepared with JOCHERA partners and contacts with potential partners were initiated. This project was submitted, but unfortunately, was not accepted.

During the third study tour in METU, UJ and METU discussed the ideas of two EU-research proposals both focused on cultural heritage conservation researches:

- Improvement of new materials for conservation treatments: was developed in the context of research to innovation and sustainable societies call. This project proposal would study the topics of, damage assessment, diagnosis and monitoring methods, conservation works, such as cleaning, protection and consolidation treatments with particular attention to the use of new nanotechnology for the treatments, performance specifications of treatments and repair materials. This project was planned to be conducted through twinning, training and support activities, and collaborative research-to-innovation.
- Nanotechnology and new methods for historic materials conservation together with standards for performance: in the context of advanced materials and environment. This project proposal would study the development of methods for compatible stone consolidation treatments targeted to the control of decay mechanisms and development of standard methods to verify the efficiency of the consolidation treatments. The project aimed at identifying the most appropriate consolidation methods involving nanotechnology, their application techniques, efficiency assessment and monitoring.

In addition to these specific proposed projects, a framework of cooperation was set up between POLITO and UJ and METU and UJ:

- POLITO and UJ prepared a Memorandum of Understanding to facilitate exchange of students and researchers, as well as the foresight of future common projects
- METU and UJ prepared a Memorandum of Understanding
- METU and UJ prepared an agreement, to facilitate exchange of students between the two universities.

Task 3.6: Upgrading research capacities

Upgrading and renewal of S&T research equipments for UJ was studied, the aim was to install or upgrade an equipment involved in a high cooperative research work on the same scientific problem by researchers from POLITO and METU. The main research equipment that fulfilled this criterion was a Bruker NMR instrument. This instrument was upgraded with solid-NMR probe to expand its capabilities to study and characterize solid samples in addition to liquid ones.

Achievements:

The pursuit of the solid NMR probe for the upgrading of the 500 MHz Bruker NMR instrument had been established by the end of the first year of the project.

In the second year a solid NMR training was organized by METU for six researchers and students from UJ in Ankara/ Turkey (April 2013). A second training was also organised and conducted by POLITO researchers for the solid NMR (June 2013). A POLITO PhD student (1 PM not charged in the project budget) has also been involved in the NMR training activities to show the potentialities of this technique in the study of the degradation processes of limestone and tuff.

WP4: Strategic Development of UJ and Enhance Innovation

The planned and realized objectives were:

- To develop a UJ strategy for the internationalisation of the research centre, in order to become a world-class entity for cultural heritage research

- To improve research and develop performance in Jordan’s cultural heritage sector through the creation of framework for the mobilization of innovation resources and engagement of cultural stakeholders
- To support UJ in developing a dialogue on innovation with SMEs, involve policy makers and increase competitiveness in the conservation sector.

Following Tasks:

Task 4.1: Setting up and operating external experts group (EEG) for guidance to sustainability of the business plan development

Three external experts were selected in collaboration with the European Association of Research Managers & Administrators (EARMA)

Achievements:

Three external experts have been selected to support the development of the business plan for Hamdi Mango Center for Scientific Research. In addition, two more experts have expressed their availability to work on the business plan. The table below shows experts’ details and expertise.

Table 1: Experts' details and expertise

Expert Name	Country	Expertise
Selected experts		
Lola Fernandez	Spain	EU Project Management, Cultural Heritage
Angele Giuliano	Malta	Cultural Heritage, Creativity and Culture
Salvatore Monni	Italy	Economics, Creative and Cultural Industry, Business plan, Innovation
Additional experts		
Dr Trinidad Cortés Puya	Spain	Business development and identification of potential opportunities
Nizar Al-Halasa	Jordan	Innovation management, intellectual property, commercialization, business incubation and SME development.

Task 4.2: SWOT analysis

Aimed at identifying the strengths, weaknesses, threats and opportunities of HMCSR

The SWOT analysis which was performed by METU on HMCSR to reveal its strategy, strengths and weaknesses on research, management and administration together with the assessment of cultural heritage sector externalities, threats and opportunities. The report has evaluated the results of the analyses on the existing cultural heritage protection research activities and the main needs for research, training and mobility/networking in this area with reference to HMCSR.

Achievements:

This task focused on the analysis of HMCSR, its internal strengths and weaknesses for cultural heritage protection research as well as the external opportunities and threats that have to be taken into account in the context of the European Research Area.

The SWOT analysis was a useful tool for better understanding of the present situation and the capacities of HMCSR for cultural heritage research and for its improvement in that context. The SWOT analysis provided valuable inputs for the strategic development plan in the context of WP4.

Two separate questionnaires were prepared, one by TECNALIA and the other by METU-MCL in cooperation with POLITO. They were answered by HMCSR researchers and administrators. Answers to those questions were evaluated by METU-MCL. The results were given in the SWOT analysis report.

The SWOT analysis showed that HMCSR is a well-established research centre with its highly-qualified researchers forming a multidisciplinary team, advanced equipments and proper laboratory spaces. HMCSR has a high potential to assimilate the cultural heritage protection research in its structure. Its researchers were interested in adapting themselves to cultural heritage protection research issues.

However, HMCSR faced some externally embedded difficulties related to shortcomings in administration and management. HMCSR is capable of using its potentials to become an important research centre contributing to fundamental research areas including cultural heritage protection. Those difficulties presented new opportunities to be overcome. HMCSR is able to find ways to tackle with those difficulties by taking into account its own potentials and priorities.

Task 4.3: Development strategic development plan for integrating, internationalization and expansion.

Based on the SWOT analysis, the SDP (Strategic Development Plan) has been developed to include a projection of activities to be implemented in the next 3-5 years enabling HMCSR to become a centre of excellence in conservation technologies for cultural heritage.

Achievements:

A detailed strategic development plan was developed to allow HMCSR to become a centre of excellence for conservation technologies in Jordan and a reference centre for Mediterranean countries.

Task 4.4: Foresight plan

Matching between the economic and societal needs in Jordan with the results of the strategic research agenda priorities.

Achievements:

Foresight and innovation focus on vision development and innovation planning. Through a collaborative team based approach it is possible to design innovative, long-term strategies to put into action today, while helping to build new skills to meet tomorrow's challenges.

Foresight is a process attempting to look into the long-term future of science and technology with the aim of identifying the emerging know-how likely to yield the greatest economic and social benefits. This approach has been selected in order to enlarge scope of research activities and capacity building of researchers of HMCSR.

Main actions defined in the foresight plan are based on the Jordan strategic research agenda in cultural heritage and the strategic research agenda implementation plan developed under WP2 and the SWOT analysis carried out for the HMCSR, developed in WP4. Foresight planning, in the context of the JOCHERA project, is to actively use the knowledge and competence of the HMCSR, to plan and create the basis for innovative solutions for the future.

HMCSR provides support to researchers to conduct scientific research and finds appropriate financial funding at national and international level to carry out research in the strategic areas. It cooperates with local, regional and international research institutions in order to enhance capabilities of researchers and their way of cooperation with their counterparts. HMCSR aims at increasing its participation in the fields of applied science and technology and the cooperation between academia and industry and, in order to achieve this objective, has established its main priorities. According to its vision in the strategic development plan (D4.3), three main dimensions were defined with the objective of accomplishing these priorities.

The action plan established in the foresight plan will help HMCSR to mobilise resources in order to increase the visibility of the centre and improve the economic support from industries. The foresight plan is proposed as a participatory tool supported by a monitoring process that will guarantee flexibility and adoption of the measures to the possible changes that the centre will have to face.

All the strategic areas of the centre will have to contribute to a main common objective and will have to adopt the foresight approach. Only in this way it will be possible to find new research sectors and market needs related to one or more areas of the centre. The introduction of cultural heritage in the activities of the centre arose from the collaboration between two areas: Material Science & Nanotechnology and Colloid & Surface Chemistry. It is a transversal sector where two main strategic areas contributed with different backgrounds, being one example of best practice for the entire centre. A shared vision among a multidisciplinary team is needed in order to respond to new scientific challenges.

WP5: Network facilitation and dissemination

The planned and realized objectives were:

- To develop dissemination infrastructure and project portal
- To provision of the maximum visibility and public awareness of the project progress and results to policy makers, cultural organizations and researcher actors in cultural heritage sector within Jordan and EU;
- To Demonstrate Jordan's achievements in cultural heritage protection research;
- To facilitate contacts and relationships between Jordanian research centres and European counterparts;
- To liaison with relevant ongoing EU projects and initiatives.

Following Tasks:

Task 5.1: Development of Dissemination Infrastructure and Materials.

Design and launch of JOCHERA project website; creation of JOCHERA corporate identity including JOCHERA logo, power point template, and project headed notepaper, project flyers and posters, newsletter.

Achievements:

JOCHERA dissemination activities stand on three pillars: digital media (website, newsletters, other digital promo materials); print media (brochures, leaflets, flyers, presentations); public relations (communication activities with public and mass media).

The JOCHERA website had been launched in February 2012 and populated with news and information on project consortium, activities and main events. The web site had been developed by REDINN; input on content has been provided by all partners.

The created JOCHERA project corporate identity logo, power point template presentation and headed notepaper have been designed and used in all communications; promotional materials such as brochures; flyers and posters and had been designed and disseminated during events and seminars.

In numbers:

- Two press releases launched since the project start
- Six newsletters released
- Two papers were published
 - Al Bawab A., Abdallah R., Bozeyya A., Odeh F., Al Ashqar H., 2012, Jordan Conservation of Cultural Heritage in ERA, Progress in Cultural Heritage Preservation-EUROMED 2012, 295-300
 - Al Bawab A., Na'es M., Al Ashqar H., Bozeyya A., Hamati H., Sharar M., Abdallah R., 2014, Conservation Materials and Archaeometry Techniques in Jordan (2000 - 2012): A Review will be published and presented via oral presentation on (MONUBASIN9)the 9th International Symposium on Conservation of Monuments in Mediterranean Basin: Improvements in Conservation and Rehabilitation – Integrated Methodologies, in June 2014, Ankara/Turkey
- One booklet was printed
- Facebook, LinkedIn and Twitter account created and regularly updated (www.jochera.eu)
- Two videos published on you tube
(<http://www.youtube.com/watch?v=cEpDR8xv7k0&feature=youtu.be>)
(<https://www.youtube.com/watch?v=muLtB8Hyylg&feature=youtu.be>)
- One symposium held on June, 2012 (<http://www.jochera.eu/28/jordan-s-cultural-heritage-symposium.htm>)
- One conference held on November, 2013 (<http://www.jochera.eu/136/news/jochera-final-conference-proceedings.htm>)

Task 5.2: Jordan's Cultural Heritage Symposium

The organization of Jordan's Cultural Heritage Symposium, June, 2012 which gathered academics, researchers, and experts in cultural heritage conservation.

Achievements:

The Jordan Cultural Heritage Symposium had been conducted on 6th of June 2012 where academics, researchers, experts in cultural heritage conservation had been gathered, discussed, and analyzed the current situation in Jordan. The symposium main categories:

- General topics
- Architectural conservation: sites and buildings as a study case
- Architectural conservation: sites and buildings (general studies)
- Novel approach in chemical treatment in cultural heritage

The achievements of the symposium were:

- Gathering of Jordanian researchers interested in cultural heritage and their interaction with their European counterparts.
- Networking among Jordanian researchers themselves was initiated. Various points have been agreed upon as the outcomes of this symposium, these included:

- Constructing of a database for all researchers in the field of cultural heritage conservation in Jordan, and the symposium attendees can be considered as the seed for this database.
- Constructing of a database of all international and national projects in the field of cultural heritage conservation in Jordan that were performed in the past {the establishing of database, a technical glossary (techniques, materials and typologies) from the successive programs and projects covering cultural heritage research in Jordan, where the participants agreed at the importance of collecting all the results from the finished works that were concerned with cultural heritage in Jordan to benefit from it and to complete the needs in preserving our heritage and improving our environment}.
- Evaluating the outcomes of these projects in order to better direct and plan ongoing and future projects concerned with cultural heritage conservation in Jordan.
- Strengthen interaction and collaborative research between Jordanian and European researchers, universities, institutes and centres in the field of cultural heritage conservation in Jordan.
- Introducing students (both graduate and undergraduate) to research in the area of cultural heritage conservation in Jordan and the various sciences that play a role in such a vast research area.
- Establishing more detailed rules and instructions for the standards of the special materials that are used in conserving and protecting movable pieces.
- Establishing mechanisms to save, conserve, and monitor pieces in museums warehouses.
- The need of the preservation the archaeological and aesthetic character of the mosaic floors through conserving and protecting them.
- The need of developing a new strategy by experts in the area of cultural heritage protection in order to preserve the archaeological sites through raising the public awareness along with an emphasis on the nature of the laws and regulations that protect these sites.
- Proposing and recognizing some solutions for the potential lacks and needs of governmental and nongovernmental sectors in Jordan dealing with cultural heritage and their implementation for the development of cultural heritage rational management and dissemination strategies and tools, and improvement of the conservation system in Jordan, to achieve a firm commitment to an integrated conservation strategy that balances the needs of various stakeholder.

Task 5.3: Networking activities and contacts with other EU initiatives

By creation of synergies with other cultural heritage initiatives, the participation in relevant EU events and networking with other ERA-Wide projects in the region.

Achievements:

Dissemination activities are one of the pillars of EU funded research projects as they contribute to spreading of results and transfer of knowledge in a determinate area. In order to reinforce UJ cooperation capacities, some relevant EU events addressing FP7 and cultural heritage protection research have been attended. These events created links between Jordan's researchers and relevant EU initiatives and projects, and represent a source of new contacts for further promotional activities.

During the project period (Dec.2011-Nov.2013), several activities related to networking and contacts' improvement in the field of cultural heritage have been developed.

The following conferences and events have been attended:

- Euro- Mediterranean conference on research and innovation, Barcelona, Spain, April 2012
- AR&PA Fair, Valladolid, Spain, May 2012
- Mediterranean Archaeology: An Advanced Training. Rome, Italy, October 2012
- Integrating Jordan into the European Research Area (IJERA) project workshop. Amman, Jordan, June 2012
- ERA-WIDE Projects – 3rd Week of coordination Governance, Human capital and RDI management skills: accompanying success stories in the Mediterranean research centers. Brussels, Belgium, July 2012
- International Conference on Mediterranean Countries and EU Opportunities in Research, Development and Innovation. Amman, Jordan, October 2012
- The 4th International Euro-Mediterranean Conference on Cultural Heritage (Euro Med 2012) "Progress in Cultural Heritage preservation". Limassol, Cyprus, November 2012.
- 7th World Archaeological Congress. Dead Sea, Jordan, January 2013
- The 44th World Chemistry Congress. Istanbul, Turkey, August 2013
- Cultural heritage conservation science and sustainable development: experience, research, innovation International Conference. Paris, France, October 2013
- Get ready for Horizon2020 Workshop. Amman, Jordan, April 2013
- Building communication and synergies between MEDSPRING and ERAWIDE projects. Amman, Jordan, May 2013
- PEOPLE Infoday/ International Incoming Fellowships IIF Call. Amman, Jordan, June 2013.

T5.4 Final conference

A final conference to represent project results, and, in particular, cultural heritage conservation priorities for Jordan was organized in Amman by University of Jordan (HMCSR). Researchers, experts in cultural heritage conservation, cultural stakeholders were invited to meet high-level EU representatives, policy makers, national contact points and successful project coordinators. The event was extensively promoted and transmitted through various media channels (electronic, print and broadcast) within and outside of the Jordan.

Achievements:

The JOCHERA final conference had been conducted on the 3rd of November, 2013 and gathered academics, researchers, experts in cultural heritage conservation. The attendees discussed, and analyzed the current situation of cultural heritage in Jordan and explored new ways of collaboration both at national and European level, and proposed some recommendations that can help overcoming the various difficulties facing most researchers in this field.

The conference main categories were:

- Overview of the JOCHERA project and its outcomes
- European-Jordanian cooperation
- Stakeholders challenges and opportunities from this cooperation
- Overview of the new EU programs such as Horizon 2020

The conference gathered academics, researchers, and experts in addition to decision makers and provided a platform for interaction between all of them. This interactive discussion that was held

during the fourth and final session of the conference, in addition to many meetings during the last two years, resulted in the following conclusions and recommendations:

- HMCSR has a high potential to assimilate the cultural heritage protection research in its structure.
- The council of HMCSR needs to be convinced of the fundamental importance of the “cultural heritage protection research” for Jordan and for its inclusion into the policies and activities of HMCSR.
- Funding will be necessary for the employment of new researchers, their training in cultural heritage conservation through collaborative research programs inside the centre and/or abroad.
- There is a need to acquire new equipments and new laboratory spaces for the purpose of cultural heritage protection research activities in HMCSR.
- Young researchers have to be attracted by HMCSR while distinguished researchers to be maintained and increased in number. Teamwork and stronger integration of young researchers with the more experienced ones need to be supported.
- Increasing the scope of personal training and exchange in order to build a base of research community in the field of cultural heritage conservation, build a network of research community especially for young researchers.
- Building data banks on major experts and people who worked in cultural heritage and other ERA WIDE projects that are easily accessed.
- The major difficulties are “the decline of public awareness on scientific research”, “poor scientific approach in cultural heritage conservation”, “presence of a gap between research and industry” as well as “weakness in marketing of research results”.
- Approaching public to increase the awareness in cultural heritage importance and benefits (and to include the public in the activities)
- Spending more efforts on bridging the gap between researchers and decision makers.
- Revision of our regulations regarding cultural heritage fields since most of them are old and/or not implemented
- The development of standard protocols on “ How to approach conservation of a cultural heritage site or object"
- HMCSR is able to use its potentials to become an important research centre, contributing to fundamental research areas including cultural heritage protection research.
- Need to improve research priorities related to assessment, monitoring & diagnosis and management, exploitation & maintenance.
- Tourism is a crucial factor: mass tourism or non sustainable tourism should be considered in the management priority, it can affect cultural heritage assets causing an irreversible damage.
- Improvement in research priorities related to materials, energy & environment and city & territorial aspects should be promoted, as all of them are related to sustainable development
- Research is still focused on the asset itself, while it is part of the territorial system and should be considered as an engine for growth and development
- Both tourism and sustainable development visions need to share a common ground, preserving, managing, maintaining and promoting a sustainable cultural heritage valorised by society, which promotes the economic growth of the country respecting the nature, the environment and the heritage itself.

- Researchers think that their contributions can be on “the development of repair materials and conservation methods” particularly on nanotechnology in relation to conservation of cultural heritage.
- Direct research to heritage at risk (such as the Dolmens)
- Involve the major stakeholders in the process of research such as Ministry of Tourism and Antiquities.
- Focus on projects that will contribute to community development (such as restoration for sites that could foster jobs and create community-based opportunities).
- Need to have a report or leaflet that summarizes all ERA-WIDE funding projects (including URL and contact person) and EU funded projects.
- Disseminate tourism strategy and DoA major objectives at focal points that are allocated for all universities and research institutes.
- Disseminate Jordan's STI policy and research priorities to get funded projects within these strategies

Project management

In order to ensure a coherent and well-organised structure and implementation of the project, JOCHERA was structured into five work packages (WP). Each work package was under the responsibility of one WP leader. The work packages were subdivided into a number of tasks and subtasks, which were in turn related to concrete activities and deliverables. Each task had been organised by a task leader and executed with the help of the consortium partners attributed to the task. Every task in the work package had been handled with a significant degree of autonomy by the task leader. The work of the task leaders was crucial to the project since they had been responsible for the organisation of the work in the task and for the preparation of the deliverables in time and in good quality. The task leaders had reported to the respective work package leaders.

The management was based on three levels, which were closely connected to each other: the coordinator supported by the work package leaders and the project consortium.

The consortium of JOCHERA was led by a coordinator; the University of Jordan, which has extensive experience in managing bilateral international cooperation projects at national level. The coordinator was in charge of the general administrative, legal and financial management of JOCHERA (WP1) and was the intermediate between the project consortium and the European Commission.

Information and communication

There were two levels of communication, an internal and an external level. On the internal level the task leader cooperated and communicated with the work package leader who communicated with the coordinator. On the external level the dissemination of information through the web site or through attending different conferences and activities ensured the widest possible distribution of the project achievements and ensured a high level of awareness rising. Project symposium and final conference outcomes had been disseminated to multipliers such as national contact points (NCP's) and other interested archaeologist in heritage conservation. The scientific community in Europe and Jordan had been informed about the project's activities and outcomes by means of the multipliers as well as by means of information days. The European Commission had been continuously informed on project activities by various means of communications as well as through project reports and participation in meetings.

The potential impact and the main dissemination activities

1. Strategic Research Agenda Implementation Plan

During the JOCHERA project, an extensive analysis of documents on cultural heritage research was carried on and a questionnaire was developed and circulated around for the establishment of a preliminary list of research priorities in the area. According to the results and analysis that were carried on under the previous step, the identified highest priorities for cultural heritage research were archaeological sites, movable heritage, natural and architectural heritage and the main problems associated to the conservation and protection of cultural heritage were related to heritage management measures and capacities (lack of strategic planning, inadequate restoration/conservation, lack of funding for cultural heritage conservation etc.)

2. Foresight Plan

In order to enlarge scope of research activities and capacity building of Hamdi Mango Center, a foresight approach had been selected. Foresight is a process attempting to look into the long-term future of science and technology with the aim of identifying the emerging know-how likely to yield the greatest economic and social benefits.

This will help to improve research and development performances in Jordan's cultural heritage sector through the creation of a group of stakeholders and human resources dedicated to fostering links between research and the private sector.

Main actions defined in this plan were based on the Jordan strategic research agenda in cultural heritage, SWOT analysis and the Strategic Development Plan carried out during the project.

Foresight planning, in the context of JOCHERA, had been designed to actively use the knowledge and competence of HMCSR, to plan and create the basis for innovative solutions for the future.

3. Networking with other research centres in member states or associated countries

During the two years of project duration, Hamdi Mango Center for Scientific Research participated in relevant events and established synergies with other research groups. Main conclusions of these networking activities are as following:

- Project symposium and final conference helped to create a network of researchers interested in cultural heritage both at national and international level. The events gave the possibility of opening a debate in the field of cultural heritage research in the Mediterranean countries as well as exchanging good practice examples and projects results, helpful for the continuity of activities from a shared and common perspective
- JOCHERA training activities were useful to widening contacts' network, establishing shared vision and addressing common problems on cultural heritage research. Several opportunities of collaboration were detected, especially in mobility programmes and EU funded research, which will be perused in the future HORIZON 20/ 20 programme.
- Several contacts were made throughout the participation in relevant events and conferences, where the JOCHERA project and its results were presented, thus leading to increase the visibility of Hamdi Mango Center in the international community
- Participation in relevant European events, especially the ones that were focusing on the scientific community, had been the objective of establishing Euro-Mediterranean interests in

Research and Innovation, in order to improve the knowledge on the actual state of the art of cultural heritage research and fostering international scientific cooperation. Main activities were focused on training and discussions related to cultural heritage research especially in the field of chemistry and archaeology, both areas had been the main interest for Hamdi Mango Center

- Networking with other ERA-Wide project had been among the main objectives of encouraging clustering activities, synergies and complementarities among different projects, as well as defining good practice and success stories in the Mediterranean research centres and partnerships.

4. Increased visibility and scope of Hamdi Mango Center

All the activities contributed to the dissemination of project's results and improved visibility of Hamdi Mango Center for Scientific Research. The JOCHERA project helped to disseminate and demonstrate Jordan's achievements in cultural heritage research at international level, especially in the European and Mediterranean areas, thus strengthening and improving cooperation capacities of research centres located in the ENP countries.

5. Enhanced participation of the country in the Seventh Framework Programme

During the first training with title of "FP7 capacity building and one-to-one sessions" that was held in Amman (4th – 5th June 2012), few project ideas were presented and collected. Some were just ideas emerged from the analysis of the NMP Work Programme; others were concentrated on some concept notes need to be discussed more in details and turned into project proposals.

Table 2 shown below the two project idea that were turned into project proposals then they were submitted to EC as an IRSES.

Thrid project idea was developed after the 1st training and had been added because of its relevance to the cultural heritage sector.

Table 2: Project proposal idea

Participants	Topic	FP7 Programme	Short idea description
Shereraz Alhaj Baddar – UJ	Group A – ICT for Water	IRSES	Analyse sensor technologies for water treatment related to irrigation in countries with a ridity problems (Jordan, Tunisia and Egypt). Main project activities: study visits to EU research centres and university with experience in the field; study tour to Mediterranean partners for advice and capacity building.
Emine Caner-Saltık, Ayse Tavukcuoglu – METU	Group B – NANOCULT MOB-MEB	IRSES	Objectives of the project: a) training, clustering and exchange of experience of young and experienced researchers in nanotechnologies applied to cultural heritage. b) clustering with JOCHERA project through 2 Summer Schools to be organised during the MOB-MED project lifetime

Emine N.Caner-Saltık, Ayse Tavukcuoglu – METU	R2I-ENP Cultural Heritage Integration with Innovative Practices	R2I	Objective of this project was to review and disseminate the current research results on materials conservation for the purpose of leading to their transformation as innovative practices; tools and standards ready to be used in the market of conservation practice.
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6. Capacity building for Hamdi Mango Center

- Upgrading of the 500-MHz Bruker NMR instrument with a solid analysis capability was performed in order to analyze solid samples for cultural heritage conservation projects. Purchasing the solid-NMR accessory enhanced HMCSR capacities and competitively in the field of material sciences, because Solid NMR instrument can characterize solid samples for cultural heritage objects, which, in turn, will give a detailed description of the sample and surface situation
- During the Project two study tours were organized one to POLITO and second to METU, UJ employees as project coordinator, researchers, students and young researchers. The young researchers and students participating in those tours were highly evaluated by them, and they declared the great impact on their ongoing and future research and their academic achievement.
- POLITO's expertise in cultural heritage conservation will largely help UJ/HMCSR to strengthen its capabilities in cultural heritage research. There are many common interests and similarities between Jordanian and Italian heritage sites, making it essential to benefit from POLITO's experience especially in monitoring the environmental parameters indoor and outdoor conditions. During the two study tours to POLITO, the Jordanian delegate presented the situation in Jordan regarding the open and indoor heritage sites (e.g. museums). On the other hand, the Italian partners presented the followed methods and policies for the cultural heritage protection in Italy; especially system monitoring that was developed in POLITO. A promising impact on the material section at HMCSR will result from interaction between UJ researchers and POLITO's researchers such as the coating field on surfaces
- METU's expertise in conservation of cultural heritage will largely help UJ/HMCSR to strengthen its capabilities in conservation of cultural heritage research. There are many common interests and similarities between Jordanian and Turkish heritage items, making it essential and useful to benefit from METU's experience, especially in non-destructive analyses and consolidation of historical monuments. A good impact on the material section at HMCSR will result from interaction between JU researchers and METU's researchers such as in the field of historical material analyses and conservation.

The address of the project public website

<http://www.jochera.eu/>

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