

EPOCH Network of Expertise Centres as a mechanism for bridging the knowledge gap between Cultural Institutions and Information and Communication Technologies professionals

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Abstract

In order to overcome the major challenges and gain from the opportunities phased by the Cultural Heritage (CH) institutions as they enter into the digital world, EPOCH developed the Network of Expertise Centers in CH. This paper presents the main methodological elements, and the roadmap behind the creation of the Network of Expertise in CH. The main objective of this network is to support the understanding of both worlds, provide training and facilitate knowledge acquisition of the CH+ICT domain, improve methodologies and techniques to fit better with the needs of the users and debate new ways to introduce and use technology in the CH institutions. The methodology known as Learning Network integrates action learning techniques with the network approach, producing a very powerful mechanism for sharing knowledge between different organisations. The vision is to create a network of centres, organised in a Europe-wide network, integrating a number of local CH and ICT institutions, policymakers, companies, research institutions and other stakeholders with a regional mission to improve the sector. The paper will further discuss the lessons learned and the successes and challenges encountered during the implementation of the network.

Keywords: Learning Networks, Encouragement of SMEs, ICT and CH Integration

1. Introduction

Whilst technological advances continue to permeate all areas of the heritage discipline, it is clear that there is still a major gap between the Cultural Heritage (CH) sector and the Information and Communication Technology (ICT) business sector which is slowing down the successful use and implementation of ICT technologies in the CH domain. This is due to a number of factors related to both the CH stakeholders and the ICT providers, including, most importantly, the *fragmentation of the sector, challenges in dealing with organisational and technological change, and the development of mature technologies for CH.*

Sector Fragmentation

- The sector is widely fragmented and incorporates many different types of organisations including:
- CH institutions: for example, museums, heritage sites, archives, libraries;
- Information and Communication Technology (ICT) and CH research organisations including universities and other public and private research centres;
- ICT and Creative Industry commercial enterprises providing services to CH community;
- Local authorities, funding bodies and other public sectors custodians of heritage.

All these organisations belong to different disciplines, have diverse priorities and objectives, and communicate in different “languages”. A major objective of the EPOCH network has been to re-emphasise continually the holistic role of all disciplines and encourage all the different groups to work on common problems. Potentially, the solutions have practical applications in achieving technical objectives, underpinning sustainable businesses and effectively communicating cultural heritage.

Introducing change in the CH Institutions

Cultural Monuments, Sites, Museums, Libraries and Archives - collectively referred to here as CH institutions - have for very long time been offering their services for civic engagement, cultural identification and enrichment. They are collecting, preserving, researching, curating cultural objects as well as providing access to sites and information which are critical to society. The value of these institutions to the society is so high that the most of these institutions are supported directly by the state, and even private collections are subsidised by public funds and private donors. This status has also created a dependency on public funding which produces a level of disturbance with each change that the institution wish to introduce. Changes and innovation in science and technology in the 21st century require different approaches in research, in business and organisational models, as well as the adoption of new policies. In the case of CH institutions, all the stakeholders need to be informed,

and a consensus must be achieved, before the introduction of any change. The models, policies and other professional assumptions and ethics that have regulated the analogue era, with its constraints of time and space, are no longer suited to the digital world. New business models, together with cultural and legal policies, need to reinforce behaviours and values at regional and national level. There is no doubt that new technologies are introducing major organisational challenges in the CH sector.

Development of mature CH technologies

Research and investment in the technologies of communicating Cultural Heritage has resulted in significant progress, but the coverage of the whole process from initial investigation and knowledge discovery to the communication of CH topics to educational audiences and the general public, in the form of particular applications and engaging experiences, remains incomplete. Most technology developed at universities and research centres, especially the more innovative and more complex technology, does not have the maturity and necessary features to be released within the CH domain. There is a need for more effective applications for intelligent content creation and management; for supporting the capture of knowledge and its sharing and reuse, in order to preserve, develop and disseminate cultural assets, improve learning and strengthen the creativity of the society. The use of ICTs - particularly by commercial enterprises - for capturing content and increasing its accessibility to citizens is still in its infancy. SMEs are innovators, system developers and creators of the interface between Research, Technological Development (RTD) and industry. It is predominantly the large ICT and CH Institutions that can bear these risks that support such activity. This has the effect of increasing the technology and knowledge gap between large and small organisations in the sector.

In addition to previous constraints, the *lack of knowledge* about the needs and behaviours of the users of this technology, create frustration and lack of success for CH institutions as well as for ICT companies involved. This is the main cause of any *lack of communication and trust* between the various stakeholders, as different communities in CH and IT are talking “different languages”; there is a “clash of cultures” and the convergence of interests is a long and painful process.

The concept and methodology of the Network of Expertise Centres (NoECs) were developed and implemented within the EPOCH Network of Excellence funded by the European Commission under the Sixth Framework Programme (IST-2002-507382). The aim is to overcome the major knowledge gap between the Cultural Heritage and the Information and Communication Technology sectors by understanding both worlds, providing training and facilitating knowledge acquisition of the domain from all perspectives, improving methodologies and techniques to fit better with the needs of the users, and debating new ways to introduce and use technology in CH that fits with the needs of the CH institutions.

This paper presents the concept and roadmap, as well as the methodological elements behind the creation of this Network of Expertise. The paper will further discuss the results and lessons learned as well as the successes and challenges encountered during the implementation of the network.

2. NoECs Concept, Methodology and Implementation

The defining feature of the EPOCH approach is the development of a method to engage ICT research providers and knowl-

edge/application intensive SMEs with the Cultural Heritage community. SMEs are deemed key to efforts to bring CH content to a wider European audience mediated by electronic devices (including computers) and the Internet. The CH sector is highly regulated and often politicised which to some extent renders it not amenable to SMEs with their product lead times and cash flow imperatives. However, this disjuncture is also an opportunity. In partnering the CH sector and ICT sectors, SMEs will be able to tap into the ongoing research worldwide and allow for global funding.

The objective, therefore, has been to create a Network of Expertise Centres each with a regional mission but organised at a European level network. Each Centre should be a not-for-profit organisation embedded in the regional governmental structure (for example museums, galleries, cultural centres, research organisations etc.). A cluster of companies, R&D development organisations, that are - or aspire to be - active in the CH and ICT domain, other CH organisations as well as funding bodies executives, surround each Centre. This structure enables participation in decision-making and implementation processes in cultural heritage whilst encapsulating local differences in laws, policies, culture and governmental structure. Expertise Centres should play a key role in the improvement of the cohesion of the Cultural Heritage sector, acting as the bridge between research, government, buyers and users, amongst others. It must be noted that an Expertise Centre represents the knowledge of all its stakeholders and only then can claim its identity as a Regional Expertise Centre (EC).

The EPOCH consortium has provided a rich mixture of expertise in CH+IT, as well as competence in innovation management and organisational studies. Many partner organisations participated in workshops and focus group sessions before agreeing to take part in this experimental process.

However, building sustainable structures for providing incentives and cooperation, for knowledge creation and the sharing of best practice between different organisations that derive from a variety of disciplines and originate from different countries, is a difficult task. In this paper though, we demonstrate the utility of such a model as a vehicle for building these sustainable structures. In the next section we introduce the concept of the Learning Network before discussing the implementation of the Learning Network mechanism for Network of Expertise Centres.

2.1. Learning Networks

Learning Networks [Wen98], [WS00], [LW91], [BT01] refer to networks of organisations where structures have been established with the primary purpose of enhancing the knowledge of its members. These networks:

- include representatives of different organisations (mainly, but not exclusively, private firms);
- are formally established with clear and defined boundaries for participation;
- have an explicit structure for operation with regular processes that can be mapped to the learning cycle;
- have a primary learning target - some specific learning/knowledge that the network is going to enable;
- can assess the learning outcomes that feed back to the operation of the network.

The formal character of the Learning Network provides an ‘institutionalised organisational platform’ which represents a permanent

structure for identifying knowledge gaps and satisfying knowledge needs, allows evaluation and accumulates experience regarding the support required by learners. More significantly, the lasting character of membership in Learning Networks facilitates the development of trust relationships among learners.

Different types of Learning Networks at different stages of their development may be differently configured; they may be a “star” when information flows from the centre, a “wheel” when information flows mainly between members, and a “hub and spoke” when the structure of different activities is coordinated centrally. In the latter brokerage and the facilitation of extensive interaction and information flow between members is structured and encouraged at both regional and central level. The type, as well as the configuration of the network, may change over time. It is an evolutionary process starting with the star configuration (an information-focused phase) and progressing to the hub and spoke model (the multi-node knowledge-intensive operation). It is this journey that the EPOCH Centres of Expertise have been taking.

During the *set-up stage*, Learning Networks have a number of administrative and structural choices: decision-making structures must be established; learning processes need to be developed; and a dissemination policy should emerge. During the operation stage the network formalises its structure, process and roles. The final stage is known as the *maturity stage*, which potentially suffers the risk of organisational bureaucracy and rigidity. At this stage the formally established structures and procedures of the network can ossify and become a ‘core rigidity’ rather than a constructive learning vehicle. At this stage the network has the options of regeneration through changing its operation mode or alternatively suspending its activities. Learning Networks need an evaluation process to identify the causes of problems and to define remedial action. Networks evolve and develop only if they deal with the challenges occurring between these stages.

Key elements of networks are activities, actors, resources and processes. These four concepts are regarded as components of a relationship that are equally important and are dependent on each other as shown in Figure 1.

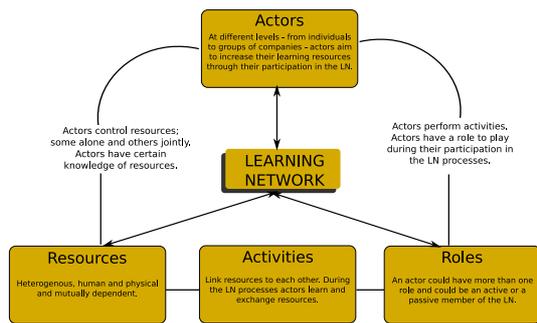


Figure 1: Learning Network Model.

Learning Network activities take place at three different organisational levels:

1. the single actor (a company/organisation or an individual representing a company) taking part in the various activities of the network in order to satisfy learning needs.
2. the learning group (a cluster of stakeholders) represents the core of the Learning Network because it is where the actors commit

themselves to the core learning activities and form real communities of practice.

3. The Learning Network (Centre of Expertise) as a whole represents a dynamic entity which reconfigures its processes and resources over time.

Actors are defined by the activities they perform and the resources they control; they are connected to other actors by virtue of resources and roles. Each actor’s unique combination of resources and activities constitute identity (Figure 1). The role of the actor can vary from being an active participant executing activity, or a relatively passive communication partner. Human actors are an integral part of any network’s organisational process. In a Learning Network a set of typical roles can be identified as follows:

- Learning network moderators manage and co-ordinate activities, people and time. They know how to match learning needs with knowledge resources; to detect process deviations; to monitor the relationships between members, etc. Their knowledge tends to be tacit as it is experiential in nature.
- Learning group facilitators assist groups of practitioners in their structured reflection. The facilitators have gone through training and accumulated experience over time. The Learning Group Facilitator works also very closely with the Learning Network Moderator.
- Network members are individuals who represent an organisation in a learning network.
- Guests and/or experts are non-network members invited to participate in the network for a specific reason (such as presentation of a topic) and for a defined period of time.

Resources are elements that can be combined to create an asset. They may tangible like technology, materials or people, or intangible such as knowledge. The relationships between resource holders are themselves a resource. It is the relationships that bring about the essential mobilisation of resources.

Moreover, there are four key organisational processes to note [Kan04]: *Decision Making Process, Collaborative Learning, Learning Dissemination and Harvesting Learning.*

Power distribution and relations are important for decision making. It is assessed across four primary dimensions. First, the extent to which decision making is centralised (centralisation); second, actual participation; third, the extent to which decision making is regulated by explicit rules and procedures (formalisation); and amount of task differentiation (specialisation).

The decision-making process is taking place in two different levels in the Learning Networks: The network level and the group level. At the network level, the Learning Network Steering Group that is mainly responsible for the strategic planning of the network takes level decisions. The Moderator, by contrast, is responsible for tactical decisions that reflect the supposed interests of the network members. Thus he is responsible for the brokerage activity of the network. During the decision making process, the network establishes its rules and procedures (setting up, running and sustaining); primary objectives; structures of operation (membership, fees, etc); procedures for recruiting new members; co-ordination mechanisms; roles in the network; participation procedures for Participating in Learning communities; and IT integration.

During the collaborative learning process the network members engage in a peer learning-teaching process. Here real time issues are addressed. All members are expected to share ideas and experiences

and, consequently, learn. However, trust needs to have been fostered in the set-up and training phases if the Learning Network is to function as a locus for innovation. The exchange of resources - and the willingness to engage in that exchange with its expectation of reciprocity and discretion - provides access to knowledge and resources that are otherwise unavailable. We argue that Learning Networks are unique in that the experience presents an opportunity for critical reflection and improvement. It introduces members to new and/or enhanced concepts and frameworks. Members can experiment and evaluate outcomes with peers. Moreover, shared learning helps explicate the system's principles and elucidate the underlying patterns.

Learning Dissemination involves the transfer of knowledge and learning beyond the group into the members' organisations. Harvesting learning is associated with ensuring that there are distinct practical outputs and applications generated in organisations as well as for the improvement in the operational processes of the group and the network as a whole.

In the next section we present some dimensions of the operationalisation of this model in the EPOCH network.

2.2. Implementation of Expertise centres in CH: The Roadmap

During the EPOCH project, the Learning Network (LN) model described in the last section has been adapted and implemented in order to create a Network of Expertise Centres in the area of Information and Communication Technologies (ICT) and Cultural Heritage (CH). The *set-up stage* involved establishing a better understanding of the needs and challenges faced by stakeholders involved in the Cultural Heritage domain. Thereafter, the Learning Network methodology was adapted as was a strategy on how to encourage all the stakeholders to participate in the EPOCH Network of Expertise Centres.

The NoEC model *contains two levels of clustering expertise and learning activity*; the local /regional NoECs learning Communities and the European level network.

At the core of the Network of Expertise concept is the recognition that CH is largely local. CH is, however, linked to national or regional structures (ministries, organisations), local laws and customs, local culture and practice.

While each centre creates a cluster of stakeholders (organisations, ICT and creative industry SMEs, RTDs and funding bodies) at the regional level that form their local learning community, all the centres together form a community and organise themselves in a European learning network. The NoECs moderation steering group performs the overall functions, structure, methodology and activities of the NoECs as well as the facilitation of the top-level cluster.

At European level, each centre is represented by a not-for profit organisation responsible for a *region*, which - if possible - is a cultural entity such as, for example, Flanders or Andalusia, and has a *mandate* to act as such in that region. Currently, the prototype network has 9 such organisations involved at the European level and 6 of them are in the process of creating regional expertise centres (see figure 2). In addition to those, two international partners have taken part in a range of activities during the whole process (CultNat-Giza Egypt, and Unesco World Heritage Centre).

As noted earlier, during the set-up stage, learning networks have a number of administrative and structural choices: decision-making

structures must be established; learning processes need to be developed; and a dissemination process should emerge.

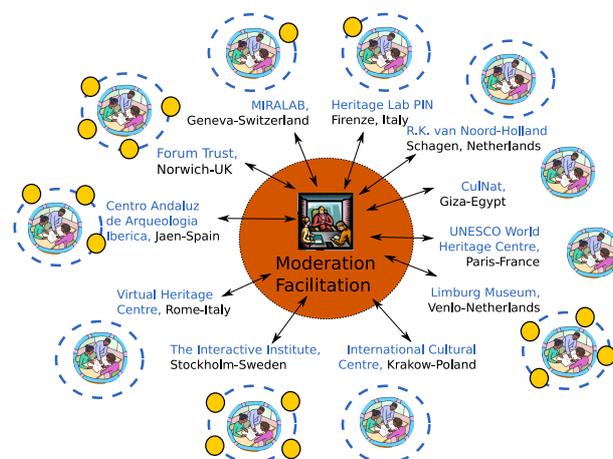


Figure 2: EPOCH Network of Expertise Centres

In this particular case, the challenge has been greater. We must note that we have followed an evolutionary approach that has not yet - to our knowledge - been implemented in any other sector. We apply the LN approach to build up a "new" sector at a European level. That means that the set-up stage had to be designed and implemented with participants with different expertise in CH and/or ICT, from different countries. The combination of experts and practitioners was also very important. We also made a choice to run this group as a "Learning Group" and not as an "Experts' Group". The reasons for this decision are the following:

- to create sustainable structures. We did not seek to create one more advisory body/executive committee with experts where people meet and discuss for the duration of a project. We wanted to empower people with a structure and tools in order to implement their ideas in their own region, during and after EPOCH;
- to build consensus over what an expertise centre in CH+ICT should be; defining functionalities and concept regardless the differences in culture, expertise, authority and interests;
- to build trust - create a community;
- to familiarise the members with the concept and techniques of a LN and demonstrate its advantages;
- to familiarise members with strategic thinking;
- to map knowledge gaps and identify expertise in the area.

Recruitment tended to be either internal to the EPOCH network - with an overall involvement of over 100 organisations - or by invitations extended to known candidates who the facilitators thought may benefit from the training and the networking experience. The candidates were invited to focus groups or workshop sessions (held in Brussels, Ghent and Pisa). All had some interest in establishing Expertise Centres for which Learning Groups/Communities are a core component and a qualification for such 'accreditation'. At this prototype stage, the main criterion was the involvement of the organisation in CH+ICT projects, as well as their commitment to participate in a learning process of collaboration and the sharing of best practice, which would lead to building consensus and organisational change.

The centres did not start from scratch and all have different backgrounds, just as they all have a different specialisations. Some of

them are specialised in archaeology related matters, while other centres focus on technological know how and/or know how with regards to monuments or tourism. This means that the centres as a learning community represent a vast amount of diverse knowledge, and include stakeholders from different disciplines with different priorities communicating in different “languages”. The members of the EU level Learning Group (LG) were drawn from a variety of institutions, organisations and countries. In the end there were 16 members from 11 institutions. However, generally, meetings were attended by between 10 and 15 people.

The operation stage of the European level of the network was launched with a networking event with the general theme of “Discussing a Technological Pipeline in CH”. SMEs and potential Expertise Centres were invited and it took place in Brighton on 13 January 2006.

By this time we had also defined the methodological steps for the deployment of the NoECs in the local/regional level as a road map, to assist us during the implementation process. Those are:

1. **Defining the needs and requirements of the Centres** by mapping the training and organisational development needs. This task was first performed during the recruitment process of the European Network (recruitment workshop) and then by visiting each of the centres as a group and organising workshops with its members. By the end of the first year of operation almost all the members of the group had been assessed.
2. **Establishing regional meetings and Focus Groups for each Centre**, consisting of local companies, funding bodies, local RTDs and other CH organisations to be interviewed. After this they were invited to attend a workshop where their needs, priorities and requirements would be discussed, the concept of the NoECs in CH presented and they would decide if they would like to participate in the establishment of their own regional expertise centre in CH.
3. **Training Facilitators** for the learning cluster/community of each Centre, as well as the NoEC learning group (each Centre needs at least one trained facilitator). CENTRIM, University of Brighton (UOB) has developed a training module adopted on the needs of the sector.
4. **Establishing the Learning Networks** which means that regular physical meetings of the learning communities are organised in the start up phase in order to get people to know each other and build up trust; this evolves into communication through the EPOCH website for the European level of the network.
5. **Organising observation and evaluation** of the learning networks and providing corrective actions. This includes observations as well as in depth interviews with most of the partners of the network.

2.3. NoECs templates defining structure, functionalities and criteria for Expertise Centres in CH+ICT

During the last two years of operation we have been experimenting with different elements and processes derived from the LN model, which has much to do with the defined organisational infrastructure of a NoECs in CH+ICT; namely:

- Coordination/governance; University of Brighton was leading the activity and formed a steering group together with Visual Dimension, Belgium and The Interactive Institute, Stockholm.

- Structures of operation (format of meetings -dates and places- actions taken-documentation, LN facilitation training, coordination of resources, integration of various activities internal and external to EPOCH partners).
- Roles in the network (facilitators, members, associate members, experts).
- Profile, primary objectives/functionalities of Expertise centres (consensus building).
- Procedures and criteria for recruiting new members.
- Building a knowledge base, of stakeholders, expertise, technology infrastructure, training requirements, etc.

Figure 3 summarises the profile and the functions that a regional Expertise Centre need to perform in order to enhance learning, build competences and achieve knowledge transfer and collaboration between the different stakeholders in its region. The structures of operation and the facilitation skills to implement the LN activities are part of the training that the members of the NoECs LG have received.

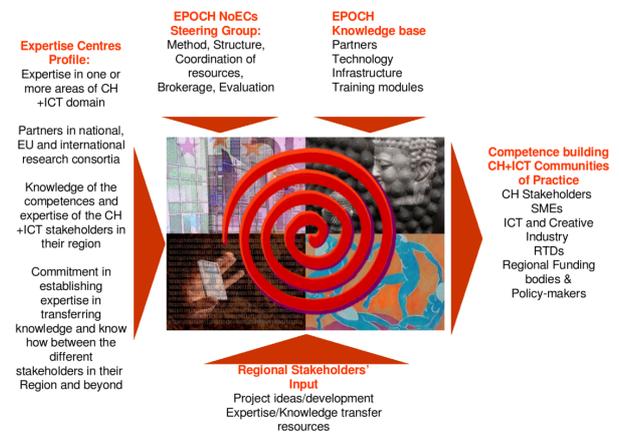


Figure 3: EPOCH Network of Expertise Centers Template

We must note that there is ongoing support, mentoring, evaluation and adjustment tailored to the particular environment for each of the ECs. Furthermore, at the European level, a structure to organise the knowledge base and resources of the EPOCH partners has been established to facilitate brokerage and training modules development activity for the whole network. As we have described earlier, it is this organisational infrastructure of the network that will provide a sustainable system to organise the knowledge and competence development in the new sector, as well as the mode of adaptation and dissemination between the different stakeholders.

The different *roles* in the network - and especially in a LG - have also been defined. The difference of a member and an expert has been identified and lessons learned. An expert in a Learning Network has two choices:

- to become a member of a learning community where he/she may need to spend a lot of his/her time for free and where he/she may develop ideas and collaborative projects with other “learners”; or
- to be an expert on specific issues and be invited from the group for a session(s), when the group needs his/her expertise. A fee could be paid for this service.
- a similar principal applies with the identification of an Expertise Centres. One of the primary objectives of an Expertise Centre is to contribute in the CH+ICT domain by playing a part in the

General
- Mission statement, organisational goals - Context, story, value system - Discipline competence
Organisational readiness
- Type of Institution - Size of Institution - Skills portfolio (ICT, CH) - Activities in CH+ICT area (publications, research projects, turnover of CH+ICT projects, training, consulting, exhibitions)
Strategic value of CH+ICT
- Type of commitment from top management - Strategy documentation (targets, goals, milestones) - Allocated resources (human, financial)
Degrees of Interaction with regional/national and international stakeholders
- Knowing the local/regional/international stakeholders in CH+ICT - Scanning the local - Activities with different stakeholders - Formal (teaching, training, workshops, research, exhibitions, consultancy, visits) - Informal (social networking, meetings, etc.)

Table 1: NoECs: Basic criteria template

creation and professionalisation of a new interdisciplinary sector. An organisation could have the capabilities and expertise in the CH+ICT domain, for becoming an Expertise Centre member of the Network, but if it does not have an interest to perform a “liaison function” - in other words to become the intermediary who will facilitate competence building and knowledge transfer between the CH+ICT stakeholders in its region - then it can always play the “expert’s” role, or a participant’s role whilst not becoming an expertise centre itself.

Expertise Centre Activities

The interaction between CH+ICT needs to be one of the strategic values of the EC organisation, stated in their vision and performed by four distinct but related operational functions:

1. **Organisational Expertise:** In figure 4 we have identified the Knowledge domain of an EC in CH+ICT. The Knowledge domain structure template is one of the outcomes of the EPOCH NoECs group. An EC needs to have expertise in one or more areas of this domain and demonstrate partnership with other regional organisations with complementary expertise know-how.
2. **‘Observatory’ function:** An EC needs to gather and disseminate information on CH+ICT at least at the local/regional level; they also need to be aware of their partners/competitors in the area and have assessed their capabilities. The observatory function will be strengthened with the participation in the network level and enriched with the brokerage activity.
3. **‘Project’ function:** To carry out projects in the field of CH+ICT with local stakeholders and international partners.
4. **‘Liaison’/building competence function:** This is the most important activity of a regional expertise centre. The centre must demonstrate a commitment to establishing expertise in transferring knowledge and know-how between the different stakeholders. As we stated earlier, an Expertise Centre consists of the knowledge and know-how of its parts (stakeholders). Therefore, the ability to coordinate resources, to identify synergies between cultural heritage stakeholders and ICT companies or RTDs and to communicate needs and demands at the European level of the network, are vital for the successful implementation of the network. This activity is supported by the Learning Networks methodology with a structured “learning group” meeting schedules.

Cultural Heritage	Tangible Heritage
	Building, Monuments and sites
	Cultural Routes, Cultural Landscapes Artefacts, Books, Documents
Intangible Heritage	Oral Traditions
	Performings Arts, music, rituals
	Social practices
CH Management	Collecting, Documentation and Archiving
	Conservation, Preservation
	Museology and Museography
	Tourism
Technology	Multilingual and Semantic Technologies
	Databases and Knowledge Management
	Mobile Wearable Ambient Systems
	Recording and Data Representation
	Visualisation and Rendering
	Multimodal Interfaces
	Virtual humans and other avatars
Games and edutainment	

Figure 4: Knowledge domain in CH+ICT

Learning communities meetings

The local Companies, CH stakeholders, Research Centers, and Funding and Policy makers’ representatives, together with each Centre of Expertise form a Learning Network. Using action-learning techniques, practitioners’ groups are set up to reflect and learn collectively from each other, following structured meetings (see figure 5) and a number of principles:

- Organisations and companies, represented by managers, are allocated in small groups with up to 20 members.
- All necessary decisions for learning are made by the learners themselves rather than experts and tutors.
- Learning is practical and derives from the discussion of the concrete experience of the group members rather than the introduction of abstract concepts.
- Training is designed based on members’ needs, and provided by the Network.
- Part of the participants’ duties is to go to their own organisations, try out the learned approaches and come back to the group to report their experiences.
- The group becomes a forum for sharing concerns, getting psychological support and also receiving feedback on their own ideas from other practitioners.
- Experts and tutors may be invited, when the need arises; a knowledge bank of experts and expertise is provided by the EPOCH NoECs brokerage activity.

The group sessions are ‘guided’ by an appointed facilitator who is responsible for organising the group meetings, developing the group dynamics (e.g. involving everybody, resolving conflicts) and maintaining its objectives. The facilitator is a supportive coach stimulating the group to achieve motivation and inspiring trust.

Knowledge resources are used but only in conjunction with their practical learning. This process will allow companies to determine needs for training or cooperation and will be the platform to discuss further developments and standards in the CH sector. As the Centres of Expertise will originate from governmental organisations, but

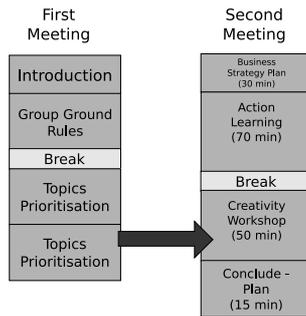


Figure 5: Structure of Learning communities meetings template

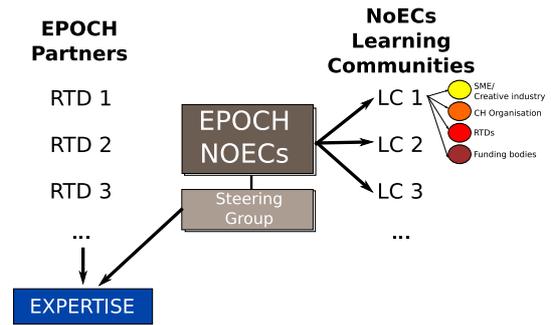


Figure 6: EPOCH Network of Expertise Centers model

have the mission to understand and improve the development and implementation of ICT, they will form ideal partners to coordinate the regional clustering activity.

2.4. EPOCH NoECs: the model

The vision of the EPOCH NoECs discussed and documented during the consensus-building period of the network is:

“to create collaborative learning communities for the CH and ICT sectors by developing an infrastructure, the Network of Expertise Centers (NoEC), that supports shared learning on a regular and sustainable basis. The Network will facilitate European integration of research outputs in CH and ICT and empower commercial and social enterprises in the ICT and Creative Industries sector to engage fully in the deployment process.”

The Network has a coordinator (at the moment this role is executed by the steering committee, but the creation of HerITage.net foundation is envisioned in the near future) to organise the overall activities of the NoEC. Each Expertise Centre is juridically and financially independent and has a contract with the coordinator concerning the network’s activities, rights and duties. The Network, through its coordinator, will ensure an optimal exchange of information between the centres, a European or even worldwide quality assurance methodology and a centralised technology transfer.

Each Expertise Centre is active in its region, which in most cases will be defined by the region of activity of the founding governmental organisation. Activities outside this region can be regulated by coordinator or by contracts, so that no conflicts emerge between the Expertise Centers.

A number of mechanisms and concise methodological guidelines are built into the work structure in order to enable the accomplishment of this complicated task and was presented in the previous section. The structure of the EPOCH Network of Expertise Centres today is presented graphically in the figure 6.

On the left side of the graph, different EPOCH partners provide expertise (on technology, CH and innovation management issues) through the steering group to the NoECs and their learning communities. The EPOCH brand name has guaranteed quality of research, which has attracted CH organisations and SMEs to become partners in the NoECs Learning Communities (see final report D.2.14).

On the right side, the pilot Centres: Forum Trust, Norwich UK, Limburgs Museum, Netherlands, the Interactive Institute, Sweden

and the Jaen Andalusian Expertise Forum are at different stages of the journey towards establishing durable and productive regional networks. They have all established good partnership with their SMEs, CH institutions as well as policy makers and funding bodies representatives. Two more Centres: MiraLab in Switzerland, and the University of Madrid have decided to embark on the journey, have been trained and have started the process of recruiting members (stakeholders).

The EPOCH NoECs and their Steering group offer the intermediary infrastructure to support the networks with expertise and services as well as communicate the demands and requirements of the network members to the academic research community. In doing so, they bridge the knowledge gap between academic research, SMEs and CH practitioners. The benefit of organising this mutual information exchange through a learning network is undeniable. When a certain centre needs information about a certain specialisation, it can contact the specialist in the appropriate centre.

Critically, the learning from these six distinct networks needs to be harvested and disseminated across existing developing European networks, as well as those proposed by the Consortium members. This is a major undertaking. Whilst the learning networks have been empowered and trained in the process of harvesting learning, the evaluation, interpretation and transfer is a task beyond the competence and expectation of regional groups. The EPOCH Steering group has monitored and evaluated the whole process so far and the challenges and lessons learnt from this journey are summarised in the final section of the paper.

3. Challenges and Lessons Learned

At the beginning of this paper we discussed factors that are slowing down the successful use and implementation of ICT technologies in the CH domain. Those factors related to both the CH stakeholders and the ICT providers, and include amongst others the *fragmentation of the sector, challenges in dealing with organisational and technological change and the development of mature technologies for CH*. We then proposed the learning network approach in order to create a sustainable structure for the sector to overcome those challenges. We argued that Learning Networks are unique in that the experience presents an opportunity for critical reflection and improvement. They introduce members to new and/or enhanced concepts, technologies, business models and frameworks. Members can experiment and evaluate outcomes with peers. Moreover, shared learning helps explicate the systems’ principles and show the underlying

patterns. At the end of the process communities of practice are developed and organisations build and/or improve their competences.

However, we are aware that building sustainable structures to provide incentives and cooperation, for knowledge creation and sharing of best practice is a difficult task. In this particular case we have followed an evolutionary approach that has not yet - to our knowledge - been implemented in any other sector. We apply the LN approach to build up a “new” sector at a European level. That means that the set-up stage had to be designed and implemented with participants with different expertise from different organisations that derive from a variety of disciplines and originate from different countries and culture.

According to the organisational learning literature, the main driver to learning, networking and business development/change among SMEs as well as other small organisations - like museums, galleries, libraries etc.,- is an immediate need to solve a problem or seize an opportunity. However, from our research and experience in different projects ION (EPSRC&BT/1996-99,U.K), TREND CHART (2000/F5-EC), KNOWLABORATION (2002-4/IST/F5-EC), KM in SMEs (2004-6/SEEDA, UK), SM-Empower (2004/F6-EU), EPOCH (2004/IST/F6-EC) it is clear a number of barriers to participation in training and development are faced. Those barriers could be summarised as following:

- No recognition of the need for learning and development;
- Stimulus for change is too weak/misinterpreted;
- No access to valid knowledge/confusion about where to go for advice and support;
- Resource constraints, both human and financial;
- General cynicism and mistrust of external providers, (too academic/too abstract);
- Insufficient buy-in to development of the sector from the policy level, such that significant opportunities are illusory;
- No interest from organisations to play the role of Expertise Centres.

These barriers have been recognised at the very beginning of the project, and we were facing them in each of our first regional meetings in Brussels, Norwich, Krakow and Jaen and have taken them into account when trying to engage businesses, policy makers and CH organisations to ensure their continued participation in the EPOCH learning clusters.

In order to overcome those barriers, we guided the Expertise Centres to contact their local stakeholders and organise focus groups to:

- Discover the challenges that the different stakeholders face locally, at the industry and/ or policy level, as well as internationally;
- Identify the learning issues confronting the stakeholders in order to cope with those challenges;
- Demonstrate how action learning technique would help them to solve some of their burning issues and build understanding and trust relations among participants;
- Specify and prioritise a learning agenda arising from those issues and discuss it with them in the first meeting of the group.

At the last three Regional meetings though, in Athens, Madrid and Geneva we were pleased to realise the importance of EPOCH brand name in the participation and commitment of the different stakeholders in all those countries. Participants were eager to become part of the network and its activities and become part of the NoECs database and brokerage even after the project finishes.

Network Capabilities Strengthened	Network Incidence
(1) Governance and organization - Developed Vision, Mission, Code of Conduct, membership requirements - Recruited new members - Initiated process to legally register network - Established new thematic sub-committees/working groups e.g. training modules, know-how books (1a) Network Strengthening best practices - Convene members for participatory planning - Institutionalize cooperation, rather than compliance, in agreements and structures - Build expertise of members and network staff - Establish role as moderator/ facilitator of members' action	All All EU level EU level EU level EU level EU level
(2) Collaborative strategy development plans, systems and procedures - Developed strategic and operational plans - Improved efficiency and effectiveness of planning - Developed coordination procedures, systems - Increased member commitment to network and shared goals - Integration of EPOCH Brand	All All All All All
(3) Communication systems (internal and external) - New communication strategies & mechanisms - Established/updated websites - Established e-systems for member communication - Links to other networks : EU, business, education & Venlo, Norwich	All EU & MiraLab EU level All
(4) Network/member relationships (internal and external) - Better mutual understanding - More open and tolerant communication - Development of trust; Stronger connections among members - Advocacy and cooperative engagement - Links to key external stakeholders, e.g. other EPOCH partners, through brokerage	All All All Norwich EU Level, Sweden, Norwich, Venlo
(5) Sectoral and/or Technical expertise of network/members - Improved knowledge and skills - SME-led knowledge transfer - Initiated a moving exhibition of prototype applications "Interactive Salon" - Thematic clusters, training modules - Post-Incubator model knowledge transfer - CH institutions-led knowledge transfer	All Venlo Sweden EU level+ UNESCO Sweden Norwich
(6) Financial resources - New grants and program partnerships with donors	Norwich Miralab

Table 2: NoEcs Capabilities Strengthened

The Table 3 summarises the EPOCH NoEcs Capabilities strengthened according to six criteria measuring results on Learning Networks activities:

- Governance and organisation
- Collaborative strategy development plans, systems and procedures
- Communication systems (internal and external)
- Network/member relationships (internal and external)
- Sectoral and/or technical expertise of network/members
- Financial resources

These results are the outcome of a research evaluation based on participatory observation (European level Network, Norwich, Venlo partially,) and in depth interviews (Sweden, European level Network, Norwich, Venlo) with the 90% of the participants' members of the Network, and presented as case studies in the EPOCH final report D.2.14. In the next concluding section we discuss further the evaluation results.

4. Discussion and Conclusions

This paper has presented the concept and methodology of the Network of Expertise Centres (NoECs) as well as evaluative reflections on implementation. Both play a key role in the improvement of the cohesion of the CH and ICT sector by acting as the bridge between research, government, buyers and users amongst others. The Network of Expertise Centre is based on the Learning Network model which incorporates a combination of knowledge management and, in particular, tacit knowledge and clustering. Learning Networks have proved to be useful mechanisms for bridging the knowledge gap between CH and ICT professionals.

The implementation of this methodology in the ICT and CH field within the EPOCH Network of Excellence has demonstrated that:

EPOCH Brand

At the close of the project, there are four functioning Expertise Centres: Norwich, Stockholm, Limburgs and Andalucia. In addition, there are two putative Expertise Centres: Switzerland and Madrid (both of which have hosted Regional Meetings). One further group - Mediterranean - is looking for Expertise Centre status by the close of the project. For all of these groups, EPOCH Expertise Centre status confers a legitimacy that cannot be achieved by any other means. The EPOCH brand has considerable currency amongst the CH community.

Learning group

None of the Expertise Centres have fully implemented action-learning techniques in line with the Expertise Centre model. There are a variety of reasons for this that need to be addressed in the future. On the one hand, the cases of Stockholm and Andalucia demonstrate the impact of geography on physically locating members sufficiently regularly to practice action learning. By contrast, other Centres are reluctant to move away from large group learning within the confines of generic topics into the more specific issues encountered in action learning sets. Some facilitators have reported that they sense that action learning sets would either disrupt the flow of substantive discussions, or that they would deviate from building a collective identity in what is already a small group. Others are reluctant to expose themselves amongst peers and competitors. Moreover, as reported previously, many of the participants - predominantly male - are senior people used to engaging in group discussions and the notion of action learning is far from their world-view. It should also be noted that trust and familiarity are necessary for small group exchanges. The authors have witnessed considerable trust-based exchanges occurring in the longer-lived Centres of Norwich and Limburgs.

SME involvement

All of the Expertise Centres have good representation by SMEs; however, the incentives to stay involved - possibly in the absence of action learning sets - need to be improved. Stockholm's post-incubator remains a beacon in this respect. The entrepreneur who heads the first of the post-incubator companies benefits from being immersed in the technologies and the process of technology transfer. For example, from Interactive Salon to prototype for museum exhibition. All SMEs suffer from the long lead times associated with bidding for funds and contracts in the public sector.

However, established SMEs - as seen in Norwich and Limburgs - continue to support the Expertise Centre and participate substantively to debates and discussions. One reason is the procurement power of the host (the Forum Trust and Limburgs Museum). Allied

to that, the network provides intelligence that is more difficult to get from other sources.

The cases indicate that sustained SME involvement might come from enhanced 'boundary spanning'. Whilst the hosts play the role of observatory, knowledge diffusion is not systematic (especially in cases where meetings have stalled). It has been reported that SME members particularly appreciate more information about - and perhaps demonstrations of - technologies coming out of EPOCH activities. The website has a role to play here; but hands-on experience is preferred (cf Limburgs Expertise Centre's trip to Philips). Allied to this, access to resources such as Know-how books and other practical guides is valued. These resources, equally, have the potential to increase the flow of knowledge from the CH professionals to SMEs (as noted by SME members at Limburgs).

Educational Programmes

The Stockholm Expertise Centre has incorporated a post-graduate course for CH professionals. The technology transfer opportunities here are significant if under-utilised. Students engage in a real-time project with a diverse range of CH institutions in a technology transfer project. Full integration of course members and convenors into the meetings of Expertise Centres has considerable potential in this respect. Partner institutions can benefit from a transfer mediated by students to their visitors, whilst other members of the Expertise Centre can share in the problem-solving of in institutions. Moreover, course books and materials can have enhanced value if the Expertise Centre leverages them in its own work. Equally, visiting lecturers can be an important source of ideas and stimulation to a wider community.

Influence on regional/national policies

Over time, it seems that personnel change which has the potential to stall or provide new impetus for activities. In the latter case - and particularly for small countries - integrating Expertise Centre thinking and organisation into national policy is a real possibility. The two notable examples are Hupperetz's move to Dutch National Heritage and Hans Öjmyr's leveraging of the Interactive Salon to engage local and national politicians in his museum. The indications are that Madrid, Andalucia and the Mediterranean all seek regional and national advantage through the Expertise Centre.

In summary:

- Benefits to members include improving knowledge about the CH/ICT interface as well as enabling strategic thinking and generating project ideas.
- More work is needed to recruit, integrate and retain stakeholders, particularly ICT enterprises, into networks.
- Skills and knowledge transfer have shown encouraging results. Although, we note that lessons learned cannot always be transferred directly without adaptation to regional circumstances.
- The network has also led to collaboration between members as competences and assets are rendered explicit by the learning process.
- The concept of learning networks represents an unfamiliar learning environment, and its intangibility should not be underestimated. The context is very important and understanding why an individual is involved in the network and the opportunities that present themselves is important.
- The role of the facilitators is critical. Hence, the training programme is of great significance; however, this does not guarantee in itself facilitators' competence. The cases show that facilitators

need additional 'on the job' guidance to hone the skills in real-time situations. Action Learning, for example, in network situations is a step that requires some courage to undertake owing to discernible scepticism amongst network members.

These results demonstrate the utility of Learning Networks as a vehicle for building sustainable structures for creating trust and cohesion between the two distinct sectors. The first implementation of European regional groups in UK, the Netherlands and Sweden were followed by groups in Spain (UPM, Madrid and Centro Andaluz de Arqueologia Iberica, Jaén; MiraLab, Geneva). The methodology is dynamic and subject to ongoing development in light of experience and local circumstances. This informs the best structure, process and roles that each centre should have. It is envisaged that this initial implementation phase and the lessons from the pioneer centres will lead to a wider European Network driving the emergence of this new sector.

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