



EUROPEAN COMMISSION

ICT - INFORMATION AND COMMUNICATION TECHNOLOGIES

A Theme for research and development under the specific programme “Cooperation” implementing the Seventh Framework Programme (2007-2013) of the European Community for research, technological development and demonstration activities

**Extracts of the
Work Programme 2007-08**

Agreed by Programme Committee

3.4 Challenge 4: Digital Libraries and Content

In today's society individuals and organisations are confronted with an ever growing load and diversity of information and content, and with increasing demands for knowledge and skills. Coping with these demands requires progress in three closely related domains. First, content should be made available through digital libraries and its long-term preservation, accessibility and usability must be ensured. Second, we need more effective technologies for intelligent content creation and management, and for supporting the capture of knowledge and its sharing and reuse. Third, individuals and organisations have to find new ways to acquire, contribute and exploit knowledge, and thereby learn.

The challenge, therefore, is to harness the synergies made possible by linking content, knowledge and learning; to make content and knowledge abundant, accessible, interactive and usable over time by humans and machines alike. This should take into account current trends in content production and consumption and particularly the move from few-to-many to many-to-many models. Europe, with its unique cultural heritage and creative potential, is well placed to take advantage of this paradigm shift and to be a key actor in the knowledge economy.

The research is expected to firmly establish digital libraries services as a key component of digital content infrastructures, allowing content and knowledge to be produced, stored, managed, personalised, transmitted, preserved and used reliably, efficiently, at low cost and according to widely accepted standards.

The support of more personalised and collaborative services, particularly within self-organising communities, will lead to more creative approaches to content and knowledge production.

Improvements are also expected in terms of the usability, accessibility, scalability and cost-effectiveness of the resulting methods, technologies and applications with respect to large amounts of data and concurrent users.

The work will strengthen the link between content, knowledge and permanent learning processes. It will improve our ability to master and exploit content and knowledge and to learn in increasingly dynamic working environments.

The work carried out under this challenge will contribute to the implementation of the "i2010: Digital Libraries" initiative.

Objective ICT-2007.4.1 (ICT-2007.4.3): Digital libraries and technology-enhanced learning

Target outcome

For digital libraries

Medium term:

- a) **Large-scale European-wide digital libraries** with innovative access services that support communities of practice in the creation, interpretation and use of cultural and scientific content, including multi-format and multi-source digital objects. They should be combined with robust and scalable environments which include semantic-based search capabilities and essential digital preservation features. Particular attention is given to cost-effective digitisation processes and to the use of digital resources in multilingual and multidisciplinary contexts.

Longer term:

- b) **Radically new approaches to digital preservation**, such as those inspired by human capacity to deal with information and knowledge, exploring the potential of advanced ICT to automatically act on high volumes and dynamic and volatile digital content, guaranteeing its preservation, keeping track of its evolving semantics and usage context and safeguarding its integrity, authenticity and long term accessibility over time.

There is a specific focus on the creation of a network of centres of competence for digitisation and preservation, building upon, pooling and upgrading existing resources in the Member or Associated States.

For technology-enhanced learning

Medium term:

- c) **Responsive environments for technology-enhanced learning** that motivate, engage and inspire learners, and which can be embedded in the business processes and human resources management systems of organisations. They support the transformation of learning outcomes into permanent and valuable knowledge assets. Focus is on the mass-individualisation of learning experiences with ICT (contextualized and adaptable to age, situations, culture, and learning abilities), through pedagogically-inspired solutions for competency, skills and performance enhancement. Activities integrate pedagogical and organisational approaches and exploit, where relevant, interactivity, collaboration and context-awareness. Interdisciplinary research should deliver a convincing and theoretically sound body of evidence as to which approaches are effective and under which circumstances.

Longer term:

- d) **Adaptive and intuitive learning systems**, able to learn and configure themselves according to their understanding and experience of learners' behaviour. Cross-disciplinary research on the synergies between learning and cognition in humans and machines should lead to systems able to identify learner's requirements, intelligently monitoring progress, capable of exploiting learners' abilities in order to let them learn better, and able to give purposeful and meaningful advice to both learners and teachers either for self-learning or for learning in a collaborative environment.

Research on both themes of this objective is to be carried out by cross-disciplinary teams and it should include empirical evaluation studies assessing the broader socio-economic context in which technology is to be embedded.

Expected impact

- Unlocking people's and organisations' abilities to access content, master it, transfer it to the desired contexts and preserve it over time. Widespread use of these resources in the collaborative creation of cultural experiences.
- EU-wide migration of content to digital form involving memory institutions (libraries, archives and museums), leveraging national initiatives, and resulting in a significant increase of content available through digital libraries.
- Faster and more effective acquisition of knowledge, competences and skills, increased knowledge worker productivity, and more efficient organisational learning processes.

Funding schemes

CP, NoE, CSA

Indicative budget distribution¹²

ICT Call 1 - 52 M€:

- CP 44.5 M€ of which a minimum of 20 M€ to IP and a minimum of 10 M€ to STREP;
- NoE 5 M€;
- CSA 2.5 M€

ICT Call 3 - 50 M€:

- CP 42.5 M€ of which a minimum of 20 M€ to IP and a minimum of 10 M€ to STREP;
- NoE 5 M€;
- CSA 2.5 M€

Calls

FP7-ICT-2007-1; FP7-ICT-2007-3

Objective ICT-2007.4.2 (ICT-2007.4.4): Intelligent Content and Semantics

Target outcome

Medium term:

- Advanced **authoring** environments for the creation of **novel forms** of interactive and expressive content enabling multimodal experimentation and non-linear story-telling. These environments will ease content sharing and remixing, also by non-expert users, by automatically tagging content with semantic metadata and by using open standards to store it in networked repositories supporting symbolic and similarity-based indexing and search capabilities, for all content types.
- Collaborative automated **workflow** environments to manage the **lifecycle** of novel and legacy media and enterprise content assets, from the acquisition of reference materials to the versioning, packaging and repurposing of complex products, including their linguistic and cultural adaptation to target markets and user groups. Empirical results from the psychology of human perception and attention will be used to identify salient multimedia segments and apply summarisation and encoding schemes that will improve content storage and transmission without affecting its perceptual properties.
- Architectures and technologies for **personalised distribution, presentation and consumption** of self-aware, adaptive content. Detecting and exploiting emergent ambient intelligence they will use features embedded in content objects and rendering equipment to enable dynamic device adaptation, immersive multimodal experiences and contextual support of user goals and linguistic preferences. Privacy preserving learning algorithms will analyse user interactions with devices and other users so as to update and effectively serve those goals and preferences.
- Actions geared towards **community building**, intended to stimulate cross-disciplinary approaches and a more effective user/supplier dialogue, and other measures, including field validation and standards, aimed at a faster **uptake** of research results. Usability and technology assessment studies, economic analyses and roadmaps to chart the democratisation of personal and community based multimedia production and management tools.

Longer term:

- Semantic foundations:** probabilistic, temporal and modal modelling and approximate reasoning through objective-driven research moving **beyond current formalisms**.

Theoretical results will be matched by robust and scalable reference implementations. Usability and performance will be tested through large scale ontology mediated **Web integration** of heterogeneous, evolving and noisy or inconsistent data sources ranging from distributed multimedia repositories to data streams originating from ambient devices and sensors, supporting real time resolution of massive numbers of queries and the induction of scientific hypotheses or other forms of learning.

- f) **Advanced knowledge management systems** for information-bound organisations and communities, capable of extracting **actionable meaning** from structured and unstructured information and social interaction patterns, and of making it available for activities ranging from information search through conceptual mapping to decision making. Such systems will exploit semantics embedded in multimedia objects, data streams and ICT-based processes, and rely on formal policies to manage user access as well as audit trails in support of dynamic virtual organisations. Research advances will be embedded within end-to-end systems using **computer-tractable knowledge** in support of dynamic data and application integration, automation and interoperation of business processes, automated diagnosis and problem-solving in a variety of domains. Robustness, scalability and flexibility will be tested in real-life settings, together with interworking with legacy systems.

Expected impact

These activities will make digital resources that embody creativity and semantics easier and more cost-effective to produce, organize, search, personalise, distribute and (re)use, across the value chain.

- Creators will be able to design more participative and communicative forms of content.
- Publishers in creative industries, enterprises and professional sectors will increase their productivity with innovative content of greater complexity and ease of repurposing.
- Organisations will be able to automate the collection and distribution of digital content and machine-tractable knowledge and share them with partner organisations in trusted collaborative environments.
- Scientists will operate more efficiently by automating the link between data analysis, theory and experimental validation.

Funding schemes

CP, NoE, CSA

Indicative budget distribution¹²

ICT Call 1 - 51 M€:

- CP 46 M€ of which a minimum of 20 M€ to IP and a minimum of 12 M€ to STREP;
- NoE 1.5 M€;
- CSA 3.5 M€

ICT Call 3 - 50 M€:

- CP 45 M€ of which a minimum of 19 M€ to IP and a minimum of 13 M€ to STREP;
- NoE 3.5 M€;
- CSA 1.5 M€

Calls

FP7-ICT-2007-1; FP7-ICT-2007-3