THE EUROPEAN UNION AND SERIALS PUBLISHING: IMPACT AND INFLUENCE

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Like the USA and Japan, the European Union has developed initiatives to address the implications of the increasing importance of information as a strategic resource. Whilst considering the social impact from developments in information and communications technologies: job security; skill requirements and human resources etc, the EU strategy is also focused on keeping EU businesses competitive through a wide range of research projects in information engineering. As major participants in the information business, the publishers' role will be greatly changed by the new communication methods, the changes in nature of information and the shifting relationships in the communications chain.

Introduction

Information is becoming increasingly recognised as a strategic resource. Today's economy is more and more knowledge-based and the possession, transmission and exploitation of information are now critical to the success of Europe's industries and businesses. Considerable media coverage has been given to 'information superhighways', both to the enormous potential they offer as well as to the problems (for example, pricing and regulation) surrounding their realisation. In Europe, Japan and the United States efforts are under way to build the 'information superhighways' of the future. In fact, the World Bank forecasts a virtual tripling of global communications capacity in the next dozen years, and that still excludes cellular, cable and VSAT based networks. An improved information and communications infrastructure is essential in a world which is becoming a global trading place where business is increasingly being conducted electronically. Computer communications networks are no longer the domain of science, but also of government, industry and the ordinary citizens, and have now a direct impact on economic competitiveness and social evolution.

In the United States, in September 1993, the Clinton administration outlined its agenda for action for the creation of a National Information Infrastructure\(^1\). In Japan, part of a 1993 economic stimulation package dealt with the construction of a new information communications infrastructure, and NTT, the principle Japanese telecommunications service provider, has inaugurated a 25-year programme called OFL-21 (Optical Fibre Loop for the twenty-first century) to build a broadband network that will reach every school, business and home by the year 2015. Equally, numerous other countries such as France, Australia, The Netherlands, Canada, Singapore, and the UK, have all published policy or discussion documents concerning 'information superhighways' and Information Society issues.

Within the European Union, similar initiatives are under way. Title XII of the Maastricht Treaty provides for the construction and extension of trans-European networks in the telecommunications,
energy and transport sectors. The European Union's RACE (Research and Development in Advanced Communications Technologies for Europe) programme has prepared the ground for the introduction of integrated trans-European broadband communication (IBC), based upon ATM (asynchronous transfer mode) technology. Around 3.4 billion ECU of the 13 billion ECU Fourth Framework Programme on Research and Technological Development (1994-98) has been earmarked for information and communication technologies. Today's priority is not so much to develop new technologies but to meet the requirements of users of electronic information and their need for interoperability of information systems throughout the European Union. This goes well beyond just transmission protocols and network standards and extends to the content of information and the way it is presented to, and exploited by, the user.

Recent milestones in the European context have been the White Paper on 'Growth, Competitiveness and Employment' presented by President Delors to the European Council in Brussels in December 1993, and the Bangemann Report on 'Europe and the Global Information Society', presented at the European Summit in Corfu in June 1994. More recently the Commission published in July 1994 a communication entitled 'Europe's Way to the Information Society: an Action Plan'. Still more recently, an important event was organised during the ministerial conference of the G7 on the Information Society, held in Brussels in 1995. In the last few months the Commission has issued two communications on 'The Implications of the Information Society for European Union Policies: Preparing the Next Steps' and 'The Information Society: From Corfu to Dublin', and a Green Paper entitled 'Living and Working in the Information Society: People First'.

The approach taken in this paper is to highlight Community actions broadly touching on issues likely to be of interest to the STM community, stressing the link with information and communication technologies, and highlighting some actions under a recently initiated R&D sector called Information Engineering. Relevant actions under the new Info2000 programme are also mentioned.

White Paper and the Bangemann Report: their implications for the information market and the information industry

The White Paper addresses the issue of steeply rising unemployment in Europe and sets as a target the creation of 15 million new jobs by the year 2000. The White Paper makes specific reference to the information market and information industry, and stresses that an economy based upon the creation, dissemination and exploitation of knowledge - or information, will be one of the dominant features of the twenty-first century. A new 'Information Society' is emerging, in which management, quality and currency of information are key factors for industrial competitiveness. Access to and utilisation of information - the essence of an 'information culture' - are becoming more and more key issues, as European industries strive to increase their productivity and competitiveness.

The White Paper recognises the structural changes currently taking place in the information industry: the convergence of the telecommunications, information technology, consumer electronics, media (including publishing) and broadcasting industries around the issue of multimedia. Complex groups and alliances are forming, and will continue to form, and are impacting significantly upon the information value chain: creation and distribution of information.

The Bangemann Group was set up to bring together high-level representatives of the following sectors: computer industry, telecommunication industry, telecommunications operators, satellite operators, publishers, audio-visual industries, and users (eg: medical, educational and administration fields), and submitted its final report at the European Council Summit in Corfu in June 1994, entitled 'Europe and the Global Information Society.'

The report contains specific recommendations and proposes an action plan of concrete initiatives, based on a partnership between the private and public sectors designed to bring
Europe forward into the Information Society. The report maintains that the Information Society has the potential to improve the quality of life of Europe's citizens, and the efficiency of our social and economic organisation, as well as to reinforce cohesion between Member States.

Warnings are given of the risk of creating a two-tier society consisting of the information-rich and the information-poor. This must be avoided by guaranteeing everyone a fair access to the information infrastructure. Widespread acceptance and use of the services, offered by the new technologies, must be secured by preparing Europeans for the advent of the Information Society. This priority task can best be achieved through education, training and promotion. The Bangemann Report points out that in Europe business awareness of the opportunities is still lower than in the US. Teleconferencing, telecommerce, and electronic document interchange (EDI) are specifically cited as business applications worth promoting and improving. Furthermore, small- and medium-sized enterprises (SME) - the backbone of the European economy - must be able to benefit from the increased competitiveness that can derived from being linked to easy-to-easy access, cost-effective networks providing not only information on production and market openings, but also connecting them to R&D teams working in universities, research institutes and laboratories throughout Europe.

In the consumer market, a plethora of services is predicted to emerge, which will range from home banking and teleshopping to an almost unlimited choice of entertainment on demand.

The recommendations conclude with a number of possible applications geared towards launching the European Information Society. It is proposed that projects in the following areas could fulfil a demonstration function that would help promote their use by stimulating demand and supply:

- teleworking: more jobs, new jobs, for a mobile society;
- distance Learning: life long learning for a changing society;
- a network for universities and research centres: networking Europe's brain power - telematic services for SMEs: relaunching a main engine for growth and employment in Europe;
- road traffic management: electronic roads for better quality of life;
- air traffic control: an electronic airway for Europe;
- healthcare networks: less costly and more effective healthcare systems for Europe's citizens;
- electronic tendering: more effective administration at lower cost;
- trans-European public administration network: better government, cheaper government;
- city information highways: bringing the Information Society into the home.

The conclusions of the European Council at Corfu recognised the importance of the opportunity and the scale of the challenge facing Europe, but emphasised that the prime responsibility for action rests with the private sector, and that the role of the European Union and the Member States is to back up this development by giving a political impetus, creating a clear and stable regulatory framework and setting examples in areas of their direct responsibility. The Commission fully supports these conclusions and has established an action plan which it presented to the Council and European Parliament in July 1994 entitled 'Europe's Way to the Information Society: An Action Plan'.

The Action Plan has successfully established a framework for a European Union Information Society policy, and covers four areas:

- the regulatory and legal framework;
- networks, basic services, applications and content;
- social, societal and cultural aspects;
- promotion of the Information Society.

As regards the legislative framework, the Commission has presented a complete reform package, leading to full liberalisation in telecommunications by 1 January 1998. The Fourth Framework Programme on Research and Technological Development is successfully being implemented and it incorporates three
specific programmes related to information and communication technologies. Several measures, aimed at increased awareness building, have been launched. The G7 Conferences held in Brussels in February 1995 and in South Africa in May 1996 also contributed to raising awareness. Most of the measures outlined in the Action Plan have either been realised or are being launched. However, some actions are pending as their preparation takes more time than expected, eg: information security.

Valuable experience has been gained in the process of the implantation of the Action Plan. The Commission has now a more comprehensive picture of the measures necessary to achieve the objectives of its Information Society policy. In addition, new questions and issues have emerged. It is therefore time to review the Action Plan in order to give the Information Society a new political impetus. This is the objective of the Information Society Council on 8 October 1996.

In essence four main policy lines have been identified as priorities of equal importance:

(i) Improving the business environment

Full telecommunication liberalisation must be effectively implemented throughout the European Union by 1 January 1998. Increased transparency and consistency of national regulation related to Information Society services is needed to ensure fair competition and the functioning of the internal market. Speedy take-up of information and communication technologies by the various sectors of the economy including SMEs is essential.

(ii) Investing in the future

The Information Society means a knowledge-based society. Information Society related research should have a key role in the 5th Framework Programme as stated in the first orientations that the Commission adopted on 10 July 1996. The Commission will respond to the invitation of the European Summit at Florence 'to rapidly work out an action plan on the initiative Learning in the Information Society'.

(iii) People at the centre

Putting people at the centre of the Information Society policy is a Commission priority, ie: to respond better to their expectations and concerns on issues such as access to a wide range of services and content. In practice the Commission intends to advance towards a closer integration of Structural Funds and the Information Society policies to address social questions, to protect consumer interests and to improve the quality of public sector services.

(iv) Meeting the global challenge

Increasing globalisation means effort should be put on defining global rules. The Commission considers the completion of the WTO negotiations highly important in this respect.

As an immediate practical step, the Fourth Framework Programme of Research and Technological Development will contribute extensively to accelerating the deployment of the applications mentioned above. The programme Telematics Applications of Common Interest looks at the applications of existing and emerging technologies in a number of important areas directly related to the objectives outlined in the White Paper. Specifically these are in areas such as administration, transport, research networks, education and training, libraries, urban and rural areas, healthcare, disabled and elderly people, environment, and supported by telematics, language, and information engineering. More information can be obtained on Community supported Research and Technological Development programmes and projects, including results, etc, from the public database system called CORDIS.

Concerning the content aspect which covers the audio-visual field and the information industry and market, several actions have been initiated in 1996. In the area of the information market, the availability of high quality information resources will be a key element in the information infrastructure. Building on the results of Commission programmes such as IMPACT, the programme Info2000 will help provide high quality information resources.
The Info2000 programme will focus on the transition from print to electronic publishing and on interactive multimedia services. As a very concrete measure an Information Society Project Office (ISPO) has been set up to support, promote and orient private and public actions in the field of the Information Society.

**G7 Meeting on the Information Society**

From 25 to 26 February 1995 the G7 held a ministerial conference in Brussels dedicated solely to exploring the critical issues related to a world-wide Information Society. The conference covered three main areas: regulatory framework and competition, the information infrastructure and applications, and social and cultural aspects.

The G7 partners committed themselves to:

- ensure citizen's access through universal service;
- open up markets to allow the development of global systems;
- pursue the interconnectivity of networks and the interoperability of services;
- provide open access to networks for service and information suppliers;
- implement fair and effective licensing and frequency allocation;
- allow for cooperation while shielding against anti-competition behaviour.

In addition the participants agreed to increase their efforts to find creative, technological and policy solutions to the issues of: (i) privacy and the protection of personal data; (ii) increased reliability and security of national and international networks, and (iii) the technical protection of creativity and content provision.

Equally the G7 partners recognised the impact that interactive (multimedia) applications will have on society and they agreed to: (i) share experiences on emerging applications through the creation of an inventory of major implementations; (ii) act as a catalyst for the promotion of research, applications and generic services, and (iii) promote joint demonstration projects. In fact eleven selected joint pilot projects (one of which concerns digital libraries) were selected where international cooperation would be an asset.

For further information on the G7 Information Society Pilot Projects - Theme 4: Electronic Libraires, contact: Mr A Arot, tel: +33 1 40157502; fax: +33 1 40157404.

**Living and working in the information society: people first**

This most recent of contributions by the European Commission asks a few simple questions which are nevertheless at the heart of today's problems: will the technologies not destroy more jobs than they create?; will people be able to adapt to the changes?; will the complexity and the cost of the new technologies not widen the gaps between industrialised and less developed areas, between the young and the old, and between those in the know and those who are not?

The Green Paper states quite clearly that with the widening application of information and communication technologies there is a huge potential for wealth creation, higher standards of living and better services. These technologies are adding a new dimension to society in Europe, and as goods and services become more and more knowledge-based, there is an increasing need for public policies which ensure equitable access to the Information Society and a fair distribution of the potential for prosperity.

The key messages in the Green Paper can be summarised as follows:

- the most successful enterprises are combining information and communication technologies with education and training and with organisation transformation in an integrated approach;
- information and communication technologies have huge effects on skill requirements, and thus employment policies must become more focused on human resource investment;
- the Information Society must be about people and it should be used to unlock the power of information and not to create inequalities between the information rich and the information poor;
- the introduction of new information and communication technologies raises great
concerns in terms of job security, job content, skills obsolescence, and the relationship between working and living patterns;

- Europe's economies are being transformed away from standardised manual production towards a more diversified, knowledge-based, production of goods and services;
- effective implementation of new information and communication technologies require enterprise-level training, careful job design and rapid implementation of innovations;
- an integrated approach to information and communication technologies must be built on the small unit, market-driven, decentralised and based on teamwork, which is particularly adapted to the needs of the SME, and in particular 'microfirms';
- the application of new technologies can bring considerable added value to risk assessment activities, the collection, screening and dissemination of information, education and training in occupational safety and health, and for end users, particularly the SME;
- it is also important to reflect upon how to promote best practice in terms of use of information and communication technologies and job creation;
- these new technologies require not only stronger basic skills in numeracy and literacy but also a new form of basic skill, the skill of interaction with the new technology itself;
- the 'learning company' must emerge as a vital component of the learning society where people use their electronic access to knowledge and information to update their skills.

Some aspects not directly related to R&D activities

Without entering into a detailed discussion, the world of scientific, technical and medical information can be identified as touching on a variety of different issues, many more related to regulatory aspects rather than R&D orientations. As a list of key issues, the following are worth noting:

- the fundamental right of freedom of movement of workers and the self-employed, as well as the freedom to provide services (eg: mutual recognition of qualifications in the scientific, technical and medical fields, engineering, architecture, etc);
- the author's right to derive a financial advantage from the economic exploitation of his work, as well as the promotion of intellectual and artistic creation and scientific innovation (eventual harmonisation of copyright and related rights);
- taxation of CD-ROM, CD-i, and other digital video and multimedia supports, as compared to paper-based dissemination;
- actions to encourage a wide access based upon the diversified supply of information sources;
- a guarantee of genuine access to core information and data of high scientific quality;
- the important role that scientific, technical and medical information has in areas such as education, training, regional and industrial development, etc;
- pluralism in the media (competition policy);
- guarantee public access to information (right of access, at a reasonable price);
- promotion of cultural and linguistic diversity;
- openness of trade and competition and the avoidance of undue distortion of markets (public subsidies);
- the role of public service in the provision of information, education, culture and entertainment, as well as sports (broadcasting policy);
- the emergence of new types of audio-visual services ('pay-per-view' and 'video on demand') and the new interactive multimedia products and services (erosion of the traditional frontier between broadcasting and telecommunications);
the custodianship of national resources
having scientific, technical or industrial
value;
access to information on local savoir-faire or
on traditional methods of manufacturing,
etc (part of the issue of cultural identity).
The focus in the following sections will be the
specific relationship developed between STM
information and advanced technologies, and in
particular with the R&D programmes in
information and communication technologies.

STM publishing and information/
communication technologies

There has developed over the last few years an
interesting relationship between the general
area of publishing and of advanced information
and communications technologies. Table 1
outlines some of the projects funded under the
R&D programmes over the last few years which
have a relationship with issues of importance to
the STM community. Clearly other projects
could be cited (but are not) which include other
types of publishers, eg: art, catalogue, tourism,
mass media, etc. Additional information can be
obtained by contacting directly the projects
mentioned.

Additional information on projects funded
under the RACE/ACTS programmes can be
obtained from Ruth Nugent (phone: +32 2
2963415, e-mail: aco@postman.dg13.cec.be), and
for ESPRIT from Dominique Gonthier
(phone: +32 2 2968151,
e-mail: dominique.gonthier@dg3.cec.be).
In addition, the Libraries sector of the
Telematics Applications Programme supports
some interesting projects in the sector of
libraries, which are by definition all linked in
one way or another to information access issues.
A complete review of library projects are on
echo (http://www.echo.lu/), and additional
information can be obtained from Ariane Iljon
(phone: +352 4301 32923,
e-mail: ariane.iljon@lux.dg13.cec.be).

In general a number of fundamental shifts in
the focus of R&D funding in the broad area of
electronic publishing can be identified, namely:
the change of focus from the description
(eventually also preservation) and
management of collections of information
to the exploitation, dissemination and
 provision of access to those collections:
hence the increased focus on distributed
access to networked archives;
the increasing role that the image plays
(capture, archiving, resolution, etc) and the
move through the exploitation of
multimedia technologies to the integration
of the image (increasingly 3D images and
video) into virtual environments for
presentation purposes;
the focus now on networking solutions (or
eventually hybrid) as compared to the CD-
ROM solution for the dissemination of
information;
the move from technological components
supporting the issues of IPR, copyright,
and transactions to systems providing ‘key-
in-hand’ solutions;
the evolving role of the library community
in providing networked access to
collections of specialist information.

It is however true to say that the STM
publisher has not been a particularly active
participant in European funded R&D projects.
Just as much as the museum and gallery
communities have established themselves as
being privileged locations for the creation and
application of multimedia resources and have
proved good at illustrating the benefits of the
use of advanced technologies, so the scientific
publishing community has been hesitant in
proposing truly innovative R&D projects for
European support.

IPR management

Some conclusions from a recent workshop,
organised by the European Commission
( Brussels, 10 June 1996), were:
IPR management remains a key issue both
for global commerce as well as for
information system interoperability;
there is a need to promote consensus
between all the players on copyright
management systems;
future work should be more oriented
towards the users' needs and on practical
business aspects;
increased focus on exploiting copyright rather than just protection techniques;  
less emphasis on payment methods and security since commercial solutions will soon appear;  
authors, small distributors and copyright holders need to become more involved in the discussion and decision processes;  
look to standardise contracts across the EU for clearing copyright material;  
greater coordination is needed between groups/projects working in the area.

The URL for the complete transcript of the discussion is: http://www2.echo.lu/oii/eu/ipr.html

The information market and STM publishing

The IMPACT (Information Market Policy Action) programme concerned the creation of an internal market for information services. Under the extension programme IMPACT 2 (1991-1995), actions were funded in the general areas of multimedia publishing, geographic information and business services. In general, it can be said that the programme had a considerable effect on raising awareness about how multimedia can be used to present information of cultural, industrial and public interest.

Currently, Info2000, which supersedes the IMPACT programmes, aims to stimulate the development and use of multimedia information content. The central theme of Info2000 is to stimulate the development of a European, information-content industry both capable of competing on a global scale and able to satisfy Europe's internal demand for high-quality multimedia content. The Commission has recently closed (opened on 21 June 1996, closed on 13 September 1996) a call for proposals for pilot projects that help to establish a European capacity to produce multilingual, interactive, multimedia information products by building on the wealth of available European content. Ways should be demonstrated which overcome technological, cultural, market and other barriers to the growth of a European information industry.

Projects will aim at European multimedia products that incorporate the specific characteristics of language and culture. The projects address the issues of multimedia information supply in the following specific domains:

- the economic exploitation of Europe's cultural heritage;
- business information for firms, in particular for SMEs;
- the organisation and use of geographic information;
- the exploitation of scientific, technical and medical information.

All projects will demonstrate the full value of multimedia content to users on a European scale, and they will concentrate on:

- European content of intrinsic worth to users by virtue of its breadth, depth and reliability;
- the improvement of interactive access mechanisms to the content offered;
- making basic data (e.g. mapping data) available on the open market for further exploitation by the addition of thematic data and advanced multimedia methods or information systems;
- the adaptation of content to the real needs of significant numbers of potential users, whether SMEs, citizens or other target groups, including taking account of linguistic and cultural differences;
- the employment of adequate distribution channels to facilitate user access.

Initial support to selected projects will be to perform a definition phase of six months duration, in order to carry out market research, technology assessment, rights acquisition and the development of a working prototype, or other demonstrable result. After evaluation of the results, certain projects will be granted further financial support for a phase of implementation.

Community financial support has been based on actual costs incurred and will be calculated at up to 40% of those costs. For a participant established in a less favoured region or in a small enterprise, the percentage support could
be raised to 50%. For the definition phase projects, the ceiling on support is 100k ECU. For the later implementation phase projects, support may be granted up to 500k ECU. In exceptional cases a higher ceiling, up to 1m ECU, may be decided.

All projects are transnational in scope, aim at multilingual information access and exemplify cooperation across national borders.

In the area of scientific, technical and medical information the aim is to bring together the different actors involved in the creation, dissemination and use of such information, thus linking the research scientists to the many users from different cultures and having different objectives, in particular those in industry. The call sought to support:

- projects which addressed specific sectorial information needs and aimed to develop products and delivery services based upon proven commercial requirements;
- integrated information services specifically addressing the prospects of integrating industry procedures and systems with the requirement for information market products, eg: the development of technical information, such as materials test data, to integrate with tendering and bidding systems;
- services that address the need for public policy makers and administrations, as well as workers' and citizens' organisations to have available scientific information adapted to their requirements in specific domains, such as public health protection.

For further information on the activities of the STM sector, contact Mr G Heine; phone: +352 4301-33620; fax: +352 4301-33190; e-mail: gerhard.heine@lux.dg13.cec.be. Mr Heine is also responsible within Info2000 for the issues surrounding the use of multimedia content standards (see the echo site for more information).

Another useful contact point is Mr J Hoorens; phone: +352 4301-32560; fax: +352 4301-33190; e-mail: jan.hoorens@lux.dg13.cec.be, who is responsible within Info2000 for issues involving the trading of multimedia intellectual property rights.

This action, although completed (the call having closed in mid-September 1996), can be expected to produce an important set of feasibility projects followed in late 1997 by a smaller series of implementation projects. Depending upon budgetary considerations further calls may be envisaged in the coming four years.

Further information on the Info2000 programme is available from: Info2000 Central Office, European Commission, DG XIII-E, EUPO 1179, L-2920 Luxembourg. Fax: +352 430132847; e-mail: info2000@echo.lu; http://www.echo.lu/

### Information Engineering

Information Engineering, as a new horizontal R&D sector in the Telematics Applications Programme, aims to permit easier and more selective access and better usability of information in all its forms. The approach involves pilot applications which integrate the three main links in the information chain (electronic publishing, information dissemination, information retrieval). In targeting ease of access, usability and multimedia information content, it focuses on:

- user requirements (user-centred design, user requirement analysis);
- cost-effective integration into user friendly systems of tools and methods used in different stages of the information chain;
- multimedia information (repositories of non-text information).

Projects are being funded in areas such as:

- digital collections and asset trading networks;
- electronic newspapers and magazines;
- technical documentation and services;
- multimedia interactive catalogues;
- scientific, technical and medical publishing.

Information Engineering today is co-funding (50%) a total of nine large-scale pilot experiments, ten short-term feasibility projects, as well as four support projects. These projects are listed in Table 2. The larger projects generally involve Community funding in the 1.4-3m ECU range, run over 30-36 months, and bring together between ten and 25 different
organisations and companies. The smaller feasibility projects are funded (at 50%) for 100k ECU for a twelve month period and are designed to develop new and innovative perspectives for future large-scale pilot projects.

Information Engineering projects

The single most important project with respect to scientific, technical and medical information is the EUROPE-MMM project. Although both the projects MULTIMEDIA BROKER and TWENTY-ONE can be expected to provide some very useful results for the broad STM publishing community.

It is equally interesting to note that at least three of the presently operational feasibility projects target, in one form or another, the publishing of STM information, namely: NEESTAR, HYPDOC, and MEDFORM. These three projects can be expected to act as foci for new project proposals in the broad area of STM publishing in the forthcoming call under the Telematics Applications Programme.

Forthcoming call under the Telematics Applications Programme

Information Engineering will be issuing a new call for large-scale implementation projects on the 15 December 1996, with a probable close date of 15 March 1997.

The call will be essentially oriented towards implementation projects, being based upon, and as an extension of, a solid feasibility project. The call will be open to any and all consortia able to demonstrate adequate proof of feasibility. Clearly the presently active feasibility projects are likely to possess such information. However, past experience has shown, and this is particularly true in the area of STM publishing, that many consortia are already actively performing tests and trials in the general area of tele-publishing. As such the call would allow such consortia to develop their ideas further in a truly European context. Solid feasibility must be demonstrated and can be expected to cover such things as:

- survey of technical issues and relationship with tasks in the Information Engineering work programme;
- customer related issues, user requirements and survey results;
- market survey, cost-benefit, and business plans;
- issues associated with, and pre-selection of, the commercial transaction mechanisms;
- treatment of existing technical standards;
- inclusion of usability methodologies;
- consortium building.

The call in Information Engineering will have a limited scope. It will focus only on projects attacking one of the following:

1. digital collections (large volumes of distributed information, asset trading);
2. new publishing models, in
   - scientific, technical and medical publishing.
   - 'niche' (small groups of knowledge-intensive users, network delivery only).
   - mass market (family, news, etc);
3. corporate publishing (animated technical documents, product information and catalogues).

It can thus be seen that the general area of STM publishing (and this could equally include different forms of 'niche' publishing), when based upon the practical testing of new commercial models, is well represented. The now well known requirements of Information Engineering (eg: real user involvement, supporting the interactive design process including usability testing, enhanced functionality and added-value criteria, and the true involvement of multimedia data types) will naturally be maintained.

Further information on Information Engineering can be obtained from I'M Europe on http://www.echo.lu/, or from a technical information site, run by the project IESERV, on http://www.pira.co.uk/ie

New projects: new ideas

As has been outlined above, Information Engineering will be looking to support one, or possibly more, sizable R&D project(s) in the specific area of STM publishing. The programmes expectations are multiple, but
many of the following key issues will need to be treated in any successful proposal:

- examine how publishers deliver information and how users search and retrieve it;
- target network-based content delivery (open network);
- establish cooperation and common platform between publishers;
- include a critical mass of content;
- create and maintain a shared multimedia (scientific) information space;
- contribute to guidelines and principles for electronic archiving;
- conserve the elements of quality and differentiation;
- achieve a ‘one-stop-shop’ for customers;
- involve user groups and aim for the knowledge-intensive ‘need-to-know’ user;
- evaluate user needs and demand, and profiling techniques for consumers;
- support the users ‘need to publish’ requirements, count for tenure;
- maintain the concept of strict peer review;
- contribute to a code of ethics and conduct for electronic publication;
- empower the user to manage his own information space;
- perform a detailed cost-benefit analysis on the options studied;
- copyright:
  - legal compliance,
  - protection,
  - access control,
  - transaction of rights,
  - secure TPR tracking (enable reuse);
- examine and empower the commercial transaction (charging, bill, payment and pricing):
  - implications for publishing models and the publishers,
  - market implications for future products and services,
  - role of ‘electronic only’ journals,
  - the role of the intermediaries, libraries, subscription agents,
- user and usage models,
- user rights, usage tracking,
- packaging requirements,
- pricing models,
- different payment systems, cashflow, ‘micropayments’,
- terms and conditions of use, licence agreements,
- cost of electronic/network (journal) production;
- respect and contribute to technical standard issues:
  - tables of content, coding of articles,
  - multimedia, data formats,
  - 3-D visualisation, video, algorithms,
  - content linking,
  - net browsers, and cross journal search engines;
- treat the privacy and confidentiality issues;
- examine how to structure multimedia content for deep interactivity;
- integrate multimedia databases with authoring/editing tools and use different indexing, navigation, and classification aids;
- develop new markets (electronic promotion and marketing).

The above list, disordered as it is, provides but one view of what a ‘good’ STM project might aim at within the context of Information Engineering. It is of course for the proposing consortia to establish their objectives, justify them in a clear and concise way, and to ‘build’ a viable platform for experimentation purposes. However, one point is clear, the focus of Information Engineering is not so much on the development of new technologies, but more on the integration of available technologies, along with copyright and transaction components, into functional information systems supporting different business models, and on providing answers to real world problems and well defined user needs.

Conclusions

This report clearly demonstrates, if only providing a partial and fragmented account of
Community initiatives, that some actions do include a strong publishing dimension, could impact key problems of relevance to the STM publisher, and could thus be employed to mobilise the STM community around important problems facing its members. The key words are: strengthen and expand the participation of the STM community in European R&D projects, build-on and enrich the solid foundation for the dissemination of STM information in Europe, support scientific excellence and innovation, promote the emergence of permanent networks between all actors in the value chain.

From the perspective of Information Engineering, advance information and communication technologies are likely, in the coming years, to dramatically change the way that people acquire and distribute knowledge, and as such also scientific, technical and medical content. Some projects, both at the national and international level, aim at the creation of massive stores of digital information of scientific significance. Projects such as Europe-MMM are equally vital in that it will become increasingly important that users are provided with simple ways for accessing and using these massive collections of valuable digital information. The capacity to select and identify relevant information, wherever it may be stored and in whatever language it may be found, will be one of the most important criteria by which users will judge future information systems, be they scientifically oriented or not. It is clearly the moment to provide concrete results, and it is to the advantage of EUROPE-MMM that they intend to package key results for distribution to the wider publishing community.

However, developments external to the scientific community will often impact and condition what will and will not be possible in the coming years. A recent study performed under Information Engineering, reviewed the likely developments through to the year 2001 in areas touching on electronic publishing, information dissemination, and information retrieval. The study found that:

- transaction systems will mature and user confidence in the electronic marketplace will develop (although a single unified copyright system in Europe was unlikely to emerge in the next few years), and the seamless and transparent interaction of such systems will become a major issue from the users' viewpoint;
- if communications costs were to drop significantly (a likely option following liberalisation of the telecommunication marketplace in 1998), then significant new types of services, and in particular broadband services, would rapidly become economically attractive;
- PC functionalities (rather than TV-based functionalities) were likely to be central to the interface for domestic electronic information services;
- whilst Internet-based services were likely to develop, there was still considerable doubt concerning how revenue would be generated in an electronic marketplace, and who (European or non-European information providers) would dominate the European market.

Concerning the general area of digital collections and asset trading, the report concluded that:

- broadband communications would have a major impact on asset (image, video) identification, acquisition, and transfer;
- new workflow software will support design, editorial and commercial processes;
- that all tradeable assets will be digital, be in standardised formats, and logically tagged;
- that rights trading environments (copyright / permission / licensing / royalty) were likely to incorporate artificial intelligence techniques;
- that there will be major advances in indexing and search engines (associative / probabilistic indexing, pattern recognition, search agents);
- that a significant portion of assets will become 'shareware', bypassing traditional publishers, image libraries and intermediaries;
- that the problems of verification and authorisation for brokering and payment will be solved;
- that global standards will be in place for digital cash and electronic wallets.
that agent technologies will be important in managing the location, specification and completion of transactions,
that the key commercial 'battle area' will be in who controls the electronic transaction process.

More specifically with respect to STM publishing the report stated that:
- digital printing will enable STM publish-on-demand;
- academic corporate bodies will have an increasing role to play as publishers;
- STM works of persistent value will appear as truly interactive multimedia presentations;
- Internet-based fast scientific communication will erode the traditional role of the STM journal;
- 'validated' databases will become accepted as publications (for tenure);
- digital multimedia content databases will be the common core for the production of print, CD, online, etc;
- encryption will enable lockable multi-volume electronic 'bookshelf' publishing (on CD).

The report concluded by recommending that the key technology domains for action are:
- authoring tools and environments;
- virtual networks and services;
- workflow and transaction management;
- content tagging and identification.

A final word of warning is perhaps justified. Despite the immense potential offered by digital technologies and networks there still remains an enormous question mark concerning the acceptance by the user of these new technologies and the associated set of 'information-rich' products and services. Today, networks, such as Internet, are still used by a small minority of people. People who are usually young (33 years old), male (68%), reasonably well educated and well paid (approx. US$59,000). More than half of the people access the network from the home, pay for their own access, use it for browsing and entertainment, and see it as being nothing more than a substitute for watching TV.

Those people who do not use such technologies and networks see the issue in the light of the erosion of their job security and the difficulty in providing an acceptable education for their children.

Clearly there is a long way to go before everyone is both willing and able to use modern information and communication technologies and has troublefree access to the vast digital archives of human knowledge and culture that we all know is out there, but we just cannot find it when we need it!

References

1. 'The National Information Infrastructure: Agenda for Action', Information Infrastructure Task Force, September 15, 1993. More information can be obtained from an Information Infrastructure Task Force (IITF) Gopher Server which can be accessed through Internet by pointing out your Gopher Client to ittf.doc.gov or by telnet to iitf.doc.gov and login as gopher. There is access also available at the same address for WWW clients. Dial-up access by modem is available at +1 (202) 501-1920.

2. The RACE Programme has been superseded under the 4th Framework Programme (1994-98) by the ACTS Programme. More information on RACE and ACTS can be obtained from: ACTS Central Office, European Commission - DG XIII/B, 200 rue de la Loi, B-1049 Brussels fax: +32 2 295 0654, e-mail: aco@postman.dg13.cec.be General Information related to the ACTS programme is available on: FTP from Stuttgart University ftp.rus.uni-stuttgart.de/pug/org/cec/acts, WWW home page at Analysys http://www.analysys.co.uk/acts/default.htm, and in the TWEUROPA forum on CompuServe

3. 'Concerning the S&T Content of the Specific Programmes Implementing the 4th Framework Programme for Community Research and Technological Development (1994-1998)', COM(93) 459 final, 06.10.93

4. 'Growth, Competitiveness and Employment - The Challenges and Ways Forward into the 21st Century (White Paper)', the Bangemann
The EU and serials publishing: impact and influence  Bernard Smith

5. More information on the Telematics Programme can be obtained from following addresses:
(for all sectors excluding information engineering, language engineering and libraries) Telematics Applications Programme - DG XIII-C, 200 rue de la Loi (Bu29, 4/35), B-1049 Brussels, fax: +32 2 296 8398, e-mail: telematics@dgl3.cec.be
(for information engineering, language engineering and libraries)
Telematics Applications Programme - DG XIII-E, Bâtiment Jean Monnet (JMO B4/37), L-2920 Luxembourg, fax: +352 430134079, e-mail: telematics@mhsg.cec.rtt.be, or at webmaster@echo.lu

6. A Commission service called CORDIS (Community Research & Development Information Service) provides documentation and online access to several databases, including the text of key documents, invitations to tender, calls for proposals, etc. More information can be obtained from:
RTD-Help Desk, tel: +352-430133161,
fax: +352-430132084, or CORDIS Customer Service, ECHO, BP 2373, L-1023 Luxembourg, tel: +352 34981240, fax: +352 34981248, e-mail: helpdesk@cordis.lu,
WWW: http://www.cordis.lu/

7. More information on the Info2000 programme can be obtained from: European Commission, DG XIII-E, Info2000 Central Office, tel: +352 40 116 2222, fax: +352 4301 32847, e-mail: info2000@echo.lu
The Info2000 programme provides a WWW server on the Internet called I’M-EUROPE on which a number of key documents [eg: White Paper, Bangemann Report, etc] have been loaded. If using a WWW browser, simply open the URL http://www.echo.lu. For telnet users, telnet www.echo.lu and login:www. Enquiries should be addressed to webmaster@echo.lu

8. Secretariat of the Information Society Project Office, Rue de la Loi 200 (Bu24 2/78), B-1049 Brussels, tel: +32 2 2968800 (free-phone in Ireland: 1800553224), fax: +32 2 2994170, e-mail: ispo@ispo.cec.be, CompuServe: 100137,370, WWW: http://www.ispo.cec.be

9. More information can be obtained from:
European Commission, DG XIII-E, Office C4/24, Bâtiment Jean Monnet, L-2920 Luxembourg, tel: +352 430134195,
fax: +352 430134959,
e-mail: bernard.smith@lux.dg13.cec.be
The descriptions of the feasibility projects and studies launched under Information Engineering are available on the Commission’s I’M-EUROPE server: http://www.echo.lu/

10. Information Engineering 2001: Identification of Influential Technologies, Impact Assessment and Recommendations for Action', Nov. 1995.
Table 1

| Programme | Project | Objective | Contact |
|-----------|---------|-----------|---------|
| ACTS      | Tracing Authors' Rights by Labelling Image Services and Monitoring Access Network (TALISMAN) | Protection of video sequences (labelling and watermarking) to comply with copyright guidelines | Catherine Simon Thomson-CSF RGS Division, France phone: +33 1 46132594 e-mail: catherine.c.s.s.simon@rgs.thomson.fr |
| ACTS      | Multimedia Publishing Brokerage Service (MULTIMEDIATOR) | Demonstrate the use of an intelligent multimedia brokerage service for customers and suppliers in the publishing and electronic commerce areas | Jaime Delgado Logic Control, Spain phone: +34 3 7285400 e-mail: delngdo@logiccontrol.es |
| ACTS      | Publishers Reusable Integrated Network Toolkits for Information Technologies (PRINT-IT) | Conduct a state-of-the-art survey and assess the requirements for distributed printing services | Jean Pierre Eisele Indigo Europe, The Netherlands phone: +31 43 3565656 e-mail: eiselej@indigo.co.il |
| RACE      | Distributed Integrated Multimedia Publishing Environment (DIMPE) | Create an environment for future publishing services | Mr Sallery Maxwell Communications, UK phone: +44 1223 420561 fax: +44 1223 420154 |
| RACE      | Distributed Documenting Services (DIDOS) | Demonstrate and test a distributed service centre concept for advanced information processing, publishing, and communication methods: technical documentation | Andrens Kindt DeTeBerkom GmbH, Germany phone: +49 30 46701232 e-mail: kindt@deteberkom.de @de.deon.d400.de |
| TAP - Information Engineering | Remote and Online Publication of Multimedia (Europe-MMM) | Demonstrate and authoring and dissemination platform supporting publishing for higher education (from classical journals to new multimedia material) | Rosemary Altoft John Wiley & Sons, UK phone: +44 1243 770332 e-mail: altoft@wiley.co.uk |
| TAP - Information Engineering | Developing Critical Support Tools for Multimedia Publishing (MULTIMEDIA BROKER) | Development and integration of existing tools into a range of products aimed at the production, management and dissemination of multimedia products by publishers | Ana Maria Segovia Ibermatica, Spain phone: +34 1 3649100 e-mail: ana@nt.iber.es |

continued
| Organization                                      | Program Description                                                                                                                                                                                                 | Contact Person                              |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| TAP - Information Engineering                     | Develop a 'domain independent' model for the distribution of multimedia documents: with a focus on ecology and sustainable development                                                                                 | Ronald Punt, Getronics Software BV, The Netherlands |
| TAP - Information Engineering                     | Build an integrated environment to catalogue, browse and visualise data from social science archives (present feasibility project)                                                                                     | Simon Musgrave, Economic and Social Research Council Data Archive, UK |
| TAP - Information Engineering                     | Build an integrated system for preparing multimedia material for industrial companies and technical publishers (present feasibility project)                                                                     | Gianfranco Abbrescia, Datamat - Ingegneria dei Sistemi SpA, Italy |
| TAP - Information Engineering                     | Provide advanced access facilities to publishers and authors for the production of multimedia scientific information: technical books (present feasibility study) | Stefano Marconcini, Rigel Engineering Srl, Italy |
| TAP - Information Engineering                     | Pilot new services and systems for medical information dissemination (past feasibility project)                                                                                                                    | Roberto Minio, PIRA International, UK      |
| TAP - Information Engineering                     | Develop an infrastructure for the publisher and user of scientific, technical and medical information (past feasibility project)                                                                                   | David Pullinger, Macmillan Publishers Ltd, UK |
| TAP - Libraries                                   | Establish an Italian and Portuguese library network providing international and document supply services                                                                                                         | Fabrizio Del Lungo, Studio Staff Srl, Italy |
| TAP - Libraries                                   | Concerted action on copyright issues for information professionals                                                                                                                                              | Emanuella Giavarra, European Bureau of Library, Information and Documentation Associations, The Netherlands |

*continued*
Implementing Billing System for Open Access Networked Information (COPINET)

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e-mail: psgb@mari.co.uk

Automated Information Filtering and Profiling (BORGES)

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e-mail: jagerman@auto.dec.com

Delivery of Copyright Materials to End-Users (DECOMATE)

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e-mail: j.m.m.dijkstra@kub.nl

Document and Library Integration (DALI)

David Kay
Fretwell-Downing Data Systems Ltd, UK
phone: +44 114 2686090
e-mail: dgodfrey@fdgroup.co.uk

Copyright in Transmitted Electronic Documents (CITED)

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phone: +33 1 30120071
fax: +33 1 30600461

Copyright Ownership Protection in Computer Assisted Training (COPICAT)

Pete Bennett
MARI, UK
phone: +44 191 5191991
fax: +44 191 5191990

Coordinating Project for Electronic Authors' Rights Management System (COPEARMS)

Dominique Spaey
Bureau Van Dijk, Belgium
phone: +32 2 6486697
e-mail: dspney@pophost.eunet.be

Intellectual Multimedia Property Rights Model and Terminology for Universal Reference (IMPRIMATUR)

Janet Hurell
ALCS, UK
phone: +44 171 2552034
e-mail: alcs@alcs.demon.co.uk

Open Asset Storage and Interchange System (OASIS)

Roberto Minio
Pira International, UK
phone: +44 372 360092
fax: +44 372 377526

Construct and trial an experimental system using WWW for information retrieval and document delivery

Develop an information filtering service for message disseminated by Usenet News and the WWW

Provide end-user access to copyright material in electronic form

Develop and pilot a service for multimedia document delivery in a distributed environment

Tools for control, policy and remuneration of copyrighted material stored and transmitted in digital form

Electronic copyright protection system

Assist and integrate projects concerned with IPR

Methodology for business, legal, technical and standard areas on multimedia rights clearance

Providing guidelines for systems and methods to manage, access and trade multimedia assets
Table 2

Information Engineering Projects

Aquarelle - Shared Cultural Heritage through Multimedia Telematics
Alain Michard, ERCIM, France, phone: +33 1 39635472, e-mail: Alain.Michard@inria.fr

GEOMED - Geographic Mediation System
Marcello Sabatini, Intecs Sistemi SpA, Italy, phone: +39 50 544111, e-mail: marcello@sole.pisa.intecs.it http://www.pisa.intecs.it/projects/GeoMed

Europe-MMM - The Efficient Use of Remote and Online Publication of Multimedia Material
Rosemary Altoft, John Wiley and Sons, UK, phone: +44 1243 770332, e-mail: altoft@wiley.co.uk

MAGICA - Multimedia Agent-based Interactive Catalogues
Enrico Ascani, Ing. C. Olivetti SpA, Italy, phone: +39 6 59502965, e-mail: enrico.ascani@iol.it

WATIS - Work and Training Information System
Ignace Dierckxens, Vlaamse Dienst voor Arbeidsbemiddeling en Beroepsopleiding, Belgium, phone: +32 2 5061801, e-mail: idiercke@vdab.be

MBLN - Multimedia as a Business Option for Local Newspapers
Josefine Hofmann, Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung E.V., Germany, phone: +49 711 9702095, e-mail: Josefine.Hofmann@iao.Org.de

Multimedia Broker - Developing Critical Support Tools for Multimedia Publishing
Ana Segovia, IBERMATICA, Spain, phone: +34 1 384 91 00, e-mail: ana@nt.iber.es

MAID - Multimedia Assets for Industrial Design
Tom Evens, Stichting Center for International Technology and Education, UK, phone: +44 171 587 5313, e-mail: cite_te@exaxon.lond-inst.ac.uk http://www.edc.nl/ and http://www.lond-inst.ac.uk/cite/

Twenty-One - Development of a Multimedia Information Transaction and Dissemination Tool
Ronald Pant, Getronics Software BV, The Netherlands, phone: +31 20 430 6430, e-mail: puntr@ims.gso.getronics.nl

ProNet - Product Information System for Business Networks
Bernard Battaglin, Telesis Beratung Gesbr. Franz Ruf und Mitgesselschafter, Austria, phone: +43 5577 88419, e-mail: battaglin@telesis.vol.at

IDEA - Innovative Document Engineering Application
Eric Trodd, Brameur Ltd, UK, phone: +44 1252 812252, e-mail: 100142.3334@compuserve.com

NESTAR - Networked Social Science Tools and Resources
Simon Musgrave, Economic and Social Research Council Data Archive, UK, phone: +44 1206 872321, e-mail: simon@essex.ac.uk

GISEDI Europe - Electronic Trade for Geographic Information
Marc Sahrnuoi, Devise EDI, France, phone +33 57 25 92 92, e-mail: devise@icare.fr

OMIMO - Online Multimedia Information for Maintenance and Operation
Robert Newman, Coventry University, UK, phone: +44 1208 88022, e-mail: bohns@vide.coventry.uk

MIMOSA - Multimedia Management Information Optimisation and Synthesis Assistance
Philippe Chauvet, Groupe Informatique Scientifique et Technique, France, phone: +33 1 45071919, e-mail: philippe.chauvet@gist.fr

Procat-GEN - Product Catalogue in the Global Engineering Network
Franz-Josef Stewing, Siemens Nixdorf Information System AG, Germany, phone: +49 5251 606100, e-mail: stewing@cadlab.de

PROMIS - Portable Reception of Multimedia Information Services
Patrick Chapel, Telediffusion de France, France, phone: +33 87207541, e-mail: pchapel@c2t.1df.fr

Hyphoc - Hypermedia Publishing, Documentation and Cooperation based on Technical Material that is Online Retrievable
Gianfranco Abbrescia, Datamat - Ingegneria dei sistemi SpA, phone: +39 6 5027 4671, e-mail: gian@datamat.it

Medform - Multimedia Publishing Information Europe
Stefano Marconcini, Rigel Engineering, Italy, phone: +39 586 210 222, e-mail: rigel@commune.livorno.it

MAF - Multimedia Application for the furniture industry (a Telematics support project for SMEs)
J. P. J. Buis, Central branchevereniging Wonen, Bilthoven, The Netherlands, phone: +31 30 229 4359, e-mail: CbW@pi.net

IESERV - Information Engineering Support Services Project
Geoffrey Stephenson, KET, UK, phone +44 1352 319680, e-mail: ketlux@ketlux.demon.co.uk http://www.pira.co.uk/IE/

EuroEMaster - A Masters Degree in Information Engineering
Sheila Pantry, Sheila Pantry Associates, UK, phone: +44 1909 777024, e-mail: 100327.3572@compuserve.com

Baseline - Baseline Data for User Validation in Information Engineering
Elke-Maria Melchior, ACT - Advance Concepts for Interactive Technology GmbH, Germany, phone: +49 251 42310, e-mail: aci@acm.org http://www.ucc.ie/hfrg/baseline

INUSE - Information Engineering Usability Support Centres
Nigel Beven, National Physical Laboratory and Executive Agency of DTI, UK, phone: +44 181 9436993, e-mail: Nigel@hc.npl.co.uk

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