ISTAG REPORT

New Business Sectors in Information and Communication Technologies

The Content Sector as a case study

Final Version

September 2007

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Executive Summary

The latest i2010 Annual Report (2007) identifies the creative content sector as one of the strategic areas that have contributed to these developments and, as projections in the Screen Digest 2006 study on Interactive content reveal, the sector is likely to confirm its strategic importance for European growth in the coming years. Content includes a variety of media products from TV and radio, music, film, games, interactive, Web and mobile services delivered by a wide range of distribution technologies from terrestrial broadcast, satellite, internet as well as DVDs and CDs.

Given the rich, cultural traditions of Europe and its dynamic content industry, the potential for growth is very large. Much of this depends on online delivery of content, but the very openness of the internet and its global reach means that competition from outside Europe will be as intense as that from within.

The ISTAG Working Group on 'New Business sectors in ICT' in this report has identified a number of key recommendations to ensure a healthy economic future for the European Content sector, as well as reciprocal benefits for the ICT industries that support it. Many of these suggestions are in line with existing priorities and programmes, but some, such as the *revision of copyright law*, will require new initiatives and a great deal of thought in balancing the rights of content owners with those of users.

This analysis and the discussions about the related recommendations have been launched by ISTAG because we are entering in a period which is particularly promising for the content industry. This is due to the convergence of challenging and enabling facts such as:

- the wide diffusion of broadband networks in Europe,
- the switch from analogue to digital TV,
- the explosion of user generated content and services through e.g. web2.0,
- the advent of new business models related to the digital opportunities and the new user behaviour.

This creates a **completely new paradigm.**

For Europe to play a central role in this new paradigm, the working group recommends:

- to establish a cluster network to monitor and benchmark the European content sector,
- to develop *a European-wide incubator* based within the Member States to offer entrepreneurs access to best practise, and a range of support to grow their businesses,
- to create *a European standardisation initiative on multimedia annotation* and interoperability,
- to exploit the *switch-off of analogue TV* to consolidate the digital economy,
- to move from copy right to right to copy, by developing new mechanisms to protect the creators within the new paradigm,
- to support R&D initiatives that combine technology, business models, services and creativity,
- to stimulate new cross-disciplinary educational approaches.

The new paradigm offers a unique opportunity to the European industry of the content sector to take a leading position and to the European Commission to tune the R&D policy of the Community. It is essential that Europe makes the right strategic choices and investments, and puts in place the best instruments for encouragement and support.

1. Introduction

This report, prepared by the Information Society Technologies Advisory Group (ISTAG), aims to recommend actions that target the stimulation of innovation and economic growth in new business sectors in Information and Communication Technologies (ICT).

The creative content sector, a new ICT business sector with high growth potential, is treated as a case study on which to structure and base the analysis and recommendations.

The report aims to address questions such as:

- How can we turn a new business area into an innovation ecosystem?
- Can we remove existing technical, legal, and information access barriers?
- How can we improve SMEs' industrial access and participation in competitiveness clusters?
- How can we further involve SMEs in Research and Innovation programs?
- What are the mechanisms to assess and capitalize on best practice in Europe?
- How can we facilitate the creation of lead markets in relevant areas?

The European Content sector represents a field which is enormous, as is its potential for enriching the lives of citizens, and its importance for the economy of Europe. Content includes a variety of media products from TV and radio, music, film, games, interactive, web and mobile services delivered by a wide range of distribution technologies from terrestrial broadcast, satellite, internet as well as DVDs and CDs.

This report surveys opportunities offered at a time of unprecedented technological change. It then presents an analysis of impediments and puts forward a series of recommendations to ensure a profitable future for the sectors involved and a competitive position for Europe.

Section 1 provides a brief introductory overview. Section 2 defines the content sector, its main characteristics and its strategic importance for Europe. Section 3 surveys the main challenges facing Europe's content industries. Section 4 outlines a series of recommendations that will help address the challenges. Finally, section 5 contains the conclusions.

2. The Content Sector

This report aims to analyse the content sector by way of its innovation capabilities and present a list of recommendations to improve corporate competitiveness of this industrial sector, notably through Research and Development activities. It addresses content as a sector identified through four different sources:

- *Cultural industries* as defined by the European Culture Foundation and encompassing commercial activities: applied arts, culture and media industries (books, film, entertainment and video), related industries and crafts; public activities: public or subsidised arts, media and heritage, public administration and funding and cultural education and informal activities: informal arts, support services (e.g. foundations and associations).
- *Cultural and creative industries* as defined in the 2006 KEA report on the "Economy of culture": core arts field including visual arts, performing arts, heritage; cultural industries: film and video, TV and radio, music, books and press; creative industries and activities: design, architecture and advertising; related industries: ICT manufacturers, cultural tourism.
- *Copyright industries* as denominated by the World Intellectual Property Organization (WIPO). The copy-right based industries are defined as the firms and professionals who deal with the creation, production, distribution and consumption of products and services resulting from intellectual and artistic creation independently of their specific support and subject to be protected by intellectual property rights, but also by free material that is not copy-right protected.

- *Creative content industries* as defined in the EPIS[1] project i.e. heavily industrialised services including broadcasting, advertising and marketing, films, games, internet and mobile content, music industries, electronic publishing and print, and some of the less industrialised activities namely museums and library services as well as education and learning or knowledge engineering.

Massive efforts have been allocated to the deployment of networks and other hardware and software infrastructures. Attention now needs to be paid to the economic opportunities offered by the creation and use of content, services, and applications that will benefit from current and future broadband infrastructures and capacities.

2.1 Content defined

Content, as defined for the purposes of this report, includes a wide range of media products encompassing television and radio programs, music and film recordings, games and interactive services, web and mobile services delivered by terrestrial, satellite, cable, telephone/mobile telephony and Internet, as well as CDs and DVDs. One of Europe's major challenges today is generating favourable conditions to encourage and grow the content industries. It is important to understand that content operates through a dynamic process evoking emotional stimulus. This process is apparent in genres as diverse as drama, sports, music, news, games, education, and information. The emotional connection (via excitement, curiosity, euphoria, amusement), and a consistency in meeting audience expectations for this emotional 'reward', motivates users to return to content brands. Freshness is an important characteristic, since dull content, or content without emotion, generates few return customers. *Creative innovation* is therefore an important factor, and stimulating that is a first requirement for producing competitive content products.

Traditionally, content has existed in linear and narrative form, often derived from theatre, concerts or classic teaching methods. The video games industry, however, has developed new forms of entertainment that are both interactive and competitive. Games promote intervention rather than passive consumerism. Pro-active users control the outcome. Younger generations spend more of their time interacting with games than with one-directional entertainment. This new form of content has had a major impact on the consumption of non-interactive media. Advertisers who target key demographics (e.g. the 16 – 34 year old) have had to reconsider both their strategy and methods.

A key development in FP7 is the emphasis on 'Intelligent Content' and the convergence of multimedia, web, and knowledge-engineering. Sometimes described as 'content that listens', Intelligent Content is designed for the interactive age; it reaches out from linear stories to possibilities as vast as the web itself. Content labelling and annotation are the keys to allowing users to find their way through the wealth of text and audiovisual material that exists on the web. This form of content poses at once opportunities and challenges for authors, producers, delivery systems, and business models. Re-use (re-hashing) of existing content tends to engender legal problems for professions where contracts have hitherto been drawn on geographical or per-use basis. Users' demand for content as a 'building material' for their own productions cannot be ignored, and solutions for unbundling and repackaging of content are needed to encourage sustainable, legitimate content markets to develop.

By giving a new form to imagination, content becomes an essential ingredient of our European culture, expressing our feelings and thoughts and embodying our aspirations, frustrations, and desires. Culture is a foundation for growth and Europe has an exceptional richness and diversity of culture and content. We should seek to accelerate Intelligent Content's access to the marketplace, as enabled by Information and Communication Technologies, and reciprocally, look to stimulate these industries' growth.

2.1.1 Interdisciplinary approach to content creation

Content creation today requires a high level of technical knowledge. The computer is now the workbench for making digital content whether in television, web services, mobile content or publishing. Creators need to

[1] EPIS (http://epis.jrc.es) is a multi-annual project carried out by the Institute for Prospective Technological Studies (IPTS) of the European Commission's Joint Research Centre on behalf of EC DG INFSO, aiming at deepening the understanding over potential market developments and trends, over the potential evolution of technologies and of business models, with focus on the creative content industries.

feel at home with digital technology. This blend of technical and artistic knowledge has existed throughout history, as for example during the renaissance when artists needed competence in metallurgy and pigment chemistry, as well as mathematics. However, formal education in most European countries tends to keep humanities and technology in separate compartments.

Ownership of content is enshrined in copyright law, and defined by the contractual terms under which it was commissioned. Generally, the discreet elements comprise spoken (or sung) words, text, music, performance by actors and musicians, design and directorial work. For this reason, rights can be complex and their scope not easy to generalise outside the terms of specified use. The development of high resolution image and audio systems, together with greater ease of copying (legal and illegal) and distribution make this is an area for concern. If Europe wants to have a leading role, new solutions and legal forms should be developed. Existing copyright legislation is mostly drafted on a national, and per-use basis. This makes little sense given the global, unlimited way the internet works. It is therefore necessary to consider how to move forward from copyright to *right to copy* and go from company generated solutions to those generated by users. As well as rights holders, we need to respect users and their needs, and to see their challenge to existing business models as an opportunity. We must give academic credit to cross-disciplinary training and research.

An exciting aspect of the internet is that it can build communities based on mutual interest. Numerically smaller than conventional TV channels, these can nonetheless total very significant numbers seen in a European or world context, and be of great interest to advertisers. This middle part of what is sometimes called the *long tail,* could be of great importance to European producers. Indeed, a strategic possibility for Europe is to prioritise developing content for the middle part of the long tail and develop tools, technology and business models for these middle sized markets.[2] New markets are emerging in this area where diversity and the ability to adapt quickly to new trends and the wishes of users dominate. We do not have to focus only on the mass markets that US companies have exploited with such success, because the global reach of the internet allows small individual markets to aggregate into sizeable numbers.

In short, the necessary next step is to *focus on content and treat technology as a tool*. Meeting user needs is a complicated process that requires *interdisciplinary research and development* – as well as imagination and some daring on the part of the companies and at the state procurement level.

Content lies at the centre of four elements (Fig.1): *Research* to enable and develop new content services, *Interoperability* to make content available interactively cross media, *Education* to support creativity through technology, and *Business* to structure and provide profit from the value chain.

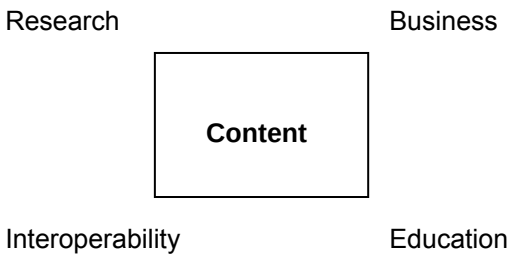

Figure 1. Four essential elements for Content

To succeed in this market one needs to:

- Master the creation of content that the user finds of high quality in terms of satisfaction, design and functionality
- Make the content function reliably on the technological platforms for which it was developed
- Use or create a business model that is accepted by the user for this content on this platform

[2] The middle part of the long tail refers to the market segment between mass-market and the so-called 'long tail', representing the millions of niche products which collectively can produce significant market shares.

This means cooperation across a number of different research and development areas: creative arts, design, user perception, technology, and business models. Current education systems in most European countries do not adequately support such interdisciplinary research. Many university professors still view interdisciplinary projects as being of lesser value than single-discipline projects. This means that students may be taught to do research that fits yesterday's markets. It also means that Europe is losing important insight into the crossover areas where most of tomorrow's value is likely to be created.

2.1.2 Transformation in the Content sector

In recent years, the content sector has experienced a massive transformation due to changes in user behaviour, heightened by ever-increasing demand stimulated by new ICT capabilities, the phenomenon of convergence and the need to improve efficiency and productivity. This transformation has consolidated the following trends:

- Changes in user preferences and media consumption brought about by interactivity
- New access tools allowing the media consumer to become an active creator
- Content deployed cross media, and scalable according to screen size
- Increased importance of mobile services
- Growth of social networking and sharing
- Changes in technologies and devices for production, distribution, experiencing
- Changes in operation/exploitation models, financing and the industrial fabric itself

These changes lead to a *triple convergence in the creation, distribution and utilisation/consumption* of contents which have altered the previous rules of the game.

Changes in user preferences

Users have decided massively to assert their individuality. They want to consume personalised content, and are determined to do so, sometimes irrespective of copyright law. This can be seen in illegal downloads of music, movies and TV programmes. Conventional broadcasters have had to respond. The BBC initially provided a service enabling users to listen to a programme they had missed by downloading it to a computer. They soon discovered that more than half the audiences for some shows were listening in this way. BBC has now moved to the downloading of TV programmes as well.

The Personal Video Recorder (PVR) lets viewers choose their own personal schedule. The machine can 'learn' user preferences and will automatically locate and record shows from the network. This kind of personalisation reflects user irritation at content that is not of interest, be it weather information, news or advertisements. PVRs can omit commercials, and this feature alone has provoked a crisis in the economics of commercial television which is funded by advertising paid according to the number of 'eyeballs' that watch. The winners are companies like Google that achieve considerable advantage through better contextual advertisement. In some ways, as we will see, they are changing the business models of the advertisement business as well as the market for private consumers of software products such as Microsoft Office. The Google model is increasingly to offer software as part of an online service that challenges the Microsoft model head on.

But perhaps the most radical change in user behaviour is a *growing desire to participate actively in the creation process*, boosted by the increasing capacity for interaction provided by content platforms.

Convergence in sources of Content creation and in use

Beyond watching and interacting with professionally produced content, millions of people now engage with content produced by other users. User Generated Content (UGC) is a very new phenomenon that has rocketed into the headlines in less than twelve months, propelled by the astronomic valuations of sites like YouTube. At one time, the only way to access information was to wait passively for traditional sources like TV, radio, or newspapers. Today, anyone can create news and give opinions through websites, e-mails, and blogs either using text or, if they have the skills, more appealing audio-visual formats.

Creators sitting at a PC can now access images, video, audio, and text, process these with software like Photoshop and Final Cut to produce new hybrid products that can be directly uploaded to sites like Metacafe and YouTube, though there is still a significant lack of usable tools for the job. What they cannot do however, is find the means of easily accessing and acquiring rights in third-party material, or paying for it. Although such mechanisms are promised in the DRM of some systems (i.e. MPEG21), they are far from being practical and are inevitably hampered by the lack of a clear legal framework.

New network ICTs have transformed the devices used to access and consume content and services. From WebTV in the 90s we have reached Personal Video Recorders (PVR), Media Gateways and other devices that combine computer performances with TV components. Telephones have also converged with computers as Internet Protocol (IP) and WiFi telephony blossoms, but in the mobile field, changes are both more radical and rapid. Mobile phones have PDA capabilities (or vice versa) with 'qwerty' keyboards, camera, mp3 transceiver and video game console capabilities, with the possibility to watch Terrestrial Digital TV, plus GPS, etc.

The most radical consequence of this change is that *devices are now independent of the format* in which the content is stored. Consumption of content is no longer strictly connected to the device itself but to the preferences of users, based either on contextual needs (fixed/mobile, audio/visual) desired level of immersion (size of screen/quality of sound) or depth of experience (cinema/home video/iPod)

Changes in operation and exploitation models

The traditional Broadcast Model in which content was exploited through time windows (cinema, premium channels, TV) maximising audience numbers, is being transformed towards a narrower, multi-platform and multi format environment. This new scenario leads to new exploitation models selling TV episodes through Internet (without advertisements), buying songs, movies, building hot spots into video, as Blinkx have done with James Bond's sunglasses (click them as they take you straight to the manufacturer's website). Personalisation can affect device, viewing time, context, the nature of the content itself and tailoring of advertisements.

2.2 Market analysis

2.2.1 Sector composition

The European content sector is basically composed of the following types of companies:

- *Multinational companies in traditional sectors*. Especially in the publishing sector, European companies such as Pearson and RTL hold an important share of the international market and have a considerable size. However most of them have not invested strongly in new models of exploitation of digital content and some are even reluctant to commit to a massive introduction of ICT.
- *Large companies embedded in international processes* which are starting to innovate in terms of creation & distribution processes and business models (investing in R&D projects, cooperation with universities and research centres and acquisition of small companies).
- A heterogeneous world of *SMEs* with two main models:
  - *companies working on a single project basis* whose major asset is creative skills and which lack critical mass to achieve continuity and sustainability (e.g. many movie and TV production companies), and
  - *innovative companies* often rooted in a disruptive innovation that have managed to position and differentiate themselves in the market through a radical new offering. Some of them suffer from lack of venture capital and management skills.

*2.2.*2 Market projections

The latest i2010 Annual Report (2007) underlines the importance of ICTs as a major driver for growth in the EU. The same report identifies the creative content sector as one of the strategic areas that have contributed to these developments and, as projections in the Screen Digest 2006 study on Interactive content reveal, the sector is likely to confirm its strategic importance for European growth in the coming years:

- The European online music market which generated €120m in 2005, is expected to grow to €1.1bn by 2010.
- Digital on-demand movie distribution which accounts for €30m revenues in Europe, is expected to reach €1.2bn by end 2010.
- Online radio with 15m weekly listeners in Europe is expected to see this figure doubled by 2010, to reach 32m or 7% of Europeans.
- The European 'digital' games market worth €698m in 2005, will reach €2.3bn by 2010.
- Online publishing advertising revenues estimated at €849m in 2005, are expected to reach €2bn in 2010.

The Screen Digest, Goldmedia, Rightcom, CMS Hasche Sigle report (2006), identified major *hindering factors*. Broadband and mobile penetration, terms of trade, rights management, consumer acceptance, skills management and VAT distortion will be much improved by 2010, though piracy offsetting digital revenues and new media regulation are still likely to be hindering factors. Although major online distribution channels such as Google and YouTube are American, broadcasters are developing online repeat services, Telcos are active in IPTV, and User Generated Content is growing in importance.

2.2.3 Lessons learned from the USA

Why more than 70% of audiovisual content used in Europe, is made in the USA? Data provided by Andre Lange from the European Audiovisual Observatory shows that:

- 75 % of the movies shown in EU theatres are made in USA.
- DVD distribution is estimated to exceed 75%.
- 70% of TV series are made in the US.

Although there are some exceptions (more than 50% of French cinema films are made in France), it is a fact that *audiovisual content is dominated by US companies in Europe*. This is confirmed in the World Film Market Trends, Focus 2006[3].

The reasons for this are historical, cultural and economic. John Trumpbour, Research Director of the 'Labour and Worklife Program' at Harvard University, and author of *Selling Hollywood to the World: U.S. and European Struggles for Mastery of the Global Film Industry, 1920-1950*, made the 5 following points:

- A nation of immigrants, a sort of world audience, forced producers to learn how to produce spectacles appealing to people from many different backgrounds. In the words of the head of the Motion Picture Producers and Distributors of America (MPPDA) Will Hays: "There is a special reason why America should have given birth and prosperous nurture to the motion picture and its world-wide entertainment. America in the literal sense is truly the world state. All races, all creeds, all men are to be found here...."
- An ideology of optimism and happy endings that stood in contrast to the tragic realism of much European cinema. Back in 1909, *Moving Picture World* advocated "Give the public good cheer and watch the increased stream of dimes and nickels that will flow into your coffers."
- The world's largest domestic market by a substantial margin – 38.852 theatres compared to 3,000-5,000 in the largest European nations of the era. Films could be amortised in the domestic market and then exported relatively cheaply.
- Industrial organisation of production and distribution were reflected in studios rich in land, labour, and equipment, the star system, professional advertising, later extensive financial networks -- all a stark contrast with the largely 'artisanal' production of film in many rival nations.
- Corporatist leadership of the industry that in a formative period built up cooperation between the sectors of exhibition, distribution, and production -- unlike in Europe where these three sectors found themselves often in conflict. Cooperation with the US State Department and the Department of Commerce aided US film expansion during a variety of crises and sensitive negotiations with foreign regimes.

[3] European Audiovisual Observatory

US laws historically prevented vertical integration and TV companies had to buy from independent sources, thus building a massive independent sector in Hollywood with real competitive advantage. Their development of an active competitive market selling content dates back to the beginnings of radio. That compares to the slow start in Europe resulting from the public service dominance of national broadcasters which only started to erode in the late eighties. Primary, secondary and tertiary market segmentation is newer in Europe.

Predominantly commercial environments in USA always put emphasis on achieving major market penetration, and their financial institutions understand the content production sector and provide the necessary capital. The tradition of visual rather than literary storytelling, resulting from poor language skills among diverse USA sectors, meant that films and TV told their stories more through pictures than words. This has resulted in great success in other English language markets. USA Government also understood that content was *the* major US export, and *an important factor in spreading US influence as well as making money.*

The power of US financial markets enables them effectively to 'cannibalise' the market. They not only make the most expensive films but can make investments for the future by buying rights in content (books, plays, cartoons), if only to prevent others using them. They are able to recruit the most valuable European talent by offering compensation unrealistically high for European norms. US dominance in the audio-visual market is real and will continue for the foreseeable future. Can we learn from what they have done or the way they have done it? It may be hard for Europe to win the race against the US in conventional media, but we can certainly compete powerfully, and, as we will see, present conditions may even confer some competitive advantage for Europe.

2.2.4 Successful business models

There are many examples of existing and developing businesses that demonstrate how content, technology and business models offer challenging new solutions, at an ever increasing pace. Such cases include Google, Pandora, Last FM, Second Life, Joost, GSM, 3G and Media File Exchange standards.

In March 2003, media wrote about Google: *"Its performance is the envy of executives and engineers around the world ... For techno-evangelists, Google is a marvel of Web brilliance ... For Wall Street, it may be the IPO that changes everything (again) ... But Google is also a case study in savvy management -- a company filled with cutting-edge ideas, rigorous accountability, and relentless attention to detail".*

Google has more than fulfilled its promise. Few analysts five years ago could have believed a search engine could build itself into one of the most powerful media companies in the world. Google used innovative technology and imagination to attack from an unexpected corner. They provided a service that most people did not even know they needed, and by providing both access and ratings, were essentially able to control the flow of users to content. Today they are estimated (April 2007) to serve 55% of all web searches, and their AdWords programme remains a very competitive product. Competitors like AltaVista, Inktomi, WiseNut and Teoma copy their popularity-placement methodology, advertisers supply two-thirds of its revenue by purchasing keywords, while consumers like the unobtrusive way advertisements are placed. They also have a hardware product used for searching internal corporate networks. Google encourage their engineers to spend 20% of working time on their own projects – from which come 50% of their new product launches. They have also diversified cross media from their original core business into radio and advertising. Profit margins are estimated at over 30%.

Google is an interesting case study for European content companies: it started small with a good idea based on technology, grew with great speed, had innovative and effective management, and knew how to expand into important business areas.

Some general lessons can be learned from the analysis of success stories in the content sector:

- The association of advertising and content enables new and promising value chains (based on personalisation and the overtaking of the 'blind' advertising model of linear TV).
- Advanced technological solutions (e.g. search engines, ranking algorithms, content distribution techniques, payment and compensation processes) are essential to guarantee the *uniqueness* of the service proposition and its *economic sustainability*.

- The key to service success resides in the ability to create *virtuous loops*, enlarging the initial centre of interest. Access to a given service naturally amplifies its service appeal, hence enlarging the interest of the market in the service itself).
- *Social sensitivity* can be boosted by means of specific enabling tools (for instance Web2.0 paradigm can facilitate the creation of collective intelligence and collaboration/sharing attitudes).
- The *association of different domains of interest* can produce innovative content-based value chains (e.g. the association between local news, local content and community services; the association between content profiling and e-commerce opportunities).

The key to success in the content industries appears to lie in *understanding the most appropriate linkage between content, advertising and payment.* A large number of SMEs have the necessary ideas and elements for success. The challenge is how to help them *react quickly and at large scale* to capitalise on their dynamic ideas.

2.2.5 The role of advertising

Advertising is a well-established ingredient of the content business. The importance of this sector has been underlined by recent events. While Google had 55% of all searches in April 2007, Microsoft slipped to 9% (Nielsen/NetRatings). The same month, Google outbid Microsoft to buy DoubleClick for $3.1 billion. In response Microsoft paid $6 billion for aQuantive, an online advertising agency. The importance of online advertising lies in its direct connection with the consumer. The actual number of viewers can be assessed more accurately than with television, consumer preferences can be better measured, advertising more precisely targeted, and consumer interest turned into direct sales. There are many forms of direct online advertising, ranging from banner headlines on websites to intelligent product placement. Indirect advertising takes the form of sponsored programming or underwriting of services.

Advertising may be based on revenue-sharing, pay-per-click, or other schemes. Sometimes, as in the case of online newspapers for instance, a mix of subscription and advertising is used: users can freely access part of the service but in order to access the full newspaper or archived articles, a subscription is needed. LastFM is a European internet customised radio station and music community site which started as a subscription service without advertising. Following recent agreements with Warner, LastFM will start an advertising-supported radio streaming service and a premium subscription-based interactive radio. Equally, Joost uses advertising to finance its activities.

A business model *not relying on direct advertising* is Apple iPod/iTunes where content is commoditised and made accessible inexpensively (the iTunes/iPod model), in order to support the sales of iPod devices. However, the service directly promotes sales of the Apple device. With this model, the control of the distribution channel and platform architecture provides Apple with the ability to capture an appropriate part of the revenue stream that is generated by mass adoption of the platform and use of the distribution channel. The Apple model also provides incentives for content creators who are attracted by the existing audience they can reach through iTunes. As part of the service provided, users benefit from a 10-15 seconds free trial window for all music archived and Apple is negotiating the provision, at a slightly higher price, of content free of DRM (transferable to all devices).

Social networks are another tool used to sustain business activities: for example, creating awareness about music bands through word of mouth via social networks, and thus positioning digital content as a promotional tool while relying on income from ticket sales for live concerts, merchandising, and CD sales.

Taking advantage of web 2.0 developments and the means to capture user profiles and tastes, advertisements can now be customised to the level of the individual, which opens up new markets and sources of revenues for the advertising sector. At the same time, new models emerge enabling users to skip advertisements by paying a fee. The winners in this new media paradigm will be those capable of developing *business models based on the right mix between, free and paid content, between advertising and subscription.* On the other hand, advertisers face the challenge of winning the attention of consumers who are exposed to an increasing wealth of information. Attention economics becomes more and more prominent in trying to solve this problem.

2.2.6 The strategic value of the Content sector in Europe

The convergence, or collision, of new ICTs within creative industries is transforming the sector. The massive shift from analogue to digital in the creative industries opens opportunities for industrial production to domains that have traditionally been 'cottage industries' linked to artistic creation and intensively using a low-value added workforce.

As described in the Aho Report, the content sector was identified in 2006 - as one of the strategic areas for innovative actions because of its economic importance, high growth rate (between 5% and 20% per year), and its relative importance, representing 30% of the total European market. Figures indicate that creative content industries add up to an important economic activity. In the UK alone, the creative economy is estimated to represent £112.5 billion annually, employing around 40,000 people, and being an important source of income for artists such as writers, actors (37,000) and musicians (30,000). It has been estimated that approximately one million jobs depend on this sector. The advertising, television, video, and film sector exports around £18.6 billion per year. There are around 1000 post-production companies. Value chains naturally differ for independent creators and large-scale distributors.

Throughout Europe, analogue delivery services are being supplemented and may soon be superseded by digital services. Beyond its paramount economic vitality, the content sector is strategically important to Europe. There are several reasons for this:

- The increasing consumption of media products and services, across entertainment, culture, information and knowledge, reflects transformations in lifestyle and media consumption. This trend guarantees a steady and increasing demand for this sector in the foreseen scenarios.
- There is a continuing need for stories based on the rich diversity of Europe's history, culture and sensibility, and, as the recent German-produced 'Lives of Others' movie has shown, can be very successful commercially.
- Local Culture, can be described as the cultural production of a region, and requires updated support. As more information comes from global sources its impact progressively weakens, while information perceived from the local angle has much greater relevance. Local stories and events always have a strong appeal.
- If a powerful content sector exists, based on local creation and strongly implemented through the Global Market, it is very difficult to be delocalised, particularly when value-added competencies are developed. Powerful local clusters around firms, universities, administrations, technological and media production centres are of special interest.
- The content sector is a very important promoter, developer and user of ICT Technologies, and is itself a stimulus to creativity.

3. Challenges

"A successful media company needs three things: content, an audience, and a way to cash in on that audience. The trick is to find a free – or at least extremely low-cost – way to do each of these things." (Richard Rosenblatt, founder of MySpace, Financial Times, April 2007).

The *cultural diversity* of Europe which contributes to its richness can also be an impediment. Most content is language-based, and does not pass easily from one language group to another. Content locked within the culture of a particular group may well lack the vision to address wider markets, and be structured and financed within modest confines that inhibit its competitiveness.

At the creation level, authors require an increasing level of comfort with digital technology to create competitive products. At the business level, structures are needed to ensure that entrepreneurial ability can flourish and not be stifled for lack of capital of business support. While infrastructure such as broadband is widely available, the threat is that content from outside Europe, often produced at a cost advantage, will

out-compete European production. Lack of interoperability can hinder cross-media exploitation and increase costs, while the complexity of many production tools inhibit keen amateur users and pro-sumers who wish to enter the market or provide services for their communities. 'Thin client' solutions (software provided at source together with content) from outside Europe, may present a substantial threat.

A 'Strengths, Weaknesses, Opportunities, and Threats' (SWOT) matrix for the Content sector in Europe might then be as follows:

Strengths	**Weaknesses**
Cultural diversity is a resource – lots of stories and ideas. Good implementation of digital services in production, distribution and display. Effective standards and infrastructure.	Micro-SMEs only create small value. Different languages make programme interchange difficult. Weak interoperability due to slow standardisation process with an imbalance towards technology. Cultural division between creators and engineers.
Opportunities	**Threats**
Use ICT tools to enable low-cost production by wide group of entrepreneurial content creators. Grasp opportunities for niche production and aggregate across global markets. Understand technical challenges and support ICT wisely. Build appropriate financial instruments.	Low-cost content from outside Europe. High-value productions from USA. ICT solutions from outside Europe. Thin client solutions from outside Europe (software solutions with content). Lack of interoperability due to top down standardisation process. High European labour costs.

3.1 Exploiting the opportunity for new business models

For many years, content was characterised not only by what it was but also by how it was distributed. Business models grew up around individual cases, and later expanded as new distribution opportunities arose. Today, convergence means that all media can be distributed in many ways, and new business models arise from unique inter-relationships between digital TV, internet, mobile, and print. *Enabling this cross-media matrix is a major business opportunity, but also presents a technology challenge.* Producers need to exploit content in many ways, and do not want to be confronted by expensive standards transfers when moving content between platforms or fixed and mobile devices.

Currently, wherever one looks, whether in digital television or mobiles, one sees *a plethora of standards, all of which impede interoperability*. Manufacturers generally support this confusion, seeking to lock consumers into their own proprietary standard. Needless to say, this diversity operates at the cost of producers, distributors and ultimately consumers. For the vision of content anywhere and anytime to work, there must be easy and affordable ways of bridging standards without introducing delays or the de-synching of video and audio elements that are so common today. Work initiated under previous European Framework Programmes for RTD is leading to global metadata standards which support the automated conversion to diverse file formats, simpler language and caption versioning and wide access to media search systems. *The ultimate goal must be common standards that enable true interoperability at no cost.*

Authoring software has generally been created for professional markets, and most packages had their origins at a time when media production was the exclusive – and expensive – preserve of broadcasters and large media companies. Budgetary pressure (a documentary costing £160K ten years ago might be £60 today) means that more primary creators (writers, producers, directors) have to use technology directly when previously they would have gone to professional artist-technicians. The popularity of User Generated Content sites has proved that a constituency of ordinary users exists aspiring to create content. *The need here is for usable software to make the authoring of narrative, interactive or intelligent content as pleasurable and easy as using a word processor*.

With broadband, the Internet is developing into a major means of direct content distribution. Its global reach transforms the kind of equations common in the days of national TV distribution. A minority interest – stamp-collecting – can build up impressive audiences when totalled with viewers throughout the world. Services like Narrowstep have demonstrated the power of minority interest programming, and created new ways of doing business by offering owners of content not only a channel of distribution, but also tools for audience measurement and possibilities of revenue generation through advertising that would conventionally be the preserve of large companies.

Taken together, cross media, interoperability, usable software, and global reach bring a new flexibility into the commercial equation. They offer the possibility for new business models and access to specialised markets that are no longer controlled by corporate gatekeepers.

3.2 From copyright to a 'right to copy' system

Traditionally, the rights of creative artists have been protected by a complex of regulations known as copyright. Based on the concept of ownership by the creator making the first 'copy' of a work, this legislation has become a major stumbling block to the development of a real commerce in content. Producers who need to purchase rights have traditionally done so on a national and per-use basis. This clearly creates problems in the world of the Internet where the audience might be global and the number of 'plays' infinite. Producers can theoretically purchase unlimited rights in a work, but at high cost. The collection of fees is generally administered by artists unions (such as Equity or the Musicians Union) or the Performing Rights societies who have proved inflexible. A current problem concerns the archive of older material, which may be unusable because of the complex historic rights attached. Another problem concerns new material, where producers are unable to purchase complete rights. This is because producers are faced with high upfront fees, or because (for reasons of the quality of digital copies) owners, especially of art works, do not wish them to be used in high resolution digital media.

Further difficulties face those who wish to use segments for the kind of re-mixing (re-hashes) common on sites like YouTube or GoogleVideo. Content libraries, usually owned by large media conglomerates, have price structures based on television rates, which are too high for UGC creators. Creators cannot “quote” – even in a fair-dealing context – from feature films. The problems extend beyond producers to consumers - those who wish to obtain music online may find that that what they buy is playable only on one kind of approved device. Possible solutions provoke major debates. Collecting agencies and talent unions fear their clients will be ruined, lawyers fear they will lose valuable contracts, and content owners that they will lose their content’s value.

The answer must include a right for consumers to copy the information, and an accessible and fair way for creators to be recompensed. This should not involve large up-front payments that paralyse small production budgets, but effective micro-payments that reflect degree of use. DRM technology is moving in this direction, but commercial acceptance has to follow. Effective research (such as those using the ethnography discipline) needs to evaluate what is really involved. For example, much of the trade in illegal DVDs results from the 'windowing' practises of the film industry, where movies may not be available in some territories for some time after release, though marketing has trumpeted their qualities. It is also known that with fair pricing, most consumers prefer to buy legal copies. Illegal copying involves particular segments that are likely to find a way around regulations whatever the strictures. *For some, the present system only rewards the distributors. The users want a system that rewards the creators*. As a consequence unlawful things are happening – and now on a large scale.

3.3 Promoting large-scale value

Innovation in content creation increasingly comes from micro SMEs. This business layer creates value quickly but only on a small scale. The word 'entrepreneur' in English was originally applied to theatre producers who had to juggle money, talent and resources to make a living. This applies very much today to small production companies working in media, television and film. Small companies often come up with brilliant ideas, but lack the resources and management skills to develop into continuing and growing businesses. Bigger companies often cannot address the international market either. For example, big broadcasters looking to buy series need large numbers of programmes in order to build the brand.

However, many European series are produced by one or two writers who simply do not have the energy to innovate beyond a small number of programmes. American media companies, by contrast, employ teams

of writers and skilled managers to organise their work. The publishing industry is even using software systems like Media Predict to take the 'gut' instinct out of commissioning, and replace it with surveys based on a virtual stock market. The challenge therefore exists at several levels to:

- Create a vision of building a successful content company using effective management techniques.
- Build that vision into the education of would-be creators.
- Find ways of incubating the growth of new content ideas that may, as in the case of interactive media, be intrinsically linked with technology.
- Structure the industrial fabric in such a way that small companies can have access to capital, expertise and means of promoting themselves in big international markets.
- Ensure the right kind of technology support at both micro and macro level, through tools, middleware and distribution systems that are effective in getting the product out and money in.
- Underpin enterprise with effective financial instruments.

Overall, the challenge is how to structure the industrial fabric so that Europe's creators can grow to succeed in what is now a global marketplace.

3.4 From national to European success

Today, many SMEs target USA or Asian markets before Europe. We urgently need new tools that allow SMEs to address the 27 counties in one rather than 27 steps. The strengthening of the content sector in Europe can cope with the above requirements, even if the enforcement is produced at local level. This is particularly true for SMEs operating in this context. In fact:

- Content production and development schemes can be economically sustainable even if mostly addressing a local market, due to the decreasing costs of digital content production and distribution.
- Content value chains aggregating SMEs capabilities can be effectively created *around* new content-based perspectives. A necessary condition is that a *connection* capability is put in place locally (entrepreneurship) and the adopted economic models are able to guarantee remuneration to the value-chain actors.
- SMEs can profit from the fact that these local initiatives are naturally open to integration with public and private TV-based services whose development is framed within a local horizon.

Nevertheless, at the same time, this local market can be inserted into a global marketplace, enabling the most innovative SMEs to broaden their ambitions. This will happen if there is a consolidation of common DRM solutions for content to flow (and be paid for) through any network, interoperability between the domestic Broadband networks, and compatible e-payment schemes. Europe needs to create appealing, innovative content that can cross national boundaries. This translates to:

- Take up the challenge offered by the convergence of TV and IT.
- Learn a lesson from the Americans who faced a multi-cultural audience, many of whom had low English language skills. Their solution was to produce media (films, television) that had high visual/ action content and derived much from comic books. By contrast European creators often start from literary concepts that are less appealing and more rooted in individual language cultures.
- Understand the advantages of focusing effort on a strong centre of excellence (e.g. Hollywood).
- Understand the appeal and importance of strategically important sectors. These include interactive services, animated content which can be easily repurposed for specific language groups, and digital cinema. Put resource into developing better authoring systems, faster 3D animation software, better middleware to deal with the data storage crisis (caused by high resolution media and the need to provide content in a meta-dated interactive form), technology for 3D cinema content.
- Solve copyright issues that limit broad exploitation of content.
- Press for common media standards to ensure that content will flow throughout Europe's digital TV systems, mobile systems and internet.

- Understand that part of Hollywood's strength lies in having financial institutions that understand the risk/reward of the entertainment business and develop appropriate financial instruments.

3.5 Creating a new generation of technology experts

Some of the industrial processes of media production from the early days of broadcasting cast a long shadow today. Darkest is the division of the workforce into *creatives*, responsible for the conceptualisation and realisation of programme material, and *engineers*, responsible for making systems work. In the early days of television, technical work involved a wide range of disparate analogue processes demanding a range of particular skills. These have been largely transformed and unified by the digital revolution. ICT is now the prevailing technology, and the common material composed of files, labelled with metadata and increasingly organised using common XML structures.

In spite of this, the 'two cultures' of *creative* and *engineering* still prevail in Europe, nurtured in many educational establishments under banners of the 'opposing' disciplines of humanism and science. This flies in the face of the fact that creation today is achieved with technology. Creators are needed who are as comfortable handling software as Leonardo was with pencil and paint. Artists of the past had to be technologists, and understanding the principles of metallurgy and pigment science. These skills were the basis of their business. "Art" came later.

We need a concerted push in Europe to ensure that those educated in the humanities have a real understanding and friendliness towards ICT. This needs an outreach from the ICT community to make software user-friendly, and replace high-tech elitism with genuine usability. It needs a new attitude from the humanities establishment with its well-known distaste for technology. The initiative needs to be concerted across education from earliest schooldays, through university and into the workplace. There needs to be support for creative workers to understand ICT better, as well as popular acknowledgement of the importance of technology in the creative process. One model perhaps lies in the games industry, where some of the world's most successful content is created almost completely by software. This can be consolidated through awards such as the BAFTAs and OSCARS, but it is at the personal level of teachers and professors that prevailing attitudes are spread, and this needs to be a prime point of attack.

If we are to create a new competitiveness in our creative industries, we also need to make the creative flow as easy as possible. As E.M. Forster asked "*How do I know what I think until I see what I say?"* This can only be achieved in digital media when creation flows as easily from mouse and keyboard as from piano or pencil. The novelist Patricia Hampl wrote: "*Every story has a story. This secret story, which has little chance of getting told, is the history of its creation*".[4] The story of content today needs to be one of imagination and software working together seamlessly, with the creator effortlessly in control.

The challenge is educational - how to persuade the formal academic profession at schools and university to create a new generation of people empowered by a good knowledge of technology, who think imaginatively and understand the business models.

[4] Quoted by Daniel Dennett in 'Consciousness Explained'.

4. Recommendations

The previous section presented an overview of the main challenges Europe faces in growing its content sector. This section presents a series of recommendations for actions and initiatives aimed at addressing the identified challenges. One or more recommendations address one or more challenges. For instance, recommendation R1-2 (the European incubator) addresses both challenge 3.1 (exploiting the opportunity for new business models) and challenge 3.2 (from copyright to a 'right-to-copy' system). Reversely, recommendations R1-3 (on annotation standards) and R1-7 (on micro-payment standards) both address challenge 3.4 (from national to European success).

4.1 Creating a favourable environment for business development

R1-1. Establish a network of clusters for European-wide monitoring and benchmarking

As underlined in recommendations from the 2006 KEA study on 'The Economy of Culture', intelligence gathering is needed in order to unleash the Lisbon potential in the culture and creative industries. The study underlines the problems encountered because of the scarcity of statistical data and advocates: '*for these problems to be remedied in the future, more work needs to be done at national and European level to adopt appropriate standards and definitions as well as to prioritise the collection of statistically sound data right across the cultural & creative sector'.* Along this line ISTAG recommends to:

- Define European standards and definitions for the collection of data allowing monitoring of the content sector. This implies collecting data that mirrors how value is created: by combining technology, content and business models which means that substantial resources should be allocated to develop a viable taxonomy that points towards the future.
- Monitor in each European country the new trends and the usage evolutions so that the Framework Programme can be adapted rapidly.
- Rely on national organisations to monitor locally the sector. Real-time monitoring should be developed to detect rapid evolutions.
- Create a European network of clusters, to facilitate the monitoring as well as the benchmarking of national policies, to aggregate at European level the data, and to communicate on the best practices.

The task of assessing the economic contribution of the creative content sector to the overall economy both at national and European level is particularly complex for a number of reasons including:

- The lack of market data and taxonomy reflecting the present situation.
- The lack of a clear, homogeneous definition of the creative content sector and agreement on the type of activities to be included.
- The deep structural changes affecting some if not all sub-sectors (e.g. publishing) which may call for new classification, data collection and indicators.
- The pace of change affecting the sector or sub-sectors makes it difficult to monitor evolution over time.
- The lack of data in particular on new activities and services that are only starting to emerge.
- The difficulty associated with quantifying the economic impact of some of the emerging trends (e.g. social trends like user created content, user preferences etc.).
- The lack of uniform content industry clusters across Europe. A number of clusters exist but there is no overview of where they are, what they focus on and what they are good at. Exchange of best practise across Europe is therefore very difficult.

R1-2. Establish a European-wide incubator with a local national structure within the 27 countries, a joint network and common frame of rules.

Europe has the capacity to play a much bigger role in the fields of multimedia content creation, creative design of related services, definition and exploitation of the most appropriate interaction and distribution schemes. The importance of developing this capacity has been widely recognised by the Commission, through its R&D policy orientation and support of relevant initiatives.

Within its i2010 initiative, the Commission has identified digital convergence as the main growth factor for the ICT market. The Commission has also undertaken to revise regulations on electronic communications and the dissemination of content online, with the aim of stimulating the creation and distribution of rich and diverse content, developing secure networks and services, protecting consumers and maintaining the market's freedom and accessibility.

The time is now ripe to accelerate this, and since the Working Group believes that value comes from combining content, technology and business models, it seems appropriate to use the incubator as a prime tool to achieve these goals. We recommend that an incubator be set up in each of the 27 countries (they could be named *i2010 incubators for SMEs)* with responsibility for accelerating the pace of development. The proposal aims at opening new perspectives by building and leveraging on:

- Value that can be created by better integration of the production and service domains, which have hitherto shown weak interaction capability.
- Association of this new content chain with content and context-related services which can take account of and reflect local characteristics and habits.
- Framing of these local models in a strong, Europe-wide industrial and cultural perspective, based on:
  - The full capabilities of broadband networks and their ability to interconnect services and devices.
  - The adoption of common enabling formats (including rights management techniques, payment schemes and basic service-enabling tools).

The 27 incubators will give SMEs a single contact point for access at a national level and towards the 26 other markets via a local architecture, a linking network, and a common frame of rules. The initiative therefore gives value to local skills and entrepreneurial capabilities and, at the same time, access to market opportunities offered through the consolidation of a Europe-wide market. The incubator needs to be structured so that both local and global requirements are satisfied through sustainable solutions.

The description of the incubator's local architecture, linking network (Eurocenter and Media desks), and common frame of rules should clarify its structure and the kind of activities and regulatory actions to be encouraged by the Commission. Each incubator should offer SMEs facilitated access to the following:

- Entrepreneurial competences, i.e. tools enabling fast, successful growth.
- Local partners within the complete value chain for digital content.
- An Internet publishing channel accessible in all 27 countries.
- State of the art tools such as *the best annotation tool so far* for this specific purpose, the *best billing solution so far* for this specific purpose, *the best graphic rendering solution so far* for this specific purpose, etc.
- National venture capital that understands the content creation business and risk equations.
- National public procurement qualification programmes such as *pre-commercial public procurement*.

The key objective of the Distributed Incubator initiative is to identify the best commercial and operational schemes to guarantee self-sufficiency of the overall model.

R1-3. Create a European standardisation initiative on multimedia annotation.

A marketplace cannot thrive or be efficient if there is too large a range of options and few common conventions. Underpinning the entire content enterprise is the need for software systems and devices to work seamlessly together. An important example here is television delivery. Although there were some regional system differences (PAL, SECAM, NTSC), the absolute requirement was that ordinary people without technical skills be able to easily receive programmes, select channels and adjust qualities of picture and sound. This was achieved because public service broadcasters were able to decide and apply standards, and agree them with other national broadcasters through bodies such as the EBU. Also, the more complex conversions between, for example PAL (50 fields/sec in Europe) and NTSC (60 fields/sec in the USA) are done by broadcasters in-house with costly and complex machines.

Software and internet services have developed more independently, as have viewing devices. While it is inevitable that manufacturers seek to lock consumers into using their own products by creating

dependencies of content on devices, this undermines the entire concept of convergence. Families of content and devices that do not speak to each other will not, in the long term, encourage the anything, anywhere, anytime concept. Real entrepreneurship in content depends on universal access to devices, and reliability in service provision.

However, achieving standards is easier said than done. The need to 'cover all eventualities' means that standards work can be slow, extend over years, and make heavy demands on contributors. Often only the biggest companies can afford to stay the course. One way of tackling this is to accept that most media forms do actually have similarities. The parameters of sports, news, music and drama programmes impose common requirements, as do those of web pages or music download sites. The result is that although design gives individuality to competing services, the workflow and formats have much in common. In effect, these genres operate using 'templates' into which individual assets (essence) are placed in the process of content creation. . By establishing Common Technical Specifications (CTS), these forms should be able to work on multiple devices across multiple service provision.

Standards issues can be confusing firstly because they are in constant flux at this time and secondly because some knowledge of the basic topography of the image capture/creation, editing/processing, distribution and finally the display process, is important in understanding where to put resources to further the convergence in this industry. Compatibility between film, digital cinema and the graphics and IT worlds is now relatively easy to achieve. On the other hand, the overhang of technique of image compression from the analogue era (called interlace scanning, created in the 1930's) remains a challenge for the easy re-versioning and exchange of material between broadcast television and all the modes of exploitation. Opportunities now exist to promote *progressive* (non-interlaced) systems that provide excellent quality and compatibility between IT and audiovisual systems. Being late in taking up digital high-definition television broadcasting when compared to America, Japan and much of Asia, Europe now has a unique chance to bypass this burden from the past and complete the progressive audiovisual chain from capture/creation right through to the cinema and home display.

Common Technical Specifications would of course relate closely to current overarching systems such as MPEG but be put together more quickly and in response to the kind of rapid evolution that is natural in content provision. Since they would be based around the template, or genre concept, the range of requirements would be more limited and therefore achievable.

As audio and video capture devices (microphones, cameras) fall in cost, increase in quality, and generally become ubiquitous in the modern home and workplace, people and SMEs will invent new ways to use multimedia information to increase productivity and generate new, enriched, information, and new sources of revenue. Many significant consumer and corporate applications for digitally captured/archives of multimedia information (often involving SMEs, or conditioning the growth of SMEs) are limited by the lack of internationally recognized and widely accepted standards for annotation of dynamic data (video and audio) and flexible integration into a wide variety of applications.

This observation is further hindered by the widespread confusion between signal processing (e.g., compression) standards, multimedia recording and retrieval standards, and *annotation standards*. While we believe signal processing and multimedia standards are well known, and start being adopted, we also advocate the large EU potential (leveraging on a leading edge position in the areas of multimedia information structuring and indexing) in the area of (open) multimedia annotation standards, which could significantly help SMEs to develop new ICT business models. Current standards are not adapted to the needs of future users/applications for multimodal unstructured data.

Standards for Metadata structures and formats for electronic media have followed from a series of European funded initiatives the results of which were taken up on an international basis by an industry body. Publishing the results and demonstrating interoperability was only the start of a long road to effective implementation. All major manufacturers such as Sony (Japan), Avid (USA) and a good number of smaller European companies supported the work, but it has taken a lot of industrial muscle to re-design workflows to gain real advantage from the file-based systems. The most interesting broadcast Ingest/Store/Edit/ Repurpose and Playout system based completely on MXF files exchanged between eleven different manufacturers' products was demonstrated in April 2007 and will be permanently installed at the Turner Broadcast Centre in London this year.

The Digital Cinema Distribution and Exhibition standards, from a clean start have adopted MXF, as have the defence industry for Image file Exchange. A survey of broadcasters in the UK in 2006 showed that 92% claimed to have introduced digital workflow into their routines, but more than half of these had not redesigned their workflow showing, to quote the Analyst, *'that they saw file-based equipment as a technology project, not a deep-rooted business process change'*.

The annotation of files, if not done at the time of creation, is a challenge to software engineers. Data mining of existing non-annotated material (as with Google) gets a lot of attention, but for professional/ commercial use it is important to avoid re-keying data. At the professional level, organisations like the European company Autonomy (see autonomy.com) are showing the way which is compatible with MXF.

The overall challenge is to create an agile bottom-up process that is sensitive to market and people realities, rather than a technology driven top-down process.

R1-4. Use opportunities provided by the switch from analogue to digital TV to promote cross fertilisation between the TV and broadband network domains

European countries are now involved in the process of switching from analogue to digital TV. The ISTAG recognises that this *switch-off* provides Europe with a unique opportunity to explore a range of opportunities and related business models. Most technological discontinuities offer new market and industrial opportunities, but *switch-off* is particularly rich in this regard:

- In a relatively short time, millions of European citizens will be involved in the transition to digital TV.
- Since analogue transmission of TV channels will be discontinued, all citizens will be *forced* to have a new decoder or a digital TV Set.
- Meanwhile, the diffusion of the broadband network (mostly through advanced DSL and optical solutions) should have reached very high levels of penetration.

This perspective raises some key questions that should encourage the launch of an initiative connected with the transition to the digital TV era:

- What kind of Set Top Box (including of course the decoder) will best enable the content convergence to become an opportunity for the European industry?
- How will this transition contribute to the reduction of the *Digital Divide* in European households (i.e. removing the barriers to using the PC through a simple access to the TV set)?
- In which way will Set Top Boxes (and integrated TV Sets) become valuable catalysers for new content-based initiatives?
- How can the Commission influence the key elements of the value chain to move towards open contents and metadata standard?
- Can the integration between the TV domain and the broadband network domain generate new distribution and interaction models? What industrial opportunities can be consolidated through them?
- What are the technical and service configurations most suitable to deploy these opportunities?

The proposed initiative will then help the Commission to:

- Steer FP7 projects based on the DTT and the Broadband service perspectives so as to gain genuine added value in terms of technical solutions and service configurations to be pursued in conjunction with the *switch-off* phase.
- Obtain a clear view about the key elements that condition the (joint) evolution of TV and broadcast network models:
  - content characteristics (e.g. linearity, peculiarity, context dependency)
  - interaction level (different functions that can be assigned to the fixed network in relation to the *use of the TV screen*)
  - payment schemes (e.g. pre-paid content, subscription, pa- per-view)
  - advertising models

  - kind of Set Top Box and TV Set (e.g. pure DTT decoder + modem for the return channel or hybrid STB with DTT decoder and IP (xDSL) connectivity) and related service-development enablers

- Identify actions to be taken at the various levels (regulatory, financial support, communication, education) to consolidate the emerging value chains mostly in relation to:
  - service concepts
  - the variety of applications of social character which can be developed in co-operation with the Public Administrations
  - DRM rules to be adopted for the content use in different domains.

R1-5. To promote an innovative approach to procurement

Several application sectors apart from entertainment benefit from content sector technologies and creativity: e-education, e-health, e-government and e-culture. Several European initiatives are in place to facilitate experimentation using innovative technologies. *New pre-commercial procurement rules should facilitate the deployment of experimental platforms to ensure economic production of innovative local content.* Pre-commercial procurement is a useful tool for promoting innovation, putting citizens and their concrete needs at the centre of the innovation process. A condition for the success of the industrial initiatives is that they become self-sustainable in 2-3 years. Nevertheless, most of them imply the setting up of new economic processes. It is this challenge that justifies an extensive use of pre-commercial procurement, at least in those cases where public administrations are involved. When set-up properly, pre-commercial public procurement can:

- Promote local entrepreneurship with credible goals.
- Lower the risk of the *yet to be proven* syndrome
- Facilitate integration over newly defined value propositions.
- Bring about a fruitful connection between local knowledge and advanced technological tools.

The ISTAG recommends that issues related to promoting and monitoring the use of pre-commercial procurement in Europe are put in the agenda of (or possibly assigned to) the National IST Directors Forum[5]. This Forum provides the best place for successful cases to be shared, inspiring local take-up and possibly enriching already existing initiatives.

We should make advanced platforms and new usage initiatives across the Member States visible and their elements accessible. We should let European citizens know what regions and cities are developing and promoting new services and let European citizens describe their experience and exchange the benefits and constraints concerning digital life. Promoting and sharing examples of innovative services, best practice and state-of-the-art from individual countries would be extremely valuable.

Over a 10 year period it would then be possible to create a large scale infrastructure and *back end* across Europe and small scale applications at Member State level. That would ensure the economic production of local content that it is difficult to copy.

R1-6. Revisit advertisement's role in business models

Content and advertising are in many ways interdependent: media content brings audiences to advertisers, who, in return, effectively finance the production of the programs. This symbiosis of broadcasting organizations and advertisers has been recently broken by the fragmentation of channels caused by the digital revolution and the Internet increasingly becoming a space for publicity and leisure. The result has been a fresh impetus to understanding how advertising can work in the new media world. Increasingly, content technologies, advertisements and the location (within media content) of commercial products will be personalized at an individual level. This promises new opportunities and business models. New forms and approaches to advertising are already being derived from the application of image technologies and information processing, and the result is likely to be a re-invigoration of a sector that provides important financial inputs for he content sector.

[5] National Directors Forum – Working Group on Public Procurement "Pre - commercial procurement of innovation – a missing link in the European innovation cycle" March 2006.

R1-7. Support the development of cross-border micro-payment standards and infrastructures

There is a need for adequate payment systems to support the diffusion of creativity-related products and services. Without a successful standard for micro-payments, and reliance on systems based on credit cards (whose uptake is hindered by mistrust of the security of online transactions, and neglect of younger customers), some providers have decided to establish their own micro-currencies, adopting models based on the physical purchase of 'digital vouchers' which can be redeemed online. Another channel for payments popular, for example, in South Korea places Internet Cafes as intermediaries with a financial function between customers and content providers. Some providers have adopted other business strategies to generate revenue streams indirectly, such as bundling, subscription models, advertising, and payment solutions capable of handling even micro-payments below 1 € have also been put in place.

Nevertheless there is still some inconvenience as there is no international payment infrastructure for smaller payments. In this field, national borders still matter in Europe, and thus the demand for something like a unified European payment infrastructure for small payments remains. The European content market would gain from this type of infrastructure as well as from the adoption of standards for micro-payments.

R1-8. Support new, industrially convincing, approaches to copyright and intellectual property

We need efficient rules to be able to provide new digital life to what we consider our European cultural heritage. Existing copyright legislation historically is drawn largely in geographic terms and according to number of uses, and fits poorly with the digital age where internet coverage is global and number of uses potentially infinite. The result is a kind of paralysis, both in use of existing libraries, and the creation of new content where the necessary rights cannot be bought. A further difficulty arises with User Generated Content, where users often want to quote or *re-hash* existing work. The need is to agree a new framework that would allow more content to be created, as well as allowing users the right to quote or use parts of existing works in making their own productions. Some would argue that copyright needs to be replaced by a *right to copy. The challenge is to balance the rights of creators and owners of content with the needs of citizens to access and re-use content for social or business purposes.*

ICT has an essential role to play here. Effective software approaches to monitoring use of media and making per use payments to rights' holders already exist, and more are being developed. Systems are in place or developing for digital TV and IPTV use. Metadata can provide the necessary information and enable payments as well as offering "tiers" of rights. Transparent systems can reassure rights holders, and provide continuing income streams. It can also protect against contextual misuse by defining usable contexts and leaving misuse subject to legal sanction – a step towards protecting moral rights.

Existing legislation protects the rights of individual artists whose work contributes to the making of content (as well as companies that own completed work), but frequently does so through terms of trade inhibiting the industrial growth of exploitation. Opening up a right to copy means that new structures for payment need to be put in place, validated and shown to be effective and transparent. Technology can play an important role by mechanizing payment. However, to make all this work requires high level initiatives. In practice, the most convincing element would be examples of content commissioned and distributed in this way that have proved commercially successful for content creators, rights holders and attractive to users.

Entrepreneurs need access to library material for reasons of economy. At the moment they are restricted to commercial libraries which can be expensive and also restrict available rights on a national and per-use basis. They also need to be able to contract artists at reasonable fees and ask them to share some of the risk. Pro-summers and creators of user generated content have the same needs, though they are able to pay much less than the professional makers of audiovisual content.

4.2 Building the underlying technology through RTD

Technology has a key role in enabling and supporting all the content industries. This can run from the very beginning of a project where an author plans an interactive story, though the creation and acquisition of sounds and images, post-production, distribution and display. The key challenges here are for European companies to understand the way markets are changing, develop necessary tools and systems, and provide quality services. *Research is the essential, underlying action needed for Europe to get ahead. It needs to be targeted at making existing processes function better (interoperability), supporting innovative*

business models and providing essential support services. To ensure the effectiveness of the resources allocated for the research and innovation process in the content sector, ISTAG suggests concentrating efforts on *ten lines of action*:

- **R2-1. Support social scientific research for early-stage innovative technologies**
- **R2-2. Support creativity and technical expertise in content and product creation**
- **R2-3. Support the development of content-rich communication products**
- **R2-4. Support high-quality visual and sound content**
- **R2-5. Support the development of intelligent content**
- **R2-6. Support the understanding of interactive contents, use and impact**
- **R2-7. Support multi-channel technologies**
- **R2-8. Support community models for creating and sharing content**
- **R2-9. Support anywhere and anytime access to personalised content**
- **R2-10. Support the deployment of digital cinema**

These lines of action address different forms of research - sociological, ethnographical and socio-economic for obtaining a clear view of the demand that will emerge in a society with rapidly-changing habits in terms of its consumption of communications products. These action lines represent research work in areas which are considered particularly relevant for addressing the challenges identified in section 3. These recommendations, are in line with the strategic research agenda of the European Technology Platform on Networked Electronic Media (NEM)[6].

Research into audiovisual content technologies covers a wide variety of activities, from basic research with no specific aims or limits ("Blue sky" research) to research into advanced applications. The field also includes disciplines that ensure the technological viability of advanced applications as well as applied industrial research, which comprises aspects such as multimodal semantics, advanced interfaces and creation of, and experimentation with new media contents and formats.

Research in the media field necessitates guiding technologists toward the creation of intelligent content (including collaboration and creation of metadata), as well as toward (i), the organization of content using automated work flows, (ii) rendering for different users and platforms, and (iii) secure, efficient exchange and marketing of contents. The creation of content technologies will also involve researching people's response and modeling their behavior − not only to discover how best to develop the technology, but also how to exploit it in business terms.

Technology for content treatment, oriented toward the automation of laborious tasks for the audiovisual content creation industry, as well as significant improvements in the usability and accessibility of content, represent san enormous challenge. In order to address it successfully, great strides need to be made in the following research areas: computational image and graphic processing, linguistic computation and speech treatment, acoustic and physical acoustic modeling, information recovery, cognitive and perception sciences, data mining, information systems, experimental creation, the sociology and ethnography of communications.

4.3 Creating the necessary skills

R3. Stimulate new cross-disciplinary educational approaches

The dualism behind the arts sciences split has been well documented from the CP Snow's 1959 Two Cultures Rede lecture on. It was a central issue in approaches to teaching at the Bauhaus, where Walter Gropius proposed to "create a new guild of craftsmen without the class-distinction that raises an arrogant barrier between craftsman and artist!". Gropius was a man in the grip of an idea, but he understood the need to amalgamate technology and creativity in the classroom.

[6] The NEM Strategic Research Agenda (SRA) highlights European industry's views on the research priorities that are required in the next few years so that Europe can truly become a worldwide champion in all domains related to "Networked and Electronic Media". http://www.nem-initiative.org/Documents/NEM-SRA-040.pdf

Strong leadership is within grasp of the EC itself. An excellent opportunity presents itself with the proposed European Institute of Technology. Ensuring that cross disciplinary work is built into individual KICs will send a strong message to academia, as well as giving distinction to the institution itself. Equally, the recognition of the importance of this kind of approach can be reflected in what is demanded of IST "integrated" projects, as well as associated PhD work. Inevitably, the 'market' for funding can be a powerful influence, and by showing commitment to a cross-disciplinary core, the Commission itself can seed a change of attitude.

The proposed recommendations should also have a profound impact at the educational system level. This impact is twofold: on the one hand, affecting specific disciplines by enriching their perspectives and their application horizon, on the other hand stimulating a new interdisciplinary sensitivity thanks to the transversal characteristics of the content-related value chains.

As for the specific disciplines, some of them have to be re-visited in order to cope with the emerging requirements:

- The DRM techniques need to be investigated in the direction of a greater ability of the algorithms to guarantee a transparent fruition of the content, regardless of the administrative domain and the delivery channel used.
- Tagging schemes have to introduce the semantic concept to facilitate the adoption of advanced searching techniques.
- Browsing and retrieval mechanisms need to be enriched through ontological and semantic characterisation.
- Content storage and content distribution topologies and algorithms need to be re-considered by taking into account the content characteristics (volatility, locality, context-dependency, peculiarity), the service requirements (delay, latency, bandwidth) and the distribution schemes (broadcast, multicast, point-to-point).
- Service concepts and their potential impact on community behaviour and communication models need to be studied in the light of the enabling features offered by technology.

Concerning interdisciplinary aspects, these are raised in relation to the new service concepts, the presence of interactions and transactions along the service process, the multi channel essence of the delivery side. These elements have to be considered together in order to model in a consistent way the emerging content-related chains. Key interdisciplinary issues are

- Modelling of complex systems, community behaviour and related control algorithms.
- Impact of pricing schemes and remuneration criteria on the sustainability of the new service concepts.
- Impact of the DRM configuration on the diffusion of content and content-based services.
- Modelling of the economic value of functional segments composing the delivery chain (content creation, acquisition and storage, DRM and security, service definition and management, content distribution, use of Telco capabilities,..).
- Evaluation of the economical (industry) and social effects (hopefully benefits) induced through the innovative value chains based on content production and distribution.

5. Conclusion

The Aho report clearly indicates the significance of ICT for the industrial future of Europe. The Content sector is now almost completely digitalised. Given the rich, cultural traditions of Europe and its dynamic content industry covering TV, radio, games, print, music, web and mobile, the potential for success is very large indeed. Much of this depends on online delivery, but the very openness of the internet and its global reach means that competition from outside Europe will be as intense as that from within. For these reasons, it is essential that Europe *makes the right strategic choices and investments, and puts in place the best instruments for encouragement and support*.

The ISTAG Working Group on 'New Business sectors in ICT' has identified a number of key recommendations to ensure a healthy economic future for the Content sector, as well as reciprocal benefits for the ICT industries that support it. Many of these are in line with existing priorities and programmes, but some, such as the *revision of copyright law*, will require new initiatives and a great deal of thought in balancing the rights of content owners with those of users.

The new initiatives outlined in the report are intended to kick-start the process of recognising the importance of the content sector for Europe. By establishing a cluster network to monitor and benchmark, Europe will possess *an observatory to sense change and inform actions*. Its ecosystem should respond to these perceptions and allow for the exchange of ideas, while *the Incubator* based within the 27 Member States will offer entrepreneurs access to best practise, and a range of support to grow their businesses. By having *a common framework for multimedia annotation*, and a more practical approach to standards, interoperability can become a reality across all media. The *switch-off of analogue TV* offers a window of opportunity to consolidate the digital economy, while the possibility of using *pre-commercial procurement* to activate citizens and public budgets to define and create middle markets remains a strong, realistic recipe for future action.

Mass media have traditionally depended on appealing through broad genres to large national audiences, and their economy has traditionally been geared to those numbers. Broadband internet is transforming that equation. Minority interests, uneconomic to address under *broadcast* models, can now aggregate globally to significant numbers. Communities of interest, whether united by music, sports, or hobbies, are of great interest to advertisers. A more active participation by users, and a more personalised response to their needs, means that engagement with media can be dynamic as well as passive. Great opportunities are already there, and it is time for Europe to seize them.

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