ICT-Innovations in Creative Industries

Background paper on ICT and Creative Industries

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www.lets-create.eu

The creative industries are a key sector in the Europe of tomorrow. They are developing and evolving rapidly. A crucial driving force for this development is ICT technologies. Using innovative IT solutions in growing areas of the creative sector – such as advertising, digital media, games and interactive design – opens up manifold competitive advantages for research, development and business.

Since March 2008, the CReATE project consortium has been developing strategies to improve cooperation at both regional and European levels to enhance the innovative capabilities of small- and medium-sized companies from the creative sector. The CReATE consortium is led by MFG Baden-Württemberg and comprises besides the Steinbeis-Europa-Zentrum (SEZ) from Stuttgart European partners from Piemonte (CSP, PTO, Regione Piemonte), Rhône-Alpes (Imaginove) and West Midlands (AWM).

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1.Main Findings

The aim of this report is to study the impact of information and communication -or digital- technologies (ICTs) on the development of Creative Industries (**Cinema/Television/Video Production and Distribution**, **Publishing**, **Recorded Music and Radio**, **Game and Animation**, **Design&Architecture** and **Advertisement**), highlighting areas of ICT innovation that are – or are expected to be – relevant for the creation, distribution and consumption of CI products and services. Particular attention is given to the potential impact on Small and Medium Size Enterprises (SMEs). Specific emphasis is also placed on those technology-driven evolutions that offer opportunities for small and medium enterprises and users to deploy their economic potential. Information and Communication technologies, in fact, are making the distinction between users and producers of creative content more and more functional rather that real.

- ICT innovations triggering business in CIs can be clustered in four main trends, according to the possibilities of fruition/production for creative content that they enable:

  - Trend 1- **Digital distribution and shareable content:** While the paradigm of pre-broadband era was centered on accumulation of data, the competitive factor to date is the amount of data deliverable and sharable in a given time frame. The new paradigm is called 'Cloud Computing': no matter of where the information is stored (in servers on the Internet and cached temporarily on clients that include desktops, entertainment centers, tablet computers, notebooks, wall computers, handhelds, sensors, monitors, etc), the crucial factor is how it is reachable and how (from technical, organizational, legal and economic point of view) it can be used to generate new, sharable, content.

  - Trend 2 - **Enhanced visual experiences:** Plain access to content is going to be treated and considered as a commodity. Value depends on the usability of content in terms of user experience. The capacity to effectively visualize, experience and navigate the flow of content (data, video, audio) is the key to generate value.

  - Trend 3 - **Continuos Interfaces:** The interface is the entry barrier between the user and the service/content. The lower such a barrier is, the easier the user takes advantage of the service and uses the content, i.e. generates and feeds economic opportunities. The alternative paradigm to the desktop model is called Ubiquitous Computing, which aims at achieving a seamless interface between the user, the device and whatever is delivered through it. Haptic technology and neuro-controllers support continuity between the body of the user and the device, while the handheld wireless devices assure space continuity between multiple private/public environment of fruition.

  - Trend 4- **Distributed / open production facilities:** Production facilities are based where production resources are (capital - financial and cultural - and time of workers). If production resources are shared / collectable in a distributed way, production facilities can be virtual and ubiquitous. Organizational capabilities have to adapt.

- These main innovations are supported by different digital technologies, which sometime are in a fluid stage of development and it is still uncertain which of them will succeed, become a standard or establish a new dominant design.

- Each trend declines differently according to the specific industry: we remit to each subchapter 4 for sector-related conclusions.

- The technological and economic trends in the CIs have generally a global scope. Nevertheless, for Regions interested in supporting and in encouraging new business developments, possibly open to users/citizens interactions and driven by information and communications technologies, the following recommendations could be of potential interest:

  - **Distribution**: Local governments/agencies could sponsor the rise of new business models for content delivery based on exploitation of digital distribution with suitable, flexible, intellectual property rights protection designed to enhance the circulation of the content on the web. The distribution of protected and encrypted content through the web seems about the past and does not take advantage of the distribution potential offered by the Internet. “Knowledge and content actually are to be the new capital of postindustrial society, then they have to circulate and be accessible by all”. Enterprises have to be ready to take advantage of this new era (see ch. 3 and 4).
  - **Production**: The entry barriers to the production of digital content are less and less a matter of hardware production facilities and more a matter of personal capabilities (education), infrastructure (broad band penetration and network neutrality) and open&interoperable platforms. Systematically addressing such a three factors with a long term commitment could help the flourishing of new entrepreneurship and the multiplication of market players.
  - **Fruition:** The multiplication and harmonization of content fruition opportunities is a matter of connectivity continuity between private and public spaces. Guaranteeing such continuity is a fundamental asset for the diffusion of ICT driven innovations in every CIs sub sector. This is not only a matter of broadband penetration: the diffusion of digital cinema screens are a further example of how the dematerialisation of the content can lower the barriers for a collective form of fruition.

- Creative Industries are extremely important for human wealth, they are a relevant source of employment and they act as fundamental economic organizations to assure a solid and democratic growth process for our society. As such, their development needs to be harmonized with the opportunities offered by technology and considered in political agendas of national and local governments.

2. Aim and scope of the Study

The aim of this report is to study the impact of information and communication -or digital- technologies (ICTs) on the development of CIs, highlighting areas of ICT innovation that are – or are expected to be – relevant for the creation, distribution and consumption of CI products and services. Particular attention is given to the potential impact on Small and Medium Size Enterprises (SMEs). In order to define the scope of our analysis, we have to select, match and adapt those definitions of Creative Industries already made by scholars and practitioners that better suit our aim.

In order to address the concept of Creative Industries unambiguously, the CReATE Consortium relies on the definition provided by the Queensland Government, Australia: "Creative Industries are driven by individuals with creative skills and business goals and served by technology". The OECD observation that possibilities offered by ICTs are particularly relevant for those complementary industries focused on producing electronic content, define the broad scope of our analysis. Thus, we mainly focus on the following "core groups" industries: **Cinema/Television/Video Production and Distribution**, **Publishing**, **Recorded Music and Radio**, **Game and Animation**, **Design&Architecture** and **Advertisement** - to the extent that they involve digitalized/able content. Though very little published material on the impact and use of ICT is available for the latter two sectors, we think they deserve attention. In Design&Architecture, the emerging practices of collaborative and interactive design are gaining growing importance and, from the technological point of view, are tightly linked to the video games/animation sector since they are user-centred, and take advantage of the same Web interactive technologies and new user-computer interfaces. From the technological point of view in fact such sectors involve similar techniques of images visualisation and are experimenting similar innovations trends, although with totally different applications. As for advertising, the content industries are very reliant on advertisement-based business models and it also gives us the opportunity to talk about new ad/marketing strategies proactively involving users.

For what it concerns regional development priorities, the four participating regions (**Baden-Württemberg**, **Piemonte**, **Rhone-Alpes** and **West Midlands**) have decided to focus on the following interrelated fields of excellence and aspiration: Film production and Television, Animation, Games and Serious Games, Design and Visual Arts, Architecture, Advertising, Publishing and Music.

Digital technologies empower people (Benkler, 2006) as individuals and as nodes of loosely connected networks. Thanks to cheap content production tools and to the intrinsic bi-directional, neutral and non-hierarchical nature of the Internet as a communication web, individuals and organizations can easily be either users or producers of content, the difference being merely functional. This report takes into account **the emergence of consumer/producer interaction at the supply and demand levels of the value chain, even when this takes place outside the bounds of creative industries regular employment** (Higgs, Cunningham, Bakhshi, 2008). Although in most cases it is too early to judge, whenever possible we try to argue the economic feasibility of these relatively new phenomena.

Technology opportunities greatly influenced the industry structure of the sectors belonging to the selected core group. The predominant broadcast distribution model, in fact, involves huge fixed costs and big scale economies, which favor an industrial ecosystem dominated by large companies. Digital technologies are challenging this industrial structure because the peer-to-peer distribution infrastructure enabled by the Web as a technological platform allows the delivery of content and information to a large number of users at affordable costs and without the need for any initial, large investments. This is an opportunity for SMEs to reach the user/customer and compete in the same market of the large incumbents. While other reports recently focused on the impact of ICT on big stakeholders in content industries (EC, 2007), **the present work**

emphasizes emerging forms of business models that might interest highly innovative SMEs and independent players competing in the CI field.

The remaining of this report is organized as follows: Chapter 3 makes an attempt to recognize four main horizontal technological trends triggering business in Creative Industries, while Chapter 4 goes vertically through each specific industry: Chapter 4.1 present the analysis of edited videos industries (**Cinema** and **Television**), Chapter 4.2 is devoted to recorded sounds (**Music** and **Digital Radio**), Chapter 4.3, provide an in depth examination of the **Publishing** industry, Chapter 4.4 analyses recent trends in **Gaming&Animation** and discusses those ongoing changes in **Design&Architecture** that, similar to Gaming, are due to image manipulation developments, Chapter 4.5 briefly considers some of the aspects of **Advertising** that are most related to ICTs, finally Chapter 5.1 put forward a few recommendations for regional development based on the analysed CIs. Each chapter includes: a description of the industry status form the business point of view, with particular reference to the relevance of each sector within the economy of the four represented countries; a description of the major innovation trends in the sector, with particular attention to those offering opportunities for small and medium entrepreneurs and for user involvement. Highlights Tables summarising the main findings for each chapter and concluding considerations are also provided.

3. ICT innovations triggering business in Creative Industries

ICT innovations triggering business in CIs can be clustered in four main trends, according to the possibilities of fruition/ production for creative content that they enable:

- Trend 1: **Digital distribution and shareable content**
- Trend 2: **Enhanced visual experiences**
- Trend 3: **Continuos Interfaces**
- Trend 4: **Distributed / open production facilities**

These main innovations are supported by different digital technologies, which sometime are in a fluid stage of development and it is still uncertain which of them will succeed, become a standard or establish a new dominant design.

From the business point of view, nonetheless, it is already recognizable a whole course that links all these trends together.

The major attraction for digital distribution is its direct nature. To make a commercially successful work, artists/content producers usually are required to enter their industry's publishing chain. The role of publishers is to help artists advertise, fund and distribute their work to retail outlets, and, through them, to the audience. In some industries artists find themselves bound to publishers, they are often required to give up the control of their work, and in many cases they are unable to make the content they want: the publisher might not think it will profit well for the kind of audience that is supposed to buy more. This can quickly lead to the standardization of the content and to the stifling of new, considerably risky ideas.

The internet network is, so far, a neutral distribution platforms (neutral w.r.t. users, applications, distributors) for digital content. By opting for digital distribution through the web, an artist can get their work into the public sphere of interest easily with potentially minimum business overheads, because the transmission costs are getting lower and lower. The diffusion of the P2P technology helps dropping the cost of streaming content as well, which used to be a huge entry barriers with the unicast transmission technology, even by the web.

This often leads to cheaper goods for the consumer and increased profits for the artists, as well as increased artistic freedom.

Digital distribution also opens the door to new business models. For instance, an artist could release one track from an album or one chapter from a book at a time instead of waiting for them all to be completed. This either gives them a cash boost to help continue or warns that their work is not financially viable before they have sunk excessive money and time into it. Videogames have increased flexibility in this area, demonstrated by micropayment models such as the one in Gunbound. A clear result of these new models is their accessibility to smaller artists or artist teams who do not have the time, funds, or expertise to make a new product in one go.

An example of this can be found in the music industry. Indie artists are for the first time able to access the same distribution channels as major record labels, with none of the restrictive practices or inflated manufacturing costs; there are a growing collection of 'internet labels' that offer distribution to unsigned or independent artists directly to online music stores, and in some cases marketing and promotion services.

The distribution of protected and encrypted content through the web seems about the past and does not take advantage of the distribution potential offered by the Internet. “Knowledge and content actually are to be the new capital of postindustrial society, then they have to circulate and be accessible by all”. Enterprises have to be ready to take advantage of this new era. Several alternative business model are arising:

- **content vs data / advertisement**: the content is provided for free in exchange for data on users, which in turn are used for advertisement purpose (see **4.5**)
- **content vs donation**: the content is provided for free and is up to the user to decide if and how to reward the producer for it (see mainly **4.1-2-3**);
- **content vs premium content**: the basic version (in term of quality/materialisation) of the content is provided for free and the advanced/higher quality/more sophisticated version is offered for payment (see **3.2** and **4**);
- **content vs social values**: is the basic economic mechanism at the base of the peer-to-peer content distribution. The content is provided for free to others people belonging to a given community in exchange of social values such as reputation, visibility, connections, recognition, networking opportunities and the opportunity to enter a production experience. Communities not only collect content produced/shared by users, but also produce new multimedia content in a peer collaborative way (see **3.4** and **4**).
- **content vs interface**: the content is provided (almost) for free while the value (and the user expense) is concentrated on the interface appeal and quality (see **3.3** and **4**)

The value is then no longer attached to the content through the control of the traditional supply chain, because the technological reasons for old intermediaries to exist no longer apply.

Tables 3.1-2-3-4 quickly sketch the main technology sub-trends that can be supposed to have a remarkable effects in the future of CIs business. Chapter 4 provides a detailed description of these technologies within the different fields of application.

3.1 Digital distribution, shareable content

While the paradigm of pre-broadband era was centered on accumulation of data, the competitive factor to date is the amount of data deliverable and sharable in a given time frame. The new paradigm is called 'Cloud Computing': no matter of where the information is stored (in servers on the Internet and cached temporarily on clients that include desktops, entertainment centers, tablet computers, notebooks, wall computers, handhelds, sensors, monitors, etc), the crucial factor is how it is reachable and how (from technical, organizational, legal and economic point of view) it can be used to generate new, sharable, content.

Technology	Business impact	Industries
P2P networks : A P2P network uses the cumulative bandwidth of network participants so that the streaming of a video/music/game does not load only to the service-provider /user link.	Streaming costs are lower than in the unicast transmission and can be affordable by small players. The unicast mode hamper small players because costs of streaming content increase proportionally with the number of users (as opposed to the broadcast transmission, in which economies of scale are applicable)	**Cinema**, **Radio**, **TV**, **Games**, **Music**, **Publishing**.
High capacity broadband internet : Enables the transmission of big amount of data for the purpose of streaming of downloading digital content.	Digital content is becomes more and more a shareable and ubiquitous good. Publishers, as artist/audience intermediaries has to rethink their role, which can no longer be based on the control of the delivery channel (like in the 'analogic world'.	**Cinema**, **Radio**, **TV, Music**, **Games**, **Publishing**.
Mobile broadband data connection: connects people with data/content provider on the go, with high speed, high capacity performances. It is achieved through a portable modem, telephone or other device. Various network standards may be used, such as WiMAX, UMTS/ HSPA, EV-DO and some portable satellite-based	Its the technology boosting digital content consumption, which otherwise is limited to podcasted/downloaded material.	**Cinema**, **Radio**, **TV, Games, Music**, **Publishing**.

Case study from Cinema industry (chapter 4.1)

Emerging production/distribution models

Watching a movie or a short on the Web for free is not only about piracy, it is an infringement of copyright law. The 'Screening Room' You Tube initiative is only the last resounding example of how the Web can be legally used to put artists in contact with their audiences when other channels fail. It is well known that prize-winning short films or most festival movies hardly find even a theatre available to screen them. As an alternative, authors/producers can decide to retain all copyrights while streaming the movie for free on the Web and earning through advertising (like You Tube) and/or donations/micro-funding/pre-purchase of DVDs (like the Peach Open Movie project (http://www.bigbuckbunny.org) or A Swarm Of Angels (http://aswarmofangels.com). Or they can release their products with a more flexible licence that allows people to share the movie/intermediate material with or without a commercial purpose and with or without the right to create derivative works (like http://www.bloodspell.com/).

Bloodspell (http://www.bloodspell.com/) is a feature-length Machinima animated film. It was realised by Strange Company, a UK production company founded in 1997 and specialized in 3D animation and virtual words. The producers are describing it as the "largest Machinima film ever created. It's an independent film that, because it is using Machinima technology, isn't subject to the usual limitations of smaller films. But, at the same time, we don't have the politics, money and producers of a Hollywood production involved, so we can experiment with ideas, styles and attitudes that wouldn't be possible in a more top-heavy Hollywood production." Bloodspell, like other projects of Strange Company, is released under Creative Commons by-nc-sa 2.5 licence. It is not clear whether and how Bloodspell raised the profits of Strange Company, but people are actually talking about it and showing it to others. Moreover, it has 42,000 Google quotations, almost one tenth of the 2001 acclaimed "The Lord of the Rings: The Fellowship of the Ring".

3.2 Enhanced visual experiences

Plain access to content is going to be treated and considered as a commodity. Value depends on the usability of content in terms of user experience. The capacity to effectively visualize, experience and navigate the flow of content (data, video, audio) is the key to generate value.

Technology	Business impact	Industries
3D immersive visualization: visual presentation system that attempts to maintain or recreate moving images of the third dimension, the illusion of depth as seen by the viewer. Can be attained with or without glasses, or through the help of other visual devices and special viewing rooms. It applies for films or games (serious and not)	Though the standardization process of 3D visualization tools is far from completion in the word of entertainment, 3D immersive visualization techniques are very promising in the field of Serious Gaming, Interactive Design and Animation as reality simulation tools. At moment, such a technology, with leverage the visual experience, is in competition with the Haptic approach (see Continuous Interfaces), which leverage the tactile sense, because both involve huge investments. It's not unlikable a possible convergence.	**Cinema**: DreamWorks, for instance, has announced that starting in 2009 all of its animated releases will be in 3D digital. **Games** and **Animation,** as a lever to enhance the entertainment experience; **Serious gaming, Interactive design** and **Architecture**, as simulation/ real time interaction tool, especially when combined with **web 3D techniques**.
Free viewpoint digital visualization and 3D camera capture: (under development and standardisation). Creates a scene that can be viewed from every perspective according to the user's/director's choice.	In the entertainment field it enables a high degree of interactions with users and is suitable to capture the web 2.0 / video-players generation. In the production / education market, it enables a hyper-real simulation experience.	**Cinema** and **Television** (especially sport shows), **Games** (serious and casuals), **Design** and **Architecture**.
Meta web visualization - Semantic Web Data Aggregation: Meta rich visualization -Semantic web visual data aggregation: tags are already instruments to aggregate content on the web (delicious). They are made, used and chosen on purpose by users. The principle of SW is that content own intrinsic informations that can be mapped and matched automatically by machines. Like a big eye on the largest content repository.	Also called web 3.0 and revolutionary. It applies from science to architecture.	**Cinema**, **Games**.. all kind of **digitalizable content**.

Case study from TV and Video Games industry (chapter 4.1.2 and 4.4.1)

Future entertainment becomes simulated reality

Experts believe future entertainment systems will satisfy much more of our recreational needs. In his web article, "Views of the Future," British Telecom futurologist Ian Pearson predicts by (1):

2015 – TV, computer, and phone converge into a wall-size, interactive, 3D screen, delivering entertainment and information tailored to our wishes. When idle, it displays beach, forest, or other scenes so real, we think we are there.

2020 – Nano-size electronics inside "active contact lenses" receives TV, video games, Internet, and phone calls; and displays images directly onto the retina. Tune program with pocket keyboard initially; later with thought control. Watch TV; browse the web, or video-phone a friend; all with eyes open or closed.

2030 – Microscope-size nanobots communicate with the brain creating simulated realities indistinguishable from the real world. Download a program like "Star Trek Holodeck" and dive into the action. Any scene your mind imagines becomes real for you.

Re-live when you first met your mate, or create a reunion with family members. Your imagination becomes reality. Change and end program with voice control.

2040 – Author Raymond Kurzweil believes human and machine intelligence will meld. We can "re-create the world" and enter environments as amazing as in "The Matrix" movie.

Simulated reality describes an environment impossible to tell from "real" reality. But immense computing power is required to create and download these huge programs to your brain.

Will this future happen? Experts say yes. Hewlett-Packard, Nantero, and others are rushing to develop vast memory systems required for simulated reality, and the Allen Brain program promises faster understanding of how technology interacts with neurons.

Philosopher Nick Bostrom poses an even deeper thought. He suggests our world may not be real at all – we could actually be living in a simulation. "Given sufficient technology," he says, "it is possible to simulate entire inhabited planets, including everyone on them."

(1) http://www.memebox.com/futureblogger/show/800-future-entertainment-becomes-simulated-reality

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3.3 Continuos User Interfaces

The interface is the entry barrier between the user and the service/content. The lower such a barrier is, the easier the user takes advantage of the service and uses the content, i.e. generates and feeds economic opportunities. The alternative paradigm to the desktop model is called Ubiquitous Computing, which aims at achieving a seamless interface between the user, the device and whatever is delivered through it. Haptic technology and neuro-controllers support continuity between the body of the user and the device, while the handheld wireless devices assure space continuity between multiple private/ public environment of fruition.

Technology	Business impact	Industries
Haptic technology: refers to technology which interfaces to the user via the sense of touch by applying forces, vibrations and/or motions to the user. This mechanical stimulation may be used to assist in the creation of virtual objects (objects existing only in a computer simulation), for control of such virtual objects, and to enhance the remote control of machines and devices. Smooth the discontinuity between the body and its 'electronic extensions'.	The recent extraordinary success of the Wii Playstation, in the field of games, could demonstrate that for the user is not only important the image quality but also the 'physicality' of the interaction with the image. It is also usable and promising in the design field and as a remote controller for any king of device.	**Games**, **Design&Architecture**, computer interfaces in general for whatever application.
Neuro controllers: The first produced models look like light helmets, and although still imperfect, they seem increasingly capable of reacting to the user's emotions. Smooth the discontinuity between the mind and its 'electronic extensions'.	Lead users have the sensation that although this technology is being tested and developed for gaming, once it is reliable enough it will be a breakthrough innovation as a secondary interface method for computing.	**Games**, computer interfaces in general for whatever applications (listen to the music, watching TV programs etc).
Mobile wireless hand-held devices: from the portable consoles to the electronic paper display (see ch. 4), with or without wireless broadband connection, smooth discontinuity between private a public spaces of content consumption.	Combined or not with wireless broadband access technology, are the preferred way to use and share content, since they move with the user and fit with her nomad life style. The surrounding network (power and data) infrastructure is a complementary asset, especially if the devices are multi purpose (power consuming, short life batteries) and connectable to the web.	**All Creative Industries.**

Case study from Music industry (chapter 4.2)

SMOs - Social Music Objects (1)

SMOs are musical objects which enable new ways of interacting with digital music. In the world of the near future, where our digital life resides completely in the "cloud", we theorize that hard drives will become obsolete and all we'll be carrying are interactive ID cards, representing not our physical selves, but our segmented digital selves. An SMO thus represents my "music self".
Those objects can bring social media to the table, literally.

At first SMOs eliminate and hide all technology aspects, there are no itunes playlists, nor opening application such as Winamp.
They do so by simply playing music once you interact with them (usually by laying the objects on a small surface or table).
At first, the interface seems minimal and limited to a single action of playing a specific playlist. Still, complex interactions are hidden within the possibilities this system can provide.
For example: by placing two different objects representing two different genres, the current playlist will be a mix of the two genres. Furthermore, one can control "how much" each genre is dominating the current play list - simply by rotating the object.
This allows great level of diversity in managing and playing music in the home environment, and even more on the social aspect, once other people are present. They may use their own objects representing their musical taste and by that a new social interaction emerge as two (or more) people mix their musical taste in a most intuitive and simple way.

Scenario1: coming home / individual use
Viviana comes home after a long working day, wanting to relax - she decides to put on some music. Opposing to the long and wearing process of approaching the computer, lunching the music software and selecting a playlist - she simply throws a music object on the table, that initiate the music.
In our scenario Viviana uses a dice with 6 different sides, each side represent a music genre. That said, one of the of the dice faces is heavier than the others, so that when Viviana throws the dice, there is a higher probability that it will fall on the heavier face (her preferred music genre). The other faces correspond to other genres - thus providing randomness. At the same this Viviana can select a specific genre, simply buy placing the dice on the corresponded dice face.

Scenario 2: Having a guest / social aspect
As guests arrives, they can use the current music object laying on the table, or other musical objects, either one from Viviana house, or ones they carry with them, assuming they have the same system at home. By adding other musical objects that correlate to other playlists, the music is a mix representing the users preferred music for the moment.
The system is connected to both itunes-like music players, and/or online music tools such as last.fm.

(1) http://www.nastypixel.com/prototype/workshops/physical-interface-design-lugano/smos-social-music-objects and interview with Yaniv Steiner, developer.

3.4 Distributed, open production facilities

Production facilities are based where production resources are (capital - financial and cultural - and time of workers). If production resources are shared / collectable in a distributed way, production facilities can be virtual and ubiquitous. Organizational capabilities have to adapt.

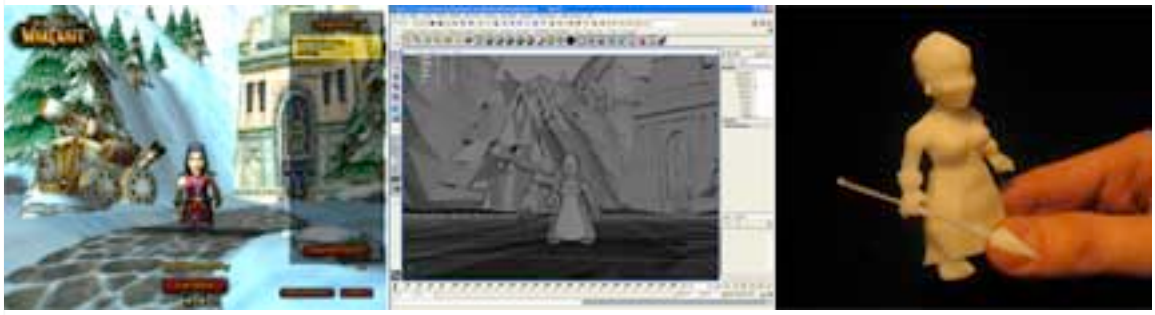
Technology	Business impact	Industries
Ubiquitous/Affordable shooting/ recording equipment :(MiniDVs. Cameras, Mobile Phones, Multi Purpose Handheld Devices etc). Everyone with a good idea (and a few talented crew) can produce a good movie/song/game with a small/micro budget	Combined with the digital distribution possibilities, they are enable the so called User Generated Content. After the bubble of popularity of UGC on the web, consumers seems to prefer a balance between user generated content and editorial control, which sometime is called “Curated User Submissions”	**All Industries built around Videos/images, Sounds, Writings or a combination of them.**
Open source softwares for content production/editing/remix/sharing	Accessible to all, they enable everybody editing and producing digital content which is in turn usable re-mixable, compatible with consumption platform (everybody can download and install an OSS for free) . The software license cost is no more an entry barrier for content producers and distributors.	**All Industries built around Videos/images, Sounds, Writings or a combination of them.**
Collaborative and distributed peer production platforms: such as wikis, multi editing platforms, music conferencing technology, massive multiplayers on line games..	They enable the collaborative job of several, self-selected people around the same generative/creative task/product. Complex creative projects are no longer un-affordable for ‘indie’ production, as long as the project is granular enough and the product is modular enough, the web can act as a virtual organization facility and leverage the latent production potential of people.	**All Industries built around Videos/images, Sounds, Writings or a combination of them.**
On demand physical production	The new frontier of mass customization: More and more affordable for a consumer market, allow users to print a real copy of objects (**fast prototyping, 3D printing**), to print a single copy of a book (**print on demand**). A possible scenario is that users will download 3D models from the Web straight to the printer and authors will offer digital copies of the books and users will print them themselves without usual intermediaries (but new ones).	**Design, Publishing...**

Case study from Design industry (chapter 4.4.2)

Breeding Objects - Computational Design, from Digital Fabrication to Mass-Customization

Design is currently re-considered and shaped through the lens of information society and, more generally, new technologies. The work of young designers today involves a crucial paradigm shift: not only do they use the digital tools provided to them but they also invent, modify and produce new instruments themselves.

Another important characteristic of the new design production involves digital fabrication processes such as laser cutting and 3D printing (a few examples in the posts Rapid Products 1 and 2). The impact of digital fabrication is far from marginal: instead of churning out identical products, objects are created which, while they undeniably belong to the same family, are all different from each other. Beyond the creative process and fabrication, the digital tools and new design processes have also the potential to radically modify the marketing of design products and the way consumers engage with the creation of objects.



3D-printing your World of Warcraft character

http://www.cstem.it/press_e.php

4. Creative Industries and the impact of ICT

4.1 Cinema and Television

Movies or TV programs differ from casual clips because they go through four basic processes: pre-production, when the content is conceived and the resources to realize it are organized; production, when the video is shot (or realized in a digital way); post- production, when the video is edited, refined, customized; and distribution, when one or more channels are selected to deliver the result to target audiences. Both the cinema and TV industries are organized along these fours steps. ICT technology is affecting the pre-production process by opening new ways to collect ideas and organize resources; the production and post-production with new shooting and editing tools, which gradually shift the kernel of the creative process from the director to the editors; distribution, with a trend toward on-demand model on different platform, from the broadcast digital television to the two-ways communication network per excellence, the Internet. Peer-to-peer distribution technology, decreasing the cost of streaming, is setting the future of Internet TV. Digital cinema, blu-ray technology, collaborative tools to organize the production of movies and new legal tools to facilitate the distribution and sharing of content through the Web are shaping the future of the new generation cinema.

Regional relevance of the 'Cinema and TV' sector:

- ***Current stated perceived advantage for* Baden-Württemberg*, Piemonte, Rhone Alpes and West Midlands.***

4.1.1 Cinema

Production costs

Continuous upgrading of current production technologies is keeping the average production cost of professional movies at almost the same level as a few years ago. However, the cost of digital equipment to film and edit a movie is decreasing year by year, allowing 'amateur' or independent filmmakers to make movies at affordable costs. Filming equipment is truly in the hands of everybody. In 2006, for example, Nokia promoted a short film competition called 'Play the Lab' (www.playthelab.it.) with the only requirement being that the videos had to be shot with a N90/N93 mobile model equipped with a 2 mega pixel camera.

A recent report by the UK Film Council on low and micro-budget films concluded that film value has little relation to budget, but is dependent on a well-developed script instead. The Council also found that while making movies today is relatively easy for independent producers with a small crew and affordable filming equipment, distribution is practically impossible.

Free viewpoint videos

As for new technologies for filming, the free-viewpoint technique seems to be promising because it allows for a further degree of user interaction: the scenes are shot from multiple angles all at once and the computer then generates a 3D model from these data. After texturing, the result is a video that can be viewed from any angle, thus allowing the user to act as a director and to choose the perspective he/she likes better for every scene (source Joe Kilner). Apart from movies, the same technology shows high potentials in television shows and in sporting events in particular.

Video on Demand

At the end of 2007, a survey led by the European Audiovisual Observatory and the French Government's Media Development Department (DDM) found 258 VoD services in operation in the 24 European countries covered, compared with

142 services at the end of December 2006. France, the Netherlands and Germany are leading the chart with the highest level of VoD provisions.

This upsurge in the number of services is largely explained by the fact that television channels generally now have websites offering free catch-up TV, giving viewers access to certain programmes, notably episodes of series, for several days after they have been broadcast.

There are three basic business models for video on demand: 'à la carte' sales of movie files, Pay-per-view rentals (PPV), subscriptions to 'all you can eat' platforms.

Thus far, PPV systems have driven the market with 90% of the digital market share (€ 28m in 2005 out of a total of €31m). The reason is both technological and juridical. With the PPV model, rights are easier to negotiate than with other business models and the implementation of closed network 'walled gardens' have little or no bandwidth problems as a rule since the aggregator service provider is usually also the platform operator controlling the supply chain. As for services being delivered on the open Internet, they are at the mercy of bandwidth issues and of end-consumer's broadband connection. A digitally encoded movie file designed for Internet downloading is approximately 700MB in size (2 hrs at 1Mbs Internet connection to download it all).

Free sponsorship/advertising business models are also a possible solution for the digital distribution of movies, reproducing the financial model of free television. The Internet Archive initiative (sponsored by public and private donations) is digitalizing and publishing old movies and other rights-cleared content on the Web.

You Tube is 'channelling' its offer more and more in order to increase ad revenues. On 22 June 2008, it created the "Screening Room" channel aimed at free streaming (and possibly offering in the future the possibility to buy on-line the DVD) independent movies not entering traditional distribution channels.

Digital cinema

Digital Cinema (DC) refers to the use of digital technology to distribute and project motion pictures to public audiences at a standard comparable to or better than that which can be achieved with traditional 35mm film. Since digital content can potentially be released in a multitude of different formats and specifications, major Hollywood studios have promoted a standardization initiative called Digital Cinema Initiative (DCI) with the aim of :

- defining an open architecture specification for the distribution of digital movies;
- defining and implementing anti-piracy systems, according to a military standard encryption scheme. The purpose of the encryption is to ensure that films are used only according to contractual terms, i.e. in a particular cinema, on specified dates and on identified and certified equipment.

The new DCI specifications requires a JPEG2000 compression format and a 2K (2048x1080 pixel) image resolution, while the aim for the future is to achieve a 4K standard resolution (4096x2160 pixels). It should be noted that the 2K resolution for HDTV content is 1920x1080 pixels; considering that digital cinemas are expected to screen even content originally created for television (sport shows, rock concerts, opera, etc.), this could be a potential problem.

Digital films are usually stored in cinema servers and distributed using computer hard drives, which costs around €150 plus €30 for the delivery. Satellite distribution of DCI standards, while used for instance in case of opera live performances, is considered too expensive at the present with respect to the hard drives delivery. The cost of printing a typical 35mm, instead, is around €1500.

	Digital screens			
	2006		2007	
	n	%	n	%
US	1945	5%	4562	12%
EU	479	2%	719	N/A
FR	36	1%	69	1%
GER	114	2%	152	3%
IT	31	1%	37	N/A
UK	161	5%	272	8%

Table 2: Digital cinema current roll-out. Source: EAO

The cost of digital projection technology is decreasing. For example, the new generation of projection equipment is 25-30% less expensive than the previous models. The typical cost of installing digital projection equipment is around €80,000, an expense that cinema operators in particular perceive as problematic since digital projectors are less durable and less self-maintainable than traditional ones. Cinema owners also incur staff training costs. In order to assist them in making the switch to digital cinema, several funding models (from leasing schemes to virtual print fees) have been designed and tested so that the operator can recover the installation costs in a few years (5 years, for an installation cost of $80,000 and 14 films per year – see Inglis 2008 for more examples).

The transition to digital cinema is fundamental for the diffusion of 3D cinema viewing experiences. Though the standardization process of 3D cinema is still far from completion, and several different techniques are being experimented (with or without glasses, with one or multiple screens), the market is moving forward and DreamWorks, for instance, has announced that starting in 2009 all of its animated releases will be in 3D digital.

Not only can digital cinema be considered a financial opportunity for the studios, it is also a way to help independent producers to distribute their movies and to small theatres to screen movies in previously uncovered areas. For example, in rural Kent, the 90 seat Kino Cinema (100% digital, 35,000 admissions in the first year of operation) shows 5-6 different feature films every day, offering a total of 20 different titles per month, mostly supplied through the UK Film Council digital screen network scheme.

Movies, however, are not the only content suitable for screening in digital cinemas. Sport shows, opera performances, rock concerts and games (serious or casual) represent some of the alternatives that could be offered by the theatre in different time slots (games in the early afternoon, rock concerts very late at night, etc.).

The UK is the most advanced country with respect to digital screen adoption: the Digital Screen Network/Film Council initiative now has 238 digital screens in operation, distributed among independent cinema circuits and multiplexes (more than half).

Emerging production/distribution models

Watching a movie or a short on the Web for free is not only about piracy, it is an infringement of copyright law. The 'Screening Room' You Tube initiative is only the last resounding example of how the Web can be legally used to put artists in contact with their audiences when other channels fail. It is well known that prize-winning short films or most festival movies hardly find even a theatre available to screen them. As an alternative, authors/producers can decide to retain all copyrights while streaming the movie for free on the Web and earning through advertising (like You Tube) and/or donations/micro-funding/pre-purchase of DVDs (like the Peach Open Movie project (http://www.bigbuckbunny.org) or A Swarm Of Angels (http://aswarmofangels.com). Or they can release their products with a more flexible licence that allows people to share the movie/intermediate material with or without a commercial purpose and with or without the right to create derivative works (like http://www.bloodspell.com/).

Bloodspell (http://www.bloodspell.com/) is a feature-length Machinima animated film. It was realised by Strange Company, a UK production company founded in 1997 and specialized in 3D animation and virtual words. The producers are describing it

as the "largest Machinima film ever created. It's an independent film that, because it is using Machinima technology, isn't subject to the usual limitations of smaller films. But, at the same time, we don't have the politics, money and producers of a Hollywood production involved, so we can experiment with ideas, styles and attitudes that wouldn't be possible in a more top-heavy Hollywood production." Bloodspell, like other projects of Strange Company, is released under Creative Commons by-nc-sa 2.5 licence. It is not clear whether and how Bloodspell raised the profits of Strange Company, but people are actually talking about it and showing it to others. Moreover, it has 42,000 Google quotations, almost one tenth of the 2001 acclaimed "The Lord of the Rings: The Fellowship of the Ring".

Case:
The Blender Projects

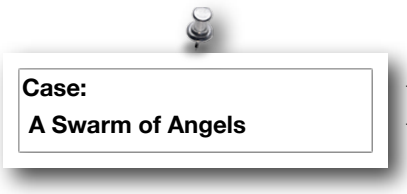
Another interesting recent development is Blender, an open source 3D computer animation suite that intends to become an alternative to professional closed solution such as Maya (Autodesk) or Houdini (Side Effects Software). In 2006, the Blender Foundation – seeking funds through the pre-sale of DVDs and donations – and the Netherlands Media Art Institute Montevideo/Time Based Arts– asking for public grants – promoted the production of a 3D animated short movie called "Elephant Dream". The film was made entirely by using open source software and is free to see, share, remix thanks to the Creative Commons licence applied to released content. The experiment proved to be such a success in terms of funding, DVD sales and downloads that the Blender Foundation is now engaged in two other projects: The Peach Open Movie Project and the Apricot Open Game Project (http://apricot.blender.org/). Along with the Machinima case, this is yet another example of the convergence of the tools and genres of movies and games.

The Web is not only about widespread distribution of the content; it is also a space to gather artists and enable then to work together. In moviemaking, that is one of the most collaborative artistic experiences ever, and the so-called 'crowd-sourcing' or peer-collaborative-production is inspiring a few experiments.

My movie mash-up (http://www.myspace.com/fainthearttthemovie) is a collaborative movie project structured as a competition. It is open to the participation of all English members of MySpace (roughly eight million in all). It is sponsored by Fox Interactive Media UK Limited along with other private and public bodies (including the UK Film Council and "The Times"), with a total budget of 1 million pounds. Members are allowed to offer themselves as director, actors, technicians, musicians and/or to vote in order to choose the winner. The result is not merely co-created; the selection of resources is supposed to be as open and transparent as possible, even though there have been some complaints by the participants .

Case:
The Wreck a Movie projects

"Star Wreck in the Pirkinning" is a feature-length sci-fi parody, from a core group of five Finns and over 300 extras, assistants and supporters. It was released for free on the Web and thanks to the great success of downloads, Universal Pictures decided to screen it in Finnish theatres. The project continues to receive donations and to sell DVDs and merchandising. Now the producers are working on a new €2,500,000 production called "Iron Sky" (http://www.ironsky.net/), which is currently in the pre-production phase and has already received a grant of €40,000 from the Finnish Film Foundation. The "Iron Sky" project is part of a structured Web platform (www.wreckamovie.com) that, under the same umbrella, aims at gathering people who want to collaborate on the production of a movie or to start, lead or simply organize a grassroots collaboration around new movie projects such as Sauna (http://www.bronsonclub.fi/sauna/). Both "Iron Sky" and "Sauna" will become a game. The mission of the Wreck a Movie project is to realize professional user-generated content exploiting the Web to gather resources, coordinate collaboration and promote 'intelligent distribution' with Creative Commons licences (even though the project leader is not forced to adopt them).



'A Swarm of Angels' (www.aswarmofangels.com) is an ongoing project whose aim is to make a feature film with the collaboration, both creative and financial, of 50 thousand people (Cassarino, Geuna 2007). It started from the initiative of Matt Hanson, a British director based in Brighton. Even though the Swarm has not yet released the movie, the community has been active since early 2006 and relevant products are already available. The movie is micro-funded by its creators (25£ each), who gather through the Web, organize themselves in workgroups and realize all the movie-making processes task by task. Being entirely crowd-funded, crowd-sourced and aiming at a wide free-to-remix Web distribution of the content, ASOA deserves attention as the highest collaborative and participative movie project on place, proposing itself as a 'more enlightened alternative' to the Hollywood model.

Interestingly, all the prominent open-movie projects are based in Europe or arose from the initiative of an European digital pioneer. They are all struggling to give flesh and success to the wisdom of the crowds principle, paving the way to a new, more open and shared approach to art and culture. The open issues those projects are coping with in this field refer to:

- how to manage – form the organizational point of view – distributed and volunteer collaboration within a top-quality product (how to select, involve, organize, coordinate, motivate… people);
- how to manage the collaboration in terms of intellectual property rights if money is somehow expected to come back; (if there is expected to be a return on the investment)
- how to collect funds (advertising, donations, public/private sponsors).

Highlights Cinema

	TRENDS
Technological trends	
	• Ubiquitous/Affordable shooting/editing equipment (MiniDVs. Cameras, Mobile Phones, Multi Purpose Handheld Devices etc). Everyone with a good idea and a few talented crew can produce a good movie with a small/micro budget • Free viewpoint video or 3D camera capture (under development and standardisation). Creates a scene that can be viewed from every perspective according to the user's/director's choice • Open source suites for 2D and 3D editing of images/video • Distributed editing platforms that allow people to edit videos from available on-line videos and to share the result with others in real time. Good for the collaborative editing of a movie, even though such platforms do not perform like professional editing suites • Digital cinema (current DCI standard: 2K/2048x1080 pixel resolution and JPEG2000 compression). Satellite distribution of digital encrypted copies is still not convenient because of a lack of scale effect, but it will likely succeed in the near future. Number of digital screens increasing year by year. Complementary with the diffusion of 3D theatres. • 3D viewing experiences. Still hampered by a standardization process (with or without glasses, with one or multiple screens) • Movie delivery by Web unicast streaming • Movie delivery by P2P streaming • Blu-ray technology as the next standard for physical support for movies (instead of DVDs). Superior storage capability and future expandability with respect to HD-DVD, but less backward compatibility and more expensive
Business trends	
	• Walled garden Videos on Demand services are expected to grow steadily in the coming years, but still account for a lower percentage of revenues from direct customer spending with respect to physical format sales • On-line movie distribution (based on 'à la carte' business models or 'all you can eat' platforms) is expected to grow faster, obtaining 7% of all movie revenues from direct customer spending by 2010 • Free distribution of movies through the Web with ad-based business models is strongly dependent on bandwidth connection, but very promising, especially for low-budget, high quality productions (e.g. short movies) banned from traditional distribution channels. Ad-based use is also aligned with the mainstream way to put contents on the Web. • Digital cinema is a good opportunity for independent producers to distribute their products and for small theatres to screen movies in previously uncovered areas. • User sponsored/supported financing: donations, advance sale of DVDs potentially combined with user participations in production decisions and 'intelligent' distribution of the content through the Web for free with suitable and flexible IPR solutions alternative to copyright

	TRENDS
Trends in user involvement in creative content production and distribution	
	• Crowd micro-funding / sponsoring • Participation of user in the creative production process through Web collaboration/coordination tools (from script to the editing process) • Participation of user in the remixing/re-use of production materials with or without commercial purpose, even as a viral marketing strategy • More distribution opportunities for first-time/amateur producers/directors, from Web platforms to on-line sale of DVDs to digital cinema screens • Participation of users in movie reviews. Peer reviews are considered reliable and help distributors to gather information about the demand side (see Advertising section).

4.1.2 Television

Until a few years ago, television was a business based entirely on a technology that could deliver and stream videos directly where the consumers were located (home, office, public places). Since the content was produced by a few large operators and delivered in a one-directional way to many users through a broadcast network, television was considered the mass media par excellence (after the press) and a strong tool for influencing and shaping public opinion.

The traditional supply chain bringing videos directly to users consists of:

- a content producer, which designs, films and packages video content;
- a content aggregator, which edits and runs a channel, i.e. a given stream of contents;
- a content distributor or broadcaster, which holds the technical equipment to deliver the contents to the consumer's viewer using one of the available communication technology platforms (mobile, Internet, cable, etc.).

Broadcast TV

Within such an eco-system, the user/consumer used to mainly be a pure receiver of information, having little interaction with the service providers. With analogue television, a real-time interaction between user-at-home and service provider can only happen through a telephone call during shows or telesales (or, more recently, a SMS). With the digital television regulated through the DVB (Digital Video Broadcasting) communication standards (DVB-T/H/S), the case is similar from the technological point of view, even though the user's perception is different. The DVB standard is a broadcast model that gains some degree of interactivity if coupled with an Internet platform (through a DSL cable, Wi-Fi connection and so on) or a telephone service (in the case of mobile phones). That way the user is able to choose, communicate/ask, buy and receive what to see, how to see it (in which frame of the screen, how many times, etc.). This technically limited interactivity differs from the full interactivity underpinning the Video On Demand services, which is offered on two-way broadband networks (IPTV, through the Internet network). It should be said, however, that even though virtually full, such interactivity is also limited in terms of the content delivered by Internet because the upload bit-rate is considerably lower than in the download mode.

IP TV

The broadcast model differs from the IP model, which streams contents via Internet for technical and economic reasons. The main economic difference is that the first model is characterised by high fixed costs and a huge scale effect. The second model suffers transmissions costs (broadband, storage, streaming) increasing proportionally with the number of users. Streaming a video on a Website, on a mobile handheld or on a TV screen is a unicast (one-to-one) technology, which means that each user opens a two-way connection and so use up some of the available bandwidth. This cost structure is well suited to a business model based on single subscriptions, or rather with a pay-per-view system; otherwise, service providers have to carefully balance the amount of content delivered with the advertising revenues. Even more constraining are the technological obstacles, which in turn restrict the market. In the case of a mobile receiver on a typical 3G network, a single network cell (areas with a radius of 3 km) can support around 15 streaming users at the same time. A 3.5G network will have better performances in the future, but they will always be limited if we consider that the average quality/dimension of a single video is also expected to increase.

P2P TV

Peer-to-peer (P2P) technology, however, promises to overcome these obstacles by allowing one to obtain the same amount of resources usually bought and paid for by a single service provider, harvesting them in a distributed way. A P2P network uses the cumulative bandwidth of network participants, so that the streaming of a video does not only load on the service provider-user link. Other kinds of real time data, such as voice during phone calls, already go over P2P networks (e.g. through the Skype application, also available on mobile handhelds).This is also the case with the user-generated TV joost.com, and is the future of user-generated video channels in addition to major service providers/aggregators (e.g. YouTube) and broadcasters.

Broadcasters, on the other hand, seem to privilege content exploitation models rather than on-line TV. According to Screen Digest, pay TV in Europe will generate a market of 34 Billion EUR a year by 2010, with on-line and TV on demand representing just two percent of the total.

Obstacles for insiders

Broadcasters delivering services through the digital channels face some generic obstacles.

As for fully interactive TV, such as DVB-T (digital terrestrial television), the DVB-MHP standard has now been widely adopted in Europe and a complete switchover is expected to happen in the next few years. DVB-MHB has been designed and adopted by the DVB project because it was intended to be open; it was meant to carry no/minimal licence fee payments, which is why many broadcasters have invested in it and public governments have been supporting the adoption of set-top boxes among the population. The thrust is that Comcast, Open TV, Panasonic, Royal Philips Electronics, Samsung Electronics, Thomson and Time Warner, hold a patent pool that covers the MHP standard. Via Licensing, the company managing this pool, has said that after the first of January 2009 a licensing fee will be applied for the usage of MHP to broadcast content. Without resolving that problem, the terrestrial digital television business will be penalized because multiple standards could be adopted, thus increasing the cost of any service or application running on the set-top box.

Regarding on-line/Web/IP TV, the main issues are related to the exploitation/protection of rights and to the need to adjust the old business model based on time windows and control over the number of reproductions that did not consider the present distribution technologies. The already mentioned Creative Archive project conducted by the BBC is an important trial for dealing with this issue, even though the material available has not reached critical mass as yet.

P2P Networks

Considering the technological and economic efficiency of P2P networks (reference), it could be argued that the stronger innovation potential is with the IPTV, in particular on-demand content and channels (e.g. joost.com enables the user to assemble his/her preferred channel by choosing from the huge bouquet of contents available on the website). Creating content that is valuable and interesting for even niche audiences requires more time and skills than keeping a blog alive. No matter how inexpensive it is to maintain website edit and to deliver TV-like services (as opposed to the 'dancing cat' model of You-Tube that does not claim to be edited), the skills and time to build the content are significant, and we do not expect an explosion of user-generated channels comparable to what has been seen for blogs. Nevertheless, the history of Internet has taught everybody that if the platform is open and neutral and the barriers to entry are low, we have to be ready for the unexpected.

It is worth noting here that by TV we primarily mean on-line edited services, while for videos we mean clips. Nevertheless, the border between the two is blurred. An example of this would be a news service consisting of a handful of news clips, updated regularly, which the user can access at any time. Another example is vimeo.com, a video sharing platform with a 'videos we like' channel offering a selection of highly entertaining short movies ('professionally' filmed and edited), music videos and documentaries.

User-generated clips

Compared with previous years, the number of Internet users who watched videos on YouTube and other user-generated websites has risen only slightly. The overall number crept up to about 135 million in April from 132 million in May 2007, according to comScore, an on-line measurement firm. But each of those users is watching far more video than before. ComScore reported that the average viewer watched 228 minutes of video in April, compared with 158 minutes in May 2007. One reason is that the videos people watch are becoming longer — the average viewer spent about 17 seconds more per video in April than in May 2007 — but most of the rise came from a spike in the number of videos that each person watched.

Despite 80 million visitors per month, there are concerns that YouTube does not attract enough advertisement because most of the videos are seen very few times. Perhaps that is why YouTube recently (June 2008) switched to TV-like, or edited, services such as CitizenNews – a citizen journalism channel- and Screening Room with a section devoted entirely to independent cinema (four new movies are expected to be uploaded every two weeks starting from 22 June 2008).

Highlights TV

	TRENDS
Technological trends	
	• DVB (T/S/C/H). A broadcasting technology that gains some degree of interactivity when coupled with an Internet platform or a telephone service. Some issues emerged with the DVB-MHP standard because of the surrounding patent pooling. Large-scale effects on costs, as with every broadcasting technology. • IPTV (television delivered through the Internet network). Transmission with high interactivity, but with unicast the costs for streaming increase proportionally with the number of users • IP mobile TV (e.g. over 3G network). Technological constraint over the number of videos that can be transmitted simultaneously within a cell • P2PTV. A particular IPTV transmission technology based on a peer-to-peer network of Internet users. A P2P network uses the cumulative bandwidth of network participants so that the streaming of a video does not load only to the service-provider /user link. Streaming costs are lower than IPTV • Free viewpoint video (see cinema highlights). Have great potential with TV shows, particularly sporting events
Business trends	
	• Insider broadcasters are expected to prefer the traditional pay TV business model, with on-line TV and TV on demand representing just 2 percent of the total expected earnings by 2010 • P2P IPTV is a good opportunity for small players. The producer is responsible for content editing/ quality/selection, while it is up to the user to shape the channel and watch videos. It is usually advertising based. The future of IPTV – as provider of edited content instead of casual clips - is supported by recent surveys reporting that Internet video watchers are watching longer and longer videos, but are more selective on quality (no 'dancing cat' content). Even YouTube is changing its policy accordingly
Trends in user involvement in creative content production and distribution	
	• With IPTV, the user can ask for content and edit customized channels • User can easily turn into a producer thanks to P2P low transmission costs, and build his/her own IPTV • User can provide content that – once selected by the IPTV editor – can become part of the IPTV on demand content (e.g. News Web television channels)

4.2 Music

In the business of recorded music, Majors are trying to earn from the multiplication of formats by which a single piece is available. Each of them (from ring-tones, to Web streaming, to CDs, Vynils, downloadable mp3, etc.) has a different business model; some content offer is subscription based, some is bundled to a particular hardware, some is for free and ad supported. On the other hand, the Web as a powerful tool to put the artist in touch with his/her audience with very low transaction costs is becoming the testing field for alternative business initiatives promoting independent music and capturing money in several ways (from ads to users donations), none of them has been affirmed as a killer model, so far. Apart from the funding strategy, new distribution models are distinguishing themselves for leaving both the artist and the user more freedom to use, exploit, circulate the songs they like.

As for radio, while the digitalization process – from FM/AM to DAB – is slowed down by several uncertainties related to the candidate standard and its actual performances, Web radios are much appreciated by Internet users. The diffusion of Web radio is hampered by the cost of content streaming – often too much for small local players to be compensated by ad revenues, but the development of geographically targeted advertising and of the P2P technology for streaming are preparing the field for a growing future for a diversified offer of radio content through the web. Podcasting of radio content – mostly talking – is also said to overcome blogs in the next future as business opportunities for advertisers.

Regional relevance of the 'music' sector:

- ***Current stated perceived advantage for Baden-Württemberg, Piemonte and West Midlands***

4.2.1 Recorded music

Music is the most popular form of entertainment, and according to EUROSTAT, listening to/downloading music is the second best use of the Internet for cultural purposes in the 27 EU countries. The IFPI report states that music is also responsible for the growth of the ISP, telecom and hardware industries. It would be very interesting to know precisely how many new ISP contracts have been created for users so that they can download music from the Web (legally or not).

New business models

1. ***A-la-carte download services***

'A la carte' download services remain the dominant digital business model, with i-Tunes leading the on-line sector. In the US, i-Tunes surpassed Amazon and Target to become the third largest music retailer.

Niche markets, like classical music, also benefit from Web shops. In November 2007, Deutsche Grammophon introduced a classical music download service active in 40 countries. The service offers 2500 DRM-free albums, 600 of which are no longer available in CD format. Consumers can choose from among complete albums, collections of albums, box-sets, individual movements, complete works or individual pieces. In November 2007, EMI Classics released Sir Simon Rattle's recording of Mahler's Symphony, with the Berliner Philharmoniker, as a digital only release.

2. ***Subscription services***

On-line subscription models such as Virgin and HMV have lost momentum in Europe despite at least three high profile launches. Moreover, according to Screen Digest, there has been little prospect for growth thus far. This is in contrast with the US, where such services have been gaining in popularity, with 2.8 subscribers at the end of 2005 (mostly because of discounts offered to colleges and student facilities).

At the end of 2007, OmniPhone launched MusicStation, a new mobile subscription service designed to function on a wide variety of mobile handsets worldwide. It is currently in use in the UK, Sweden, Hong Kong and South Africa. MusicStation offers consumers access to a library of over 1.4million tracks for a weekly fee (1.99£ in the UK), with no additional data and transfer changes.

Another subscription-like model is based on the concept of bundling music with other services and devices – be it an ISP subscription, a mobile phone or a portable player. As a result, the music comes 'virtually free' to consumers and record companies and artists get paid from the sale other services and devices.

In December 2007, for instance, Nokia announced a new subscription venture in partnership with Universal. Starting in December 2008, the "Comes with Music" programme will offer consumers who buy selected Nokia music phones 12 month access to Universal's entire catalogue. Users should be able to keep the downloaded tracks permanently.

Also in late 2007, Universal partnered with French ISP Neuf Cegetel. For a monthly fee of €29.90, the ISP offers high speed Internet, fixed-line telephony, HD TV service and an unlimited music download service with Universal's catalogue. In Italy, Telecom Italia has partnered with Napster in order to make the entire basket of 5million tracks available on its network.

3. **Advertising supported services**

According to Jupiter Research, file-sharing currently dominates music acquisition among young consumers and over a third of Internet users aged 15-24 illegally file-shared music. This is roughly three times the rate of legal services usage for this age group. Advertised supported services offer consumer free access to streamed or downloaded music. Artists and record companies are compensated by advertising revenues. The best examples of this are the recent agreements between certain record companies and social network services like YouTube, MySpace, Bebo, LastFM and SpiralFrog. These deals are mostly based on licensing agreements for streaming music and music videos for a share of advertising revenues. We7 assures free downloads with a 10 second advertisement inserted at the beginning of every track and allows users to buy the free-ad track. Myplay and MusicBox, both from SonyBMG, are ad supported services whereby fans watch videos of their favourite artists and send them to friends.

DRM interoperability issue

In the physical format market, consumer choice was restrict by the format in which the content was stored (CD, LP, Cassette, MD). For example, if one bought a CD, a CD player was needed to play it. In the digital market, the restriction is due to DRM (Digital Rights Management) technology formats that can allow the use of content only on specific platforms and hardware.

For third-party digital service providers who are not in the business of developing their own DRM platforms and hardware configurations, this situation means that if they want to adopt a DRM strategy to lock the usage of content in some way, they must licence one or more DRM formats.

The DRM supporters say that the iPod plus iTunes model has accelerated – if not enabled – the launch of the major European digital music Web market because this strategy made it possible:

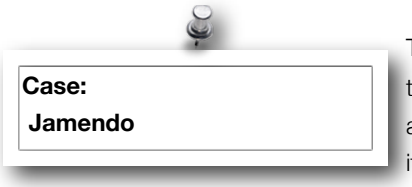
- to offer customers attractive prices (99 cents per track). In reality, however, the prices were not as low as they seemed since customers also had to buy the not-so-inexpensive i-Pod;
- to more easily negotiate deals with music companies afraid of piracy.

There is some evidence that the strong support for DMR is fading away. Perhaps the reason is that DRM policy turned out to have the opposite effect on consumer trust and then on consumers' tendency to join piracy. Some of the major companies, like EMI, are adopting a DRM-free policy, and more and more independent music download services are offering DRM-free

tracks. For example, Magnatunes founder John Buckman[1] provides DRM-free music through his Website and says that if you buy a track, you are allowed – and encouraged - to share it with three people at most.

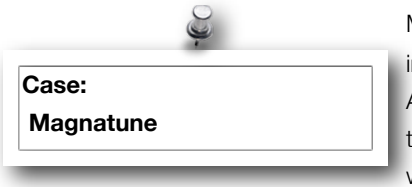
Beyond IFPI

Discography industry stakeholders concentrated their energy in fighting piracy and file sharing, as the real threat to their survival. Nevertheless, since 2005 new forms of innovation have been deployed and have blossomed on the Web and beyond industry bounds: Jamendo, Magnatune, Sellaband, Indy, Last fm, Sounddogs, BeatPick, Music4iPod, etc. Particularly interesting are the cases of Jamendo and Magnatune.



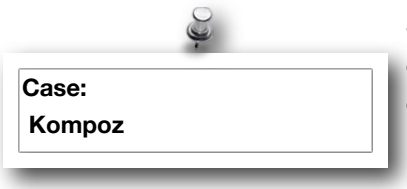
The French music-sharing site Jamendo has released 9744 albums by 5586 artists thus far with one of the Creative Commons Licences, which means that everybody is allowed to download the music and at least have free, legal, and unlimited access to it.

Each artist can choose between two revenue programs: 'Donation' and 'Revenues Sharing'. With 'Donation', Jamendo enables all users to make a minimum €/$5. donation to the Artist. Jamendo retains 50 cents for financial fees and the remaining sum goes directly to the artist. Within the 'Revenue Sharing' program, Jamendo shares 50% of its advertising revenues with the artists. There is no information available about revenues for the second program. As for the first, we can see from the Website that 2,270 fans have donated an average of €/$11 each to 630 artists since June 2006 (see table on donation choices by fans). €/$40 on average per artist is not a great deal so far, and as we have said, we know nothing about the alternative Revenue Sharing program. Nevertheless, Jamendo is a company of 20 paid employees and provides a six-language service to 352,349 registered users, who have written 59,074 album reviews. In August 2007, thus within one year, Jamendo distributed 4,253 albums (50 different genres) in 26 available languages. By contrast, in 12 months (2007), EMI Music France, Sony BMG Entertainment, Universal Music France and Warner Music France together only managed to promote 76 new signatures (first commercialization – national and international).



Magnatune is a slightly more sophisticated model offering a DRM-free distribution and intermediation platform for independent artists. All the 128k mp3 are available under Attribition-NonCommercial-ShareAlike Creative Commons licence. Users can listen to the radio stations and download the music as many times as they want. Derivative work is also allowed and some artists publish lyrics, MIDI files, samples and track-by-track audio files, i.e the bricks the song is made of. High quality albums are downloadable at a low price ranging from 5 to $18: it is up to the buyer to determine the exact price. The user is allowed and encouraged to share the album with no more than 3 people (see DRM chapter). The fastest growing and most profitable business area, nevertheless, is the sub-licensing of music for commercial purposes (trade shows, advertising, websites, etc.). Magnatunes provide a smart and automated platform to calculate the price of the agreement. The website says "Because we've automated the licensing process, Magnatune's prices are about 30 percent lower than industry standard." The automated system does not require any negotiation. Illustrious Magnatune clients include Gearhead Pictures (Blair witch project), Renault, Hitachi, Regal Entertainment, Publicis Net, Central de Comunicacao (Portuguese ad agency), @www (Australian ad agency). In both revenue models (from cd sales and sub-licensing agreements), the author receives 50% of the earnings and does not lose any degree of control over the music.

[1] How does he intend to enforce this restriction without DRM technology? He writes in his Website: "You've always had the capability to copy anything you bought from Magnatune. We don't believe in copy protection and we think you're honest, otherwise you wouldn't be bothering to read this! Dishonest people can always abuse the system. Rather, we want to reward all the honest people who truly want to do the right thing. If you abuse our generosity, we're not going to break down your door and throw you in jail. We just want you to feel a little guilty about it. We're trusting you to do the right thing, and introduce new people to the music you love. You'll feel good about it, your friends will thank you, and you'll help Magnatune prosper."



Suitable licensing policies are not only designed to encourage the circulation of music content and put musicians in contact with their audiences, but also to enable collaboration among artists. A typical music track, in fact, is a collaborative effort. Platforms like kompoz.com enable musicians to start a music project/song idea and use the Web to gather contributors (e.g. a violinist or a drummer if a violin or a drum piece is needed to complete the master) Part of the Kompoz service offer is the 'Open Music Agreement', offering artists the legal platform to share their creations.

Music conferencing technology is ready and stable enough even for real time collaboration between music players, who can use services like Musigy (musigy.com) to realize live performances/music lessons/auditions/ jam sessions while being in different regions of the globe. Musigy is free to use and download, while the underpinning technology is secured by patents in the US and Russia (the developers' country).

Highlights Recorded Music

	TRENDS
Technological trends	
	• Web distribution channels for independent music with IPR solutions designed to put musicians in contact with the widest possible audience – while protecting their commercial interests. • wireless download of music on mobile devices (with 3G or Wi-Fi networks) • music conferencing technology, allowing distributed people to play together at the same time through the Web • distributed recording facilities in everyone's personal computer
Business trends	
	• à la carte' digital download (i-Tunes like, is the dominant business model • subscription services offering access to a variety of tracks with a periodical fee. Usually linked with ISP subscription fees or a particular device adoption (e.g. access to the Universal catalogue bundled with the purchase of a particular Nokia mobile phone) • advertising-supported services offering 'free' access to streamed or downloaded music (sometimes with suboptimal quality), also linked to social networks (to promote viral advertising). Ads can also be inserted in the tracks • donation-based services. Users sponsor independent music by voluntary donations. Music is delivered for free with flexible (Creative commons-like) intellectual property agreements and authors do not lose control over their creations (as if they had a traditional production/distribution agreement with a recording company). They can be combined with investment programs for advertisers or users as well (see Jamendo or Sellaband-like services) • flexible sublicensing platforms designed to facilitate the legal commercial exploitation of independent music (see Magnatunes-like services)
Trends in user involvement in creative content production and distribution	

	TRENDS
	• users as listeners and music fans have the possibility to listen to a great variety of independent music and to sponsor their favourite artists through donations or viral marketing actions • users as independent producers have the possibility to distribute their music through devoted services and to licence it for commercial exploitation to interested customers without relying on the intermediation of a recording company and without losing the control over the exploitation of their own music

4.2.1 Digital radio

Digital radio refers to digital technologies delivering information as a digital signal through a digital modulation method. Digital radio broadcasting refers to one-way communication (one to many), as opposed to two-way communication (many to many, many to one). Especially in continental Europe, traditional analogue AM and FM bands remain by far the principal means of communication and are expected to keep a dominant position for the next ten or even fifteen years. The most relevant digital platform technologies for the distribution of radio are:

1. Broadcast digital radio for dedicated receivers of digital radio (Digital Audio Broadcasting, Digital Radio Mondiale, IBOC/ HD-Radio, Mobile satellite Radio)

2. Broadband Internet: Fixed (DSL, Cable), Wireless (WLAN, WiMAX), Mobile 2.4/3G (UMTS, HSPDA, EDGE)

Broadcast digital radio

The DAB standard was developed in the 1980s as part of the Eureka 147 project in order to replace current AM and FM analogue systems. Compared with AM and FM reception, DAB is supposed to provide high quality radio, more choice of programmes, and superior reception in cars and portable radios, although the promised performances are sometimes unmet due to the low bit rates. Because of similar criticism of uncertain DAB performances, a new DAB+ standard has been proposed, generating uncertainty and confusion among broadcasters and adopters.

In 2006, DAB technical coverage ranged from the 20% of Austria to the 98% of Belgium, although a high coverage does not imply a high adoption. In Germany, for instance, even with a 82% coverage, only 200.000 compatible devices have been sold until the end of 2005. In the UK, which shows the greatest use of DAB, more than 11% of the population in 2006 lived in a house with at least one DAB device. In the UK, about 420 radio services are transmitted via DAB. The BBC services transmitted via DAB are also broadcast via Internet and via Freeview, the UK free-to-air DTT/DVB-T service.

The United States is not using DAB, but a proprietary system called IBOC (in- band on-channel technology), which has also been tried in Switzerland.

Digital Radio Mondiale (DRM) is another example of in-band on-channel technology to broadcast both digital and analogue signals at the same frequency, making the switch-over much easier. At the moment, the DRM standard is not suitable for Europe because it is only used in shortwave frequencies. However, the DRM+ standard may be able to broadcast even VHF frequencies (but not before 2009).

Because of the uncertainty about IBOC, DRM+ and DAB+, DAB is currently the dominant standard in Europe.

Further problems regarding the adoption and diffusion of DAB digital radio are:

- low sound quality (lower than traditional FM reception);
- lack of devoted content. Together with the lack of sound quality, this means the customer is unable to recognise the added value of the new platform;

- cost of receivers too high (€80-€150).

The automotive industry is a determinant stakeholder as well, but the effort of car manufacturers to make the switchover is also hampered by the lack of a convincing standard.

The economics of Web radio

As opposed to traditional or digital broadcasting the cost of streaming a Web radio increases with the number of listeners. This means that revenues are often unable to cover costs. To control the costs, some Web radios are forced to limit the number of listeners (e.g. on a geographical basis). Furthermore, some radio broadcasters decide to have a Web radio as a marketing strategy to look new, and not as a side business.

The problem of economic sustainability is due to the different technology, which has high variable costs, and to the revenue model, which needs to be improved. The traditional revenue model is in fact based on the support of local / national advertisers, who are not interested in advertising their products to international or interregional costumers. Targeted advertising could be a possible solution to this problem. In addition, traditional methods of audience measurement (which regulate the agreement between the service provider and the advertising companies) are inadequate for the new medium. From the technological point of view, the use of P2P networks instead of broadcast streaming services could be an opportunity for Web radio as well (see Web TV).

Another factor potentially hindering the diffusion of Web radio as a real alternative to traditional AM/FM radio is the lack of really portable receivers so people can listen to the radio anywhere in the house. Such devices should be smaller and cheaper than a PC. Moreover, how to use Web radio in cars is still an unresolved technical problem.

Podcasting

By podcasting, we refer to the distribution of radio content packaged in downloadable episodes. Usually episodes are downloaded automatically in MP3 format to the PC through RSS feeds and then transferred to the portable music player so they can be listened to while on the go, which is why podcasting can also be called a mobile radio service. Podcasts do not have the same economic problem as radio streaming because the content is downloaded. They are considered an opportunity for traditional radio broadcasters because they are a great opportunity to offer radio content for niche audiences. They are also a good, new way to generate ad revenues provided that another suitable method is found to account for audiences. Newspapers and magazines (e.g. The Economist) also provide audio versions of their texts or recorded interviews through podcast. But users can also podcast language courses, short videos etc. Goldmedia expect an exponential growth of podcasting listeners.

According to PQMedia, Podcast advertising spending reached $3.1 million in 2005, and is projected to grow at a compound annual rate of 154.4% between 2006 and 2010, when it will be larger than the blog market.

User-generated content and podcast

Podcasting is mentioned among the distribution platforms of user- generated content, but compared to blogging, it is a more complex activity because it requires more time from the creators and is not as appealing to the ‘consumer’ as blogs are. Nevertheless, this situation is expected to change. Blog advertising, in 2005, accounted for 81.4%, or $16.6 million of total spending on user-generated media advertising, but it will comprise only 39.7% in 2010, when podcasting is expected to surpass it. The blog phenomenon is already being undermined by rich messaging / status update services like Twitter.com. Instead of extended pieces of texts, users seem to prefer to publish short messages about their feelings or their status – where they are, what are they doing. The future of podcasting could either run in this direction or as a substitute for the extended blog content.

Mobile digital radio

By mobile digital radio, we mean radio services using 2.5/3G networks like UMTS or HSDPA, mobile services using DAB technology, mobile services based on the DVB-H standard, services using a combination of broadcasting and broadband standards, services complementing FM traditional transmission with additional multimedia content and satellite services.

Satellite radio providers like XM and Sirius are driving mobile radio usage in the US, while they are all but absent in Europe due to huge language fragmentation, As a result, in 2005 there were more than ten times more weekly mobile radio users in the US than in Europe, were the penetration of mobile radio services accounts for only 0.04% of the population.

Although devices like mobile phones equipped with mobile broadband technologies are not very widespread in Europe, frequent replacement of the installed base thanks to network operators subsidies could rapidly solve that problem.

Highlights Digital Radio

	TRENDS
Technological trends	
	• Digital radio broadcasting for dedicated receivers of digital radio. DAB/DAB+ is the candidate standard in Europe, but it seems to perform less well compared with other competing standards like DRM, DRM + and IBOC/HD-Radio. Satellite radio is not economically convenient because of the huge language differences within the European territory (it is widespread in the US) • Web radio through Internet broadband connection, fixed (DSL, Cable), Wireless (WLAN, WiMAX) and mobile (UMTS, HSPDA, EDGE). Mobile phones equipped with broadband technology, for now, are not widespread in Europe for now. • P2P radio is a Web radio relying on a P2P network for bandwidth connection (like P2P television) • RSS feed technology is important as being complementary to radio pod-casting.
Business trends	
	• The DAB adoption is still very low at the European level. The sound quality is lower than traditional FM reception and there is a lack of devoted content. Furthermore, the cost of receivers is very high with respect to traditional receivers. The higher potential of competing standards introduces uncertainties into Governments, which are reluctant to provide financial help, and in car manufacturing companies, which are crucial stakeholders in digital radio adoption. • On-line radio has been very successful among Internet users, who are expected to continue to grow with Internet broadband coverage. The cost of streaming radio content trough the Web is increasing with the number of listeners, so that revenues from advertisers are often unable to cover costs (especially for small local players). Geographically targeted advertising and the use of P2P technology to stream content could be two opportunities for small, local radio stations to consolidate their presence on the Web • Podcasting of radio content is expected to grow at a compound annual rate of 154% until 2010, and to surpass blogs as an investment field for advertisers. Since the content is downloaded and not streamed, podcasting is suitable for small content providers. Nevertheless, because of the unsuitability of major music licences, podcasted content rarely includes music. The diffusion of alternative (CC-like) licences for music content distribution over the Web could overcome this problem.
Trends in user involvement in creative content production and distribution	
	• User-generated podcasting is expected to become more popular than blogs • P2P Web radio can run at affordable costs and can be viewed as an update of amateur analogical radio, but with a broader audience • As a two-way communication channel, the Web allows for greater interaction with listeners

4.3 Publishing

The publishing sector includes newspapers, journals, periodicals and books. ICT is impacting the traditional distribution of written information in the various ways. As for newspapers and periodicals, the content of the paper edition is being duplicated in the Web through digital editions. Here the issue is how to manage the duplication of ad spaces as well, considering the fact that Web editions are mostly 'for free'. Opportunities for users are the ubiquity of information sources, the digitalization of archives and the possibility for everybody to access and search them. Radical innovation of the relationship between journalists/reporters and audiences concerns the citizen journalism phenomenon and the rise of a new 'on-demand' funding model. As for academic journals, the open access movement is raising the issue about the obsolescence of the traditional model to manage academic publication, which, so far and thanks to the digitalization, demonstrated to be very profitable but controversial and unsustainable. Regarding books, the sub-sector that experienced the worst production crisis within the last 10 years, at least at the European level, the major innovations driven by digital technology are the introduction of the e-book and the print on demand phenomenon; the diffusion of the e-book is growing, while the underpinning business model is still uncertain – especially concerning the technological and economic bundle with the Electronic Paper Display. The PoD is mostly the symptom of the narrowing distance between writer and audience which will force editors and collective societies to review their roles and strategies.

Regional relevance of the 'publishing' sector:

- ***Current stated perceived advantage Baden-Württemberg and Piemonte***

4.3.1 ICT driven Challenges to newspapers and periodicals

The newspapers and periodicals market in Europe is geographically confined because of language barriers, tight distribution schedules and a fast rate of obsolescence, while books can be translated into other languages and go across country borders.

Citizen journalism

The Blog phenomenon, when thousands of people around the world report and comment on their life, but also on issues of public interest, and the diffusion of mobile Internet connectivity allowing ordinary people to act as reporters, have hugely amplified sources of information and challenged the role of professional journalism / reporters. In reporting the consequences of a local earthquake in China, for example, a journalist in London obviously cannot compete with a person living in China. Indeed, wherever a reporter may be, another person will likely be closer to the 'hot' location. Nevertheless, professional journalism and so-called citizen journalism can be complementary. Newspaper websites have already enabled users to edit news and/or to video report from the news location, and blogs are among the information sources for journalists. Global Voices (www.globalvoiceson-line.com), an independent project started by the Berkman Center for Internet and Society and supported by Reuters, among others, is perhaps the most structured balance between professional and citizen journalism. Regional blogger/editors and translators are engaged and organized – for money or on a voluntary basis – to select, verify and collect 'user-generated' news from around the word and translate it into several languages.

Another hybrid model that is going to be tested starting in the Fall of 2008 is called Spot.us. The basic idea is to allow individuals or groups to use a crowd funding mechanism to 'hire' a freelance journalist to investigate an untold story in a local community. Called 'community-funded reporting', it is supposed to work in conjunction with "local media outlets to have the articles published more widely" (http://spot.us).

Advertisement

The big challenge for publishers is to recover possible losses by capturing advertising investments within on-line activities. The race is not easy, considering that search engines already have from 30-50% of the market (depending on countries) and that various kinds of content such as music, videos, and blogs contend for the rest. Unless the advertisement pie becomes bigger, from the industrial point of view this competition over advertising resources could lead to a concentration trend that is in complete opposition to the diversification of players that the Internet arena would suggest having low market entry barriers due to reduced distribution costs. One possible evolution is targeted advertising, which refers to the possibility of identifying the users (their location, interests/tastes, buying habits, etc.) and delivering them focused advertising suggestions. This

would encourage advertisers to pay more and would also make it convenient for local companies to enter the field of Web advertising. While there are some obvious privacy issues to deal with, users seem to feel comfortable with this practice and to find it useful to find product and services they are searching for (NetObserver 2007 a-b, see section on Advertising).

Blogs

A recent study (NetObserver, 2007) reported that more that 17% of Internet users in the selected countries (except for Germany) have been updating a blog/personal page in the last 12 months (25% if we consider people aged 15-34); and more than 10% of Web surfers have published a piece of content on user- generated websites like Wikipedia. A survey by Telegraph Media Group in the US, the UK and France (2006) reveals that in every country the readership of blogs is much higher than for newspapers. More interestingly, comScore analysed the appeal of UGC sites with respect to non-UGC ones, and collected the data presented in Table 4. The attractiveness of UCG may be why traditional media corporations (like News Corp) are acquiring sites like Myspace.com.

4.3.2 ICT driven Challenges to books

The business model underpinning the publishing of books is mostly based on sales volumes. Trade books (for general customers) are the largest category, followed by educational books: McGraw-Hill Education is the fourth largest publisher internationally (Peresson, 2007).

e-books

Electronic books are books in electronic format (PDF / HTML / TXT / JPG / BMP/ PNG) designed to be read through electronic viewers like pc, mobile phones, handhelds and Electronic Paper Displays (EPD). EPDs are designed to replace paper in terms of reading quality and comfort. They are extremely thin, they can be read in bright sunlight, from any angle, and since they do not require power to maintain the image, they can work for long periods without recharging batteries. When Sony launched the Librie in Japan several years ago, its success was probably hampered by the use of a strong DRM policy (only one encrypted format was readable) and by the fact that the titles were only available from a Sony content store initially. Since November 2007, for $359, Amazon has been offering its Amazon Kindle EPD, able to buy and download books in proprietary Kindle format (AZW) or in plain text. In 2005, Philips presented a new model of EPD called ILiad, which can read different formats and is equipped with a Wi-Fi port in order to download the content straight to the device, as in the case of a newspaper subscription. In 2006, in collaboration with Philips, the Italian newspaper “La Repubblica” started an e-ink edition downloadable daily on the ILiad through the Wi-Fi or Ethernet connection. In June of this year, La Stampa, another Italian journal, and Simplicissimus, a provider of content optimised for EPDs, opened the same delivery channel. As a result, users can now have 2 newspapers in the same EPD.

As for books, several e-book stores are already on-line. Kindle e-books now account for 6% of the sales of the 125,000 titles available in both print and electronic formats. Kindle is mainly criticized for its DRM closed technology binding the contents to the provider Amazon, which had an 80% share of on-line book sales in 2007 (85% in 2006); the main roadblock to the diffusion of EPDs, on the other hand, is the price, which remains high considering that it is a single-purpose device. Some of them are able to record notes, but the requirement to be power-independent almost like a piece of paper cannot be maintained if other power-expensive functions are running at the same time. The price of a full-options iLiad is €599 (€499 without Wi-Fi connectivity). On the other hand, the commercial success of expensive single-purpose devices like the iPod does not exclude the possibility that there could be a boom of e-books in the near future despite the price. This boom could well be driven by educational texts, especially if we consider that the propensity to read peaks between 11 and 17 years of age (around 60-63%), i.e the digital-born generation.

As The Economist points out[2], an economic slowdown may encourage the adoption of the new technology since paper and cardboard printing, storing and shipping costs are on the rise. A Kindle bestseller can be downloaded in less than a minute for $9.99, while the discounted paper copy of the same book can be delivered to American customers for $16.77. At the moment, however, the discounted price seems to be well below the price Amazon pays to publishers. The Amazon strategy

[2] See ‘Unbound’, The Economist, 5 June 2008 http://www.economist.com/business/displaystory.cfm?story_id=11504752

behind that temporary loss – recalling Apple's i-Tunes/i-Pod one – would be to would be to expand Kindle's penetration and then to use the popularity of Kindle as a lever to demand that publishers cut prices[3].

SMS-books

The publishing of books / short stories through SMSs was quite a phenomenon in Japan, which has the peculiarity that people access the Web mainly through the mobile connection. Short stories written by means of SMS have also been published as real books, quickly becoming top-sellers in the Japanese bookstores (Koizora, released in October 2007, totalled over one million copies). While the same phenomenon has not been replicated elsewhere, this is an evidence that media may not compete over the same content (as it is apparently the case of newspapers), but they could be complementary.

Regardless of whether the SMS book becomes a stable genre of convergence literature, technology is having an effect on formats. "Serialisation is making a comeback: a firm called DailyLit divides e-books into small chunks for drip-feeding by e-mail. Harlequin, a Canadian publisher of romantic fiction, sells short-fiction e-books for reading on PCs or other devices in a lunch hour. Last autumn the firm, which sells around 130m books a year, became the first big publisher to offer its entire catalogue in both printed and digital formats. Brent Lewis, who runs Harlequin's digital business, says his firm's digital readership is composed of the same middle-aged women who read its printed books" (The Economist, 5 June 2008). The recent debate surrounding Marianne Wolf's book "Proust and the Squid: The Story and Science of the Reading Brain" has been arguing whether the Internet is wasting human concentration, presumably diminishing the ability to read long texts and encouraging the production of shorter and shorter writings. Certainly, short writings have never been appreciated by traditional editors. The optimistic argument about the proliferation of short texts on the Web is that Internet is a channel that is complementary to print rather than a cannibalistic substitute, and that it is 'only' giving short writers the opportunity to emerge and find a way to reach their audience.

It is still unclear whether digital copies of books and writings in general can be considered substitutes for paper versions, or if they make the owner want to own them physically: digital formats are not forever. The fact is that despite the wave of digitalization, the yearly consumption of paper per person, which was 100 kg in 1992, increased steadily over the years, arriving at 132 kg in 2005 (http://earthtrends.wri.org/).

Self-editing and self publishing

If a Web user has the content (pictures/images and/or texts) and he wants to publish it in a book-like edition, he can do so and sell it as well. Services like mybook.com allow everyone to collect, organize and print digital memories (pictures in particular) into a physical book. Flickr (flickr.com), the popular Yahoo photo-sharing service, offers people the possibility to print pictures in several physical outputs such as business cards, posters, albums, books, in cooperation with print companies like Moo, Blurb or ImageKind. A growing number of services allow authors to print a real book starting from the manuscript. The website ilmiolibro.it allows Italian users either to print the book for personal pleasure or sell it on-line at a price of their choosing. Customers can read a free PDF preview (usually the first few pages) and write a review encouraging other people to read the book or not. Print on Demand (PoD) technology is still not very visible, but it is showing signs of growth. Once again from The Economist: "Stephen DeForge of Ames On-Demand says his POD business, which specialises in printing small runs of customised books for schools and universities, has been growing by 45% a year since 2001. Last year his firm printed more than 800,000 books in runs as small as ten copies at a time."

Internet is opening up new alternatives for the dissemination of culture. An increasing number of artists, writers in particular, are considering Internet distribution as a way to improve their visibility and marketability. Rather than an alternative to print, Internet is seen as being complementary because the Web reaches places where printed editions and distribution systems do not. New licences are emerging to protect certain rights associated with the content and to increase the accessibility to it through the Internet.

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[3] http://www.nytimes.com/2008/06/02/books/02bea.html?_r=1&pagewanted=1&_r=2&sq=kindle&st=cse&scp=1&oref=slogin

4.3.3 Academic journals

The economics of a scientific journal is very peculiar with respect to other kinds of published content. First of all, authors receive no monetary compensation for their published works, but rather career incentives, visibility and a reputation within his/her scientific community. Paper reviewers, or rather those who assist the author throughout the editorial process, are not paid either since they are colleagues volunteering to make the dissemination machine work properly. It is a sort of gift economy, because sooner or later each author plays the role of reviewer and vice versa. Nevertheless, as Elsevier's revenues show (25% market share of academic publications), beyond this eco-system driven by delayed returns incentives instead of monetary compensation, money is not lacking. The target customers of the publishers of academic journals are universities, research centres and enterprises (to a lesser degree), which usually pay a subscription so their staff can access the electronic edition of the journal. Distribution, to date, is basically electronic.

Internet is now offering researchers unprecedented opportunities not only to increase the circulation of their studies and provide greater access to the results, but also to improve the search method itself (not merely by title or key works, but by searching the complete text of the paper, provided it is free to access and not locked by a walled garden/ subscription model). To date, about 10-15% of journals are Open Access, i.e. offering free, immediate, permanent, full-text, on-line access, for any user, anywhere on the Web.

Highlights Publishing

	TRENDS
Technological trends	
	• E-book: digital, sometimes encrypted copy of a book. Sold by Internet book stores for fruition by bundled (like Amazon / Kindle) or multiple Electronic Paper Displays (EPDs) or by other mobile or fixed screens. • Electronic Paper Display: portable display designed to replace paper in terms of quality reading and comfort of reading. They can be provided with a Wi-Fi connection enabling them to download e-books, e-journals and other kinds of writings. Their hard disk capability and adds-on functions (possibility to take notes and so on) have to be balanced with the long-time battery requirement.
Business trends	

	TRENDS
	• The paper copy of certain writings (be they books or newspapers) must be changed and customized for an EPD reading. This is a new field of specialization for small start-ups. • Print-on-Demand (POD): more than a technology, it is a new practice, enabled by the Web as a 'disintermediator' between the writer and the reader. The writer can order a printed copy of his/her writings, picture album or whatever from a website and sell it straight from the Web. Based on the intrinsic value of having a physical copy of objects, it is an opposing trend with respect to the e-book. • Citizen Journalism: business model based on a closer interaction between citizens, as a source of local and first-hand information, and professional journalists/editor/translators/reporters, as certifiers and analysts of the news themselves. It can be funded by donations of users – which pay to have an 'independent' journal or a 'private' reporter (e.g. Spot.us) or by donations and/or investments by news agencies like globalvoices.org. • Serialization is making a comeback: from sms books to e-mail feeding with chapters of novel, the technology is affecting the genres • POD: new forms of flexible IP licences designed to encourage the circulation of writings through the Web (without losing control over them) instead of hampering it via legal threats. They are challenging the traditional business model of editors, which should be re-examined from the bottom up. A great opportunity for small-time/alternative editors to try out new models to assist writers to capture audiences and profit from them • Academic journals, as we have known them, are outdated. Open access policies enabled by the Web as a medium and by the gift economy governing the research community are more in keeping with the mission of Universities to provide content and knowledge to humanity, without access barriers to it.
Trends in user involvement in creative content production and distribution	
	• Citizen Journalism, Open Access, and PODs (see above) are examples of how U/P interactions are transforming business models and creating new opportunities for small players, where big incumbents have failed to adapt.

4.4 Visuanimation: Gaming, Animation, Design and Architecture

Animation, Gaming, in particular serious gaming, and new Design&Architecture interactive methodologies are relying on the same technological developments for the future: the possibility to have interactive electronic objects allowing people to modify them and use them as a method of generative communication and interaction. For serious games, whether they are on line or off line, objects are modified by users or groups of users in order to have a reaction and learn/assimilate something (like a virtual person in an emergency simulation game). In interactive design, modifiable 3D objects allow the complex and interdisciplinary community of designers to interact over common models of reality, deploy concepts, apply ideas and share a common wisdom through a sort of virtual prototyping. Haptic technology is also being experimented in both application and technology fields as neuro-controllers, developed as user-computer new generation interfaces while playing a game, can be easily seen as a central tool in the user-centered design practices. The technology and skills to build the future of digital entertainment (in case of Gaming and Animation) , education and training (in the case of serious gaming) and of design, have a common origin. As for Architecture, which is the application of Design to big and complex projects of physical infrastructures, the same technological opportunities serve the need for co-ordination, organisation and interaction of a very large amount of data and people.

Regional relevance of the 'gaming & animation' sectors:

- ***Current stated perceived advantage for Baden-Württemberg, Piemonte Rhone-Alpes and West Midlands; Stated aspiration for Baden-Wurttemberg, Piemonte, Rhone-Alpes and west Midlands***

4.4.1 Gaming and Animation

In June 2008, PricewaterhouseCoopers released its latest forecasts on the video game market, including consumer spending on console games, handheld games, personal computer games, on-line games and wireless games, as well as video game advertising. The video game industry is expected to grow from $42 billion in global sales last year to more than $68 billion in 2012, with a compound annual growth rate of 10.3%, better than all other media sectors.

Consoles

Console gaming can be portable or not. The market of fixed console gaming is dominated by three new generation platforms (identified with hardware manufacturers): Nintendo Wii, Sony PlayStation 3 and Microsoft Xbox360, while the market of portable players is currently split between Nintendo Dual Screen and the Sony PlayStation Portable. This means that a content producer has to release the content in one or more proprietary formats if he wants to distribute it to the users through any of these platforms. On the contrary, PC platforms are open (anybody can make a program running on a Windows OS), so everybody can try to build a new game and enter the market by delivering it through the Web or through a retail channel without locking the content to any proprietary platform. In this respect, the expected fall in market success of the PC game is a bad signal for innovativeness and competition in the games market.

Online games

Both the three console platforms and the two portable platforms allow online games. Playing on line could mean streaming the content and starting a competition with the program running in the service provider server or engaging in the so-called Massively Multilpayer On-line Gaming (MMOG) experience, i.e. playing with or against other people. The Nintendo Wii platform for fitness exercises allows the user's avatar to run with/against a computer-generated 'friend' or with an avatar generated by a friend living and running in another flat possibly at the opposite side of the globe. In 2005, according to Screen Digest, the European market of MMOGs was dominated by a few leading players, almost entirely based on PC platforms and managed by subscriptions. While the obvious factor hampering the diffusion of MMOGs in Europe is the low broadband penetration, there other roadblocks, such as the huge language differentiation and lack of publisher expertise in managing and running large scale games. Users entering a community of players need to be supported (one support person for every 3-4 thousand subscribers) before (training), during (policy, dispute arbitration, event organization etc), and after the game (websites, forums, etc). The lack of such skills can force publishers to put boundaries on the dimension of the community in order to keep it manageable. World of Warcraft, from Blizzard Entertainment, is currently the market leader and responsible for the success of MMOGs in Europe, holding 62% of the total monthly subscriptions (17 million).

iTV games as an European strength

iTV games are broadcast through the digital television platform. They have been introduced by digital television operators in their content bouquet in order to attract analogue customers into the new market. Lately they revealed to be a market segment per-se, since customers proved to be willing to pay for them.

Neuro- controllers: just the fourth generation of gaming?

Customers of the third generation of consoles are now used to controlling the game without any button-pressing/holding/releasing, but just by moving their body (along with the console or consol peripheral device). While this feature is said to be the key to the success of the Nintendo Wii console, it will likely become obsolete very soon because a new generation of neuro-controller is entering the market. The first produced models look like light helmets, and although still imperfect, they seem increasingly capable of reacting to the user's emotions. Nevertheless, lead users have the sensation that although this technology is being tested and developed for gaming, once it is reliable enough it will be a breakthrough innovation as a secondary interface method for computing. A 'neuroheadset' provider, Emotiv Systems, has already announced that its device will be provided with software allowing user's music or photos to organize themselves according to the user's mood/emotions. It is also easy to imagine the impact of this technology on everyday life, the opportunities and controversial issues that it could arouse (e.g., the treatment of the tremendous amount of data generated).

Serious Gaming

Serious Gaming (SG), expected to be a US$1.5b global market in 2008, is being described by some analysts as the next wave of technology-mediated learning. While casual games are purely for entertainment and learning is a by-product, serious games focus on specific and intentional learning outcomes to achieve serious, measurable, sustained changes in performance and behaviour. Since the literature about it is very recent, some confusion still remains among different sources, for instance, on whether simulation – the use of 3d immersive environment reproducing the reality for learning – can be considered 'playable', or whether advertisement games –the use of engaging virtual world for promotional purpose – can be considered as SG or if a different category should be built.

As to whether a certain degree of playability is recognizable and exploitable, a SG can in general be devoted to several aims, such as:

- learning / training (learning games, edugames, business games, collaboration games, simulation..);
- information / networking (social information campaigns, social networking..);
- marketing (advertisement games, marketing research..).

Thus far, it not been proven whether SGs are more successful than traditional practice for learning. More research needs to be done on this subject, and comparison is complex. Positive results favouring the serious game approach are expected for under-served learners.

When serious gaming is applied in open educational fields like schools and universities, the issues of the open access of educational content, of standardisation of evaluation criteria and of possible uses of learner-generated material arise and are still unresolved. Both in schools and companies, skill and costs to develop such games are also a crucial issue. While producing a set of slides for a lecture/training session essentially required basic computer skills and elementary communication capabilities, being an expert on the particular topic to teach is not enough to build a learning game. Instead, it requires the collaboration of professionals from different fields: computer programming (C programming, Java script..), animation, art, story writing, database programming and so on. It also requires more time and costs, and consequently more accurate budget planning and time scheduling for the institutions involved. Another question debated is whether the learning goal could be compromised by the presence of advertisements in games, which would open or close a possible financing channel for game developers and companies/institutions using the game itself. Dealing with multiple virtual identities / avatars created by users of serious gaming is another issue that will likely need to be regulated.

Haptic computing and 3D immersive environments, while not yet at the stage of commercialization, seem to be the last frontier of the 'visualization' technique, enabling people to truly dive into casual or serious gaming experiences.

Animation

From the point of view of development skills, games and animated movies are very similar. The result is a balance between visualisation rendering, style, storytelling. While the game developers has traditionally been programmers and animation developers, coming from the word of analogue art, can ignore how to build a software, there will be an higher and higher convergence between the two labour intensive field. The direction of Animation sector could be represented by the strategic alliance recently signed between DreamWorks Animatios and Intel, with the aim of meeting the increased demands of creating 3-D animated feature films: Intel will provide DreamWorks Animation with the latest high-performance processing technologies, including future chips with multiple processing cores and DreamWorks Animation will enable its artists to work with new, state-of-the-art 3-D authoring tools to render higher quality images more quickly and to modify them with greater ease. From the technological point of view the two sectors, Animation and Gaming, because of economies of scope, are addressed toward an increasing convergence: games developers are making animated movies (at the UGC level as well, see the Machnima case), and viceversa. The field of 3D animation as well is contented between proprietary (like Maya) and open technologies (like Blender), which are more and more levelling their performances and are making the choice between them a matter of policy and organisational opportunities rather technological predominance.

Highlights Gaming&Animation

	TRENDS
Technological trends	
	• Third generation consoles (fixed and mobile) are already a widely diffused technology. The market is dominated by three manufactures each imposing its own standards, thus hampering the diffusion of new gaming content. The adoption of PC games (i.e. games developed for an open platform) is decreasing. All three generation consoles are connected to the Internet and enable the customer to play on-line. The Wi-Fi connectivity of mobile consoles is improvable. • MMOGs (massively multiplayer on-line games) are almost entirely based on PC platform. Nevertheless, except for "World of Warcraft", their diffusion through Europe is hampered by the huge language fragmentation and the lack of high level community management skills to look after players, to mitigate possible controversies and to glue them through common events. • Neuro-controllers are a possible technology suitable for the fourth generation of gaming. They can be applicable either to casual games, serious games or as a secondary computer interface. • Hoptic computing and 3D immersive environments, while not yet at a commercialization stage, seem to be the last frontier of 'visualization' technique, enabling people to truly dive into casual or serious gaming experiences.
Business trends	

	TRENDS
	• The market of portable consoles is the most vibrant one at the moment, while fixed consoles and pc games have lower (when not negative as in the case of pc games) growth rates. However, the market of portable consoles is dominated by closed platforms. • PC based MMOGs are a good opportunity for innovators in the game industry because there is a lack of 'soft' competences in managing communities, signalling a market possibility • Serious gaming is said to be the next frontier of technology-aided learning processes. Serious games can also be used for information/networking and marketing purposes. The diverse set of competences (from computer programming to story writing) to assist firms/schools in developing customized games are still lacking in the market and could be a good business opportunity for interdisciplinary start-ups. Learning measurement parameters still have to be standardized and the management of multiple avatar identities and the strategies to manage player-generated material still have to be identified.
Trends in user involvement in creative content production and distribution	
	• The higher the interactivity level of a game and the user's potential to generate developments in the game plot, the more the game is appreciated and valuable. This implies that a lot of material is generated by the user during each game and that the game is getting closer to (becoming) an animated and immersive virtual reality environment. Game developers have to create strategies to manage user-generated material/data and to deal with each single user's individuality instead of treating him/her as an ordinary, typical customer.

4.4.2 Design and Architecture

According to Bessant, White and Neely (2005) 'Design is the purposive application of creativity to all activities necessary to bring ideas into use, either as product (service) or process innovations'. For the UK Design Council, instead, design is 'an activity that translates an idea into a blueprint for something useful whether it's a car, a building, a graphic, a service or a process'. From the industrial point of view, design activities range from the 'hard sciences' – like engineering component design – to symbolic goods such as artistic artefact or graphic design (Tether, 2005). Design has great economic importance because it can affect product and process performances, product appeal to the market, productivity of an enterprise, usability of a service, comfortableness and climate of a working place, appeal and efficacy of a public space, etc.

Regional relevance of the 'Design & Architecture' sectors:

- ***Current stated perceived advantage for Piemonte and West Midlands;***
- ***stated aspiration for Baden-Württemberg***

Collaborative interaction design

Design can be seen as a very cooperative and collaborative activity performed by a community rather than a single person. The design community consists of a group of stakeholders possessing different skills in the various fields (e.g. domain experts, interaction designers, human factor specialists, interface developers, usability experts, user representatives and organization/company/institution management, etc.) contributing concurrently to the solution of a design problem. Such stakeholders, which do not necessarily need to be co-located, all share the same negotiation process when cooperation among members is needed to elaborate, define and specify a problem, and collaboration is required to solve it.

The process becomes more complex because community members may work on different levels of details, may employ different languages, use different representations of the artifact and be supported by different computational systems.

Such complexity can be supported by:

I. computer-based tools that either assist the individual activities of the members or the communication/sharing of models and ideas among them

II. a common base of knowledge, accessible to everybody within the community and increasable by everybody. Teams need to have the possibility to rely on a common and shared past design experience, design rationales and solutions, and to articulate them in a manner suitable for the next problem at hand. A common base of models and knowledge is the foundation of coordination and communication. Technology, as in (a), can help in sharing, reuse and expand the common knowledge.

From this perspective, Web 3D technology – the same that supports serious games environments – is an important aid for collaborative interaction design, allowing people to visually dialogue through interactive images.

Modularity of design modules, interactivity and immersive environments are the keys so that users can quickly learn how to express their needs and preferences about the products or services (e.g. a Web page).

In the case of the furniture or automobile sector, where every customer can customize the item he/she wants to buy according to his/her needs, the production system should be able to work in a 'mass customization' way. It should provide the user with design flexibility without making the cost of the final product increase by losing any of the scale effects of production facilities. The key to mass customization is product modularity. The more the product is modular, the greater the choice of components and adds-on; the closer the moment of assembly is to the distribution stage of the supply chain, the better the process work without increasing costs.

Rapid prototyping

The availability of models and designs over the Web, together with the growing ability of users to learn how to turn their needs into physical objects (empowered by Web 3D technology) is complementary to the usage of the possible DIY tool of the future: desktop rapid prototyping printers. Their cost is rapidly decreasing (Fab@Home for about $2,300, Desktop Factory 3D printer, $4,995) and they can either be seen as tools to bring customization at the extreme consequences and avoid the distribution process altogether (people in this scenario will be able to 'download' objects), or, combined with rapid 3D desktop scanners, as a complementary device to 3D visualisation while helping to design something.

The diffusion of haptic technology – already experimented within casual and serious video games – is also a possible aid in the visualisation, control and simulation of virtual objects and environments. The 3D fast modelling helped by haptic technology is already being used in professional design studios.

Architecture

The literature on how ICT enables the development of design practices is scarce, the same is true for architecture. Clearly, architecture has importantly benefitted form the diffusion of ICT as there is a functional relation between the two fields. From the point of view of the process, the peculiarity of Architecture with respect to Design refers to the greater amount of data and technical calculations required to validate the project, the highest complexity of the output, the highest fragmentation of the process and the highest importance of the complete and consistent exchange of data among the several parts the project is split on.

Inter-enterprise collaboration to deliver a one-of-a-kind product has gained momentum with the emergence of new information and communications technologies to support information exchange and collaborative work amongst distinct geographically dispersed entities. Typically, the modus operandi of such collaborations is that of the virtual enterprise. While relatively new to some industries, this has been a common mode of operation for the construction industry for long. ICT support for the construction industry to support its ways and modes of operation has however been lacking. While organisation specific proprietary tools do exist, those supporting inter-enterprise collaboration are not up to a similar par.

The development of ICT tools is going in the direction of helping several and complementary people to collaborate and consistently contribute to the same output without wasting development time and/or compromising the result. The Internet and the future Next Generation Internet (NGI) or Semantic Web will be the information infrastructure backbone for all communication.

As well as for Design, even the future of Architecture is strictly linked with enhanced visualisation technologies: the Augmented 4D (A4D) system for instance is a co-operative design system for the Architectural, Engineering, and Construction sector that integrates state-of-art technologies in the area of 3D Computer Graphics, Computer Vision, Augmented Reality, 4D Simulation, Human-Computer Interaction, Computer Supported Cooperative Work, Mobile Computing and Sensory devices. A4D's objective is to help the Architectural, Engineering and Construction sectors to build more efficiently, accurately, with lesser costs, in a manner that is more planned, safer, easier and humanized for all, by developing and introducing new augmented reality technologies and novel workplace design concepts in those sectors. A4D systems are based on the general adoption of multidimensional information exchange and visualisation in the life-cycle of architecture and building construction, within an e-work cooperative and interactive environment, establishing the fusion between the real and the virtual design and construction site workspaces.

Highlights Design&Architecture

Main trends driven by ICT	
	• Collaborative interaction design communities (consisting of a group of stakeholders possessing different expertise in various fields – like domain experts, interaction designers, human factor specialists, interface developers, usability experts, user representatives and organization/company/ institution management) need to be assisted by computer-aided tools in order to communicate, negotiate, coordinate and share models they are interacting with. Web 3D technology – the same one supporting serious games environments – is an important aid for collaborative interaction design, allowing people to visually dialogue through interactive images. • Rapid prototyping tools, more and more affordable for a consumer market, allow users to print a real copy of objects. A possible scenario is that users will download 3D models from the Web straight to the printer. • The diffusion of haptic technology – already experimented within casual and serious video games – is also a possible aid in the visualisation, control and simulation of virtual objects and environments. 3D fast modelling helped by haptic technology is already used in professional design studios. • As well as for Design, even the future of Architecture is strictly linked with enhanced visualisation technologies: A4D systems, for instance, are based on the general adoption of multidimensional information exchange and visualisation in the life-cycle of architecture and building construction, within an e-work cooperative and interactive environment, establishing the fusion between the real and the virtual design and construction site workspaces.

4.5 Advertising

Advertising is a prominent source of revenue for creative content production and distribution businesses because it relieves the user from direct payment and does not force him/her to make a portfolio choice in selecting content fruition channels. The diffusion of the Web as a distribution channel challenges traditional broadcasters because it attracts advertisement investments formerly concentrated in other channels (paper, television, analogical radios, etc.); at the same time it offers unprecedented opportunities for both big and small players. Big companies are involved in the race for the control of data left by users while surfing, because data are the most important resource to control the consumer market – whatever goods are at stake - and to organize advertisement investments. Small, local players, especially in Europe where language fragmentation is very high, can take advantage of targeted advertising opportunities and try to involve the user with a wide range of ad practices (e.g. viral marketing and ad games) to spread their message. Peer reviews are also crucial in addressing purchases. They are considered reliable by buyers and are seen by producers and distributors as a key tool for evaluating and adjusting the success of a given product. As the case of Machinima shows, when provided with suitable tools to generate content, users can play an even more active role in publicising the brand of a given company.

Regional relevance of the 'Advertising' sector:

- ***Current stated perceived advantage: Piemonte and West Midlands;***
- ***stated aspiration for MFG***

The IAB (Interactive Ad Bureau) Internet Advertising Revenue Report 2007 from PWC shows that Internet ad revenues in the US totalled $21.2b in 2007, 26% more than in 2006. Search revenues (ads placed on Web pages that show results from search engine queries) accounted for 41% of full year Internet ad revenues, Display ad (Web banners as well as interactive media that might include audio and video elements) for 34%, Classifieds (short textually based messages) for 16%. With respect to other ad delivery systems, Internet is the third best after newspapers ($48.6 b) and TV Distribution ($31.2b) and is followed by TV Networks, Radio, Magazines, and Outdoor.

On 2 June 2008, IAB also released the findings on 2007 European ad spending, showing that on-line ad continues to experience an average growth rate of 40% year-on-year across 16 EU countries. In 2007, the European on-line ad market was worth €11.2b, up €4b from 2006, and promising to close the gap with the US market value.

On-line advertising and users

In all selected countries, more that 60% of Internet users have used Internet to search for product information before making a purchase (70% if aged over 25). The same graphic shows that young European Internet users surf less for product consumption than their elders, perhaps due to lower purchasing power and a lack of adequate means of payment.

Viral marketing

Viral marketing occurs when a person voluntarily shares an advertising message he/she likes with others. Through the Web, ad message carriers are videos, flash animations, games or even text messages.

User generated advertisement

According to the same survey, more than 21% of French and Italian Internet users visited a company blog in order to collect information about a product. In all the countries, more than 50% of males aged 15-34 trust peer reviews and recommendations before making a purchase, and 15% of all those interviewed reviewed a product after purchase.

As for the UK, the Digital Entertainment Survey investigated how much social networks are influencing content discovery and, most importantly, content purchase. The result was that 30% of British people refer to peer recommendations, at least occasionally, when searching for new music and 25% for new movies or TV programmes.

The importance of user-generated product reviews is well perceived by many websites and on-line stores, which encourage customers to write recommendations. According to the data presented above, one reason is customer trust in peer reviews; voluntary reviews are also a powerful tool for collecting data about product manufactures and distributors.

Amazon Inc. owns the service called "The Internet movie database" (imdb.com), but the two sites are apparently not connected (e.g. through the possibility of purchasing a movie DVD directly from Amazon), perhaps because it would hurt the reputation of Imdb as a pure fan-to-fan initiative. The reason Imdb is a strategic asset for Amazon could be the control over data left by users. Imdb receives a good deal of very detailed reviews and each score is associated with the age and sex of the author. This likely enables Amazon to plan what to sell (or advertise for sale), to whom and when. It is also an example of the extent to which data voluntarily provided by users because of their passion to communicate with each other is important as a business instrument.

Amazon also offers Web domain owners the opportunity to spread advertising messages about books and other goods sold through the Amazon Web store. The user sponsors a link of the book in his Website and gets revenues according to the number of clicks on that link. The service is called Amazon Affiliate program; it is free to join but often the economic interest is embedded (surfers do not know that their click generates revenues for the Web page owner), and can be considered a combination of viral marketing and user-carried advertising.

Machinima and user generative entertainment as an ad lever

The Machinima phenomenon is another example of user-generated or interactive advertisement. Interestingly, music Majors sue unauthorised downloaders or remixers of music because they do not pay any royalties, however the same company (as in the case of Sony) do not sue people using the digital characters provided by videogames to create movies. The reason they do not, and in most cases the reason they purposefully created 'Machinima licences' allowing user communities to make movies and share them, is the huge advertisement campaign generated by the circulation of those videos through game players and beyond. Users' 'generative entertainment' is perceived as a marketing and advertisement lever, at least for video game developers and manufacturers.

The core characteristic of Machinima is that developers are forbidden to sell the movies or to make any profit from them. Machinima videos have now reached an outstanding level of quality, however, and if the 'non-commercial' constraint is not removed, it is said it will hamper the Machinima phenomenon and possibly hurt the reputation of the game companies and their profits as well.

Several companies are leveraging the same creative potential for users to generate advertising concepts and videos.

Targeted advertising

Targeted advertising consists in customizing ad messages to suit the potential user's needs so as to show the user what he/she wants and increase the possibilities of a return on the ad itself. It has always been a common ad practice with all delivery systems. Targeted advertising relies on behavioural data collected from users or contextual data extracted from the environment and suggesting clues on attendees preferences. It is well known, for instance, that supermarket fidelity cards on supermarkets are used to collect data from identified customers and address targeted ads to them. Fidelity cards can also be considered as an example of a major impact of ICTs on advertising, they have reduced the cost of collecting data tremendously, which in off-line analogical environments has always required enormous effort in terms of time and money (see costumer survey, trial groups, etc…).

Within the Web, behavioural (which uses information collected on an individual's Web-browsing behaviour) and contextual (based on the content displayed to the user) targeting has become a huge and feasible opportunity for advertising agencies and companies.

The user profiling through data voluntarily or unconsciously left by Web browsers is also an opportunity for small local companies, which have thus far experienced uncertainties in exploiting the potential of the Web as a global delivery service. Which is the reason of the difficulties of local radio in switching from an analogical local advertisement model to the global arena of the Web.

AdSense (https://www.google.com/adsense/) is the Google targeted advertising generator service for anyone willing to host – and possibly profit from - ad messages on his/her personal Webpage. Google tracks how many clicks each ad link totals in a given person's page and calculates revenues accordingly. Another common revenue generator for the owners of personal pages is to include a Google search box in the pages themselves and earn through the results of Web searches (when

people search from the Website, the search result page shows up with ads and the owner of the domain gets paid when people click on these ads). Google AdWords (HYPERLINK "http://adwords.google.com/" http://adwords.google.com/) is the dual service, allowing advertisers to show their links through the AdSense target ad service.

AdSense and AdWords, or the so-called 'Google Cash' duo, were released in 2002 and have been called a killer ad tool for small businesses.

Targeted ads can also come with the book itself: Studentsupport.nl is a Dutch academic editor who is providing students with free e-books with targeted ads inside (relative to subject, buyer's age and language).

User perception of on-line advertisement

According to Novatris/Harris Interactive - NetObserver Europe (December 2007), with the exception of the United Kingdom, 15-24 year olds are less interested by most of the advertising that they see on the Internet than those aged 25 and over. Moreover, fewer of them think that advertising helps them find the products and services they search for compared to those aged 25 and over. The report point out that interactive advertising (through games), participatory or 'user generated' advertising (through calls for contribution), as well as viral marketing, could be strategies that will enable young people to appropriate the commercial messages, and therefore increase their effectiveness. Furthermore, since young people are the main users of the new features of 'Web 2.0', the main challenge for E-marketers is currently to find alternatives to traditional display advertising an to deliver users efficient commercial messages without encroaching on their 'private spaces'.

Despite this conclusion, the survey shows that it is only in France that young users show more preference for interactive advertisement in personal spaces than older users.

Advertising is a source of revenues for many Internet-based commercial activities. Users are usually asked to provide data – through an explicit registration process or simply through browsing - and they get back the service that is paid for by advertisements organized and addressed according to those data.

Traditional media providers are concerned by the shift of ad investments from traditional deliveries (e.g. press, TV, radio) to the Web. Furthermore, they seem to compete for advertising resources and struggle to concentrate the control of different Web services under the same ownership (different websites, same owner). All these concerns about the control of ad shares derive from the assumption that the ad pie is going to have the same size in the future. However, it is possible that new advertising methods will attract more investments on the Web – especially from small companies; and the size of the pie could increase thanks to micro and more creative advertising initiatives, to the benefit of small Web ad-based entrepreneurial activities (e.g. small local radio stations). Google AdWords allows advertisers to select the targeted area (a region, a city or even a suburb) so that the ads only appear to surfers who come from the selected areas, The fundamental conditions for this to happen are:

- the diffusion of broadband connections throughout the population
- the diffusion of digital literacy and technical skills in small and medium enterprises
- the elaboration and diffusion of techniques to measure digital marketing performances.

Highlights Advertisement

Main trends driven by ICT	
	• Advertising is a source of revenues for many Internet based commercial activities. Users are usually asked to provide data – through a explicit registration process or simply through browsing - and they get back the service paid by advertisements organized and addressed by means of those data. Since 2002, this principle has been at the basis of the most common ad practice, i.e. targeted advertising. • Viral marketing consists in making the advertisement so appealing to users that they exchange the message through their own voluntary effort. E-mails and Web social networks help the ad to have faster and more widespread circulation (video-ad, game-ad, music/jingles-ad). • Peer generated ad: social networks (horizontal communities) and groups of users (vertical communities) exchange opinions, feedback, recommendations about products they use. Peer-reviews are highly regarded by users planning to make a purchase, but also by companies, which examine them to collect valuable feedback in order to assess the success of their production and to plan future activities. • Ad games: they are a declination of viral marketing, leveraging on the entertainment power and networking potential of video games. • Ad within videos/songs/games: it differs from the previous case because the ad is not the purpose of the game, but the way to fund it, reducing the customer's upfront cost. The ad can be positioned before a song or a video, or can consist in specific branded products that make up the scenario of a video /videogame. • User generated ad: Ad goals can also be achieved by giving users the tools for producing something they are fond of. The Machinima phenomenon is a case in point. Game companies release 3D contents of games so users can make - and circulate – animated movies with the characters and scenario of the game epopees. Another example is the cinema festival, where the assets (or the subject – for instance a car) must come from a specific brand. How to manage the rights over the new content produced by users and the possibility to exploit it commercially – through a sort of users' spin offs - is still an open issue.

5. Conclusions

The aim of this report is to discuss the impact of Technological trends on Creative Industries, that here are intended to be: **Cinema/Television/Video Production and Distribution**, **Publishing**, **Recorded Music and Radio**, **Game and Animation**, **Design&Architecture** and **Advertisement.** Specific emphasis is placed on those technology-driven evolutions that offer opportunities for small and medium enterprises and users to deploy their economic potential. Information and Communication technologies, in fact, are making the distinction between users and producers of creative content more and more functional rather that actual. The same people that listen to the radio or watch a movie, can easily find the resources to create and distribute a Web radio or a short movie, becoming an entrepreneur or collaborating with a larger production. In most of cases we describe the digitalization as a process, not just a result, since at the moment content is provided to the user both through digital and analogical delivery systems. It is not possible to say if such a process will end with a complete digitalization of all content or whether the digital and traditional supports will co-exist and for how long. In many industries there are different technological, economic, social and cultural factors hindering the complete digital switch off; new business models are in a trial phase; old business models are still alive or struggling to survive; technology opportunities are experiencing an unstoppable change, continuously modifying the economic feasibility of a service/product and the production/distribution opportunities for all stakeholders.

Despite such a fluid dynamic in Chapter 3 we recognized four main information and communication technological trends that are possible candidate to trigger future innovations in Creative Industries. These are:

- Trend 1- **Digital distribution and shareable content (e.g. P2P networks, High capacity broadband internet, Mobile broadband data connection):** While the paradigm of pre-broadband era was centered on accumulation of data, the competitive factor to date is the amount of data deliverable and sharable in a given time frame. The new paradigm is called 'Cloud Computing': no matter of where the information is stored (in servers on the Internet and cached temporarily on clients that include desktops, entertainment centers, tablet computers, notebooks, wall computers, handhelds, sensors, monitors, etc), the crucial factor is how it is reachable and how (from technical, organizational, legal and economic point of view) it can be used to generate new, sharable, content.

- Trend 2 - **Enhanced visual experiences (e.g. 3D immersive visualization, Free viewpoint digital visualization and 3D camera capture, Meta web visualization - Semantic Web Data Aggregation):** Plain access to content is going to be treated and considered as a commodity. Value depends on the usability of content in terms of user experience. The capacity to effectively visualize, experience and navigate the flow of content (data, video, audio) is the key to generate value.

- Trend 3 - **Continuos Interfaces (e.g. Haptic technology, Neuro controllers, Mobile wireless hand-held devices):** The interface is the entry barrier between the user and the service/content. The lower such a barrier is, the easier the user takes advantage of the service and uses the content, i.e. generates and feeds economic opportunities. The alternative paradigm to the desktop model is called Ubiquitous Computing, which aims at achieving a seamless interface between the user, the device and whatever is delivered through it. Haptic technology and neuro-controllers support continuity between the body of the user and the device, while the handheld wireless devices assure space continuity between multiple private/ public environment of fruition.

- Trend 4- **Distributed / open production facilities (e.g. Ubiquitous/Affordable shooting/recording equipment, Open source softwares for content production/editing/remix/sharing, Collaborative and distributed peer production platforms, On demand physical production):** Production facilities are based where production resources

are (capital - financial and cultural - and time of workers). If production resources are shared / collectable in a distributed way, production facilities can be virtual and ubiquitous. Organizational capabilities have to adapt.

Chapter 4 went through each single industry, briefly describing how these trends diversify their effects according to the output. While we remit to each subchapter for sector-related conclusions, the following horizontal phenomena can be described as concluding remarks. They less strictly related to technology - as trends in Chapter 3 are - and more to culture. We think they can be of some help in understanding the whole innovation evolving scenario.

Content convergence

The one-to-one relationship between media, delivery systems and content is out-dated. The same content can now be delivered in different platforms: a song can be transmitted through the radio (analogical, digital and/or web based), sold in a cd store (real and virtual), listened to on the TV music channel, streamed in a website (through a fixed or mobile platform), downloaded as ring tone of the mobile phone, loaded and listened through a portable player etc. Contents have become dynamic and mobile, not in the sense that they are usable through a dynamic platform (such as the mobile phone or console), but in the sense that they duplicate themselves from one delivery system to the other. All this leads to an increase in the availability of the content, which is in line with the mission of content industries: putting the content provider in touch with his audience, everywhere.

Complementarity vs substitution

Delivery systems (satellite TV vs. cable TV vs. digital terrestrial TV, DVD vs. Blue Ray, etc) are substitutes of each others. Media, instead, even if they deliver the same kind of content, tend to be more complementary and follow the user as she moves from the desktop, to the sofa, to the bus, to the gym, etc. The limited resources at stake are the user's time and money, and the money of the advertisers. When the fruition platforms and opportunities increase in number, the share of 'old' media is forced to be re-sized. Substitution phenomena happen when the digital born generation prefers to spend its time with the pc screen rather than television (thus far called the 'the big thief'- of time), and use the on demand/mouse based approach instead of content streaming. The user also copes with a portfolio problem of money allocation and periods of economic recessions are a possible cause of platform substitution, narrowing the choice to the cheaper one and avoiding redundancy. To help the user access the same content through a wide rage of platforms, most suppliers tend to offer content for free, and to cover the costs of distribution through advertising. Advertising strategies experienced a boom period thanks to the Web, allowing even small content providers to provide content 'for' free on the Web and enabling small, local advertisers to pay for it. Thus, the dimension of the advertising pie seems to grow continuously and to favor the business mode relying on it.

Concentration vs diversification

More crucial than advertising is the control over data that users leave on the Web while browsing, using, buying and creating content. The ownership of data, in turn, makes it possible to organize targeted ad campaigns and to collect valuable marketing information. The aim of controlling data and advertising resources leads to the formation of large multimedia groups. Such a concentration phenomenon seems to betray the high diversification potential of Internet as a peer- to- peer bidirectional network. On the other hand, taking advantage of the low entry barriers and low transaction costs of the Web as an entrepreneurship platform (for or non-profit), more and more new activities are arising day by day based on experimental business models to provide and exchange creative electronic content, from the independent web p2p TV to the citizen sponsored professional journalism.

Business models

The trend about content provider business model is to provide content for free and on demand. Money can be collected through targeted ad, through direct donations by users interested in supporting and sustaining the production of a given content, or through the sale of hardware locked to the content, like in the case of the Amazon e-books or of the music bundled to the purchase of a particular mobile phone (and, before, of the i-pod/i-tunes duo). The multiplicity of formats in which a particular content is available allows provider to apply flexible offer policy, e.g. the low-medium quality electronic version of a song or a video for free and premium quality for money.

Virtual vs. real

Digital is not only about virtual objects. Virtual and real formats are still in a delicate balance: in case of books, for instance, the print on demand phenomenon deploys in parallel with the e-books, both enabled by ICT. In case of design 3dhaptic computing is competing, as technological trend, with the possible diffusion of rapid prototyping desktop tools.

User engagement

Whether for profit or not, user-generated content is competing with professional content in capturing audience attention. Recently two data emerged, capturing two significant trends very well. The first was about greater success in terms of time spent per page of User Content Generated (UCG) websites; the second about the less and less attraction that YouTube classic 'dancing-cat' user-generated clips compared to edited content. These two signals seem to point to two successful ways to run an advertisement based business through UGC: make the UCG part of an edited and refined content, or capture high quality UCG content like independent music, movies, newspapers and TV and distribute them to a targeted audience.

P2P is not about piracy

Peer-to-peer, or rather the network architecture using cumulative bandwidth of nodes – as opposed to traditional server based network – has been identified so far with illegal file sharing. Nevertheless, while the cost of distributing content through a server based network is very expensive and increases with the number of users, transmitting the same content with a P2P network is much more affordable for small players or common users willing to stream content via the Web. The most famous Web telephony service, Skype.com, is based on a P2P technology, as are the first examples of independent Web TV. If the quality of content increases in dimension and small entrepreneurs want to run a business delivering it through the Web, P2P networks are one of the keys to promote diversification and competition instead of concentration and oligopolies.

5.1 Recommendations for regional systems to exploit technological opportunities in the CIs

The technological and economic trends in the CIs have generally a global scope. Nevertheless, for Regions interested in supporting and in encouraging new business developments, possibly open to users/citizens interactions and driven by information and communications technologies, the following recommendations could be of potential interest:

Distribution

Local governments/agencies could sponsor the raise of new business model for content delivery based on exploitation of digital distribution with suitable, flexible, intellectual property rights protection designed to enhance the circulation of the content on the web. The distribution of protected and encrypted content through the web seems about the past and does not take advantage of the distribution potential offered by the Internet. "Knowledge and content actually are to be the new capital of postindustrial society, then they have to circulate and be accessible by all". Enterprises have to be ready to take advantage of this new era (see ch. 3 and 4).

Production

The entry barriers to the production of digital content are less and less a matter of hardware production facilities and more a matter of personal capabilities (education), infrastructure (broad band penetration and network neutrality) and open&interoperable platforms. Systematically addressing such a three factors with a long term commitment could help the flourishing of new entrepreneurship and the multiplication of market players.

Fruition

The multiplication and harmonization of content fruition opportunities is a matter of connectivity continuity between private and public spaces. Guaranteeing such continuity is a fundamental asset for the diffusion of ICT driven innovations in every CIs sub sector. This is not only a matter of broadband penetration: the diffusion of digital cinema screens are a further example of how the dematerialisation of the content can lower the barriers for a collective form of fruition.

Creating a Joint Research Agenda for promoting ICT-Innovations in Creative Industries across Europe

Creative Industries are extremely important for human wealth, they are a relevant source of employment and they act as fundamental economic organizations to assure a solid and democratic growth process for our society. As such, their development needs to be harmonized with the opportunities offered by technology and considered in political agendas of national and local governments.

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