

OPPORTUNITIES FOR IRELAND IN THE MEDIA SECTOR

Introduction

The Media sector is complex, comprising a wide variety of sub-sectors ranging from Film, television and Radio production and post-production, Animation & Special Effects, Music and Advertising, to that of the sub-sector traditionally described as "Multimedia".

This section on Media and New Media identifies key technological and market trends that are driving significant developments in each sub-sector outlined above. It additionally presents an overview of Ireland's current position within this framework.

This section has not attempted to replicate the analysis and recommendations that have already been effectively captured within published reports such as "The Bigger Picture" (FMI, February 1999) and "Raising the Volume" (IBEC, 1998).

The structure of this section is as follows:

- PART I: GLOBAL TRENDS AND DRIVERS OF CHANGE**
- PART II: THE EVOLUTION OF MULTIMEDIA**
- PART III: IRELAND'S MEDIA CAPABILITIES**

PART I: GLOBAL TRENDS AND DRIVERS OF CHANGE

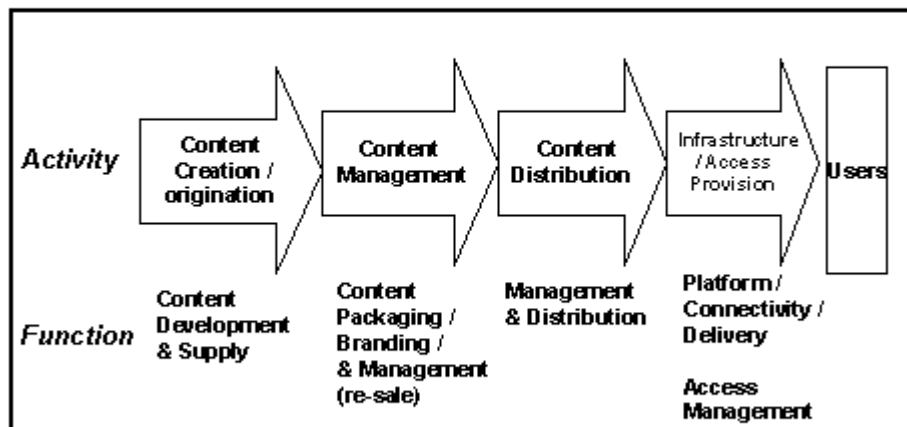
Digital technologies and the Internet are driving enormous change throughout the media sector. Not only will digital technologies improve the quality of images and sound, and increase the number of networks and channels that can be broadcast and received, digital technology will also make the Internet easier to use, will support higher quality interactive services, and will increase the penetration of on-line services.

Digital media represents "convergence between traditional media and the growing on-line media segment, with the related telecommunications and information technology enablers". As such, the value chain will no longer be about separate media sub-sectors or processes across different sub-sectors, but rather, will be about digital content creation, management and distribution across multiple platforms, as shown in figure 1 below. It should be noted that digital content embraces diverse content types such as entertainment, "edutainment", education and training, information / data and design.

A number of key technological and market trends are driving major changes across each part of this value chain, creating both opportunities and threats for all participants. As such, this discussion presents these drivers in terms of their impacts on the distinct activities of content creation, content management, content distribution and access / infrastructure.

As media and new media are experiencing significant change, a significant number of opportunities exist but are "further down the road" in comparison to most of the other sectors under review. However, if Ireland does not position itself now, for this emerging and changing media environment, then it will fail to secure its longer-term position for the Media and New Media sector of the future.

Figure 1
Value Chain in the Digital Media Industry



In the following pages, the global drivers of change are presented in respect of their impact on each link of the media value chain, namely:

- I.I Content creation / origination
- I.II Content management
- I.III Content distribution
- I.IV Access / infrastructure

I.I Content Creation / origination: Global drivers of change

There are eight critical global change drivers impacting content creation across all media sub-sectors from film and music to television and radio programming. The

implications of these include:

- an accelerating demand for content due to the proliferation of more channels and media formats, and a move towards "markets of one";
- higher demand on creative, technical and editorial skills of content creators, as content for the media rich Internet and "enhanced" television environment will be more highly-evolved than current content;
- a requirement for strong creative differentiation as content is increasingly produced on similar technical platforms. Expertise in advanced creative software applications and tools will become a basic requirement;
- increasing pressure to produce creative and innovative content more cost-effectively as technology lowers barriers to entry and increases competition.

These will increasingly demand content creators to implement new business models and "ways of working", in terms of more creativity, but also, in terms of costs and distribution models. It is recognised that the required creative, artistic and editorial skills are not yet fully developed in an Irish context, and that additionally, cost-competition will increasingly become an issue for many producers.

In terms of the implications for creative and technical skills, this change has been clearly recognised in the USA, with many universities increasingly offering mixed creative and technical courses.

The eight global change drivers impacting the content creation part of the media value chain are as follows:

1. The integration of the computing, media and telecommunications industries is both increasing demand for content that can be distributed across multiple-platforms, and enabling the production of creative content more cost-effectively.

- The telecommunications and computer industries, and On-line Service Providers (OSPs) are moving quickly to boost availability of high bandwidth communications for access to the Internet and interactive television.

For example, Microsoft is investing heavily in cable companies deploying digital & interactive TV services globally. It has invested in a range of US and European companies in its bid to drive the broadband Internet and digital TV set-top markets, such as Comcast, Rogers, TCI and AT&T in the USA,

and UPC, NTL and TVCabo in Europe.

AT&T recently acquired TCI and MediaOne. Charter Communications is investing in cablecos & Internet Service Providers (ISPs). Computer companies such as HP, Compaq, Gateway and Intel are making DTV receivers part of the standard PC configuration, and companies such as Intel are investing in set-tops & satellite networks.

- "State-of-the-art" technologies including imaging, 3-D, simulation, vector-based animation and virtual reality etc. are facilitating development of high technical and creative quality content at lower cost content, across a broad range of applications from film and television content, to advertising and non-media related sectors such as design.
- Emerging Universal Mobile Telecommunications System (UMTS) and Wireless Application Protocol (WAP) based mobile services will support content and data service provision. Content alliances between creators and service partners are expected, with UK media groups such as BBC, ITN & Reuters already showing interest in UMTS potential.

2. The roll-out of digital production and post-production will enable small and niche content creators become more economically viable, due to lower production costs and reduced barriers to entry. Digital production also offers opportunities to leverage content across multiple channels.

- Digital shooting of films is not currently being done on a wide-scale basis but is expected to occur, due to cost and time saving opportunities. A small number of US and UK production companies have recently become involved in digital productions with a view to driving the transition, and more will follow the director George Lucas' example of converting to a digital production and post-production environment. This is anticipated to be prevalent within the next 5 years (or perhaps sooner).
- Hollywood is committed to digitising the industry - 100% digital production ultimately means increased efficiency and control, and additionally sets the stage for lucrative ancillary revenues ranging from video games, CD-Roms, digital arcades

to Internet-based services.

3. Advances in computer-based animation technologies present opportunities for content creation in markets ranging from digital and broadband Internet media, to advertising, and non-media applications such as CAD / CAM in areas such as prototyping, reverse engineering, simulation and analysis etc.

- Technological developments in graphics workstations and software are opening the visual & special effects and animation markets up to smaller production and post-production companies, and start-ups in niche areas. The emergence of NT workstations, in a market traditionally held by Unix-based SGIs, provide a less complex and more affordable desk-top environment for content developers. Software tools and application developments are also more innovative particularly in areas such as vector based animation.
- Increasingly, innovative niche start-ups are emerging outside the traditional film industry. For example, US company Paraform whose technology enables manipulation of more accurate models in minutes instead of months, and SynaPix, also in the USA, which has developed technologies for computer-generated characters and for transformation of 2D-video into 3D imagery.
- More and more, leading providers of computer-based animation and visual effects to the film industry also provide services for TV, commercials, music videos and films, recognising the emerging multi-application opportunities, and driven by the need to reduce dependence on the cyclical film industry. Additionally, Entertainment companies and the large US studios are increasingly seeking to outsource "high value-added" animation and effects work.

4. Digital compression technologies, and the evolution of broad band are enabling the development of the on-line sector, which in turn is driving demand for media rich and broadcast quality content.

- Multimedia has remarkably different densities, video for example requires much larger amounts of data to be transmitted than text. Digital

compression technologies reduce bandwidth requirements that in turn reduce the cost of transmission. Video signal compression technologies are of key importance because "moving images" provide content developers with some of the most attractive revenue opportunities, but also place the greatest demands on bandwidth.

- The Motion Picture Experts Group (MPEG) is responsible for the development of compression standards under the International Organisation for Standardisation (ISO). MPEG 1 and 2 have already been agreed, and MPEG 4 is being developed to enable manipulation and multiplexing of different media types such as streaming video and audio, and text, and suiting applications such as video phones, mobile video, smart cards and games etc.
- As the standards have evolved to enable streaming multimedia to be launched, a large number of players have established themselves in this market of streaming technologies. These include companies such as Macromedia, Motorola, Vivo, VDONet, VXtreme, Progressive and Xing Technologies. Xing pioneered software based MPEG and has distributed more than 15m copies of its MPEG player. The majority of use is however limited to file-based and CD-Rom applications - not Internet-based multimedia. Extending this technology to the Internet, while retaining high quality video is a key development. Advanced Internet and streaming technologies such as Synchronised Multimedia Integration Language (SMIL) etc. are being rolled-out to facilitate development of this.
- The Internet is also evolving driven by developments in broadband technologies. The interest in broadband services and content is high but the current level of bandwidth for multimedia content delivery over DSL and cable networks is still evolving and is a critical factor to enable mass-market roll-out of on-line interactive / multimedia services. On-line video is not expected to be mainstream until public network technology allows frame relays closer to those enabled by television and CD-Rom.
- In the USA, considerable investment is being made into broadband Internet cable-based networks. The largest service providers are @Home (TIC / Liberty

owned) which increased its customer base from 50,000 to 210,000 over 1998, and RoadRunner which is owned by Time Warner. Other major telecommunication / cable companies are also becoming involved in broadband cable-based Internet services.

- Market partnerships are also speeding the emergence of broadband Internet, including those between Yahoo & Broadcast.com, and AOL & RealNetworks / MCIWorldcom (for corporate broadcast services) and SunMicrosystems (streaming media servers incorporation into its operating system), and Netscape (bundling of media player into its browser).
- US residential take-up of broadband is expected to be high with cable as the dominant access channel. European residential broadband is also forecast to be high although significantly lagging the USA. The three major manufacturers of cable modems and digital set-top boxes, Motorola, Nortel and Cisco are also committed to driving development of broadband access markets. This is discussed in more detail in section I.IV on Access / Infrastructure technologies.
- There are two other major developments that are also enabling further development of broadband multimedia content delivery. The first is that of digital television set-top box technology, and the second is that of a cable modem technology, variations of which have been developed.
- The implications of these developments are that the rich media "space" is far larger and growing much more quickly than is realised. The application of digital & multimedia technologies to the Internet are evolving to the stage where commercial content opportunities are beginning to emerge, with tremendous implications for the nature of the content that can be delivered over the networks.

5. Digital broadcast will drive development of on-line and interactive services as it offers extensive possibilities for high quality graphics, on-line information and Internet access. These will increase content demand as the numbers of channels proliferate.

- At this point, there is little planned programming specifically made for digital television (DTV) to take advantage of the new digital format. Digital content will largely comprise traditional TV programming, such as live sports, film and TV series and already, many US studios have converted some of their existing analogue content. New digital content will however be required to both attract consumers to digital TV, and to create differentiated broadcast services.
- New digital content producers are emerging in both the UK and the USA from digital post-production and special effects houses that can apply their skills, creativity and technologies to create high quality content cost-effectively. Additionally, it is emerging from "green-field" digital content production houses (approximately 7 in the UK, such as Illuminations Media). These companies operate using entirely different business models than traditional production companies.
- As broadcast companies seek to fill channels and generate transaction and advertising revenue, interactive or "enhanced" television services will be provided as an additional feature, for which new media rich content will be required. Additionally, the roll-out of these services is seen as facilitating the move to "markets of one" (personalised content delivery / consumer relationships) for which once again, additional interactive / enriched content will be in demand. Companies are now positioning themselves for this development. For example, Cable & Wireless has announced a large number of partners for its interactive services including Flextech Interactive, Bloomberg, Emap On-line, Scoot and PA Sporting Life, as has British Interactive Broadcasting (BIB) which is partnering with a broad range of companies including Dorling Kindersley.

6. Content creation opportunities for the broadband Internet and digital production / broadcast markets, are currently being leveraged by the technical and creative expertise of digital post-production and special / visual effects houses.

- Unable to focus exclusively on film due to its cyclical nature and margins, post-production and special / visual effects companies are beginning

to expand into content production. For example, Digital Domain, a leading full-service visual effects house, has established a new content production division. Many international players in this market now recognise that effects and computer graphics are "increasingly about content production rather than merely post-production".

- Under constant pressure to innovate, digital post-production and visual / special effects companies need to be at the forefront of technology. The application of this leading edge digital, computer-based animation and effects technologies will be leveraged to secure a position in the emerging on-line and digital interactive television markets.
- This move into content production by the post-production and special / visual effects houses, is also being driven by the opportunities from on-line and digital / interactive television markets that are beginning to embrace, support and demand the quality of video, content and real-time entertainment currently supported by traditional media such as analogue / linear film and television. In time however, as the technologies evolve further, it is expected that the quality of the on-line and digital / interactive content will become more superior than the current content offering from both analogue and digital alike.

7. Increasing diversity in media software requirements present opportunities for the adaptation of existing, and the development of new, software applications and technologies for the computer-based animation, special / visual effects and digital media sectors.

- Many leading special effects and digital post-production houses tailor or develop software and technologies in order to differentiate their special / visual effects and content. Despite major software companies such as Canada's Softimage having extensive code-developers, markets are too diverse to cover in their entirety, ranging from games, film, broadcast, commercials and virtual reality etc. As the needs of each market are very specific (for example, games require high quality Polygonal modellers but film requires Nurbs modellers, and the film industry demands high quality renderers but real-

time broadcasters will accept lower rendering in place of speed), companies have evolved to meet these "plug-in" needs.

- Phoenix Tools, Konshus and Pison Tools, all of which are US and Canada based, and which are the main suppliers of these software tools, have tried to fill market gaps. All of these successful companies have been spun-off from Softimage.
- Some houses recognise opportunities to commercialise their tools and applications. For example, Digital Domain's compositing program "Nuke" could potentially compete with incumbent Discrete Logic, and in the same way, Windmill Lane (USA) aims to commercialise its "motion tracking" technology.

8. Evolution of the "games market" is presenting content development opportunities, although, it is recognised that until it is on-line based, it will continue to be a high-risk and niche market.

- Despite growth, the games market faces fundamental problems including over-supply of titles and constantly changing console bases.
- However, consumer electronic firms are introducing devices that combine game with film play, and cable-access. This convergence is not expected until at least 2002, by which stage, the PC games market is expected to be worth \$1.8bn. Next generation Sony "Playstation" will link into broadcast and DVD technologies, Nintendo and Matsushita are launching the "Dolphin" offering similar capabilities, and Sega is launching its next-generation "Dreamcast" console.
- It is believed that games developers must develop products for the casual gamers and emerging on-line markets. Additionally, as games capabilities are at the "high end" of graphics and technical capabilities, these skills will be critical for the emerging broadband Internet and digital content markets.

I.II Content Management: Global drivers of change

The main global driver of change impacting content management, is as follows:

1. Due to the proliferation of digital distribution channels, and the associated rise in demand for content, the ease with which content can be divided and re-purposed is becoming increasingly important. It offers new opportunities for entertainment companies to fragment and re-package existing music, film and software assets.

- Digitisation enables the "slicing and dicing" of content into component parts and sequences, thereby providing opportunities to exploit existing content portfolios.
- Developments in standards such as MPEG VII will also drive the development of digital asset management. This standard is a video tagging scheme which can be used for the tagging, storing and management of digital assets.
- As broadband Internet and digital / interactive television content requirements increase, there will increasing need for content aggregators to re-purpose, re-package and syndicate content.
- While, the possibilities for subsequent re-use of material at component level are greater, this creates challenges for content protection and copyright management. In a digital world, the risk of piracy and misuse of re-purposed material will increase. Inadequacies in copyright laws mean that protection is questionable and exclusivity no longer guaranteed. While security technologies and copyright laws are developing, companies also need content management, usage and tracking systems. Digital content management and distribution strategies are now being developed by entertainment and media companies.

I.III Content Distribution: Global drivers of change

In the area of content distribution, the four key global drivers of change are considered to be:

1. The emergence of audio and video Internet-based streaming software and technologies, along with roll-out of consumer recording devices, will enable producers to by-pass intermediaries and gain direct distribution access to growing on-line market segments.

- Digital downloading of music is forecast to become a significant part of the industry by the year 2003, growing to approximately \$1.1bn (Forrester).
- At present, there are some 25-75k music-related web sites and Internet based music sales are approximately \$143m, with the majority being sold through on-line retailers.
- Down-loading is being driven by emergence of software and technologies such as those from MP3 and RealNetworks, which *currently* by-pass copyright owners, and technologies such as A2B, AudioSoft, Intertrust and LiquidAudio which do not.
- To date, constraints to commercial downloading have been: lack of significant content; lack of involvement from the five major record labels; slow downloading capabilities; lack of security technologies to protect copyright; and lack of consumer-grade CD-recordable units.
- Commercial development will be driven by emergence of playback devices, "legitimate" development of software formats and the secure digital music initiative (SDMI).
- A key driver is music industry involvement. The five major record labels have not openly embraced digital downloading except on a project-basis. In 1999, these major labels announced participation in initiatives to drive commercial music downloading, recognising that consumers will by-pass them if they do not.
- Liquid Audio has the greatest amount of deliverable content available today. EMI is its largest record label but it also has 300 smaller record labels and offers >10,000 music tracks for

sale on the service. Other initiatives include Sony and Microsoft's partnership to sell music on-line through Windows Media 4.0 in late 1999, and AOL's partnership with RealNetworks.

- Digital music downloading will offer opportunities for small record labels to gain access to a wider audience, and for artists to promote themselves directly to the consumer. As such, these technology developments are opening up an entirely new channel to market for emerging and other talent.

2. Digital technology is driving "packaged" media towards formats such as DVD, facilitating higher levels of better quality content to be produced.

- DVD is emerging as the standard format for storage, video and audio. By the end of 1999, it is forecast that some 4.3m US households will have DVD players. Recent European forecasts predict its DVD-market should be selling some 126m disks pa (80% in films, 10% children's interest, 5% music and 5% special interest) by 2003.
- DVD's adoption rate dwarfs other similar electronic products such as VCR and CD players. Affordability, similarity to CDs, global system compatibility and sell-through and rental proliferation are driving their take-up.

3. The broadcast industry will be in a state of flux over next five to ten years with the transition from analogue to digital television (DTV) being made. This provides real opportunities for additional and / or media-rich and interactive content providers to enter the market.

- In the UK, digital satellite and terrestrial services were launched over 1999, and digital cable is due to launch in late 1999. Analogue "switch-off" has been scheduled by the UK government, for the end of 2002. UK digital terrestrial, satellite and cable TV will offer 30, 140 and 200 channels respectively - all will require new or re-packaged content (including near video on demand (NvoD) and Internet services).
- In the USA, digital television broadcasting has also commenced. While analogue cable is the most prolific broadcasting format, some 20% of cable

subscribers have already upgraded to digital. There are additionally about 5 million digital satellite subscribers. Analogue switch-off has been scheduled for the end of 2006 and it is expected that it will take until then for DTV to penetrate even 50% of consumer homes.

- In Ireland, the recent issue of the Broadcasting Bill provides for the establishment of a new broadcasting infrastructure and a commercial entity "Digico" which will manage and operate a digital terrestrial television (DTT) service. The DTT network will comprise 6 multiplexes each of which will have five or six channels. Cablelink, having been recently acquired by NTL, may in time be capable of offering up to 200 channels.

4. Roll-out of digital projection and distribution technologies will facilitate the economic viability, and access to distribution channels, for small production houses.

- Film distribution is anticipated to move towards real-time projection driven by the objectives of reducing costs, maximising distribution and improving security. Digital projector technology is improving rapidly to enable this. Texas Instruments Digital Light Processing Cinema Division has developed semiconductor chips embedded with micro-mirrors that enable high precision control of each pixel on a screen.
- There are additionally a number of US and European consortia developing digital projection services expected to comprise either direct distribution or DVD-based distribution. Some examples of initiatives that have been implemented to date include the following: CyberStar, Digital Projection and Texas Instruments partnered to undertake a pilot digital projection initiative. Two US independent film-makers shot and edited a 90 minute film, "The Last Broadcast", entirely on digital video for <\$1k. The three companies

distributed it real-time via satellite to five US cinemas leveraging CyberStar's satellite network, Digital Projection's digital projector technology and finally, Texas' digital projection chip technology. Another company Real Image Digital (RID) is currently rolling out a service whereby films will be distributed to cinemas on Digital Video Disk (DVD) initially and subsequently on-line, via cable, satellite or telecom wires. Finally, Cinecom Digital Cinema works in conjunction with leading technology providers, film makers and studios to provide turnkey solutions for satellite-based delivery of films from a central hub.

- The benefits of digital projection are believed to be too great for the film industry not to eventually move to "on-line" digital distribution. Through satellite or broadband cable delivery, digital films can be shown on demand without the risk or expense involved in shipping film canisters. Digital transmission is additionally "cleaner" - maintaining a film in digital format reduces the possibility of interfering with quality which arises when converting from digital to analogue format.
- Industry developments including growth of "mini-major" distributors such as Miramax, New Line Cinema and October Films, have made it difficult for niche / small films to gain distribution, thereby creating a distribution bottleneck. Digital is set to alter this landscape. Broadband delivery and digital production will offer possibilities for small independent films to become economically viable.

1.IV Access / Infrastructure: Drivers of change

In the area of access / infrastructure technologies, the key global drivers of change are considered to be:

- 1. The pace of telecommunications industry developments is driving development of more intelligent communications technologies, as well as bandwidth capacity which is**

enabling distribution of media rich (graphics, audio and interactivity) content.

- Value-added service provision and intelligent network technology are rapid growth areas, which increase connectivity and intelligence in user equipment.
- In the USA, a large number of fibre optic networks and IP gateways are being constructed which will enable Internet and interactive services be delivered. Additionally, wireless local loop (WLL) networks are under construction in virtually every US city that could provide a wireless return path for interactive television.
- Bandwidth will commoditise in the future, facilitated additionally by compression technologies. The current level of broadband over DSL and cable networks is still evolving and is a critical factor to enable mass-market roll-out of on-line interactive / multimedia services.
- US residential take-up of broadband is expected to be high with cable as the dominant access channel. There were less than one million residential broadband subscribers in 1998, with cable modem access having over 70% of these, xDSL approximately 24% and satellite the remaining 5%. This number has since grown to approximately 2m with 76% through cable modem access, 21% through xDSL and 3.5% through satellite. US residential broadband is forecast to increase to 14.5m by 2003 with a decline in cable modem access to 56%, and increase in xDSL to almost 40% and finally, satellite access to increase to more than 4%.
- European residential broadband is also forecast to be high although significantly lagging the USA. There were approximately 150k residential broadband subscribers in 1998 (dominated by cable modem at 78.5% and xDSL at 21.5%). This is forecast to increase to just under 7m by 2003 (dominated by xDSL at 60%, cable modem at 35% and satellite at 5%). European broadband residences are expected to access broadband via cable initially and to then switch to xDSL due to Europe's high ISDN penetration that is anticipated to convert to xDSL.

- However, there exists the possibility that players such as NTL and other players will potentially have a more substantial impact on the broadband market with deployment of a broadband cable modem network in Europe.
- Beyond 2003, satellite broadband access is expected to be complimentary as users require both fixed and wireless broadband.
- Cable is expected to be the "most successful" broadband access technology due to its "time-to-market" advantage over xDSL and most wireless solutions, plus the availability of low cost cable modems. However, approximately 80% of cable modems do not permit interactivity and the costs associated with up-grades to "two way" modems are considerable. Ultimately, driven by the relative advantages and disadvantages of the key broadband access technologies, cable modems and broadband satellite are expected to be most prevalent. xDSL is not expected to be highly successful as a broadband access technology in the longer term, because of the fact that a large percentage of local loops have "loading coils" which are expensive but necessary to remove, and additionally because of the unsuitability of much telephone wiring in the home, for high speed data.
- An additional potential inhibitor of the mass-market roll-out of xDSL, or more specifically, ADSL, is that of "cross-talk". As the penetration of ADSL in phone lines increases, the issue of "cross-lines" or cross-talk becomes a problem. This will act as a barrier to a mass-market roll-out of ADSL, if not resolved.
- The three major manufacturers of cable modems and digital set-top boxes, Motorola, Nortel and Cisco etc. are also committed to driving development of broadband access markets.
- Future mobile services such UMTS are expected to improve access to media rich content and data. While roll-out of these services will begin initially in Japan, then move to Europe and finally, the USA (most likely not until around 2005), it is expected that Lucent and others' technology will confer advanced content communications capabilities to current mobile

services.

2. The roll-out of set-top boxes and other digital receiver technologies, will drive development of a richer and more interactive media environment.

- In the future, television will increasingly be connected to interactive computer technologies and networks. Digital receivers will be embedded in set-tops, PCs and other devices.
- It is expected that set-tops will be the most prolific digital receiver device. For example, SkyDigital now offers free set-tops with its digital satellite service, and OnDigital is expected to follow. Cable customers will not have to pay up-front for their set-top boxes. Microsoft additionally believes that set-tops will drive the future of the Internet, thereby explaining its investment into companies such as AT&T and Rogers Communications.

3. Traditionally, satellites have been used for point to multi-point broadcast communications based on Geosynchronous / Geostationary satellites (GEOs). The emergence of "Low Earth Orbiting Satellites" (LEOS) will further improve communications infrastructure for high quality lower cost content.

- Telecommunications, computing and satellite players have announced plans for satellite programs to serve as "Internets in the Sky". For example, Teledesic and Alcatel, which are driven by key leading industry figures such as Craig McCaw and Bill Gates.
- These will be personal communications networks based on LEO satellites offering significant advantages over GEOs for delivery of mobile data due to quality of service to low powered mobile hand-held equipment. These networks will also match the ability of current terrestrial networks.
- Key content opportunities lie with broadband capabilities which are expected by mid-2000s.
- It must be noted however, that there are considerable costs with launching these LEO-based networks and that the return path technology is still immature.

PART II: THE "EVOLUTION" OF MULTIMEDIA

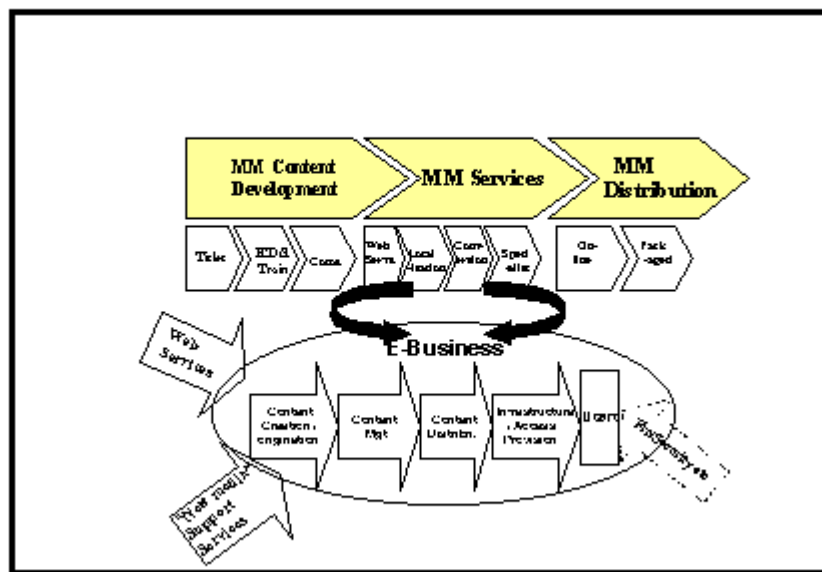
Multimedia spans all parts of the media value chain, from content creation and management to distribution. The term has traditionally been used to describe a broad range of products and services ranging from the hardware and software used to create "multimedia" products, and the actual products (content) themselves, to the technologies used to deliver the products (primarily "packaged" to date).

However, driven by the accelerating convergence of telecommunications, media and computing, digitisation and the emergence of the Web, it is no longer appropriate to incorporate this diversity into a single sectoral concept such as "multimedia". This should be viewed merely as having been an intermediate stage between linear content production by specific "multimedia" sectors, and that of the burgeoning environment of rich media interactive, transactive content ("new media") which spans virtually all industry sectors.

As such, "multimedia" has largely been dis-aggregated into three broad and interrelated categories as follows, and as shown in figure 2;

- "New media" within all industry sectors ranging from media, education & training, and publishing, or generically, creation of information, entertainment and educational content etc., for multi-platform distribution.
- E-Business which has evolved as services and selling have become Internet linked.
- Services to facilitate E-Business and new media. This incorporates "web services" such as web site and portal design and management, and services to support the transition to E-Business, and "new media support services" such as CD-Rom or DVD pressing.

Figure 2
Evolution of Multimedia to "New Media"



For companies involved from the outset within the "traditional multimedia" sector, this transition has been an evolutionary rather than a revolutionary process. This can be described by the development process of the US "multimedia" industry which is shown in figure 3 below.

In 1996 in the USA, the multimedia sector typically comprised young companies in one or a number of the following areas: content design and development (focusing primarily on titles, film and interactive advertising services, and CD-Rom, cartridge etc.), content packaging and distribution (CD-Rom publishing and a small amount of on-line publishing), and enabling services such as design and technology consulting, and content creation tools. The majority of these companies had one to 10 employees and less than \$100k turnover. E-Business and the Internet were only a minor part of multimedia activity.

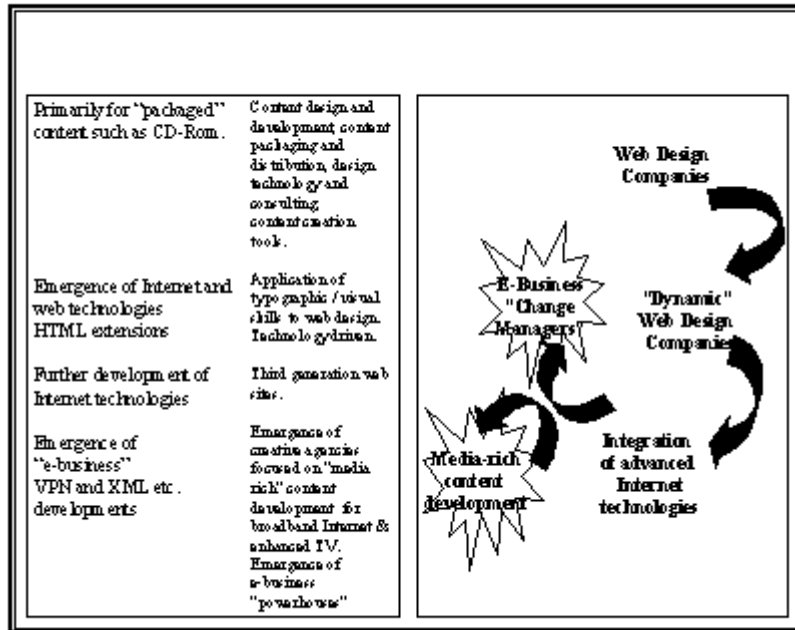
Web designers began to experiment with creating typographic and visual layout principles to content on the Internet. The earliest sites were designed and implemented internally by organisations posting their own information on the web. The introduction of Netscape's extensions to HTML saw Web designers incorporate icons, images and coloured borders but the sites still appeared to be driven by technology. Web sites then progressed from second to third generation with the major differences being that the latter were led by design rather than by technology principles.

Instead of broadcasting static content to a general audience, third generation sites enticed specific groups of audiences to interact with the content presented. The third generation web site designers emerged from a variety of industry backgrounds and sectors, ranging from advertising agencies and traditional design firms, to dedicated web design and technology companies.

Now with further Internet developments such as virtual private networks (VPNs) and extensible mark-up language (XML), these Web design companies are moving towards combining the content aspect of web design services to that of becoming e-business powerhouses, i.e.: transactive content and web based business process integration and re-design, to support companies' transition to becoming on-line digital businesses.

US companies evolved organically, primarily driven by the roll-out of e-business through-out the US economy, and the convergence of the media and telecommunications industries. However, access to funding, and consolidation through mergers and acquisitions have also assisted in boosting the status of the industry. As the industry has matured, profiles now typically comprise companies of one to three years old, with some 25 employees and some \$2m revenue, involved in the type of web-based / e-business change management activity described above.

Figure 3
Development of Web Services Companies



PART III: IRELAND'S MEDIA CAPABILITIES

The Irish media sector comprises a diverse range of activities and capabilities. It has companies active in all media sub-sectors ranging from music, television, radio and film production, post-production, and distribution / broadcast, to new media and web-services companies. However, Ireland's position relative to major international players such as the US, is generally regarded as being at the early stages of development, notwithstanding the fact that for such a small country, Ireland has had some notable success stories across the various media sectors.

The international perspective of Ireland is that as a nation, we are creative and imaginative, with an enriched cultural heritage. In the media environment of the future, where bandwidth will be commoditised and technologies will no longer be the basis of sustainable competitive advantage, content, and in particular creative content will be at a premium.

The Music Industry

Composers and performers are the core strength of the Irish music industry. However, it has varying degrees of capability in all music activities ranging from composition, recording and publishing, and distribution via broadcast, on-line and retail, to management and professional services.

In terms of creativity, Ireland has an extensive and internationally recognised array of talent including traditional performing artists such as The Chieftans and Clannad, to more contemporary artists such as U2, The Corrs, Enya, The Cranberries, Bewitched and Westlife.

In the independent sector, it is estimated that there are more than 110 Irish record companies of which only about 10 are engaged in the international commercialisation of Irish music and talent. International success has unfortunately depended heavily on a contract with one of the five major record labels; Sony, Universal / Polygram, EMI, Warner and BMG. Apart from Sony, these companies have no manufacturing nor distribution operations in Ireland with the country tending to be viewed as part of the UK territory. However, many of them have 'talent scouts' here who are interested in spotting emerging talent.

A critical factor underpinning the success of many Irish Groups, has been the emergence of a small number of professional managers, with the relevant industry knowledge and commercial expertise to 'package, market and manage' the talent they have identified. In this way, a balance of interests has been struck, with these managers acting as crucial intermediaries between the young and sometimes commercially naive music talent on the one hand, and the big commercial record labels on the other.

It is believed that development of the Irish music industry may potentially be hampered by lack of seed and development capital for investment in new artists, and additionally, by difficulties in accessing export markets. It is however, an economically significant industry. Employment estimates are up to 10,000 full-time equivalents and the value of the output of the industry is estimated to be over £160m pa (1998, IBEC).

To rationalise the strategic recommendations for the Irish music sector, we set out below a brief analysis of its strengths, weaknesses, opportunities and threats. Again it is highlighted that this analysis does not attempt to emulate the analysis and recommendations of "Raising the Volume" (IBEC, 1998).

Strengths

- International recognition and acceptance of Ireland's music heritage, and as a source of music talent.
- Successful Irish music groups which act as positive role models for emerging talent.
- A deep reservoir of untapped music talent - it is estimated that at any one time there is in the region of 1000 young groups trying to achieve success in the Dublin music scene.
- The existence of a small group of managers capable of internationalising Irish talent, while at the same time safe-guarding their interests.
- The Irish taxation system, specifically the provisions in relation to artist exemption and tax-free royalty income, has been important in successful Irish artist choosing to live and be domiciled in Ireland.

Weaknesses

- The Irish music industry is highly fragmented and diffused, with no central co-ordinating body. Unlike other creative industries such as film, theatre and literature etc., there is no organisation looking after

the development of the contemporary music sector in an integrated pan-industry fashion. Some years ago a task force which was established to examine the development of the Irish music industry, proposed the establishment of a "Music Board". This has yet to be put in place.

- While the impact of the small number of "professional music talent managers", has been significant, there is room for more professional managers with the appropriate industry knowledge and management expertise, to enter this arena. Unfortunately, the career path by which such managers accumulate this expertise is ill-defined and to date, has been largely experienced based. In the absence of an organisation focussed on facilitating the development of emerging Irish Music talent, a greater number of experienced music talent managers are required.
- The sheer power and dominance of the big five music groups has led much of Irelands international music talent to be signed to one of these labels, thereby resulting in lucrative music revenue and industry development opportunities being lost from the indigenous sector.

Opportunities

- The main opportunity, and indeed challenge, facing the Irish music industry, is centred around, how to increase the numbers of quality Irish acts getting through the "pipeline" and becoming established in the lucrative international market.
- An additional opportunity and challenge is how to retain the management of, and the commercial activities associated with these acts, in the Irish Market. It is believed, a series of 'push and pull' strategies are required in order to create a more conclusive enabling environment.
- The historical stranglehold that the "big five Record labels" have in controlling the channels to market, is beginning to be "attacked" by the emergence of electronic business music hubs or internet sites. As noted earlier, minor music labels and indeed music artists, are beginning to evolve to the Internet as a means of circumventing the power of the big labels. This development represents a new opportunity for the promotion and internationalisation of Irish Music talent.

Threats

- The main threat, facing the Irish industry is the failure to fully realise both the commercial and

creative potential inherent in the indigenous music sector talent base

The Film & Television Industry

Despite the relatively high profile of the Irish film and television industry (predominately due to the production of a number of internationally recognised indigenous films, and films shot in Ireland), the industry is still, in reality, at the very early stage of development.

Since 1993, Irish film production growth has been greatly facilitated by the implementation of integrated Government policy measures including tax relief schemes such as Section 481, project support from the Irish Film Board and company support measures from Enterprise Ireland and Screen Training Ireland. In some cases, particularly in terms of Ireland as a location for international film production, its attractiveness has been determined by the availability of Section 481 funding for off-shore film; the relative cost effectiveness and ease of shooting a film here, and finally in some instances, favourable currency exchange rates.

The industry comprises a large number of small production companies with much Irish film unable to obtain general public release due to distribution access, print costs and in some cases, lack of wide-market appeal. Commercial opportunities in the film and television lie with broad distribution capability. A key factor facing Irish Production Companies is their ability/inability to retain some key rights in the film as a means of securing a revenue stream post release. Instead, many producers sell all their rights up-front in order to finance production of the film, which means they have little retained earnings to invest in the company and in the next slate of projects.

Within the independent television sector, there is a traditional reliance on programme commissions from RTÉ and now, TnaG and to a much lesser extent TV3. There is a low level of production for the export sector apart from niche channel commissions from broadcasters such as SC4, C4, BBC and BBC NI, and content syndication for cable channels. In total, it is estimated that there are some 120 indigenous independent production companies in Ireland. While many of these companies are micro enterprises, there exists a core group of about 15-20 production companies that have demonstrated an increasing

ability to: handle a slate or number of projects at any one time; leverage off Section 481 and IFB finance as a means of securing better deals with international distributors, sales companies and TV broadcasters and; manage their business in a more professional and progressive manner.

Despite these 'issues', the Irish film and television industry has many strengths upon which it can build. While some cultural barriers exist at the international level, there is an increasing popularity of "Irish interest" as demonstrated by the critical success of many Irish film productions such as *Dancing at Lughnasa*, *The Boxer*, *The General* and *The Butcher Boy* among many others, and Irish television drama such as *Ballykissangel* and *the Ambassador*. More recent Irish productions (1998) include *Angela's Ashes*, *The Mammy* and *Ordinary Decent Criminals*.

Within the post-production sector, Ireland has about 25-30 Post-production facility houses, a small number of which compete on an international scale. In terms of post-production capabilities, Ireland is self-sufficient, from both a video and audio perspective, with regard to television output. In the area of feature film quality output, however, Ireland has a number of gaps, specifically in film picture post production. Ireland's existing film post-production capacity does not currently enable it to compete on an international level with companies operating out of London. This is due to insufficient capacity to undertake a large international film post-production driven by, lack of 35mm film scanner and output devices etc. There is not believed to be any *capability* issue with the more developed post-production companies here. These companies could undertake film quality resolution post-production had they the capacity and the international contacts by which to secure large film contracts. For leading-edge post-production companies, their primary focus to date has therefore been on high-quality television programs and commercials. These leading Irish post-production houses, also have internationally comparable digital post-production skills and technologies that enable them to compete in both today's post-production environment, and to position themselves for the burgeoning digital media environment of the future. These companies understand that digital effects and computer graphics are increasingly about content creation rather than merely post-production. It is imperative that they move now to build and develop their skills and technological competencies for content production for the digital, interactive television and

broadband Internet markets.

In terms of sound post-production, there are also a small number of companies which have evolved through the development of strong relations with leading Irish Directors and major US production companies/studios, by attracting international high-profile sound engineers for skill and expertise transfer, and through investment in leading-edge facilities.

The value of the Irish film industry (including independent TV productions) was more than £123m in 1997 (105 productions), representing a growth of 25% over the previous year. Film and TV drama accounted for 85% of this and independent productions for television accounted for virtually the remainder. As with the music industry, the economic significance of this is considerable, with some £88m spent in the Irish Economy, generating the equivalent of 1500 full time jobs for that year.

While 1998 was even a better year for the Irish Film Industry, the level of business in 1999 so far, is significantly down, particularly in relation to the shooting of international films in Ireland. While the global film industry overall is experiencing somewhat of a down turn, the lack of certainty around the continuation, post 2000, of Section 481 is considered to be a contributing factor. In August of this year, Minister DeValera launched the report of the "Think Tank" which had been established in Autumn 1998. This report sets out the views of leading industry players on the strategic development of the industry over the next five years or so.

Radio & Television Broadcasting

The Irish television broadcast market is estimated to be worth some £210m (excluding the cable companies), with the main companies being RTÉ, TnaG and TV3 along with the cable companies such as Cablelink, Princes Holdings and CMI. Irish broadcasting legislation is now providing for the transition to digital television - albeit at a much slower pace than the US and the UK.

The recent issue of the Broadcasting Bill provides for the establishment of a new broadcasting infrastructure and a commercial entity "Digico" which will manage and operate a digital terrestrial television (DTT) service. The DTT network will comprise 6 multiplexes each of which will have five or six channels. Cablelink, having been

recently acquired by NTL, may in time be capable of offering up to 200 channels.

Key Irish radio broadcasters include RTÉ, Today FM and at least 20 independent radio stations, with an increasing trend to consolidation of local and community radio. There is limited organic growth opportunities in this sector with opportunities primarily relating to digital audio broadcasting and the Web, in areas such as web-casting.

Animation

During the mid-to-late 1980's, the IDA recognised classical animation production as a sector which could feasibly be attracted into Ireland. Because it conformed to the normal factory-based industrial model and had the potential to generate significant employment, a number of the big American Studios were targeted. The outcome was the setting up of Sullivan Bluth, which at its peak had more than 300 people employed in Dublin. Allied to this, an animation college, at Senior College Ballyfermot, was set up, modelled on the internationally acclaimed Sherdian College in Canada, as a means of providing skilled graduates to feed the pipeline of the burgeoning industry.

Today, with the demise of Sullivan Bluth/Don Bluth the profile of the animation sector is quite different. The industry now comprises primarily indigenous companies, a number of whom operate internationally. Almost all companies generate animation using software tools and technology to a certain extent but few companies are undertaking "true" computer-based animation. The classical animation companies are primarily involved in TV shoots and TV series commissioned by Irish and UK Broadcasters. A number are engaged in the development of more adventurous film projects. However, the level of funding required, and the time required to produce an animated film are major issues for indigenous production companies to contend with. The animation sector itself, views its core strength as being the ability to create story-boards and undertake strong creative work.

A key issue for the indigenous animation sector is its inability to compete cost-effectively for much of the US out-sourced traditional animation activity which is undertaken in the Far East. Pre and post animation

activity is primarily undertaken in Europe, and this factor, combined with media and computing convergence, are increasing the demand for indigenous to move up the value-chain into computer-based and innovative animation production.

Additional issues facing the indigenous animation sector include those similar to the film production industry, namely, rights and royalties retention in order to fund company development and the next slate of projects, and marketing / distribution networks and capabilities.

In 1997, indigenous animation output declined to £100k from some £12m the previous year. This virtual disappearance requires innovative policies and initiatives to restore performance of the sector.

It is believed that the main areas of opportunity for this sector in the future are to leverage developments in computer-based animation technologies for content and effects creation in markets ranging from digital television/film and broadband Internet content, to advertising and non -media applications in areas such as prototyping, reverse engineering, simulation and analysis etc. The skills and technologies associated with computer-based animation are considered to be particularly well suited to web based content development. Opportunities also exist with entertainment companies and the large US studios which are increasingly seeking to outsource "high value-added" animation and effects work. This strategy will require relationships to be nurtured between the Irish production, post production and animation companies to ensure capabilities to leverage opportunities in these emerging media and non-media application markets, are developed.

It is also believed that there is a large amount of Irish creative talent working internationally in companies such as Disney and Fox who are keen to return to drive development of the animation sector in Ireland.

New Media and Web Services

The indigenous "multimedia sector" has traditionally comprised a broad range of products and services ranging from hardware and software used to create "multimedia" products, and the actual products (content) themselves, to the technologies used to deliver the products (primarily "packaged" rather than on-line, to date).

The sector is fragmented with the number of companies growing by approximately 10% per year from about 1993 onwards. The Farrell Grant Sparks industry analysis estimated some 100 indigenous and 20 multinational to represent the sector, with some 2200 full-time employees.

In 1997, the majority of indigenous companies provided services such as web-site design, and non-games content development. As such, to date Ireland's key strengths have been in web publishing, CD creation and localisation services.

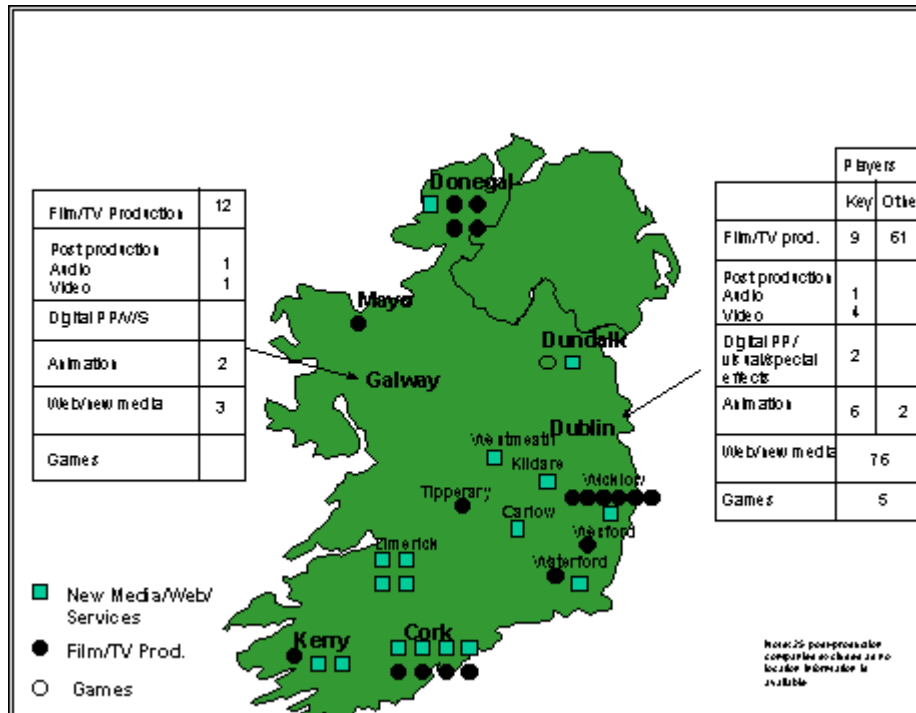
However, driven by the accelerating convergence of telecommunications, media and computing, digitisation and the emergence of the Web, multimedia has largely been dis-aggregated into two key areas of "new media content development", and "web services to enable businesses become e-businesses". Traditional channels of communications are being complemented by the Internet and as such, companies are positioning themselves for development of the "next wave" of media rich content (video, graphics, audio, text and interactivity etc.) to leverage convergent distribution platforms such as digital / interactive television, broadband Internet and WAP-based mobile phone services etc. On the other side, driven by Internet developments such as virtual private networks (VPNs) and extensible mark-up language (XML), leading-edge traditional multimedia companies are also positioning themselves to become "e-business powerhouses", i.e.: transactive content and web based business process integration and re-design, to support businesses' transition to becoming on-line digital businesses. Two things are occurring in the Irish "multimedia" sector in line with this development; indigenous companies are evolving and new start-ups are emerging - focusing on either one or both of the two distinct sectors described above.

Other Irish companies can also be identified that are, in reality, "more behind" in terms of their transition to becoming media rich content development houses and e-business "powerhouses", focusing instead on development of multimedia titles and web design activities etc.

In the area of media-related web services, IFTN is a web site for promoting the Irish film and TV production industry to foreign investors containing information on Irish production companies, locations and facilities. The site attracts about 1m visitors per month. It also has a music web site Irish Music Net and has added a

third high profile site to its portfolio, "Whats On Where" (WOW). The latter is a weekly on-line arts and entertainment magazine for every where in Ireland. The site is advanced with costly streaming technology for video and audio clips.

Figure 4
Ireland's Media and New Media Industry



Implications of the global drivers of change for Ireland

The global drivers of change, impacting all components of the media value chain have real implications for Ireland's capabilities in these areas.

- Increasingly, the same services and content can be distributed over wireless, fixed and satellite networks and as such, new multi-platform distribution opportunities are presented for Irish content developers that have been historically limited to television broadcasting and film distribution.
- A greater amount of content will be required as broadcasters and service providers seek to differentiate their service offers.
- High quality content at lower production costs will be critical, with considerable implications for the existing business models of Irish production and post-production companies.
- A key differentiator will be creativity but expertise will also be required in leading edge tools such as computer-based animation, vector animation, advanced web audio / video streaming, 3D, simulation, imaging and multimedia software applications etc.
- While technology is lowering barriers to entry, it is imperative that it is fully in place to support a leading media industry position.
- While current television production companies' core business will be relevant for the future, these companies will either need to develop capabilities in-house, in computer graphics tools, digital production and post-production technologies and other media-related technologies, or else will need to develop synergistic relationships with other companies in these areas.
- Currently, digital post-production and special effects houses are well placed to achieve success on the burgeoning digital and broadband content environment. Irish leading edge players in this sub-sector should be supported to partner with other synergistic industry players, in the film and television production, and animation areas.