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'Assess the impact of the convergence of media technologies in the home'

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Abstract

As we approach the millennium, related technologies utilised for home entertainment media consumption are developing at an accelerating pace. The introduction of the radio and, later, black & white and then colour television earlier this century had a massive impact on the living habits of consumers. Today, over 98% of UK households own at least one television set (source: *BBC*). New technologies emerging in the domestic realm such as PC's, the Internet, cable and satellite TV, and digital storage mediums are becoming part of an increasing arsenal of affordable media products.

Communication technologies such as the telephone and, recently, the Internet have allowed personal communication on a truly global scale. Geographical concerns have become less important, with technology giving home users the power to interact with individuals or groups of people across the globe.

"Increasing ease of access to the Internet is making it feasible for geographically dispersed communities to work closely together, coordinating their activities through electronic mail, digital document archives, and access to remote computing facilities.". - Gaines, B, 1994.[1]

[1]B. Gaines, "Supporting Collaboration through Multimedia Digital Document Archives", Knowledge Science Institute, (University of Calgary, 1994). Available Http://www.acs.ucalgary.ca/~converge/background.html

Both broadcast and communication media are on a convergence path, which is set to change the way we consume products and services in our homes during the following decade. A level of interactivity once confined to a highly computer-literate elite is now becoming accessible via more user-friendly and affordable products.

This text will examine these opportunities from a consumer perspective, with particular reference to entertainment. It will also discuss how the convergence of technology is affecting areas such as copyright laws, personal security and government censorship on a global scale. The predicted trend in on-line home shopping will have far-reaching effects on the distribution of music and multimedia products, threatening to put high-street retailers out of business. These issues are all affected by the impending technological convergence, and will be examined with reference to developments in the UK marketplace, and supported by opinions and factual statements from those observing and working in the multimedia industry.

Contents

1 Introduction - Media technology in the UK marketplace

Existing entertainment and communication technologies in common domestic use in the UK are all media-related; non-broadcast media such as CD's, Compact Cassette, Minidisc and VHS video; broadcast media including radio and television; communication media (telephones) and multi-media computer products such as the new generation of PC's, which allow both communication and the transmission / reception of broadcast media. It is these developing areas of home technology which will be the focus of this study, in which I aim to argue the case for small and large scale integration of media technology in the domestic realm.

1.1 Non-broadcast media

The main area in which non-broadcast media is utilised in the home is for archive storage of audio (rapidly becoming dominated by digital storage media). The most common format for consumption of pre-recorded audio is the Compact Disc, launched by *Philips* in 1982. This was the first digital music format to become widely adopted by consumers, and one which still has enormous potential, both for music and other applications. Recent developments have seen the format being used for digital video (DVD), video games, and computer data storage (CD-ROM), with recordable variations of both software and hardware now cheap enough for consumers to take advantage of (CDR / CDRW). Sony's Minidisc, a physically smaller variation of CDR utilising data-

compression is beginning to make inroads into the portable market as a replacement for the compact cassette, which has been the market leader in consumer recordable audio for over 20 years.

The other main non-broadcast format is the videocassette, used for viewing commercial films via sale or rental, and for the recording of television broadcasts. The latter has arisen due to the rigid and linear nature of television broadcasting which requires the viewer to choose from a range of programmes broadcast at fixed times. Although in itself a non-broadcast media, the video has enabled users to decide how and when they view television broadcasts, allowing individuals to reschedule TV viewing around their daily life.

1.2 Broadcast media

" Though many view broadcast as an industry in decline, the greater probability is that it will be the broadcasters who will drive convergence of all the other industries through an orderly adoption of externally mandated standards on a fixed timetable. This changeover to all-digital media may prove to be the primary driver for the creation of low-cost digital appliances that will replace the old analogue television set we grew up with (history certainly bears out such a prediction)." . Rau, M, 1995.[2]

The longest surviving broadcast medium in the home is the wireless radio, which began to be used in the domestic realm

[2]M.C. Rau, "Broadcast Television", Philip V.W. Dodds (ed), *Digital Multimedia Cross-Industry Guide*, (Newton, MA: Butterworth-Heinemann, 1995), pp. 25-59.

during the 1930's (*Grainger*) and is now broadcast in hi-fi stereo (VHF/FM). The UK has five main national BBC stations and numerous regional stations, funded through the television license fee. In addition to this, licenses are granted to commercial stations broadcasting on a local and national level, covering a wide spectrum of musical tastes and target audiences. These are funded through advertising revenue.

Radio has now come of age due to the Internet. The need to apply for a license to allow broadcasters to occupy a particular frequency range acts as a form of censorship from the authorities, resulting in sometimes bland, 'middle-of-the-road' stations catering for mass audiences. Pirate radio stations emerged, catering for minority groups and left field tastes, operating illegally with sometimes fierce competition from rival pirate broadcasters. Radio broadcast in the late nineties exists in much the same format as it has done, with the addition of Internet radio, which offers a legal alternative to previous forms of non-censored radio broadcasting. With an Internet web site utilising streaming technology, individuals can 'broadcast' to anyone logging on to their address. This exciting new technological development has far reaching implications which are covered in further chapters.

"Current uses of technologies, particularly those linked to music, radio, cinema sound and so on, are in an experimental or transitional phase. In one developmental arena, radio listening and 'broad'-casting are being revitalised and altered through new

delivery systems (an area of research deserving an issue of Convergence in its own right).". Coyle, R, 1997.[3]

The television became commonplace in the 1950's, offering relatively high-quality audio-visual stimuli in the realm of the home. The pixel resolution and 4:3 screen ratio which remained standard for many years is soon to be complemented by digitally-broadcast high-definition (HDTV) and widescreen 16:9 format broadcasts. This was previously unavailable, due to limitations of the (analogue) UHF signal. Terrestrial television in the UK consists of 3 commercially funded stations, and 2 publicly funded (BBC) stations. Additional non-terrestrial services are available via commercial subscription providers, utilising cable or satellite technology.

Online media (broadcast & non-broadcast)

The rise of the Internet is perhaps the most significant development in media delivery during the last decade, largely due to the fact that connection costs are relatively cheap, giving users access to an unlimited array of audio-visual stimuli. While electronic mail has revolutionised business communication, domestic use of the PC has given rise to a wide variety of entertainment opportunities accessible via the Worldwide Web.

"The Web is the glossy, glamorous, user-friendly face of the Internet: a media-rich potpourri of shopping, music, magazines,

[3]R. Coyle, *Convergence: The journal of research into new media technologies*, Vol. 3, Number 4, (Luton: John Libbey Media, 1997). Available Http://colossus.luton.ac.uk/

art, books, museums, games, job agencies, movie previews, self-promotions, and plenty more. And for the most part, it's all free ... all from the keyboard of your computer." .- Kennedy, A, 1998.[4]

Although still in its infancy, it is not difficult to see why the Internet (particularly the Worldwide Web) has become so popular in recent years. Even though until recently, it's use has primarily been restricted to users of desktop computers. The concept of having such a powerful means of multimedia communication in the comfort of the home has caused many to predict the dominance of this medium well into the next millennium. Restricted at present by low-bandwidth modems and phone connections, new delivery systems such as high-bandwidth ISDN lines may soon supersede the standard telephone line for communication of this kind.

Faced with the perhaps daunting prospect of having to adapt to such developments, the consumer has much to be wary of, although ultimately market forces should determine that costs are forced down, with the benefits on offer from new technology far outweighing any disadvantages.

In perhaps 10-15 years from now, the formats we now accept as the norm for the consumption of audio and visual stimuli will have changed due to developments in media technology, as digital communication and storage of information become increasingly cheaper. If a broad consumer base adopt this technology, it has the potential to seriously affect our daily routine,

[4]A.J. Kennedy, *The Internet & World Wide Web*, (London: Rough Guides Ltd, 1998), pp. 105-106.

offering benefits such as home shopping, unlimited choice and levels of interactivity never once thought possible.

2 Convergence - Can we afford to ignore the technological revolution?

"I think it's quite clear the way [digital technology] is going to go for quite a while now. You can see that the convergence thing's finally started to happen." . Black, M, 1998.[5]

High-technology products in domestic use have been a significant part of western culture during the previous 30 years or more, and satisfy our considerable and increasing demand for home entertainment. Consumers are becoming educated and technologically literate at an increasing rate, due to PC's being utilised on a colossal scale in the workplace, and education catering for this need. However, this level of refinement is still in its infancy. While a promising foundation, existing technology such as the ubiquitous PC with its *Windows* environment has yet to be accepted as a form of entertainment in the same way that the TV has. Indeed, why should it? The interface of the personal computer was designed as a working tool for the desktop; not for the living room. A significant proportion of the UK population have yet to realise the new wave of powerful entertainment opportunities to be exploited in the home, as much of it utilises technology introduced first to the computer markets. Indeed, many consumers feel alienated by computer technology and its' surrounding jargon; they are not computer literate and do not have the desire to be. Others simply cannot justify spending the inevitable high asking prices for something utilised primarily for entertainment.

[5]S. Quinn, "Ninjas on the mix", Chris Everard (ed), *Technologica*, Vol. 1, Issue 5, (Stockport: Mondiale Publishing, 1998), p. 96.

For this reason, the impending convergence of all the known media-related technologies in the home that many are heralding as the 'next big thing' may not come as soon as expected. However, I would argue that without some kind of mass adoption of format or medium through which to consume the new generation of (multi) media broadcasts and software, we stand the risk of being bombarded with an unwanted and rapidly obsolete array of incompatible technology products. Consumers of the 90's are thankfully very wary of new fads and are slow to jump until the bandwagon looks as if it is going somewhere.

This is to be expected - why should consumers invest in uncertainties? People have long memories; when VCR's were released in the UK during the early '80s, many were quick to embrace the new technology. Unfortunately, those opting for the jilted *Sony* BetaMax medium (or the lesser-known *Grundig/Phillips* Video2000) soon realised that *JVC*'s VHS was the format that was to become standard, forcing it's competitors out of the marketplace. Similarly, with the digital music format wars of 1992, Minidisc and DCC met with poor sales, despite heavy marketing campaigns by both Phillips and Sony. Only after six years of steady marketing have consumer sales of Minidisc increased noticeably.

"Two years ago the MiniDisc format looked to be dead in the water ... But with sales up a whopping 2000% in the last six months ... the benefits of this affordable, portable, digital

recordable disc at last seem to be reaching the masses.". - Slateford, N, 1998.[6]

The television has become something of an institution in the western world. We rely on the television for information (news, weather), comedy, films, trivia, gossip, education and fiction. This single technological format is responsible for feeding more than 20 million homes at any one time on a single channel with an (albeit passive) stream of entertainment programming which we feed off of and rely upon for a large part of our leisure time whilst at home.

"... broadcast television [is] the oldest and most experienced of multimedia-based electronic infrastructures. Many of our perceptions and prejudices as consumers emanate from our nearly lifelong experiences with the 'one-eyed monster' at home." - Rau, M, 1995.[7]

It is necessary to fully understand the importance of this when suggesting any kind of impending technological evolution or revolution. People have become so attached to this format as a means of consumption; I would argue that any change to this status quo would be met with scepticism by a broad consumer base. I would further argue that for this reason, a convergence of related media technologies towards a single, familiar user interface is necessary in order to catalyse the process and win over the most important party; the consumer.

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[6]N. Slateford, "Virtual Insanity", Tim Barr (ed), *Future Music*, March 1998, (Bath: Future Publishing Ltd, 1998), p. 13.

[7]M.C.Rau, "Broadcast Television", Philip V.W. Dodds (ed), *Digital Multimedia Cross-Industry Guide*, (Newton, MA: Butterworth-Heinnemann, 1995), p. 25.

"The entire broadcasting industry is experiencing massive changes and so far we have seen only the tip of the iceberg. Digital technology will allow choice and encourage competition on an unprecedented scale. Broadcasting will become both more disparate and more global, and certainly more commercial." .- Birt, J (Director-General, BBC), 1996.[8]

In its' 1996/97 annual report, BBC chairman Sir Christopher Bland talks of preparing the BBC for the ***"impending digital revolution"*** and ***"responding to the digital challenges".*** To hear a public-service broadcaster speaking in these terms is an indicator that changes are indeed on the way. For the consumer, this will mean in the first instance, more choice.

"Over the past year we have planned, consulted and developed a core of new services. We shall start to introduce these over the next few months as the means of delivery become available. They include a 24-hour television news channel, BBC1 and BBC2 in widescreen, BBC Choice, which will extend the output on the main television networks and BBC Inform, a new service of information and data. These new services will be optional but free to licence payers.". Birt, J (Director-General, BBC), 1996.[9]

As more broadcasters offer this kind of choice, more consumers will equip themselves with the technology required to

[8]J. Birt, *Annual Report and Accounts 96/97*, (London: British Broadcasting Corporation, 1997), p. 12.
[9][Ditto].

exploit new services to their maximum potential. The UK marketplace has already seen this with the recent popularity of cable and satellite TV subscription channels.

"During the first half of 1997/8 ... consumer revenue grew by 22%, with consumer television revenue increasing by 34% to £86 million. [compared with the same period 1996/97]". - *Cable & Wireless Communications*..[10]

But what is meant by the term 'digital revolution'? In the case of the domestic realm, many existing technologies such as the telephone, radio and television would significantly benefit from recently affordable developments in digital technology. This modernisation process, currently being integrated into many new versions of these products is what I am referring to. Whether it is an evolution or revolution depends on how quickly the new technology is adopted and fully utilised by a broad consumer base.

One of the main points to be considered when discussing the digitisation of such products is that of interactivity. The telephone, for example is an interactive medium allowing a 2-way (or more) communication between geographically separated persons. The main restriction of the hardware is that of sound quality and that fact that you can not see the other parties you are communicating with, face to face. Television, on the other hand is a passive medium, allowing minimum user interactivity. The only element of choice with traditional broadcasting technology is which channel to

[10][Author not stated], *Cable & Wireless Communications News Release*, (London: Cable & Wireless Communications, November 10, 1997).

receive. (Teletext offers a limited range of choices, but has been technologically suffocated since its introduction due to the limitations of the UHF analogue signal). With strategies implementing new technology, such as digital broadcasting, the concept of television viewing and communication via home technology will, I suggest, change significantly over the next decade. The television will have the potential to become a truly interactive medium encompassing all forms of home entertainment and communication with the outside world. Certain European countries are already enjoying the benefits of interactive live sports coverage where the viewer can choose from a number of different camera angles, and prompt replays of selected moments during a game (*TVi*). **[Appendix 2].**

"Digital Television is likely to have the greatest impact on viewing since the advent of the television itself. Digital TV broadcasts are planned for 1998 ... " - *Radio Rentals*, April 1998.[11]

The era of digital broadcast also brings advantages to the broadcasters themselves; one of the main flaws in the nationally-funded TV service in the UK is that of collecting payment from consumers. Non-payers of the license fee can still receive and benefit from the services, and detection of non-payers is an expensive and full-time business. However, interactive broadcast will, by its very nature require the consumer to register or subscribe to a service, thus being accountable at all times; consumers may stand to benefit in the long term when

[11][Author not stated], *Widescreen TV promise*, (Reading: Radio Rentals Ltd, 1998).

broadcasters stop losing money to fee evasion. The UK licence fee may have a limited life if new methods become popular.

The Internet, recently confined to a highly computer-literate elite has already become available (via low-cost custom add-on hardware) to non-PC owners with access to a television set and phone connection (*WebTV*).[12] This development in itself offers a superior alternative to the ageing Teletext service, with additional benefits such as e-mail and home shopping. Radio and TV pirate broadcasters could then provide a true alternative to the commercial stations. Additionally, consumers would benefit from the developing trend of video conferencing, allowing eye to eye visual contact in real-time (globally, for the price of a local call); this may yet provide an alternative to the telephone as a means of communication. These services are all examples of how the convergence of media technologies may benefit consumers.

Matt Black, of London-based multimedia company *Hex* suggests that developers lost their way with PC development as a major entertainment medium. Speaking of the television network system I have just described, he commented:

"That could have happened a much longer time ago. If all the research and money that was spent on getting all the gen locks to work and developing all the monitors had just gone into making computers plug into televisions there would now be computers in all households. More than one. And the

[12][Author not stated], "1998 International CES The source for consumer technologies", Steve Jarret (ed), *T3*, March 1998, (Bath: Future Publishing Ltd, 1998), p.30.

entertainment revolution could get underway ...". - Black, M, 1998.[13]

Black highlighted one particular area of technological integration - a difficult area for manufacturers, who, following the fast buck will seek to avoid heavy R&D costs in areas of high risk. The particular problem in this instance is that of resolution; the television ceased to be supported as a means of monitoring computer graphics output when higher resolution pixelation was required. All standard PC equivalents are now designed for use with custom high resolution monitors, leaving the standard television with its poorly bitmapped low resolution Teletext as an information service. For this reason, the *WebTV* hardware I described earlier has made a poor impression on the market; the standard television set is simply not technologically capable of the task.

It has been well documented that many of the large broadcasters and hardware manufacturers have been researching into high-definition TV (HDTV) for some time as a means of broadcasting high-quality television pictures. The technology involved in transmitting and receiving images of higher resolution does not in itself present any formidable problems, except that of maintaining backward compatibility with existing hardware. Much of the hardware is now available, albeit at the high-end of the market, with the latest development (set to become standard in the next few years) being Widescreen TV.

[13]S. Quinn, "Ninjas on the mix", Chris Everard (ed), *Technologica*, Vol. 1, Issue 5, (Stockport: Mondiale Publishing, 1998), p. 96.

Only when the hardware finally filters down to the 'average' layperson can the convergence finally become beneficial to consumers en mass. Indeed, one of the many problems holding any convergence back, as Black highlights, is that of bringing the available developments into line; both in compatibility terms and within financial reach of the consumer. This task is in the hands of the research and development departments of the multinational hardware manufacturers and broadcasters. Unfortunately, this can sometimes cause conflicting business interests, as Douglas Rushkoff points out with reference to Internet technology...

"The companies ... (intentionally) create all sorts of compatibility problems as they fight for dominance in the marketplace ... By setting standards and fighting compatibility, companies can insure that their customers will need to buy new machines and software if they want to keep communicating with others.". - Rushkoff, D, 1998.[14]

Rushkoff continues, arguing that it is not competition that pushes forward technological progress, but consumer input and research. In reference to the Internet, he states that it ***"... depends on cooperation for its survival"*** and ***"while shareware developers create programs to address universal needs, businesses develop programs in order to create needs.".***

Java, a new computer programming language which is non-hardware specific is, in line with recent trends, being offered free

[14]D. Rushkoff, "Free lessons in innovation", *The Guardian Online*, April 9, 1998, (London: Guardian Newspapers Ltd, 1998), p. 16.

on the internet by *Sun Microsystems*, its' developers. This serves the dual purpose of allowing consumers to test the software by highlighting any operating problems, and offer feedback. It is also a good marketing ploy which has been utilised to great success in other markets. By offering consumers a free product, they become dependent upon that standard, and peripheral or exclusively-compatible services are where the business makes it's revenue. This approach has been used to sell mobile phone contracts (by offering free or subsidised hardware) and may be a way for businesses to gain vital user loyalty to their proprietary systems.

"Unlike telephone systems, cable TV systems do not conform to any national standard, and the technology can vary from one cable system to another. A set-top descrambler used in one cable system probably won't work in another system.". - Ciciora, W, 1995.[15]

"Big companies ... [will] give away set-top boxes that connect the TV to a cable or satellite system to bring you web TV, Internet shopping and so on. They'll do it because they make money on the connect time and call charges.". - Trump, R, 1998.[16] (

In the case of Internet services, we are currently in a marketplace where there is an abundance of service providers offering a free trial periods, including software, email addresses and Web space. In a bid to pull as many individual users online as

[15]W.S. Ciciora, "CABLE Television: Views on the Set-Top Box", Philip V.W. Dodds (ed), *Digital Multimedia Cross-Industry Guide*, (Newton, MA: Butterworth-Heinnemann, 1995), p. 66.
[16]R. Trump, "Home help", *The Guardian Online*, February 12, 1998, (London: Guardian Newspapers Ltd, 1998), p. 4.

possible, one may be forgiven for thinking that the Internet will imminently become a main part of our arsenal of home entertainment services. However, although increasing in popularity, the first report on Europe's internet growth by US analysts *Forrester Research* shows almost all increasing revenues are generated from business to business e-mail commerce, and not from retail sales to consumers. The report goes on to state that although Europe's online population will reach 53.2 million by 2001, only 15.1 million of those will be households, ***"well below publicised estimates of 38 million or more households".*** [17]

Consumers have been slow to take up the World Wide Web as a serious form of entertainment in the home. The prime reason for this is, I believe, that the hardware is not up to the task; while restricted to the medium of the desktop computer in the home office, it is an invaluable communication and educational tool. With a fast modem and browsing software, many have found the Web to be a fascinating form of home entertainment. However, as I have suggested, this will fail to become major competition to the terrestrial and subscription TV broadcasters until ease of use and low-costs (with no compromises in quality) become available. This means, in my opinion, abandoning the interface of the desktop computer, with its impenetrable language and operating system hierarchy. Equally, the televisions currently in use in most UK homes are not capable of matching the picture quality provided by the high-resolution desktop computer. Another factor is that of speed; the standard telephone line is not capable of fast, reliable,

[17]J. Schofield, "Floating points - Microfile", *The Guardian Online*, April 9, 1998, (London: Guardian Newspapers Ltd, 1998), p. 13.

digital data transfer. ISDN or proprietary cable mediums would have to be utilised for the 24-frames (or more) per second plus CD quality sound people have come to expect from a high-end home entertainment system.

"As well as offering PC access to the internet, [Cable & Wireless] is researching TV-based internet services. It is... trialling cable modems to give high-speed access to the services people want". - *Cable & Wireless Communications* news release, November 10, 1997.

This is a serious argument for the convergence of these related technologies; the hardware is available, the broadcasters have the services to offer. It is now in the hands of the consumer as to whether they want or need these new services. If they do, there are obvious advantages giving a freedom of choice and power of interactivity never envisaged before. However, the advantages also present complexities concerning security, copyright, distribution, payment and censorship, which, if not addressed properly by those in authority, could threaten the convergence process.

3 The proliferation of digital information - Security, Ownership and Censorship

The convergence of broadcast and communication media has raised important issues regarding ownership; many are questioning how information can be accurately sourced and accredited to its rightful original owner. Issues concerning copyright and ownership also relate to those of censorship; how can authorities control access to material thought unsuitable for minors (such as violence and pornography, for example), who can freely download material and save it for later retrieval. Individuals now have the power to broadcast and re-distribute media without consent. Until recently, regional and national governing bodies would be relatively successful in regulating and policing these problems. However, the dispersion of control to the anonymous individual has made this increasingly difficult. Who should govern the situation in order to protect those most at risk? Questions such as this have been increasingly difficult to answer since the rising popularity of Internet culture in recent years.

The Internet has grown in popularity partly due to its truly global nature, whereby the availability of information on any given topic is by probability, never more than a few mouse clicks away. Capability of hardware over the last 5 years has also played its part in this revolution, allowing not only text, but full colour animation and stereo sound to be retrieved from potentially anywhere across the globe. Further technological developments in

this arena include the recent ability to 'stream' information of a linear nature (such as continuous audio or video) via the telephone line, rather than having to go through the lengthy process of downloading sound/video files for archive playback. This has allowed truly interactive multimedia communication to take place on the internet such as music 'jamming' between groups of users[18] and the aforementioned 'net radio'[19].

The problem with groups of unknown individuals participating in one of the oldest home pastimes - making music (or indeed anything which involves unsolicited group participation on the Internet) - is that there is no objective means of assessing ownership; one individual's form of relaxation is another's next business opportunity.

This problem is not only restricted to the Internet; it is a ***"symptom of the information age"*** as Matt Black describes it. Black suggests that the global currency of assumed wealth and status has traditionally relied upon the acquisition of physical property or assets. This is now changing, due to digital technology; access to information and knowledge now equates to power in the highly evolved western world based around high-technology. This presents the same problems relating to copyright and ownership, as Black explains:

"If I've got a chair, and you steal my chair, I haven't got a chair anymore. But, if I've got a copy of a poem and I give you a

[18]['DRGN' music software for Internet jamming]. Available Http://www.resrocket.com
[19][Live Internet radio broadcasts]. Available Http://www.pirate-radio.co.uk

copy on disk, I've still got it, and you've got it as well; so it's a different kind of thing and this is a symptom of the information age. Information is taking over from material as the prime essence of what we are dealing in." - Black, M, 1994.[20]

Additionally, with digital information, material can be altered or changed transparently by third parties without its originator or interpreter knowing. Multiple copies can be posted anywhere on the Internet (a form of 'broad'cast) without the creators consent. There is the case of a highly personal 'home' video of TV actress and model Pamela Anderson and her partner. The tape in question was allegedly stolen from their apartment and is now being sold as pornography on the Internet. This breach of moral rights and privacy is difficult to control, even when criminal breaches have occurred. Once material enters the public domain, even for a short period of time, numerous third parties in different corners of the globe have the means to continue distributing or profiting from this.

"With print, information is already complete. It is the reader who is the processor, the free agent. But now that machines are processing words and information for us, we may have to take a harder look at the relationship between our media and the perception of ourselves as autonomous consumers and producers of information.". - de Kerckhove, D, 1997.[21]

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[20]W. Pilmer, *Music Technology* , (Radio), Radio One 97-99 FM, (Manchester: British Broadcasting Corporation, 1994).

[21]D. de Kerckhove, "Psychotechnologies", Christopher Dewdney (ed), *The Skin of Culture*,(London: Kogan Page Limited, 1997), p.209.

Esther Dyson, in her book 'Release 2.0 - A design for living in the digital age' highlights the increasingly common practice of electronic tagging, allowing content available in digital forms to be electronically monitored and billed for.

"Already, there is a 'Digital Property Rights Language' ... Xerox has licensed it to others including IBM, which is using ... protective digital "envelopes" that use encryption and monitor permitted uses of the content with the rights language ... Playboy has started 'watermarking' its images so it can detect them wherever they may be copied on the Net." - Dyson, E, 1997.[22]

In the case of censorship, the Internet has taken control away from authorities wanting to restrict availability of products thought inappropriate for public consumption; a book banned in France but legally saleable in Holland can be posted on the Internet and available to anyone in France within hours of publication.

"National laws don't always work on the Net. On the Net, with its global reach, that could be a big problem, even tougher than creating a common currency because there's more to harmonisation than an exchange rate.". - Dyson, E, 1998.[23]

Dyson continues to suggest a labelling system, such as 'This site follows French privacy laws', which would allow the user to decide on what to view. Although more applicable to privacy than

[22]E. Dyson, *Release 2.0 A design for living in the Digital Age*, (London: Penguin Books Ltd, 1997), p. 139.
[23]E. Dyson, "Trust should be the common currency", *The Guardian Online*, (London: Guardian Newspapers Ltd, April 2, 1998), p. 9.

censorship, a similar system could be adopted for the purposes of information before users enter a site. A more satisfactory solution, however, would be for governments to make it an obligation for service providers to restrict availability of sites not conforming to the guidelines set for that country. This ideal is a long way from being a realistic goal however, and still relies on an international consensus for a uniform and clear labelling system.

Since the Internet allows access to information in non-material forms, the user can effectively aquire information without owning the rights to it. This again presents problems for the censors who, for example may want to protect minors from accessing material of a violent or pornographic nature. The more astute and moral standing pornographic sites on the Internet limit access to X-rated material to only those who can prove their mature age and identity or a subscription code. This is one solution to the problem, but can only be fruitful if the system is adopted on a global scale. As with existing media, a certain responsibility must be placed in the hands of parents to decide what is and is not suitable for their children. Most Internet browsing software now includes password entry and options to filter out unwanted language, nudity, sex and violence. However, they are not foolproof, and act as merely another thin safety net in combating the problem.

The next step, I would suggest (and it will take quite some time for all parties to address the situation and implement any system successfully), would be for a global forum on these related topics and a uniform system of combating the problem. Restriction laws are in constant need of updating; the '9 o'clock watershed' of

British television broadcasting serves as little more than a parental guide, in the same way that film censorship gives a labelling code with guidelines on suitability for different age groups. However, digital information, as I have noted, is a far more malleable and complex medium; it can be retrieved, stored, coded, decoded, mutated, copied, bought, sold and exchanged entirely in the digital domain, with little regard to its originator or interpreter. The consumer is at their most vulnerable in the home, where entertainment to some may be construed as offensive material to others.

Another notable area affected by the convergence of communication and broadcast technology is that of financial security; the predicted boom in home shopping via online means is dependent on payment and personal details submitted during transactions being protected from unwanted third parties.

However, most businesses who are serious about generating custom via online sales are adopting methods of encryption, and although much has been written on the potential dangers of trading on the Internet, it is not as unsecure as many make it out to be; telephone or postal ordering presents more of a risk. Both the main Internet browsers (*Netscape Navigator* and *Internet Explorer*) have their own encryption codes built in for submission of personal details such as credit card numbers.

With this is mind, it is a fair assumption that as increasing numbers of people become used to the idea of piping into a global network, solutions to these related problems will become easier to

tackle; more communities and businesses will devote their energies towards common goals concerning fair trading and moral codes of practice. As this begins to happen, consumers will become more at ease with the technology and what it has to offer.

4 Sale & distribution of media products via online technology

The online revolution, whatever form it may take gives more choice to consumers not only in what they consume, but also how they pay for it, and what form it takes. Traditionally, the formats used as mediums for media consumption, even digitally, are purchased 'over the counter' at a local retail outlet; CD's, Videos, and CD ROM's, for instance. The main broadcasters have to pay for the privilege of broadcasting these products. Online shopping has begun to take off, although it does not present any significant advantages over ordering via other means such as the telephone or mail, i.e. the product still has to be physically mailed to the customer. However, consumers are now nearing a time when the same quality they have come to expect from traditional formats, such as CD, is available via the digital broadcasts I have been referring to. Whether through the cable companies, digital radio transmission, or the Internet, consumers will be able to enjoy high-quality digital audio and video purely via online services.

This could mean a number of things if successful. Firstly, it could cut costs, which would benefit the consumer; packaging, retail and distribution costs could be kept to a minimum. It would also allow smaller companies and individuals to sell media products directly, where they would otherwise have been unable to, due to the high costs involved.

A service not unlike an online jukebox could be envisaged, with customers 'dialling up' products of their choice (music, music videos, video games, classic TV shows, films, live sport broadcasts; people would not make such a heavy distinction between these products due to the physical storage mediums being banished). Payment could either be via credit card (an unlikely choice, I would suggest), or on an account, billed monthly to the customer. This would, however, require service providers to come to an agreement with the online retailers, in order to pay monies collected. A system such as this may not be far from fruition, as companies such as *Liquid Audio,* who have secured online distribution deals with several major-label music acts (utilising software encryption), become as popular as the high-street retailers.

"There's lots of research to suggest that retail shopping will be done increasingly online.". Willis, L (business manager of *Entertainment Express* online music retailer), 1998.[24]

New methods of media distribution are being piloted, such as MPEG Layer 3 Compression for music (or MP3 for short) and E-Mod (Encoded Music for Online Delivery), which allows the user to burn only a single CDR clone of the downloaded file. If successful, this may lead the industry to encourage the use of digital recordable media as a means of storing downloaded product in this way. There are already portable MP3 players available, which store music downloaded from the Internet for

[24]L. Willis, "Online selling picks up with two more stores", *Music Week*, (London: Music Week, February 21, 1998).

personal listening. I am not suggesting that traditional means of consuming media, such as CD's will become extinct; there was enough ill-feeling among consumers when the vinyl LP ceased large-scale production, with record companies re-marketing entire back catalogues for the CD format. There will always be an argument for having a product which feels physically real, complete with inlay artwork; a personal item worth collecting which online delivery cannot give. It is, however a promising breeding ground, giving the option for people to put together their own collections of music, videos, games, correspondence and images in a customised form.

The current media retail and distribution system in the UK, encompassing all the formats covering music, film, and games software is a complex one; with a massive yearly turnover. We are now in a situation where anybody can advertise and even directly sell media products to a worldwide audience directly from our homes. However, in the harsh world of business, the tallest trees always get the most sun. When the convergence of technology leads consumers onto high quality means of transmission as well as reception, it would be a healthy assumption that many would take the 'DIY' ethic of the Internet a step further and give the big companies a run for their money. Realistically, however, this will not have the effect that many are contemplating.

For granted, the Internet radio pirates I referred to will be able to provide alternatives to commercial broadcasters who opt for the safe middle ground. However, the non-participating consumer, with a bewildering array of services is unlikely to waste

precious leisure time trudging through the wares of the obscure. Even at this relatively early stage of development, the Internet gives too much choice; search engines will need to become more responsive to user preferences, while broadcasters should offer the user easy categories of choice and ratings of quality. In the same way that radio playlisters at major stations such as *Radio 1FM* are more likely to playlist a David Bowie record over a unknown artist, many consumers will 'log on' to their multimedia hi-fi-surround-sound-home-cinema network only to follow these same preconditioned instincts.

5 Conclusion

"There is an increasing trend towards the convergence of telecommunications, information and entertainment.". - *Cable & Wireless Communications* news release, November 10, 1998.

Small and large scale integration of existing and developing technology in the home will, I suggest, have a significant impact on leisure patterns for UK consumers over the next 10-15 years. The passive broadcast media offering one-way relay of information is under threat, and now the technology is available, it is only a matter of time before it filters down to consumer level.

As I have stated before, it is imperative that in order for this to happen, available technology will have to be easy to understand and operate, following concepts consumers are already familiar with to deliver these new services. This means no computer jargon, conflicting or incompatible software, unstable operating systems or lengthy downloads; most consumers do not have the time, patience or knowledge to deal with such problems.

For this reason, a convergence of current and developing media technologies, in the broadcast, storage and communication sectors needs to happen to such a degree that global standards are agreed upon between all the main players; communication companies, service providers, software developers and hardware manufacturers. This is not unfeasible; much of this has already begun and will continue to happen way into the next millennium.

The convergence that I and many others are predicting will, I suggest, happen for the following reasons:

1) There is a demand from consumers for more choice and diversity in audio-visual home media entertainment (traditionally dominated by television viewing). This is demonstrated in the rising popularity of cable and satellite TV subscriptions. **[**Appendix 2].

2) Communications companies, service providers and broadcasters are responding by offering digital services capable of the choice and diversity commanded. A main issue determining the speed at which any convergence will develop is that as more people become educated of the capabilities of available technology, the more demand there will be for such services. This in turn will push prices down, and fuel the streamlining process towards standardising and refining product lines.

3) Software developers, record companies and businesses are exploiting this new trend by opening Web sites and encouraging business via online means.

"[Online music sales are] a better way to deliver music - that's the bottom line.". - Rosen, L, 1998.[25]

The trend has been set, an will continue to accelerate beyond the millennium. Governments will sooner or later have to respond

[25]K. Lillington, "No! It's not OK, computer", *The Guardian Online*, (London: Guardian Newspapers Ltd, April 16, 1998), p. 3.

to the changing marketplace by updating the laws governing issues affected by the ongoing convergence process. And, as humans have to respond to technological advancements, the technology used as a platform for the delivery of new services will have to adapt (which is really the essence of the convergence process itself) to suit consumers wants and needs (namely power, ease of use and value for money).

Our collective inter and intra-personal perception of TV media is dominated by a sense of social observation, and (even though still a one-way form of communication) has perhaps become the cultural mainstay it has, due to the fact that the television provides a wide variety of easily palatable social entertainment. i.e. it mainly portrays, discusses or reflects real life. If convergence is to be as successful at a consumer level, technologies such as the Internet must adapt to offer this same level of social stimulation.

"Interaction with machines, however temporarily novel, will reveal itself as a poor substitute for using machines to interact with one another. We will tire of a 'bit only' Internet and, unless we engage in its living communities, we will instinctively reject its lifeless offerings". - Rushkoff, D, 1998.[26]

With this in mind, my personal view is that the broadcast sector will benefit most from the convergence, as non-broadcast technologies such as the Sony MiniDisc, MP3 players and CDR/CDRW will serve to give consumers the ability to build

[26]D. Rushkoff, "We woz robbed!", *The Guardian Online*, (London: Guardian Newspapers Ltd, January 8, 1998), p. 9.

personal libraries of archive material, in the same way as the VHS videorecorder is used today. Traditional media products such as the Compact Disc will still be around for a long time to come, although they will have to sustain an increasingly unique appeal in order to survive what promises to be an exciting period of development in the media industry.

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Http://www.pirate-radio.co.uk	Live Internet radio broadcasts.
Http://www.realaudio.com	'RealAudio' player audio streaming software.
Http://www.resrocket.com for	'DRGN' music software Internet jamming.
Http://www.sky.co.uk	SKY Television Web site
Http://www.soundbyting.com	Recording Industry Association of America Anti-Piracy Campaign
Subnet-audio.co.uk/helicopter.htm	'Shockwave' realtime audio technology

Appendix 1

Glossary of terms

BPS	'Bits per second'. Used to rate modem speed for digital data transfer via a telephone line.
Burn	The process of writing to a CDR.
CD	'Compact Disc'. Format for storing digital information, developed by *Philips*.
CDR	'Compact Disc Recordable'. Record-once version of the CD.
DCC	'Digital Compact Cassette'. Digital version of the Philips Compact Cassette, launched in 1992, but failed to make an impression on the consumer market.
EMail	'Electronic Mail'. The practice of sending computer text via a telephone connection.
FM	'Frequency Modulation'. A means of transmitting high-quality stereo analogue signals used for local and national radio.

Frame	Term used in film or television for describing a single screen-shot. Most television is viewed at 24 or 25 frames per second.
HDTV	'High Definition Television'. A developing high-quality means of broadcasting television pictures with a higher pixel resolution than is currently in use.
ISDN	'Integrated Service Digital Network'. A high-quality digital telephone link which allows fast data transfer, designed for multimedia and business applications.
Log On	A term for entering online activity by keying in a user password or personal identity number.
MP3	'MPEG Layer Three Compression Format'. A form of data compression utilised for transferring CD-quality audio via the Internet.
PC	'Personal Computer' (Usually referring to the *IBM*-compatible variety).
R & D	'Research and Development'.

Scrambling	Digital coding of information intended only for paying subscribers on cable television networks with the correct 'de-scrambler' hardware.
Streaming	A form of data compression which allows real-time audio or moving images to be transmitted via a telephone line.
Teletext	Text information service available on UK terrestrial television networks as part of the UHF signal.
UHF	'Ultra High Frequency'. The type of waves used for transmitting television broadcasts for the five UK terrestrial channels.
VHF	'Very High Frequency'. (See 'FM').
Widescreen	Television pictures sized at a 16:9 ratio instead of the standard 4:3 ratio.
Windows	An operating system developed for IBM-compatible PC's by *Microsoft*.

Appendix 2

Cable & Wireless Communications

(Reprinted from Cable and Wireless Information Pack, 1998)

Residential Television Products

Videoway: This is Europe's most advanced interactive TV delivery system and provides information and data services (including teletext) in addition to a wide range of fun and educational "computer style" video games.

Interactive television (TVi): Videotron pioneered the introduction of this service in Europe, which permits the viewer to customise and participate in what they are watching. The viewer can, for example, select a the camera angle or an instant replay in sports programmes, or tailor programming to suit individual tastes or interests.

Cable Television Packages: The cable companies provide access to numerous cable channels. The TV packages can be tailored to suit different households and mean viewing will no longer be constrained by broadcast schedules. All this puts the customer in control over programming, time and cost.

The key to managing all the choice is an electronic programming guide or "navigational guide". In the future this is likely to be the

first thing you see when you switch on, and will show you an easy way to find what you want to watch.

Local Cable TV: Local networks provide a real opportunity and will give Cable & Wireless Communications a local face in its franchise areas. Organisations such as the local council, education authority or Chamber of Commerce will contribute to local cable TV with community programming.

Pay Per View: This means that customers can access a particular service whenever they want it. The customer orders an event, movie or TV programme by making a phone call when they want to watch it. Video on Demand encompasses everything currently available in video stores as well as access to a vast library of television programmes. This highly advanced service is already offered by Cable & Wireless Communications' sister company Hong Kong Telecom and will be commercially available in the next few years.

Internet Services

Cable & Wireless Communications' growing range of Internet services provide instant access to any information the customer requires, increasingly in an interactive manner. The Internet is faster and easier to use with a modem (provided by Cable & Wireless Communications) or through fetching requested information at off-peak times and retaining it in a local server within our franchises. This is a process called 'catching' - storing what the customer wants to avoid problems of congestion on the

Internet. Interactivity relies on a return path for the information and it is the capacity of fibre optic cable which allows for that. A current example of interactivity developed by NYNEX Corporation initiative - "Big Yellow" - an Interactive Yellow Pages which can be accessed from anywhere in the world.