TOWARDS DIGITAL TELEVISION IN EUROPE

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Abstract

On the face of it, DTV would seem to be a technology for which consumer demand is weak at best. As a production, delivery and display innovation, its deployment is more obviously driven by a technological rather than an audience imperative. The major question hanging over its future is how this greatly enhanced distribution system will be supplied with programmes. Much of the debate on DTV so far has concentrated on engineering standards, delivery platforms and the impact of competition. Major film/TV companies increasingly see the roll-out of DTV in the context of a "windowing" strategy, which serves to maximise profits by extending market reach over time as well as across territories. This will go some way towards answering the question of where significantly large new volumes of programming will be sourced in order to drive a "content is king" scenario. But there is the danger, for early adopters especially, that disillusionment may set in as the rhetoric of abundance, pushed hard by the TV industry for so long, is confronted by viewer realisation that "multiplexing" is really synonymous with "repeats," thus elevating the existing problem of viewer resistance to repeats in analogue broadcasting to new heights. In Europe, there is little doubt that public service broadcasters should play a major role in content supply, beacuase of their vast archives of programming and their accumulated investment in production infrasctucture. But the strengths of both cultural affinities and barriers in existing, analogue TV markets must be carefully assessed before we can extrapolate to any new digital environment and the role of PSB in it. We must also assess the current tensions between public and private TV systems, intensely focussed on the European Commission and its relationship with national governments since the adoption of the Protocol of the Amsterdam Treaty, in particular the guerrilla war being waged against the EBU, the attempt to redefine PSB as a set of programming genres, the contention that the licence fee is a form of "state aid" and the argument that PSB will be competing unfairly with private TV interersts if allowed to develop "new services."

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By the end of 1998, about 25 million households world-wide had access to digital television. Most were concentrated in a few European countries, plus Australia and the US, taking a direct-to-home (DTH) service from a handful of leading digital operators: DirecTV, USSB, Primestar, Canal Plus, Echostar and BSkyB (Renaud 1998, 11). These households represent only a tiny fraction of the global analogue television audience and the most intractable question in broadcast planning presently is the rate at which a critical mass of television households will switch from analogue to digital and how these can be mapped across different geographical regions and competing delivery platforms.

On the face of it, digital television would seem to be a technology for which consumer demand is weak. As a production, distribution and display innovation, its deployment is more obviously driven by a technological rather than a consumer imperative. This has energised government policy-makers to move towards decisions which will not only profoundly shape the configuration of television technologies for a long time to come but also protect the status quo of television industry stake-holders against the potentially disruptive effects of the new technology. In 1997, for instance, the British government, frustrated by the slow growth of cable television and the lack of terrestrial competition to BSkyB's direct broadcast satellite services, and determined to promote a rapid transition to Digital Terrestrial Television (DTT), ignored digital television's potential to provide an enhanced new high definition 1000+ line standard, which would double the definition of the existing standard, in favour of using its capacity to deliver a large number of channels via digital compression.

In effect, governments are licensing the new technology to established television interests, the first generation terrestrial operators who had ushered in the era of analogue television several decades ago, plus the second generation newcomers who pioneered analogue cable/satellite broadcasting. The interest of these major companies lies more in increasing the number of channels they transmit (despite what is already known about sluggish audience interest in analogue channel abundance) than in selling new high definition receiver sets or production equipment, neither of which they make. The potential of the new distribution technologies has stimulated them to hedge their bets, minimise their risks and diversify their options in a series of defensive manoeuvres that include spreading capital investment and sharing the development costs of digital television. Winston (1998, 301) points out the contrast with Japanese entrepreneurs, who have a strong interest in selling production and receiver hardware but cannot provide the necessary programming, despite attempts by Sony and Matsushita in the late 1980s to extend their vertical integration strategies into control of Hollywood majors and exploitation of their content (Herman and McChesney 1997).

At this stage in the evolution of digital television, the public is only dimly aware of what it all means, despite the hype that surrounds the roll-out optimists' predictions of how steeply the take-up curve should climb if only governments will deal decisively with the analogue switch-off problem. There is some evidence of consumer caution in the face of this new technology, as is evidenced, for instance, by Web TV's lacklustre performance in trying to convert a very expensive $25 million marketing effort into more than a very diffident purchase rate for its pioneering technology that allows access to the Web through existing TV sets using an add-on box (Parker 1998, 207). The aim of this paper is to the time factor in the move from analogue to digital and to explore issues of technology, economics and audience behaviour that must be

factored in to any attempt to predict the success or otherwise of digital television. We will also focus on content and how it will be provided in a future digital environment that promises an explosion in channel capacity but not necessarily in origination of new programming or real expansion of choice for viewers.

Media Technology and Society

Digital television is not the first communication technology to search for a compelling consumer demand. Some technologies, such as the videodisk or Polaroid's instant 8mm film , were rejected by the market and became historical redundancies, despite the brilliance of their prototypes. Other technologies diffused successfully but did so as prototype spin-offs, like the extension of microchip technology that yielded video games, or the CD that failed in a video format but succeeded first in audio form, when the record industry ceased pressing vinyl, and then in CD-Rom form as a memory store for computing. Winston (1998, 11-15) suggests that the "jerky advance into the future" of communications industries is ultimately determined by the tension established between a series of "brakes" and "accelerators" that are applied to technological innovation. The accelerator is the supervening social necessity transforming a prototype into an invention and pushing this out into the market place. Its diffusion, however, is restrained by the operation of brakes, general social constraints that coalesce to limit the disruption to pre-existing social formations that can be caused by the introduction of a new technology. Brakes slow the rate of diffusion, so that the need of media business entities for stable trading circumstances and the varied needs of other cultural institutions can be protected by a series of careful adaptations so that the social fabric in general can absorb the new technology.

The interaction of social, cultural, economic and political brakes and accelerators can be discerned in the history of all communication technologies (the telephone, radio, cinema, television, the computer, the VCR, the audio-cassette, the Internet), from the supervening nineteenth century need for safety in the technological infrastructure of the railway which created the need for the telegraph, to the economic pressures pushing today's global conglomerates to leverage themselves into a stronger market position by exploiting the potential of digital compression technology. Nothing is predetermined and inevitable (despite the ideological discourse of globalisation) about the outcome of the contradictions at work in society as each technology is either diffused successfully or suppressed into redundancy or transformed into a spin-off. Despite the steady stream of new communication technologies introduced into Western society over the last 150 years, and despite the periodic eruption in the public sphere of an Information Age rhetoric predicting rapid, revolutionary, almost uncontrollable change closely determined by technology itself, most of our social institutions — government, business and civil — have generally experienced evolutionary alteration rather than radical disjuncture and have managed to contain the disruptive potential of new technologies within existing social and cultural patterns. The same may be true of digital television.

Thus, from an historical vantage point it is surely pertinent to ask some fundamental questions about the roll-out of digital television, the latest large-scale communication innovation in Western history, mature in its development as a technology but in its infancy as a mechanism for the distribution and exhibition of audio-visual images to new audiences. Will it be deployed across the continents at the pace pre-

dicted by the most optimistic information revolutionaries working both inside and outside the television industry, releasing spectrum for less profligate uses, driving analogue television into historical oblivion, according to a timetable fixed by government switch-over decisions? Will it have the profound social effects claimed for it in a great deal of press comment, building on the work of Negroponte (1995) and other neo-McLuhanites who claim that a "new digital civilisation" is already upon us which is revolutionising even such fundamental human activities as the way we find pleasure in narratives?

Will digital television have the same kind of cultural "fit" that enabled the VCR to thrive over the last twenty years as a valued add-on advantage to television (allowing for time shifting and the personal archiving of broadcast material, providing inexpensive access to theatrical films) without unduly disturbing vested interests in broadcasting and cinema? Or will digital television, after a few years of trial by disappointed "early adopters," prove to be unable to offer sufficient advantage to large enough numbers of viewers (in terms of cost, temporal flexibility, choice, significant ease of use, enhanced aural and visual quality, interactivity, increased access to new programme material produced with high production values,) to out-perform the analogue system it seeks to replace? Will it then become a redundant device, like the 1125-line analogue HDTV system developed by NHK, funded by Japanese television licence payers, which perished in the face of an absence of public demand, huge expense and the threat of massive disruption to existing broadcasting systems (Hart 1998, 217-237)? Or will the basic television standard change from analogue to digital but in such a way that its advance into the future will be very jerky indeed, proceeding at a much slower pace than usually predicted, as it responds to several socio-economic brakes working to contain its disruptive potential, perhaps taking four or five decades more to transform the normal television viewing experience in most countries into something resembling the radical possibilities implied by the notion of "convergence" (Parker 1998, 204)?

It is evident that at this early stage in the deployment of digital television, the accelerators are fully engaged and the brakes are hardly yet perceptible. Digital television will build on the deeply embedded cultural drives that have been determining popular culture in general for the best part of a century and in particular the momentum to develop information and entertainment forms that could be delivered by a range of domestic technologies into the homes of the urban masses (Silverstone 1994). These drives encompass the deep, culturally determined addiction to realist illusion and classic narrative realism which has a very old provenance in the evolution of Western civilisation, given deeper institutional roots with the popularisation of prose fiction in the nineteenth century and the explosive development of cinematic fiction through the Hollywood narrative paradigm in the twentieth (Branagan 1992; Cubitt 1998).

The assumption among equipment manufacturers seems to be that "digital" is becoming a magical word that will successfully sell a new entertainment format that is the most exciting development since the introduction of the colour screen. Yet recent surveys across Europe indicate that up to sixty-five percent of people say pay-per - view programmes on digital are of "no value" to them. In one survey in Britain, only eight percent of people said they would want digital television ("Will Couch Potatoes" 1998). Whatever one thinks about the reliability of new product demand research, it is

likely that one of the main factors inhibiting the migration of viewers in large numbers from analogue to digital television will prove to be confusion about the different delivery systems, which include terrestrial, cable and direct-to-home satellite (DTH). This confusion will be exacerbated by the fact that the television industry itself, and many of its regulators, are not yet clear about what digital television as a social phenomenon will become.

Technological Uncertainties

Before we begin to think about programming in the digital age, a number of technological issues have to be elaborated. There is firstly the question of the trade-off in image quality that will be necessitated by digital compression according to MPEG standards. As with digital cellular telephony services, compression is necessary to conserve bandwidth and expand carrying capacity. But a compromise with quality results, to the surprise of many telephone users who expected from digital telephones quality comparable to digital audio compact discs. A similar surprise may await early adopters of digital television persuaded by sales campaigns promising greatly enhanced visual and audible realism (down to the sweat drops on the goalie's forehead!) on television sets that may be wide-screen but will not be high definition.

It is compression, of course, that has opened up the opportunity for long- established terrestrial broadcasters finally to challenge their more recently arrived cable / satellite competitors on the basis of channel abundance. Sinclair Broadcasting announced plans to broadcast a multichannel digital terrestrial service in the US in 1998 and the BBC has led a similar move to DTT on this side of the Atlantic, in turn spurring similar developments in neighbouring countries. Equally influential in shaping the present digital television situation have been developments in two parallel industries: the increasing consolidation of the personal computer market and the increasing privatisation of telephony. These global developments are reshaping what until recently was a series of discrete national over-the-air television environments and increasing competitive pressure at the supplier end, both content and delivery, now made possible by convergence. Hence the computer industry's interest in influencing decisions on new standards for scanning, despite serious misgivings about the practicability, from both an ergonomic and viewer habit point of view, of the current PC/TV screen convergence drive, pushing towards what Parker (1998, 204) reminds us was also a fetish of the 1950s: the desire to put multiple functions into one appliance.

There is the real possibility that competition among delivery platforms will seriously delay the development of a critical mass of digital television viewers as potential subscribers remain confused about the relative benefits of each platform. Will platform wars be resolved ultimately by technological factors alone? Will the television delivery industry settle into a stable environment in which access to each platform by households will be generally decided by the entry barrier of hardware costs, competing subscription charges, range of services offered and technical back-up promised, with an initially high degree of "churn" as viewer experimentation becomes an important feature of the change-over process? Or will public regulators eventually decide to intervene in the play of market forces by, for instance, allowing a single platform to monopolise delivery in particular geographical areas?

Although satellites enable the deployment of large-capacity delivery systems, new antennae and associated equipment required for satellites make DTH a relatively

expensive option for viewers, especially as the necessary equipment for electronically amplified reception of signals costs more than the passive antennae used by DTT and has a more frequent replacement cycle. Satellite distribution furthermore will be unable to deliver universal access, due to difficulty in getting line-of-sight to orbital positions because of urban clutter. It is worth noting that overall growth of DTH in the UK is now flat, with 3.4 million subscribers, and Sky's digital launch has not expanded the market (A Lunge 1998). Asynchronous Digital Subscriber Line (ADSL) has become the main delivery system in Singapore, squeezing multimedia bandwidth through old twisted copper wires at speeds sufficient for today's consumers' needs, but its future in Europe is uncertain beyond high-speed Internet delivery.

Cable systems provide probably the best return path capability for interactive services (viewers have the ergonomic advantage of pressing one button on the remote control for VOD and other services, rather than having to make a phone call) but cabling is uneconomic in rural areas because of the large distances between homes. Existing cable systems will require huge investment for conversion to digital and hybrid Cable/MMDS systems are prohibitively expensive due to the large number of new transmitters and repeaters needed for line-of-sight transmission. Although its channel capacity is more limited, DTT has superior propagation characteristics, requires fewer transmitters and is generally considered to be the most cost-effective way to fulfil a universal service obligation as a primary delivery system. Since it achieves very high population coverage for a relatively small investment, as it builds on existing transmitter networks and existing viewer aerials, it enables a relatively rapid rollout, a key element in the economic success of a platform. But it cannot offer telephony directly and must rely on other companies for its return path, although both BSkyB and ONDigital in the UK are attempting now to muscle in on the perceived strength of cable by bundling in discounted telephony as part of their set-top box offer. In Europe, DTT is receiving strong government encouragement in Ireland, the UK, Sweden, Spain, Finland and the Netherlands.

In the larger economies of Western Europe, digital television has made its entry into the audio-visual landscape initially via satellite, for a variety of historical reasons. A small number of influential private broadcasters already involved in pay-TV on cable / satellite systems began to use encrypted signals to pinpoint paid-up subscribers and protect their investment in programming. Digitisation of encrypted signals was an obvious next step so that multiplexing could be deployed to provide greater choice for subscribers. In Britain, for example, the government reacted to the slow growth of cable and the relatively rapid growth of BSkyB's DTH service by promoting the rapid development of DTT: a White Paper was published in August 1995 and a new Broadcasting Bill was introduced in Parliament four months later. Two groups bid for the licences to run twenty-four new DTT channels: British Digital Broadcasting (BDB) initially made up of BSkyB, Carlton and Granada, and Digital TV Network (DTN). BSkyB was forced by the ITC to withdraw from the BDB consortium, now operational as ONDigital. Many commentators saw in this a move to forestall the emergence of a Trojan horse scenario, in which the DTT platform would act as a shop window for its DTH service, showing a compilation of the basic and premium services available on its larger DTH platform.

In Germany, the two largest television broadcasters controlling terrestrial distribution were the public companies ARD and ZDF, while Deutsche Telekom controlled

most cable television systems. Direct broadcast satellite was therefore the choice of delivery vehicle for new private broadcasters and they aggressively pushed Germany towards digital television: Bertelesmann AG, the Kirch Group and Luxembourg-based CLT, which had launched the analogue satellite service RTL via the ASTRA satellite to France and Germany in the early 1980s in partnership with Bertelsmann.

A similar situation prevails in France, from where Canal Plus became the first company to offer a digital pay-TV service across much of Europe, built on its base of four million analogue pay-TV customers and its acquisition of the Dutch company Nethold, with its 8.5 million analogue subscriber base spread across Europe, Africa and the Middle East. These developments occurred against a background of limited choice in terrestrial television and very limited cable offerings. Deal making accelerated in both France and Germany, as the European Union deadline for deregulating telecommunications approached. Disputes continue over several standards issues, including the establishment of a common European standard for a set-top box application programme interface (API) in the face of US commercial interests who do not favour a completely open API (Microsoft 1998).

Meanwhile in Spain, conditions favoured the recent decision, as in Germany, for two main competitors in the digital market to merge into a single shared platform, to rationalise their programming offer, reduce satellite distribution costs and eventually derive economies of scale from using a single digital decoder. Since cable is not well advanced in Spain (less than 200,000 subscribers) the government is steering terrestrial broadcasters to commit to DTT as the alternative platform and a complete switch-off of analogue by 2010 (Spanish 1998). Canal Plus Espana, with 1.5 million analogue terrestrial pay-TV subscribers, is a keen supporter of DTT, since this will give it an intermediate level platform through which to migrate analogue subscribers to digital. DTT would then serve as a shop window for its more expansive digital satellite service, unless the Spanish regulator follows the ITC in Britain and steps in to frustrate the Trojan horse scenario.

Thus, the viability of different digital television platforms (and how they may be perceived by confused customers) must be estimated with reference to the specific conditions in each European territory, in particular the recent history of free-to-air and subscription analogue television and the interest, if any, of large well-established companies in digital television. In contrast with the large European countries discussed above, broadcasting in Ireland, with a population of 3.6 million and only 1.1 million television households, enjoys none of the economies of scale that benefit British broadcasters, who have a domestic audience twenty four times larger. Ireland in fact already receives all the major British channels across 75% of its households. The impetus for its move towards digital television originates solely in a realisation, crystallised in RTÉ, the national public service broadcaster, that since British digital television would spill over across the border with Northern Ireland from its launch in late 1998, it would be undesirable if large numbers of Irish viewers signed up to British digital services in the event of an Irish digital vacuum. This apprehension about sovereignty and national identity, articulated in the late nineties in response to the deployment of digital technology, echoes the debate in the 1950s on the setting up of analogue television and indeed the debate in the 1920s on the setting-up of a national radio service, in both of which fears about loss of cultural control and sovereignty in the face of British spill-over played a significant role (Savage 1996).

Predicting the success or failure of a digital platform must be anchored not only in the technological features of each, but in the industrial and historical conditions that prevail in each audio-visual environment. There is an emerging conviction in some sectors of the industry that DTT will have little impact unless there is a huge investment in providing set-top boxes that are either heavily subsidised or even free of charge. Both BSkyB and ONDigital in the UK now offer free decoders but there is still considerable speculation in the industry about the extend to which the lowering of entry barriers to each platform will increase the overall size of the market and accelerate the entry of the relatively stable proportions of the population classically defined in new product research as Innovators, Early Adopters, Early Majority, Late Majority and Laggards. If programme choice and viewing convenience are the two key motivating factors in consumer purchase decisions relating to digital television, both cable and satellite systems would seem to have the edge over DTT because they offer a large number of channels and may use some of their capacity for NVOD delivery of films or even staggered transmission of mainstream channels to suit viewer needs at different times of the day. A lack of bandwidth confines DTT broadcasters to providing a relatively smaller number of free-to-air and pay channels (though far more than analogue allows), so its potential strengths may be outweighed by what are seen as its fundamental weaknesses: limited capacity and being a late starter.

But it is also arguable that there are advantages in belonging to a second wave in the adoption of new technologies, in particular the ability to learn from the players who use the first wave of technologies, who incur high costs and take large risks. This may be an advantage for DTT. Furthermore, there is little evidence so far that audiences actually want hundreds, or even scores, of channels: existing large-capacity systems manage to generate viewer loyalty only to a core of about eight channels. The current strengths of different analogue platforms in each European market, the current penetration rates of pay television systems and the presence or absence of a large-scale corporate driver must be factored into any prediction about the outcome of platform wars. The problem of the slow rate at which a reticent population will migrate from analogue to digital and the length of the expensive dual broadcasting period required could be solved by adopting a radical solution along the lines of what is currently being discussed in Finland. If the television licence fee were raised by approximately 20 per cent, this would fund the provision of an upgradeable digital set-top box to every television household. Volume purchase of boxes from manufacturers would at once reduce cost per household, allay consumer fears of equipment obsolescence and guarantee a speedy rollout, thus reducing broadcaster costs for dual broadcasting.

Content is King

Given decisions over the last decade which amounted to turning away from digital television's capacity for delivering a new high definition widescreen standard and adopting instead its capacity for compression to deliver a wide number of channels, it must now be asked how this new distribution system, greatly enhanced in breadth rather than in depth, will be supplied with programmes. Indeed, much of the debate on digital television has so far concentrated on standards, delivery platforms and the impact of competition, although there is now a realisation, at least among broadcasters, that content not technology will drive the adoption of digital television, that, in

the jargon of the moment, "content is king." It is likely that new, profitable, server-based forms of content will emerge in time, whose early adopters will be today's youth, increasingly fluent with the interactive challenges presented by video games and the Internet. But the majority of viewers are still a long way from finding pleasure in interactivity and the new forms of multimedia narrativity it enables. It is almost certain that audience viewing habits and preferences will remain fixed in the medium term on the output of the mainstream broadcasting companies that currently dominate analogue distribution channels at global, regional and national levels, provided there is no major negative change in price or convenience of viewing.

The arrival of a second generation of broadcasters over the last dozen years or so has already had a huge impact on the analogue television industry. De-regulatory pressures in many Western societies over this period have encouraged the proliferation of private terrestrial and cable-delivered satellite channels, which in turn has led to a shrinking of audience share for all broadcasters. The most dramatic change in viewing behaviour has been in the US, where the commercial networks have seen their combined share decrease from 90 per cent for three networks in 1990 to about a 60 per cent share now for four networks and the halving of the audience that was available fifteen years ago for an average network show. Digital compression will drive the multiplication of channels and fragmentation of audiences still further. One result may be a shortage of programming in general and in the hunt for audience maximisation and the reduction of investment risk a skewing of production output towards a narrow range of programming, such as escapist fiction series provided by U.S. producers with brand names well established in the global television marketplace.

How will digital television interests thrive in such an environment? Major television and film production interests increasingly see the roll-out of digital television in the context of a "windowing" strategy, that is, adding a new exhibition window to augment those already developed (free-to-air television, monthly subscription pay-TV, pay-per-view, syndication, video rentals, video sales, first-run and second-run cinema release). The new digital windows serve to maximise profits by extending market reach over time through sequencing sales via an extended range of distribution channels. Exposure through one window acts as an effective promotion for others that open for the same product at a later time. Even before the deployment of digital television, European satellite channels offered second and third opportunities to sell exhibition rights to some very old television series as well as feature films whose chances of running again on analogue terrestrial television were negligible. A windowing strategy must take into account not only differences in the per-viewer price earned in the different windows but also such factors as the extent to which viewers exposed to a programme through one channel are eliminated from its potential audience in other channels, the rate at which viewer interest in a programme declines and differences between channels in their vulnerability to the cumulative effect of unauthorised copying (Owen and Wildeman 1992, 30).

Digital television offers major revenue-enhancing opportunities for programme providers to improve the efficiency of their price discrimination strategies by setting different prices for different customers according to their willingness to pay. To the extent that digital television facilitates more efficient price discrimination and therefore revenue growth, competitive forces should lead to increased investment in pro-

duction and thus improvement in the quality and quantity of programming. This argument assumes that "high value" (high-willingness-to-pay) viewers can be segmented from "low value" viewers and induced to pay higher prices for higher video or audio quality (HDTV, interactive TV) or more convenient viewing (VOD, NVOD, quantity discounting).

Mechanisms for such audience segmentation can be seen most clearly in the US film industry, where its products have very little time-sensitivity compared with, say, sports programming, where topicality is transformed into archival interest very rapidly. Feature films are released over time through a variety of windows, each opening up as the previous one closes, in such a way that high value film viewers are induced to pay high charges early in the release sequence (first run cinema release) and are separated in time from low value viewers who pay low prices (or nothing beyond their value in advertisers demographics) perhaps years later in the windowing sequence, for lower quality exhibition, such as films cluttered with commercial breaks on advertiser supported free-to-air television. Digital compression is already improving film and sports availability with staggered start times for the same programme and large capacity systems (satellite and cable) have greater freedom to exploit these technologies of convenience. But it remains to be seen if true VOD systems can overcome server configuration limitations and dramatically increase viewer flexibility. Digital technology may also offer the advantage of "metering" repeat programme viewings, like the DIVX technology that monitors traffic along a telephone line between a DVD player and a central computer and allows for quantity discounting (Waterman 1998).

Extending market reach over time through windowing and a segmentation strategy must confront two unknowns however. Firstly, audiences can be segmented in several ways — demographically, geographically, even psychographically — and use of a segmentation strategy requires audience groupings that are identifiable, accessible and of substantial size. Certain segments of the population may never be interested in the "heavy premium" pay-TV model, for instance, preferring a "mini-basic" package that includes reduced telephony, while other segments may be at the forefront of the natural upgrade cycle of the domestic TV set and as Early Adopters link their decision on a particular platform to the appeal of the Integrated Digital TV set rather than the low-cost set-top box. It is doubtful, however, if the economies of segmentation which may work in large digital television markets like the US, the UK, Germany or France will also work in European countries with much smaller markets which are rolling out digital television at the same time as their more populous neighbours. Secondly, there is the danger, for Early Adopters especially, that disillusionment may set in as the rhetoric of abundance, pushed hard by the television industry for so long, is confronted by viewer realisation that "multiplexing" is synonymous with repeats (Viewers' Choice, Yesterday's TV etc.), thus elevating to new heights the pre-existing problem of viewer resistance to repeats in analogue broadcasting. Winston (1998, 112) reminds us that objections to an excess of repeats at the dawn of analogue television in the UK was one of the factors in its slow uptake before the World War II moratorium.

Extending the market reach of programmes over time through careful sequencing of "windows" will go some way towards answering the question of where the abundance of programming will come from that is going to drive digital television, at least in large wealthy markets. In Europe, there is little doubt that public service broadcast-

ers will play a major role, because of their vast archives of programmes and their accumulated investment in production infrastructure. But even this will be inadequate for the channel abundance promised by some providers. We must therefore also examine both the potential and the limitations of extending the market reach of programmes over space in the process now often loosely referred to as globalisation.

Global Television?

One solution to the question of how to fill all the available digital television channels can be seen in the vision of "world television" associated with the naive global-villagism of commentators like Noll (1997, 18) in which television systems will carry the immense variety of all the world's existing television programming each day from every corner of the planet. Parker (1998, 201) is correct in concluding that there is no evidence of some market-significant unexpressed consumer demand for Italian game shows outside Italy or for local American mid-Western small town news outside of the US. Indeed, studies of CNN conclude that, despite its satellite coverage footprint of 200 countries world-wide, its average audience outside the US is very small indeed (Sparks 1998, 115), perhaps no more than a quarter of a million, heavily concentrated among US tourists, business travellers and expatriates (Parker 1996). Research evidence shows that viewing taste in most countries favours the local voice in news, delivered by journalists from within the culture who reflect national or regional values and outlook, hence the momentum towards "localisation." Further evidence of localisation is seen in MTV's move away from global uniformity towards more customised regional services, linguistically and musically tailored towards geographically differentiated tastes; and in Star TV's switch from a pan-Asian English language format to a strategy of providing local language programming in its main regions of Asia (McChesney 1997, 73).

Rather than allowing viewers to sample television from every corner of the globe, a more likely scenario for any 1000-channel "Death Star" satellite, if such ever develops, will be the delivery of mostly US-made fiction, especially feature films, on several hundred of those channels, for convenient-time viewing on digital television or downloading to the home DVD player. It is instructive, therefore, to examine existing trends in the global flow of television fiction in order to understand how distribution patterns in the digital age might be structured.

In recent years the US has enjoyed a growing trade surplus for audio-visual products (TV, video, cinema) with the EU, much of the expansion being attributable to increased US exports to new satellite TV channels (Statistical Yearbook 99). US exports of feature films to the EU are about ten times greater than imports to the US. Those for television programmes are seventeen times greater (Hoskins et al. 1997, 28). Globally the US accounts for about 75 per cent of all television programme exports, although there is evidence of increasing export success for producers in some regional television markets (especially Egypt for the Arab world, Brazil and Mexico for Latin America and Hong Kong for parts of Southeast Asia) in outselling US producers in their regions (Sinclair et al. 1996). The most tradable type of programming generally is drama, particularly programmes focused on crime, conflict or fantasy.

Reasons for US (and, some way behind, UK) dominance of global television markets have been well explored elsewhere (e.g., Collins et al. 1988; Hoskins et al. 1997) and need only a very brief mention here. The US enjoys a unique combination of

features: a large population speaking the same language and possessing more television sets than any other country; a GNP substantially larger than any of its rivals; production mostly in English, the world's largest language market in terms of GNP and the world's largest second language, through which a majority of the population of the globe communicates directly or through translation (Corcoran 1994); the concentration in one area, Los Angeles, of massive human and technical production infrastructure that includes financial and distribution expertise and associated diffusion of world-wide deal-making knowledge. The vertical and horizontal integration of media conglomerates advanced at an accelerating pace in the1990s and the active role played by successive US Governments in promoting its film and television industry abroad enabled it to sell programmes to foreign exhibitors at prices below the price of production or of domestic exhibition.

These comparative advantages are amplified in the global television market by the unique economic character of the television industry. Television programming, unlike goods produced in most other industries, is a "joint consumption good." Viewing by one consumer does not use up the product or detract from the enjoyment of other viewers, so cost is unaffected by the number of markets to which copies are supplied. Revenue generated from foreign markets is therefore obtained at minimal incremental cost, effectively involving only the cost of replicating and distributing another copy of an existing programme, although this may include the relatively low cost of extra tapes, residual fees for actors and writers, dubbing/subtitling and marketing/distribution costs. The size of its domestic market allows for a high production cost (typically well over one million dollars per episode for US-made drama) for the first copy, which in turn increases its value to an exhibitor in a foreign market. A large domestic market results in a larger production budget, which in turn increases the proportion of the potential audience to which the programme appeals, since higher budgets in film and TV are positively related to higher viewer appeal. This is because producers who have more finance at their disposal can spend more on inputs that enhance the audience appeal of their productions: expensive sound effects, elaborate sets and multiple locations, star actors and writers. Conversely, lack of capital tends to drive down programme quality. Thus there is a wide range within which to negotiate a trading price which will look both attractive to the exporter, because it is above the cost of supplying, and attractive to the importer because it is below the revenue-generating potential of the destination market (Hoskins et al. 1997, 34). Of course, the joint consumption characteristic of TV programming and the minimal cost of duplicating it also explains the prevalence of video piracy in many parts of the world (Sinclair et al. 1996).

Cultural Barriers

While international trade in television programmes is significantly structured by economic factors, the role of cultural factors is probably just as significant. It is important to note that even same-language markets may be dominated by cultural differences which severely inhibit the flow of television programmes. Every cultural product that is sold across borders carries with it some degree of "cultural discount" or diminished appeal that is based on viewer's difficulty in identifying with aspects of its form and content. In the case of television, a large cultural discount may apply where methods of language transfer such as subtitling or dubbing lessen foreign programme appeal to native audiences, or less obviously, where programmes reflect a

different history or physical environment, or alien belief systems and behavioural patterns, or build on such formal differences as editing tempo, pace of scene changes, use of cameras and colour, music tracks or acting styles. As Collins et al. (1988, 57) point out, a condition of consistent success in the international market is the production of programmes that appeal to international tastes, in which national content is confined to the internationally current stereotypes of national histories and formations. The US, for instance, is mainly represented to the rest of the world in terms of contemporary melodrama in which the values of capitalist business and the family are shown, both positively and negatively. A great deal of drama originating in the American television industry, using tried and tested formats that have survived in the competitive polyglot US domestic market, has gained popularity globally over several decades as a near-universal narrative form.

Thus, Hoskins and Mirus (1988), assuming that fewer viewers will watch a foreign programme than will watch a domestic programme of the same type and quality, calculate the percentage reduction in value (revenue potential) to the foreign exhibitor of the cultural discount attached to a given imported programme in this formula:

(Value of Domestic Equivalent — Value of Import) / (Value of Domestic Equivalent).

The assumption here is that, all other things being equal, viewers prefer watching domestic programmes in their own language, locally produced, or even ones that have cultural relevance or proximity based on production in an adjacent geographical region or a distant but common geolinguistic region.

There has been little empirical examination of cultural discount. Dupagne and Waterman (1998) examined the flow of US television fiction into 17 Western European countries and concluded that value of imports was negatively related to the size of the receiving country's GDP and positively related to the number of private stations it had. Countries with a larger percentage of private stations were more likely to rely on US fiction imports. Surprisingly, the level of English fluency was negatively related to the level of fiction imports, confounding predictions based on cultural discount. Countries with high English language fluency, like the UK and the Scandinavian countries, import relatively little television programming from the US, although there may be a spurious relationship here between linguistic factors and the presence of a strong public service broadcasting tradition, since the study also finds that countries with fewer private television stations are less likely to import US fiction. They conclude that "perhaps a better proxy for the cultural discount factor than language would be some measure of Westernisation/Americanisation, such as number of fast-food restaurants or consumption of soft-drinks in a country" (p. 217).

However, in Biltereyst's (1992) study of programme import flows in 26 channels spread across thirteen small European countries, where dependency on foreign fiction tends to be high (because of small internal market size and chronic shortage of resources for audio-visual production, especially in the expensive category of fiction), there is some evidence of the strength of cultural affinities and cultural barriers as determiners of programme flow between countries. Despite EU diffusion quota regulations, programmes from major European regional exporters encounter strong barriers, unless they emanate from same-language regions. US-made fiction flows predominantly to private stations, which invest very little in indigenous-language fiction. The proliferation of private television in a deregulated Europe in the 1980s has meant that the public broadcasting discourse on the protection of cultural identity,

which used to defend the need for home-produced drama, has yielded to a logic of competition, especially in small countries not dependent on a larger, same-language neighbour, where both public and private broadcasters recognise the programming strength of home-made fiction in a competitive environment.

It is likely that with the rollout of digital television, existing analogue trends will be amplified. Thus German public broadcasters decided in 1998 to take advantage of the popularity of home-produced material by switching investment away from acquiring US material, where strong inflationary pressures are now driven by the competitive forces unleashed by channel diversity, in order to increase investment in home-production. In smaller countries, where it also might be desirable to take this route, there is a danger that inadequate revenue streams will only support material with low production values, which will then be rejected by audiences in favour of expensively made imports.

Cost factors are already related to trends in the importation of international programme formats (mainly situation comedies and soaps) and formulae into home-made productions, thus giving a new twist to the notion of the globalisation of television production. O'Donnell (1998), following a broadly neo-Gramscian approach linking the success of television fiction to large-scale socio-political changes in 14 European countries, analysed the position of domestic soap operas in the international context of the 1990s. In late 1989, only eight domestic soaps (six in the UK, one in Ireland, one in Germany) existed in a continent dominated by US soaps. Today almost 50 exist, most of them domestically produced or co-produced, and normally screened in or just before prime time. The driving force behind these apparent successes is the role of co-production partners like the Australian company Grundy International, now part of the British Pearson Group, in reworking serial formulae and scripts into localised versions tailored to different cultural and narrative configurations in each European country. While European domestic serials do not export well (Silj 1988; Biltereyst 1992) and the search for a pan-European soap has been abandoned for lack of audience interest, new serials have emerged, often developed from a common ancestor invented elsewhere, but adapted to the tolerances of domestic audiences. The patchwork of such tolerances, which forms the enduring cultural underlay of what is the contemporary European television market, is linked to different ideological balances and social value systems that flourish behind national boundaries that are otherwise impervious to the flow of serial television fiction. The local overrides the global, in the sense that although the long-established European preference for domestic programming endures, in many cases that programming has been deliberately bred from what once was a global prototype.

Conclusions

If digital television is to kill off the analogue system in the near term, all broadcasters must be able to exploit viewers' ability through new technology, such as electronic programme guides and perhaps eventually intelligent agents, to exercise greater choice than heretofore in what channel they want to view and when they want to view it. Their immediate task is to convince viewers to take the first step of deciding to surmount whatever barriers to entry still remain and adopt digital technology. Digital service providers, whether they are using cable, DTH, or DTT platforms, must invest significant funds up-front in digitising production and distribution and perhaps even

reception. They must then respond to investor demands by seeking to recoup these costs quickly through working towards a short, intensive rollout with a fast television household penetration rate. The pressures in this situation are being felt most acutely in smaller markets where the threat of insufficient subscriber revenues looms large, especially in environments where intense platform competition may be accompanied by uncertainty about the interoperability and upgradability of set-top boxes.

The outcome of the television industry's strategic encounter with digital technology over the last decade is that the main development of all digital services will be to increase programme supply, though this will hardly translate into a dramatic widening of real choice of content for viewers. Since no operator can afford to provide from current resources the huge range of programmes needed, the immediate challenge is the sourcing and purchasing of content. While there is no shortage of very cheap programming available in North (and now also South) America and Europe, filling every television schedule gap with dubbed soap operas and game shows will not seduce mass audiences away from what is for them less costly analogue television. "Blockbuster" films and sport may become the killer applications, but experience to date of special pay-per-view sports eventsand concerts and of NVOD has demonstrated low levels of audience interest (Weinberg 1998, 15). Experience also shows that good local productions will draw large audiences. But will digital television provide revenue for this, or will the solution be found in new variations on the local-global axis, in the form of hybrid localised international brands that may just ease past regulators' requirements protecting local production quotas?

"Localisation" has already become another mantra in the international television trade press, signifying the many ways in which pressures within global television markets respond to the evidence that domestic content has become more popular than imports. It now signifies a range of adaptive manoeuvres applied across different world regions, which are currently being implemented most forcefully by television companies as diverse as Star TV, ESPN, MTV and the Jim Henson Company. These include international franchising formats, providing "produce-it-yourself" kits to local companies for "reality-based" programmes; shooting local sequences for insertion into programmes aimed at a whole range of markets across different national cultures; selling localised versions of game shows that have attracted large audiences in major television markets; designing different versions of content in drama co-productions to reflect local accents and attitudes and eliminate what might be seen as "an American slant;" including local hosts and voice-overs in natural science programmes designed for global audiences and as narrative links in the interstices of magazine formats for which most of the edited documentary material is imported. These ways of locally customising and culturally adapting what is designed essentially as an international product build on the economies of scale and the business strategies established by US-based global companies like Coca Cola over the course of a century, paying close attention to local partnerships that handle the brand and its marketing. In the long run, one major impact of digital television may be to accelerate the tendencies towards localisation that have lain dormant for many years in Hollywood's infrequent interest in co-production.

It may also be that broadcasters with severely constrained budgets, who are cash-poor but airtime-rich, will require significant amounts of advertiser-funded programming in order to maximise audience share in a digital environment. As independent

producers search for new ways to find programme finance and broadcasters have less to spend on programming, advertisers are already beginning to play a bigger role in the direct financing of programmes. This can take the form of sponsorship (for example, Nescafe's decision to sponsor the cult US comedy *Friends* on Channel Four in the UK for a reported Ł4 million) or direct funding of production by advertisers who then supply programmes to broadcasters very cheaply in return for free advertising airtime. Advertisers argue that in a future of fragmented audiences and therefore reduced revenue streams, broadcasters will be unable to supply "quality" programming that fits well with the broad values of their products (UK Programme Production 1999). This trend in the advertising industry is not unrelated to another emerging strategy in the financing of programme production: the exploitation of cross-media opportunities by extending programme brands to other media besides television and to industries traditionally associated with the manufacturing and merchandising of toys and other products. This tendency follows the lead of Hollywood majors-turned-global-conglomerates who have a long experience of developing merchandising and licensing (M & L) activities as a way to spread both investment and risk and open up new markets. M & L exploits the brand value of characters that were originally established in films by moving them out into television, CDs, CD-ROM's, video and a range of toys and other products. It has already changed the face of children's television in the US (Pecora 1998) and the BBC's global merchandising success with Teletubbies demonstrates that even public service broadcasters are not immune from the lure of M & L as another way to generate revenue for production modifying the traditional relationships between independent producers, broadcasters and advertisers.

Paradoxically, despite the demonstrable power of local production to attract large audiences, it may be that the transition from analogue to digital television will need stronger, not weaker (as is often assumed) regulation, to encourage investment in new production as an integral part of the digital order. The Andersen (1998) study commissioned by the European Broadcasting Union shows that for Europe as a whole in the 1990s, despite increasing competition which should in theory lead to a greater spend on programming at the expense of profit margins, such expenditure is not in fact increasing. New (mainly private advertiser-supported and pay-television) broadcasters tend to devote a smaller percentage of their revenues to programming than do first generation broadcasters, even though they are increasing their market share steadily in revenue terms. Since new digital services, which are largely about offering easier access to already existing content, are likely to intensify current major pay-television trends, we shall see the percentage of revenue devoted to programme expenditure falling rapidly and television revenues being switched out of programming into both infrastructure (debt servicing, new transmission capacity, set-top box subsidies etc.) and service management (conditional access, subscription management). This trend is already evident in the three countries with the strongest pay-television markets: France, Spain and the UK, where the percentage of revenues devoted to programming is falling. In 1995, for instance, although BSkyB, which is practically free of regulatory requirements to invest in programme production devoted 42 per cent of its revenues to programming, 81per cent of this was spent on acquisition of sports, feature film and other purchased rights (Andersen 1998).

The gap between revenues and expenditure on programme production is also growing and at an even faster rate. The shift of revenues out of programme production is

mainly related to the entry into the market of second generation broadcasters (particularly pay-television companies) who devote more of their programme budgets to acquiring programmes (mainly sports, feature films and US material) than to programmes they have produced themselves, not least because of the increase in the volume of content transmitted. It is likely that the development of digital television will have a similar impact on production budgets. The Andersen (1998) report concludes that if the first generation broadcasters are unable to enter the digital marketplace and to seize the opportunities to exploit batter the programmes they make, they will find themselves in an accelerating decline. And if this happens, the proportion of television revenues flowing into programme production will also fall, as ever larger proportions of expenditure are concentrated on scarce sports and film rights and the most sought-after US fiction, whose value hyper-inflates as a consequence of intensified competition. As audiences become more fragmented, the value of easily-recognised programming will also increase and broadcasters' ability to substitute for these genres by producing their own high quality fiction (which they know will attract large audiences) will decline. When such acquisition costs rise faster than revenues, broadcasters will be obliged to shift resources out of production into acquisition and in a cycle of profound change in European television, decline in the supply of new high-quality production will serve to intensify audience demand for acquiring expensive imports.

It is mainly the growth of pay-television which is producing the shift of revenues out of programme expenditure and this trend will be exacerbated to the extent that pay television channels will dominate the future digital market. It may well be, furthermore, that what expenditure remains available for production will still be spread over a large number of hours of output, perhaps in response to pressures from regulators that focus on programme genre ratios (for instance, protection of factual or children's programming) rather than expenditure, driving down investment in production and therefore also production values. It is very unlikely that audience interest will be maintained in badly-produced news, current affairs, documentary, children's and other genres that may just ease past regulators' definition of "home production" but command no respect from and offer little pleasure to audiences with access to programmes made with higher production values albeit in other countries.

One further pressure on programme budgets may come in the form of electronic programme guides. Depending on the size of individual national markets, they may evolve into a programme-packaging role very similar to that filled by today's channels: taking advertising and even subscriptions from viewers and in turn making payments to content-providers for programming supplied. This would again alter the relationship between revenues and expenditure by changing the relationships between viewer, channel and programme. This would provide a further opportunity for siphoning off revenues from expenditure that could be flowing into programme production (Andersen 1998). The beginnings of a spiral of decline in European television production can already be discerned in the impact the second generation of analogue broadcasters is having on production in Europe. Blumler and Biltereyst (1997) trace the deterioration, across 39 channels in 17 countries, in children's programmes offered by public service broadcasters, a genre often taken as a litmus test of shifts in quality in the total television system. They found that while the increase in competition generated by the arrival of new broadcasters into a deregulated environment has

driven up the overall quantity of programming in the public sector, it has drastically depressed the range of genres offered and driven down the amount of domestic production that is originated for children. Expenditure has been shifted from production to acquisition, mostly of cheap imported animation material, which is now heavily relied upon to fill out the expanded schedules to the point of dominating output. Twice as many hours are devoted to animation than to either factual or dramatic programmes for children. The provision of more children's television is therefore a two-edged sword: it gives children more to view but it diminishes diversity both in genre (animation dominates) and in origin (more imports from the US).

There is every reason to believe that the spiral of decline in European production in Europe will intensify when digital television begins to exert pressure to increase the proportion of revenues required to cover non-programmes costs, unless policy-makers and regulators recognise current trends and move to encourage all broadcasters, first and second generation alike, to invest a majority of their revenues in originating new production and to ensure that a broad range of high-quality European production becomes an essential and integral part of what digital television offers viewers.

This will necessitate a new political commitment, firstly to recognising the declining market share of first generation free-to-air broadcasters, the sector with the strongest production infrastructure, by ensuring an appropriate increase in revenue to cover the additional costs of digital, and secondly, to supporting stronger content regulation through the imposition of positive programming requirements on all broadcasters, including pay-television and all second generation channels. This will obviate the danger of a very strong pay-television sector, benefiting from advertising and subscription, distorting the television market so badly that production declines dramatically across all sectors. From a public policy point of view, the ideal scenario is surely not to regulate expenditure on programming so strongly that the total market stagnates and total programme expenditure declines, but to find the point of balance between maximising the growth in revenues which digital television in principle makes possible and maximising expenditure on originating programming in each country and region of Europe.

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