DIGITAL TV, DIGITAL SWITCHOVER AND PUBLIC SERVICE BROADCASTING IN EUROPE

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Abstract

This paper aims to assess the role the Public Service Broadcasters (PSBs) have played in driving overall digital take-up and therefore bringing forward the likely date of digital switchover across Europe. While pay television has driven the initial uptake of Digital Television (DTV) in Europe, saturation of the pay television market in terms of penetration may be occurring. Attention was focused on the free-to-view market and with the launch of a number of free-to-air services (e.g. the BBC-led *Freeview* service in the UK in 2002; the France Televisions-led *TNT* in France in 2005), Digital Terrestrial Television (DTT) in many parts of Europe has turned into a free-to-air platform. The re-direction of DTT towards a primarily free-to-air system in which PSBs have a key role has proved compelling to many households, particularly affluent, older customers, who are skeptical about pay television, as evidenced by *Freeview*'s success (more than 7.5 million customers in early 2007). This paper argues that PSBs have played a significant role in enhancing consumer interest in digital services and making the target of prompt analogue switch-off across Europe in 2012 seem achievable.

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Introduction

This paper[1] aims to assess the role the Public Service Broadcasters (PSBs) have played in driving overall digital take-up and therefore bringing forward the likely date of digital switchover across Europe. While pay television has driven the initial uptake of Digital Television (DTV) in Europe, saturation of the pay television market in terms of penetration may be occurring. Attention was focused on the free-to-view market and with the launch of a number of free-to-air services (e.g. the BBC-led *Freeview* service in the UK in 2002; the France Televisions-led *TNT* in France in 2005) Digital Terrestrial Television (DTT) in many parts of Europe has turned into a free-to-air platform. The re-direction of DTT towards a primarily free-to-air system in which PSBs have a key role has proved compelling to many households, particularly affluent, older customers, who are sceptical about pay television, as evidenced by *Freeview*'s success (more than 7.5 million customers in early 2007). This paper argues that PSBs have played a significant role in enhancing consumer interest in digital services and making the target of prompt analogue switch-off across Europe in 2012 seem achievable.

Television represents the largest segment of the European audiovisual sector and in 2006 there were more than 4,100 TV channels which constituted the primary source of information for most people. The remarkable development of analogue television during the second half of the twentieth century led to widespread penetration and today nearly 99 per cent of the 200 million European households in the EU 27 own at least one TV set. Television has been characterised as a familiar and trusted medium of communication and played an important role in people's lives by bringing information and entertainment into living rooms. It has contributed to shaping our social and cultural understanding of the world, provided us with a forum of shared experiences and defining historical moments, and continually raised issues of construction of media discourses.

The advent of full digital broadcasting is expected to reinforce TV's role as the "window of the world" because it is expected to bring additional channels, more choice, better picture quality and an element of interactivity that may combat negative connotations associated with terms like "couch potato." Of course the extent of choice that is offered by DTV is also controversial given that some of the offerings of some service providers consist mainly of risk-averse material and repeats, while innovative and original home-grown output is largely missing. The potential exclusion of a sizeable minority, such as many older and disabled people, due to unavoidable problems of accessibility and usability of DTV is another area that needs attention as the process towards digital switchover accelerates (Carmichael et al 2006, 401).

Digital switchover is the phased switch-off of the analogue terrestrial television network and its replacement with a new, fully digital terrestrial network. It involves converting the current broadcasting network, as well as encouraging everyone to convert or upgrade their TV, radio and recording equipment to receive digital broadcasting. The case for switching-off the analogue signal grows stronger as more and more people convert to digital. Yet digital switchover is largely seen as an inevitable result of technological progress. It is an unpopular policy that people often see as coercive. This is partly because the national governments' rationale and motives for switchover are not entirely understood and trusted, and partly because

people think analogue television will be "taken away" and therefore they will have to incur costs to be able to continue to watch television (Klein et al 2004, 8-14).

However, completing the switch to digital will bring significant benefits both to consumers and broadcasters. National economies as a whole are also expected to benefit. More specifically digital broadcasting brings:

- Increased choice and quality for viewers (as there will be more channels and the opportunity to provide a better image, including wide-screen aspect ratio, high definition and sound quality);
- Lower transaction costs or the ability to transmit more channels or services for the same cost. Broadcasters will no longer have to incur the costs of transmitting signals in both formats, releasing sources for investment in programming and other services for consumers;
- Better efficiency in spectrum use (as more data can be transmitted within the same bandwidth). Spectrum will be released to allow the development of more television and other services for consumers. Digital terrestrial television signals are also expected to reach the population who live in areas that cannot currently receive them because of spectrum limitations; and
- The ability to transmit associated data allowing for enhanced television or fully interactive applications when associated with a return-path facility (BIPE 2002; Jowell 2004).

Alongside these tremendous economic and social benefits, the analogue switch-off entails drawbacks, notably it may result in social exclusion in so far as digital TV is unavailable to some parts of the population. The level of coverage after digital switchover should be the same (if not greater) than currently exists in analogue. However, it is not clear as to whether customers who can receive analogue signals will be able to receive digital terrestrial signals of acceptable quality in the future. In some countries, the level of DTT coverage is below 70 per cent, thus leaving out a large part of the population. Also, digital switchover should be affordable for the vast majority of the population. Costs of equipment are steadily decreasing – for example, in early 2007 in Britain digital set-top boxes were sold for just £30. However, the British government through the 2006 White Paper acknowledges that those aged 75 and over and people with disabilities are particularly likely to face practical difficulties in obtaining, installing and beginning to use digital equipment (DCMS 2006). Carmichael et al (2006) expressed concerns with regard to usability and accessibility for many older and disabled people in light of the range of powerful influences pushing for switchover to be completed within the next few years in the UK. As will be shown below, some European countries have taken measures to ensure that certain criteria of availability and affordability are satisfied as part of their strategy for analogue switch-off.[2]

In sum, the best-known advantage of digital TV is the breadth of choice it offers, followed by the improvements in picture and sound quality. However, the public remain concerned about the cost of converting and practical difficulties they might face in using the new services. Public awareness is also an issue - it is clear that a large part of the population is unaware of the benefits of digital TV and is therefore not making the switch themselves. Left entirely to the market, switchover may never happen, partly because not all households can affordably receive digital TV and partly because some do not see the need to convert their equipment to receive

digital TV. Governments and other public bodies should do more to demystify digital television's benefits to those unsure about making the move and ensure that the conversion occurs in a socially acceptable manner.

EU and National Approaches Towards Switchover

Digital switchover has been put high on the agenda of both national and European regulators in recent years. The role of DTT, in particular, is underscored in the e-Europe 2005 action plan as one of the three main access platforms to the information society, together with UMTS and fixed broadband access.[3] According to the e-Europe action plan, all member States were required to disclose their national strategies for the switchover from analogue to digital terrestrial television by the end of 2003. In June 2005 the European Commission published a Communication "on accelerating the transition from analogue to digital broadcasting" which urged EU Member States to bring forward the likely date of analogue switch-off and called for a coordinated approach to making freed-up spectrum available across the EU. The EC suggested the year 2012 as a possible target for the completion of switchover (EC 2005). This Communication builds on the 2003 Communication "on the transition from analogue to digital broadcasting" (from digital "switchover" to analogue "switch-off"), which set the benefits of switching over to digital broadcasting and initiated the debate on EU policy orientations on the amount and future uses of spectrum potentially released at switch-off of analogue terrestrial television transmission (EC 2003).

DTT has already been introduced in some countries of the EU, while others are still in the planning stage. The dates for the analogue switch-off that have been set by national governments vary greatly, depending upon penetration of digital services, the infrastructure and public awareness of the process to switchover (see Iosifidis 2005; Iosifidis 2006). Table 1 shows that most EU Member States have stated their intention to switch-off the analogue frequency sometime between 2006 and 2012. The Netherlands has set the very ambitious target of switching to digital by the end of 2006 and has now completed the process. Finland and Sweden are also expected to be among the first EU Member States to switch-off analogue terrestrial television at a national level. In Finland the terrestrial analogue network will be switched-off on 31 August 2007 and Sweden is expected to switch-off in February 2008.

The switch-off of analogue terrestrial TV will take place by end 2010 or earlier in established members such as Austria, Belgium (Flanders), Denmark, Spain and Luxemburg, but also in new members like Malta. Cyprus, Czech Republic, Greece, France, Hungary, Italy, Latvia, Slovenia, Slovakia and the UK are expected to switch-off between end 2010 and end 2012. Lithuania will begin regional switch-off in 2012, Poland has proposed 2014 as the date for switch-off and Bulgaria will begin the process in 2015. However, with the successful completion of the first switchover process in August 2003 Berlin/Brandenburg has played a pioneer role in Europe and beyond. But taken as a whole, Germany is not expected to turn-off the analogue transmissions before 2010. At the other end of the scale, national governments which have not committed to a prompt fixed date for analogue switch-off include established members such as Ireland and Portugal, but also the new members Estonia and Romania. To summarise, fast tract timetable switchover plans have been set in some countries of Northern Europe (the Netherlands, Finland, Sweden

and Germany), middle term plans have been set in Belgium, Britain, Denmark and Austria, whereas last territories to switch-off the analogue signal include the Mediterranean countries of Italy, France, Spain, Portugal and Greece, and most of the new members.

Table 1: DTV Roll out and Switch-off Dates of Analogue Terrestrial TV in EU Member States (2006-07)

Country	DTT roll-out	Switch-off dates
Austria	26 Oct 2006	2010
Belgium (Flanders)	2005	2012 (n.a. in Wallonia/Brussels)
Bulgaria	DTV started in Sofia in 2003	2015
Britain	available since 1998	2008-2012
Cyprus	DTT licence to be granted in 07	2012
Czech Republic	DTT started in Oct 2005	2012
Denmark	31 March 2006	Oct 2009
Estonia	-	no decision yet
Finland	available since 2001	31 August 2007
France	31 March 2005	Nov 2011
Germany	2002	2008: nation-wide switch-off
Greece	March 2006	2012
Hungary	envisaged 2007	31 December 2012
Ireland	DTT pilot 2nd phase in March 07	no decision yet
Italy	available since 2003	31 December 2012
Latvia	Expected to start in 2007	2012
Lithuania	2006 in Vilnius	2012
Luxembourg	April 2006	September 2006
Malta	Commercial operations started	31 Dec 2010
Netherlands	since 2003 in Amsterdam	October 2006
Poland	no decision yet	2014
Portugal	DTT tender expected in 2007	no decision yet
Romania	Not yet started	no decision yet
Slovakia	2006	2012
Slovenia	envisaged 2008	2012
Spain	available since 2000	31 December 2011
Sweden	available since 1999	1 February 2008

Source: Author's analysis based on information gathered from the EC (2007), Shulzycki (2007) and national regulatory agencies.

A close look at digital TV penetration across Europe reveals that digital TV conversion depends both on the adoption levels and the start date of the Digital Terrestrial Television technology. Table 2 shows that most of the countries with advanced

levels of DTT penetration have also set early dates for analogue switch-off. Finland and Sweden, which are committed to making the switchover to digital in 2007 or early 2008, ended 2006 with a DTT penetration of 40% and 21% respectively. Germany (with a 2008 switch-off date) and Italy (with an initial switch-off date of 2006, although later postponed to 2012), each also had relatively high DTT penetration in 2006 (17% and 19%). All these countries consider making the switchover before the end of 2010. Exception to this is Britain, arguably the most advanced European country with a DTT adoption in 2006 at 39%, well above the European average, but has fixed a late date for complete switchover. The British government policy is to replace today's ageing terrestrial broadcasting network during 2008 and 2012. Britain seems to proceed to switch-off with caution. The switchover will be contacted on a region by region basis, starting from the Border region in 2008 and completing with the Meridian, London, Tyne Tees and Ulster region in 2012. The relatively late timetable for switch-off is expected to allow plenty of time to manage the public information campaigns and coordinated industry communications through Digital UK (formerly Switch Co), the body which manages the transition.

Table 2: DTT Penetration in Selective EU Countries (end 2006)

Country	DTT penetration	Years after full launch
Britain	39%	8
Sweden	21%	7
Spain	15%	5
Finland	40%	5
Netherlands	4%	3
Germany	17%	3
Italy	19%	3
France	20%	1

Source: Shulzycki 2007.

DTV Forecasts

Market reports suggest a bright future of digital TV. According to market research from Strategy Analytics (2006) digital TV in Western Europe was expected to reach a new record by the end of 2006. Overall, 75 million homes in Western Europe will have at least one digital TV service by the end of 2006, up from 56 million at the end of 2005. Of these, nearly 19 million homes will buy digital TV for the first time. The report suggested that the most popular option for new subscribers is DTT, with more than 10 million new homes added in 2006 and forecasted that by 2010 digital TV penetration will have reached 77 per cent, or 127 million homes. Britain with 94 per cent penetration will remain Europe's leading digital TV market in 2010, with Ireland, Austria and Sweden next in line. DTT will overtake satellite to become Europe's largest digital TV platform by 2008 (Strategy Analytics 2006).

Despite his positive scenario, the European market will remain fragmented with regard to the adoption of technologies and there is little sign that Europe is developing a homogeneous digital TV industry. These variations in the national

structure of the TV industry create a dilemma for EC regulators in terms of the feasibility of introducing common digital switch-off dates. The rationale of EC's involvement in the field is to create a workable internal market. Without doubt, switchover will bring about benefits to viewers and broadcasters, stimulate innovation and growth of the consumer electronics sector, and therefore contribute to the renewed Lisbon agenda. Hence the earlier the switchover process is started and the shorter the transition period, the sooner these benefits are realised. However, the Commission's proposal for a common timescale may not be feasible, in view of the disparities of Member States' approaches and advances to digital switchover. It has been argued that the EC's proposal for the 2012 deadline for completing terrestrial analogue switch-off may lead some Member States to an ill-timed, insufficiently planned and unduly rapid introduction of DTT services to catch up with other more advanced territories (see Iosifidis 2006).

But what strategies should be adopted to accelerate digital uptake? The following section looks at different options put forward to encourage conversion and the next considers the role of Public Service Broadcasters (PSBs) in accomplishing switchover.

Accelerating Digital Uptake and Bringing Forward Switchover

Fixing a date for the Switchover

Until recently the conversion to digital broadcasting was occurring on a voluntary basis and was driven by the perceived benefits of digitisation. Households' plans for converting their televisions were voluntary because they did not take a definite switchover timetable into account. Up till the early 2000s a few EU countries had committed to a fixed date for switchover, as shown above. However, research undertaken in Britain showed that the announcement of a switchover timetable would trigger many people who would otherwise not have converted any televisions to make a plan (Klein et al 2004, 3). The study went on to show that without a timetable for switchover, uptake was likely to plateau at between 70 and 80 percent of households. If switchover was announced, then the vast majority of households would convert at least one television by the date of switchover (ibid 11). Those people who would only convert "if pushed" to do so by the impending switch-off of analogue television would tend to leave conversion until the last possible year. However, the research concludes that about 5 per cent of British households were unlikely to convert because of the costs and complexity of digital TV (ibid 14).

A 2004 report by the British regulator Ofcom also argued that digital switchover is achievable provided that there is a greater certainty over the timing of switchover. An announcement of a timetable would significantly extend digital penetration in the UK and would help allow digital switchover to be achieved between 2007 and the end of 2010 (Ofcom 2004). Following Ofcom's suggestion the British government finally announced the year 2012 as the likely date for the completion of digital switchover, a little longer than originally scheduled. Since then Britain has witnessed a continuation, or perhaps acceleration of digital TV take-up. More than 70 per sent of British households had bought digital TV services by the end of 2006 (all platforms), whereas the EU27 average was just above 25 per cent.

Government and Industry Subsidisation Schemes

Fixing a date for analogue switch-off is by far the only means of encouraging early digital TV adoption. Subsidising the relevant equipment to receive digital television (i.e. set-top boxes, integrated TV sets) may also prove compelling. In Italy DTT, known as *Televisione Digitale Terrestre*, is expanding rapidly. Almost every major network – including public broadcaster RAI and main commercial network Mediaset - started digital transmissions, and the Italian territory covered by DTT signal approaches 70 per cent. Italy was expected to switch to digital terrestrial by 31 December 2006 and this ambitious target was promoted by heavy government subsidisation of set-top boxes. In order to speed the switchover, in 2004 the former government (in charge until April 2006 and led by Silvio Berlusconi, owner of the Mediaset television network) started promoting the new standard by granting a subsidy for the purchase of a digital television decoder. However, low consumer interest and adoption of the technology meant that the deadline was not feasible. As digital conversion is occurring primarily on a voluntary basis, the Italian government plans to subsidise digital take-up may have cannibalised the market momentum for voluntary purchase of digital TV. It might have been wiser for the government to wait a bit longer and perhaps consider paying to convert the households which are refusing to buy any digital TV services (the so-called "refuseniks"). Italy is now expected to convert to digital by the end of 2012.

Other national governments also view public financial support as a necessary precondition to set the switchover process in motion and to implement it in a socially acceptable manner. Austria, for example, considers that the switchover to digital technology cannot be achieved without state support. As a financial incentive, in 2004 the Austrian broadcasting regulatory agency KommAustria, charged with developing a specific strategy for the introduction of digital broadcasting, considered setting up a "digitalisation fund" with an annual budget of 7.5 million Euros derived from licence fees. The resources from the fund may be used for various purposes, including assisting consumers who are unable to afford the end-user equipment in the final switchover phase scheduled to take place in 2010. In addition to the government's help to subsidise the cost of set-top boxes, a number of other options have been put forward to make digital TV more affordable. These include the direct, spontaneous actions from market players. For example, British Sky Broadcasting (BSkyB) has played a significant role in making digital television more affordable as it continues to subsidise digital set-top boxes, offering them for free to new subscribers. Cable operators also offer incentives to convert to digital as customers can access telephony, digital TV services and broadband Internet with a single subscription.

A 2002 BIPE study for the European Commission recommended the setting up of a so-called "Switchover Fund," which would consolidate the macro-economic transfers (BIPE 2002, 11). The funds raised from some of the players that will ultimately benefit from the analogue turn-off (terrestrial broadcasting players, other spectrum users, governments themselves) would be used to finance some of the measures that will help accelerate the process. The study went on to argue that compared with financial transfers through the general public budget, a dedicated Fund would provide some specific advantages: higher guarantees of transparency, platform neutrality and proportionality, consensual private/public decision-making.

The parties involved in the switchover process in Berlin that was completed in 2003 were in agreement that a key issue for a successful switchover was affordability for all homes regardless of income. Also the Interstate Broadcasting Treaty governing broadcasting in all German states was amended to entitle public broadcasters to gradually discontinue analogue terrestrial transmission under certain conditions including universal coverage of digital broadcasts. The British government's objective, first announced in September 1999, is to achieve full switchover from analogue to digital only when the following tests are satisfied:

- To ensure that everyone who can currently get the main public service broadcasting channels can receive them on digital systems
- To ensure that switching over is affordable for the vast majority
- To ensure that 95 per cent of consumers have access to digital equipment. (DCMS 2004).

Active Management

Alongside funding, active management is required to complete switchover effectively. Some European countries have established working groups with the task of bringing together all relevant players (TV broadcasters, the supply chain, regulators and consumer associations) to achieve a consensus in designing a clear plan for the switchover. In Germany, for instance, the successful completion of the first switchover process in August 2003 Berlin/Brandenburg was achieved with a coordinated process that ensured a socially acceptable manner. In Austria, a working group dubbed "Digital Platform Austria" was set up in 2002 with the task of developing a plan for a speed introduction of digital broadcasting. The group consists of members of broadcasting companies, service providers, network operators and consumer associations. Also in Britain the April 2005 formation at Government request of a properly staffed body with a significant marketing budget, SwitchCo (later renamed Digital UK), has contributed to the coordination of the country's switchover to digital television. Digital UK has three main objectives: to coordinate the technical roll-out of DTT across the country; to communicate with the public about switchover to ensure everyone knows what is happening, what they need to do and when; and to liaise with TV equipment manufacturers, retailers, digital platform operators and consumer groups to ensure understanding of and support for the switchover programme. However, there is some scepticism regarding Digital UK's adequate authority and resources to manage the interests of a diverse group of industry stakeholders and balance these with consumer concerns (see Reid 2006).

Free-to-air DTV

Until 2002 the economic model for DTV had been largely based on pay television services offered by private consortia. These consortia have acquired exclusive popular programming (particularly sports and film rights) and require subscribers to buy a decoder (and, in the case of satellite, a dish) to access it. However, the year 2002 witnessed the collapse of some high-profile pay-TV consortia. More specifically, in April 2002 *ITV Digital*, jointly owned by commercial broadcasters Carlton Communications and Granada Media Group (now merged) filed for bankruptcy. This financial crisis was the result of a poor management policy, technical problems

(picture freezing) and the decision to give away free set-top boxes to emulate the strategy of pay satellite broadcaster BSkyB. Above all though, the consortium's collapse was caused by overbidding for football rights (Iosifidis, Steemers and Wheeler 2005, 112-14).

The simultaneous closure of another pay DTT platform in Spain put the viability of the technology in serious doubt. DTT operator *Onda Digital* (later renamed *Quiero TV*) was introduced in 1999, making Spain the third country in the world to launch DTT (the other two being Britain and Sweden). Owing to huge debts and limited subscriber base, in April 2002 *Quiero TV*'s shareholders decided to close the platform. *Quiero TV*'s failure can be attributed to a number of factors, including the relatively limited number of services compared to those offered by rival digital satellite platforms Canal Satellite Digital and Via Digital (now merged), limited geographical reach as it covered only 60 per cent of the Spanish population, and prohibitive cost (about 400-500 Euros) of purchasing the digital decoder (Iosifidis, Steemers and Wheeler 2005, 115-16).

These failures raised serious doubts as to whether DTT can provide a valuable alternative to satellite and cable digital offerings. Attention was focused on the free-to-view market and with the launch of the BBC-led *Freeview* service in September 2002, DTT in the UK has turned into a free-to-air only platform. The re-direction of DTT towards a primarily free-to-air system has proved compelling to many households which are negative about pay television. Evidence of this is that from the third quarter of 2002 (the time *Freeview* was launched) until the first quarter of 2006 DTT showed a strong increase in share of the digital television market from 10.6 per cent to more than 40 per cent, whereas over the same period digital cable saw a slight decline from 21.1 per cent to 15 per cent, and digital satellite showed a drop from 68.1 per cent to 40 per cent.

The popularity of free-to-air digital service *Freeview* has contributed in digital TV take-up from previously sceptical groups (affluent, older customers) and helped in rebuilding public confidence in digital TV (see Quest survey 2003). As it is a free-to-view platform, it helped to combat the common misconception that DTV is necessarily pay-TV. Since the launch of *Freeview*, digital TV has become considerably more affordable as competition between manufacturers and retailers of *Freeview* receivers resulted in significant price reductions (end 2006 digital adapters were sold for about £30).

The Role of PSB in Accomplishing Digital Switchover

The British Case

Some European PSBs have been allocated with new public service purposes, including shaping the digital future and accelerating the uptake of digital services. The British government, for example, has set out through a 2006 White Paper, special purpose for the BBC which is called "Building Digital Britain" (DCMS 2006). The White Paper acknowledges that the new BBC services[4] have already helped to drive the take-up of digital TV and radio but it states that a new initiative will be needed if the country is to become fully digital. Among the tasks that the BBC should do are the following: provide generic information about digital TV and radio; develop new interactive and web-based services; ensure that there is adequate access provided

for those with sensory impairments; help establish and manage the organisation that will co-ordinate the technical process to switchover; play a leading role in the public information campaign relating to switchover; and help establish and fund schemes to assist the most vulnerable consumers make the switch.

The BBC is acknowledged as a trusted guide to new technologies and a key outcome of digital switchover will be to ensure that all licence fee payers can receive the BBC's digital services. Therefore, the White Paper suggests that the BBC should take a leading role in making digital switchover happen. After all, the BBC is the majority shareholder in Digital UK, the organisation set up by the main broadcasters to coordinate the switchover programme. The BBC's licence fee settlement takes into account the Corporation's share of building the DTT network. Under the new Charter and Agreement (to run from 2007 to 2016) the BBC's responsibilities will fall into three key areas: (a) extending the digital network to ensure that consumers who can now receive analogue signals will be able to receive digital terrestrial signals in the future; (b) informing the public by undertaking a major communications effort; and (c) helping the most vulnerable TV viewers by providing practical help with the switch to digital TV for those aged 75 and over and people with significant disabilities.

The Spanish Case

In Spain terrestrial television plays a strong role and DTT is viewed as essential to analogue switch-off. As mentioned above, Spain was one of the pioneers in launching digital terrestrial services in Europe, but Quiero TV ceased to broadcast in May 2002. A period of inaction followed and in 2005 a technical plan for the re-launch of DTT was introduced. Central to the scheme are the availability of free-to-air services as well as the key role for the public broadcaster RTVE, which will have a multiplex containing four channels with regional variations. Previously, RTVE's role was minimal as it shared one multiplex with the other national broadcasters. With its two multiplexes now, it was expected to cover 80 per cent of the population by 2006, 90 per cent by 2008 and 98 per cent for the suggested switch-off in 2011. The 17 Spanish autonomous regions have also been granted a second multiplex. It seems that after a period of relative stagnation following the collapse of Quiero TV, DTT in Spain now has a second chance. Similarly to the UK, Spain has switched to a new Freeview-style business model for DTT and a fuller role has been given to the PSB.[5]

The Italian Case

Like the Spanish market, the Italian one is dominated by free-to-view multichannel analogue terrestrial services. There are 11 analogue terrestrial TV channels, essentially constituting a duopoly between the public broadcaster RAI and Mediaset, the Berlusconi-owned dominant commercial broadcaster, which between them account for 90 per cent of the audience share. Mediaset was first to launch DTT in December 2003 and RAI followed suit. By the end of 2004 five multiplexes were allocated – two for RAI (9-10 channels), one for Mediaset (5 channels), one for Telecom Italia/TV International (2 channels) and one multiplex operated by D-Free (TF1 and HCS). The business model for DTT was originally all free-to-view, based on advertising revenue. However, led by Mediaset, the broadcasters decided

to challenge satellite pay-TV consortium Sky Italia (owned by Rupert Murdoch) in offering premium content and now offer pay-TV content through pre-pay re-chargeable cards.

The initial rapid take-up of DTT services (500,000 set-top boxes had been sold by mid-2004) can be attributed to the government's decision to offer subsidies to consumers who bought the decoders (typically costing between 100-150 Euros). As explained above though the early uptake did not last long and the switchover date has been postponed at a much later date. The other striking issue is that RAI and Mediaset have accompanied the subsidised receiver purchase scheme with a strong marketing campaign, demonstrating the close cooperation between the two main broadcasters which underpins the digital terrestrial venture. Thus the Italian case demonstrates the leading role played by the public broadcaster (in collaboration with commercial broadcasters) in developing and promoting DTT.

The French Case

As in Spain and Italy, terrestrial transmission remains the dominant means of television viewing in France and the existing terrestrial broadcasters are the main players. France has been a relatively late entrant to DTT, following strong initial opposition from commercial broadcasters and lengthy debates about the regulatory framework to be adopted. The deployment of DTT, known under the acronym *TNT (Télévision Numérique Terrestre)*, was formally arrived on 31 March 2005. In August 2006 about 3.1 million DTT receivers had been sold, showing an increasing consumer interest. Like Freeview it will support many new channels as well as the current terrestrial television stations. The free-to-air channels currently available include TF1, France 2, France 3, Canal + (when programmes are non-encrypted), France 5, M6, ARTE. Direct 8, W9, TMC, NT1, NRJ 12, La Chaîne Parlementaire and France 4. Thus DTT in France is following a free-pay business model with 18 free-to-view national channels, but it provides the option to top this up with 11 pay-TV national channels. The public broadcaster France Televisions, together with other terrestrial broadcasters are expected to play a key role in accomplishing the switch-off target of 2011.

The German Case

The German TV market is dominated by cable with a high penetration of 20 million households, followed by satellite at 13 million households and terrestrial TV, with only 2.6 million. Thus the most striking differences with the other large European markets, is the predominance of cable and satellite and the insignificance of terrestrial reception. In a two step process that took place in 2003 analogue terrestrial TV broadcasting in the states of Berlin and Brandenburg was switched off to be replaced by DTT, which offers improved reception (especially in cars and with set top aerials) and because it offers a selection of more than 20 channels it establishes itself as a free competitor to cable TV. During 2004 and early 2005 the states of Schleswig-Holstein, Niedersachsen, Hamburg, Bremen, North Rhine-Westphalia and Hesse also ceased analogue broadcasts in many areas. In late 2005 Saxony, Saxony-Anhalt, Thuringia and Bavaria also commenced the transition to digital only broadcasts. Other metropolitan areas followed in 2006. All analogue television broadcasting in Germany are forecasted to be terminated by 2008. Completion of analogue terrestrial switch-off by 2008 in Germany looks feasible, given the low

dependence on terrestrial reception and the decision not to provide universal digital terrestrial coverage. However, similarities with the other countries include a leading role played by the public broadcasters ARD and ZDF.

DTT and PSB in Some Smaller Territories

In the Netherlands digital technology and DTT are provided commercially by broadcast leader Nozema Services, the country's largest nationwide terrestrial broadcaster. The company offers 25 TV channels and 16 radio channels. In May 2006 the Government announced that analogue broadcasting would stop on 30 October 2006 (earlier announcements gave 2008 as a more likely date) and this target has now been achieved. This means that the Netherlands was the first country in Europe to switch over to digital terrestrial broadcasting in its entirety. The public television channels Nederland 1, Nederland 2 and Nederland 3, as well as the regional television channels are now free-to-air. Viewers have access to Nozema's pay-TV services, while the business's parent company, KPN Royal Dutch Telecom, offers competitive "triple play" bundles (combining broadband, audiovisual and telephony services).

In January 2006, the Greek public broadcaster ERT launched free-to-air DTT with three channels called Prisma+, Cine+ and Sport+. The first channel, Cine+ broadcasts movies, Sport+ broadcasts sport programming and Prisma+ is targeted at disabled people. A set-top box is all that is required to view these channels. For the first 2 years, programmes will last 6 to 10 hours each day (Cine+ already offers a 22 hour program). However, ERT is planning to make its own digital productions in order to deliver a 24 hour program for all three channels. The prospects are good given that by the end of 2006 there were 280,000 digital terrestrial set-top boxes sold in the country. As of end 2006 at least 65% of the Greek population is able to view DTT. As elsewhere in Europe, this will not change until the analogue signal starts to be turned off and the current number of transmitters used for digital reception. The government recognises the current limitations of DTT coverage and the need to extend the availability of ERT's free-to-air digital services to other areas. However, the switch-off date has been set for 2012 or beyond as both the technical infrastructure and public awareness are limited.

Conclusion

Research indicates that the number of households with digital TV in Western Europe crossed over the 50 million mark in the end of 2005 and was expected to reach 75 million in 2006, driven initially by pay-TV providers moving their subscribers from analogue to digital transmission, and later by the arrival of free-to-air services in many countries. Governments with short deadlines for the analogue TV switch-off have started promoting free-to-air digital TV through subsidies and/or action plans. Britain has the highest digital TV penetration in Europe, primarily driven by pay-TV Sky and Freeview, the BBC-led free-to-view service. The national structure of the European TV industry and the different levels of technology adoption create a dilemma for the EC regulators who pursue common analogue turn-off deadlines.

European PSBs play a pivotal role in accelerating take-up of digital services and therefore bringing forward switchover. In some cases a specific mandate has been

added to PSB purposes and as a response public broadcasters have taken a leading role in launching DTT services and driving the conversion process. The adoption of a free-to-air business model in which public channels have a leading role has helped to recruit groups which are sceptical about the merits of the new technology. This has helped to maintain momentum towards prompt analogue switch-off which had been disrupted due to pay-TV commercial failures in the early 2000s. In sum, the new digital services launched by PSBs have played a significant role in at least three areas: to enhance consumer interest in digital TV services and address confusion and "fear" over them; second, to drive the take-up of DTT, which is seen as the main platform to convert to digital reception; and third, to make the target of analogue switch-off seem more achievable than before.

PSB's participation in this delivery system for electronic media provides them with the opportunity to fulfil their mission in new ways, by for example upgrading their production processes, making their programming available in additional platforms, and therefore adding more value to society. In fact, if universality is to be maintained as a fundamental principle of public television in the digital age, then public service content must be available on all media and delivery networks at affordable prices (i.e. analogue or digital terrestrial, cable and satellite, the Internet, Digital Subscriber Lines, etc). The introduction of digital TV (along with the broadband internet), gave public broadcasters the potential, but also the obligation, to develop new interactive, on-demand and "individualised" services to meet changing viewer preferences and audience fragmentation. Investment in these advanced technologies both enables PSBs to regain a competitive advantage and play a leading role in the new era, and come closer to maintaining the universality objective (DSG 2002).

However, PSBs should proceed to this new territory with caution and clear objectives. Driving digital take-up is one of the key aims of some of the European public broadcasters' digital services, although the principal aim of each service is to add choice and diversity rather than simply to drive take-up (see Iosifidis 2007). Decisions about service content should therefore primarily take account of public value it delivers and secondarily how it can encourage the take-up of digital TV. This means that priority should be given to the viewing needs and preferences of the audience, including those in homes that have not yet taken up digital TV.

Notes:

1. An earlier version of this paper was presented in the RIPE@2006 conference held in November 2006 in Amsterdam.

2. Member States' switchover plans are available at: http://europa.eu.int/information_society/topics/ecomm/highlights/current_spotlights/switchover/national_swo_plans/index_en.htm.

3. See http://europa.eu.int/information_society/eeurope/2005/index_en.htm.

4. The new BBC services include: BBC News 24, BBC Parliament, Cbeebies (a service for children under 6), CBBC (another service for children aged 6-13), BBC Three (a service for young adults) and BBC Four (aiming at 'anyone interested in culture, arts and ideas').

5. Some of the information about the Spanish, Italian, French and German cases was extracted from the Memorandum submitted by the Oxford University Programme in Comparative Media Law and Policy. <http://www.publications.parliament.uk/pa/cm200506/cmselect/cmcumeds/650/650we26.htm> Retrieved October 2006.

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