BALANCING PUBLIC AND PRIVATE VALUE FOR THE DIGITAL TELEVISION ERA

TOM EVENS
PIETER VERDEGEM
LIEVEN DE MAREZ

Abstract

As the digital switchover is the result of the dynamic interplay between economic, social and political interests, this article reflects on the role of all stakeholders involved in the switch to digital television services. It aims to discuss the trade-off between public and private policy interests focussing on strategies for preparing the transition process and the digital take-off as well as on future opportunities that become available in the spectrum (digital dividend). Based on a comparative study amongst three European countries, it is demonstrated that government has played an important role in the development of the digital television landscape in the past, and it is argued why policy makers should continue to do this in the future. Instead of a solely market-driven approach, a strong plea is made for a better understanding of stakeholders' expectations in deploying public policies and business strategies concerning the digitised media landscape.

Tom Evens is a researcher, Pieter Verdegem is a senior researcher, and Lieven De Marez is professor at the Research Group for Media & ICT (MICT), affiliated to Ghent University (UGent) and the Interdisciplinary Institute for Broadband Technology (IBBT); e-mail: Tom.Evens@UGent.be.

Introduction

After analogue television sets have become ubiquitous in the viewers' living room for several decades, technological developments and policy initiatives have led to the worldwide roll-out of digital television (DTV) services. Simultaneously, valuable content such as major sports competitions and Hollywood movies is migrating from free-to-air (FTA) television towards pay-television platforms, an evolution that is likely to produce a polarised digital television market (Padovani 2007). This migration process towards digital television services is being pushed both by content providers and network operators that are seeking revenue opportunities in exploiting the digital content market. In their turn, (European) policy makers have stimulated the development of digital television in the light of the establishment of the information society policy (e.g. eEurope, i2010). To accelerate the uptake of digital television services, the European Commission is urging all Member States to switch over from analogue terrestrial to digital television signals no later than 2012. Although this process has already been completed by a couple of European countries, many Member States are still in the phase of planning the transition and co-ordinating the roll-out of digital transmission systems and can possibly learn from the experiences of the countries where the mission has been accomplished (un)successfully.

As this digital switchover is far the result of the dynamic interplay between economic, social and political interests (Galperin 2004; Hart 2004; Feng et al. 2009), this article reflects on the role of all stakeholders involved in this (broad) migration process. In addition, the trade-off between public and private policy interests – which is complicating the establishment of digital television markets (Maier and Ottaviani 2007) – is also considered. As policy makers are faced with the challenge to facilitate a smooth switchover, this interface is the subject of current debate. A poorly managed process can have dire ramifications, leaving socially weaker households (especially in rural areas without simulcasting) without access to television services (Raycheva 2008). Regarding the outcomes of the analogue switch-off and the digital future, questions therefore arise what role the government should play (e.g. in terms of service or technology neutrality) and how they should handle digital dividend issues. As the added value from digital content/services is considered anything but obvious, the question remains who – if not the audience – will benefit from the digital switchover. The focus of this article is both on policies and strategies for preparing the transition process and digital take-off as well as on the future opportunities that become available in the spectrum (i.e. digital dividend). Based on a case-study approach of three European countries, it is demonstrated that government has played an important role in the development of the digital television landscape in the past, and it is argued why policy makers should continue to do this in the future. Instead of a market-driven approach, a strong plea is made for more involvement of all stakeholders in deploying public policies and business strategies concerning the digitised media landscape.

Analogue Switch-Off and the Digital Dividend

The European Commission (CEC 2005, 3) has defined "switch-off" as "*terminating the terrestrial transmission of analogue television,*" and "switchover" as "*the*

transition from analogue to digital broadcasting of all types of broadcasting." According to Iosifidis (2006, 250), digital switchover should be understood as "*the progressive migration of households, from analogue-only reception to digital reception*." This process is seen as the natural outcome of technological evolution in the television landscape with consumers and broadcasters as main beneficiaries. Digital television is assumed to generate advantages for both citizens and broadcast companies in terms of (a) more choice, better signal stability and higher image and sound quality; (b) lower distribution costs and the possibility of transmitting more channels and services at similar costs; (c) greater efficiency in spectrum use, and (d) the ability to send data that allow for interactivity and more customised services (d'Haenens and Bink 2001; Iosifidis 2007). In order to guarantee a successful analogue switch-off and the rapid development of (new) digital television services, the digital switchover should lead to a win-win situation and to a strategic fit between the interests of all stakeholders involved.

Despite these promising social and economic affordances, the transition towards digital transmission systems is not welcomed by every citizen. Research has demonstrated that a substantial part of the citizens show a rather negative attitude towards this switchover process (Klein, Karger and Sinclair 2004; Verdegem, Hauttekeete and De Marez 2009). These attitudes may depend upon different aspects: (a) people believe that analogue television will be taken away from them and fear a significant increase of costs to watch television, (b) citizens do not seem to understand why the switchover is on the political agenda and have no faith in the arguments put forward by the government authorities, and (c) some citizens really have a problem with the (extra) financial investments needed for digital television. In some cases, people are satisfied with the current television supply and suspicious of the promises made in the digital era (De Marez 2006). Iosifidis (2005) and Murdoch (2000) even point at the danger of social exclusion when certain parts of the population have no access to digital television services. Therefore, government and public authorities have a responsibility in guaranteeing equal and affordable access for all of the new possibilities offered by digital television (van Cuilenburg and McQuail 2003). In this digital transition process, government has a specific role to play when it comes to communication and support. Evidently, in order to develop adequate measures regarding the switchover, government will need accurate insights in the viewing practices and expectations of the people (Verdegem et al. 2009).

In order to reduce and even avoid negative consequences for citizens, careful planning (on different levels: technological, financial, regulatory and social) is needed (Raycheva 2008). Therefore, national and European regulators have put the management of this transition high on the political agenda. The analogue switch-off largely remains a national responsibility of all Member States, but the transition process also affects the European level. As there may arise some quality problems with the existing analogue transmissions owing to signal interference[1], there is a strong need for a co-ordinated approach on the European level to ensure a harmonised European spectrum. Member States were thus urged to reveal their national switch-off plans in terms of timing, strategy, commissions, subsidies etc. (DigiTAG, 2008). Although Europe aims for the end of analogue terrestrial television by 2012, all European countries can freely choose their transition strategy. As a result, strategies and timing towards the analogue switch-off in Europe vary

greatly due to the current penetration of digital television services, spectrum availability and the individual character of the television landscape (Iosifidis 2007). In some countries, the analogue switch-off has already been completed (such as in Sweden, Germany, Finland, the Netherlands and the Flemish Community in Belgium[2]), others (amongst other France, Spain, Italy and Portugal) have set a fixed date in the near future.

The compatibility of home equipment is essential for the switch-off procedure complexity, which represents substantial challenges in those countries where the majority of households are exclusively served by analogue terrestrial networks (Burns et al. 2005). In this perspective, three types of countries can be roughly distinguished across Europe: (a) "cable countries" with more than 90% of the households having access to cable television (Belgium, the Netherlands, Luxemburg); (b) "terrestrial countries" where terrestrial transmission is the dominant platform (France, Italy, Spain), and (c) "hybrid countries" where cable and satellite together serve more than the half of the households (Finland, United Kingdom, Germany, Sweden) (BIPE 2002; d'Haenens and Bink 2001; OECD 2009). In contrast with terrestrial countries, cable and hybrid countries may await an easier transition as there is no obvious need for considerable investments in antenna adaptation and set-top box purchase. As a result, the analogue switch-off will have less impact on these countries (Fontaine and Girieud 2007).

At least as important as switching off analogue terrestrial television signals, is how to turn account of the opportunities offered by this process of spectrum optimisation. Hereby, we refer to an often recurring concept in this digitisation debate among policy makers, namely the "digital dividend." Currently, this concept is high on the agenda of media and information society policy and closely relates to the analogue switch-off/digital switchover. The digital dividend refers to access to frequencies that are released by the analogue switch-off and *"is to be understood as the spectrum made available over and above that required to accommodate the existing analogue television services in a digital form*" (Doeven 2007, 1). More specifically, it is the financial and social payback for the investment in the digitisation of broadcasting, with industrial actors, policy makers and the public all having a share in this dividend to go digital (Vermaele 2008). According to recent research commissioned by the European Commission, this dividend is estimated to be in the range of 150 and 700 billion Euros (Analysys Mason et al. 2009). The allocation of these new spectrum frequencies allows for the creation of new distribution networks and the support of innovative wireless services. Four main service categories may be interested in using the frequencies released by the analogue television switch-off: (a) fixed or mobile broadcast television services (including additional TV programmes or TV enhancements such as high-definition and mobile television; (b) mobile telecommunication services (mobile data applications through WiMAX, LTE and systems beyond)[3]; (c) public safety services; and (d) commercial or public PMSE (programme-making and special events) services (Burns et al. 2005; Fontaine and Girieud 2007). As there might raise a potential conflict between public and private interests when opting for digital dividend opportunities, this indicates the further need for a balanced policy in order to reconcile both.

The released spectrum is a resource of economic, societal and cultural added value and lies at the basis for the development of important services in broadcasting,

mobile communications, wireless broadband (especially in rural areas), navigation and public safety. The real policy challenge for national spectrum regulators and European advisory groups (e.g. the Radio Spectrum Policy Group) is in maximising the benefits of the digital dividend to contribute to all these kinds of value. Policy should turn the digital dividend into a practical reality for the benefit of Europe's economy and all its citizens by extending its leadership in electronic communications services, creating growth and jobs, increasing productivity and, last but not least, granting equal access to broadband services for all Europeans. Therefore, harmonising economic development and social growth remains the major issue for European digital dividend policies.

Public and Private Policy Issues

As the analogue television switch-off is a *conditio sine qua non* for the release of new spectrum, policy makers should guarantee that this transition process runs rapidly and smoothly. However, this process of spectrum use optimisation varies considerably from one country to another in terms of network neutrality and allotment procedures[4]. Therefore, the switch-off success within Europe is not guaranteed as it depends on a couple of key factors that are influencing the complexity of this transition stage. The success heavily depends on the wide availability and high penetration of alternative reception solutions such as digital terrestrial television (DTT), cable, (free) satellite and pay television platforms. High DTT coverage is extremely important especially for terrestrial countries where the majority of households need its home equipment updated in order to switch to digital services. However, as DTT's implementation and further development is often depending on government subsidies and public service broadcasters initiatives (Storsul and Schanke Sundet 2006), the roll-out and program delivery of DTT across Europe is extremely scattered, which causes high differences in use diffusion (see Table 1).[5] Not only the total proportion of homes equipped with integrated digital decoders/television sets but also territory size and topology are considerable factors in this. Whereas satellite appears to be the best alternative for terrestrial television in remote areas, cable and IPTV seem more appropriate for (sub)urban areas. To counterbalance problems in the transition period and to improve the chance of a successful switch-off, public authorities have undertaken a wide array of actions in the countries involved: information campaigns, subsidies for purchasing DTT decoders, digital television regulation, complementary broadcast solutions for shadow zones, antenna upgrades, etc. (Iosifidis 2006; Fontaine and Girieud 2007).

In order to benefit from the digital switchover, broadcasters as well as viewers should invest in new technology and upgrade equipment to deal with the digitisation of production, transmission and consumption of television signals. On the supply side of the market, broadcasters should invest in digital transmission equipment and deliver content over digital platforms. On the demand side, viewers should buy a digital decoder (set-top box) or an integrated digital television set. The costs and benefits of the digital switchover, however, are unevenly distributed among the different market players. Especially the absence of transfers among these parties impedes this transition process (Maier and Ottaviani 2007). On the one hand, the digital switchover and the allocation of the digital dividend are further complicated by the interplay of both economic and political forces, which

Table 1: DTT Penetration and Status of the Analogue Switch-Off across Europe

	% home penetration	Status switch-off
Austria	12%	Processing
Belgium (Flemish Community)	4%	Completed
Belgium (French Community)	1%	Planning
Denmark	11%	Completed
Finland	54%	Completed
France	48%	Processing
Italy	37%	Processing
Luxemburg	2%	Completed
the Netherlands	10%	Completed
Portugal	20%	Planning
Spain	54%	Processing
Sweden	18%	Completed
United Kingdom	37%	Processing

Source: EAO 2008.

are often entwined. Government has a responsibility in stimulating innovation and supporting economic development, which in turn should contribute to common welfare and public prosperity. On the other hand, tensions between public and private interests may arise as well since public and private goals sometimes oppose (Mansell and Steinmueller 2000).

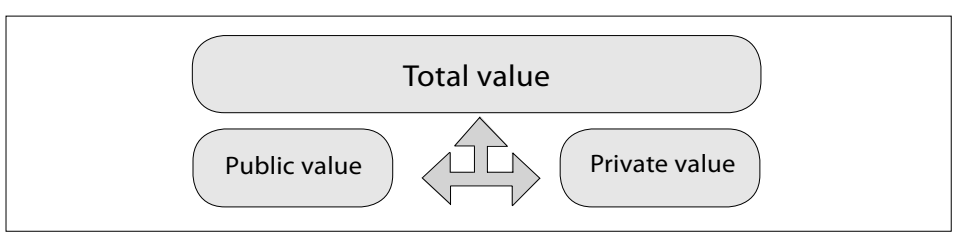
Addressing the optimal time schedule for switching off analogue terrestrial television signals embodies a crucial trade-off between public and private value. Whereas broadcasters and platform operators aim for a rapid switch-off, government should manage a non-discriminatory switchover in order to guarantee access to information through television for all its citizens. As operating both analogue and digital technologies (simulcast) multiplies costs, platform operators - aiming at minimising transmission costs - prefer digital systems because of the smaller and, consequently, cheaper spectrum requirements for digital broadcasting (Iosifidis 2007). However, the terrestrial signal should not be switched off unilaterally until a sufficient high proportion of viewers have already access to digital television services. A forced migration to digital would breach the universal access principle according to which all viewers should be assured equal access to some kind of broadcast content (van Cuilenburg and McQuail 2003). Viewers prefer to switch to digital services whenever the present value of the benefits from switching exceeds the switching costs (i.e. the purchase of a set-top box and the inconvenience of installing it). Platform operators may opt to offer subsidies or discount subscription fees to encourage viewers to switch to digital television services. Subsidies can be granted or suitable home equipment can be distributed free of charge to induce users to go digital in cases when they would otherwise prefer to remain with the analogue service. Solving for the optimal subsidy policy in general involves deriving the optimal time scheme for launching digital television platforms (Maier and Ottaviani 2007).

Regarding the development of digital television services, the emergence of the so-called "pay-per society" (Lillie 2005, 44) or "premium rate culture"[6] (Goggin

and Spurgeon 2007, 755) is threatening key public values such as the universality and open access of television content. This exemplifies another important tension between public and private stakes in the information society. As premium and pay-per-view channels are considered key drivers for digital broadcasting, television operators are eager to provide appealing content on subscription and on-demand channels exclusively available to end-users paying a supplementary fee (Callanan 2004). Bardoel and d'Haenens (2008, 354) argue that "*thematic channels will change the function of open channels into showrooms for thematic channels and on-demand platforms*" with television operators likely to encrypt all premium content for conditional and paid access. However, this evolution towards conditional access implies that only the elite can afford full access and control of programme content in the digital broadcasting world, which raises concerns about digital exclusion. Some argue that universal service principles should be applied to all digital media applications; others contend that limiting universal service values in digital media should enable service providers to develop sustainable businesses and stimulate new media innovation (Michalis 2002; Steemers 2004). The position of public service broadcasters (PSB) in digital technology should deserve special attention to constitute a legitimate future for PSB, as convergence and digitisation processes urge for redefining the PSB concept. PSB content should be universally available within its designated territory and free at the point of delivery. As a result, public service content should be freely accessible to all kinds of platforms and access technologies (Steemers 1999; Bardoel and d'Haenens 2008; Van den Bulck 2008).

Finally, the (re)allocation of released spectrum as a result of the analogue switch-off might raise new potential conflicts between long-term public value (welfare) and short-term private value (profit) (EBU 2008). Since radio spectrum is a scarce resource owned by society, all users of spectrum should support its efficient use. Telecom operators and service providers, mainly motivated by financial arguments, may opt for developing innovative mobile communications services and entering new media markets in order to create customer loyalty, develop triple-play services, gain extra revenues and make higher profits. However, efficient allocation of a scarce resource in private interest is not necessarily the same as for public interest. For example, what is the public value if public spectrum is given up for the introduction of new paid services inducing supplementary costs for end-users? Concerns rise whether future networks such WiMax or LTE will really be able to bridge the digital divide or just foster existing inequalities within and between societies. Therefore, efficient allocation of the digital dividend necessitates an optimal balance between public and private value in order to guarantee that all stakeholders involved have a meaningful share in this dividend (Vermaele 2008).

Figure 1: Policy Strategies in the DTV Era



From a regulatory viewpoint, it is the government's responsibility to reconcile both public and private policy goals and to maximise the joint surplus (total value) of the broadcasting industry as well as the viewers (Figure 1). Regarding the analogue switch-off and the digital switchover, government could facilitate competition among different delivery platforms to decrease switching costs for viewers and accelerate the uptake of digital television services. This way, stimuli (e.g. tax reductions, access to premium programming) can be obtained to provide digital television in remote areas, where satellite transmission is less costly than terrestrial technology. However, a key issue with encouraging digital television adoption is how to persuade those households who are reluctant to consider going digital, to adopt digital television services. This is of crucial importance, especially if these households are more disadvantaged in terms of socio-economic status. Given the availability of alternative and affordable services and educational efforts to inform analogue households about the switch-off, appropriate policy intervention such as subsidising conversion equipment should be justified (Bratton 2005)[7].

In addition to switching off analogue terrestrial signals and to support the development of digital broadcasting services, questions remain how the reallocation of the spectrum dividend can and should be organised. Governments should find the most appropriate spectrum management model or mix between models in various frequency bands to achieve a balance between the differing policy objectives. In order to achieve public interest policies such as security, defence, cultural diversity or interference requirements, the traditional "command-and-control" model is considered the most effective to harmonise spectrum and to avoid fragmentation of technical standards in order to establish interoperability and economies of scale[8]. In this model, regulators manage spectrum and design appropriate uses, technologies and users (OECD 2006). Especially in environments of rapid technology developments and converging services, the "market-based property rights model" grants tradability of spectrum rights in secondary markets and grants flexibility to apply spectrum in response to changing market needs. Concerns arise, however, about the risk of a decreased capacity of government to pursue general interest objectives and potential increased interference. Just as the market-based approach, the "commons model" stimulates technology innovation by lowering access to spectrum and reducing time to market but potentially risks overuse of spectrum. Finally, the "easement model," a mix between the market-based and commons models, stimulates the flexibility of spectrum use by introducing spectrum-sharing technologies including cognitive radio (Ofcom 2007). When opting for reallocating various technologies in the released spectrum, governments can choose between different approaches to deal efficiently with the digital dividend: whereas some countries prefer the development of (extra) broadcasting services, the European Commission pleads for adopting neutrality regarding the grant and use of spectrum frequencies and for setting technology-neutral performance standards in order to benefit from economies of scale (Analysys Mason et al. 2009). Despite this European policy, some analysts argue that service neutrality causes interference and therefore, they prefer international standard harmonisation to technical neutrality to create necessary critical mass for launching new services (Azibert 2008).

Particularly at this point, this article emphasises the need for user-oriented public policy strategies, i.e. based on extensive user and stakeholder research which offers profound insights in the real needs and expectations of the citizens towards

new possibilities offered by technological development. The authors believe that it should not only be the market "*who should essentially determine how the current broadcast spectrum will be used in the future,*" as suggested in some European studies (Burns et al. 2005, 4). As the European Commission and national governments have previously contributed to the development of digital television services and technologies, it is our conviction that governments should establish and regulate a market, which produces total value for society (sum of public and private value). In this context, technology development and innovation strategies could profit from bottom-up and user-driven approaches in order to create a win-win situation for all stakeholders involved in the e-communications policy process. Expectation management then becomes increasingly important (Maier and Ottaviani 2007). As de Holanda et al. (2008) have shown, this methodological multi-agent approach should be based on a comprehensive analysis of the social, economic, technological and regulatory aspects that support a decision of this complex nature. Special attention is devoted to mapping the individuals' (user) demand and preferences regarding the new digital dividend benefits, specifically in terms of new services and perceived attributes in order to analyse the social impacts associated to the services that will be released in the digital spectrum.

European Case-Studies

The diversity in configuration and development of digital television across Europe asks for an appropriate approach for managing the analogue switch-off, stimulating the establishment of digital television services and reallocating the digital dividend. In this section, public policies and private strategies regarding these issues are compared for three different European regions: Finland (hybrid country, Northern Europe), Flanders (cable country, mid Europe) and Spain (terrestrial country, Southern Europe). Special emphasis is put to finding the optimal balance between public and private interests to achieve total value for society as a whole. Table 2 summarises the television landscape for the three regions, characterised by diversity in market size, (digital) platform penetration, switch-off date, etc.

Table 2: Market Conditions for Flanders, Finland and Spain

	Flanders	**Finland**	**Spain**
Geography Population (millions) Area (km2)	 6.5 13,522	 5.3 338,145	 45.3 504,782
TV households (millions)	2,5	2,4	15,9
Analogue switch-off	3 November 2008	1 September 2007	3 April 2010
Digital TV penetration	47.3%	95.2%	76.5%
DTT service Launch Penetration Business model	 2002 3.5% FTA	 2001 54% FTA + Pay-tv	 2000/2005 54% FTA
Cable penetration	79.4%	69%	7%
Satellite penetration	4.3%	7%	13%
IPTV penetration	10.1%	1,5%	3,6%
DVB-H status	Auction pending	Deployment	Trial ended

Sources: EAO, 2008; OECD, 2009.

Analogue Switch-Off

Finland was one of the pioneer countries in switching off analogue terrestrial signals: on September 1st 2007 analogue terrestrial signals were abandoned, in February 2008 analogue cable transmissions were switched off. Despite the large amount of households relying on terrestrial television signals with approximately 140 main transmitters and 600 relay stations needed to be converted, Finland managed to switch over across the whole country on one single day. Aiming to smooth the transition from analogue to digital platforms, the government budgeted approximately 900,000 Euros for civic communication through informational websites, direct mail and call centres (Lugmayr 2008). Since all analogue channels were switched off simultaneously (in order to avoid preferential treatment for some broadcasters), teletext messages were shown while accessing these channels in the two-week period following the switch-off (DigiTAG 2008). In Flanders, a similar co-ordinated approach was adopted and all analogue terrestrial channels were shut down simultaneously. Moreover, the government and the public service broadcaster VRT played an important role in this transition process by unfolding a communication campaign worth of 350,000 Euros including television and radio advertisements, call centres and posters. Information brochures were distributed by local administrations, welfare organisations, cultural centres, public libraries, electronics retailers and camping terrains. This communication campaign has been based on results of a research project commissioned by the Flemish government to profile the antenna viewers and to discover their needs and wants regarding the switch-off and switchover (Verdegem et al. 2009). Contrary to Finland and Flanders, the Spanish government has opted for a phased approach with trials in a few northern provinces. In total, the switch-off will take place through ninety nationwide projects across three different types of geographical areas based upon the size of the population. By switching off rural areas and cities with low population density first, a rolling approach is developed and lessons learned from earlier experiences can be applied while completing the process in province capitals and metropolitan areas. In order to promote the development of digital television, analogue switch-off was brought forward two years from 2012 to April 2010. Given the modest growth of the DTT platform and the insufficient support from the Spanish government, concerns have arisen about the feasibility of this switch-off date (León 2007; Suarez 2008).

Development of Digital Television Platforms

In 2000, Spain became the third European country ever to launch DTT services after the United Kingdom (1998) and Sweden (1999). Although digital cable and satellite had already been rolled-out, digitisation only became a real issue for the audience when terrestrial, as main access point to television, had to face it up. The government decided in favour of a pay-DTT model but Quiero TV failed in 2002 by lack of viewers owing to the incapability to offer interactive services and value-added content. Owing to the slow reaction of the government, DTT implementation stagnated for three years. By the end of 2004, the new socialist government announced a new action plan and opted for FTA DTT as a vital element in the information society. Furthermore, the broadcasting association Impulsa TDT was created and funded by the government to foster the implementation of DTT.

Despite the growing DTT penetration, the television operators complain about the inactive role of the government, characterised by lack of leadership, lack of co-ordination, lack of transparency and lack of financial support to promote DTT implementation and decoder purchase (León 2007; Suarez 2008). The Spanish policy is in stark contrast with the experiences of Finland, which is listed the most advanced European country in the digital switchover with almost full digital penetration. The Finnish government has highly invested in network trials and research efforts. This successful cooperation between government, operators and research centres is regarded as one success factor of the introduction of digital television in Finland. In addition, various (inter)national research projects have established several spin-offs which now play a major role in the digital market worldwide (Lugmayr 2008). Today, Finland enjoys full DTT coverage including free and paid-for programming. While more than the half of the people relies on DTT, digital cable (mixed business model) has achieved a strong market position as well. Owing to historical reasons, analogue cable has been the dominant platform in Flanders for decades. Cable continues to dominate the market; however, its supremacy is threatened by the emergence of digital platforms (including digital cable and IPTV). The government has highly been involved in several trial projects for interactive digital television, which was considered an ideal entrance to the information highway enabling access to e-mail and e-government services. Given the wide penetration of cable, digital cable is expected to play the lead in the Flemish digital television market. As a cable country, terrestrial signals have a modest penetration, which has eased the analogue switch-off and caused little risks to deny many viewers access to television programmes. The DTT platform is not really successful since the platform only offers a simulcast of the public service broadcaster and allows for no interactivity. As the public broadcaster exploited the terrestrial network, commercial channels remained aloof to join; however, the analogue switch-off has driven the recent but modest growth of DTT penetration. Since the network is now operated by an independent company, rumours about a fully commercial DTT deployment in Flanders have arisen (De Marez et al. 2008).

Reallocation of the Digital Dividend

Finland focuses largely on using its digital dividend for television services and has been silent on the allocation of spectrum to other services and on the achievement of public service and public safety objectives. After a successful pilot, it became the first European country to launch commercial mobile television services (in 2006). The FTA service is supported by all major broadcasters and has a coverage area of approximately 40% of people living in Finland. Together with the DVB-H offer, Finland hosts a wide array of operators providing 3G television (EAO 2008). Since demand for spectrum for broadcasting is less than supply, beauty contests or auctions were not taken into account. As the Finnish government is committed to a service- and technology-neutral approach, no subsidies are considered (Europe Economics, 2008). Owing to disputes about which authority is competent for exploiting the digital dividend, Flanders is likely to lose its leading position achieved through the relative early switch-off. While the Flemish government aims for auctioning the released frequencies itself for broadcasting purposes (especially an extended DTT supply and DVB-H offer), the national telecommunications regula-

tor claims its competence over these affairs. By allocating the digital dividend to mobile broadband services on the contrary, the federal telecommunications minister is striving to create more competition on the Belgian broadband market causing lower prices, which remain relatively high compared to the EU average (CEC 2009a). Owing to the incomplete switch-off, the Spanish government cannot fully exploit the digital dividend yet although it has announced that broadcasters may continue simulcasting until 2015. This would mean that the frequencies released by the analogue switch-off will not be available before 2015. However, in order to fill public debts, government is likely to auction them already in 2010 so that telecom operators expect to gain return-on-investment only beginning from 2015. Since Spain is considered the most expensive market for mobile services in Europe (CEC 2009b), deployment of 3G-4G networks is assumed to stimulate competition, lower consumer prices and sustain economic growth (Mobile Europe 2009).

Towards an Open Innovation Approach

As international case studies have exemplified, a successful analogue switch-off and a sustainable development of digital television services require the full and active participation of all stakeholders involved in the process and a strong leadership from the government to affirm this process (Iosifidis 2005). Policy makers should not only make available financial resources to support the communication and marketing budget. In addition, they should also bring together broadcasters and content providers, multiplex and network operators, consumer electronics manufacturers, equipment retailers and consumers to successfully (a) roll-out digital access networks, (b) make the necessary home equipment available and (c) launch new and innovative consumer services. This plea for a holistic approach refers to the "open innovation" paradigm from a recent body of innovation management literature, considering innovation as a cyclic and open process with cooperation and collaboration of all stakeholders involved. Open innovation can be defined as: "*the antithesis of the traditional vertical integration model where internal research and development (RandD) activities lead to internally developed products that are then distributed by the firm*" (Chesbourgh, Vanhaverbeke and West 2006, 1). It is the central part of the innovation process in which private companies go about organising the search for new ideas that are socially relevant and have commercial potential. External actors and sources can help to achieve and sustain innovation in order to create user-centric added value (Chesbourgh 2003).

The emergence of so-called "living labs" can also be mentioned in this context. One of the major examples is the European Network of Living Labs (ENoLL) which is launched in December 2006, assembling hundreds of living labs from twenty-nine different countries. Living labs are experimental platforms in which technology – even in the early innovation process – is given shape in real life contexts and provide full-scale test bed possibilities for conceptualising, co-creating and prototyping as well as for the interactive testing and marketing of new (mobile) technology applications and business models (Frissen and van Lieshout 2004). Most often, test-users get devices "for free" and/or enjoy free access to services; therefore the results in terms of user acceptance and willingness-to-pay should be handled with care. As innovation is perceived as an active and a continuous process, the successful application of living lab environments should be supported by all relevant

stakeholders from user, policy and private communities. As a result, living labs contribute to a new innovation ecosystem in which users, academic institutions, public organisations and private companies cooperate towards the development of innovative technology solutions, products and business models.

Flanders, as well as other European regions, has a strong tradition of open innovation and living lab settings in the field of new media research. In the context of the analogue switch-off, the development of digital television and the reallocation of the digital dividend, several research efforts have been set up to support public policy. The commercial roll-out of digital television in Flanders was preceded by two government-supported trial projects. Between 2001 and 2003, the public service broadcaster VRT in cooperation with the state-owned telecom operator, managed the interactive IO project ("Digital Home Platform"), in which a living lab of hundred representative households was provided with set-top boxes. Although the project was conceived as successful, it also had some limitations (such as technical problems and limited content supply). In the "Flanders Interactive" project (2003-2004), all major broadcasters and cable operators were united. In this trial project, 300 households were equipped with a set-top box, on which they could watch digital television and test some interactive applications. In both trial projects, the public service broadcaster worked together with infrastructure providers, and both technical and socio-economic research groups from Flemish universities (Van den Broeck 2008).

As the Flemish government recognised that the smooth switch from analogue to digital terrestrial television demanded a certain degree of "strategic guidance," it commissioned a study (2007) to learn more about the analogue terrestrial television viewer in terms of profile and viewing expectations. The government assumed that a profound insight in the Flemish terrestrial viewer was needed as a starting point for guiding the information campaign (Verdegem et al. 2009). The project aimed at (a) profiling the analogue terrestrial viewers (in terms of socio-demographics and motivations to stick with their analogue television set); (b) gauging their knowledge related to the analogue switch-off and (c) mapping their expectations after the switch-off when it comes to television viewing. The results demonstrated that the antenna viewers are not very demanding viewers and especially watch news and information programmes. Nevertheless, these viewers were rather badly informed about the switch-off process and the possible viewing alternatives, causing negative attitudes towards this evolution. Digital terrestrial television clearly proved to be their most preferred alternative. These results were a first step in the development of a certain strategy towards the analogue switch-off and stressed the need of a communication campaign, which should explain the (rationale behind the) switch-off process and should stress the possible alternatives after the analogue switch-off (including both financial and technical aspects), with a particular focus on DTT.

Between 2006 and 2007, the MADUF (Maximising DVB Usage in Flanders) project was set up in the same tradition. Following the spirit of the open innovation paradigm, the two most important infrastructure providers were brought together and cooperated with the public service broadcaster VRT and equipment suppliers. Government has initiated the research project, as it was one of the projects of the Interdisciplinary Institute for Broadband Technology (IBBT), which is a public funded research institute whose mission is to stimulate innovation by

bringing together industrial partners and academic researchers. The objective of MADUF was to create an optimum model of providing mobile television services in Flanders via the DVB-H transmission standard, not only by providing technical solutions but also investigating legal, economic and user aspects. Within the broad city perimeter of Ghent, a living lab was installed with full network coverage and users were provided with DVB-H handheld devices. Research results clearly prove that mobile television will not gain mass market uptake in the near future and that market potential is considerably lower compared to other countries such as Finland (Schuurman et al. 2009).

This type of user-driven research projects should improve government's understanding of the value to consumers and society of new media applications and should serve both public as well as private needs. Hence, policies for the further digitisation of the European media landscape should be developed taking into account the challenges and experiences learned from user-centric research, which should raise both policy issues as well as provide economic forecasting for new (mobile) markets and the future use of the digital dividend spectrum. The MADUF project serves as an excellent example for this kind of user-oriented policy research. As mobile television is one of the possible new services that are likely to become available after the analogue switch-off, this research was closely related with a pending policy issue such as the digital dividend. Regarding the industry, the sector is under serious pressure due to the growing number of failing innovations, making a user-centric approach increasingly important in technology research (De Marez 2006). As well from the policy as the industry perspective, a general paradigm shift from a technology-driven focus towards a user-driven focus is identified. Technology research gradually becomes more interdisciplinary, affecting policy decisions. MADUF is a clear example as it provided policy makers with useful insights on both technical issues and knowledge about the citizens' preferences towards new services that become available in spectrum. This is crucial because of the ambivalent position of government in stimulating innovation and competition (economic policy) as well as securing inclusion of all citizens into the information society (social policy).

Concluding Remarks

The current European media policies should be driven by the desire for a non-discriminatory analogue switch-off, the rapid transition to digital television services and the successful reallocation of the digital dividend. Hence, this article aims for elaborating on the role of all stakeholders in this broad migration process and on the delicate trade-off between public and private interests. This balance seems a complicating element the further digitisation of the television landscape in Europe. Policies should pursue both public and private value and maximise total value in society. In this context, governments can choose between several policy tools and learn from experiences of other countries that are pioneers in media innovation processes (e.g. Finland). Although television landscapes and media policies greatly differ across Europe, a common policy goal should be that digitisation ultimately should lead to content and services offering added value for both citizens and industry. Hence, business models evolving from free to paid-for content are threatening the acceptance of media digitisation and are likely to produce a

polarised digital television market. Therefore, governments should intervene in the market to ensure the sustainability of digitisation and maximise total value for society. Apart from the responsibility of the Member States in this transition, co-ordinated European action should avoid a situation where decisions taken by one EU country negatively influence spectrum use in others. Therefore, spectrum policy in Europe requires close cooperation between national regulators and the European Commission.

In this article, the open innovation approach has been proposed as a conceptual framework for pursuing a balanced policy and managing the potential conflicts between public and private value in television's digitisation. Within this process – beginning from the analogue switch-off over the development of digital platforms to the efficient reallocation of digital spectrum – media policies should pursue a strategic fit between consumer and industry expectations. Consequently, expectation management becomes increasingly important in order to create a win-win situation for all stakeholders involved. In this context, technology development and innovation research could profit from user-driven approaches, which are concretised in living lab settings. In these interdisciplinary research settings, innovation is considered an active and continuous process supported by all stakeholders from user, policy and business communities. Scholarly institutions, public organisations, private companies and users cooperate towards the development and testing of innovative technology, services and business models. Together with a better understanding of the value of these innovative media applications to consumers, these experimental platforms should raise policy issues and should provide economic forecasts and business models for new digital markets.

However, the likeliness to which governments establish, design, support and regulate media markets is largely cultural-dependent and stems from a long tradition of policy intervention in correcting market shortcomings (Hallin and Mancini 2004; McQuail 2005). Finland acts as a textbook case combining one of the highest competitive economies in the world with a strong social welfare model. The Finnish dynamic market economy is characterised by openness (no monopolies or foreign ownership restrictions), strategic alliances between telcos, components manufacturers and equipment vendors and a large amount of public-private partnerships. The country has the highest public research and development (R&D) spending in Europe and thanks to high investments in education and universities, Finland has become one of the world leaders in the development mobile communications architecture and middleware residing the world's leading cell phone producer Nokia (Castells and Himanen 2002). This tradition of open innovation has further fostered the penetration of digital television platforms in Finland to become the most advanced European country in the digital switchover. By developing a tradition of sharing resources, leveraging ideas and bundling all stakeholders' knowledge and expertise during the 1990s, Finland has reoriented its undercapitalised economy into a vibrant innovation ecosystem which should be an inspiring model for other European countries to manage innovation in the media and communications industries.

Notes:

1. Some countries have already accomplished the switch-off while others are still in the phase of planning.

2. In Belgium, media is the responsibility of the regions. The Flemish Community (Flanders) is the northern region of Belgium, home to the Dutch speaking community.

3. WiMAX (Worldwide Interoperability for Microwave Access) and LTE (Long-Term Evolution) are broadband wireless communication network technologies.

4. In general, Member States choose to either sell the frequencies in a closed auction (highest bidder) or award them by means of a beauty contest (based on other criteria such as industrial experience, project viability, speed of deployment etc.).

5. It is important to be aware of the specific profiles of antenna viewers. Other research has shown that there is a clear distinction between primary antenna viewers (people having no cable or satellite subscription at home, which obliges them to watch television by means of antenna) versus secondary antenna viewers (people who possess cable or satellite at home, but they also watch television via the antenna in a second room or at a second residence (Verdegem et al. 2009).

6. The shift from free television content to pay-television business models.

7. When financing digital decoder purchase is technology-neutral and does not favour particular platforms or operators, subsidies are compatible with EU Competition Law and do not violate the EC Treaty state aid rules (Article 87(1)).

8. In a telecommunications context, interoperability refers to compatible communications paths (frequencies, equipment and signalling), adequate signal strength and scalable capacity.

References:

Analysys Mason; DotEcon, and Hogan & Hartson. 2009. Exploiting the Digital Dividend – A European Approach. Report for the European Commission. <http://www.analysysmason.com/PageFiles/13825/Analysys%20Mason%27s%20final%20report%20%27Exploiting%20the%20digital%20dividend%20-%20a%20European%20approach%27%2020090814.pdf >

Azibert, Michel. 2008. Spectrum Policy and Digital Dividend. <http://www.eppgroup.eu/*Press/peve08/docs/080305azibert.ppt*>

Bardoel, Johannes and Leen d'Haenens. 2008. Public Service Broadcasting in Converging Media Modalities: Practices and Reflections from the Netherlands. *Convergence: The International Journal of Research into New Media Technologies* 14, 3, 351-360.

BIPE. 2002. Digital Switchover in Broadcasting. <http://ec.europa.eu/information_society/topics/telecoms/regulatory/studies/documents/final_report_120402.pdf>

Bratton, William. 2005. *Managing the Analogue Switch-Off Process: Timelines, Difficulties and Questions*. Spectrum Strategy Consultants: Singapore.

Burns, John et al. 2005. Implications of Digital Switchover for Spectrum Management. Executive summary. Technical Study Prepared for the European Commission – DG Information Society.

Callanan, Ronan. 2004. The Changing Role of Broadcasters within Digital Communications Networks. *Convergence: the International Journal of Research into New Media Technologies* 10, 3, 28-38.

Castells, Manuel and Pekka Himanen. 2002. *The Information Society and the Welfare State. The Finnish Model*. New York: Oxford University Press.

CEC. 2005. Communication on Accelerating the Transition from Analogue to Digital Broadcasting, COM (2005) 204 Final (24 May). Brussels: European Commission. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0204:FIN:EN:PDF>

CEC. 2009a. Progress Report on the Single European Electronic Communications Market 2008. Country chapter: Focus on Belgium. <http://ec.europa.eu/information_society/doc/factsheets/14thimplementation/14th-progress-report-be-final.pdf>

CEC. 2009b. Progress Report on the Single European Electronic Communications Market 2008. Country chapter: Focus on Spain. <http://ec.europa.eu/information_society/doc/factsheets/14thimplementation/14th-progress-report-es-final.pdf>

Chesbourgh, Henry William. 2003. *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

Chesbourgh, Henry William; Wim Vanhaverbeke and Joel West. 2006. *Open Innovation: Researching a New Paradigm*. Oxford: Oxford University Press.

de Holanda, Giovanni, Ismael Ávila and Ricardo Martins. 2008. Mapping Users' Perspectives and Outlining Social Impacts from Digitalization of Terrestrial TV in Brazil. *Telematics and Informatics* 25, 1, 19-35.

De Marez, Lieven. 2006. *Diffusie van ICT-innovaties: accurater gebruikersinzicht voor betere introductiestrategieën*. Gent: Universiteit Gent.

De Marez, Lieven et al. 2008. Assessing the Added Value of Alternative Distribution Methods for Digital TV in a Cable-Dominant Region. In A. Urban; B. Sapio, and T. Turk (eds.), *COST Action 298 – Digital Television Revisited: Linking Users, Markets and Policies*, 15-22. Budapest: COST Office.

d'Haenens, Leen and Susan Bink. 2001. Digital Convergence. The Development of a New Media Market in Europe. In L. d'Haenens and F. Saeys (eds.), *Western Broadcasting at the Dawn of the 21st Century*, 125-146. Berlin: Mouton de Gruyter.

DigiTAG. 2008. *Analogue Switch-Off. Learning from Experiences in Europe*. Geneva: DigiTAG.

Doeven, Jan. 2007. Implementation of the Digital Dividend – Technical Constraints to be Taken into Account. *EBU Technical Review*, January.

EAO. 2008. *Yearbook 2008. Film, Television and Video in Europe*. Strasbourg: EAO.

EBU. 2008. How Should the Digital Dividend be Used? Long-Term Public Interest versus Short-Term Profit. <http://www.ebu.ch/CMSimages/en/A5_digital-dividend_EN_final_tcm6-57745.pdf>

Europe Economics. 2008. How Ireland can Best Benefit from its Digital Dividend? <http://www.comreg.ie/_fileupload/publications/CP50e.pdf>

Feng, Charles et al. 2009. Exploring the Evolution of Digital Television in China: An Interplay between Economic and Political Interests. *Telematics and Informatics* 26, 4, 333-342.

Fontaine, Gilles and Girieud Sophie. 2007. Analogue Switch-Off – Digital Dividend and TV Services. *Communications and Strategies* 66, 2, 181-186.

Frissen, Valerie and Marc van Lieshout. 2004. *To User-Centred Innovation Processes: The Role of Living Labs*. Delft: TNO-ICT.

Galperin, Herman. 2004. *New Television, Old Politics: The Transition to Digital TV in the United States and Britain*. Cambridge: Cambridge University Press.

Goggin, Gerard and Christina Spurgeon. 2007. Premium Rate Culture: The New Business of Mobile Interactivity. *New Media and Society* 9, 5, 753-770.

Hallin, Daniel and Paolo Mancini. 2004. *Comparing Media Systems: Three Models of Media and Politics*. Cambridge: Cambridge University Press.

Hart, Jeffrey. 2004. *Technology, Television and Competition: The Politics of Digital TV*. Cambridge: Cambridge University Press.

Iosifidis, Petros. 2005. Digital Switchover and the Role of BBC Services in Digital TV Take-Up. *Convergence: The International Journal of Research into New Media Technologies* 11, 3, 57-74.

Iosifidis, Petros. 2006. Digital Switchover in Europe. *The International Communication Gazette* 68, 3, 249-268.

Iosifidis, Petros. 2007. Digital TV, Digital Switchover and Public Service Broadcasting in Europe. *Javnost – The Public* 14, 1, 5-20.

Klein, Jeremy, Simon Karger, and Kay Sinclair. 2004. *Attitudes to Digital Switchover: The Impact of Digital Switchover on Consumer Adoption of Digital Television*. Cambridge: The Generics Group in Association with Ipsos UK.

León, Bienvenido. 2007. Going Digital. The Spanish Experience. *Javnost – The Public* 14, 1, 77-92.

Lillie, Jonathan. 2005. Cultural Access, Participation, and Citizenship in the Emerging Consumer-Network Society. *Convergence: The International Journal of Research into New Media Technologies* 11, 2, 41-48.

Lugmayr, Artur. 2008. DTV in Finland. In W. Van den Broeck and J. Pierson (eds.), *Digital Television in Europe,* 65-70. Brussels: VUBpress.

Maier, Norbert and Marco Ottaviani. 2007. Switching to Digital Television: Business and Public Policy

Issues, in S. Greenstein and V. Stango (eds.), *Standards and Public Policy,* 345-371. Cambridge: Cambridge University Press.

Mansell, Robin and Edward Steinmueller. 2000. *Mobilizing the Information Society: Strategies for Growth and Opportunity*. Oxford: Oxford University Press.

McQuail, Denis. 2005. *McQuail's Mass Communication Theory*. London: Sage.

Michalis, Maria. 2002. The Debate over Universal Service in the European Union: Plus ça change, plus c'est la même chose. *Convergence: The International Journal of Research into New Media Technologies* 8, 2, 80-98.

Mobile Europe. 2009. Spain to Reserve Digital Dividend Spectrum for Mobile. <http://www.mobileeurope.co.uk/news_analysis/114845/Spain_to_reserve_digital_dividend_spectrum_for_mobile.html>

Murdoch, Graham. 2000. Digital Futures: European Television in the Age of Convergence. In J. Wieten, G. Murdoch, and P. Dahlgren (eds.), *Television Across Europe*, 23-34. London: Sage.

OECD. 2006. The Spectrum Dividend: Spectrum Management Issues. Organisation for Economic Co-operation and Development. <http://www.oecd.org/dataoecd/46/42/37669293.pdf>

OECD. 2009. *OECD Communications Outlook 2009*. Paris: OECD Publishing.

Ofcom. 2006. Digital Dividend Review. A Report of Consumer Research for Ofcom by Holden Pearmain and ORC International <http://www.ofcom.org.uk/consult/condocs/ddr/mktresearch/research.pdf>

Padovani, Cinzia. 2007. Digital Television in Italy: From Duopoly to Duality. *Javnost – The Public* 14, 1, 57-76.

Raycheva, Lilia. 2008. Tracing the Digital Switchover in Enlarged Europe. In A. Urban, S. Bartolomeo, and T. Turk (eds.), *COST Action 298 – Digital Television Revisited: Linking Users, Markets and Policies*, 155-164. Budapest: COST Office.

Schuurman, Dimitri et al. 2009. Context and Content for Mobile Television: Integrating Trial, Expert and User Findings. *Telematics and Informatics* 26, 3, 293-305.

Steemers, Jeanette. 1999. Between Culture and Commerce: The Problem of Redefining Public Service Broadcasting for the Digital Age. *Convergence: The International Journal of Research into New Media Technologies* 5, 3, 44-66.

Steemers, Jeanette. 2004. Building a Digital Cultural Commons – The Example of the BBC. *Convergence: The International Journal of Research into New Media Technologies* 10, 3, 102-107.

Storsul, Tanja and Vilde Schanke Sundet. 2006. Digital Terrestrial Television in Scandinavia. In F. Colombo and N. Vittadini (eds.), *Digitising TV. Theoretical Issues and Comparative Studies Across Europe*, 239-257. Milan: Vita e Pensiero.

Suarez, Roberto Candel. 2008. DTV in Spain. In W. Van den Broeck and J. Pierson (eds.), *Digital Television in Europe*, 197-212. Brussels: VUBpress.

Van Cuilenburg, Jan and Denis McQuail. 2003. Media Policy Paradigm Shift: Towards a New Communications Policy Paradigm. *European Journal of Communication* 18, 2, 181-207.

Van den Broeck, Wendy. 2008. DTV in Belgium. In W. Van den Broeck and J. Pierson (eds.), *Digital Television in Europe*, 13-21. Brussels: VUBpress.

Van den Bulck, Hilde. 2008. Can PSB Stake Its Claim in a Media World of Digital Convergence? The Case of the Flemish PSB Management Contract Renewal from an International Perspective. *Convergence: The International Journal of Research into New Media Technologies* 14, 3, 335-350.

Verdegem, Pieter, Laurence Hauttekeete, and Lieven De Marez. 2009. The Analogue Switch-Off in a Cable Dominated Television Landscape. Implications for the Transition to Digital Television in Flanders. *Communications, the European Journal of Communication Research* 34, 1, 87-101.

Vermaele, Lieven. 2008. From Digital Dividend to Digital Deficit. Keynote speech at MICT Seminar "Digital Dividend Opportunities? Multidisciplinary Approach of Technological and Regulatory Evaluation," October 17, Ghent, Belgium.