

Interoperability, standards and sustainable receiver markets in the European Union

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This article ¹ addresses a recent debate undertaken by the European institutions on the interoperability of interactive television (iTV) receivers. The debate centred on whether it would be appropriate to mandate the MHP standards for iTV in order to enforce interoperability in support of media pluralism.

The article argues that the role of interoperability has changed – owing to newer concepts such as access – and that it is no longer realistic in an EU of 25 Member States to achieve interoperability through a single receiver standard for any technical function.

Improved co-ordination and implementation by market players could reduce the risks of market failure attached to the launch of new receiver products in horizontal retail markets. Grouped implementation by Member States could help to leverage supranational economies of scale and to overcome market fragmentation.

The political debate on the interoperability of interactive television services added another chapter to a policy saga spanning nearly twenty years: how far broadcasting standards should be mandated at European level in support of policy objectives – ranging from the Single Market through fair competition to media pluralism and industrial policy, all linked to the top-level objective of maximizing consumer welfare for European citizens.

The most recent episode focused on whether the European Commission should mandate the **MHP standard**. This revived memories of earlier episodes, notably the Commission's support for the MAC standards in the early 1990s. It has been suggested that public authorities were so cowed by this, and other failed experiences of "picking winners", that there is an unwillingness to mandate standards as an *ex ante* ² measure to avoid potential abuse of market power, thanks to the use of proprietary technologies in receivers ³. The reality is that lessons have been learned from the past and new approaches put in place; also that the interoperability debate conceals other issues, discussed later in this article.

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1. The opinions expressed in this article are purely personal and do not necessarily reflect those of the European Commission.
 2. *Ex ante* is Latin for "beforehand". There is an important distinction between regulation – consisting of *ex ante* rules usually applied to all market players – and competition law which is in general applied *ex post* ("after the fact") on a case-by-case basis, only to the undertakings involved in a case. While competition law allows commercial freedom, regulation can provide certainty for investors on the legitimacy of certain commercial actions in the absence of competition law precedent, an important consideration for those operating communications infrastructure.
 3. P. Laven: [Standards – who needs them?](#), EBU *Diffusion*, on-line edition, May 2004 .

Design criteria for the Communications Directives

The regulatory framework for electronic Communications networks and services consists of five Directives and a Decision on Spectrum policy. They address communications infrastructure, but not the content carried over that infrastructure. The top-level aims are to promote innovation, in particular through investment in competing infrastructures, while controlling market power, and protecting users' rights in a focused and proportionate manner, and developing the European Single Market.

The underlying principles are set out in the *Communications Review* document which launched the consultation on the draft directives, following the *Convergence Green Paper*. The *Review* proposed a commitment to regulate only where necessary and to “sunset” *ex ante* regulation, as markets become more competitive and could rely solely on competition law. The main mechanism is therefore an assessment of market power on individual network operators in the style of competition law and the deployment of appropriate remedies – including access remedies – to networks and to associated facilities. Broadcasting networks and their associated facilities, such as conditional access (CA), are included within the scope. Broadcasting services are primarily content services and are therefore regulated as content services, mainly at national level, but also at EU level through the *Television without Frontiers* Directives.

Those familiar with the earlier *TV Standards Directive 95/47* will find most of its key provisions spread around the *Framework, Access and Universal Service and Users' rights* Directives, including the requirement on conditional access services to all broadcasters on fair, reasonable and non-discriminatory terms. This is stronger regulation than the individual significant market power (SMP) test applied to operators elsewhere in the Framework, but consultative and political opinion agreed that CA should continue to be offered on fair, reasonable and non-discriminatory terms by all operators, although Member States (MS) have the possibility to use an SMP test instead, subject to certain conditions.



EU flag

One significant difference between *95/47* and the new Directives is the absence of the requirement to use a transmission standard agreed by a European standardization body. This points to a somewhat different approach to interoperability and standardization, driven by another underlying principle that had been strongly endorsed in the consultation – notably the need for technological neutrality on the part of regulators and public authorities. Art. 17 of the *Framework Directive* (FWD)⁴ is based on elements of *Directive 93/387* – an earlier telecommunications Open Network Provision measure – which it replaced, requiring the Commission to establish a list of standards. Member States shall encourage the use of such listed standards, according to Art. 17.2. The list serves as a basis for encouraging the harmonised provision of electronic communications networks, electronic communications services and associated facilities. If the listed standards have not been adequately implemented so that interoperability of services in one or more Member States cannot be ensured, the implementation of such standards and/or specifications may be made compulsory “*To the extent strictly necessary to ensure such interoperability and to improve freedom of choice for users*”.

Art. 17 and the accompanying recital do not mention using standards and the associated interoperability in support of competitive markets. The focus is rather on “harmonised provision of services” i.e. pan-European services. Despite the often expressed view that only horizontal equipment markets can guarantee competitive markets, the legislator preferred not to use standards in support of competition. There are a number of reasons for this. Standards do not provide a very flexible regulatory tool in new, dynamic markets where technology is changing rapidly. Technology competition may have a positive role in deciding requirements and the risk of freezing innovation is higher. The dangers of public policy trying to “pick winners” by enshrining one particular standard have been illustrated by numerous case histories from a variety of sectors, including the Commission’s inter-

4. Directive 2002/22/EC. All Communications Directives and related documents can be reached from this URL: http://europa.eu.int/information_society/topics/ecomms/all_about/todays_framework/index_en.htm

vention in support of the MAC transmission standards and analogue high-definition from 1986 to 1992. These were swept away by digital television.

That said, standards are major market facilitators when interested parties can all agree to fix a timely specification that will ensure rapid exhaustion of economies of scale and lead to affordable and ultimately to fully-interoperable products. There may be strong incentives for players to work together, either because the previous generation of technology was standardized, and everyone wants to retain the benefits into the next generation; or following a battle between competing technologies with no clear victor, thereby creating a climate of *Realpolitik* for collaboration on the next generation. The oft-cited GSM example represents the latter. After a generation of competing national analogue mobile telephony systems, incumbent monopoly telcos saw the potential for a common digital standard. Even this benign example does contain some features that are hostile to welfare, as can be seen from a recent assessment⁵. Where market parties can agree on standards, public authorities are usually supportive. Where this is not the case, then they need to tread carefully, and to take into account the risks of imposing standards as well. Imposition is unlikely to deliver the benefits of successful voluntary standards, which by definition have wide support, given the possibility for market players to withdraw or seek ways to undermine regulatory requirements.

Interoperability of digital interactive television services

Art. 18 of the FWD on the interoperability of digital iTV services was not in the Commission's original draft proposal. It was added by legislators, whose attention had been drawn to the nascent interactive television market. In 2001, a number of different API platforms were in use (Fig. 2), the majority of receivers in the market containing non-standardized proprietary APIs. The DVB's nascent MHP standard has just been completed, with the first receivers starting to become available, but market conditions were difficult owing to the higher initial costs of MHP receivers and its arrival some five years after the digital television market had started. During the Dot.com boom, DVB had switched its API effort from a basic presentation engine to a more elaborate execution engine, based on Java. Public uptake of interactive television services was however slow, without the rapid take-up foreseen during the boom.

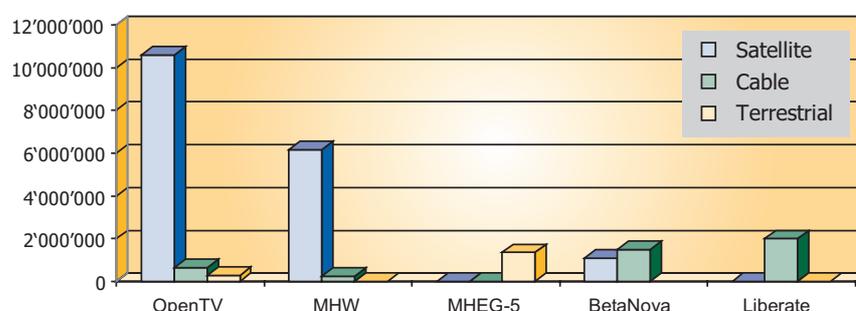


Figure 2
Estimated market shares of “legacy” API platforms across digital interactive television markets in the EU

Sources: ConTeSt consultancy, individual industry sources.
Reproduced from CENELEC, *standardization in Interactive Television, 2003*, (see reference 7. at the bottom of page 5).

DVB's MHP vision called for operators of proprietary API platforms to migrate to MHP. This was taken up politically by broadcasters in certain Member States at European level, in the knowledge that the decision to mandate standards can no longer be taken exclusively at national level owing to possible barriers that would be created within the Single Market. Such national draft laws must be notified to the Commission so that both the Commission and other Member States can scrutinise the measures through the mechanism set up under *Directives 98/34* and *48*.

Nordic players argued that it was not feasible to support multiple APIs in small markets. In Germany, broadcasters decided to turn interactive television into a major differentiating feature,

5. B. Clements: **Future Bottlenecks in the Information Society**
 IPTS report EUR 19917, 2001, p.55
<http://www.jrc.es/>

given that most German cable households already have 30 analogue cable channels and digital multichannel is not a major driver for take-up. MHP supporters also argued that imposing MHP would moreover help to overcome the digital divide, by ensuring that two-way Information Society services could be delivered to TV screens and not just to households with PCs. These efforts fuelled attempts to mandate MHP in the text of the draft *Framework Directive*. The core political concern was that the use of multiple, non-standardized API platforms could lead to a loss of pluralism and cultural diversity, a general interest justification.



The 25 EU Member States (January 2005)

The ensuing legislative compromise led to the current text of Art. 18 FWD, and its accompanying recital 31, on interoperability of digital interactive television services. Arts 18.1 and 18.2 require Member States to encourage providers of interactive television services and interactive receiver equipment to conform with an open API, and to encourage transparent provision by API providers of all information necessary to author applications. This sent a political signal to Member States on interoperability. The requirement imposed on the Commission sent an even stronger signal to the market players. Art 18.3 FWD required the Commission to review interoperability one year after entry into force of the *Framework Directive* – by July 24th 2004 – and if necessary to impose a standard from the Art. 17 list if interoperability and user choice had not been adequately achieved. The mandated standard could only be MHP as the Commission had also declared to the European Parliament that it would add MHP to the list of standards to be encouraged by Member States as part of the above political agreement. Only listed standards can be mandated using Art. 17 procedures, as described above.

The debate on interoperability and MHP illustrates some intriguing tensions between different public policy objectives. The NRF strives for technology neutrality; but how could support of standards fit with that orientation? The NRF also sought to split content regulation – usually targeting general interest objectives – from communications regulation, which has an economic character and is intended to provide access while ensuring adequate incentives to invest in infrastructure. Art. 18 is part of communications regulation as it addresses interoperability, as well as media pluralism. The link with media pluralism in particular was politically very sensitive. Media pluralism has long been a hot-button issue in the European Parliament in respect of broadcasting, given political concerns over both media concentration and governance issues.

Interoperability itself is not a fixed concept and takes different forms. For many in broadcasting, it means that everyone should be using the same API in receivers. In telecommunications, interoperability would imply gateways and interfaces between different networks. The PSTN does not achieve interoperability because everyone uses the same handset across the world. Even in GSM, the level of mandatory standardization was minimal; Community law only mandated the air interface between the handset and the base station. This is no longer a requirement. Interoperability in interactive television saw two different traditions facing off against each other. Major proprietary APIs like OpenTV and Liberate came from the IT sector, with its minimalist approach to interoperability and formal standardization. MHP supporters came from the broadcasting and consumer electronics

side, with a strong tradition of public authority-inspired standardization. This was also a text book convergence battleground: one group of players from the IT sector using their software skills as a land-bridge to enter the CE and broadcasting space.

Preparatory work

Even before entry into force of the EU Directives, the Commission services started to prepare for the interoperability review. A study on the economic aspects of interoperability was launched through independent consultants⁶. This set out the main families of policy options and variations, together with costs/benefit implications. The second strand of analysis was a mandate to European standardization bodies to investigate whether further standardization could contribute to greater interoperability. This provided a more formal, procedural environment than DVB in order to make progress on interoperability issues. Two very useful reports appeared. The first analysed interoperability across the EU, arguing that different solutions were needed in different Member State markets. Those with less developed DTV penetration should indeed use MHP. In markets where there was substantial penetration of earlier API platforms, other ways of achieving interoperability would need to be found, rather than migrating to a common API⁷.

Some 25m receivers containing proprietary APIs had already been deployed, according to CENELEC; it would be too expensive to swap them for more costly MHP receivers, especially given the limited demand for the more sophisticated forms of interactive television with return-channel interaction, independent of TV programmes. The second report – undertaken through an ETSI special task force – set out a programme of standardization deliverables to improve interoperability⁸. This included the development of a Portable Content Format (PCF) capable of playing out an application to different middleware platforms. This would overcome earlier objections to the high cost of multiple authoring an application for different APIs. The report also suggested the standardization of one or more presentation engines to provide a low-cost alternative to the fully-fledged execution engine approach of MHP, measures to improve the implementation of DVB service information and functional receiver specifications.

Staff Working Paper

The Commission launched its interoperability review after developing its own assessment of these documents and bilateral exchanges with the market parties. A Staff Working Paper argued that interoperability could take many forms across the converged space of IT, telecoms, DTV and CE⁹. More controversially, it argued that interoperability was perhaps less important now than in an earlier era of broadcasting, when it guaranteed the broadcasters full access to viewers on the basis of a common, universal receiver and a single – usually terrestrial – network often controlled by the broadcaster itself. Such simple interoperability at one level of the OSI model is harder to sustain in today's more dynamic world of multiple networks and functionality at higher levels than the transport/transmission layer. Moreover, interoperability no longer guarantees access to viewers, as third parties often control networks and associated facilities. Even where a facility is standardized, the infrastructure provider – or gatekeeper – can still lock it unless remuneration is paid. Access rules therefore

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6. Oxera: **Interoperability, service diversity and business models in digital broadcasting markets** February 2003
 7. CENELEC: **Standardisation in digital interactive television** April 2003
 8. TR 102 282: **Standardization Work Programme in support of digital interactive television and the effective implementation of article 18 of Directive 2002/21/EC**, ETSI, February 2004.
 9. European Commission Staff Working Paper, SEC 2004 (346): **On the interoperability of Digital Interactive Television Services**

play the role that interoperability used to play in the analogue paradigm.

The Working Document also argued that the other traditional reason for promoting standards – economies of scale – is normally left to the market rather than being a reason for mandating standards, as in the days of national industrial policy. It acknowledged that the widely differing economic characteristics of different Member States' markets mean that the implementation of new broadcasting systems is fragmented in time across Member States.



Flags of the 25 EU Member States (January 2005)

This makes it very unlikely that all EU Member States will attain interoperability by using a single standard, especially in dynamic markets where new technology is coming into the market all the time. The practical effect is that smaller and/or less economically-favoured Member States depend on larger, wealthier Member States to achieve the economies of scale necessary for their own markets.

Moreover, manufacturers have much higher requirements for economies of scale than an individual national market can provide today, thanks to the higher upfront investment needed in silicon. This requires higher volumes, and implies the need for several large Member State markets, more or less simultaneously, in order to exhaust scale within a reasonable time period. However, the scale requirement causes tensions with the decentralised, national approach to broadcasting flowing from the EU Treaties' subsidiarity principle, which applies to audiovisual policy in the EU. In areas which do not fall exclusively within its competence, *"The Community shall take action only if and insofar as the objectives of the proposed actions cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community"*¹⁰.

The fact that all MS aspire to autarchy in audiovisual policy makes it harder for any of them to launch broadcasting systems that require new receivers. This is particularly true of horizontal markets, where receiver subsidy may be impossible, unlike vertical markets, where operators offer receiver subsidies. There is therefore a contradiction between autarchy plus subsidiarity, and the desire for sustainable horizontal equipment markets based on European standards. Where new broadcasting standards are launched first outside Europe, then of course global uplift can help build economies of scale; but the Lisbon European Council Objective – of making the Union the world's most competitive, knowledge-based economy – implies that Europe should not be waiting behind other regions to launch new products and services.

Consultation process

The ensuing consultation did not cast any further light on how to resolve this issue, or on how to respond in future. The Commission had requested ideas on how public authorities should respond to a generic technology cycle with an introductory phase dominated by innovative but proprietary technologies, followed by later introduction of one or more standardized systems, then by a second generation of standardized or possibly proprietary technologies. The public policy challenge is how to respond to innovation. Preventing market entry by proprietary systems until a standard is ready penalises innova-

10. European Union, **Consolidated Version of the Treaty Establishing The European Community** Art. 5, as revised by the Treaty of Amsterdam.

Abbreviations

API	Application Programming Interface	HD-MAC	High-Definition – Multiplexed Analogue Component
ARIB	Association of Radio Industries and Businesses (Japan)	HDTV	High-Definition TeleVision
CA	Conditional Access	IT	Information Technology
CAS	Conditional Access System	iTV	Interactive TeleVision
CE	Consumer Electronics	MAC	Multiplexed Analogue Component
GENELEC	European Committee for Electrotechnical Standardization	MHEG	Multimedia and Hypermedia information coding Expert Group
CRT	Cathode Ray Tube	MHP	(DVB) Multimedia Home Platform
DAB	Digital Audio Broadcasting (Eureka-147)	MS	(EU) Member States
DTV	Digital TeleVision	NRF	(EU) New Regulatory Framework
DVB	Digital Video Broadcasting	OCAP	OpenCable Application Platform (USA)
DVB-GEM	DVB - Globally Executable MHP	OSI	Open Systems Interface
ETSI	European Telecommunication Standards Institute	PCF	Portable Content Format
EU	European Union	PSTN	Public Switched Telephone Network
FWD	(EU) FrameWork Directive	SMP	Significant Market Power
GSM	Global System for Mobile communications	TUS	(EU) Telecommunication Universal Service
		URL	Uniform Resource Locator
		WTVML	WapTV Mark-up Language

tion. However, a further generation of standardized technology would add further innovation in its turn; but this could be replaced by a third generation of proprietary systems, bringing further innovation, and requiring any policy in support of the earlier standard to be terminated in a “sunset phase”.

Market players’ responses showed no consensus between the two main camps. One group favoured mandatory imposition of open standards, notably MHP, in order to achieve interoperability at receiver level. This group confirmed that economies of scale remained important and were hostile to the need to negotiate access with vertically-integrated “gatekeepers”, arguing that proprietary APIs represent an unnecessary obstacle to the free flow of information. It also emphasized the potential for interactive television to contribute to the Lisbon objective as amplified in the European Council of Barcelona and subsequently at the Seville Council ¹¹.

The opposing group argued that interoperability could be achieved in a number of different ways, not just by using a common, standardized API. Access rules are sufficient to support pluralism and user choice in the communications context. They favoured the PCF as a way of making applications available on several API platforms. They argued that interoperability was responsive to market demand. If an application is successful commercially, it will be used on other API platforms. At the public hearing, they also argued that *ex post* ¹² attempts to impose standards would chill infrastructure investment and innovation: operators would wait for standardized systems to emerge, instead of introducing innovative new services when technologies first became available, prior to standardization.

The Commission delivers its opinion

The Commission delivered its opinion in August 2004 ¹³. This Communication drew attention to the absence of any definition of interoperability in FWD and interpreted the underlying issue in terms of

11. For background discussion, see Council Conclusions and European Commission, Communication, COM (2003) 410 final: **On Barriers to widespread access to new services and applications of the information society through open platforms in digital television and third generation mobile communications**

12. See footnote 2. at the bottom of Page 1.

13. European Commission, COM (2004) 541 final, **Communication on the interoperability of digital interactive television services**.

whether to impose a standard or not, concluding that there was no case to mandate EU-wide standards at the present state of market evolution. It argued that the limited success of interactive television had not provided much incentive for market players to ensure that all services could be made available to all receivers, in pursuit of media pluralism and user choice, and that interoperability could be expected to develop in parallel to the market, using a variety of techniques including the PCF. The Communication reports that the consultation had revealed no significant, substantiated threats to the free flow of information, media pluralism and cultural diversity.



Chalk drawing of Europe

If this line seemed to rebuff some of the main arguments of the pro-MHP standardization group, the promotional measures proposed in the Communication were more favourable to their point of view. The proposal to improve co-ordination of Member States' implementation of MHP through a working group recognized the difficulties of achieving economies of scale with a second-generation standard that is initially more costly than earlier solutions. This endorsed MHP as the most advanced open standard in Europe. The second measure "green-lit" the possibility for public subsidies for consumer purchase of receivers capable of two-way interaction and containing a standardized execution engine subject to competition law. The aim is to stimulate purchase of these initially more costly receivers, rather than cheaper, zapping boxes. This recognized the aspiration to offer Information Society services to TV screens and contribute to the Lisbon objective.

The third measure followed the standardization bodies' recommendation that market players should have the possibility to choose one or more presentation engines, in order to provide an alternative to the more costly execution engine approach. The Commission proposed to add WTVML and MHEG-5 to the list of standards. In the spirit of technology neutrality, this avoided the need to pick a winner between two legitimate technical approaches. Finally, the Commission proposed to continue monitoring the availability of proprietary technologies for licensing by manufacturers, in order to facilitate "one box" universal receivers. This underscores the obligation contained in Art. 6 of the *Access Directive* to make proprietary technologies such as CAS available on fair, reasonable and non-discriminatory terms to receiver makers.

The approach adopted by the Commission has developed over the years: a review document triggers consultation leading to assessment and decision. The process has become more rigorous and includes an Impact Assessment, now mandatory for any major legislative or policy decisions. These documents provide an opportunity to set out policy options in a transparent manner and to discuss detailed pros and cons in the spirit of a cost/benefit analysis or even a "due diligence" assessment. The same approach will be used in future, no doubt with further refinement.

The interoperability debate provided the opportunity (i) to review legacy thinking on interoperability, (ii) to explore how general interest objectives should be treated in the communications domain, and (iii) to examine signalling the risk of market failure facing nascent horizontal equipment markets, owing to the need for supranational scale and higher implementation risks. The rest of this article will concentrate mainly on (iii) after discussing the first two topics.

Legacy thinking

The interoperability debate revealed much legacy thinking. When moving to a new paradigm, it is evident that some players will seek to retain advantages or patterns developed in the earlier one. The Austrian economist Josef Schumpeter argued that the introduction of any new technology involved an element of “creative destruction”¹⁴. In other words, innovation threatens established players with discontinuities. This was certainly the case in the long telecoms liberalisation process, from 1987 to 1999, when the whole market was finally liberalised. Incumbent telcos initially tried to hold on to their advantages for as long as they could. Once they gained a full understanding of the benefits of liberalisation, including greater flexibility for themselves, they changed their behaviour. Broadcasting in Europe underwent liberalisation just as the telecommunications process got underway so the starting position is more favourable.

The universal receiver is a major example of a legacy concept. This is the idea that it should be possible to receive all services within a territory on one receiver containing a single set of complementary technologies standardized *ex ante*, before the market starts. It remains an attractive idea. However, now that broadcasting has moved from being exclusively terrestrial into a multi-network environment consisting not just of cable, satellite and terrestrial but convergent IP-based networks coming from the telco side, this is no longer possible. It would be hard to achieve even at transport level, but becomes unfeasible as one adds other technical decisions higher up the OSI stack taken at different times when different technical options were on offer. It is impossible to achieve a single universal receiver in a Union consisting of 25 Member States, with markets developing at different speeds. Building a one-box receiver able to receive services from several different networks should still be possible by combining a number of substitute technologies, several tuners or APIs or CA systems for instance.

The DVB's GEM specification is an example of an ambitious, forward-looking attempt to define a new interoperability paradigm at world level. This specification isolates the core functions of MHP and separates them from the different transmission systems used in Europe, the USA and Japan. The key interoperability objective is to ensure that an application could run on MHP-, OCAP- or ARIB-specified receivers without the need for multiple authoring. It does not propose a single universal receiver. The PCF is another example of an interoperability technique that does not take as its starting point a common receiver.

The consultation also revealed free-to-air broadcasters' continuing concern about vertical integration, especially “gatekeepers” controlling both infrastructure and content. Vertical integration certainly causes concerns under competition law, but as argued in the iTV interoperability Communication, it may also generate efficiencies. Communications regulation aims to provide a supplementary bulwark against abuse of market power by such operators. The framework assumes that negotiation is the



Egg and map of Europe

14. Joseph Schumpeter: **Capitalism, Socialism and Democracy**

Harper, New York, 1975, cited in:

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

basis for relations between network providers and network users. Free-to-air broadcasters have considerable market power in the content area. Operators would find it hard to assemble a credible service package without including the services of incumbent free-to-air broadcasters.

General interests vs. market forces

The Communication characterised the crux of the interactive television debate as a dispute over the relationship between general interests and market forces. Infrastructure investment is important for attaining the Lisbon objectives, but free-to-air broadcasters in particular are charged with fulfilling general interests such as media pluralism and cultural diversity. These dual objectives are achieved by separating content regulation – targeting general interests – from communications regulation, aiming to promote a competitive market as the means of generating innovation and new investment.

It follows that any general interest objectives falling in the domain of communications regulation will be rigorously tested for its validity and impact on economic policy objectives, while in content regulation, economic issues are secondary to general interest criteria. A good example is telecommunications universal service (TUS). This stipulates that European citizens will have access to a minimum bundle of telecoms services for an affordable price, and it permits a Member State to set up a universal service fund to which all market players contribute. The universal service fund provides the means for the TUS provider to maintain services in areas where it would be uneconomical to do so. This is of course open to abuse and misuse; if poorly implemented – TUS could become a tax on new entrants, thereby discrediting the general interest objective. TUS in the EU works as a safety net to ensure that the minority benefit from services available to the majority; it is not a fund to help roll out advanced services such as broadband. This would lead to perverse effects: ordinary telephone customers could end up subsidising wealthier broadband subscribers. TUS is an important general interest objective but its closely-defined underlying mechanism is the subject of detailed economic analysis.

The interoperability debate echoed at least one element of the TUS debate. Supporters of a single API standard argued that failure to impose MHP would prevent television from (i) contributing to the Lisbon objectives and (ii) overcoming the digital divide (by reducing the opportunity to make Information Society services available on TV screens). There is potential but the low market acceptance of iTV services so far – beyond those that are integral to TV services – means that there is some way to go before iTV services can realize that potential. Until there is general acceptance and usage of iTV services, it will be hard to realize the general interest potential. Using notional, future, general interest benefits as a policy rationale, to intervene through regulatory measures in a nascent communications market, risks distortion.

There are some echoes with Europe's failed analogue HDTV strategy of the late 80s and early 90s. Public policy support of analogue HDTV was justified in terms of industrial policy including competitiveness with Japan, enhanced consumer enjoyment and a richer cultural experience, but led to what proved to be unsustainable interventions into the market.

Sustainable receiver markets

This final section addresses the challenge of creating sustainable horizontal markets for broadcast receivers and related consumer equipment (and draws conclusions from the first part). As argued above, the iTV interoperability debate highlighted the risk of market failure arising from the asymmetric structures of broadcasting and CE manufacturing in Europe. Broadcasting is a national initiative, while manufacturers need continental or even global economies of scale. Fragmented implementation of new broadcasting systems makes it difficult for manufacturers to exhaust economies of scale and thereby achieve low-cost receivers, unless there is some uplift from prior use of a standard in the wider global market. Economies of scale were one of the reasons for mandating transmission standards at national level in the 50s and 60s. Even though this has nothing to do with technical interoperability, it is still very much part of the broader “political” definition of interoperability

revealed in the iTV interoperability debate. This section assembles some other examples and tries to draw some conclusions.

DAB

Digital Audio Broadcasting has been in take-off mode for the past 10 years, ever since the standards were agreed. By the end of 2004, there were around 1m receivers in UK homes. Presentations made at the 2004 WorldDAB General Assembly indicate that Dutch importers are sourcing products from the UK, as they prepare for the achievement of full territorial coverage. Elsewhere, the situation is more complex, with broadcasters who have tried at least once to launch DAB services, but given up because there were no receivers.

EU policy has played a limited role in DAB development because radio was not included in the scope of the *Television without Frontiers* Directives. Radio networks are included within the scope of the NRF, like other broadcasting networks, but there are no access issues currently – because radio is an exclusively free-to-air medium in Europe, access regulation is not yet applicable. The Spectrum Decision has future potential, as it encourages a co-ordinated approach in support of Community policies¹⁵. The new College of Commissioners – taking office in November 2005 – redistributes competences by creating a combined Information Society and Media Directorate-General. Media includes radio so it would be possible to develop policy for radio at EU level, given justification and adequate resourcing. Until now, the only significant action undertaken on digital radio was an investigation during 2002 into the implementation of digital radio undertaken by the Commission services through the Digital Broadcasting Experts Group, consisting of Member State officials, under Commission chairmanship.

This was a revealing exercise because it enabled a frank exchange of views between Member States and industry, which had undertaken an assessment of DAB implementation. Member States were concerned that no receivers were available in many countries despite extensive network investments. Industry was able to tell them why: the quality of implementation was so poor that manufacturers did not feel confident enough to make and market receivers in the territories concerned. For instance, some Member States had assigned so little spectrum to DAB that the selection of services in digital was more restricted than in analogue. In some cases, the licensing terms were so short that there was no incentive for commercial broadcasters to establish a DAB market. No major European manufacturer wanted to market receivers and the Japanese sent a clear message that they needed a European market in order to justify their involvement¹⁶.

In terrestrial broadcasting, the problem of achieving a sustainable receiver market at the level of a single Member State is probably at its most acute. Spectrum and licences can only be assigned after heavy political processes, often involving national legislatures. Where decisions on media policy are taken by regional legislatures, there is a further co-ordination burden. There is no synchronization between different countries, thereby guaranteeing market fragmentation over time. DAB required some significant investments in silicon in order to achieve high levels of integration for portable and pocket receivers. Manufacturers faced greater downside risk than with analogue products when it was possible to hand-assemble products in low volume until the market built up. The chicken and egg problem for receivers was finally broken in the UK. Broadcasters subsidised a chipset. In the absence of major manufacturers, this created a cottage industry of assemblers leveraging competence from other sectors, for instance hearing aid manufacturing. During 2003/4, major manufacturers started to enter the UK market. Apart from IC subsidy, the incentive-driven approach of UK regulation provided a strong impetus for DAB broadcasters to solve the receiver problem.

15. Decision No. 676/2002/EC on a regulatory framework for radio spectrum policy in the European Community

16. For background, see Digital Broadcasting Experts Group, working documents **ONP-DBEG 02-12 Rev1** and **ONP-DBEG 02-13 Rev2** at:
http://europa.eu.int/information_society/topics/telecoms/regulatory/digital_broadcasting/index_en.htm

WorldDAB's 2002 implementation assessment considered that only the UK had a satisfactory implementation of DAB.

Widescreen 16:9

Widescreen television was the subject of a major Community intervention through *Action Plan 1993-97*. This was part of the exit strategy from the earlier HD-MAC strategy. Instead of analogue HD, market players indicated that it would be more appropriate to focus on widescreen in parallel with digital deployment. The Action Plan has been covered in a recent Commission document so no detailed description of it is given here¹⁷. Its mechanism aimed to overcome the chicken and egg problem and a high risk of market failure by subsidi-



Bricks and map of Europe

disiding the broadcasting and production of widescreen services and programming, to the tune of €205m. The aim was to pump-prime the widescreen receiver market by stimulating a critical mass of services, *inter alia* by synchronizing broadcasters' efforts across multiple Member State markets.

The Action Plan certainly achieved some positive effects, acting as catalyst for the receiver market to get under way, but it did not deliver a critical mass of all services across Member States. Moreover, many broadcasters stopped transmitting widescreen once the subsidies stopped. Despite the €64m spent in France, there are only three full-time widescreen services transmitting at this time. Subsidies are one way to synchronize players across Member States, but they have high costs and significant perverse effects. The major beneficiary of the Action Plan was probably the UK, where widescreen is now in over 50% of homes. Its broadcasters received almost no Action Plan subsidies, but their implementation of widescreen digital services benefited from the market activity generated by the Action Plan. The cost of widescreen sets had fallen by the start of digital services in 1998. Had the UK market had to initiate widescreen on its own, it is doubtful that any manufacturer would have invested in new CRT production for one country. Elsewhere in the EU, DVD is the major driver for acquiring a widescreen set or display, and even helped to prime the HD market in the USA.

As with DAB, widescreen is an example where some broadcasters have given up because demand did not seem to build rapidly enough. In some cases, poor implementation of the services may have been the problem, rather than lack of demand. Such failure leads to discrediting of the underlying idea or the technology itself. For screen formats, public policy implementation may be less important than the quality of implementation by the market players individually and collectively.

A study undertaken for the Commission shows that the risk of market failure is higher for products with new screen formats¹⁸ for two reasons. First, displays are more costly than set-top boxes and there is no incentive for operator subsidies. The consumer's risk of acquiring a potentially stranded

17. European Commission Staff Working Paper SEC(2004)46, **The contribution of widescreen and high definition to the global rollout of digital television**

18. Oxera, cited in *footnote 6*. on *Page 5*.

asset is therefore higher, especially if some broadcasters decide not to offer widescreen services. Second, it also takes longer to achieve a critical mass of services and receivers in the home, increasing the risk that broadcasters or manufacturers may pull out before critical mass is achieved.

It is therefore very important that all major broadcasters in a market offer widescreen, and that the commercial broadcasters do not hang back and wait for public service broadcasters to build the market. This sends a message to the consumer that it is better to wait.

The UK widescreen implementation involved commercial broadcasters from the outset. Initially they transmitted less, but their participation in the common position established by the major broadcasters sent a signal to consumers: low downside-risk to acquire a receiver. Promotion is important. Elsewhere, public broadcasters felt they could not become involved in promoting widescreen receivers for legal reasons. This can be overcome. For example, Danmarks Radio has developed an innovative marketing strategy to promote DAB receivers in a generic fashion by creating a special DAB marketing identity. This avoids use of its own logo ¹⁹.

Screen formats such as 16:9 or HD are classic horizontal market products. The risk of market failure is high because changes are needed throughout the value chain, including content capture, in order to ensure that the service can be delivered. There needs to be co-ordination between broadcasters and between them and manufacturers. Today, extensive use by DVD publishers of widescreen and in the future HD means that market failure is less likely; but only effective deployment by broadcasting can deliver maximum penetration. Broadcasters need to take a position on whether they will help build such markets or wait for some external force to build them. The following quotation from ZDF is interesting in that context: *“Only when the digital market has further developed and there is a sufficiently large number of households equipped with high-end reception devices would it make sense to migrate to TV signals of higher quality”* ²⁰.

It is perhaps reasonable to wait for home cinema and pay-TV to prime the flat-panel market in Germany; but if these external forces did not exist, the market for large flat-panels would have difficulty getting underway, especially if other broadcasters took a similar line. Market failure could then ensue.

The Future – HDTV, accessibility

HDTV and accessibility are two up-and-coming issues where some of the same considerations will also apply. It is argued above that “political interoperability” is a much broader concept than technical interoperability. It embraces issues like market fragmentation caused by using multiple standards or technologies within the EU. The potential difficulty is that there are many options: 50Hz/60Hz; 720/1080 lines; interlace or progressive; multiple compression systems. There is therefore a

19. Denmark Country Report, Presentation by K. Marcuslund, Head of DAB marketing, Danmarks Radio, given at WorldDAB General Assembly 2004. This presentation is not publicly available, but can be requested through: <http://www.worlddab.org/>

20. Markus Schaechter, Director-General ZDF, quoted in **TVB Europe**, August 2004



European lighthouse

risk of market fragmentation which could have political repercussions. It is indicative that a market research study announced at IBC 2004 already called for a single standard ²¹.

Taking into account political sensitivities revealed by the iTV interoperability debate, there may be a need for an “Interoperability roadmap” for HDTV. Unlike MHP, all the potential technical options are – or soon will be – standardized. A roadmap could establish whether there is a way through the different options which would ensure a sustainable equipment market that leverages Single Market scale as far as possible. A lesson learned from iTV is to avoid capture by initial choices that may be appropriate at the beginning of the market but which also influence the market’s subsequent development. For instance, today’s decisions to introduce services on 1080i or 720p should not prevent later implementation of 1080p by those who may wish to do it. The challenge in a Europe of 25 Member States is to ensure sustainable co-existence of choices that will be made at different times by broadcasters in different Member States.

Accessibility services

The European Institutions have all received strong and politically compelling submissions from bodies representing the disabled, regarding accessibility by blind and deaf people to digital television services ²². At least one Member State has regulation requiring these services. However, the receiver equipment is not available because manufacturers and chip producers currently lack an economic incentive to develop the equipment for these minorities in just one country. This situation has generated requests to public authorities to mandate the inclusion of the functionality – or “mandate standards” where these already exist – in receiver equipment. This is another example of the view that if one mandates a particular standard at EU level, the desired outcome will occur. However, where there is new functionality and no standard, the threat of having a standard mandated may discourage market players from developing it in the first place.

An alternative approach is to examine the incentives at play and try to ensure the active co-operation of market players in making accessibility happen. The core issue is whether a sufficient number of Member States will require such services and how they will be funded. There will be costs for broadcasters whether they are public, commercial or pay-TV. Under the subsidiarity principle, it is up to Member States to decide whether their citizens should have such services and find ways of funding them. Assuming that a sufficient target population exists to initiate a sustainable, accessibility-enabled receiver market, relevant parties would have an incentive to meet demand. DG Information Society will be launching a consultancy study to test this hypothesis. The potential Community role is to marshal Single Market forces in support of this general interest objective without overwhelming Member States’ competence to decide on content issues.

Conclusions

These case histories and the earlier analysis of the NRF permit the following conclusions. The role of standards in broadcasting is changing. Given that technology is moving so fast, a policy of “picking winners” carries significant risk. Market power assessment and access remedies applied to gateways provide a more proportionate regulatory approach which will benefit broadcasters by ensuring a wider and more powerful range of network delivery mechanisms become available for distribution of their content.

This does not rule out the possibility of supporting standards through promotional measures, where these do not generate too many perverse effects. Overcoming the asymmetry between the national structure of broadcasting and the European scale required by manufacturers provides some

21. Datamonitor, **High-definition TV in Europe**, August 2004

22. European Parliament, P5_TA (2003) 0381, **Resolution on Television without Frontiers** (2003/2033 INI), Paragraph 34.

rationale for public policy intervention. Such interventions should be the subject of deep reflection. Standards bodies and consortia need incentives to produce timely standards with a cost profile that nascent markets can bear. The change in market circumstances – from Dot.com boom to bust – during the gestation of MHP suggests that standards bodies and consortia should pay careful attention to the possibility that market conditions may change. A more modular approach to specifications, including a low-cost entry level, would offer greater flexibility, reducing the risk of a big, costly standard failing in the market, following a change in market conditions²³.

Given the complex and dynamic nature of the converging communications market space, achieving technical interoperability based on a single standard in receivers for any function will be an unrealistic goal to achieve across the EU. Differences in size and resources mean that Member States' markets will take up new technologies at different speeds – unless some mechanism is deployed to redistribute resources between different markets. Such solidarity would require travelling “A Bridge Too Far” in political terms. Broadcasters need therefore to consider other technical interoperability paradigms apart from the receiver level. The debate on the interoperability of interactive television services is the first to involve a software facility, coming from IT. It could inaugurate a new approach based on managing interoperable co-existence of different technologies, whether standardized or not. The possibility to transfer content easily between different systems constitutes minimum interoperability and should be taken into account even by those controlling proprietary systems.

Communications regulation and content regulation have different objectives and are therefore governed by different regulatory EU frameworks. General interest objectives play a stronger role in content regulation and, even there, general principles of Community law still apply, such as necessity and proportionality. Invoking general interests in Communications regulation means that the validity of the claim will be subject to intense scrutiny and any resulting policy measures will have closely-defined objectives and be the subject of impact assessment, in order to avoid undermining the main economic objectives of the regulation.

Political notions of interoperability extend beyond technical interoperability, embracing notably the risk of fragmentation within the Single Market. The asymmetry between manufacturing and broadcasting can make it harder to exhaust economies of scale for horizontal market products. A working hypothesis is that several large Member States should simultaneously implement new broadcasting systems requiring new receiver populations to be built up, assuming the global market has not already made the product sustainable. The quality of implementation must be high, both at the level of national public authorities – notably in respect of terrestrial broadcasting – focusing on incentives for rolling out networks, and at the level of building up receiver populations. Any elements in media or content policy which would prevent this should be addressed. The market players' implementation must also be of high quality. All major broadcasters should participate; otherwise consumers will sense a risk that they might purchase a stranded asset. If a key broadcaster “waits for the market to



Child playing with starfish on a beach

23. M. Gaynor and S. Bradner: **The Real Options Approach to Standardisation**

Proceedings of the Hawaii International Conference on Systems Science, IEEE, 2001.



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Since 1990, Mr Watson Brown has been an official working on broadcasting policy issues at the European Commission. His experience includes the now legendary HD-MAC analogue HDTV strategy, the widescreen television action plan, the television standards directive 95/47 and convergence. As Head of Sector for Media in DG Information Society, he managed the recent consultation on interactive television interoperability, and authored a staff working paper on widescreen and high-definition television.

Adam Watson Brown has recently been appointed to DG Information Society and Media's newly-created task force for co-ordination of media affairs. He is a member of the Royal Television Society and the British Academy of Film and Television Arts.

develop” before committing, that equates with free-riding on the efforts of others, substantially increasing the risk of market failure. Co-ordination and promotion are key. Mandating standards at national or European level is far less important than quality of implementation.

The Commission has undertaken various co-ordination efforts in order to solve these issues at the level of the Single Market, with varying levels of success over the past 20 years. Promotion rather than regulatory coercion works best. There is no reason to depend exclusively on Brussels to provide co-ordination between Member States. Spontaneous groupings of Member States could have a similar effect if they wanted to interwork effectively on such issues. Now that the EU has 25 members, there will be greater opportunities for such groupings, however they are co-ordinated. Quality of implementation lies within the remit of Member States and market players. The Commission can analyse problems and help spread best practice when it is involved and informed. Legacy thinking should be challenged, although one should seek to identify forward-looking lessons from the past. As the Russian proverb says, “Anyone paying attention to the past is blind in one eye; he who ignores it completely is blind in both eyes”.

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All photographs in this article were provided by the European Commission's Audiovisual Library.