



Driving the Future of IPTV



**International
Telecommunication
Union**

NOTE

This working material consist of three outcome documents of the ITU-T IPTV Global Workshop on Driving the Future of IPTV held in Seoul, Republic of Korea, from 12 to 13 October 2006. The views expressed in this material are those of the authors, and do not necessarily reflect those of the ITU or its membership.

This document, together with the others materials relevant for policy debate on IPTV and prepared for the purposes of this meeting, can be found at <http://www.iptv-ws.com> or <http://www.itu.int/ITU-T/worksem/iptv/index.html>. More information on the activities of the ITU IPTV Focus Group can be found at <http://www.itu.int/ITU-T/IPTV/index.phtml>

Project on IPTV market dynamics and enabling regulatory environment was managed by Jaroslaw Ponder <jaroslaw.ponder@itu.int> under the direction of Chae-Sub Lee <chae-sub.lee@ties.itu.int>.

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Seoul, 12-13 October 2006

EXECUTIVE ROUND TABLE ON DRIVING THE FUTURE OF IPTV

CHAIRMAN'S REPORT

1. At the invitation of Mr Chae-Sub Lee, the Vice Chair of the ITU-T IPTV Focus Group, an Executive Round Table on Driving the Future of IPTV was held in Seoul, Republic of Korea, on 13 October 2006. The event was organized within the framework of the ITU-T IPTV Global Technical Workshop, which was held in Seoul, Republic of Korea from 12 to 13 October 2006¹ and chaired by Jaroslaw Ponder, Policy Analyst in the ITU Strategy and Policy Unit.
2. The purpose of the meeting was to exchange the experiences of different ICT sector stakeholders with IPTV, in particular focusing on market dynamics, regulatory and policy options, and technical aspects.
3. Approximately twenty participants took part in the meeting, including representatives of Korean government, international and intergovernmental organizations, communication service providers, ICT companies, academics, consultants and other stakeholders.²
4. To frame the debate surrounding IPTV, the meeting was divided in six parts. This offered an opportunity to consider 1) the issues related to the global definition of IPTV, 2) the optimized revenue sharing model of IPTV, 3) the key points for IPTV policy, regulation, business and customers, 4) the critical regimes for regulating IPTV business, 5) the issues related to the IPTV that are addressed exclusively at the national level and 6) global actions.
5. The participants came to a general understanding that together with the broad popularization of IPTV, the quality of the user's life should be significantly improved and the social and economic impact of the ICTs should become much more visible. In this sense, IPTV would become a new kind of growth engine for a country's future generations. Concerning the value chain, it was mentioned that IPTV is a *blue ocean* between telecom and broadcasting. The intersection of these two worlds can create many debates, and depending on a country's particularities, provide a variety of policy options. Nevertheless, in order to create an enabling environment for the growth of new convergent services, minimal regulatory interventionism would be advantageous. Many representatives of the private sector stated that, in particular, in the early stage of implementation, this approach may have very significant impact on the dynamics of IPTV take-off. As a result, they felt that many issues should be left to market mechanisms and self-regulation.

¹ For more information see <http://www.iptv-ws.com>

² See Annex for the list of participants.

6. It was stressed that ICT sector stakeholders need a clear understanding of the meaning of IPTV and its boundaries. The development of a global definition for the purposes of standardisation will facilitate sector and stakeholders in their efforts to improve interoperability in ICTs. Nevertheless, it was emphasized that this definition has to be prepared carefully as it is likely that it will be used for regulatory and policy making purposes as well.
7. The global trend of falling revenues from the traditional telecom services like voice seems to indicate that IPTV offers new business opportunities for operators. Currently most of telecommunications operators are looking for the optimal business model enabling fair collaboration with content providers. There are a variety of possible arrangements: flat fee, revenue sharing, or barter agreement (for instance in exchange for advertisement). In general, the traditional content providers have a tendency to preserve their traditional business models, but these models change over time. Another key factor is the flexibility of the telecom operator and its willingness to develop an appropriate business model capable of generating revenues that will satisfy all parties involved. Many of the individual content providers are still not convinced they can generate revenues from this new platform. Additionally, security is an important issue. Content providers expect IPTV providers to guarantee no piracy. It was also mentioned that the existence of web based technology that is already used by broadcasters should not be underestimated as a possible platform for distribution, although a QoS is not guaranteed.
8. It was emphasized that the issues relating to user protection and DRM require more focus. The existing European definition of “the user’s right to see and make a copy for the private purposes” has caused concern. The representatives of the private sector believe the rights of the user can be clearly defined via contract between the provider and consumer.
9. Concerning the content regulation, it was pointed out that in broadcasting program re-transmission, there is no need for regulation because it already exists. However, questions may arise regarding non-linear services. In this case, the imposition of some obligations, like setting certain shares for the content of particular origin, may influence business models.
10. Also, the importance of the user’s voice for the discussion on IPTV was mentioned. This is in contrast to the fact that most of regulatory discussion today appears to be mainly derived from the comments of providers and regulators.
11. The participants agreed that, for the time being, the proceedings on IPTV differ worldwide and are dependant on national particularities. The cases of Europe, US, Hong Kong were used as examples. The complexity of IPTV requires that issues which differ in nature but are related to both the telecommunications and broadcasting sector be addressed.
12. Concerning global actions, that the fact that global standardisation and interoperability are key for further development of IPTV worldwide was stressed. Other issues that might be further discussed on the international level include editorial responsibilities and the DRMs.

Annex

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INTERNATIONAL TELECOMMUNICATION UNION

ITU-T IPTV GLOBAL TECHNICAL WORKSHOP:

DRIVING THE FUTURE OF IPTV

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IPTV – MARKET, REGULATORY TRENDS AND POLICY OPTIONS IN EUROPE

BACKGROUND MATERIAL

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NOTE

This paper has been prepared by James Thomson (Cullen International, Belgium, <james.thomson@cullen-international.com>) to be presented at the ITU-T IPTV Global Technical Workshop held on 12-13 October 2006 in Seoul, Republic of Korea. The views expressed in this paper are those of the author, and do not necessarily reflect those of the ITU or its membership.

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More information on Cullen International research can be found at www.cullen-international.com

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ABSTRACT

This paper looks at IPTV commercial offers and regulation in the five largest EU Member States (France, Germany, Italy, Spain and the UK) and four smaller Member States with the highest broadband penetration rates ranging between 20%-25% (Belgium, Denmark, the Netherlands and Sweden).

IPTV is in its infancy in all of the markets surveyed. France has the largest number of IPTV subscribers so far. Alternative operator Free reported 1.26 million IPTV subscribers and France Télécom 300,000 subscribers as of end June 2006 (which should be seen in the context of 23.5 million households in France). In Italy, alternative operator FastWeb reported 870,000 subscribers as of end June 2006 (22 million households in Italy).

The paper discusses a number of regulatory issues related to IPTV: replicability of incumbent operators' IPTV offers, predatory pricing, bundling, cross-subsidy by alternative operators of their retail prices from fixed PSTN call termination revenues, must-carry obligations, and net neutrality. The paper also compares the authorisations or licences an IPTV provider would need from the broadcasting authority depending on the types of services provided.

EXECUTIVE SUMMARY

This paper looks at the commercial IPTV offers available in the five largest EU Member States (France, Germany, Italy, Spain and the UK) and four smaller Member States with the highest broadband penetration rates ranging between 20%-25% (Belgium, Denmark, the Netherlands and Sweden).

IPTV services are viewed over a fixed broadband connection (DSL or fibre-to-the-home (FTTH)) with a standard television set. IPTV services are offered over closed content distribution networks and are different from video streaming over the public Internet viewed on a PC. This paper does not look at mobile TV services provided over wireless networks to handheld devices.

IPTV is in its infancy in all of the markets surveyed. France has the largest number of IPTV subscribers so far. Alternative operator Free reported 1.26 million IPTV subscribers and France Télécom 300,000 subscribers as of end June 2006 (which should be seen in the context of 23.5 million households in France). In Italy, alternative operator FastWeb reported 870,000 subscribers as of end June 2006 (22 million households in Italy).

IPTV services offer both live TV broadcasting and stored video on demand (VoD). Increasingly, the services also include a personal video recorder (either as a hard disk in the set-top box (STB) or on the network) allowing 'time-shifted' viewing of TV broadcasts, or 'catch-up' viewing if the viewer pauses a live broadcast programme. IPTV providers in some countries integrate a digital terrestrial TV tuner in the STB (France, Spain and the UK).

IPTV providers need to have access to attractive content to compete with existing cable and satellite pay TV platforms. Rights to broadcast live national premier league football matches on the IPTV platform differ across the nine countries. In Belgium, the incumbent telecoms operator has exclusive rights for the national premier league matches, which can only be viewed on its IPTV service Belgacom TV. In a number of the other countries, IPTV providers typically have a distribution agreement whereby they resell the sports channels of the pay TV satellite operator.

This paper discusses a number of issues that may be of concern to regulators related to multiple play offers in general, including IPTV. Where local loop unbundling (LLU) is available in practice on regulated terms alternative network operators (ANOs) have the basic building block to offer their own IPTV services. In this case replicability should probably not be a major concern to regulators. A greater concern might be that incumbents could engage in predatory pricing of their own multiple play offers.

Incumbent operators' retail broadband prices are not subject to ex ante regulation under the EU framework and so alleged cases of predatory pricing would be investigated under standard competition law. The European Commission fined Wanadoo, a subsidiary of FT, €10.35 million for predatory pricing of its retail ADSL services in July 2003. The Commission currently has an investigation open against Telefónica in Spain.

Both incumbents and ANOs are investing to build-out their fibre networks closer to end users in major metropolitan areas. Incumbents will not be required to offer unbundled access to their fibre loops since the obligations for LLU in Europe currently only apply to copper loops.

As ANOs build their own fibre-to-the-curb (FTTC) in order to install VDSL they will increasingly rely on sub-loop unbundling (SLU) from the incumbents. This will lead to increased regulatory scrutiny of the prices and other terms and conditions for SLU in the incumbent operators' reference offers.

Must-carry obligations under the EU framework only apply to broadcasting networks used by a "*significant number of end users as their principal means to receive TV and radio broadcasts*". Given the limited take-up of IPTV so far, it is surprising that must-carry obligations apply to IPTV providers in three countries (Belgium, France and Sweden).

The EU regulatory frameworks for both telecoms and broadcasting are currently under review, and new directives will come into force probably around 2009. There are no changes proposed to the telecoms framework that would significantly affect IPTV. The changes proposed to the broadcasting framework would bring together both traditional broadcasting (linear services) and on demand (non-linear services) under a common basic tier of rules, with a second tier of rules for linear services very similar to those today.

The most contentious issue relates to who has “*editorial responsibility*” over audiovisual content. For example, would an IPTV provider be considered to have editorial control by selecting the TV channels offered in different subscription bouquets, or by compiling the catalogue of content offered by VoD? Another issue is how to deal with platforms, such as IPTV, offering both linear and non-linear services, and situations where the boundary between the two may be blurred. For example, a viewer may start by watching a live broadcast TV programme, but then pause, and re-start later by watching the programme recorded on a network personal video recorder.

1 INTRODUCTION

This paper is divided into the following sections:

- Section 2 – presents background data on broadband lines and penetration rates in the EU Member States and the recent growth trend.
- Section 3 – defines what is meant by IPTV and how it differs from video streaming over the public Internet.
- Section 4 – describes the commercial IPTV offers available in the five largest EU Member States (France, Germany, Italy, Spain and the UK) and four smaller Member States with the highest broadband penetration rates (Belgium, Denmark, the Netherlands and Sweden).
- Section 5 – looks at whether IPTV providers' packages include live national premier league football matches, as an example of the sort of attractive content needed to compete with existing cable and satellite pay TV platforms.
- Section 6 – provides background on the current and future EU regulatory frameworks for telecoms and broadcasting.
- Section 7 – discusses a number of regulatory issues related to IPTV: replicability of incumbent operators' IPTV offers, predatory pricing, bundling, cross-subsidy by alternative operators of their retail prices from fixed PSTN call termination revenues, must-carry obligations, and net neutrality. This section also compares the authorisations or licences an IPTV provider would need from the broadcasting authority depending on the types of services provided.

2 BROADBAND LINES, PENETRATION AND COVERAGE

This section presents background data on broadband lines and penetration rates in the EU Member States and the recent growth trend.

The data are taken from the European Commission working document "*Broadband access in the EU: situation at January 1, 2006*" presented to the Communications Committee on May 4, 2006 (COCOM06-12 Final).

Broadband is defined by the Commission as downstream capacity equal to or higher than 144 kbps. It should be kept in mind when reading the figures below that IPTV requires much higher downstream connections of at least 4 Mbps (based on ADSL2+, VDSL, or fibre-to-the-home).

As of January 1, 2006 there were 59 million broadband lines in the EU. Of these, 48 million were DSL lines (81.3% of the total) and 11 million (18.7%) were provided over other transmission means, mostly cable modem. There were 585,000 fibre-to-the-home lines, which were mostly in two countries (Sweden and Italy).

Figure 2.1 shows the distribution of broadband lines by country. Germany accounts for 18% of all broadband lines, followed by France and the UK with 17% each. These three countries represent almost 52% of all EU broadband connections. Italy, Spain and the Netherlands follow. The EU-10 new Member States (that joined the EU on May 1, 2004) contribute 3.3 million broadband lines, which represents just 5.5% of the total.

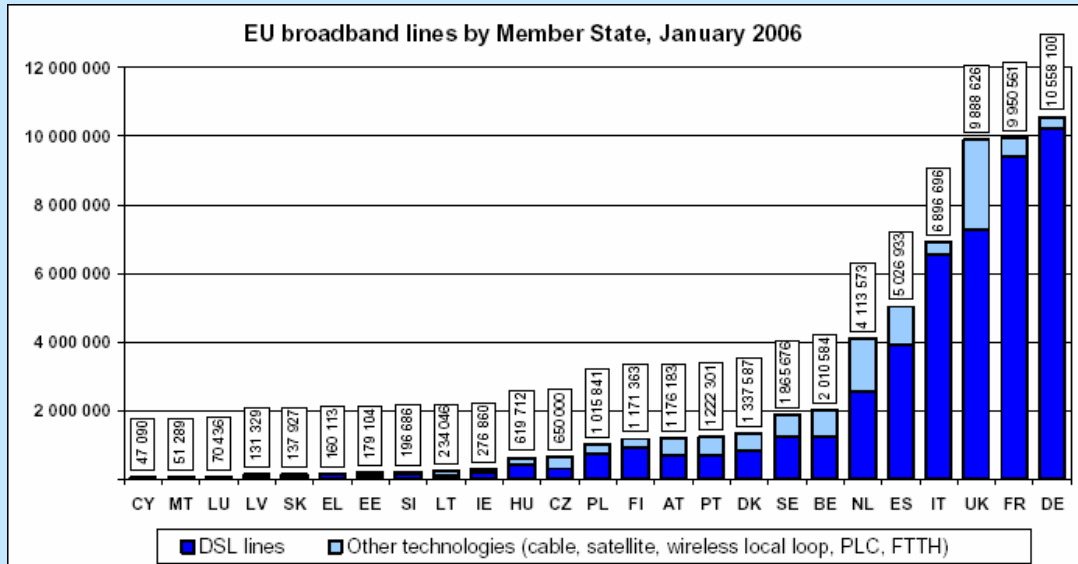
Figure 2.2 shows the penetration rate of broadband measured as the number of broadband lines per 100 population. The average penetration rate is 12.8% for the EU-25 Member States (rising from 8.6% in January 2005) and 14.5% for the EU-15 old Member States (up from 9.8% a year before).

The Netherlands and Denmark have reached the 25% penetration mark. Finland, Sweden and Belgium have reached 20% or above. These countries along with the UK, France and Luxembourg are above the EU-15 average penetration rate.

The lowest penetration rates ranging between 1%-7% are in Greece, Slovakia, Latvia, Hungary, Cyprus, Czech Republic, Ireland and Lithuania.

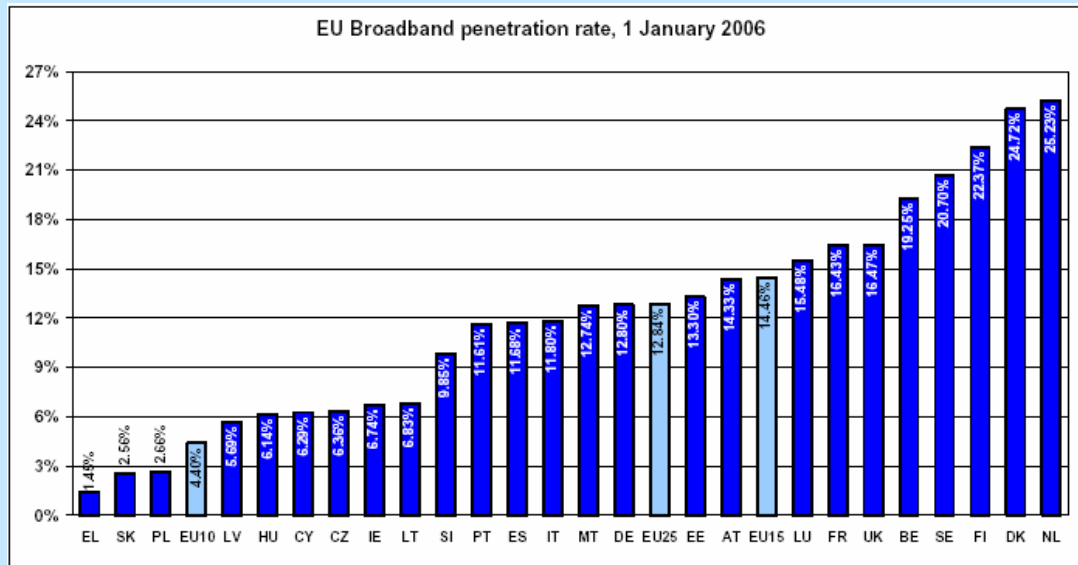
Slovenia, Portugal, Spain, Italy, Malta, Germany, Estonia and Austria have 10%-14% penetration rates. It is clear that with the exception of Estonia and Slovenia, the other EU-10 new Member States are lagging behind.

Figure 2.1: EU countries by number of broadband lines



Source: European Commission (2006), Broadband access in the EU: Situation at January 1, 2006

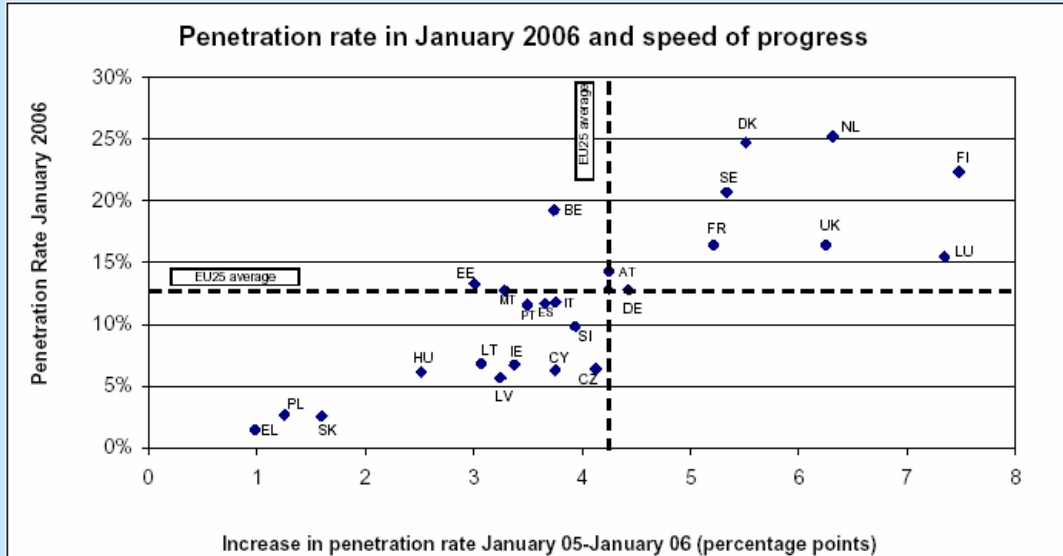
Figure 2.2: Penetration rate. Lines per 100 population



Source: European Commission (2006), Broadband access in the EU: Situation at January 1, 2006

Figure 2.3 below plots the broadband penetration rate in January 2006 against the increase in the penetration rate during the period between January 2005 and January 2006. Growth was highest in Finland and Luxembourg, followed by the Netherlands, UK, Denmark, Sweden and France.

Figure 2.3: Increase in penetration rate



Source: European Commission (2006), Broadband access in the EU: Situation at January 1, 2006

The above European Commission working document does not contain information on geographic coverage of broadband networks. The Commission published a communication on “*Bridging the broadband gap*” on March 20, 2006. The communication focuses on the territorial divide regarding broadband availability and take-up between urban and rural areas. However, the data contained in the communication refer to the EU-15 Member States only and show the situation in January 2005.

In the EU-15 in January 2005, DSL-enabled exchanges covered more than 90% of urban households and businesses, against 62% of households and businesses in rural areas (although this overestimates effective coverage as some households and businesses will be too far away from the local switches to use DSL). Only 8% of households in rural areas subscribed to broadband compared to 18% in urban areas. Rural areas also lagged behind urban areas in terms of connection speeds. Comparable data on the EU-10 new Member States were not available.

3 IPTV vs. INTERNET TV

This paper looks at IPTV services that are viewed over a fixed broadband connection (DSL or fibre-to-the-home (FTTH)) with a standard television set. The paper does not cover video streaming over the public Internet viewed on a PC (e.g. MySpace, YouTube, etc). Table 3.1 below shows the main differences between IPTV services provided by telecoms operators and video streaming over the public Internet.

Table 3.1: IPTV vs. Internet TV

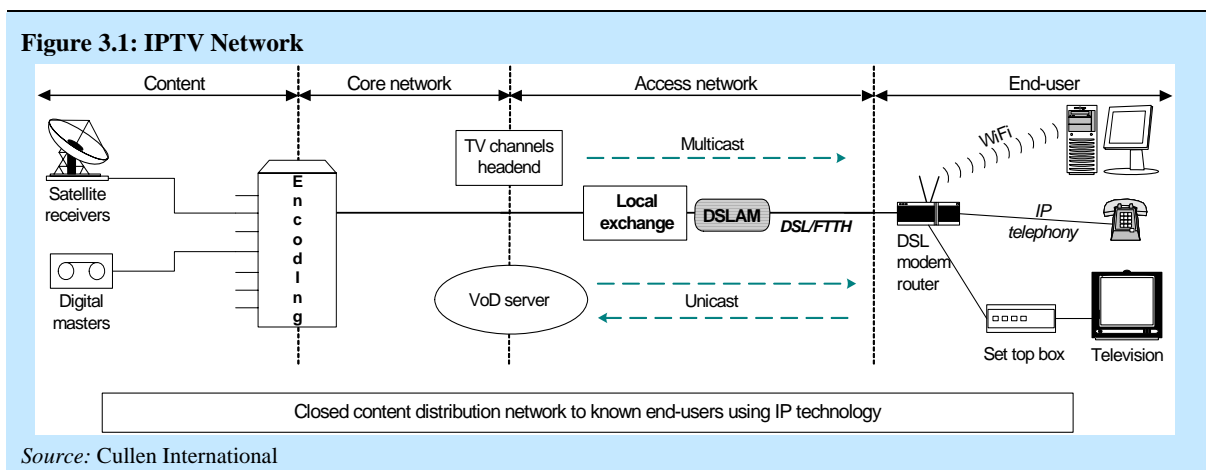
	IPTV	Internet video streaming
Footprint	Local (limited operator coverage)	Potentially supranational or worldwide
Users	Known customers with known IP	Any users (generally unknown)

	addresses and known locations	
Video Quality	Controlled QoS Broadcast TV quality	Best effort quality, QoS not guaranteed
Connection bandwidth	At least 4 Mbps	
Video format	MPEG-2 MPEG-4 Part 2 MPEG-4 Part 10 (AVC) Microsoft VC1	Windows Media RealNetworks QuickTime Flash, and others
Receiver device	Set-top box with a television display	PC
Resolution	Full TV display	QCIF/CIF
Reliability	Stable	Subject to contention
Security	Users are authenticated and protected	Unsafe
Copyright	Content is protected	Often unprotected
Other services	Electronic Programme Guide (EPG), PVR (local or network)	
Customer relationship	Yes, onsite installation and customer support	Generally no
Complementarity with cable, terrestrial and satellite broadcasting	Potentially common STB, complementary coverage	

Note: Adapted from EBU Technical Review April 2005 "Will Broadband TV shape the future of broadcasting?".

IPTV services are offered over closed content distribution networks where the network operator controls the technical parameters of the transmission path end-to-end as shown in Figure 3.1 below.

IPTV covers both live TV (multicasting) as well as stored video on demand (unicasting). Video content is typically an MPEG-2 or increasingly MPEG-4 transport stream delivered via IP Multicast in case of live TV or via IP Unicast in case of video on demand (VoD).



This paper does not look at mobile TV services provided over wireless networks to handheld devices. The term mobile TV is broad and covers both:

- digital broadcasting to mobile devices based on standards such as Digital Video Broadcast Handheld (DVB-H), Digital Multimedia Broadcasting (DMB), and MediaFLO; or

- on-demand unicast video streaming via 2.5G GPRS and 3G mobile networks.

4 IPTV COMMERCIAL OFFERS IN EUROPE

The countries covered in this paper are the five largest EU Member States (France, Germany, Italy, Spain and the UK) and four smaller Member States with the highest broadband penetration rates ranging between 20%-25% (Belgium, Denmark, the Netherlands and Sweden). The commercial IPTV offers in these nine countries are shown in Annex I (Table 7.1).

The following trends can be seen.

- Incumbent telecoms operators in all nine countries have launched (or will shortly launch in the case of BT in the UK) commercial IPTV services. As the fixed voice telephony market continues to decline as mobile and IP-based fixed services replace traditional fixed PSTN services, incumbent operators are looking to multiple play strategies, including selling media content through IPTV services, for new streams of revenue. Providing multiple play bundles of services is also expected to reduce customer churn towards competitor operators.
- Alternative network operators (ANOs) have launched IPTV services in all of the countries except Belgium. These services are based mostly on full unbundled access to copper local loops rented from the incumbent operator. ANOs use their own FTTH infrastructure in a few cases, or a combination of FTTH and LLU in other areas in order to extend the geographic coverage of their service.
- IPTV is in its infancy in all of the markets surveyed. There is limited data available from operators' websites on the number of IPTV subscribers. From the data available, France has the largest number of IPTV subscribers so far. Alternative operator Free reported 1.26 million IPTV subscribers and France Télécom (FT) 300,000 IPTV subscribers as of end June 2006 (which should be seen in the context of 23.5 million households in France). Free says that 273,000 subscribers pay for extra channels and/or pay-per-view on top of the basic TV service. In Italy, alternative operator FastWeb reported 870,000 IPTV subscribers as of end June 2006 (22 million households in Italy).
- The geographic coverage of incumbent operators' IPTV services varies. Some claim national coverage (with of course the limitation that the end user must be located within a certain distance from the local exchange). Other incumbents offer their service in major metropolitan areas only. ANOs offer their services in the largest cities only and some on a regional basis. This can be explained by the fact that ANOs tend to go for LLU only at MDF sites where they can reach a high number of subscriber lines which will be in urban areas.
- The IPTV offers look pretty similar between incumbent operator and ANOs in each country, and between countries. The offers typically comprise: a basic package of 30-60 TV channels, extra channels on subscription, plus VoD on pay-per-view basis (PPV). Premium sports are either available on subscription channels or PPV. The availability of live broadcasts of national premier league football matches over IPTV platforms is discussed below.
- IPTV services are typically sold by both incumbent operators and ANOs in a bundle together with broadband Internet access and IP telephony (often with a WiFi handset) using a DSL "router" modem connected between the telephone socket and the set-top box (STB). Incumbent operators typically require the end user to keep the basic PSTN line subscription. However, this is not sold as part of the multiple play bundle (although both are charged on the same bill to the end user).
- Some IPTV services integrate a digital terrestrial TV (DTT) tuner in the STB, so that DTT channels are delivered to the end user over the air, while the fixed broadband connection is used for extra channels and VoD. This approach is followed by Free in France, Telefónica in Spain and BT in the UK (IPTV service still to launch). Not surprisingly, these three countries are amongst the most advanced in Europe in the switchover to digital terrestrial broadcasting. The European Commission

has proposed a deadline of early 2012 for Member States to complete the switch off of analogue TV broadcasting.

- IPTV offers increasingly include a personal video recorder (either as a hard disk in the STB or on the network) allowing ‘time-shifted’ viewing of broadcasts, or ‘catch-up’ viewing if viewer pauses a live broadcast programme.

5 FOOTBALL RIGHTS

This section looks at whether IPTV providers’ packages include live or “near live” national premier league football matches, as an example of the sort of attractive content needed to compete with existing cable and satellite pay TV platforms.

The subject of rights to broadcast football matches is rather complex. The starting point in most countries is that the national football league manages the broadcasting rights collectively on behalf of the league clubs. These rights may then be sold exclusively or may be sold separately for different platforms. Further, the rights may be sold directly to broadcasters or to an intermediary agent that then sells on the rights to broadcasters.

The European Commission has taken action to stop the sale of exclusive rights by the English Football Association Premier League (FAPL). In March 2006 the Commission approved commitments from FAPL to create packages of matches to ensure that no single broadcaster would be allowed to buy all the packages as from 2007.

The FAPL committed that live TV rights would be sold in six packages with no bidder allowed to buy more than five packages. This meant that British Sky Broadcasting (BSkyB), the satellite TV group, would no longer have a monopoly in a market seen as crucial for the development of other pay TV platforms.

The decision closed a long-lasting dispute which started in December 2002. According to the Commission, the joint selling of media rights on an exclusive basis by FAPL on behalf of the league clubs restricted competition because it deprived media operators and football fans of choice, led to higher prices and reduced innovation.

Table 5.1 below shows who holds the broadcasting rights auctioned by FAPL for the current three-season period and, following the above commitments, for the next period starting in 2007. (The table covers UK rights only, overseas rights are sold separately.)

Table 5.1: English football premier league broadcasting rights

Current			Future		
2004/05 to 2006/07 seasons (3 years)			2007/08 to 2009/10 seasons (3 years)		
Live TV	BSkyB	£1.024bn	Live TV	BSkyB (4 packages)	£1.3bn
				Setanta (2 packages)	£392m
	BBC (highlights)	?		BBC (highlights)	£171.6m
Online	BSkyB	£100m bid for combined internet and mobile rights by BSkyB, 3 and Vodafone	Online	BT and BSkyB (242 “near live” matches each season)	£84.3m
Mobile	3 and Vodafone		Mobile	BSkyB	Under £10m
TOTAL		Approx. £1.1bn (€1.6bn)	TOTAL		Approx. £2bn (€3bn)

Source: Cullen International

In practice, despite the European Commission action, BSkyB has still been able to snap up parts of all three types of rights (TV, online and mobile) auctioned by FAPL for the next period starting in 2007:

- Live TV - Setanta (an Irish broadcaster partly owned by private equity firms) which acquired the rights for two of the six packages of matches has already negotiated a deal to sell access to those packages to BSkyB.
- Mobile - FAPL had originally hoped that the five UK mobile network operators (MNOs) would bid against each other for the exclusive rights to show match highlights on mobile handsets. But the five MNOs chose to bid together in a consortium that would have given each operator equal access to the matches. BSkyB outbid this consortium. The MNOs will now need to negotiate individual deals with BSkyB. Interestingly, the price paid by BSkyB would suggest that the rights to show highlights on mobile handsets is not a particularly valuable commodity! This can perhaps be explained by the existence of other types of mobile data services, such as news alerts and club-specific services. Also, Sky Sports News is available as a streamed TV channel from some MNOs.
- Online – BT together with BSkyB have won the rights to carry 242 “near live” Premier League football matches each season. BT Vision will sell matches on a pay per view basis from 10pm on the match day for a window of up to 50 hours after the match. The sum paid by BT and BSkyB for the VoD rights is tiny compared to that paid for the live TV rights, and about half the amount paid by the BBC for the right to broadcast highlights on the terrestrial TV platform!

So what are the implications for IPTV providers? Today in the UK the Sky Sports channels, including live Premier League matches, are available on a subscription basis on different pay TV platforms: satellite (Sky), cable, and IPTV (Homechoice, the only IPTV provider launched so far, in the London area only).

It is likely that, given the ownership of rights for the 2007/08 to 2009/10 seasons, this model will continue. Other IPTV providers will therefore most likely negotiate with BSkyB to resell the Sky Sports channels.

Regarding “near live” matches on demand, these will be available from incumbent operator BT. It is not clear how BSkyB will use its online rights.

Annex II (Table 7.2) shows whether IPTV providers have rights to live broadcast of national premier league football matches in the other countries covered in this paper. The situation varies considerably between the countries:

- In Belgium, incumbent operator Belgacom has bought exclusive rights to broadcast the national premier league matches, which can only be viewed on its IPTV service Belgacom TV and not on any other TV platform. (Belgacom, however, has an agreement with the two public broadcasters, VRT and RTBF, to show one match live per week on cable and terrestrial platforms).
- In the Netherlands, alternative operator Tele2 has exclusive rights for the national premier league matches, but has reached a distribution agreement with the incumbent operator KPN, so that KPN can broadcast Tele2’s football package on KPN’s IPTV and digital terrestrial TV platforms. The Dutch premier league matches are not available on cable or satellite platforms.
- In Germany, incumbent operator Deutsche Telekom (DT) has bought exclusive rights for IPTV broadcasting directly from the German Football League. The rights for other cable and satellite pay TV platforms are sold to another entity.
- In the other countries (Denmark, France, Italy, Spain and Sweden) IPTV providers typically have a distribution agreement whereby they resell the sports channels of the pay TV satellite operator (Viasat, Canal+, Sky, Sogecable) which are also available on both cable and satellite platforms.

6 REGULATORY BACKGROUND

6.1 Telecoms regulation

EU Member States were required to implement into national law the 2003 regulatory framework for electronic communications by July 25, 2003 (the 10 new Member States were required to have implemented

the framework by the date of their accession to the EU on May 1, 2004). Despite some delays the framework is now implemented in all Member States, although the European Commission still has over 30 infringement proceedings open against individual countries for areas of incorrect implementation of the framework.

The centrepiece of the framework is a system of market analyses for the imposition of ex ante economic regulation on operators found to have significant market power (SMP) in markets defined and analysed following competition law principles. The European Commission published in 2003 a recommendation on relevant markets listing 18 retail and wholesale markets which national regulatory authorities (NRAs) must analyse and regulate where they find one or more operators to have SMP. Further, NRAs must only regulate retail markets where regulatory obligations on the upstream wholesale markets, and carrier selection/pre-selection obligations, are insufficient.

The list of retail markets includes only narrowband fixed PSTN telephony and leased lines. Retail broadband services, including multiple play services and IPTV, are therefore outside of the scope of ex ante regulation under the EU framework. At the wholesale level, local loop unbundling, the basic building block for provision of IPTV by alternative operators, is regulated for access to copper loops but not fibre loops.

If an NRA wants to regulate a market outside of the 18 listed it must prove to the Commission that three cumulative criteria are met:

- high and non-transitory barriers to market entry;
- the market displays characteristics such that it will not tend towards effective competition over time; and
- ex post application of competition law by itself is insufficient to regulate the market.

The framework also provides that newly emerging markets should not be subject to ex ante regulation. Emerging markets are markets that are so new that it is not possible to determine whether or not the three criteria test for ex ante regulation is met.

The 2003 framework is currently under review. The Commission will propose changes to the directives making up the framework to the European Parliament and Council at the start of 2007. The revised directives are not likely to be adopted until 2007-08 and enter into force in the Member States before 2009. Until then, the current framework applies.

In parallel, the Commission will publish a revised recommendation on relevant markets at the end of 2006. The list of markets for ex ante regulation will be shorter (basically retail fixed PSTN calls and leased lines will be removed). No new markets relevant to the provision of IPTV are proposed in the revised list.

6.2 Broadcasting regulation

6.2.1 Current regime

The IPTV commercial offers in the nine Western European countries described above combine packages of live TV channels and VoD.

At present in the EU, television broadcasting and VoD are subject to different regulatory regimes.

Television broadcasting is regulated by the Television Without Frontiers Directive 1997 (TWF). Television broadcasting is defined as:

“the initial transmission by wire or over the air, including satellite, in unencoded or encoded form, of television programmes intended for the reception by the public. It includes the communication of programmes between undertakings with a view to them being relayed to the public. It does not include communication services providing items of information and other messages on individual demand such as telecopying, electronic data banks and other similar services”.

The directive therefore covers traditional TV, pay-per-view and near-video-on-demand (where programmes are broadcast on repeat loops). The directive does not cover VoD.

TWF contains the following provisions:

- Country of origin principle. Television broadcasters only need to comply with the legislation of the Member State in which they are established. Member States cannot restrict the reception and retransmission on their territory of television broadcasts from other Member States (except in limited cases to related to protection of minors or incitement to hatred).
- Events of major importance. Member States must list events of major importance for society and take measures so that a substantial proportion of its public is not deprived from watching the events listed via live or deferred coverage on free TV. These typically include the final rounds of certain sporting competitions (such as the national football cup).
- Quotas for European works (majority of a broadcaster's transmission time) and for independent producers (at least 10% of broadcaster's transmission time or budget).
- Limits on advertising time and teleshopping.
- Protection of minors.

TWF is a so-called minimum harmonisation directive, which means that Member States can impose obligations on broadcasters licensed in their territory that go beyond the directive.

VoD, on the other hand, are classified as information society services under the Electronic Commerce Directive 2000. Information society services are defined as:

“any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services”.

VoD are subject to a light regulatory regime. VoD also benefit from the country of origin principle, but are not subject to any of the other obligations in the TWF listed above, for the moment...

6.2.2 Future regime

In December 2005 the European Commission submitted a proposal to the European Parliament and Council for a directive on audiovisual media services (AMS) amending the TWF.

The AMS directive is not likely to be adopted before the end of 2007 and enter into force in the Member States before 2009. Until then, the current framework applies.

The proposal would apply to all audiovisual media services whether scheduled television broadcasting (linear) or on-demand (non-linear). Audiovisual services would be defined as:

“a service ... the principal purpose of which is the provision of moving images with or without sound, in order to inform, entertain or educate, to the general public by electronic communications networks...”.

The obligations foreseen in the proposal would be imposed on media service providers that:

- have editorial responsibility for the choice of the audiovisual content; and
- determine the manner in which the audiovisual content is organised.

The country of origin principle would be carried over from the current TWF and Electronic Commerce directives. A basic tier of rules would apply to all audiovisual media services, whether linear or non linear, and an additional tier would apply only to linear services.

The first tier of rules would include:

- protection of minors;
- prohibition of content that would incite hatred;
- promotion of European works (although this would not include transmission quotas, the wording is broad and would allow Member States, for instance, to impose quotas on the percentage of European works in VoD catalogues); and
- rules on advertising (but not time limits) and product placement.

The second tier of rules for broadcasting (linear) services would basically carry over the rules on events of major importance and quotas for European and independent production from the TWF. The current rules on

time limits for advertising would be lightened. There would also be a new right of access for broadcasters to events of high interest to the public for short news reporting purposes, such as sports events.

Two of the major questions under discussion in the first reading of the proposal in the European Parliament are:

- the definition of editorial responsibility over audiovisual content and when distribution platforms, including IPTV providers, can be considered to exercise editorial control. For example, would this include selection of the TV channels offered in different subscription bouquets, or the compilation of the catalogue of content offered by VoD; and
- how to deal with hybrid audiovisual platforms offering both linear and non-linear services, especially the situation where the viewer moves from the linear to non-linear environment, for example, by starting to watch a broadcast TV programme (linear) but then pausing and restarting later by watching the programme recorded on a network PVR (non-linear).

7 REGULATORY ISSUES

This paper identifies the following issues that may be of concern to regulators related to multiple play offers in general, including IPTV:

- replicability (i.e. in terms of telecoms infrastructure, are alternative network operators able to match the offers of the incumbent operators?);
- predatory pricing by incumbents;
- bundling by incumbents of multiple play offers with the basic PSTN subscription;
- cross-subsidy by alternative operators of their retail prices from fixed PSTN call termination revenues;
- must-carry obligations; and
- net neutrality.

Finally, the paper also compares the authorisations or licences an IPTV provider would need from the broadcasting authority, in addition to the authorisation from the telecoms regulator to operate an electronic communications network, in order to provide different types of IPTV services (broadcasting and VoD).

7.1 Replicability

Replicability should probably not be a major concern to regulators, at least in Western Europe. LLU - the essential building block for multiple play offers – is available in practice in most countries in the EU (with some exceptions in the new CEE Member States). Reference unbundling offers and the procedures for associated facilities, such as collocation, are in place. Prices are set on cost-oriented terms and have been approved by the NRAs.

The latest European Competitive Telecommunications Association (ECTA) broadband scorecard shows that there were approximately 11 million full unbundled and shared access loops in Europe as of end March 2006 (although, this should perhaps been seen in the context of 188 million incumbent lines in total).

Wholesale DSL services (so-called bitstream access) are not suited to the provision of IPTV since, as shown above, IPTV services are provided over closed content distribution networks where the operator needs to control the technical parameters of the transmission path end-to-end.

Incumbent operators and ANOs are in many cases investing to build-out their fibre networks closer to end users in major metropolitan areas, either all the way to the home (FTTH) or more commonly to the street cabinet (fibre-to-the-curb, FTTC) in combination with VDSL.

This raises two questions:

- Will incumbent operators be required to offer unbundled access to their FTTH local loops? Answer: No, there is no immediate prospect of unbundling obligations being extended to cover fibre loops.

Longer term the question may come up in future reviews of the Commission's recommendation on relevant markets.

- Do ANOs have access to sub-loop unbundling in order to be able to install their own VDSL services? Answer: Yes, but not much practical implementation so far.

The obligations in Europe for local loop unbundling apply only to copper local loops. Market 11 in the European Commission recommendation on relevant markets is defined as the “*market for wholesale unbundled access (including shared access) to metallic loops and sub-loops for the purpose of providing broadband and voice services*”.

No NRA has proposed to extend the scope of LLU to cover fibre loops. To do so, an NRA would need to either to:

- prove that fibre loops are substitutes to copper loops and should be included within the scope of market 11. This is very unlikely. Fibre loops are not a substitute to copper loops in most cases because of their current limited geographic availability, and their much higher price and technical characteristics; or
- define a new market for wholesale unbundled access to fibre loops outside of the Commission recommendation. Again, this is very unlikely since it would require the NRA to prove that the three cumulative criteria for ex ante regulation are met (high and non-transitory barriers to market entry, the market displays characteristics such that it will not tend towards effective competition over time, and competition law itself is not sufficient). Finally, it could even be argued that investment in fibre loops is an emerging market where it is too early to reach any conclusions on whether the three criteria test is met or not.

Therefore, it is very unlikely that incumbents will be required to give unbundled access to their fibre loops in the short term. Longer term, it is difficult at this stage to say how extensively fibre will be deployed in the local access network and what other technologies will also be widely used by that time, such as WiMAX. So, it is hard to predict what the market definition of the access network will look like in the long term, and what regulation might be imposed.

On the second question regarding sub-loop unbundling (SLU), although incumbents are required to give access to copper sub-loops and this is included in their reference unbundling offers, in practice there has been limited commercial demand for SLU in Europe so far. It's been a big enough task for ANOs to build out their own infrastructure to the local exchanges, let alone to build beyond that. But as ANOs build out their own fibre closer to end users in order to be able to install VDSL, there will be increased regulatory scrutiny of the prices and other terms and conditions for SLU in the incumbent operators' reference offers. For example, Cullen International has not so far been asked by our clients to benchmark the prices for SLU across Europe, a good indication of the level of interest in SLU at present!

7.2 Predatory pricing

A greater concern to regulators than replicability might be that incumbent operators could engage in predatory pricing of their multiple play offers in order to deter competitive entry from ANOs.

Retail broadband markets are not included in the Commission list of relevant markets for regulation under the EU framework, and NRAs do not regulate ex ante incumbent operators' retail broadband tariffs, including for multiple play packages such as IPTV.

This differs from the regime in place for PSTN telephony where in most Member States the incumbent operator is still required to give the NRA advance notice of its proposed retail tariffs, which then are either formally or tacitly approved by the NRA (tacit approval means that the notified prices are approved if there is no response by the regulator within a specified time). The methodology used by the NRA to approve the proposed retail prices typically involves a price squeeze test comparing the proposed prices to the incumbent operator's own costs and/or to the costs of an efficient alternative operator.

In order to impose similar ex ante controls on retail broadband tariffs, an NRA would need to:

- define a new relevant market for retail broadband services outside of the Commission recommendation showing that the three criteria test is met;

- find that the incumbent operator has SMP on the retail market; and finally
- show that regulation at the wholesale level (LLU and bitstream access) is insufficient.

This is very unlikely to be the case.

However, in some countries where NRAs have analysed the wholesale market for broadband access (market 12) they have imposed an obligation on the incumbent operator to set the prices of its bitstream access services based on the ‘retail minus’ methodology. Incumbent operators are then required to notify in advance to the NRA any changes to their retail broadband tariffs so that changes to the corresponding wholesale tariffs to ANOs can be made and the retail minus margin can be checked by the NRA. So, in some instances, obligations on incumbent operators to notify their retail broadband tariffs to NRAs have been imposed “via the back door” of wholesale regulatory obligations.

However, the trend in Member States is moving away from retail minus pricing of wholesale DSL services towards cost orientation obligations. The reason is the growing number and complexity of retail ADSL offers and bundles, which makes applying the retail minus approach to each one a real nightmare. Both Italy and Spain have recently moved away from retail minus to cost orientation.

In the absence of ex ante regulation of retail broadband tariffs, alleged cases of predatory pricing of retail broadband prices will be investigated under standard competition law by national or European competition authorities. For example, in July 2003 the European Commission imposed a €10.35 million on Wanadoo, a subsidiary of FT for abuse of a dominant position in the form of predatory pricing of ADSL-based Internet access services for the general public (the case has been appealed to the Court of First Instance and the court’s judgement is still pending).

In February 2006 the Commission sent a statement of objections to Telefónica, alleging an abuse of a dominant position. The Commission claims that Telefónica has imposed a margin squeeze in the Spanish broadband market since 2001.

7.3 Bundling

As part of their analyses of the retail fixed PSTN access and calls markets (markets 1-6), NRAs in many Member States have imposed obligations on the incumbent operator not to unreasonably bundle access with calls (i.e. a bundled package of line rental and inclusive call allowance). Usually these obligations state that the end user must be able to purchase the services separately and the proposed prices for the bundled package must not be predatory.

However, it does not appear that NRAs have always specified whether these prohibitions on bundling would also cover the bundling of the incumbent operator’s basic PSTN service with their multiple play offers. In practice it can be observed that today incumbent operators sell bundles of ADSL internet access, IPTV and flat rate PSTN- or IP-based calls, but this is not sold together with the basic PSTN line subscription (although both are charged on the same bill).

7.4 ANOs’ fixed call termination rates

Incumbent operators sometimes claim that in Member States where fixed ANOs are allowed to charge higher rates to terminate PSTN calls on their networks than the incumbent operator charges to terminate calls on its network, this provides a source of revenues which ANOs can use to cross-subsidise the retail prices of services, including multiple play packages.

The approach of NRAs to the regulation of ANOs’ termination rates has differed both in the past and at present across the EU. NRAs in some Member States (for example, France) have in the past set “delayed reciprocity” regimes for fixed PSTN call termination on ANOs’ networks. These delayed reciprocity models typically provided for gradual reductions in ANOs’ rates to come into line with the incumbent’s fixed termination rates after a number of years (5 years in the case of France).

Subsequently, with the introduction of the EU 2003 electronic communications regulatory framework, NRAs were required to analyse the wholesale market for fixed call termination on individual networks (market 9). The choice of obligations imposed on ANOs varies considerably between Member States. Some have

imposed delayed reciprocity models where ANOs' and the incumbent's rates will converge over time (the Netherlands, Italy), others have set strict reciprocity between the incumbent and ANOs' rates (Sweden, the UK), whereas others allow ANOs to set "reasonable" termination rates that may exceed the incumbent's without any convergence to reciprocity over time (Denmark, Germany, Spain).

Therefore, the opportunity for cross-subsidisation by ANOs from call termination to retail prices will be an issue in some Member States, but not in others.

7.5 Must-carry obligations

Article 31 of the Universal Service Directive states:

"Member States may impose reasonable "must carry" obligations, for the transmission of specified radio and television broadcast channels and services, on undertakings under their jurisdiction providing electronic communications services used for the distribution of radio or television broadcasts to the public where a significant number of end-users of such networks use them as their principal means to receive radio and television broadcasts. Such obligations shall only be imposed where they are necessary to meet clearly defined general interest objectives and shall be proportionate and transparent. The obligations shall be subject to periodical review." (underlining is ours – CI).

Given the limited take-up of IPTV commercial offers in most of the nine countries surveyed, it would be expected that must-carry obligations would not apply to IPTV providers.

However, Annex III (Table 7.3) shows that must-carry obligations are applicable to fixed IPTV providers in three countries: Belgium (French speaking community only), France and Sweden. In Sweden, the must-carry obligation applies only to FTTH networks and not to ADSL. In all three countries the national public channels must be carried by IPTV providers (although, it's very likely that these would be carried without such an obligation given their attractiveness to viewers). Local channels must also be carried in Belgium and France.

7.6 Net neutrality

The debate on net neutrality has started to reach Europe from the US. But, this debate is probably less relevant for IPTV services provided over closed networks than for other types of services streamed over the public Internet.

Net neutrality refers to a data network that assigns all transmissions equal priority as they are passed along the network. This principle which was implemented by the developers of the Internet for efficiency and costs reasons, is now challenged by some market players who argue that users and companies should be able to pay to ensure that their transmissions have priority over others. They argue that net neutrality does not guarantee quality of service for some real time applications such as VoIP and live video streaming, where packet delivery is time critical.

For others and in particular for some content providers and consumer groups, abandoning net neutrality would go against the principles of equality and openness that characterize the Internet. One of the risks of a 'two-tiered Internet' is obviously that network operators use packet shaping and prioritisation tools in an anti-competitive way so as to disadvantage their competitors' services.

In order to avoid degradation in the quality of transmission offered to third parties to unacceptably low levels, the European Commission is proposing as part of its current review of the EU regulatory framework for electronic communications that NRAs have the power to:

"set minimum quality levels of network transmission services in an NGN (Next Generation Network) environment based on technical standards identified at EU level".

7.7 Broadcasting licences

The EU 2003 regulatory framework introduced a general authorisation regime for the operation of an electronic communications network (including networks for broadcasting), requiring at the most a notification to the telecoms regulatory authority.

Annex IV (Table 7.4) shows what additional authorisations or licences an IPTV provider would need from the broadcasting authority depending on the types of services provided:

- VoD. Since VoD are information society services under the Electronic Commerce Directive there should be no authorisation or licence needed. This is the case for seven of the countries. In Belgium (Dutch speaking community) and the Netherlands a notification must be made to the broadcasting authority. While in Belgium (French speaking community) a full licence must be granted by the authority. This does not appear to be in line with the directive.
- Distribution of already licensed TV channels (either licensed in the same Member State or in another Member State under the country of origin principle of the TWF). This activity does not require a notification or licence from the broadcasting authority in six of the countries. A notification must be made to the authority in Belgium (French speaking community), France and Spain (autonomous region of Cataluña). This could be seen as contrary to the TWF which says that Member States cannot restrict the retransmission of television broadcasts originating from other Member States. If the amount or type of information required in the notification is too cumbersome this might be considered a disproportionate restriction to retransmission (for example, in Belgium, Belgacom had to provide copies of the licences granted to TV channels in other Member States!).
- Where an IPTV provider goes beyond simple distribution of already licensed TV channels and exercises editorial control over programming then a licence is needed from the broadcasting authority in all nine countries. However, it is not particularly clear from the national laws at what point the IPTV operator would be considered to exercise “editorial control” and how this is defined. For example, would choice of channels offered in different subscription bouquets or time-scheduling of programmes be considered as editorial control, or only where the IPTV provider were to supply its own channels, for example, a teleshopping channel?
- Finally, in the two countries with a federal government structure (Belgium and Germany), responsibility for broadcasting is a regional competence and broadcasting authorisations/licences are issued at the regional level (although, in Germany it is possible that one regional media authority issues a nationwide broadcasting licence). The same applies to the autonomous region of Cataluña in Spain.

ANNEX I: IPTV COMMERCIAL OFFERS

The table below describes commercial IPTV offers which are viewed over a fixed broadband connection (DSL or fibre-to-the-home (FTTH)) with a standard television set. IPTV services are offered over closed content distribution networks and are different from video streaming over the public Internet viewed on a PC.

Table 7.1: IPTV Commercial Offers

CC	Operator	IPTV service name and weblink	Geographical coverage Or population coverage	Technical solution			Number of subscribers (source + date)
				Access network (incumbent own infrastructure, alternative operator LLU or FTTH)	ADSL, ADSL2+, VDSL	Set-top box integrated with DTT decoder ?	
BE	Belgacom	Belgacom TV	Half of the population according to Belgacom	Belgacom own infrastructure	ADSL, ADSL2+, VDSL, depending on the location.	No	74K end June 2006. (source: Belgacom press release)
DK	Tele Denmark	TDC TV	Not available	Own infrastructure	ADSL	No	No data available
	Dansk Bredbaand	Dansk Bredbaand	Not available	Own infrastructure	FTTH	No	No data available
FR	France Telecom	Ma ligne TV	National, but must be within 2.5km of a FT switch	France Telecom own infrastructure	ADSL2+	Yes	306K end June 2006 (source: Echosdunet)
	Neuf Telecom Cegetel	Neuf Telecom	In total 1251 MDFs opened for Full unbundling (out of around 12000) then be within 2.5km of a FT switch where Neuf Telecom has implemented physical access	LLU	ADSL2+	Yes	60K end Dec 2005 (source: Free Telecom)
	Free Telecom (Illiad Group)	Free	In total 1251 MDFs opened for Full unbundling (out of around 12000) then be within 2.5km of a FT switch where Free has implemented physical access	LLU NB FTTH launched in Paris in Sept 2006	ADSL2+	Yes	1.26m end June 2006 (source Free Telecom)
	Telecom Italia	Alice	In total 1251 MDFs opened for Full unbundling (out of around 12000) then be within 2.5km of a FT switch where Telecom Italia has implemented physical access	LLU	ADSL2+	Yes	No data available

DE	DT	T-Home	<i>T-Home Complete</i> (VDSL) available in 10 metropolitan areas <i>T-Home Classic</i> (ADSL2+) available in many regions all over Germany	Subscription to 'T-DSL' service based on DT's own infrastructure (DSL)	<i>T-Home Complete Basic</i> and <i>T-Home Complete Plus</i> : VDSL <i>T-Home Classic</i> : ADSL2+	No	No data available. Commercial launch in August/September 2006
	Hansenet, a Telecom Italia subsidiary	Alice Home TV	Region of Hamburg and City of Lübeck	Hansenet own infrastructure (DSL) based on LLU	ADSL2+	No	No data available. Commercial launch in April/May 2006.
IT	FastWeb	Fastweb	Most densely populated cities in Italy.	Fastweb's own FTTH or ADSL based on LLU from Telecom Italia	FTTH, ADSL and ADSL2+	No	874K (Q2 2006 financial reports). Total number of households in Italy c.a. 22m.
	Telecom Italia (TI)	Alice Home TV	On Sept. 11, 2006 TI announced that the service is currently available in 70 major cities, and by the end of 2006 it will reach 250 cities.	Telecom Italia own infrastructure	ADSL2+	No	No data available
NL	KPN	Mine TV	Not available	Own infrastructure	ADSL2+	No	No data available (IPTV offer launched in May 2006).
	Tele2	Tele2 TV	Not available	LLU	ADSL2+	No	No data available In a press release , Versatel mention 84K ADSL 2+ clients 2Q 2006 (dual and triple play clients).
ES	Telefónica	Imagenio	National coverage	Telefónica's own infrastructure	ADSL	Yes	206K end 2005 Source: CMT annual (2005) report (page 32)
	Jazztel	Jazztelia TV	National coverage	Own optical fibre + LLU	ADSL2+	Not yet. Announced to be available shortly.	No data available
SE	Telenor with Viasat	Bredbandsbolaget	Available in major cities	Own fibre and LAN infrastructure and xDSL based on LLU from Telia Sonera	ADSL + VDSL depending on the location. FTTH	Yes	No data available
	TeliaSonera	TeliaSonera	Available in major cities	Own fibre and xDSL infrastructure	ADSL FTTH	Yes	No data available
	SkyCom	FastTVnet	Available in major cities	Fibre infrastructure from over 20 municipal networks	FTTH	No	No data available
	Telenor	Canal Digital	Available in major cities	FTTH	FTTH	Yes	No data available
UK	Video Networks (merged with Tiscali UK in August 2006)	Homechoice	London only	LLU		No	Between 4K and 10K in 2006 (according to press reports)

	BT plans to launch before end 2006	BT Vision	-	BT own infrastructure	-	Yes	-
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Source: Cullen International

ANNEX II: FOOTBALL RIGHTS

The table below shows whether a fixed IPTV operator has rights to live broadcast of national premier league football matches and whether those rights are:

- exclusive rights across all TV platforms (i.e. can only watch matches on IPTV operator)
- exclusive rights for IPTV platform only (i.e. matches also available live another pay TV platform, e.g. cable, satellite)
- Note: Under the Television Without Frontiers Directive, some matches may be considered as “events of major importance” (e.g. final of the national football cup) and be required to be available on free TV. These matches are not covered in the table below.

The table does not cover rights for Mobile TV platforms.

Table 7.2: Football Rights				
	IPTV operator	Does IPTV providers have exclusive rights for...		Period of rights How much paid?
		all TV platforms (i.e. can only be watched on IPTV)	IPTV platform only (i.e. can be watched on other pay TV platforms)	
BE	Belgacom TV	Yes NB The two public broadcasters signed an agreement with Belgacom TV to show one match live per week until Dec. 2006.	No	July 2005 to July 2008. €36m per year.
DK	Tele Denmark	No	No	Until Dec. 2006.
	Dansk Bredbaand	No	No	
	Viasat (MTG) has exclusive broadcasting rights to broadcast live matches from the Danish premier league until December 31, 2006 that apply to all platforms, including IP-TV. IP-TV providers willing to broadcast the Danish football matches have to sign distribution agreements with Viasat.			
FR	France Telecom's Ma Ligne	No (but distribution of Canal+ standard offer - see comment below)	Yes for 'Foot Plus' offer FT has signed a 3 year agreement with Canal+ whereby it has the exclusivity of reselling Canal Foot Plus offer (see comment below)	3 years Canal+ paid €600 m per year. FT is under stood to be paying € 50m per year to Canal+
	Free	No (but distribution of Canal+ standard offer - see comment below)	No But other specific football rights (French League Cup). Free has an agreement with France Television, the rights holder for the football cup. Iliad press release	
	Alice Télécom	No (but distribution of Canal+ standard offer - see comment below)	No Resell TPS foot offer that has the rights for English football, UEFA and the champions league	
	Canal+ has won the auction for four lots regarding live broadcast of national premier league football matches (some rights have also been granted to Orange for Mobile TV). Canal+ proposes: <ul style="list-style-type: none"> • live broadcast of 3 national premier league football matches in its standard offer • live broadcast of 7 additional premier league football matches in its 'Foot Plus' offer. Canal+ resells its standard offer to cable, satellite and to IPTV operators. An exclusive distribution right on IPTV platforms has been granted to France Telecom for the 'Foot Plus' offer.			

DE	Deutsche Telekom in cooperation with Premiere	Not applicable	DT has exclusive rights for IPTV only Arena (a subsidiary of Unity Media, one of the big cable TV operators) has exclusive rights for Pay TV platforms (cable, satellite)	July 2006 to July 2009 Price not published, according to media reports approx. €45m for the three seasons.
IT	Telecom Italia (Alice Home TV)	No (but see the note below)	No (but see the note below)	Depends on the contract with an individual team (but see the note below)
	FastWeb (access to content of Sky)			
<p>There is no collective rights management in Italy, and the broadcaster negotiate directly with the clubs.</p> <p>Competition Authority decision on Mediaset of June 2006</p> <p>On June 28, 2006 AGCM, the Italian Competition Authority, found (provvedimento n. 15632) that private terrestrial broadcaster Mediaset had abused its dominant position by entering into agreements with Juventus, Inter, Livorno, Roma, Milan, Lazio and Sampdoria giving it long-term, exclusive and pre-emptive rights to broadcast matches on all platforms.</p> <p>During the investigation, Mediaset however committed, from 2007:</p> <ul style="list-style-type: none"> to maintain exclusivity only on the digital terrestrial platform, and sell other rights to third parties in an equitable, transparent and non-discriminatory manner not to include any further clauses regarding right of first refusal or right of pre-emption. <p>Following the opening of the investigation, Mediaset sold the broadcasting rights for Serie A matches played "at home" of Juventus, Inter, Roma and Lazio, giving SKY exclusive satellite broadcasting rights as well as ceding non-exclusive broadcasting rights on different alternative platforms.</p> <p>Mediaset also agreed with Juventus, Inter, Milan, Lazio, Roma and Livorno to reduce the duration of rights acquired from 2007 to a maximum of two years with an option to renew for one further season. Therefore, the contracts originally intended to last until 2016, will expire in 2009 unless the option is exercised.</p> <p>NewsCorp/Telepiù</p> <p>On April 2, 2004 the European Commission approved a concentration, subject to conditions, where News Corporation Limited (NewsCorp) acquired control of the whole of the Italian pay-TV's Telepiù and Stream. Telepiù and Stream then merged their activities in a combined satellite pay-TV platform (Sky Italia). The conditions relating to access to content included that:</p> <ul style="list-style-type: none"> NewsCorp will waive exclusive rights in relation to blockbuster movies, football matches and other sport rights for non-satellite transmission. Cable, DTT and Internet operators will thus be able to buy content directly from right owners (e.g. film producers, football clubs, other sport rights owners) non-satellite competitors will be able to buy premium content from NewsCorp by means of a wholesale offer based on 'retail minus' pricing. The wholesale offer will work on an unbundled and non-exclusive basis access to content will be facilitated also for potential satellite competitors by allowing rights owners to unilaterally terminate without penalties their ongoing contracts with Sky and by limiting the duration of future contracts (2 years for football clubs and 3 years for film producers). <p>The commitments will be in force until Dec. 31, 2011.</p>				
NL	Tele 2	Yes In Sept. 2006, Tele2 and KPN have concluded a distribution agreement: Tele 2 will offer its football package through KPN's DVB-T and IP-TV networks.	No	From Dec. 2005 to Aug. 2008. €30.5m per year.
ES	Telefónica Imagenio	No	No	
	Jazztel (Jazztelia TV)	No	No	
<p>For 2006/2007 and 2007/2008 seasons, the audiovisual rights of the Spanish league and the Spanish cup are held by Audiovisual Sport (owned by Sogecable, a satellite platform). Audiovisual Sport has distribution agreements with IPTV and cable operators.</p>				
SE	Telenor with Viasat Broadcasting (Bredbandsbolaget)	No Distribution agreement with Viasat that offers its football package over Bredbandsbolaget's IP-TV network	No	See note below
	TeliaSonera	No Distribution agreement with Canal+ that offers its football package over TeliaSonera's IP-TV network	No	

	Telenor with Canal Digital	No Distribution agreement with Canal+	No	
	FastTV	No Distribution agreement with Canal+	No	
	In Feb. 2006 the Swiss rights agent, Kentaro Group, paid EUR 28 million to the Swedish Football Association in a five year contract for its Allsvenskan National league rights over the next five years. Broadcasters including Viasat, Canal+, TV4 and SVT have to negotiate directly with the Swiss company for rights to the domestic Allsvenskan competition.			
UK	Homechoice	No. Homechoice offers Sky sports via retail distribution agreement with Sky		
	BT Vision (to be launched end 2006)	No	No	Rights to show 242 “near-live” Premier League matches per season, for 3 years (2007/08 to 2009/10). Shares non-exclusive rights with BSkyB. BT and Sky paid £84 million (€125 million)

Source: Cullen International

ANNEX III: MUST CARRY OBLIGATIONS FOR FIXED IPTV

The table below shows:

- whether must-carry obligations apply to fixed IPTV operators
- which TV channels must be carried
- the compensation model for must-carry
- whether broadcasters have any “must offer” obligation to offer their programming to IPTV operators

Table 7.3: Must carry obligations for fixed IPTV

	Must-carry obligation on fixed IPTV operators	Which TV channels?	Compensation Who pays who, IPTV operator or broadcaster?	Must-offer obligation for broadcasters to fixed IPTV operators
BE	French speaking community: Yes Must carry obligation apply to cable networks (without distinction between coax and IP networks). (Media Decree, art. 81)	<ul style="list-style-type: none"> • Belgian French-speaking public channels (TV+radio). • 2 Belgian Dutch-speaking public TV channels (with reciprocity conditions) and all public radio channels. • Belgian German-speaking public services (radio channels) • Local TV channels (limited to those where the subscriber is located) • International channels, appointed by the government, in which the French-speaking public broadcaster participates (TV5). (Media Decree, art. 82)	Transport and broadcasting costs borne by IPTV providers.	No
	Flemish Community: No	-	-	No
	German-speaking Community: No	-	-	No
DK	No	-	-	No
FR	Yes No justification in the law. Must carry is imposed on all platforms that do not use frequencies assigned by the broadcasting regulator.	<u>Mandatory - Public channels</u> France 2 France 3 France 5 France 4 (digital only) Arte TV5 Services of Réseau France Outre-Mer that are destined to the metropolitan public La Chaîne Parlementaire Services for disabled people associated to the channels to be carried Law 86-1067 <u>On request from the channels</u> Local channels Analogue & digital free-to-air channels but unclear (<i>access to distribution terminal</i>) – Art. 34-4 Law 86-1067	Transport and broadcasting costs borne by IPTV providers.	Yes – public channels only The public broadcaster licence (cahier des charges de France Télévision) requires the provision of public channels to all networks.
DE	No	-	-	No
IT	No	-	-	No
NL	No	-	-	No
ES	No	-	-	No

SE	<p>Yes</p> <p>Cable networks and other wired electronic communications networks used for transmission of TV broadcasts to the public and a significant number of households connected to the network use it as their principal means to receive TV broadcasts. Public communications networks based on paired metal loops, where only a limited number of channels can be broadcasted, e.g. using ADSL technology, are however exempt from must-carry.</p> <p>Chapter 8 of Law (1996:844) on radio and TV.</p>	<p>Four public service channels financed by TV-licence fees: SVT1, SVT2, SVT24 and UR</p> <p>One commercial FTA analogue channel (TV4) – only until February 2008 (analogue switchover date)</p>	<p>Rights holders have previously refrained from requesting compensation for the material subject to copyright that is included in the programme services covered by the must-carry obligation. From July 1, 2005 rights holders are entitled to request compensation from network operators under the Copyright Act (1960:729) for these programme services as well. Network operators then have a right to reasonable cost compensation from a broadcasting undertaking under the Copyright Act, if the must-carry obligation would otherwise be unreasonably burdensome. If the parties cannot agree on the matter, RTVV, upon special request, can decide on the allocation of the copyright costs.</p>	None
UK	<p>Yes, in principle but not in practice</p> <p>Art. 64 of the Communications Act 2003 provides for must-carry on ‘<i>networks by means of which public electronic communications services are provided that are used by a significant number of end-users as their principal means of receiving television programmes</i>’. Thus must carry is a generic obligation imposed on all electronic communications networks, e.g. potentially all broadcast platform providers, including IPTV.</p> <p>However must-carry has not been implemented as platform and content providers have reached agreements to carry the public broadcast channels through commercial negotiation.</p>	<p>Must-carry services are listed in the Communications Act 2003 as the broadcasters with public service obligations:</p> <ul style="list-style-type: none"> • The BBC is the government-funded public broadcaster offering news, sport and its own dramatic programming. • ITV (Channel 3) is a commercial broadcaster funded from commercial revenues, for example advertising. It consists of 15 regional franchises. It has public service obligations to provide a range of high quality programming, in particular for regional programming. • Channel 4 is a non-profit public corporation funded from commercial revenues, for example advertising. It has public service obligations. It is supposed to provide programming that appeals to segments of the audience not served by the other broadcasters (that exhibit ‘distinctive character’ and appeals to a ‘culturally diverse society’.) • Channel 5 is a commercial broadcaster funded from commercial revenues, for example advertising. It has public service obligations to provide a range of high quality programming. • Teletext Ltd. is the public teletext service in the UK. It is commercially funded and has public service obligations (see 2006 Statement of Programme Policy). 	Commercial negotiation	<p>Yes, if an IPTV network offers public electronic communications to a “significant number of end users”</p> <p>Art. 272-276 Communications Act 2003 requires Ofcom to put in the license for each broadcaster with public service obligations rules to ensure:</p> <ul style="list-style-type: none"> • they are carried on all networks offering public electronic communications to a significant number of end-users as their primary means of receiving TV programming; • their content is made available to as many members of the intended audience as possible; • broadcasters may not charge for their content.

Source: Cullen International

ANNEX IV: LICENSING REQUIREMENTS FOR FIXED IPTV SERVICES

The table below shows for fixed IPTV services:

- the authorisation needed to operate an electronic communications network
- the authorisation or licence needed from the broadcasting authority to:
 - offer video on demand (VoD) services (note – there should be none as VoD is an information society service under the Electronic Commerce Directive)
 - distribute already licensed broadcasting channels
 - at what point the IPTV operator would be considered to exercise “editorial control” over programming and how this is defined (for example, would choice of channels offered in different subscription bouquets or time-scheduling or programmes be considered as editorial control, or only where the IPTV provider were to supply its own channels, for example, a teleshopping channel?)
- whether authorisations/licences from broadcasting authority are national or regional (in which case, how many different regional authorities must be dealt with?)

Table 7.4: Licensing Requirements for fixed IPTV Services

	Authorisation to operate electronic communications network	Authorisation or licence from broadcasting authority-			
		VoD	Distribution only	“Editorial control” exercised over programme content (specify how editorial control defined)	National or regional broadcasting authorisations or licences (specify how many regions)
BE (FR)	Notification to broadcasting regulator (CSA) (Media Decree, art. 97)	Licence granted by CSA (Media Decree, art. 33)	Notification to CSA (Media Decree, art. 75)	Licence granted by CSA (Media Decree, art. 33) “Editorial control” is not defined.	Regional. Four broadcasting regulators: <ul style="list-style-type: none"> • French-speaking Community • Flemish Community • Brussels Region • German-speaking Community
BE (VL)	Notification to broadcasting regulator (VRM) (Media Decree, art. 126)	Declaration to VRM (Media Decree, art. 60)	No licence or declaration	Licence granted by VRM (Media Decree, art. 65, 71, 81, 85, 92).	
DK	General authorisation without notification requirement	No licence or declaration	Retransmission of radio and broadcasting channels over cable TV networks is not programming and does not require registration. However, the operator must not make changes to the content.	Registration with The Danish Radio and Television Board if the operator provides programming. This is defined as moving video. The provision of text messages is not considered to be programming. The conditions are set out in Radio- Og Fjernsynsvirksomhed Vha. Satellit Eller Kabel – Bek. 338 av 19. april 2006. Although there is no specific regulations on IPTV, it is expected to be similar to cable.	National

FR	Declaration to ARCEP (Decree n° 2005-862)	No licence or declaration	Declaration to CSA Art 34 of Law 86-1067 and decree 2005-1355	Licence required for the provision of “television services” (i.e. services destined to be received simultaneously by the public and whose main programming is composed of an organised series of programmes with images and sounds. Law 86-1067, art 2 and art 33 and following	National
DE	Declaration to BNetzA (§ 6 TKG 2004)	No licence or declaration (but see comment below)	No licence or declaration (but see comment below)	License granted by the regional media authority (§ 20 Interstate Broadcasting Treaty)	16 different federal states, currently 15 regional media authorities (Berlin and Brandenburg have a common authority). It is possible that one regional media authority issues a nationwide broadcasting license.
		<p>Many VoD services and distribution only services are “media services” and do not need a licence or notification (§ 4 of the Interstate Treaty for Media Services), but the difference between media services and broadcasting services is rather difficult to determine.</p> <p>According to the Conference of Directors of the Regional Media Authorities, the main difference is, that broadcasting services present and distribute renditions whereas media services are information and communication services (“Informations- und Kommunikationsdienste”).</p> <p>If in doubt, the service provider can ask the regional media authority for a confirmation that the service is a media service. If a regional media authority has to decide on the differentiation between media services and broadcasting services it must consult all other regional media authorities.</p>			
IT	Notification to the Ministry of Communications Decreto Legislativo 1 agosto 2003, n. 259	No declaration nor licence	No declaration nor licence	Authorisation under broadcasting legislation from the Ministry of Communications (“responsibility for the composition of the programming”) Decreto legislativo 31 luglio 2005, n. 177 ; AGCOM decision n. 289/01/CONS	National
NL	Declaration to OPTA (Telecommunication Act , art. 3.1).	No licence or declaration	No licence or declaration	Licence granted by CVDM (Media Act , art. 71)	National licence. But there are 58 broadcasting Councils (created at the municipality or group of municipalities level) that can impose additional carriage obligations to cable TV networks.
ES	Notification to CMT Art. 6.1 of Law 32/2003 of November 3, 2003 (General Telecommunications Law)	None	None (at national level) In Cataluña, distributors must inform the Audiovisual Council of Cataluña (CAC) on each of the TV channels offered art. 1 a) and art. 65 of Law 22/2005 of Dec 29, 2005 (Audiovisual Law of Cataluña)	Broadcasting national licence (administrative concession) needed for the provision of television programmes. No concept of editorial control. Law 10/1988 of May 3, 1988 on private TV In Cataluña there is only a prior notification obligation to CAC. Law 22/2005 does not define ‘editorial control’ although it makes several references to this concept.	National licence from Ministry of Industry Tourism and Trade + notification to CAC for services provided in Cataluña. Law 10/1988 of May 3, 1988 on private TV and article 60 § 1 and 61 of Law 22/2005 of Dec 29, 2005

SE	Notification to PTS	No licence or declaration	No licence or declaration	Transmission of original broadcasts where the broadcaster compiles and is responsible for all or part of a programme service requires registration with the Radio and Television Authority (RTVV). No notification is required for retransmission of programmes	National
UK	Notification to Ofcom (Art. 33 of the Communications Act 2003)	No licence or declaration	No licence or declaration	Art. 232-240 of the Communications Act 2003 and Sec. of the Broadcasting Act 1996 defines a television licensable content service (TLCS) license, required for broadcasters on satellite and other electronic communications networks such as wired networks including IPTV (see Ofcom Guidance Notes for TLCS, April 2006). A TLCS is a service provided in analogue or digital format and consists of either editorial ('normal' television programming) and EPGs, teleshopping or self-promotional services.	National

Source: Cullen International

LIST OF ABBREVIATIONS

ADSL	Asymmetric digital subscriber line
AMS	Audiovisual media services
ANOs	Alternative network operators
DMB	Digital Multimedia Broadcasting
DSL	Digital subscriber line
DT	Deutsche Telekom
DTT	Digital terrestrial TV
DVB-H	Digital Video Broadcast Handheld
ECTA	European Competitive Telecommunications Association
FAPL	English Football Association Premier League
FT	France Télécom
FTTC	Fibre-to-the-curb
FTTH	Fibre-to-the-home
GPRS	General Packet Radio Service
IPTV	Internet Protocol television
LLU	Local loop unbundling
MDF	Main distribution frame
NGN	Next generation network
NRA	National regulatory authorities
PPV	Pay-per-view
PSTN	Public switched telephone network
PVR	Personal video recorder
SLU	Sub-loop unbundling
SMP	Significant market power
STB	Set-top box
TWF	Television Without Frontiers Directive
VDSL	Very high bit rate DSL
VoD	Video on demand



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IPTV – MARKET, REGULATORY TRENDS AND POLICY OPTIONS IN ASIA-PACIFIC

BACKGROUND MATERIAL

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NOTE

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ABSTRACT

Rapid development of broadband technologies and infrastructures, especially in South East Asia, signals huge potentials for telecommunication operators to include services beyond voice and Internet connectivity in their provisions. IPTV represents a vital opportunity for the telecommunication operator industry looking to obtain new revenue streams. With the necessary broadband infrastructure in place and availability of new video compression technology, operators have the opportunity to broadcast live TV signals to a television set or a PC via private broadband networks.

The development of broadcast technologies is increasingly influenced by the ongoing convergence process, where the whole value chain (the content, service, infrastructure and the end-user terminal industry) are converging and gain from the efficiencies and synergies enabled by the digitalisation, the IP platform and the emergence of new access technologies like optical fibres and mobile / wireless platforms. The market for television services has been subject to radical changes through the convergence of technologies and markets.

The IPTV services offered in the broadband IP networks directly compete with major multi-channel platforms like digital cable TV and digital satellite TV. The IPTV development opens up for new possibilities for broadcasters both in terms of the expansion of the number of services (total removal of scarcity), the possibility for real interactivity and the development of new business models. On the other hand, IPTV is developing in the IP world, which traditionally has not been subject to regulation. Obviously, in this development, a number of problems arise, which are directly connected to the convergence of the *regulated* media sector and the *unregulated* Internet platform. The aim of this report is to analyse the major regulatory issues related to IPTV. The analysis is mainly based on the discussions in Korea, China, Australia and the US. Furthermore, data from Japan, Hongkong and Singapore is included in the analysis.

1 INTRODUCTION

The aim of this report is to analyse the major regulatory parameters related to the development of IPTV. Furthermore, a short overview of traditional broadcast regulation and the development of IPTV technology / market is given. Detailed case studies of IPTV regulation in Korea, China, Australian, and the US are presented to create the basis for identifying the regulatory challenges of IPTV development as broadly as possible. Furthermore, data from Japan, Hongkong and Singapore is included in the analysis.

Rapid development of broadband technologies and infrastructures, especially in South East Asia, signals huge potentials for telecommunication operators to include services beyond voice and Internet connectivity in their provisions. IPTV represents a vital opportunity for the telecommunication operator industry looking to obtain new revenue streams. With the necessary broadband infrastructure in place and availability of new video compression technology, operators have the opportunity to broadcast live TV signals to a television set or a PC via private broadband networks.

Asia-Pacific broadband penetration increases promisingly and there are huge opportunities for IPTV in the Asia-Pacific region. However, the business case and the demand aspects remain challenging, especially given the significant investment costs to launch and scale IPTV. The biggest question, however, is: Is the regulatory framework ready for large scale developments of IPTV? An answer to this question is the main objective of this report

There are different views about the definition of IPTV. To broadcasters, IPTV (or Broadband Television) is simply “a new emerging platform for distributing digital television channels to home consumers using a TV screen”¹. IPTV is complementary to existing satellite, cable and terrestrial systems, although in some cases it may become a vigorous competitor to them. To the telecom industry, IPTV is synonymous with a new opportunity to take part in an attractive and dynamic media market. Here, the possibilities are not only connected to the sharing of the current media market, but to the fact that the media market increases in accordance with the invention and development of new technologies. IPTV can replace broadcast TV but the potentials for IPTV goes far beyond traditional linear one-way TV distribution and includes tremendous values by enabling interactivity and on-demand services.

Furthermore, there is an important distinction between using IPTV for the delivery of TV through dedicated/managed broadband networks and delivering WEB TV /Internet TV, i.e., TV over the open internet. There are fundamental differences between these two types of services: Delivering WEB TV or Internet TV is a best effort service, with no guaranteed service quality. Rather than being viewed via a TV screen, it is mainly available on personal computers. Its reach is worldwide (as opposed to the local reach of managed IP platforms). With ever-improving video/audio compression, the Internet network throughput and storage devices, Internet TV is becoming a very serious contender², which challenges the traditional TV and IPTV. Presently, however, Internet TV is mainly seen as a complement to mainstream TV broadcast and even to the IPTV services.

The media landscape is changing radically. The first wave of changes in broadcasting was the emergence of digital TV. Now we are witnessing the development of a variety of broadcast services, including different mobile broadcast services (DMB in Korea, DVB-H in Europe and the US, and MediaFLO in the US). Interactivity becomes increasingly important and different on-demand and non-linear services become more and more important in the daily life. The Internet is playing a major role as the platform which provides the possibility for all these developments. One of the last developments here is the user generated content with millions of video clips loaded by users on different personal blogs and Internet sites like Google Video and Youtube to mention a few of them.

IPTV regulation will also deal with traditional broadcast regulation like dealing with *market failures*, *ownership* and *cross-ownership* regulation, issues related to *plurality* and *number of voices* as well as national and *cultural protection* and promotion. Furthermore, the issues related to the removal of *bottleneck* and *efficient competition*, ban on transmission of *offensive content*, regulation of *levels and types of commercials* and *public interest* issues like *consumer protection* will be a part of IPTV regulation. In this report, an overview over broadcast regulation in the traditional sense is given.

First an overview of (traditional) broadcast regulation is given; then some important issues related to IPTV technology and market are discussed briefly; later, the IPTV regulation is analysed based on specific case studies. The report ends with a conclusion and references.

2 BROADCAST REGULATION

Broadcasting emerged from the wireless telegraphy that was organised as state monopoly, first in the developed countries and later almost globally. This historical starting point had tremendous impact on how the service was organised and regulated. There were pure technological reasons for regulation of broadcasting, but content related considerations and economic factors influenced the formation of regulation. The content aspect in the mass communication delivery-structure was important, as practically every citizen, whether child or adult could use the service. This raised concerns about the way broadcasting could influence society as a whole and gave governments incentives to control the medium.

Based on the technological characteristics of broadcasting, the interference and resource scarcity, have by large been main arguments for posing regulation on broadcasting, and considering it as a natural monopoly. In the beginning broadcasting was not regulated, and as illustrated by Riem Hoffmann: “In the beginning there was no regulation on the use of the radio spectrum but the situation got chaotic. There were so many stations and no rules for using the frequencies. Everybody wanted to talk but nobody could hear anybody. This imposed the necessity for some type of regulation to put an end to the ‘chaos in the ether’. The regulation that was imposed had the character of ‘traffic regulation’ but since the frequencies were scarce, the regulatory duty grew into the area in which consideration of common goods³ was used to find or justify criteria for allocation”⁴.

In principal the frequency resources are unlimited. But at different levels of technological development, the portions of the frequency that can be used are different.

Based on economic characteristics of broadcasting, the market failure argument has been the most used argument for legitimizing regulation of broadcasting and deployment of the organizational models for broadcast market. Generally four types of market failure are identified in the literature: 1) Public goods: Non exclusivity and Non-rival consumption, 2) Externalities: Positive and negative externalities, 3) Natural monopoly: economics of scale and scope, 4) Asymmetrical information: which is applicable to any information and entertainment services.

2.1 Public Service Broadcasting

The concept of public service broadcasting originates from the early days of British broadcasting in the 1920s and has continuously been closely related to broadcasting developments in Great Britain in the creation of BBC. The concept, practice and institution of public service broadcasting have thus existed for a good number of decades.

Today, public service broadcasting may be interpreted as a deal between broadcasters and the state, where broadcasters are assigned radio frequencies for the delivery of broadcasting with a public interest dimension. In an Ofcom document, “Beyond the Telephone, the Television and the PC – III”⁵, public service broadcasting is defined in the following way: “At the minimum it involves special rules applied to broadcasters ... in order to influence broadcasters’ portfolio of content and consumers’ access to services”.

Hence the content and access are the two basic elements of public service broadcasting – in contrast to universal service in telecommunications where only access is important. These are the two basic requirements that the state has towards public service broadcasters in exchange for the usage of the limited frequency resources. A third requirement is the financing model.

The content issue in public service broadcasting has both a control (negative) aspect and what is often called positive programming, i.e. requirements for diversity and pluralism in the programming. The keen interest in the content issue stems from the great ideological and political power that broadcasting media have. In Europe, the states wanted to control these powerful media directly, whereas in the US, the majority of licenses were given to commercial companies, and social control has been based on a ‘public trustee’ model.

The logic of ‘public trustee’, dictates that private vendors in limited competition can provide better services than can a publicly managed system. Because spectrum is a public property, however, in order to maintain their access to it, broadcasters would need to demonstrate their responsiveness to the “public interest, convenience and necessity” at regular intervals⁶. These two models of organisation of broadcasting are adopted by many other countries, including the countries in the Asia-Pacific, which are the subject of this report.

There is also an access aspect of public service broadcasting. The people of a nation or a region, in which a public service broadcaster is assigned a licence, must all be able to receive the signals and the services delivered by the broadcaster. It must, therefore, be a free to air signal that does not need any decoding⁷ to be transformed into an understandable picture and/ or sound. Furthermore, the price of the service must be affordable to people in general.

Financing of public service broadcasters has generally come from licenses paid by owners of broadcast receivers (televisions and radios), or are based on the state funding. In the US, public service broadcasters are not state-owned and are not financed by licenses but by grants/ donations and collections. In the US, there is a negotiated deal between public authorities and public broadcasters. Public broadcasters are assigned licenses in exchange for a commitment to broadcast material that is considered to have a public service dimension.

2.2 Regulatory issues related to Satellite and cable platforms

Regarding satellite broadcasting, the country of origin can be different from the country where the service is consumed. The broadcaster will place its administration in the countries that give them best opportunities. An example in the Scandinavian countries is TV3, a popular TV channel, which is transmitted from England and conforms to English regulations. In this way TV3 avoids conforming to Scandinavian regulation on advertising, one of the strictest in the EU. Of course if the country of origin is within the Scandinavian countries, for example, in Denmark even, satellite broadcasting targeted to other countries must undergo Danish regulation.

Regarding cable TV, in so far as the cable operator is not involved directly in programming and only retransmits satellite or terrestrial signals, the individual broadcasters must conform to the regulations of the country of origin. If the cable operator is involved in programming, as in regard to the provision of cable-only channels, the national regulation is applied. Among others, because cable TV can be considered as local monopoly, there are detailed rules regarding the services that must be carried within the network.

One of the important rules is the “must carry” rule, which requires that certain TV channels are deemed necessary to be distributed in every cable TV network⁸. For example in the majority of European countries, e.g., the national public service and local terrestrial channels are available in all cable TV networks due to the “must carry” rule. Access to the “must carry” channel must further be affordable. This has resulted in a structure where the channels are provided in different packages (bouquet/tire) with one of them (the cheapest one, called the basis package) containing as minimum all “must carry” channels. The other packages (optional packages) contain mostly services from satellite networks.

There are also different rules on how the channels in the optional packages may be selected. For example, the cable operator must ask the users and, by majority voting, select the channels in the optional package. The services beyond the optional package are premium pay TV channels that are offered directly to the end-consumers who subscribe to the service and are not covered by any regulation.

2.3 Regulatory issues related to Digital TV platforms

One of the important outcomes of the digitalisation of broadcasting has been implications on the resource issues, a.o., the expansion of the transmission resources for broadcasting due to more efficient utilisation of available resources. This expansion of available resources can be identified in all infrastructures; however, the implications on the terrestrial networks are the most important as the frequency resources in terrestrial networks are scarce, also in the digital age, and valuable for plenty types of uses.

The way the DVB is standardised makes it necessary to have a multiplex operator function, which organisation in terrestrial networks is a vital regulatory parameter. The allocation of resources can be static

or dynamic, and the major organisation forms for the multiplex function are: content-provider (broadcaster)-led, multiplex-led, and service-led.

Another major parameter is allocation of resources for a single HDTV service or for several services (multi-service allocation). The timing for simulcasting of analogue and digital services is also an important parameter, as this will release immense resources for broadcasting or other uses, and removes the burden of operation and maintenance of the analogue systems.

In digital broadcasting, several access parameters are vital, the major parameters are:

Regarding access to infrastructure:

- Infrastructure independency of digital receivers. This is especially applicable when using DVB standards, which have standards for different infrastructures. When the same digital receiver, in the beginning mainly set-top-boxes, can be used in different platforms, the end-user has the most optimal condition in changing between service providers across different platforms.
- Portable and mobile reception. Portable and mobile receptions give valuable flexibility at the end users site. Portable and mobile receptions (especially indoor mobility) are only possible in terrestrial networks, and make demands on the allocation of resources and planning the networks.
- Implementation of return path in terrestrial networks for interactivity purposes.

Regarding access to content:

- Conditional Access (CA). Different CA systems used by the actors in one market impend the end-users' possibility to change between different providers.
- Application Program Interface (API). The market for interactive TV is dominated by different API systems. It is important to have global standard or require interoperability between standards.
- Electronic Program Guide (EPG). EPG is a data service aiming at simplifying navigation between the huge amounts of services available in digital TV platforms. The important task here is to implement an even and non-discriminatory access to all services.
- Free-to-air compatibility of set-top-boxes. To impend tight vertically relations between receiver equipments and the service provision as minimum, it can be necessary that all receiver equipments can access the non-encrypted services.

3 IPTV TECHNOLOGIES

The development from analogue to digital is by far the most fundamental precondition for any other technological changes we have witnessed in recent years. Digitalisation enables the integration of different services in the same network and enables reaping the synergy in the whole value chain of service production, distribution and consumption. Furthermore, digitalisation enables expansion of resources in the access and core networks in a technical and cost efficient way.

The Internet is a main technological change that has revolutionised the communication sector. The Internet is based on the Internet Protocol (IP). Today we are witnessing the development towards deployment of IP in virtually all infrastructures and services.

If we assume that IPTV is the only source of TV in the home, a typical family consumption pattern in the near future could be 1 HD channel, 2 SD channels, 2 VoIP lines, and advanced communication services, yielding an accumulated bandwidth requirement of approximately 20 Mb/s pr. household. Therefore only the advanced broadband networks are capable of offering IPTV services. A short overview of relevant infrastructures is given in annex I of this report.

3.1 IP Based Platforms

When video is transported over a digital network, the content is sent in a consecutive flow of packets between the sender and receiver. Irregularities in transmission properties, such as packet loss and variance in packet delay can cause unwanted breaks or decrease perceptual quality of the content. In modern IP networks network access providers can control transmission properties within the boundaries of their own network. In contrast, the public Internet is a “best effort” network where no guarantees can be provided for end-to-end quality of service.

3.1.1 Managed IP Networks

There are several advantages in providing IPTV services over managed IP networks. Apart from higher transmission quality level, advanced transmission functionality such as multicasting can reduce network load. Depending on business model applied, the tight relationship between network access providers and customers can be utilised in service provisioning. Furthermore, intellectual property rights can be guarded better when the flow and access to content can be monitored, resulting in more simple Digital Rights Management / Conditional Access systems. Along with tighter participation of the networks access provider in offering IPTV, comes a larger role in the value chain, e.g. through revenue sharing.

3.1.2 Best effort IP; the Internet

Providing IPTV services over the public Internet detaches the service provider completely from influence on data transmission making the service subject to uncontrollable fluctuations in transmission quality. This can partly be compensated through scalable (adaptive) codecs or increased playback buffering at the customer side. However, if bottleneck throughput is below consumption rate, content can not be watched in real-time. Currently bottlenecks on the public Internet make it unrealistic to offer real-time broadcasting in high quality between countries / continents. Marketing and trust also becomes a larger problem when customers are doing business over the public Internet.

For most network access providers, IPTV traffic over the public Internet is unwanted as it reduces participation in the value chain and causes overload on shared bandwidth due to transmission inefficiency since all streams are sent individually using unicast. However, for content providers that wish to reach a broad customer group without having to make revenue sharing agreements with content aggregators and network access providers, the Internet provides an inexpensive starting point. However, with adaptation and popularity of IPTV, service providers are likely to be forced into closer ties with network access providers.

4 IPTV MARKET

The past 5-6 years, we witnessed the emergence of a huge amounts of ‘*on demand*’ video services on the Internet, specific ‘Internet TV’ channels, and ‘*time shifted*’ versions of part of programming from traditional broadcasters. This development has been intensified in the recent years, where the quality of streaming video signals are getting better and approaching the quality levels known from traditional TV services.

Furthermore, in recent years, broadband operators deliver IPTV services in their managed IP networks. Here, it is possible to deliver even better quality than traditional broadcast TV and many broadband operators have plans for the provision of HDTV based in IPTV technology. Also in the managed IP networks a great deal of video content, mainly feature movies, is available in the VoD provisions. The IP-VoD is mainly based on client server architectures, but in the future development P2P can be used as a more efficient content organization architecture.

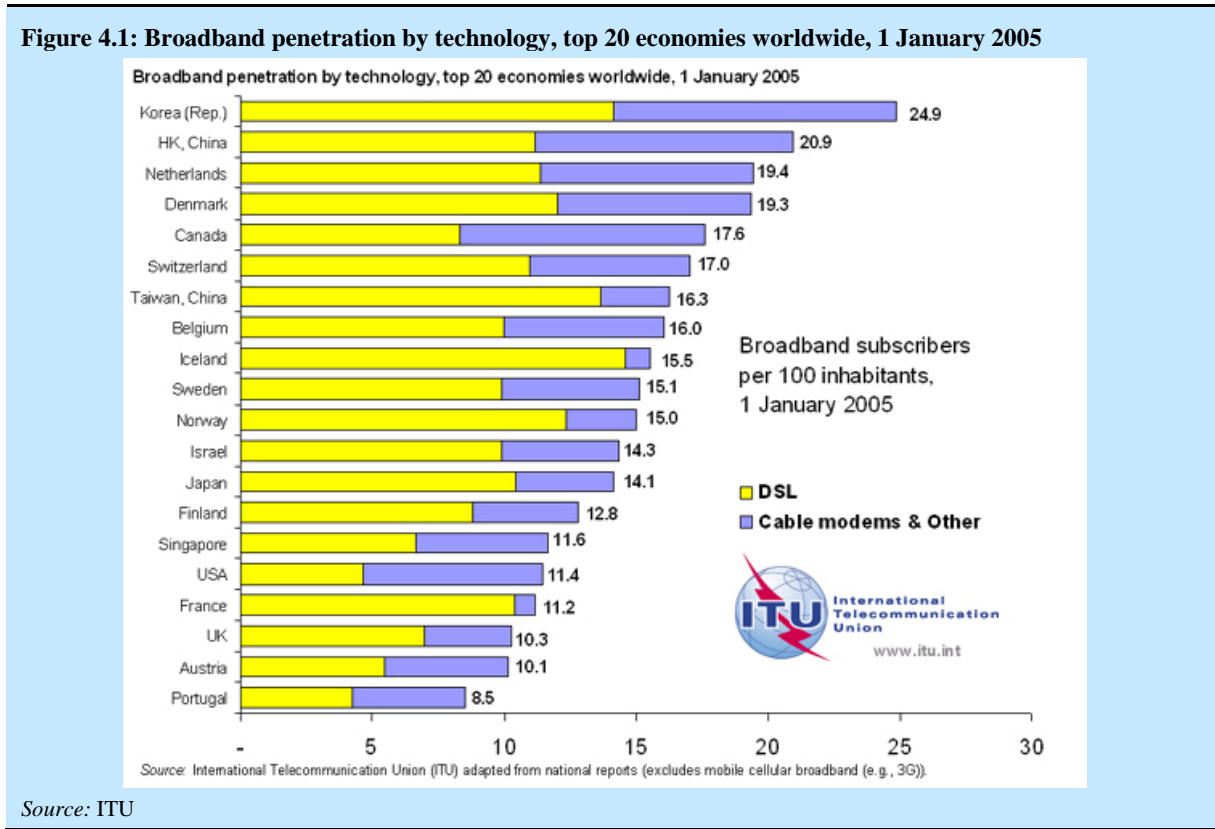
Market development of IPTV depends to a high degree on the development of broadband market. However, within the broadband infrastructures different business models are emerging.

4.1 Development of Broadband

In developed regions especially the US and the South East Asian market have experienced tremendous growth in penetration of broadband. In South Korea about 96% of online users have broadband

connectivity⁹. In Korea for example the development has been dominated by DSL technology; however other broadband technologies count for a substantial part of broadband households and growths rate. In the developing countries traditional broadband like DSL will play a minor role and the development of broadband will mainly be influenced by the development of new wireless technologies.

Following figure shows recent statistics from ITU on broadband development in the top 20 economies of the world. As seen in the figure, the Asia-Pacific countries perform relatively well.



The huge development for the broadband in countries like Korea, Hong Kong, China indicate the very potentials of IPTV in these markets.

4.2 IPTV market development

As seen from the following two figures, different analysis companies forecast a rapid development for IPTV services in the Asia-Pacific countries.

Figure 4.2: IPTV Subscribers in Assica Pasific

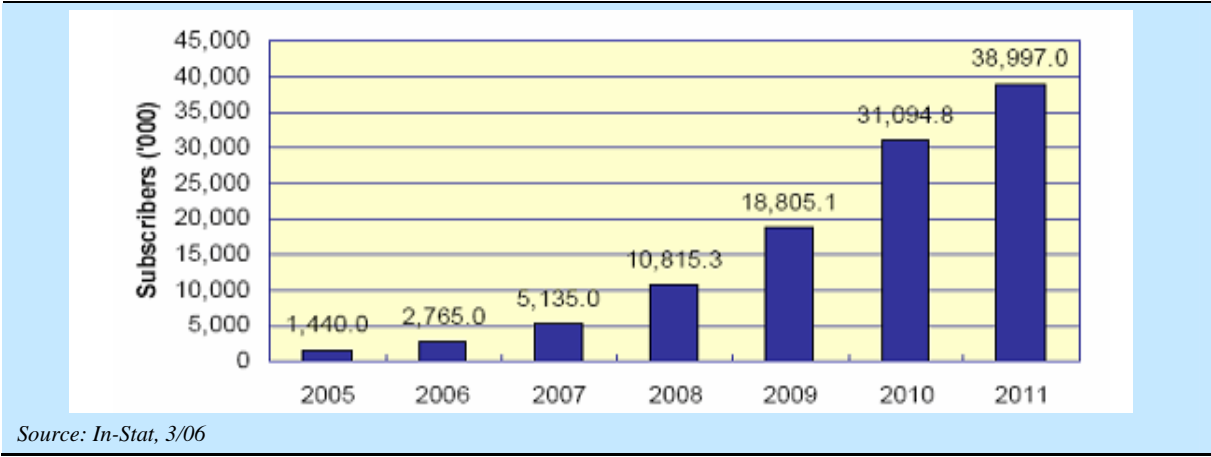
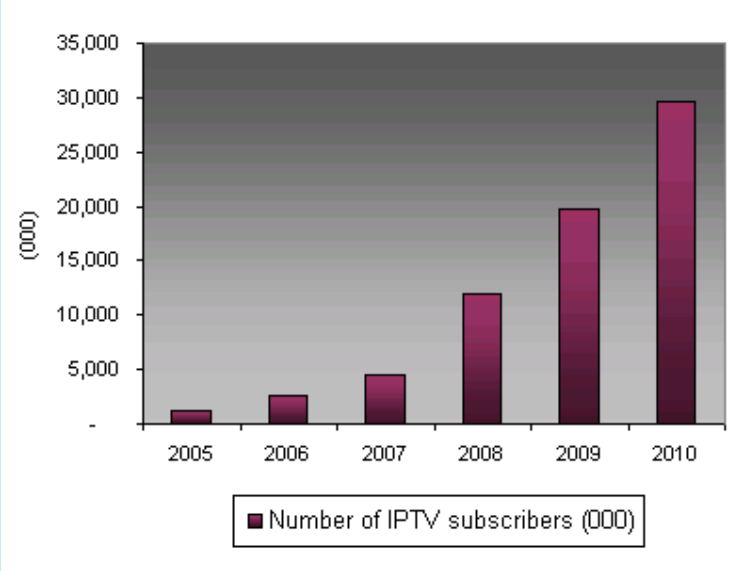


Figure 4.3: Asia-Pacific excluding Japan IPTV/TV over Broadband Subscriber Penetration



According to IDC’s latest report¹⁰, the number of IPTV subscribers in the APEJ region is expected to increase from 1.2 million subscribers in 2005 to a monumental 29.7 million subscribers in 2010 at an impressive compound annual growth rate (CAGR) of 89%. IDC expects the number of residential broadband subscribers in APEJ to keep growing at a rapid pace, increasing from just over 54 million in 2005 to 106.1 million subscribers by 2010 at a CAGR of 14%.

According to In-Sat, total IPTV revenue in the Asia-Pacific region will reach US\$8.1 billion by 2011.

4.3 Models of deployment

Three observations are important in the development of IPTV market: 1) IP platforms, especially broadband platforms, are becoming a competing infrastructure for delivering of TV services. Until now, terrestrial, satellite and cable network have been the main delivery platforms and the main development has been towards digitalisation. 2) IP platforms, due to the inherent interactive component, are changing ‘broadcast’ in a fundamental way from a broadcast service to an *on demand* service. 3) The content providers can bypass service providers and directly offer services to the end consumers.

Regarding the first aspect, a number of broadband providers simply copy the business model from the multi-channel platforms like cable TV and satellite TV and offer services in different packages: Basic package, optional package, premium package, etc. TV viewers living in areas with no cable infrastructure, like Italy, Spain and Greece, may look at IPTV as a platform for multi channel television services competing with digital satellite platforms and DTT platforms.

The broadband operator simply build up a head-end like cable TV, take feeds from different TV station, generate live stream, form different packages and send them to the consumers. The consumers must have IP set-top boxes that convert the IPTV to regular TV and send it to the TV. This model is used on many broadband platforms, mainly as a part of ‘triple play’ services in broadband networks. The model is also used on the general Internet, e.g., the Optimal Stream case in Denmark¹¹.

The second aspect, *on demand* transformation, is important because the characteristics of IP platforms are used to add value to broadcast services. If we look at the composition of TV programs, we can see that the majority of programs are not live and are distributed at certain times by the broadcasting station due to planning considerations. In IPTV provision, this type of content can be put on a server so that users can use them when they want. Of course, when the main value of a program is connected to the ability to receive it live, IPTV must use its capability to offer it as live stream.

The third aspect, bypassing the service provider, is not a new thing. In traditional analogue terrestrial broadcasting and Free-To-Air satellite broadcasting, there is no service provider. The programs are sent to the transmitters (satellite or terrestrial) by the broadcasters and received by the users. The content aggregators or *bouquet* providers emerged in the era of multi-channel TV platforms like cable and satellite. To establish a business model, the service/bouquet providers form different packages of TV channels and sell them to the end users. On the IP platforms, it is possible to continue using this model, and as seen above this is done by several broadband providers. It is, however, also possible for the broadcaster to bypass this service provider function and sell the services directly to the users.. Definitely this creates an incentive mismatch/conflict between broadband providers and content providers; a broadband operator does not get any revenue out of the huge traffic generated when the end users directly connect to an IPTV service.

5 IPTV REGULATION

IPTV is a clear materialization of the convergence process. The regulatory challenges related to the IPTV services are a subset of the general convergence process, where the borderline between media, telecom and Information Technologies vanishes at the technological level and result in new requirements to the general regulatory framework.

The market for television services has been subject to radical changes through the convergence of technologies and markets. Traditional TV broadcast services are still regulated on the basis of specific bottleneck, access and content oriented measures. This approach to regulation is no longer appropriate in a world, where there are a huge variety of TV and video services, competing with the traditional Broadcast services. Broadcasters of today are competing with TV broadcast offered through the Internet and other IP networks. Furthermore there are a number of ‘On demand’ video / audio services that to certain degree are comparable with programming within the traditional broadcast market. The IPTV development opens up for new possibilities for broadcasters both in terms of expansion of number of services (total removal of scarcity) and the possibility for real interactivity. On the other hand IPTV is developing in the IP world, which traditionally has not been subject for regulation.

Digitalization of TV was certainly the most radical innovation that TV industry has experienced since introduction of colour TV. It is important to notice that even though digital TV has been a radical changed it has mainly been kept within the broadcast industry consisting of traditional broadcast market players and using traditional broadcast business models. The increasing use of IP networks for transmission of TV and video services has radical impacts on the characteristics of TV and video services and the deployed business models. This in turn requires a more radical approach to the regulatory framework of audiovisual content, for creating a level playing-field for competition, to promote certain audiovisual content, and for protection of minors, and other societal aims.

Traditionally the media, telecom and IT are regulated by different institutions, based on different principles/requirements. In many countries a number of different institutions are in charge of regulation of IPTV services, , e.g., ‘In China and the Chinese Taipei, TV and Telecommunications services have been regulated by different agencies and strictly separated. Both of them have temporarily put IPTV under the umbrella of cable after lengthy and heated debate’¹².

Putting different requirements to IPTV services than for example cable TV services result in unsatisfactory competition situation between services, which are very much comparable. On the other hand putting different requirements on the IP platforms and cable TV platforms creates uneven competition situation between the platform providers. One example related to this is the ‘must carry’ rule that forces the cable TV operators to distribute Public Service or local terrestrial programs in their networks free of charge, where IP platforms are free for such regulations.

In the following, through empirical case studies we will identify the main regulatory issues related to IPTV development.

5.1 IPTV regulation in Korea

This section gives an overview of IPTV regulation in Korea. The aim is to analyse the regulatory settings and also to identify the regulatory challenges the Korean IPTV sector is facing.

Korea is one of the world’s most advanced broadband markets, where availability and uptake of high-speed DSL broadband are at world-leading levels. The Korean DSL providers have both the technical conditions (very fast access lines) and the motivation to move into IPTV. Hanaro and KT have been trialling IPTV for some times¹³. KT, for example, planned to launch a service called Mega-TV over VDSL in H2 2005. However, there currently exists a serious obstacle to IPTV over DSL or fibre. The Korean regulator, MIC (Ministry of Information and Communications) has ruled that telcos should not launch TV services in the near term, a ruling widely seen as a means to protect Korea’s financially weak cable-TV providers, and the MIC has explicitly stated that it wants telcos’ IP offerings limited to video on-demand¹⁴: ‘Telecommunications operators should not be allowed to offer web TV services until technical and regulatory problems (arising from) the convergence of the telecom and broadcasting sectors are resolved. Before such problems are settled, it is desirable for financially strong telecom operators to provide only on demand video services.’

The telecommunication sector in Korea is eager to be a part of development of IPTV services market. Some main reasons why telecommunications wish to enter the TV market were presented by Korea telecom in a recent conference¹⁵:

- To develop new revenue streams to offset the decreasing revenues from traditional fixed-line services. (PSTN and fixed broadband)
- To respond to the competition from cable companies
- To defend and increase the broadband data market share
- To increase the ARPU of broadband services

A number of barriers rooted in the historical organization of broadcast market and the institutional structure of regulation work against opening up the markets. These are discussed in the following.

5.1.1 Regulatory institution

The main issues related to the convergent service are the redesign of regulatory institutions and the reform of regulation in Korea. The current regulatory framework in Korea is vertical, that is, the regulatory institution for broadcasting and telecommunication is separated. The Korean Broadcasting Commission administers the regulations related to the broadcasting industry, and the Ministry of Information and Communication is involved in the regulations of telecommunication industry¹⁶.

The absence of consolidated regulatory authority seems to be a major barrier to convergence and by that to delivery of IPTV services. Regulation of Korean broadcasting and telecom are organized in the following entities¹⁷:

- The Korean Broadcasting Commission: Regulation of content and economic regulation of broadcasting
- The ministry of culture and tourism: The support of Audio-visual service industry protection
- The ministry of Information and Communication:
 - Broadcast: Allocation of spectrum and License for a radio station
 - Telecom: telecommunication policy
 - Support of telecommunication industry promotion
- Information and Communication Ethics Committee: Regulation of telecommunications content
- Korea Communications commission: Economic regulations of telecoms

Consequently, another main barrier is a confusing regulatory framework; the absence of a consistent framework on new media adds complexity to the Korean media market¹⁸. Because of the absence of a clear concept of convergence in relevant policy and regulation, the convergence service in Korea has faced overlapping regulation in one case and non-regulation in another case.

For example with regards to the DMB, the Korean Broadcasting Commission (KBC) plays an important role in the regulation of the DMB such as in licensing, spectrum, content and other behavioral regulations. Contrary to the trend toward the convergence of the telecommunications and broadcasting, the KBC maintains the legacy regulation such as cross-ownership rules for the sake of public interest. ‘Korea seems to regard DMB as a linear extension or an advanced form of traditional broadcasting’¹⁹. As a result, ‘telecommunications service providers, as well as large business conglomerates, are prohibited from the entrance to the traditionally regarded broadcasting sector’²⁰.

For example DMB presents a dilemma: Does it belong to the telecommunication industry or is it a functional extension of broadcasting?. Dong-Hee Shin gives an analysis of the issue in his recent paper²¹: ‘While semantic distinction about new technology is ongoing, the initial plan of the KBC was to define DMB as an extension of traditional broadcasting, based on the emerging medium’s functionality. As fierce opposition from the telecommunications sector arises, KBC presents a modified definition, DMB as a ‘‘special broadcasting’’ or ‘‘new media broadcasting,’’ which includes DMB and IP-TV. Even with this modified view, it places new technologies within the framework of traditional broadcasting. According to this framework, the KBC requires DMB carriers to observe key broadcasting principles and public interests such as universal service. It may be necessary to consider ‘‘diversity issues’’ in broadcasting services, which inherently observe principles of free speech’.

5.1.2 Definition of broadcast and telecom

Broadcasting and telecommunication in law are defined as follows in the Broadcasting Act²²: ‘Broadcasting is transmission of the broadcast programs which are planned, produced and scheduled to the public by means of telecommunication facilities via cable, satellite as well as terrestrial radio wave’. The Telecommunications Basic Act gives a definition of telecommunication as ‘transmission or reception of code, words, sound or image through wired, wireless, optic, and other electro-magnetic devices’. In brief, the broadcasting means that a specific sender transmits the scheduled information to the public at large, while the telecommunication means that information is transmitted and received in both directions by the electronic method. IPTV is a convergence service and is difficult to be defined in the present law.

The Korean Broadcasting Commission introduces a concept of ‘‘special category broadcasting service’’ into Broadcasting Act and to regulate a convergence service provider as a broadcasting company. The Commission insists that the convergence services should become a concept of ‘‘broadcasting,’’ based on the ‘‘opening telecommunication market’’ and ‘‘competition of the IPTV and cable television.’’²³

On the other hand the Ministry of Information and Communication claims that the IPTV should be served as value added network service for the following two reasons: the technical maturity which carries out the IPTV service is prepared, and that the delay of convergent service offer causes the result in declining of national competition in the international telecommunication market. While the Korean Broadcasting Commission insists that the establishment of a regulatory Institution and a regulatory framework should be considered

first and that services should be launched later, the Ministry of Information and Communication asserts that the IPTV service should begin first and regulations should be reformed second²⁴.

5.1.3 Protection of Cable TV

The protection of the cable TV industry and investments is identified as one of the barriers for development of a homogeneous framework for IPTV development in Korea. Today the cable operators' networks are not yet technically capable, and there will be no competitive pressure to change that quickly. Lee June-Young of CJ Cablenet was quoted in March 2005 as saying: 'We need at least three years of growing our digital services and converting subs from analog... By that stage, we might be ready to compete with IPTV by telco giants like KT.'²⁵

The Korean Broadcasting Commission points out that if a telecommunication company enters into the broadcasting market that offers the IPTV services, there will be a possibility of causing collapse of the cable TV industry²⁶.

The cable TV broadcasters stipulated by the Cable Television Act have been restricted from various regulations on channel organization, ownership restriction, and investment. The Korean Cable TV Association demands the Korean Broadcasting Commission that Broadcasting Law should be applied to the telecommunication companies that wish to start the IPTV service, and that the same regulation as the cable TV should be applied to newcomers. If it is difficult, the association demands to deregulate the cable TV²⁷

The same reasoning and arguments can be applied to the protection of investments regarding the terrestrial digital TV infrastructures.

5.1.4 Video On demand and Streaming services

The terrestrial broadcasters have for some time carried out the on demand service for TV programs through the Internet. This WEB TV service is commercially successful in Korea. SBS (Seoul Broadcasting System), a commercial broadcaster, has provided the WEB TV service since 1999. MBC (Munhwa Broadcasting Corporation) and KBS (Korean Broadcasting System), both public broadcasters, also have served TV programs through the Internet since 2000²⁸

5.1.5 Re-transmission of terrestrial TV

Attractive content is crucial for development of IPTV. 'If the IPTV services start, the re-transmitting of terrestrial television signals through the IPTV will also become a significant issue'²⁹. Due to the same reference, it is important to remember that even though the Korean Broadcasting Commission permitted the re-transmitting of terrestrial television signals through the digital satellite broadcasting, the terrestrial broadcaster refused to provide TV programs via the digital satellite broadcasting.

5.1.6 Vertically integrated industry

Many of the large media company owners are entertainment companies and have vertical integration (i.e. own operations and businesses) across various industries and verticals, such as distribution networks, content production, programming, etc. That means while this is good for their operation, the diversity of opinions and issues would be less well covered. About 75 percent of the programs come from the network in-house productions and about 10 percent come from network owned production companies. The imported programs occupy about 10 percent of the total programs while the independent production companies produce only about 5 percent³⁰. These figures can be compared to those of UK. The high portion of UK programming is delivered by independent and external production (70 percent). In-house production provides 30 percent of programs (independent and external production).

In a comparative analysis³¹ between the UK and Korea Dong He Shon has argued that by and large, the agenda in the UK has been focused on how to change the notion of public interest in convergence era, whereas the agenda in Korea seems how to apply a legacy public interest to convergence services. The laws of public interest in Korea have been drawn from a legacy regime, which makes application in a convergence

era increasingly difficult. It is further argued that a technology-neutral and provider-neutral perspective can relieve a tension between and among industries and regulators. Technology (provider) neutral approach treats any technology and provider equally. It facilitates development of new services and content over horizontal structure. Regulators' axis is shifted from content to technical bottleneck control. Based on the technology-neutral perspective, Ofcom is more concerned with interoperability between different networks and services than regulatory content itself such as public interest. Public interest provision only remains in Public Service Broadcasting. Of course, the UK's case cannot be directly applied to the Korea case. At least, however, the UK's case can provide Korea with suggestions to Korean regulators calling for their action to resolve the structural problems over convergence.³²

The desire to be a world leader in ICT is one of the strongest forces driving MIC policy³³. There are enough evidences for believing that IPTV takes off in the rest of the world. In this situation MIC will not want Korea to be left behind in this area. For this purpose it is necessary that the bar on telecommunication providers providing IPTV will be at least partially removed, and a new regulatory framework is designed, in the near future.

5.2 IPTV regulation in China

This section examines the development of IPTV in China in light of the regulatory environment. Prospects for IPTV in China are bright in the sense that China already is a huge and, furthermore, very fast growing market for Internet services. An example of predictions by consultants is that the number of broadband subscribers already by 2007 will bypass the number of broadband subscribers in the US reaching 79 million users and will further reach 139 million users in 2010 (according to the London-based research and consulting group Ovum)³⁴. Another set of figures concerns the number of IPTV users. An analyst from Ovum in Hong Kong estimates that there are 350,000 IPTV subscribers in China presently (October 2006)³⁵. Others have put forward alternative figures partly reflecting the differences in the definitions of IPTV. According to a presentation on 'IPTV in China' made in 2006, the number of IPTV users in China was 1.2 million by the end of 2004 and the prediction is that there will be more than 8 million subscribers by 2008 and that the market worth will reach US\$ 12.5 billion by 2008³⁶. As always, such predictions are rather optimistic but provide a picture of the expectations and potentials.

However, regulations seem to be one of the problems facing IPTV developments in China. In an interview made by INTERFAX-CHINA, the CEO Joe Lin from one of the companies involved in the Shanghai-based trials state that there are three major problems for the IPTV development in China. The first and most important is regulation; the second is bandwidth; and the third is piracy³⁷. The present section focuses on the regulatory aspects but also briefly touches upon the piracy issue, as this is also related to regulations, namely copyright regulations.

The development of IPTV in China is situated in the same field of tension between the telecom and the broadcast industry as in other countries. To avoid confusion and turf wars, the Chinese State Council in 1999 issue a decree (#75) to keep the two areas of electronic communications separate and banning convergence. No broadcasting or cable companies have been issued licenses to provide telecom services, and telecom carriers have been strictly forbidden to enter the broadcast market³⁸. However, technological convergence has for a long time put this decree under heavy pressure.

Even though the IPTV development in China thus relates to the same tensions as in other countries created by the convergence between telecom, IT and broadcasting, the situation in China has its proper and specific characteristics. These characteristics relate to the fact that the economy as well as the policy environment in China is centralised with widespread state ownership and political control. The telecom operators in China as well as the broadcasters are state-owned. And, in March 2005 the State Council issued a notice banning private investment in IPTV services. Foreign investment in the area is, thus, not either permitted³⁹. Nevertheless, there are possibilities for tensions between different state owned enterprises and between different state policy and regulatory agencies, central and local.

In order to obtain a license to operate, an IPTV provider must have permission from several different state agencies, first and foremost a permit from the State Administration for Radio, Film and Television (SARFT) but also from the Ministry for Information Industry (MII), as IPTV is not only broadcasting but also a Value Added Service (VAS), which is in the competence area of MII. Furthermore, permits – depending on the types of IPTV service offered – have to be obtained from the Ministry of Communications (MOC) with

respect to online games and from the General Administration of Press and Publication (GAPP), which is responsible for the censorship of audio-visual products⁴⁰. IPTV is thus under heavy regulation in China with respect to licenses for operation as well as content regulation.

In the 1999 #75 decree, a division of labour was implemented between SARFT and MII. SARFT has the responsibility for broadcast, radio/TV and cable television, while MII is responsible for telephony and Internet⁴¹. The problem with IPTV is that it falls between the two areas or covers both. However, SARFT has acquired the principal influence. IPTV took off slowly in China already from the very beginning of the century, but in 2004 SARFT established itself as the main state agency in the field with a licensing initiative for IPTV. And, SARFT licenses will only be issued to corporations in the broadcast and media area. These are the only companies eligible for licenses – meaning that telecom operators will have to work in cooperation with broadcast/media corporations to be able to operate in the area.

The implication is that the discussions and battles around the development of IPTV not only takes place between two different state agencies but also between state owned broadcast companies and state owned telecom companies. Furthermore, there is also a local-central dimension in the sense that local authorities do not necessarily accept licenses given by central state agencies. All in all, the situation in China with respect to IPTV regulation is characterised by some degree of regulatory uncertainty including inter-agency rivalry.

An important aspect of this is that SARFT is committed to promoting digital TV (not IPTV) in China. This means that their enthusiasm for IPTV is relatively small, as they are worried that IPTV may contribute to undermining the prospects for digital TV. This position is in line with their main area of work with an emphasis on traditional film, radio and TV. Furthermore, traditional media have a number of advantages for the authorities with respect to controlling content. The Internet is an open media and IPTV via the Internet will limit the possibilities for controlling and censoring content.

With respect to content, there is another issue, which in many other countries plays a large role in relation to the regulation of IPTV, namely the protection of copyright. However, in China the tradition for upholding copyright is not very strong. This is illustrated in the fact that amongst the three barriers to the development of IPTV mentioned in the beginning of this section, piracy of content is the last one and the least important. However, copyright issues and the protection of copyright by way of technical protection measures such as DRMS (Digital Rights Management Systems) will eventually become an issue in the Chinese IPTV development.

In summary, the regulatory issues affecting the development of IPTV in China are the following, at the moment – while other issues, high on the agenda in a number of other countries such as copyright, interconnection and standards, only later on will play a strong role in China:

- The uncertain regulatory situation with rivalry between policy and regulatory agencies from the broadcasting and telecom areas respectively – and the pursuant struggle between telecom operators and broadcasting and media companies
- The preference of SARFT for traditional broadcast, including digital broadcast
- The heavy licensing system with very few companies receiving licenses
- The fact that only broadcast and media companies are eligible for IPTV licensing
- The ban on private and foreign investment
- And finally, the strict control on content

5.3 IPTV regulation in Australia

Australia is a country with, presently, relatively low average broadband download speeds but also relatively low prices by international comparison⁴². Although the average speed is, thus, too low for real-time IPTV for many users, the IPTV potentials are good with high penetration rates, when download rates are upgraded. Australia is, furthermore, a country with a ‘British’ style public service broadcasting (PSB) tradition. One of the implications – when examining IPTV developments and regulation – is that regulatory discussions on IPTV tend to be embedded in debates relating to traditional broadcasting and the public interest.

Australia is, furthermore, a country where the convergence between telecom, IT and the media has been discussed and taken into consideration for many years. This is, for instance, reflected in the structure of the regulatory agencies in Australia. The general competition authority (ACCC – Australian Competition and Consumer Commission) has the competence regarding the economic aspects of communications indicating that sector specific forms of regulation should be minimized. However, the technical and content aspects have been dealt with, formerly, in two separate agencies: ABA (Australian Broadcasting Authority – responsible for cultural and social aspects) and ACA (Australian Communications Authority – responsible for the technical aspects, e.g. radio frequencies). In 2005, ABA and ACA were merged into ACMA (Australian Communications and Media Authority). There are thus two agencies regulating communications, ACCC with respect to the economic aspects and ACMA with respect to content and technical aspects. Concerning IPTV, it has hitherto been ACMA, which has been the agency involved in IPTV debates. This illustrates that IPTV is primarily seen as part of the broader discussions on the media future of Australia.

IPTV is not very developed in Australia. Telstra, the incumbent telecom operator, has been involved in an IPTV trial using Microsoft technology. This trial was, however, ended and not expanded into a commercial operation. But the trial documents the interest that telecom operators have in the development of IPTV. There are also a long range of Internet sites on which video content can be found⁴³. This is, however, mostly traditional broadcasting companies offering downloads of some of their programs, i.e. VOD. There is only little real-time Australian television on the Internet. Lately (August 2006), however, it was announced that the first commercial IPTV channel would start operating – Geelong's Own Television Content (GOTV). Furthermore, Kasenna, a provider of VOD and MPEG-4 ready IPTV, has been chosen to deliver IPTV services for Regional Internet Australia (RIA), providing broadcast IPTV and VOD to about 20,000 high speed Internet subscribers in two regional cities in Northern Queensland⁴⁴.

The public discussions on the regulation of IPTV are related to the media reform package presented in March 2006: 'Meeting the Challenge: Reforming Australia's Media in the Digital Age – Discussion paper on Media Reform Options', issued by the Government of Australia⁴⁵. This includes a broad number of initiatives in the media and communication area. However, the overall setting of the reform package is the development of digital TV and media ownership regulations in Australia.

This, of course, has implications for the manner in which IPTV is discussed. IPTV is just a small 'corner', while most of the focus is on the development of digital television. The setting is that digital television has not developed as fast as originally planned in Australia. The digital switch-over date of 2008 is not realistic and the discussion paper of the government proposes to postpone the switch-over year to 2010-12. IPTV is, in this context, seen part of a broader package of 'new services on other platforms'⁴⁶. There is, currently, a moratorium on the licensing of new commercial broadcast services, and the discussion paper extends this moratorium to what is termed 'new commercial FTA (Free to Air) broadcast services delivered over platforms other than normal BSB (Broadcasting Services Band) channels, such as wireless, satellite and broadband networks'⁴⁷, where IPTV is included in the broadband networks. This moratorium ends by the end of 2006, and the present legislation is not changed, licenses can be given to these kinds of services.

The overall intension of the package of media reforms is to open the media sector for more and new players. This applies, for instance, with respect to the legislation on cross media ownership where regulations will be relaxed. And, the intended purpose of the initiatives regarding wireless, satellite and broadband networks is also 'to offer an opportunity for new players to enter the industry and new television-like services to be developed over new and emerging platforms'. There is, however, in the media industry a concern that such an opening will not be obtained by the initiatives of the government. This applies, for instance, to Australia's Interactive Media Industry Association (AIMIA).⁴⁸

The problem, as AIMIA sees it, is that 'the Government proposes to legislate to transfer the decision-making power for the allocation of new commercial television licences outside BSB spectrum from ACMA to the government'⁴⁹. And, furthermore: 'In considering applications for such licences after 31 December 2006 the Government will consider whether allocation is in the public interest'⁵⁰. There are two issues here that concern AIMIA. The first thing is that the

government will issue the licenses it self and will not leave it to its agency ACMA. This means that the licensing procedure will probably be more politicised than it would in the hands of a regulatory agency. In extension of this, the second issue is that the government openly states this intention of politicising the procedure, as the allocation of licenses will take the 'public interest' into consideration.

In their comments to the government discussion paper, AIMIA states the following:

- 'The proposal to transfer the decision making power for new commercial FTA television services delivered outside the Broadcasting Services Bands and develop a new allocation process does not appear to be consistent with the Government's policy of light touch regulation of new services.
- AIMIA is aware that there are well developed plans to establish IPTV services in Australia using broadband networks as their delivery mechanism. AIMIA would be concerned if these regulatory changes were to create uncertainty in the market and impede investment in and development of IPTV services.
- AIMIA believes that IPTV services would fall outside of the definition of commercial FTA services and would like the Australian Government to clarify its position on this issue'⁵¹.

The issues, presently, discussed in Australia regarding the regulation of IPTV can be summarized in the following points:

- That the development of IPTV is hidden in the broader topic of digital TV. The discussion on IPTV is seen primarily as a traditional broadcasting issue. This can, for instance, be seen in that IPTV broadband broadcasting is conceptualised as a FTA-service.
- The fact that the government intends to hand out licenses itself and does not want to leave it to its regulatory agency in the field, ACMA. The result can be an over-politicised environment for the licensing of IPTV.
- The concern that this environment will not lead to the increased investment in IPTV projects as is the clear intention of the government.

5.4 IPTV Regulation in the USA

Internet TV (IPTV) is well-suited to cater for the following types of content: premium movies on VOD basis, specialized programs with a narrow or dispersed base of users, and innovative programs with interactive and multi-media components. Most of these categories favour producers with large budgets, large home markets, and immediate access to advanced technology. The United States has a stronghold in all of these dimensions. IPTV is may in a marriage between Hollywood and Silicon Valley thus strengthen the American role in global media still further⁵² and therefore is the IPTV development in the US of special interest –even if there yet is no sign of US dominance on the IPTV market⁵³.

In the US as elsewhere a struggle is unfolding with the traditional owners of distribution channels trying to protect their business models. The prohibition on the broadcasting and telecom industries entering each other's businesses was removed by the *Telecommunications Act of 1996* and these companies that own the pipes will protect this territory and fight companies that sell distribution service over the Internet. The big carriers and their affiliated content companies would like consumers to be offered only their choice of "walled garden" for very understandable business reasons, and what they have been lobbying for. Much of the current regulatory discussion in the United States about amending the 1996 Telecommunications Act has been focused on this issue, i.e., how to adapt the current regulatory regime to the arrival of IPTV incl. the license issue for cable operators.

5.4.1 Main players and Main issues

- **Telecom Carriers:** Upgrade their infrastructure with fiber to offer IPTV – and higher speed Internet; voice as "Triple Play."
- **Cable Operators:** Offers easily enhanced to "Triple Play" through VoIP and Cable Modem; want rules to be applied fairly.
- **Content Providers:** Main concern is piracy
- **FCC:** Seek to encourage growth of IPTV to further competition.
- **U.S. Congress:** Considering laws to revise the entire franchising regime and eliminate local authorization requirement.

Telecom Carriers

The big carriers and their affiliated content companies would like consumers to be offered only their choice of "walled garden" for very understandable business reasons, and that is what they have been lobbying for. To move in the direction of "walled gardens," proprietary networks are aggregating content to which their paid subscribers will have exclusive access. They realize that customers want more choice and interactive content. Many of them are providing on-demand programming.

Cable operators

With VoIP and cable modems their networks are 'born to provide Triple Play; their main concern is the license issue left over from the 1934 Communications Act.

Carriers have claimed that the single biggest obstacle to widespread competition in the video services market is the requirement that a provider obtain an individually negotiated local franchise in each area where it intends to provide service.

Content Providers

The biggest barrier being erected to the online distribution model is access to content.

Movie studios are concerned about online distribution models due to piracy, and need to feel comfort that adequate protections are in place. At the same time, they have been for years seeking ways to directly access their audiences, eliminating the "middleman."

The "middlemen," however, are relying on their exclusive grants of rights to fend off the on-line services. In the end, however, the economic incentives for the program and film producers to move online are likely to prove overwhelming.

5.4.2 Revision of the 1996 Act

The Communications Act of 1934 prohibits cable operators from providing cable service in an area without first obtaining a cable franchise from the LFA (Local Federal Agency).

There are, however, tens of thousands of LFAs around the country and cable operators must obtain consent from the LFA in every local service area. This process is difficult cumbersome and time consuming – as it also includes differing requirements and applications procedures for each LFA. The act further imposes additional requirements on Cable: retransmission consent/must-carry for local stations; non-commercial programming; rate regulation; customer service standards, etc.

The U.S. Congress has started to amend the Telecommunications Act of 1996 primarily to rebalance the interests of the cable and telecom operators over IPTV. The draft legislation ("The Broadband Internet Transmission Services Act") will create a new category of service, called a "Broadband Internet Transmission Service" or BITS, defined as "a packet switched service that is offered to the public,"

regardless of the facilities used, including Internet access service but not circuit switched service. A discussion has started whether the bill's definition of broadband Internet transmissions services (BITS) can be interpreted to extend regulations to Internet services such as Hotmail, Google Mail, E*Trade or Yahoo.

The draft bill will preempt federal and state officials from regulating the rates, charges, terms, or conditions of BITS. It provides for lessened application of existing cable TV-type laws and requirements to Broadband Video Service (BVS) providers, and no build-out obligations or other controls on programming, e-program-devices and content ownership. BVS providers must pay the equivalent of a franchise fee of up to 5% of gross revenues. The broadcast "retransmission consent" rules are carried over to all BVS providers.

Apparently, a programmer offering content directly to users over the public Internet does not qualify as a Broadband Video Service, meaning that in this case, all the rules about franchise fees, PEG channels, must-carry and so forth, become irrelevant. This is another incentive to move content to the public Internet. In the current draft, companies offering only standard broadband Internet services will be legally bound to ensure that subscribers could access and use all lawful Internet content and could connect any devices they wish. Broadband video services will not explicitly be held to the same requirements.

5.4.3 New FCC Regulation

The U.S. Federal Communications Commission has also considered IP-enabled video in the context of a "Notice of Proposed Rulemaking on IP-Enabled Services," from 2004. VoIP was the major factor in generating this Rulemaking, its impact can be much broader. The NPRM fully recognizes the migration of all kinds of formerly separate services to IP, and raises concerns about how this might effect existing public policy concerns and "social" regulation.

The FCC notes that "several observers have urged reliance on a 'layered' model to address VoIP and other areas of regulatory concern," and requests comments on a three-layered model: transmission, protocols and applications. It raises a number of questions, including how to define the layers and how to regulate entities that provide multiple layers. It also asks whether any class of IP-enabled services should be properly classified as "cable service".

Although much of its attention was been focused on VoIP, the potential scope of the Commission's approach is broader than that being taken by Congress. In light of the discussion, above, of video over the public Internet, the FCC may be able to avoid the same short-sightedness of the draft Barton-Upton Act and its focus on creating a cable-franchise equivalent for IPTV. The Commission can choose to simply ignore the migration of video to the public Internet (without intermediaries) and create rules to manage a dual system; it can acknowledge the changes that are underway and try to get ahead of them with a new approach to regulation; or it can seek to find means to stifle the growth of video on the public Internet, and place the entire Internet into a cable television model. The scope of the Commission's authority to act in this area is arguable, and it may want to request a specific grant of powers from Congress. At the same time, it will likely rely on its primary and ancillary jurisdiction to the limit, which will almost automatically result in litigation.

In the U.S., it been the custom that until the market forces realign themselves more favorably, or there are major intervening political considerations, it is unlikely that either Congress or the FCC will be ready to address the clearly emerging reality of video on the public Internet.

5.4.4 Consequences of the new Act and Regulation

The draft Bill is in line with the declared commitment to foster and encourage widespread deployment of advanced communications networks to all American households. President Bush has established a goal of "universal, affordable access for broadband technology by the year 2007" and policymakers from almost all areas of the political spectrum share the aspiration that no community or group of citizens should be without robust broadband network alternatives.

It has, however, been argued that while policymakers have focused on the availability of "broadband" functionality (*e.g.*, faster Web surfing capability) to households, many have failed to grasp that fiber will not

be widely deployed solely to provide Internet access. In fact, revenue streams from other types of communications services are critical for the construction of advanced broadband networks.

Ever since the Internet and the World Wide Web developed into a significant business and mass-market phenomenon, there has been a strong concern that a “digital divide” would emerge between rich and poor, or urban and rural, that it will consign the digital “have-nots” to a backward, pre-Information Age subsistence. Similar concerns about whether certain neighborhoods or groups would be left behind resulted in “build-out” rules that became conditions of granting monopoly cable franchises. But when applied to new entrants, these requirements can be self-defeating and often create barriers to entry for new firms. Build-out requirements are not imposed on new entrants in any other sector of the telecommunications industry. It further has turned out that some local authorities have pushed these requirements very far. When Verizon’s attempted to offer IPTV service in Tampa, Florida, the Regulator reportedly presented Verizon with a \$13M wish list, including funds for an emergency communications network, digital editing equipment, and video cameras to film a math-tutoring program for kids. Reacting to examples like this some States have explored passing laws to limit municipalities’ ability to affect market entry, particularly through concept of State-wide franchising.

In November 2005 FCC released a Notice of Proposed Rulemaking on ways to implement provision that restricts LFAs from unreasonably refusing to grant franchises.

At the same time FCC acknowledged that it is not unreasonable for an LFA to ensure that service is not denied to lower income areas, and require adequate assurance of public access and financial support.

It stands out as quite obvious that there is a clash between State/ local interests and Federal considerations. State and local governments want federal government to preserve state and local property rights and respect this as first priority in relation to, e.g.:

- Consumer protection
- Right of way ownership and management
- Zoning/ local development
- Taxation
- Localism / public access

Federal government wants modernize of the regulatory set-up to enable to enable the potentials related to IP-based system. This includes examining the LFA process as part of broader reforms of telecom and promotion of open access to strengthen competition.

The regulatory dilemma well-known from the general Internet discussion surfaces again in relation to IPTV. The Internet remains largely unregulated as an Information Service. But whenever the Internet is used to provide traditionally regulated services difficult issues arise for regulators. The dilemma has become known as “Walks like a duck, quacks like a duck” problem. A similar problem arises in relation to IPTV: If the Internet is used to transport TV shall traditional cable TV and other regulations then apply? The 1934 Act states that a facility of a common carrier “shall be considered a cable system . . . to the extent such facility is used in the transmission of video programming directly to subscribers.”

It is thus very obvious that new services being offering through the shift to IP technology create unique challenges for law makers; but it not yet clear how these challenges will be met. In October 2006, The Federal Communications Commission announced that it will conduct an assessment of competition in the video market, to include the impact of Internet-based video and IPTV⁵⁴.

This step was welcomed by the telecom industry: “In reviewing the status of competition in the video market, the Commission will clearly see that the existing, out-dated franchising system is an unnecessary barrier to entry for service providers seeking to offer consumers options to cable. We appreciate the Commission’s attention to this important issue and we will continue to strongly advocate for necessary reforms to bring more competition, innovative services and lower prices to the video market.”⁵⁵

Table 5.1: IPTV in the USA⁵⁶

<p>In2TV. Time Warner Inc.'s AOL division has launched a free Internet television service in 2006. The new service, called In2TV let fans watch full episodes from more than 100 old television series. It will be free, supported by advertising. Programs on In2TV will have one to two minutes of commercials for each half-hour episode, compared with eight minutes in a standard broadcast. For AOL, the In2TV deal is part of a broad strategy to create a range of video offerings to attract people to its free AOL.com portal. Warner, the largest TV syndicator, wants to use the Internet to reach viewers directly rather than depend on the whims of cable networks and local TV stations. AOL will offer a version of the service meant to be watched on a television set connected to a Windows Media Center PC, and it is exploring a similar arrangement to link the Internet programming to television through TiVo video recorders. For those who want to watch on a big screen, AOL is introducing optional technology it says will produce a DVD-quality picture.</p>
<p>Slingbox. Slingbox currently holds pride of place in a new category of media called "Placeshifting". Sling Media's (http://www.slingmedia.com/) Slingbox Personal Broadcaster digitizes the programming from a cable or satellite box and streams it -- in real time -- to a remote PC. As long as the user can find a broadband wire or Wi-Fi hot spot, he or she can watch home TV channels live from anywhere in the world. Also in this category are the Orb (http://www.orb.com/) software package and Sony's Location-free TV (Sony LF-x1). The Sony enables live video transmission to the PSP (Play Station Portable), while Orb is free but requires a host PC with a TV tuner card to stream user-selected television programs.</p> <p>In addition, start-ups like Akimbo Systems (http://www.akimbo.com/whatis.html/) are providing ways that producers can upload their videos and even share in the revenue when TV viewers buy the content. Akimbo was the first company to deliver DVDquality video-on-demand to any television via a broadband-Internet connection.</p>
<p>Yahoo! and Google. Yahoo! Inc. and Google Inc. are planning to bypass traditional media outlets by linking computer users with TV shows online, striking partnerships with programmer and creating content. Yahoo and TiVo are collaborating to allow individuals to view Yahoo TV content via TiVo. Navigate a menu on a TiVo box and you will be able to view Internet content just as you would cable or broadcast TV. Additionally, this partnership will allow users to TiVo programming remotely via the Yahoo website. TiVo has also recently announced plans to allow unlimited free TV-show downloads to iPods (http://online.wsj.com/article/SB113253403196102661.html/). Google is also getting into the Internet TV business. Google has also launched a new Web-based video search service which allows people to use keywords to search the company's indexed database of video from content providers that have uploaded video.</p>
<p>Theatrical Film Rental – Netflix, which currently operates an on-line DVD rental business using physical delivery and return of DVDs, is moving towards becoming a destination Web site offering a mix of content: free, ad-supported, premium pay-per-view and subscription. With many Americans upgrading to big-screen, high-definition TVs, Netflix is arguing they won't be watching on computer monitors, which is part of the rationale behind a deal between Netflix and TiVo, to jointly develop technology.</p>

Source: List from Richard Taylor and Zhang Bin: *Regulating the "TV" of the Future: Comparing the Treatment of Video as an IP-enabled Service in the U.S. and China.* PTC'06, Proceedings

5.5 A sample of other Asia-Pacific countries

Table 5.2: Case studies from selected Asian countries

<p>Japan</p>	<p>Japan has a moderately developed pay-TV market and IPTV was launched last year. However, uptake has been fairly modest so far. For example, Softbank had 10,000 subscribers for its TV-over-DSL service in October 2004, which is only 0.2% of its DSL subscriber base. NTT is barred by regulation from providing broadcast TV over DSL. We have no reason to assume that this will change over the next five years. The parameter for availability of TV over DSL is set on the basis that it will never be available to NTT's DSL customers. According to iDate in February 2005, NTT has 18% of the retail DSL market in Japan.</p> <p>Some regulatory issues identified by Ovum are:</p> <ul style="list-style-type: none"> • The government aims to achieve digital broadcast penetration of 47 million homes and 100 million TV units by July 2011. Analogue broadcasts are to be closed down on 24 July 2011.
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	<ul style="list-style-type: none"> • The Japanese government does not subsidise set-top boxes and there are no plans to do so. • Regulatory structure that requires pay-TV platforms to be merely carriers of programming and prevents packaging. All services must be offered à la carte. • DTT providers are required to provide at least 50% of their programming in HDTV format. • Telcos are currently barred from providing TV services over copper telephone lines. Video on-demand is permitted, however. Fibre access is not covered by this regulation.
Hong Kong	<p>In terms of penetration of its broadband subscribers, PCCW is the world's leading provider of IPTV over DSL. By the end of 2004, it had over 400,000 subscribers (Today in October 2006, PCCW has 650,000 active customers and a presence in over 25% of homes in Hong Kong). This is not only the majority of PCCW's DSL subscribers; it is also a substantial percentage of Hong Kong's estimated 2.2 million pay-TV households. Thus, TV over DSL is already starting to move towards saturation for PCCW. PCCW has about 75% of the DSL broadband market in Hong Kong.</p> <p>With among the highest broadband penetration rates in the world, around 69% of all the households at the end of 2005, Hong Kong has proved to be an extremely competitive market, where broadband service providers have had to differentiate themselves from competitors by rolling out more services to their subscribers. In this scenario, IPTV has been very well received by Hong Kong residents. Some of the reasons for the success have been the focus on an a la carte menu, Chinese-language content, competitive pricing, and bundling with data and voice services. Paul BERRIMAN (Head of Strategic Market Development, PCCW Limited) : 'NOW TV (PCCW's IPTV services) has been in service for over 3 years now and whilst most operators still debate technology platforms, PCCW has been able to take the platform for granted and concentrate on content and interactive transactional services for revenue growth and telco business transformation.'</p>
Singapore	<p>Singapore enjoys one of the highest residential broadband penetration rates in the region at 44.7% at the end of 2005. IPTV is a new phenomenon in the Singapore market with limited uptake in 2005. As more operators are expected to roll out IPTV services in Singapore, IDC forecasts the number of IPTV subscribers in Singapore to grow from about 40,000 in 2005 to 218,000 by 2010 at a CAGR of 39%.</p>

Source: Mainly based on data from IDC and OVUM

6 IPTV REGULATORY PARAMETERS

As seen in the case studies, a range of different regulatory issues are important for the creation of an efficient IPTV market. The major issues from the case studies are listed in the following:

- Definition issues. It is important to agree on some fundamental definition issues like the characteristics related to the linear and non-linear services.
- Institutional barriers and the fragmented regulatory situation. The institutional setting is identified as one of the main barriers for the creation of an efficient framework for the development of IPTV services.
- Licensing, authorisation, registration. Different countries use different approaches creating varying levels of barriers.
- Content related issues. Issues like cultural, language, and industry protection are as important in the IPTV world as in other technology areas.
- Organisation of services. As cable TV has been treated as a local monopoly, there have been strict rules on the organisation of services. This may change and we may see a development from tiers/packages to 'à la carte'.

- Standardisation and interoperability. A number of different standards are available for IPTV. Here, there is a huge challenge for the industry and regulation to create open standards as well as creating interoperability between different standards.
- Rights issues and DRM. The rights issues become increasingly important when we move to the IP platforms.
- Retransmission of terrestrial signals. The success of IPTV depends on the content. Here, retransmission of terrestrial content will play a major role.
- Must carry. Cable operators will require level playing field, when it comes to regulation and must carry rules are important issues.
- Set-Top-Boxes. By developing multi platform set-top-boxes, the industry can contribute to the creation of more choices and better utilisation of resources.
- QoS. QoS is mainly a parameter that will be handled in the managed IP network.

Furthermore, a ban on foreign investments and the strict control of content are identified specifically in the Chinese market.

7 CONCLUSIONS

The development of IPTV is closely intertwined with the development of residential broadband. While, previously, there was a gap between the requirements of IPTV and the capabilities of access networks and services, today, this gap has been bridged through the advancements in coding and transmission, Digital Rights Management etc. Despite a technological solution to most of the issues confronting IPTV, the lack of an overall standardisation framework has diversified the implementation efforts, which to date are mostly built on proprietary solutions. With network access providers investing in new or upgraded infrastructure platform, they are likely to demand a larger share of the value added, forcing service / content providers into revenue sharing cooperation through service differentiation.

The penetration and the development of broadband access is a major policy and business issue in many parts of the world. Different (and new) market players are taking part in the development of broadband using a variety of competitive and complementary technologies. TV and Video services will be major services in the broadband networks. We see two main models of deployment of TV over broadband: 1) The traditional distributive model known from other multi channel distribution platforms like cable TV and satellite TV, and 2) A new model, where TV broadcast evolves towards a combination of “linear” and “non-linear” / “on demand” provision in the IP networks with strong components of interactivity and with new business models, where the TV program provider directly accesses the end consumers and bypasses the “content aggregator”/ “Bouquet provider”.

The regulatory frame work of IPTV consists of a complex combination of traditional TV regulatory measures, access regulations, and regulation of resource organisation in the IP platforms. An important aspect is that the TV provided on the IP networks can be similar to the TV provided on any other platform. It is important that the same regulatory framework is applied to both. Another aspect is that the TV / video services offered in the IP networks can have radically new characteristics based on the interactivity component that is inherent in the IP platform. The development moves from ‘broadcast’ to ‘on demand’, from ‘push’ to ‘pull’, from somebody else deciding the timing of consumption / ‘scheduling’ to the end-consumer deciding on the scheduling of consumption. These new characteristics may call for new regulatory frameworks.

The ‘must carry’ rule is applied to some infrastructures offering linear audiovisual content like the cable TV networks. Some broadband networks are capable of offering exactly the same services as cable TV and in reality they copy the business model of the cable TV, i.e., the organization of the content in different tiers (basic, optional, premium, pay preview...). In the long run, it will be difficult to maintain different rules for different infrastructures, as it definitely contradicts the technology neutrality regime and creates uneven competition conditions. There can, however, be other reasons for maintaining lighter regulation for a certain

period of time when it comes to the IP broadband networks in order to promote new technologies and services.

The interoperability is another key question. There are a number of different standards for IPTV provisions (like Microsoft or DVB based standards). These standards are not interoperable and can, therefore, create 'lock in' situations, where the consumer will have difficulties leaving a service provider, as this requires change of hardware and getting used to new user interfaces etc. The interoperability problems are well known from the digital TV market, where different systems for Conditional Access (CA) and Application Program Interfaces (API) are available on the market. In digital TV, some solutions to the problems were introduced partly through standardization and partly by requirements for interoperability on the set-top-boxes.

Another aspect relates to the rights issues of the content owners. The content owners are concerned about the IP platforms' capabilities of redistribution of content. The technical solution to this problem is implementing DRM systems.

ANNEX I: INFRASTRUCTURE PLATFORMS

In the following a short overview of some of the infrastructures, which may be relevant for IPTV is given.

Fixed infrastructures

ADSL. The theoretical maximum bit rates of 8.1 Mbps is defined by the standard, but the bit rates, which can be achieved in practical implementations, depend on different parameters, for example, on the distance between the household and the central, as the high frequency band of the copper line gets strongly attenuated as the distance increases⁵⁷.

ADSL2. In the ADSL2 standard, advanced technologies are implemented to improve the capacity/bit rate, establishing QoS and also, to lesser degree, to improve the coverage. Over short distances, it is possible to achieve bit rates of about 12 Mbps downstream and 1.2 Mbps upstream. Another way of achieving higher bit rates in ADSL2 is by bonding several lines. Here at the ends of the connection, multiplexing and demultiplexing is deployed to split a connection into several parallel connections at one end and reassemble them at the other end.

ADSL2+. In ADSL2+, the bit rate is increased by doubling the deployed frequency bandwidth, i.e., by including the frequency band between 1.1 to 2.2 MHz. As mentioned earlier, the high frequencies get strongly attenuated as a function of distance, which implies that the increase in bandwidth is only valid for short distances of under 2.4 Km. Doubling of capacity can be achieved for distances less than one Km.

RE-ADSL2 (Reach Extended ADSL2) is designed to optimise the coverage by increasing the power used in the lower part of frequency spectrum in the upstream and downstream channels. Here, it is possible to achieve coverage extension of about 900 meter, which increases the potential market for PSTN operators considerably. The coverage problem is, however, not solved totally and new complementary technologies will be vital to solve the problem of coverage.

VDSL enables capacities of about 52 Mbps, which are higher than the ADSL family. This is implemented by including more high frequency bandwidth in the copper cables and by deploying more efficient modulation. Furthermore, VDSL enables high speed symmetrical connections. The coverage of VDSL is, on the contrary, very short and is kept below 1.3 Km. VDSL2 is under standardization and the aim is to enable bit rates of up to 100 Mbps.

UDSL developed by Texas Instrument is the newest variant of DSL, which tries to utilise the un-utilised resources in the Copper network and to give the PSTN operators the possibility to be competitive on the broadband market. UDSL promises aggregated bit rates of up to 200 Mbps, including 100 Mbps symmetrical connections.

Uni-DSL comprises the whole DSL family: ADSL, ADSL2, ADSL2+, VDSL, the coming VDSL2 standard and UDSL. Hence, the platform gives the operators a flexible possibility to offer a number of different connections to their customers. However, it is important to mention that offering high bit rate connections cannot be done using the current PSTN infrastructure and as discussed in relation to VDSL it requires the establishment a new infrastructure and utilising the part of PSTN networks close to the households.

Cable TV. The cable TV infrastructure is another traditional broadband infrastructure, however, with varying installed bases and with great potentials for delivery of broadband connections. The penetration of cable TV networks varies from country to country. A cable TV system is a distributive system, where the resources are organised as a number of 8 MHz channels for broadcast TV distribution. Cable TV systems have a huge capacity, however, the total capacity depends on how modern the system is and, consequently, on how much frequency bandwidth of the coax is utilized. When the cable TV infrastructure is used for broadband provision, a number of 8 MHz channels are allocated to broadband provision. In a 8 MHz channel, it is possible to transmit between 27 and 56 Mbps depending on the deployed modulation technology and some other parameters, e.g., the level of error correction. The general 'best effort' VoIP operators cannot take advantage of these QoS improving measures.

FTTx. FTTx (FTTHome, FTTHArea, FTTCabinet, FTTCurb, ...) has already become a dominant medium in metro and backbone networks. Fibre-to-the-Home (FTTH) is a synonym used for emerging access networks that uses optical fibre in the first/last mile. Several network architectures and technical implementations of FTTH exist as the technology is still being refined and developed. However, in general, the variants can be categorised as either Active Star, or Passive Optical Networks (PON). Optical fibres are broadband infrastructures with huge potentials. The physical capacity is not indicated by Mbps but by Gbps and with regards to coverage we talk about distances of around 10 Km from the central points. Even though it is possible to offer capacities of Gbps, these capacities are not implemented at the end users' sites. Different reasons for this are amongst others cost of termination and resource planning as well as pricing issues at the service provider side.

Cost of deployment of the optical infrastructures is higher than other broadband technologies but the broadband product which can be offered in the fibre infrastructures are not comparable with the traditional broadband. The development in the last couple of years shows that the implementation of fibre infrastructures becomes more and more viable and that especially the power companies have been very active in the area. This is mainly due to the decreasing cost of fibres, decreasing cost of termination equipments, the general liberalisation, and the possibilities for offering triple/multi play.

Wireless and Mobile infrastructures

WiFi. The wireless network standard 802.11, which has gained much attention, was published by the Institute of Electrical and Electronics Engineers (IEEE) in 1999. Several variations of the standard have been published since - the best known is IEEE 802.11b, better known to the public as WiFi (Wireless Fidelity). The 802.11b standard uses the unlicensed Industrial, Science and Medical (ISM) band. In the absence of licensing barriers, and because of the simplicity of the technology and its cost effectiveness, WiFi networks have developed rapidly. Indoor coverage of 50 to 100 meter is normal and depending on the standard, bit rates of 11 to 54 Mbps (in some proprietary version even more) are possible. It is, however, important to mention that the net data capacity is far below these figures. Furthermore, the capacity in a WiFi network is shared and the available capacity per user depends on the number of users connected to an access point. WiFi coverage can be extended using outdoor antennas and also point-to-point connections can be established using WiFi.

WiMAX. WiMAX is one of the most interesting access technologies with potential to, at the same time, compete and be complementary to the traditional DSL and cable TV broadband. In urban areas, where DSL and cable TV are available WiMAX is definitely a competing technology. In the rural and suburban areas WiMAX is complementary to the traditional broadband and will solve one of the main problems which is related to coverage to less densely populated areas. WiMAX in fixed and stationary reception mode does not compete with mobile infrastructures. However also here, WiMAX is interesting, as the mobile version of WiMAX can compete with the fixed access infrastructures as well as with the mobile access infrastructures. WiMAX is forecasted to be a simple and cheap technology⁵⁸ with long coverage and high capacity. Coverage of 50 Km and capacity of around 70 Mbps is a reality in this technology. It is, however, important to note that the capacity offered over long distances is only a fraction of the maximum capacity. And WiMAX as access technology is offered for distances of 5 to 10 Km. WiMAX will then be a good complementary and/or competitive infrastructure to traditional broadband. Another important aspect is that 70 Mbps will only be achieved if the frequency bandwidth of 20 MHz is allocated and assigned by the local authorities. A competing technology to the mobile version of WiMAX (IEEE.802.16e) is IEEE.802.20 or MobileFi.

Satellite. Satellite is mainly seen as a complementary infrastructure to other infrastructures. However, in less developed areas many business users also use satellite as an access network. The satellites were primarily designed to enable a high-capacity transmission medium for the increasing international telephone traffic. The development of optical fibre technology was also intensified at that time. The optical fibres turned out to be competitive with satellite communication in handling international telephone traffic. One of the alternative uses of the satellites that turned out to be a success was broadcasting, both as a means of distribution to the transmitters and relay stations but also as direct broadcasting to end-consumers.

It is possible to use satellite for the provision of broadband connections. The return path must be established through other networks like PSTN. The technology used for implementing down-stream IP connectivity is IP

data Cast (IPDC). IPDC can also be used in terrestrial broadcast networks and is seen as a viable candidate to offer broadband services to mobile devices in combination with the regular mobile networks. Another implementation of satellite networks, which is highly costly, is the implementation of two way satellite links using VSAT technology. This is mainly used as backbone technology and as access technology to business users, mainly in the parts of the world that are far from fibre backbones. Developing countries are the main users of VSAT.

2G & 2.5G. In mobile 2G and 2.5G, several technological developments have been introduced to increase the capacity bandwidth of the networks and to enable the provision of new services on these platforms. The bandwidth capacity in 2G is not enough for any TV or video transmission. 2.5G gives the possibility for low quality transmission of video services to mobile terminals

GPRS, on the other hand, is packet based and is optimized for IP traffic. In GPRS, the capacity per time slot depends on the deployed technology: CS1: 9.05 Kbps per time slot; CS2: 13.4 Kbps per time slot; CS3: 15.6 Kbps per time slot; CS4: 21.4 Kbps per time slot. In theory, using 8 time slots and CS4 technology, a maximum capacity of 171.3 Kbps can be achieved.

EDGE can be seen as a technology with the same characteristics as GPRS but with more efficient modulation techniques and, consequently, higher capacities per time slot. Theoretically, it is possible to achieve 59 Kbps per time slot, providing a maximum capacity of 472 Kbps. The capacity will depend on the deployed technology (MsC1 to MsC9), and a maximum capacity per time slot of 48 Kbps is considered as realistic in mature EDGE networks giving a maximum overall capacity of 384 Kbps. One important issue here is that even though GPRS and EDGE are capable of offering high bandwidth connectivity to the end users, the amount of frequency resources in the GSM network are far below the resources necessary to cope with the ever increasing demand of the end users for data services

3G.The main development in the mobile networks has been the development from 2G to 3G and beyond. Two major 3G standards are: W-CDMA and CDMA2000.

W-CDMA (Wideband Code Division Multiple Access): W-CDMA is the access scheme defined by the ITU to be the main technical platform for UMTS or 3rd Generation Mobile services. W-CDMA services are to operate within the following frequency bands: 1920 MHz -1980 MHz and 2110 MHz - 2170 MHz. W-CDMA is capable of delivering up to 384 kbps in outdoor environments and up to 2 Mbps in fixed in-door environments.

CDMA2000 (Code Division Multiple Access 2000): CDMA2000 (with the ITU name IMT-2000 CDMA Multi-Carrier) represents a family of technologies that includes CDMA2000 1X and CDMA2000 1xEV:

- CDMA2000 1X can double the voice capacity of CDMAOne networks and delivers peak packet data speeds of 307 kbps in mobile environments.
- CDMA2000 1xEV includes:
 - CDMA2000 1xEV-DO. CDMA2000 1xEV-DO delivers peak data speeds of 2.4Mbps and supports applications such as MP3 transfers and video conferencing.
 - CDMA2000 1xEV-DV. CDMA2000 1xEV-DV provides integrated voice and simultaneous high-speed packet data multimedia services at speeds of up to 3.09 Mbps.

Beyond 3G. Even though 3G implementation is behind ‘schedule’ in many markets, there are huge activities for the definition of new standards with the capabilities of delivering higher down stream (and up stream) capacities. This is mainly due to emergence of new bandwidth requiring services, like video services, mobile TV, etc. Some of the major technologies, denoted as beyond 3G technologies (or 3.5G), are described briefly in the following.

- **Flash OFDM (F-OFDM):** F-OFDM is a proprietary technology developed by Flaroin. This is being used in commercial services by the US operators Nextel in North Carolina and Cellular One in Texas, and is also being trialled by T-Mobile (Den Haag), Vodafone (Japan), Telstra (Australia) and Aloha Partners (Rhode Island). Joe Barrett, director of marketing, says that these services offer average downlink speeds of up to 1Mbps, with burst rates of up to 3.2Mbps⁵⁹.
- **HSPA (HSPDA & HSPUA):** High speed downlink packet Access (HSPA) enables an upgrade to existing W-CDMA networks. The aim of HSPA development is to upgrade the data bandwidth,

spectrum efficiency and also the QoS parameters of 3G networks. It is important to note that HSPA is not a new network but an upgrade to the 3G network (like GPRS and EDGE in relation to 2G networks). HSPDA (the down link version) offers data rates of up to 14 Mbps, much higher than the maximum bandwidth of 3G networks of 2 Mbps (or more realistic 384 Kbps). HSPUA the equivalent up link version) offers bandwidths of maximum 5.76 Mbps.

- **MBMS:** Multimedia Broadcast Multicast Service (MBMS) is also an upgrade to the current 2.5G, 3G, and 3.5G networks. However, the advancement does not relate to the increase of bandwidth but to more efficient transmission of point-to-multi point services. MDMS enables the efficient utilisation of resources when it comes to the transmission of broadcast services, like mobile TV services.

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- ⁷ In digital broadcasting, however, it can be necessary to scramble the signals because of, e.g., copy right issues in terms of spill-over, obvious in satellite network but also valid in terrestrial networks due to spill-over to the neighbouring countries. This is the case of digital terrestrial broadcasting in Sweden where the public service signals are scrambled. The decryption card must then be distributed to the license payers without (or with minimum) cost.
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