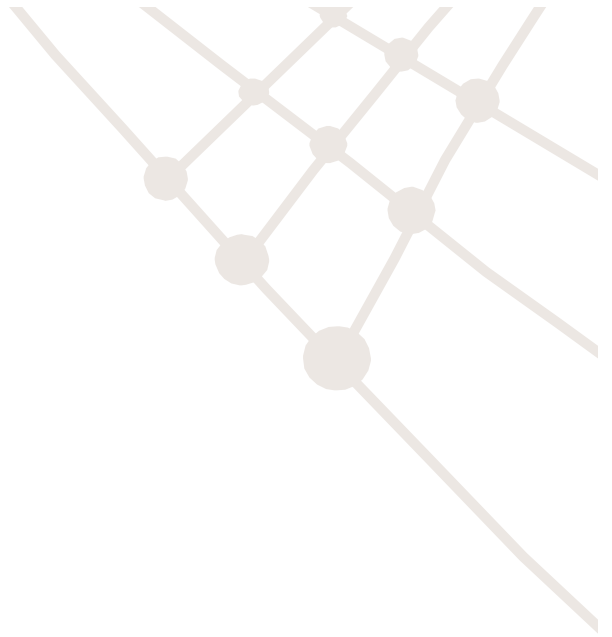


DIGITAL TELEVISION

Grupo de Análisis y Prospectiva del
Sector de las Telecomunicaciones
(Group for the Analysis and Forecasting of the
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Contents

KEY POINTS	5
1. INTRODUCTION	9
2. PANORAMA OF DIGITAL TELEVISION	10
2.1. The dual role of television	10
2.2. Digital television in Europe	11
2.3. Digital television in Spain	12
2.4. Value chain	20
2.5. Technological trends	21
2.6. Regulation	23
3. DIGITAL TERRESTRIAL TELEVISION (DTT)	25
3.1. Panorama of DTT	25
3.2. Positioning of the players	30
3.3. Business models	33
3.4. Promotion of DTT in Spain	34
4. DIGITAL VIDEO AND IPTV	38
4.1. Perspectives for the new services	38
4.2. Fixed operators' strategy	44
4.3. Cable operators' strategy	52
4.4. Satellite operators' strategy	55
4.5. Content owners' strategy	57
4.6. Manufacturers and suppliers' strategy	59
4.7. Business models	63
5. NEW SERVICES AND FORMATS	66
5.1. Mobile phonetelevision	66
5.2. High-definition television	70
6. 2008 SCENARIOS	72
6.1. Pay television	72

CONTENTS

6.2. Free-to-air television	74
APPENDIX I. AUDIOVISUAL SECTOR PLAYERS	77
Free-to-air television	77
Pay television	78
APPENDIX II. GLOSSARY	80
APPENDIX III. BIBLIOGRAPHY	82

KEY POINTS

Digital television

- The digitisation process is undoubtedly the great challenge for all players in the audiovisual sector. There are 4 matters considered of vital importance in this process: the transition to Digital Terrestrial Television (DTT), the evolution of the cable and satellite television operators' business in the new digital scenario, the breakthrough of ADSL and IP network television, and the perspectives for new services and formats such as mobile television and high-definition television.
- In the new stage of digital television, the television set, an apparatus found in all homes, should play an important role in implementing the Information Society to help in overcoming the traditional penetration barrier to PCs in Spanish homes. The television set may grant access to either low interactivity services directly provided by DTT, or to more advanced services that would be accessed through television sets with a broadband connection. The television set should serve as an access terminal to Information Society services, beyond mere access to television channels.

Digital terrestrial television

- DTT has an opportunity window that may be estimated as a 6-year period. After this period has elapsed, the greater options for interactivity and integration of services that digital television will come to offer compared to broadband and the maturity of this offering will make the DTT service less attractive. A greater delay in launching DTT could question its feasibility.
- The DTT business model is essentially a free-to-air television model based on advertising revenue. There is no place for pay services with subscription charges, but there should be room for pay content and pay-per-view models. The free-to-air multi-channel experience of DTT should consolidate itself as an important step in the sector's evolution to new forms of television.
- The speed with which DTT is adopted and, therefore, its feasibility, depends on a virtuous circle of development being generated: 1) pressure of the analogue switch-off, 2) deployment of an attractive content offering, both channels and complementary services, 3) acquisition of decoders, 4) generation of advertising revenue for the channels.
- The generation of a virtuous circle of development needs impetus in three elements: 1) distribution of the channels assigned to QuieroTV, 2) support for the adaptation of community antennae and 3) availability of apparatuses at reasonable prices. From these, the distribution of channels to generate attractive contents is the key element at this stage.

- In the role of the driving force behind DTT, Spain debates between public service television, whose high debt would limit its capacity to invest in new contents, and the current private channel licensees, whose comfortable revenue position and profit and loss account means there is no real interest in promoting a technological option that will allow the incorporation of new players. QuieroTV's channels should be assigned after very clear commitments from the licensees.
- DTT will involve a large increase in the number of TV channels, which will cause audience fragmentation and a greater fragmentation of advertising investment. The most probable option is for the spectrum to be distributed between the current analogue or digital television licensees.
- In the current free-to-air television advertising market, if we assess the unsatisfied advertising demand estimates and the foreseeable advertising limits put on the public channels, there would easily be room for a new player. The incorporation of 2 new players would add pressure to the competition for the advertising market. In any case, it should be considered that different business models could arise in a dynamic market, thus opening the way for new players.
- DTT has a low level of interactivity. Expectations that it will become a solution for universal access to the Information Society should be viewed with caution. This expectation should be associated to the television set, an apparatus found in all homes.

Digital video and IPTV

- Video or television over IP are destined to form the next great step in the unstoppable process of "everything over IP". If, in the last few years, it was the concept and the first deployments of the VoIP (voice over IP) service that led to the commencement of important transformations in the telecommunications sector, everything indicates that 2005 will mark the start of new transformations in this market around television and video services.
- Digital video, IPTV and service bundling will play an important role in stimulating broadband penetration in Spanish homes.
- Cable operators' success with a triple-play offering (voice, broadband and television) has forced fixed operators to look for options to incorporate television in their service and thus be able to compete with the cable offering.
- In the medium term, service bundling will have another consequence which is starting to become a reality in countries like the USA: the fight for the customer results in a scenario where the first to attract a customer takes it all: telephone, broadband connectivity and television.

- The 20% penetration limit of pay television in Spain constitutes an important barrier to the new IPTV and digital video services. This barrier is based on social habits, which consider television to be a free service and, therefore, there is unwillingness to pay anything for it.
- In the Spanish market, broadband television and video services are not an attractive business in itself for telecommunications operators. The main value of these services should be to stimulate the development of the broadband market, which is these operators' main objective.
- Within the context of the Spanish market, dominated by satellite and cable operators and with a pay television market which is not as developed as in most European countries, the ADSL operators may encounter difficulties in gaining sufficient market share to enable them to obtain medium-term profitability from the investments in infrastructures and contents necessary to provide IPTV and digital video services.
- The telecommunications operators' plans to digitize and deploy a new infrastructure to carry fibre to the customer's home and be able to provide digital video services can only be feasible if new windows of content use are agreed. The new windows can coincide with the DVD sales window or even with that of premieres in cinemas, provided that the digital rights management technology transmits the necessary confidence to the content owners.
- The content providers will directly market their offering. The possibility of disintermediation of the classic distribution channels (TV, cable, cinemas,...) and the possibility of increasing their negotiating powers with a more segmented global market will make this new business model especially attractive. The great advantage of the traditional channels, in particular telecommunications operators, is the ease of managing payment collection from the customer.
- The new Spanish regulation of the audiovisual sector should, in no case, hamper the development of new, still incipient services, such as digital video. The audiovisual services' new possibilities should not be limited or checked by regulatory aspects related to the complex audiovisual sector.

Mobile TV and high definition TV

- Digital television for mobile phones is one of the technologies on which most expectations are placed for the next few years. We will see the technical and financial feasibility of mobile digital TV in Japan and South Korea before anywhere else.

- Mobile television should be considered a new format, different to normal television. For this reason, it should be based on new content. The foreseeable development of DVB-H-based mobile television business models (DTT) will need spectrum assignment for these channels, which should start to be considered in the spectrum distribution.
- UMTS TV is the choice of the mobile communications operators. The mobile network's capacity is more limited than a DVB network for TV channel broadcasting. This means mobile operators are opting for streaming or downloaded video distribution frameworks.
- Thanks to the high quality of image it provides, high-definition television or HDTV can significantly boost the difference (perceived by the user) between analogue and digital television. Nevertheless, in Spain, as with many other European countries, high-definition television (HDTV) is impossible to broadcast with the spectrum availability prior to the switch-off.

1. INTRODUCTION

From the user's point of view, the television broadcasting service has hardly changed since it began. The receiving equipment, the television set, allows the channels broadcast in the medium to be tuned and accessed. Nevertheless, the service has considerably evolved over the years: the image and sound quality have improved, the number of channels broadcast has increased due to the appearance of new private players and a pay television service has been incorporated in the original free-to-air broadcast. Although these improvements are noteworthy, it is now when the television, immersed in the digitization process, faces a stage of unprecedented changes.

Digital TV is the evolution of traditional transmissions to digital format. This evolution permits an improvement in image and sound quality, a higher number of channels and the introduction of numerous interactive services. The possibility of renewing the current stock of televisions and reinventing home leisure justifies the tremendous expectations and the unconditional support of the consumer electronics industry to the digitization process. Nevertheless, the effect with greatest impact on the television digitization process is the increase in the number of channels and, therefore, the television line-up. In an audiovisual market such as the Spanish one, mainly based on advertising revenue, the appearance of new players and new channels will result in greater competition for advertising and will stimulate new business models.

Digitization also means the freeing of the spectrum currently used by analogue television. The possible uses of that spectrum, whether in additional channels, new television services or mobile or wireless communication services, will have an important effect on the overall panorama of telecommunications.

The effect on the audiovisual panorama could be even more of a breakthrough if we add the popularisation of broadband Internet access to the television digitization process. The appearance of audiovisual services provided over the Internet broadband access infrastructure (IPTV) affect even further the aforementioned trend in DTT. From a situation where the number of channels is limited and its transmission is based on a limited resource, the spectrum, we move to a situation where the number of channels is, theoretically, unlimited and dependency on the spectrum disappears. It is a new television concept, closer to the concept of digital video (content access) than to television (content broadcasting).

This document analyses the transformations in the audiovisual panorama that will be brought about by the television digitization process and the occurrence of convergence between telecommunications, audiovisual and the Internet.

2. PANORAMA OF DIGITAL TELEVISION

Television is the media with the highest penetration within the Spanish population, reaching 89.6% of individuals. The approximate average of four hours of television consumption daily (exactly 239 minutes daily in November 2004 according to the General Media Study), allow us to see how relevant this medium is.

The digitization process is undoubtedly the great challenge for all players in the audiovisual sector. This chapter analyses the audiovisual sector and the digital television market, both on a European and Spanish scale.

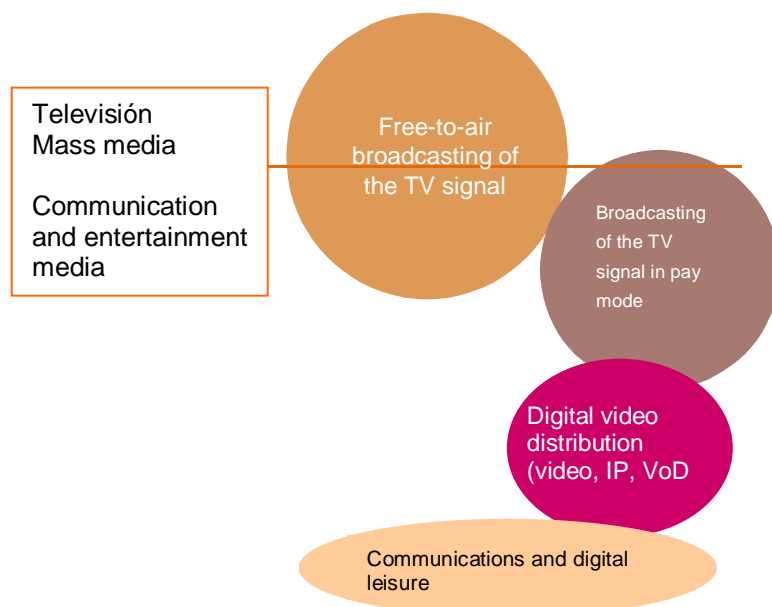
2.1. The dual role of television

Since it began, television has been characterized as a mass medium, given that it has been, and still is, a key reference for the individual throughout his daily activities: awareness of his social environment, forming an opinion on the main current affairs that comprise public opinion, establishing new forms of bonds and social relations, etc. The high penetration and audience of the medium, the live broadcasting of programmes and the reduced number of channels have shaped this facet of television.

As television has evolved and more channels have appeared, a facet more closely linked to entertainment and leisure has arisen, characterised by audience fragmentation and segmentation and the broadcasting of a great variety of contents (films, documentaries, entertainment programmes...) that are not usually broadcasted live. In this context, television can be considered as another window of audiovisual content use and distribution in which it shares its leading role with the cinema, pre-recorded hardware (VHS, DVD...), etc. From a demand point of view, the event (or a specific programme) is the key in this scenario, whilst the channel or television schedule shaped by the operator loses its relevance.

Generalist television which is broadcast free-to-air is the prime example of mass media. User segmentation and the transmission of highly varied specific content are characteristics more closely linked to pay television.

In this context, television now begins to come into relation with the new forms of digital video distribution, which boost the entertainment and leisure facet of television.



2.2. Digital Television in Europe

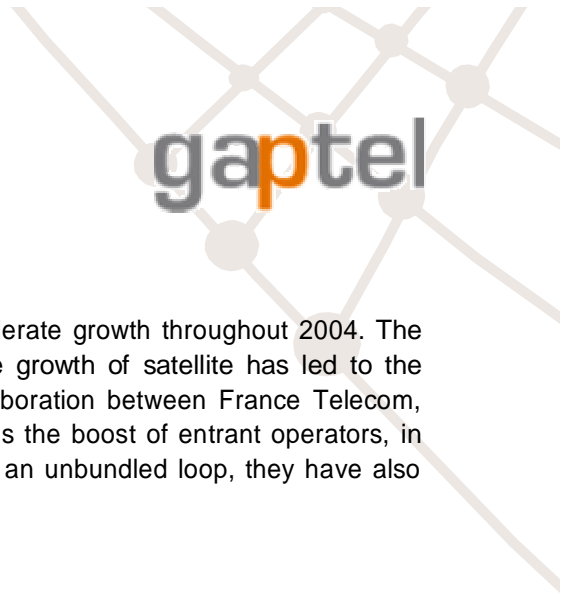
The adoption of digital television in Europe still shows disappointing figures. According to Forrester data, the penetration of digital television grew by 14% in 2004 to reach 30 million Europeans and an average penetration of 21%. The following table shows the penetration of digital television in the different European countries.

The Digital television Market in Europe at the end of 2004		
Market	Homes (in thousands)	% of total homes with TV
Large markets		
United Kingdom	14,435	57%
Germany	5,414	14%
France	4,991	21%
Italy	2,759	12%
Spain	2,280	14%
Scandinavia		
Sweden	1,116	27%
Finland	511	22%
Norway	478	23%
Denmark	355	14%
Benelux		
Holland	480	7%
Belgium	282	7%
Luxembourg	12	7%
Rest of Europe		
Portugal	263	7%
Austria	378	10%
Switzerland	148	4%
Greece	267	7%
Ireland	417	31%
Total Europe	34,589	21%

Source: Forrester Research, Inc, Market Overview 2004

United Kingdom

The British market is the most competitive European market, accumulating 42% of all European homes with digital television. It has over 50% penetration and it has the only profitable digital TV operator. The BSkyB satellite operator and the public service channel BBC have been the driving forces behind the growth of Digital television. Even in this highly advanced competitive market it is worthy of note that according to a study performed by Sony, 50% of homes are unaware of the difference between analogue and digital television.



France

The main digital TV operator, Canal Satélite, has undergone moderate growth throughout 2004. The consolidation of the cable operators, together with the moderate growth of satellite has led to the penetration figure reaching 21%. We should emphasise the collaboration between France Telecom, TPS and Canal Satellite in the deployment of ADSL TV, as well as the boost of entrant operators, in particular Free and Neuf Telecom. Basing themselves on offering an unbundled loop, they have also promoted ADSL TV services.

Italy

The merging of the Digital TV satellite platforms is similar to the case of Spain. The Italian government's determination to stimulate DTT has meant a catalyst for this market in 2004.

Germany

With a very high penetration of Cable TV, DTT in Germany did not initially attract the users' interest. The operator Premiere, introducing the possibility of using standard cheap set-top boxes, has boosted the growth of this platform, taking the penetration figure to 14%.

Scandinavia

In Sweden 2 digital satellite operators, 3 digital cable operators and 1 DTT operator comprise a very competitive market, which has taken digital TV penetration to 27%. The Finnish market is unique, as DTT constitutes the main broadcasting media.

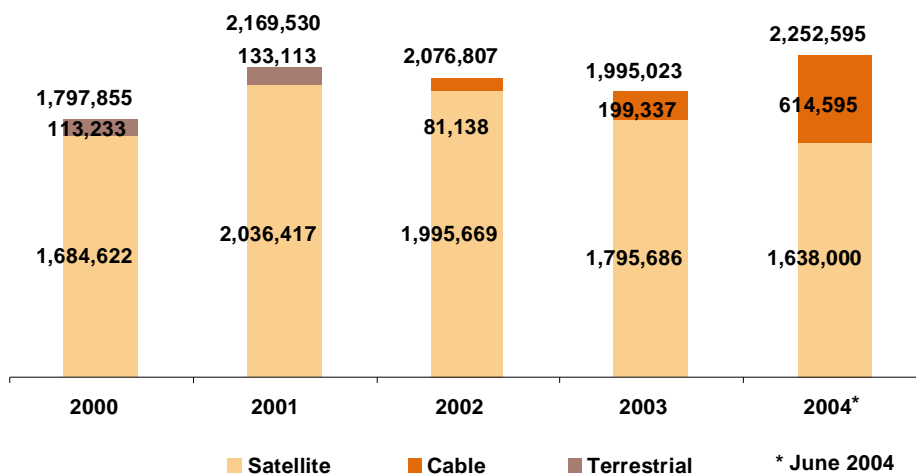
The remaining European countries have shown very little activity with respect to Digital TV in 2004.

2.3. Digital television in Spain

The merger between the operators Via Digital and Canal Satellite Digital to form Digital+ and the collapse of the DTT operator Quiero TV, shaped the situation of Digital TV at the start of 2004. The cable operators' progress in digitization and the new ADSL TV offering launched by Telefónica has incorporated new elements in this market.

The current situation of digital television in Spain shows a panorama largely dominated by the satellite platform. The following figure details the customers in each of the platforms. In the case of cable, it is complicated to obtain data on the degree of digitization of their network, and to separate customers into analogue and digital technology. For this reason, they have been estimated on the basis of total customers of said operators (60% of the total cable TV customers received digital television in 2004).

Figure 1. Evolution of the number of subscribers to digital TV



Source: CMT Annual Report, own estimate for digital cable operators and operator data for 2004

The above figure only shows customers subscribing to pay platforms that transmit digital television. In 2004, the number of homes with free-to-air digital terrestrial receiving equipment is starting to take on relevance. Since, in this case, there cannot exist figures of subscribers to a service, the estimates should be made on the equipment number (televisions with decoder, or decoders) sold in Spain. According to the estimates of the European Broadcasting Union, in Spain there are 130,000 homes with DTT decoders (mainly from the disappeared Quiero TV) in 2004.

Within this market context, the following chapters will analyse each of the 4 matters considered as vital in the analysis of the perspectives for digital television in Spain:

- The transition to Digital Terrestrial Television (DTT).
- The development of the cable and satellite television operators' business in the new digital scenario.
- The breakthrough of TV over ADSL and IP networks.
- The perspectives for new services and formats such as mobile and high-definition television.

Digital television is not coming into a new market. Instead, it must find a space in a television market divided between the free-to-air television models, based on advertising revenue, and the pay television models, based on the customer paying a subscription. In order to evaluate the panorama of digital television, we will analyse the broadcasting platforms, and the free-to-air and pay television markets in Spain.

2.3.1. Digital television platforms

Satellite

Satellite technology has the greatest number of customers in Spain, and is that which has most rapidly adopted the digitization process, largely due to its lower updating costs. The merger of the Vía Digital and Canal Satélite Digital platforms, the increasing competition of cable, and a business model based on keeping a high initial fee in the basic packets, has caused a continual drop in the number of customers since 2001.

Cable

Although the cable initially deployed in Spain was analogue, the different operators are undertaking the digitization of their networks to be able to transmit a greater number of channels and introduce other services. The large Spanish cable operators ONO and AUNA had digitized almost 100% of their network by the end of 2004. All new customers received digital television. These companies are progressively migrating their customers from analogue to digital. In the case of ONO, 60% of customers are now digital. In the case of AUNA, all its customers can now receive digital television except in the Canary Islands and Alicante, which means approximately 90% digitization.

Digital Terrestrial Television

Digital Terrestrial Television (DTT) will replace traditional free-to-air TV in Europe. After the collapse of the Quiero TV platform, DTT has been restricted to digital transmissions of the free-to-air operators, and to the very limited offering of the other two operators who obtained a DTT license (Veotv and NetTV). This platform has very limited penetration in Spain. The data submitted for terrestrial technology only includes subscribers to the disappeared Quiero TV platform, with the exception of the calculation made by the European Broadcasting Union, which estimated 130,000 DTT users in Spain the first quarter of 2004. The statistics in this regard are still very limited. However, the offering of television sets that include digital reception and set-top-boxes has considerably increased.

ADSL television

The transmission of television via a broadband connection is the latest option incorporated in the digital television market. Telefónica has launched its television service, Imagenio, using this technology, with 5,000 customers by the end of 2004. Other telecommunications operators such as Wanadoo or Jazztel that offer broadband connections have announced plans to incorporate television in their service bundle during 2005, either using their own network or Telefónica's unbundled loop service.

2.3.2. Free-to-air television

Revenue

The following table shows the itemised breakdown of the revenue from the different TV stations in 2003, as well as the amount of these figures over the total station's revenue.

Table 1. Revenue from the free-to-air televisions in 2003. Itemised breakdown.

Source: CMT. Annual report 2003

Operators	Subsidies		Advertising		Own production		Others		Total
	2003	%	2003	%	2003	%	2003	%	2003
RTVE	756.96	49.6	697.15	45.7	2.08	0.1	70.22	4.6	1,526.40
Telecinco ¹	0.22	0.04	519.59	92.1	6.12	1.1	38.5	6.8	564.42
Antena 3 ²	0	0.0	511.53	100.0	0	0.0	0	0.0	511.53
Canal 9	135.08	65.9	37.76	18.4	26.2	12.8	6	2.9	205.04
TV3	170.85	52.3	126.24	38.7	1.23	0.4	28.25	8.7	326.56
Telemadrid	72.2	51.3	63.22	44.9	0	0.0	5.27	3.7	140.69
ETB	77.57	72.5	24.4	22.8	5.02	4.7	0	0.0	106.99
Canal Sur	124.38	69.5	45.68	25.5	0.39	0.2	8.61	4.8	179.06
TV Castilla-La Mancha	45.7	91.4	3.89	7.8	0.41	0.8	0	0.0	50
Televisión de Galicia	72.37	72.9	18.58	18.7	0.11	0.1	8.19	8.3	99.25
Onda Seis	0	0.0	0.98	77.2	0	0.0	0.29	22.8	1.27
Total	1,455.33	39.2	2,049.02	55.2	41.56	1.1	165.33	4.5	3,711.21

In addition to advertising revenue, the public service channels are also financed from the government budget. Most of these operators' revenue currently corresponds to advertising revenue. At present, there is a limit of 12 minutes of adverts per hour of broadcasting. The feeling in the advertising industry is that there is an unsatisfied demand for advertising space that some analysts place at around 20%.

Recently, the revenue of the free-to-air channels from basic interactive services made by calls to 800 numbers or SMS is increasing in importance. Voting in contests on sending SMS which appear onscreen are some examples of this incipient business model. This model proposes a hazier border between the concept of free-to-air television and pay television, as in many cases, especially on a local level, it is these means of revenue, and not advertising, which finance the programmes.

¹ In the first nine months of 2004, Telefónica's total net revenue was of 544.35 million euros, which means a 28.1 % increase with respect to the same period last year. The total net advertising revenue was 502.17 million euros, whilst the "other revenue" (sales from audiovisual rights, "merchandising") figure was set at €42.18 million.

² In the first nine months of 2004 Antena 3TV's total net revenue was 480.187 million euros, which means a 29.7% increase with respect to the same period last year. The total net advertising revenue was 453,575 million euros and the other revenue figure was set at €26.612 million.

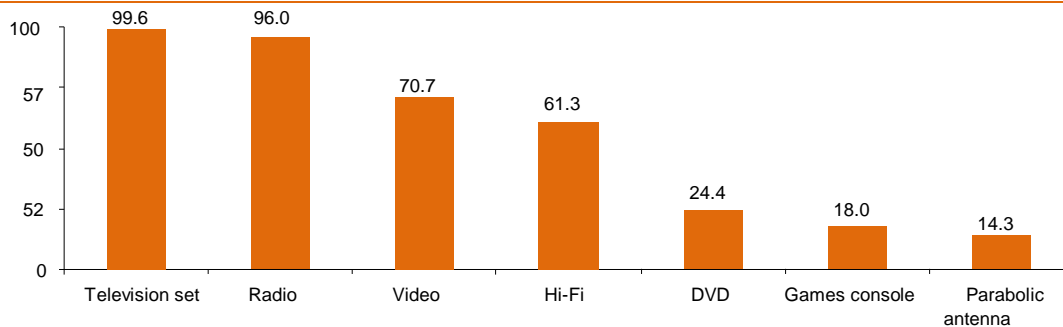
Since it is the viewer who pays directly, some questions could be raised as to whether this option should be considered as free-to-air or pay television.

Television demand and audiences

99.6% of Spanish homes and 92% of second homes have a TV set. It is the audiovisual technology apparatus with highest penetration in homes.

Figure 2. Penetration of audiovisual equipment

Reference: 2004

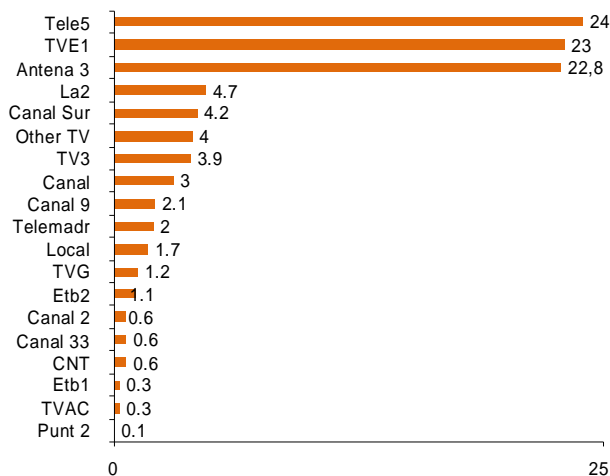


Source: General Media Framework 2004 (AIMC)

In 2004, for the first time, Telecinco, a private channel, became leader in the viewer ratings, with 24% of the total audience share. TVE-1 and Antena 3 TV are very close behind with 23% and 22.8% respectively.

Figure 3. Total television audience share (% Share Total TV)

Reference: January-November 2004



Source: EGM (AIMC)

2.3.3. Pay television

With the Quiero TV digital terrestrial television platform no longer broadcasting, the pay television offering in Spain was reduced to the analogue transmission of Canal+, Digital+ digital satellite and the cable platform operating in each region. A fourth possibility has recently been introduced in addition to these three options. This is a new service, Imagenio, offering digital television and audio, TV and PC broadband internet and Video on Demand via the telephone line using ADSL technology.

Revenue

The following table shows the evolution of revenue obtained by pay television from subscribers and “other revenue”, and the proportion they form of the total revenue.

Table 2. Evolution of revenue (million €) of the pay televisions from subscribers and other revenue.

Source: Television (5th edition) – June 2004. Sectors. DBK, SA.

Operators	Subscribers					Other revenue				
	2002	%	2003	%	Var.	2002	%	2003	%	Var.
Sogecable Group ³	780.49	80.0	889.87	76.1	109.38	157.31	16.1	233.71	20.0	76.40
Auna Telecom.	47.00	5.2	60.00	5.7	13.00	851	94.8	989	94.3	138.0
Cableuropa	62.33	24.6	83.03	23.2	20.70	191.11	75.4	275.56	76.8	84.45
Euskaltel	1.60	0.8	4.24	1.7	2.64	196.6	99.2	245.76	98.3	49.16
R Cable	4.70	12.3	8.00	11.2	3.30	33.47	87.7	63.36	88.8	29.89
Retecal	10.05	24.8	11.00	20.0	0.95	30.46	75.2	44	80.0	13.54
Telecable	13.65	38.7	15.25	31.0	1.60	21.61	61.3	34	69.0	12.39
Tenaria	1.80	24.7	3.50	22.6	1.70	5.5	75.3	12	77.4	6.50

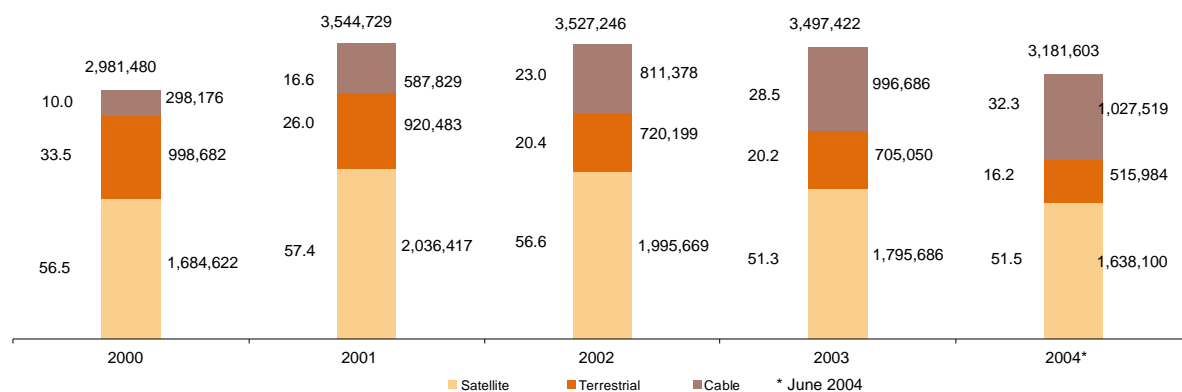
We can see that the direct revenue from subscribers only forms the largest part of revenue in the case of the Sogecable Group (specifically 76.1% in 2003). In the other pay television operators, the highest proportion of revenue is from “other revenue”. In cable operators, these correspond to providing telecommunications services, and in Sogecable Group it mainly corresponds to film production.

Subscribers

In the first quarter of 2004, the estimated distribution of subscribers by pay television access technology is the following: 16.2% analogue terrestrial television, 51.5% digital satellite and 32.3% cable. As we can see below, subscribers to satellite pay platforms have been dropping since 2001 when it was over two million. The same occurs with terrestrial technology, due to the disappearance of Quiero TV and the aforementioned migration of Canal+ users to satellite options. The number of cable subscribers is progressively increasing: exceeding one million subscribers in 2004.

³ Sogecable also has **advertising revenue**, 45.64 million euros in 2003 (3.9% of total revenue)

Figure 4. Evolution of the number of subscribers to pay TV by technology



Source: CMT Annual report and company information

The evolution of subscribers by operators is shown below.

Table 3. Evolution of subscribers to pay television. Itemised by operators.

Source: CMT and company information

	1999	2000	2001	2002	2003	Jun 2004	(2004 %)
Canal Satélite Digital	813,490	1,051,563	1,230,038	1,220,669	1,173,024	-	-
Via Digital	440,114	633,059	806,379	775,000	622,662	-	-
Digital+	-	-	-	-	-	1,638,100	51.5%
Canal+	760,424	885,449	787,370	720,199	705,050	515,984	16.2%
Grupo ONO	31,023	128,242	232,099	286,536	339,378	354,668	11.1%
Grupo Auna	12,785	69,888	165,632	260,102	296,132	292,000	9.2%
Other cable operators	59,977	100,046	171,722	187,023	231,925	251,600	7.9%
Local cable	-	-	18,376	77,717	126,240	126,240*	4.0%
Telefónica Cable	-	-	-	-	3,011	3,011*	0.1%
Quiero TV	-	113,233	133,113	-	-	-	-

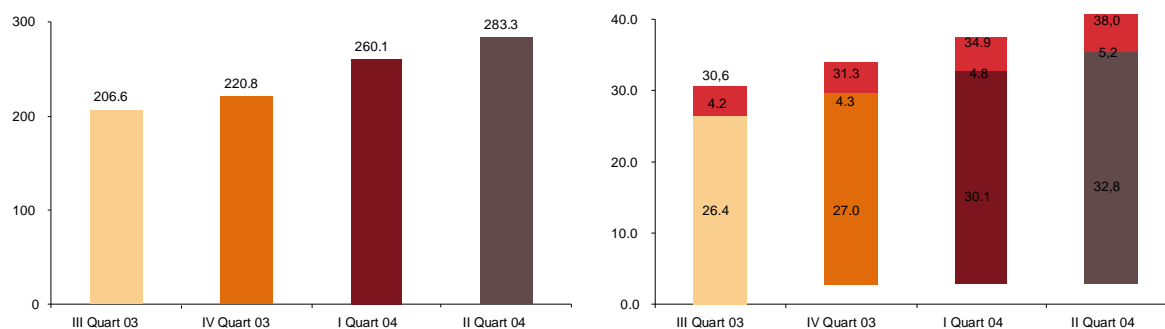
* As there is no information for the first quarter of 2004, the subscribers figure for December 2003 has been used as reference.

Consumption and expenditure

Approximately 20% of Spanish homes have pay television. In the 80% of remaining homes, the most repeated reasons for not subscribing to pay television services are the good and sufficient quantity of programmes offered by the free-to-air channels and the high price of the current offers. The latter is partly mitigated thanks to service *bundling* that the operators are starting to market.

There are approximately 2.9 million homes with pay television. These accumulate expenditure of close to €300 M, in the second quarter of 2004, a total of €970.7 M in the twelve months between July 2003 and June 2004.

Graph 1. Expenditure in pay television end services in the homes (million €) and average monthly expenditure of the homes on pay television services (€)



Source: Las TIC en los hogares españoles (ICT in Spanish homes), Red.es

The average monthly expenditure of a household on pay television services is € 32.8, not including indirect taxes. This average expenditure is greater than that recorded in other ICT services, such as the telephony – € 26.7 and € 25.8 respectively in fixed and mobile telephone services- or Internet with € 19.3.

As regards the itemisation of expenditure in pay television services, we can see that it is the subscription charge which covers the greatest proportion of the expenditure with pay-per-view being limited to 4.7% of the total.

Table 4. Expenditure on television. Itemised breakdown.

Source: Las TIC en los hogares españoles, Red.es

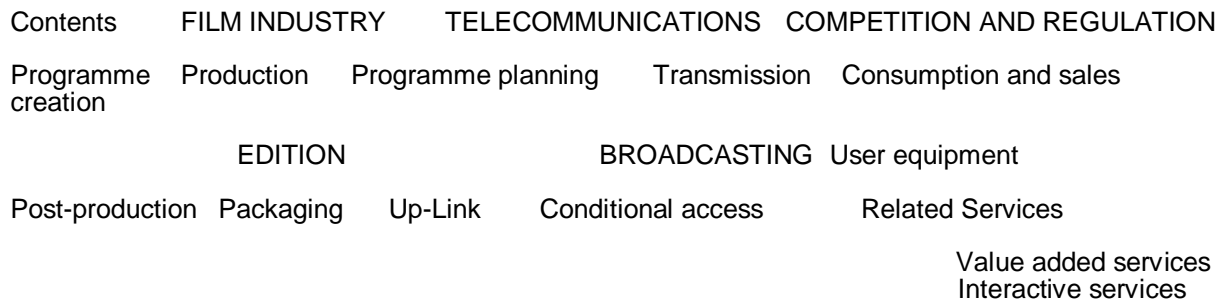
Million €	III Quart 03		IV Quart 03		I Quart 04		II Quart 04	
	Expend.	% / Total	Expend.	% / Total	Expend.	% / Total	Expend.	% / Total
Subscription charges	202.38	97.78	215.65	95.88	252.10	94.96	271.32	93.54
PPV	4.59	2.22	9.27	4.12	13.39	5.04	18.75	6.46
Total expend.	206.97	100.00	224.92	100.00	265.49	100.00	290.07	100.00
Discount ⁴	-0.36	-0.17	-4.11	-1.55	-5.43	-5.43	-6.73	-6.73
Total expend after discount	206.61		220.81		260.06		283.34	

⁴ The discounts included in the above table refer to those made by the cable operators, resulting from subscribing to service packages.



2.4. Value chain

It is especially complicated to present a single value chain for the audiovisual sector, which includes all the players and interactions arising between them. This is even more so now, since the introduction of digital technology and different media via which the audiovisual content is broadcast result in completely different business models. In spite of this, below a generic approximation is shown that tries to respond to this current situation.



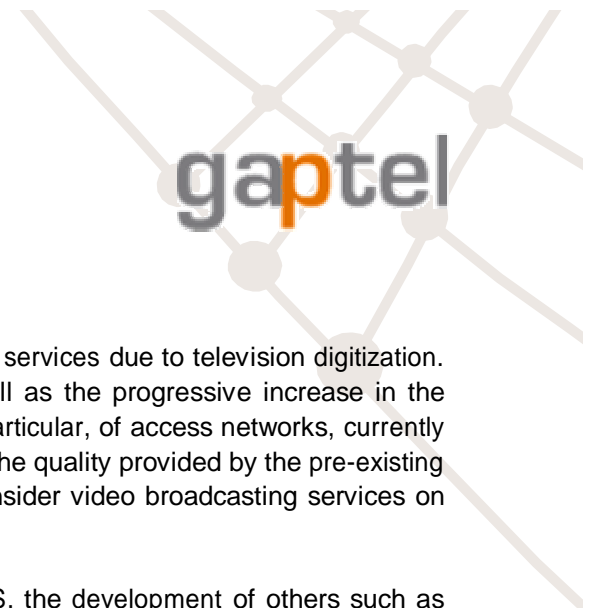
The starting point is formed by all available audiovisual content (content producing industry). After post-production and, at times, packaging, these contents are structured in the form of programmes which come in to form part of a programme schedule or, generically, a programme framework of a certain contents editor, a position which the private and public TV distributors (programmers) currently hold.

This programme schedule in the form of generalist or thematic/specialised channels are broadcast via infrastructures which they share with the telecommunications sector.

TV consumption and the sale of its associated services introduce new players devoted to the creation of services and applications such as value added services or interactive services, among others.

Depending on the business model, in the case of pay television it may be necessary to introduce a figure that manages conditional access to the contents prior to their consumption, guaranteeing the operators' profit-making framework.

The previous figure shows both the audiovisual content production and the programme planning, or their generic editing. Nevertheless, in the interests of greater clarity, multiplex management has not been included. This is an activity to be performed prior to and separate from the broadcasting and, as in the section corresponding to DTT details, it becomes the key part which, over and above the programme planning done by the contents editors, forms the final offering the digital television user receives in his receiving equipment.



2.5. Technological trends

Technology marks the profound change faced by the audiovisual services due to television digitization. The advances in coding and compression technologies, as well as the progressive increase in the transmission capacity of telecommunications networks, and in particular, of access networks, currently allow, on the one hand, to increase the number of channels and the quality provided by the pre-existing television broadcasting platforms and, on the other hand, to consider video broadcasting services on the current networks.

The consolidation of communication technologies such as MPLS, the development of others such as ADSL2, ADSL2+, VDSL, DOCSIS 3.0 and the achievement of important increases in transmission capacities permit the advance of the audiovisual service offering.

Another relevant technological aspect is the developments in the user equipment: DVR, Set-Top-Box, and others supported by the advances in chip processing capacity. It is hoped that Moore's Law, which predicts that processor power will double every two years, is fulfilled until at least 2010. The announcement of the IBM Cell processor, aimed especially at the entertainment industry, has mainly gone unnoticed amongst the typical adverts for advances in the microprocessing sector. Nevertheless, we may be witnessing a changeover where the PC, which has played the leading role for decades in microprocessor developments, will pass the baton to other devices such as games consoles, in the leadership of this race.

The present section focuses on those matters which may mean relevant changes in the markets and business models, i.e. those with breakthrough effect.

2.5.1. Coding and compression

Compression and coding mechanisms are technological elements which influence the sector horizontally, in the sense that their impact is felt in all audiovisual content distribution systems, with special importance in those which have the greatest transmission capacity limitations.

At present, most audiovisual content distribution systems use the MPEG-2 standard for content coding. This standard permits audiovisual content coding at a range of speeds between 3 and 6 Mbps to obtain "standard quality" and between 18 and 20 Mbps to obtain "high definition" quality. The most important technological milestones will be the conclusion of the standardisation process of the standard that will finally succeed MPEG-2. To that effect, there are several possibilities, which, additionally, have similar features. The most important of these is MPEG-4 due to its positioning.

The latest version of the MPEG-4 version 10 standard, typically called MPEG-4 AVC (Advance Video Coding) or H.264 constitutes a real technological breakthrough:

- For the same quality of image, the necessary transmission capacity is cut in half with respect to MPEG-2, irrespective of the content distribution platform. The latter permits increasing the offering and plurality of standard quality channels or, instead, introducing high definition channels, or even considerably reducing the overall broadcasting cost. This improvement also opens the possibility of distributing audiovisual content with adequate quality over networks that, due to their transmission capacity, were not initially intended for this type of services

- Contrary to what occurs in MPEG-2, the MPEG-4 standard also permits transmission of reduced definition images at low transmission speeds. This allows audiovisual content of reduced size to be distributed, adapted to the reduced screens of mobile phones, PDAs or car screens.

The impact that evolution of the MPEG-4 compression standard may have in the multiplication of available channels, should justify the Government's definition of a plan for transition from MPEG-2 to MPEG-4. This evolution could condition the distribution of the currently available spectrum.

Finally, we should mention the potential impact that the development of the Windows Media 9-HD codec would have on the industry, as there are already hardware manufacturers who are integrating Windows Media in the supported native formats (e.g. Kiss and Pinnacle). This fact, together with the Windows operating system and Windows Media Center, may place Microsoft in an advantageous position in the market.

2.5.2. HDTV. High-definition television

The concept of high definition is established in contrast to the definition of transmission considered standard. This means, as occurs with the broadband concept, its definition is ever-changing and at any point in time will correspond to different technical parameters and quality. At present, "high definition" refers to 1080i or 720p type resolutions, which, although technically different (e.g. the first is interlaced and the second is progressive), are practically identical when viewed.

The manufacturers of players have placed their hopes precisely in leaps such as high definition acting as the lever that will contribute to updating the available television sets in use in the home.

2.5.3. Transmission Standards

DVB-T

The DVB-T standard provides some important novelties in content consumption. It makes audio and video signals superior to the norm possible, permits two new reception models (portable and mobile) and, furthermore, allows access to advanced television services and even to interactive services. This fact can be considered relevant, bearing in mind the penetration of the television receiver in homes.

As has been mentioned, among the characteristics which make the DVB-T standard something novel, we have the moving vehicle television-receiving model (up to speeds of 80 km/h). This opens a new market to content broadcasting to which none of the content distribution platforms (cable, satellite or IPTV platforms) can access. This special feature has been widely exploited in the case of Berlin, where the network has been especially designed to provide mobile reception services and has constituted one of the levers for the adoption of DTT by the viewers and by the German industry in the form of the car and receiver manufacturers.

DVB-H

When you go over a speed of 80 km/h, it is necessary to resort to other technologies such as DVB-H, or even UMTS to distribute audiovisual content.

In the European case, the DVB-H standard has been especially designed to distribute audiovisual content to mobile devices (handsets) characterised by having, in general, low transmission capacities and reduced sized screens. There are interesting experiments in this regard, such as the cases of Korea or Japan, with a variant of DAB, called DMB and in Europe with DVB-H. All these experiments are being performed together with the use of MPEG-4 AVC as coding mechanism.

The importance of DVB-H and the possibilities it entails turn it into a breakthrough technology insofar as it could constitute the means to supply new business models to telephones and mobile devices, in particular by a large number of players outside the mobile telephony business.

2.5.4. Terminals

Developments in user equipment have undergone important improvements, supported by the advances in the chip processing capacity. Out of all of these, we should highlight the new functionalities offered by devices which include the option of recording, DVR. These devices are destined to revolutionise service provisioning and the way we understand television. The introduction of a hard drive that permits storing information in the actual user terminal enables content selection, provision of digital video services, even on low-interactivity platforms, and permits the elimination of adverts. This last aspect will mean the review of the current advertising model, in the search for new formats.

2.6. Regulation

The regulation of the audiovisual sector, and hence, television has a main characteristic: fragmentation. Many laws regulate the same situation, which is undoubtedly not without a high level of complexity. Within the current regulations applicable to the television sector, the Radio and Television Statute, passed on the 10 January 1980 should be highlighted. This defines radio and television as an essential state-owned public service.

Since the Radio and Television Statute, different acts and royal decrees have been enacted which regulate specific aspects of television. These regulations have appeared in accordance with the evolution and technological and business changes the television market has undergone: local television, private television channels, satellite television, cable television and digital terrestrial television.

With the aim of terminating the current regulatory dispersion, the Government is working on a draft of the Audiovisual Act which unifies the system applicable to Radio and Television in a single regulation. In the preparation process of the future act, several particularly relevant aspects, whose legislative development may have important consequences in the audiovisual sector, should be considered: the concept of television, the definition of public service, concentration limits and the independent regulatory model.

On 22 February last, the group of experts set up to study the reform of the state media, submitted their judgement on RTVE and the other publicly owned media. It proposes a new model of public radio-television with mixed financing (state contribution 50%, advertising revenue 40%), and a progressive reduction in advertising from the current 12 minutes to 9 minutes. This report will carry important weight in defining public service in the new audiovisual act.

Another key aspect in this new regulation will be to deal with the convergence of services. Even though it seems obvious, if television is to be regulated, we first have to determine what is understood by television. To do this, the services which are included in the concept of television must be clearly delimited and the audiovisual services should be precisely separated from telecommunications services and information society services (by establishing certain criteria). The concept of television varies from one country to another and differences are observed in aspects such as the application of technological neutrality, whether IPTV should be included, whether interactivity should be included, etc.

The new Spanish regulation of the audiovisual sector should, in no case, be a hindrance to the development of new, still incipient services, such as digital video. The new possibilities of the audiovisual services should not be limited or checked by regulatory aspects, related to the complex audiovisual sector.

3. DIGITAL TERRESTRIAL TELEVISION (DTT)

Digital terrestrial television (DTT) represents the evolution of television as we know it today to the digital format. The transition process of terrestrial analogue television to digital terrestrial television has been initially marked by the governments' interest in making more efficient use of the spectrum currently used by analogue television, to increase the number of channels, and to promote the new services and facilities that digital television could offer. On the basis of this interest a transition schedule has been drawn, which should conclude with the "analogue switch-off". This was initially set for 2012 in Spain, and has been brought forward to 2010.

In the transition design, the key aspect is constituted by the player who should stimulate the process. This chapter analyses the perspectives for DTT in Spain. It analyses the transition model presented in other European markets and the positioning of the players to the current situation.

3.1. Panorama of DTT

3.1.1. DTT in Europe

The complexity of the transition process to DTT largely depends on the penetration index of television platforms alternative to analogue terrestrial television. In those countries where this is the predominant option, as is the case in Spain, the process is considerably more complex than in those where cable television platforms dominate the audiovisual panorama, as is the case in the United States, Germany, Holland or Belgium. The following figure shows the penetration indexes of the different television platforms in the different European countries.

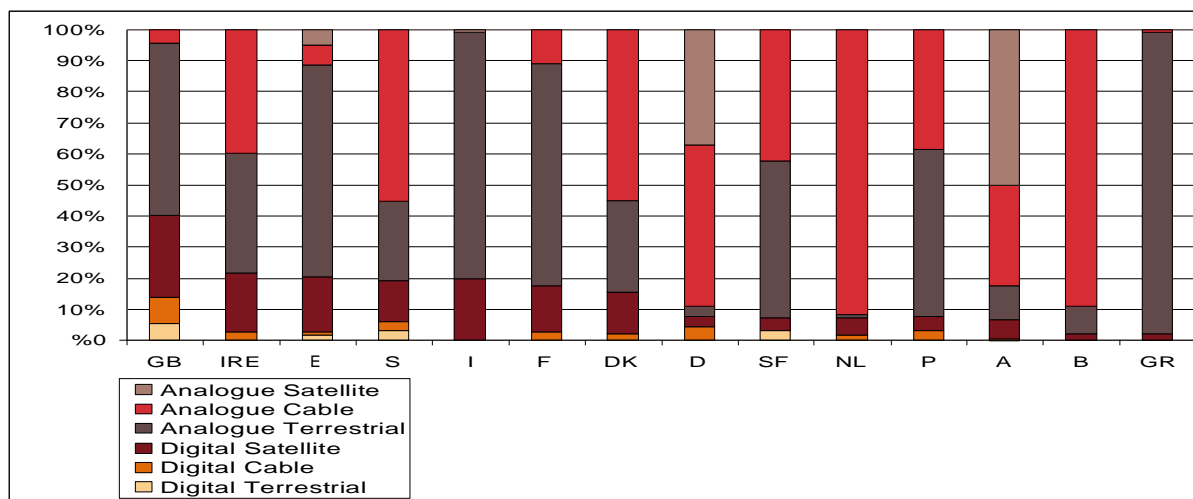


Figure 5. Penetration of the different television platforms in EU countries. Source: European Commission: from digital switchover to analogue switch-off, 2003.

The complexity and the degree of interest in promoting DTT have defined a different schedule among the European countries, as the following table shows.

Progress of DTT in Europe				
	Adequate legislation	Initial launch	Full launch	Switch-off date
Operating platforms				
United Kingdom	July 1996	September 1998	November 1998	2006 to 2012
Sweden	May 1997	April 1999	September 1999	2008
Spain	October 1998	May 2000	May 2000	2010 ⁵
Finland	May 1996	August 2001	October 2002	2007
Germany, Berlin	spring 2002	November 2002	1Q 2003	2010
Netherlands	1999	April 2003	4Q 2003	start 2004
Italy	2001	December 2003	2Q 2004	2006
Next launch				
Germany (other regions)	2002	2004	2004	2010
France	August 2000	March 2005	2006	2010
Switzerland	2003	2005	2006	2015
Austria	2001	2005	2006	2012
Norway	March 2002	2005	2006	2006-2008
Portugal	2000			2010
Denmark	December 2002			2011
Belgium	2002			2005
Ireland	March 2001			2010

Table 5. Progress of DTT in Europe. Source: EBU (European Broadcasting Union) estimates.

This situation has given rise to the DTT penetration figures in Europe shown in the following table.

DTT penetration and number of homes expressed in thousands.								
	1998	1999	2000	2001	2002	2003	2004	Penetration
United Kingdom	247	552	774	1.217	1.260	1.400	3.000	12.0%
Sweden		15	35	83	100	140	200	4.8%
Spain			3	150	150	130	130	1.0%
Finland				5	10	97	300	13.1%
Germany						120	170	0.5%
Netherlands						3	12	0.2%
Italy							25	0.1%
	247	567	812	1,455	1,520	1,890	3,837	

Table 6. DTT penetration. Source: EBU (European Broadcasting Union) estimates.

⁵ According to the Digital Terrestrial Television Action Plan on the deregulation of cable television and promotion of pluralism that the Government passed on 4th February 2005, the deadline for the transition period to Digital Terrestrial Television is brought forward 2 years (start of 2010 instead of January 2012).

3.1.2. DTT in Spain

The approach initially chosen to stimulate DTT in Spain was to assign the available spectrum to a digital pay platform, in the case of Spain, to Quiero TV, giving it the role of being ultimately responsible for promoting DTT. This operator's content offering should have motivated the adaptation of the viewers' reception systems, thus taking a crucial step towards the deployment of DTT in Spain. Said operator made huge investments and a great promotional effort. In spite of this the model failed, leaving a total number of approximately 100,000 installed decoders, a figure greatly below the initial expectations.

The failure suffered by the pay platform left the new digital distributors, Veo TV and NET TV in a complicated situation. They had the obligation of broadcasting to a practically non-existent market and with zero expectations of growth. This completely limited the possibility of attracting the necessary advertising investment which would enable and justify the acquisition of quality contents. In view of this situation, the distributors Veo TV and NET TV considered it to be impossible to offer the agreed programmes and therefore just maintain the broadcasts by retransmitting specialised thematic channels and collections of music videos.

The private analogue television licensees, Antena 3 and Tele 5, consider that the period of *simulcast* (simultaneous transmission in analogue and digital) involves a forced cost with no compensation which is of no benefit to them, as they cannot find the means to profit from the efforts made based on a very small audience and are incapable of attracting the advertising investment which justifies the transmissions.

The situation arising after the disappearance of Quiero TV, is a **deadlock situation** where the non-existence of an attractive content offering for viewers does not generate a demand for receiving equipment and, without these, the broadcasts are destined for a non-existent audience which is incapable of attracting advertising investment and, therefore, there is no possibility of establishing a sustainable business model.

3.1.3. Transition Models

Before carefully analysing the perspectives for DTT in Spain, it is of interest to evaluate the situation in the neighbouring countries, in particular those with similarities to the Spanish case, such as the United Kingdom and Italy.

United Kingdom

The case of the United Kingdom is of special interest as it offers the possibility of drawing conclusions from that which occurred in a scenario which, in addition to starting from a terrestrial television penetration situation similar to the case of Spain, has followed a very similar launch framework and initial evolution.

Just six months after undergoing a similar process to Spain, with the failure and disappearance of the digital terrestrial television pay platform which should have stimulated the development of DTT in the United Kingdom, the Executive awarded the transmission capacity freed by the closure of said operator to a platform called Freeview. It is a commercial brand created to use the new DTT license formed by the BBC and the most important private operators (BskyB and Crown Castle). This brand has created great expectations of success since it started broadcasting in October 2002. That success lies in its content offering, comprised of a line-up of free television and radio channels and of a series of interactive services of a very basic nature, which the viewers can access after buying receiving equipment costing approximately £50.

Freeview's experience, at least up to now, is showing the effectiveness of changing the pay business model for a free-to-air model. The British viewer is responding favourably to a free content offering, with a very basic level of interactive digital services, accessed by a one-off payment of a modest amount for the cost of the receiving equipment.

In September 2004, DTT penetration reached 3.9 million homes. Together with the other digital platforms, this comes to 57% television digitization in the total households.

Italy

In Italy, DTT has been launched in response to the urgent need (following statements issued by the European Commission) to solve a serious problem of audiovisual sector concentration at the hands of the Mediaset group. DTT and the increase in the plurality this entails, with the entrance of new players, may permit a certain dilution of the audience concentration and a partial solution of the problem.

The Italian model emphasises the role of DTT as a technology that provides access to electronic administration services and the Information Society in general and which, therefore, can contribute to the reduction in the digital divide. The DTT model in Italy is a mixed model, i.e. free-to-air channels and pay content. The launch strategy adopted by the Italian Executive is that which can be considered most direct from among those studied, as funds for a value of 120 million euros have been dedicated to subsidising the purchase of user receiving equipment. This subsidy has been in effect since February 2004 and is limited to the first 700,000 buyers or, in other words, a subsidy of €150 per unit (only units which support MHP are subsidised).

With the lowering of prices from the initial €200 to €150, said subsidy means that the citizens can acquire the equipment at no cost for them. With a receiving equipment rate of sales of 3,000 sets/day, by the end of 2004, the 700,000 subsidised sets were reached. At the start of 2005, the new programme to promote DTT was transformed, subsidising around €70 per set, up to a total of one and a half million sets. The Italian government clearly hopes that the digital model will be consolidated in 2006.

With regard to contents, Mediaset and Telecom Italy started offering pay-per-view football from the end of January 2005. It is a model which is based not on subscription but on pre-payment based and on a model of topping up at cash dispensers or buying cards in tobacconists and sending codes by SMS. As a promotional offer, each football match costs 3 euros. Furthermore, the RAI is cooperating with numerous public national and regional authorities with the aim of launching T-government services (Rai Utile channel), which requires the regionalization of the model in order to provide capacity to local government services.

France

July 2002, the French government commissioned an audit to examine the aspects affecting the introduction of DTT, especially regarding financial matters. The result of the public report published in October 2002 highlights the fact that it is necessary for the government to immediately take a stance with respect to DTT, and indicates that the debate should be restarted on the role of the French public service television. Something similar to what is happening in the Spanish case.

In view of the report's conclusions, the CSA (Higher Council for the Audiovisual Sector) announced the launch of 14 free channels and another 14 pay channels in 2005. The planned coverage is 35% in March and up to 65% in September, with a mixed free-to-air/pay platform model. The free-to-air service will be available in March 2005 and the pay service will be available in September 2005. This model has aroused great opposition from the private broadcasters.

The French case of DTT launch is striking due to the fact that the industry is asking the Executive to leave one of the multiplexes free to experiment with DVB-H technologies. This interest may reveal the intention of promoting an industrial policy around this television technology.

Germany

The case of Germany is very different to the cases of Spain and the United Kingdom due to the initial situation characterised by this country's low penetration of terrestrial analogue television. For this reason, the case of Germany is analysed here with the aim of reflecting a model to introduce DTT different to that followed by most countries, rather than to be able to draw conclusions and lessons applicable to the Spanish case. Furthermore, the reason which has stimulated the process of migration to digital terrestrial technology seems to be exclusively that of freeing the radioelectric spectrum, despite the fact that it has also been capable of identifying a DTT promotion model and business model for the important German industry associated to the car sector.

As has been mentioned, the case of Germany is particularly interesting due to the lever used to introduce the DTT model, consisting of using the possibilities of mobile and portable reception enabled by this technology. Thanks to this, the German car industry has found a new sales argument and has launched a large catalogue of receiving equipment for cars and a campaign associated to said launches.

DTT was launched in Germany in August 2003 with the transition of the analogue model to the digital terrestrial television model in Berlin. The transition mode is based on the switch-off concept, starting with the transmission of 24 television channels. The implementation process in the first regions of Germany has been successful and no important technical problems have occurred in the migration process. The receiving equipment sales expectations were around 1.2 million units at the end of 2004 and DTT coverage in 38 million inhabitants.

3.2. Positioning of the players

3.2.1. Television Licensees

With the aim of establishing the sensitivity of the television distributors, it is necessary to consider that the increase in the number of programmes that DTT will provide will cause audience fragmentation and, therefore, greater fragmentation of advertising investment, i.e. more channels among which to distribute the total investment and, consequently, a smaller portion for each one of them.

Private analogue licensees have criticised the imposed obligation of transmitting in digital, as it involves a cost for them with no possible compensation as there is not a large enough potential audience. Nevertheless, and in spite of the above, these operators have been demanding an increase in the transmission capacity awarded to them for digital transmission. They argued that the bandwidth currently available to them did not allow them to offer new services, or even guarantee the quality of transmissions, at the same standard currently offered with analogue technology.

Unexpectedly, and regardless of the Authority, the licensees Antena 3 and Tele 5 have changed their positioning with respect to DTT. Under the protection of a common strategy, they demand the government to involve itself in a quick transition to digital terrestrial television instead of granting new licenses for analogue transmission. These players' stance can be summarised in terms of supporting the acceleration of the digitization process and bringing forward the switch-off. The reasons for this new positioning may lie in the fear that the government may extend Canal+'s license for free-to-air transmission, privatise one of the channels of the Spanish public service television *Televisión Española* and further grant new analogue licenses to other communication groups such as Vocento or Godó or even to the DTT distributors, Veo TV and NET TV. The irruption of all these players onto the analogue scene would cause greater concurrence in the advertising investment distribution and a foreseeable reduction in the share corresponding to each one of the licensees.

As regards the private licensees, NET TV and Veo TV, they have recently obtained a moratorium by the Authority which flexibilises the transmission obligations assumed by signing the corresponding licenses. The new regulatory situation lowers their coverage obligations from 80% to 25% of the national population until January 2007, so that, at present, its transmissions only reach the provinces of Madrid, Barcelona and Valencia.



3.2.2. Receiving Equipment Manufacturers

DTT represents a very important opportunity for the receiving equipment manufacturing industry. In the long term, it involves the replacement of the approximately 26 million analogue televisions currently in use by digital equipment and, in the short and medium term, a massive demand for set-top boxes⁶ which enable the digital television signal and the associated interactive services to be received in the existing analogue stock of televisions.

This sector of the industry considers itself to be seriously harmed by the historic action of the Executive regarding DTT. In September 2003, complying with the acquired commitment, they put the first digital receiving equipment (STB, Set-top Box) and the first models of digital televisions with integrated receiving module (iDTV) on the market. This led to them incurring serious financial losses and problems with the chain of distribution as the agreed DTT launch did not come about and, therefore, neither did the corresponding demand for this type of equipment by the consumers.

Initially, the industry does not consider it vital for the Authority to subsidy all or part of the user receiving equipment, since the scale economies which are being obtained with the consolidation of other European DTT markets are permitting prices to be lowered which will eliminate the cost of said equipment from the list of access barriers to DTT. By next year, the manufacturers foresee that they will have reached scale economies which permit the availability of basic equipment at an approximate price of €80 and MHP equipment at €180 on the Spanish market.

3.2.3. Application developers

The opportunity of DTT is evident for application developers. This lies in the need to create interactive contents for a large group of television licensees, in addition to the migration of the most important services of the Information Society such as Electronic Administration or general information services, among others, to these new platforms.

Furthermore, and as has been indicated above, due to the fact that Spain is one of the pioneering countries, there is the opportunity to promote the creation of a powerful application development industry with the possibility of exporting to other European countries further behind in the DTT implementation process.

3.2.4. Signal reception system industry

In Spain, receiver installations constitute one of the most important barriers to the definitive launch of DTT due to the poor condition of a high percentage of them. The situation of the installations in Spanish homes located in towns of more than 50,000 inhabitants, and excluding detached houses (a total of 13.4 million houses) can be segmented in the following way⁷:

⁶ Equipment which permits receiving the digital television signal, and its presentation in both analogue and digital television sets.



Residential buildings whose construction licenses were granted after the coming into force of the RD 279/99 on ICT. Equipped with ICT plans and perfectly prepared to receive the DTT signal.	< 10% of the total
Residential homes with non-ICT community antennae.	> 90% of the total
>> Approximately 3% of the buildings have broadband amplifiers.	Approx. 3%
>> The remaining 87% have modular equipment systems.	Approx. 87%
> They have lines of sockets for each one of the homes in derivation mode.	Approx. 42%
> They have lines of sockets for each of the homes in serial or cascade mode.	Approx. 45%

The real difficulty is represented by the buildings that have a serial or cascade community installation which, as has been mentioned, is present in no less than 45% of the total. This type of buildings should undergo a specific individual study, and therefore, it is impossible to quantify, even approximately, the amount of the interventions.

As regards subsidies, although the industry does not consider a scenario where the Government subsidises the decoders (as the Italian Government is doing) to be necessary, it perceives it to be practically essential that the Authority focuses on facilitating the updating of the community signal receiving and distribution installations in residential buildings in some way (tax relief, subsidies, etc.).

Finally, it is necessary to introduce an explanation of the problem posed by the reception and distribution of the digital terrestrial television signal. Attention must be paid to the case of Berlin, where a high percentage of portable-type coverage has been obtained, i.e. by desktop antennae. This model is of great interest since using a very low-cost antenna can avoid interventions having to be performed on the community receiving and distribution system in the homes. This possibility could definitely contribute to reducing the problems in the complexity and adaptation cost of the receiving systems for launching DTT. For this, it will be necessary to evaluate the percentage of homes for which this type of reception will be possible and to study the broadcasting network to enable portable reception.

⁷ Data obtained from the report "Adaptación DTT en edificios de viviendas acogidos al régimen de propiedad horizontal" by FENITEL (Federation of Telecommunications Installers). February 2003.

3.3. Business models

3.3.1. Free-to-air television vs. pay television

The failure of the pay television model of Quiero TV, and the success of the Freeview platform in the United Kingdom with a free-to view television model, have largely led to the opinion that the only feasible model for DTT in Spain is free-to-air multi-channel TV.

Nevertheless, it is noteworthy that in other markets, such as Italy, France, and even the United Kingdom, pay options are being incorporated in the DTT offering. In the Spanish case, the subscription charge-based pay television option has already shown insufficient attraction with the Quiero TV experiment. However, per-per-view or for content, which complements the largely free-to-air content may appear. These services, which would in no case depend on a subscription charge, may attain a certain level of development in the Spanish market. The distribution of the available channels should permit the players to incorporate these pay services into their offerings.

3.3.2. Advertising revenue

DTT represents the multiplication of the channels and players operating in the Spanish television sector. In this scenario, it is interesting to assess the impact that the audience distribution given by this new situation would have on advertising revenue distribution.

If the national DTT channels were only distributed between the current national channels and the current DTT licensees (Net Tv and Veo Tv), the free-to-air channels' effect on advertising revenue could be quite limited. These channels would share out a market which still has a certain growth path as a result of unsatisfied demand due to lack of space, and the foreseeable advertising limits which will be imposed on the public service channels. In this scenario, each player would maintain a share, more or less similar to the one they currently have, although shared out between a higher number of channels.

Nevertheless, if the DTT channel distribution introduces new competitors in the national free-to-air TV market, the advertising business should be distributed among more companies and would have significant economic effects. Even in the scenario described in the previous paragraph, the irruption onto the scene of Net TV and Veo TV, who could compete in a largely digital market, would lead to distribution between more companies.

The scenario considered as most likely is limiting advertising in the public service channels, as is gathered from the judgement of the "committee of wise men", and the distribution of national DTT channels among the current national channels and the current DTT licensees. Even though it may be considered that this scenario has a limited effect on the current players' business, the new possibilities of digital television, as well as the emergence of new business models, which will be described in the following chapter, force the current players to adapt and modify their business models if they want to be successful in the new digital scenario. Chapter 6 shows the projection scenarios of the advertising market between the different players in the 2005 – 2008 period

3.3.3. Alliances with other players

Supplementing the television offering with a set of easy-to-use interactive services will help to improve the perception that DTT is different to traditional analogue television. In any case, we should point out that digital satellite already offers this type of services and, therefore, is not differentiated from the DTT platform. However, this will probably be the only one offering them over free-to-air content.

The DTT platform is a low-interactivity option, even with the facilities of the more advanced user terminals. This weakness, shared with platforms such as satellite, is a disadvantage with respect to the new video and television platforms broadcasting over broadband access. Nevertheless, the combination of television access user terminals via DTT, and the use of broadband access as a return channel, in alliance with telecommunications operators, may mean an option which provides advantages to both operators.

The operators, the manufacturers and the IT industry have already made a firm commitment on a global level to carry Internet navigation, multimedia applications and IP communications to the television, so that the television becomes the entertainment centre of the home and eliminates the access barrier to the Information society that is the need to own a PC. In this strategy, the combination of the DTT offering and the broadband access offering may be a relevant option. DTT operators can launch their own offering of an advanced triple-play terminal, using third party broadband and VoIP services, or go into partnership with telecommunications operators, entrants in the triple-play offering, to provide the component of television in their commercial services.

3.4. Promotion of DTT in Spain

The failure suffered by the “Quiero TV” platform and the consequent loss of its license and the spectral capacity assigned to it, produced a situation of transmission capacity availability. Now more than ever, the real possibility of creating a free-to-air DTT platform similar to the one launched in the United Kingdom is being considered.

The speed of adoption of DTT, and therefore, its feasibility, depends on a virtuous circle of development being generated. This can be described in the following way:

1. Pressure of the analogue switch-off date
2. Deployment of an interesting content offering, both an attractive channel line-up and an offering of supplementary services from DTT equipment (Video on demand, MHP content for information, broadband connectivity for the television set,...).

3. Buying decoders or equipment (TVs, DVD,...) with incorporated decoders at reasonable prices. Ease of adaptation of community antenna installations, and impetus from a promotional campaign by a DTT body, similar to the role played by Freeview in the United Kingdom.
4. Generation of advertising revenue for the channels.

Three crucial matters must be tackled to again stimulate DTT in Spain, and generate the virtuous circle of development: the distribution of the multiplex between players capable of offering quality content, the adaptation of community antenna installations and lowering the price of the receiving equipment.

3.4.1. Multiplex distribution

The distribution of the transmission capacity freed by Quiero TV constitutes, in the view of all players involved, the event that should start the real, definitive launch of DTT in Spain.

Two levels of availability must be distinguished in the transmission capacity. On the one hand, for national coverage, the spectrum freeing which has taken place has generated the availability of a *multifrequency multiplex*⁸ that currently transports the signal of the five television licensees that also broadcast in analogue in a simulcast situation, and *four single-frequency multiplexes*⁹ with national coverage which are currently only occupied by the signals of the licensees Veo TV and NET TV with different programmes that do not cover the commitments assumed in relation to the content offering. Thus, in this situation there are **three and a half multiplexes** free that provide capacity to broadcast up to **14 new digital terrestrial television channels**.

The multiplex distribution is the key decision, as it must be ensured that the distributor(s) will be suitable to provide channels with quality content that will attract users to this new television. The following figure shows some of the distribution alternatives.

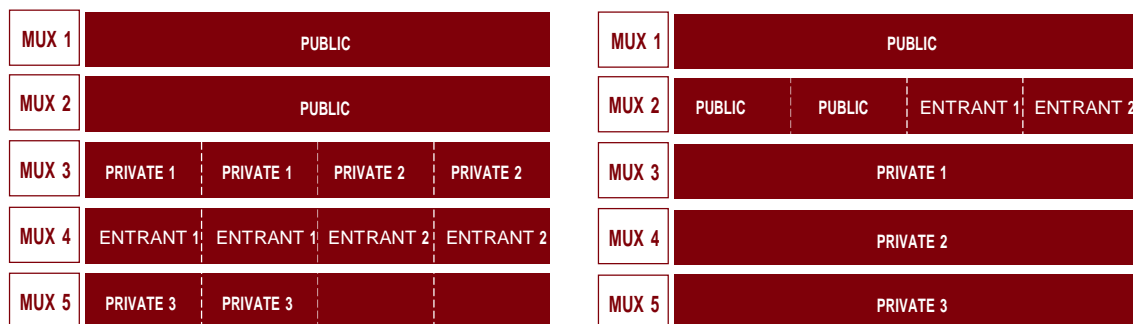


Figure 6. Multiplex distribution. Televisión Española leads DTT (left) and Private leads DTT (right)

⁸ Those which, due to their frequency planning, permit disconnections abiding by geographic criteria.

⁹ Those which, due to their frequency planning, do not permit disconnections abiding by geographic criteria.

The figure on the left shows a scenario where public service television leads the DTT impetus, for which reason it is assigned two full multiplexes. This option, backed by the BBC's success in the British market, has considerable advantages, as Televisión Española has the best catalogue of audiovisual works in stock, which lets it effortlessly create a line-up of quality thematic channels. Against the sustainability of this model, we encounter the fact that this will probably involve additional financing requirements to tackle the acquisition of new rights on attractive content, in a context where the policy adopted is aimed at reducing its deficit and where the financing model of public service television is beginning to be reconsidered.

The figure on the right shows the option where it is the current private distributors that lead the DTT impetus. They initially seem the best-prepared players to form an attractive programme line-up. Nevertheless, as has been mentioned above, it does not seem probable, at least until now, that these players would face the loss period that it is presumed the launch of the digital platform would involve, together with the costs that broadcasting in simulcast involve for them. The recent events and the communication campaign initiated by two of these distributors who have formed a united front (Antena 3 and Tele 5) result in a change in the situation making us catch a glimpse of the possibility that it will be these players who will stimulate DTT in Spain, after being granted a full multiplex licence.

Other situations can be considered, where it is the new entrants which lead the impetus, and even that room is made for new players in the multiplex distribution.

Digital Terrestrial Television Action Plan

In this context, the Government passed a Digital Terrestrial Television Action Plan on 4 February 2005 to deregulate cable television and promote pluralism. This aims to make 22 free-to-air programmes in DTT accessible for the citizens by the end of 2005.

This plan brings the deadline of the transition to Digital Terrestrial Television forward by two years. The analogue switch-off will be performed at the start of 2010 instead of on 1 January 2012. The planned launch dates of national, regional and local digital televisions are the following:

- Regional: after January 2005
- State: new programmes in autumn 2005
- Local: From August 2005 to 1 January 2008

It is also worthy to note that the commission to monitor the transition to digital television was officially established on 22 February 2005. It is comprised of the audiovisual sector players and presided by the Secretary of State for Telecommunications and the Information Society. This Commission's mission will be to agree on the measures that should be taken to give impetus to digital terrestrial television in Spain, as well as to prepare the strategy for the transition process, which should culminate in the analogue switch-off planned for 2010.

3.4.2. Community installations

Secondly, it is necessary to become aware of the problem posed by the signal receiving and distribution installations, in the case of Spanish residential buildings and look for the possible means to resolve it.

We should consider the possibility of facilitating the renewal of said installations via the Authorities' own mechanisms, such as establishing tax advantages or granting subsidies for the most problematic or onerous installations, which form approximately 45% of the total.

It is also important to establish a tight collaboration framework between COIT, FENITEL and the professional property administration associations in order to establish a transparent situation which generates confidence among the citizens and helps to prevent a type of fraud which could flourish under the protection of the Digital Terrestrial Television situation.

As mentioned above, it will be necessary to study the possibilities offered by portable reception using a desktop antenna as a highly relevant facilitating element.

3.4.3. Receiving equipment

In third place the price of the receiving equipment should to be at a level which avoids direct rejection by potential viewers. We have the example of the United Kingdom where it has been demonstrated that the emergence of receiving equipment with a price below £100 has meant an important growth of more than 50 % in their sales.

According to the equipment manufacturing industry, the scale economies which have already been reached to this effect allow sufficiently low prices to be fixed so that buying the receiver does not present a significant access barrier to DTT.

It is important to stress the promotion of buying receiving equipment which enables at least a basic level of interactivity (at least local interactivity) in order to make use of the possibilities of access to the Information Society services permitted by DTT. The case of Italy serves as an example. Here the Executive is only subsidising receiving equipment equipped with MHP, in order to ensure that DTT facilitates access to the Information Society to a very large percentage of the population.

4. DIGITAL VIDEO AND IPTV

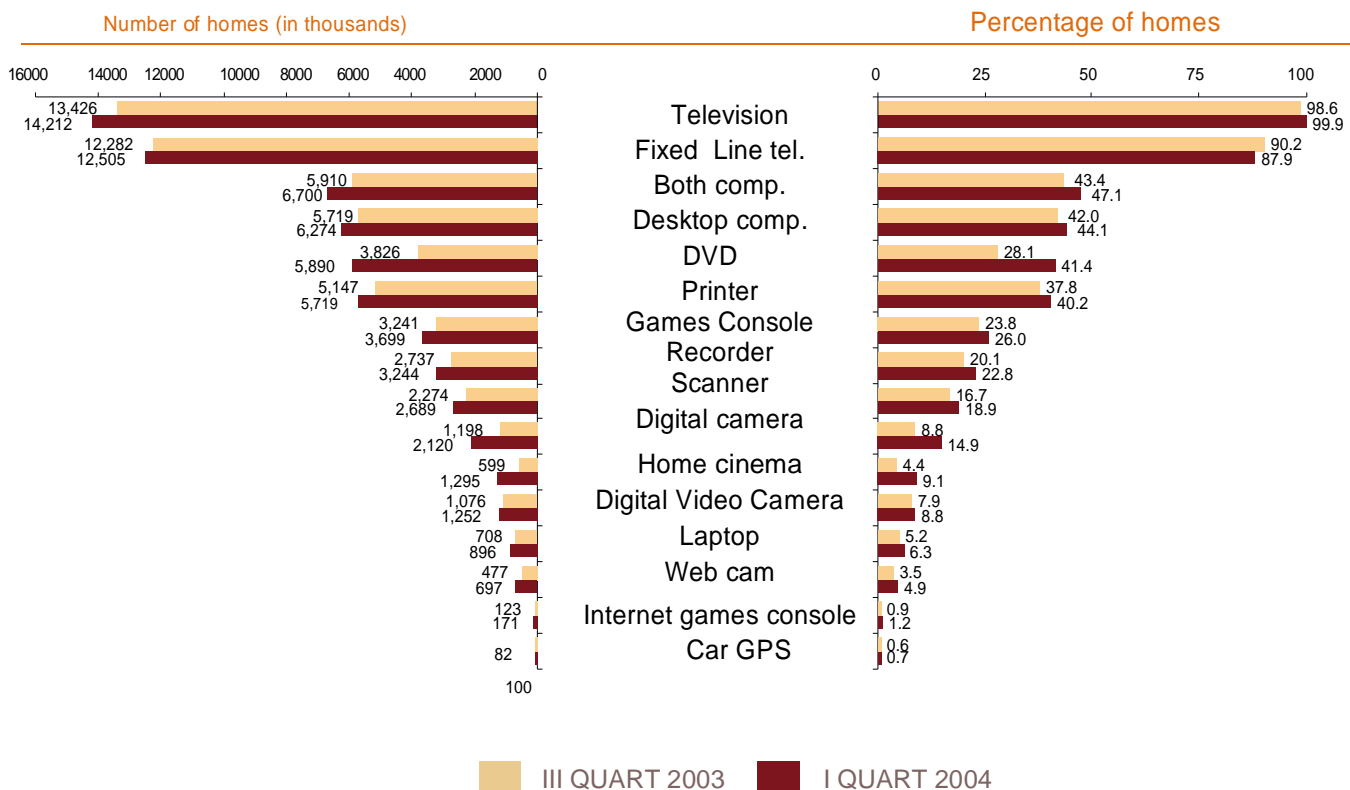
The previous chapters have shown digital television as an evolution of television as we know it today, where digitization permits a greater channel line-up, better technical quality and the introduction of interactive services. If, we add the advance of the penetration of Internet broadband access in the home, in addition to the unstoppable spread of Internet and IP technology, to this process, the effect on the television model is even more breakthrough, giving rise to new forms of television. This chapter analyses these new forms of television.

4.1. Perspectives for the new services

4.1.1. The road to digital video services

If we analyse television as a means to use and distribute content, from the user's point of view, it shares this situation with others sources of leisure and entertainment: computer, games console, DVD... The penetration of this type of equipment is ever increasing in the home, gradually creating the "digital home". ICT equipment penetration in Spanish homes, according to the demand study carried out by Red.es "Las TIC los hogares españoles" (ICT in Spanish homes)", is shown in the following figure.

Figure 7. ICT equipment in the home

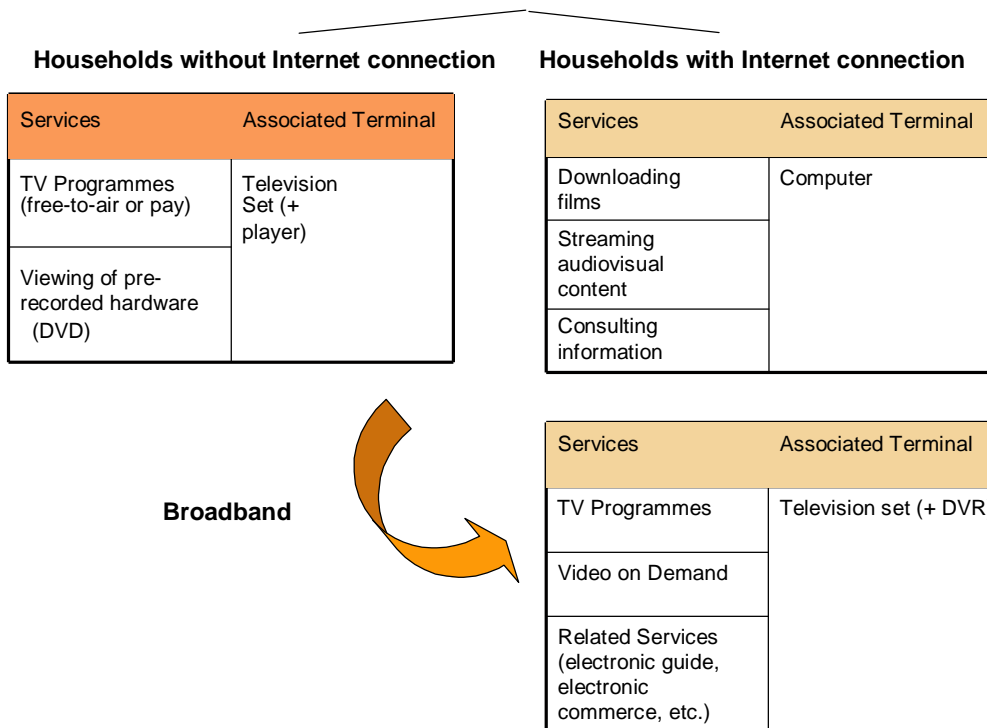


The entertainment and leisure industry has not remained untouched by the arrival of Internet. In those homes without Internet connection, the leisure activity related to viewing audiovisual content is centred on free-to-air and pay TV channels, and in renting or buying pre-recorded hardware content (VHS in the analogue scenario, DVD in the digital scenario). The user terminal in both cases is the television, and a player enables the hardware content to be viewed.

In homes connected to internet, the users can perform activities related to audiovisual content such as downloading films, streaming audiovisual files and a series of related information services (consulting the TV guide, information on cinema/show entertainment). In this case, the computer is the user terminal.

The arrival of broadband to homes opens new possibilities for audiovisual content services. These new services are generically called digital video distribution services.

Distribution of audiovisual content in the home



The traditional separation and barrier between voice, data and television services is disappearing with the development of broadband. The “digital home” or the “connected home” is the materialization of this idea of service convergence: entertainment, communications, digital management of the home and infrastructures and equipment management.

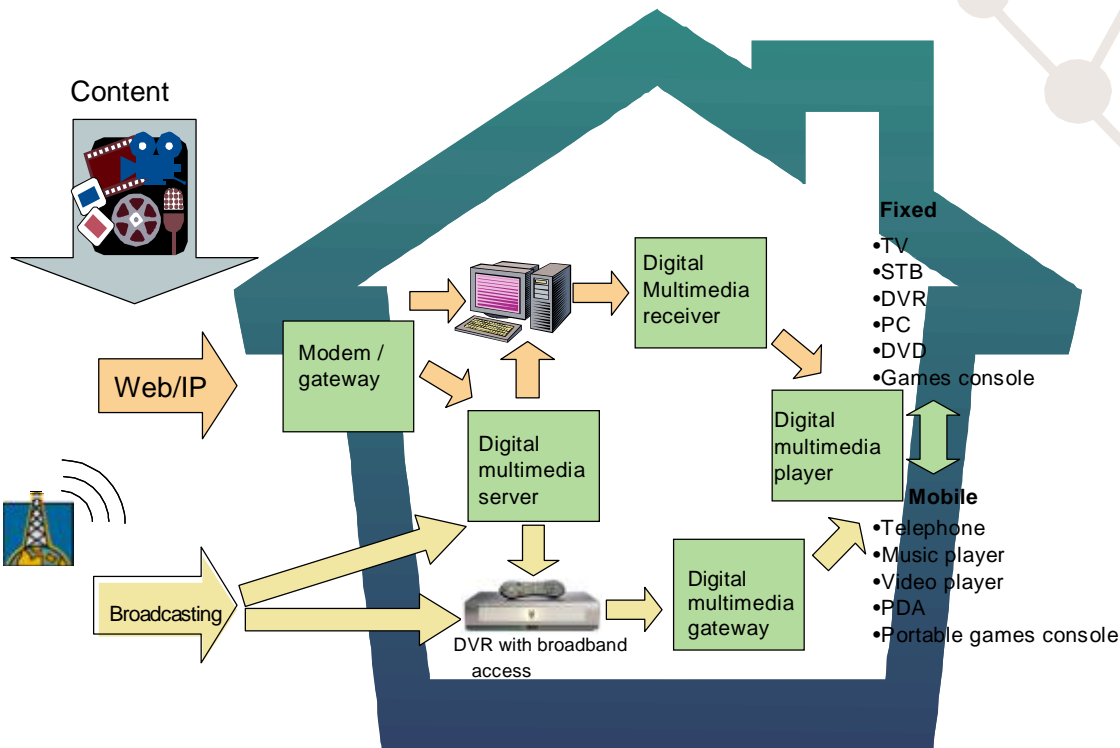


Figure 8. The “connected home”

Source: Own calculations from EITO 2005

In the rapid advance of the audiovisual content broadcasting services, different digital video distribution services, which provide different levels of choice and interactivity to the user, have been introduced. The following table shows a comparison of the most relevant services in accordance with four parameters: description of the service, content type, whether or not they have associated interactive applications and the transmission mode.

Digital Video Distribution			
Parameter	Television over IP (TVoIP)	Near Video on Demand (NVoD)	Demand (NVOD) VoD ¹⁰
Description of the service	Broadcasting digital television channels via broadband connection using Internet Protocol (IP). It is a similar service to traditional TV broadcasting.	The content is broadcast simultaneously on various channels at fixed time intervals (typically 15 or 30 minutes). This service does not involve the use of interactive options.	This service allows access to the catalogue of audiovisual content and allows you to control how it is played (pause, ff) in a similar way to playing a pre-recorded medium (i.e. DVD).
Content type	TV Channels	TV Programmes and digital audiovisual content	TV Programmes and digital audiovisual content
Interactive applications	NO	NO	YES
Transmission Mode	Broadcasting at scheduled hours	Broadcasting with repetition at fixed time intervals	A la carte

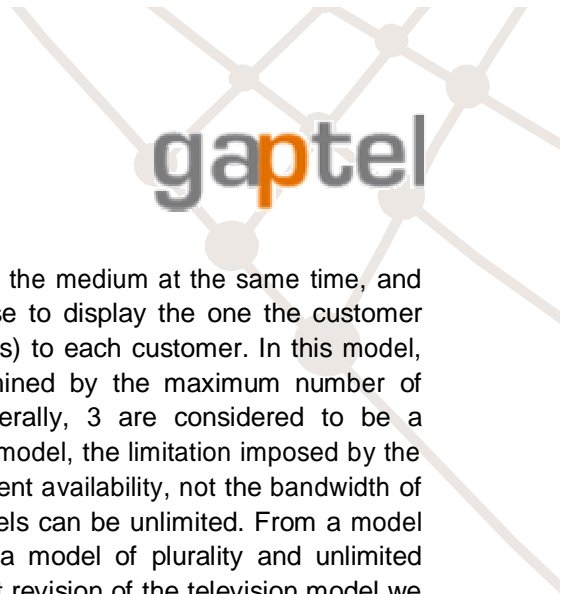
Table 7. Comparison of parameters of digital video distribution services

The return channel provided by broadband enables a series of services additional to the simple distribution of video digital to be generated. These range from the most basic (an information system), to electronic commerce services, which convert the television set in a means to make purchases and electronic transactions.

4.1.2. Broadcasting vs. content access

The main differentiating element of the new forms of television is that it is not conceived as a broadcasting service, but as an audiovisual content access service. This apparent nuance means that the number of channels the user can access is no longer limited by the bandwidth of the transmission media, whether it is the assigned spectrum (satellite, DTT,...) or cable (in traditional cable networks).

¹⁰ The VoD service has two main variants: *Streaming* VoD, where the content is stored on the network and is consumed in real time by the user, and *download* VoD, where the content is downloaded to a set-top box with hard drive (DVR functionality) in the customer's home and is played by the user on his player. There are two download VoD modes: "Queue and View" or Push (automatic download to the hard drive to be later viewed) and Individual downloads or Pull (only downloads requested by the user are downloaded).



In the classic broadcasting model, all channels are broadcast over the medium at the same time, and they all reach all customers. The receiving equipment will choose to display the one the customer selects. The access model only broadcasts the selected channel(s) to each customer. In this model, the necessary bandwidth in the access network will be determined by the maximum number of channels the customer/home can access simultaneously. Generally, 3 are considered to be a reasonable upper limit, with 1 being the most typical value. In this model, the limitation imposed by the bandwidth of the medium disappears. The limit is imposed by content availability, not the bandwidth of the medium it is broadcasted over, whereby the number of channels can be unlimited. From a model based on a limited resource, such as the spectrum, we go to a model of plurality and unlimited channels. We can predict that this change will involve an important revision of the television model we know today in the medium and long term.

4.1.3. Television and Internet convergence

Video or television over IP are destined to form the next great step in the unstoppable process of “*everything over IP*”. If it has been the concept and the first deployments of the *VoIP* (voice over IP) service that has caused the start of important transformations in the telecommunications sector in the last few years, everything indicates that 2005 will mark the start of new transformations in this market around television and video services.

As we have already analysed in the report on Broadband¹¹, the Triple-Play offering, with voice, broadband and television, has become the basic requirement to be able to compete in the telecommunications market. In this offering, many operators are reaching the conclusion that it is television that marks the differential value, since the other two elements, voice and broadband, tend to rapidly become a commodity. It is television that can enable a better performance of the revenue per customer.

So as to be able to offer Triple-Play, cable operators have incorporated voice in their service and traditional telephone operating companies are starting to offer television services via their ADSL-based broadband structure. It should not come as a surprise that the most important advances in the television over IP offering are occurring in those markets with fiercer competition between the cable and telephone infrastructures.

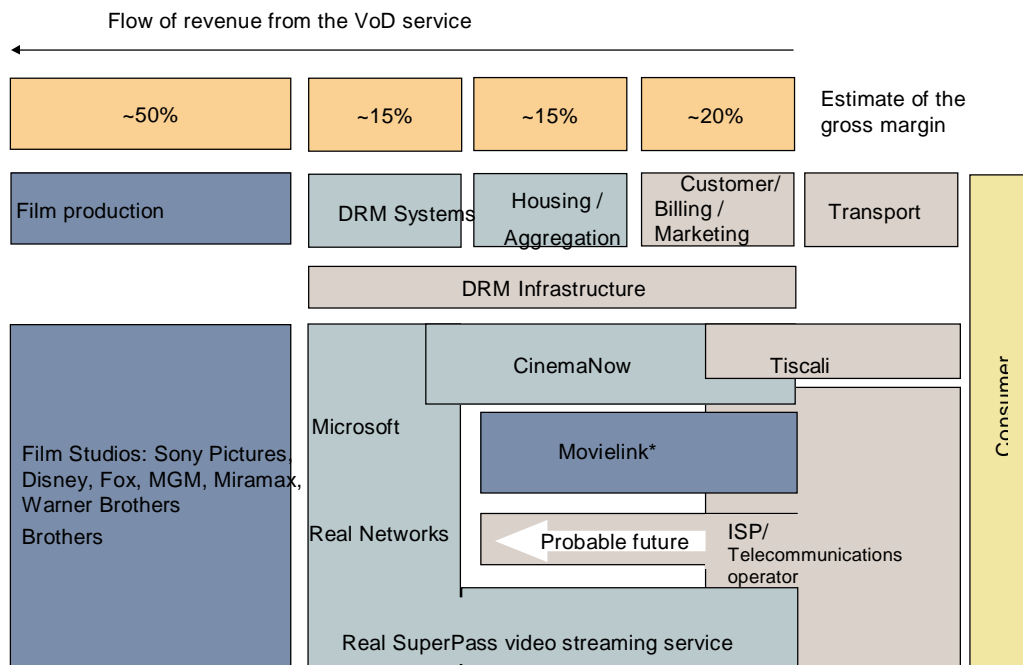
4.1.4. Service Bundling and Integration

Bundling voice, data and television services (triple-play) is laying down the basic requirement to be able to compete in the telecommunications market. This bundling is widespread in the cable operators’ offering, and is recently starting to be incorporated by the fixed operators.

¹¹ Banda Ancha (Broadband), GAPTEL, July 2004.

Competition, based on the same model by fixed operators, would not give greater differentiation. It has initially been the Video on Demand (VoD) service which seems to be the differential value in the operators' new offering. Nevertheless, the digitization process and the evolution to "everything over IP", opens the door to new possibilities. The fact that voice, and video become services offered via broadband connections, over an IP infrastructure, enables evolution from bundling services, separate from one another but jointly billed to the customer, to the integration of services. Here, it is not only the billing that defines the value for the customer, but new possibilities for interaction between these services are opened. A film interrupted to answer a telephone call, video calls using the television,... this is just a brief outline of what the future should hold for us.

Content bundling will have another medium-term consequence, which in countries such as the USA is starting to become a reality: the fight for the customer results in a scenario where the first to attract a customer, takes it all: telephone, broadband connectivity and television. Furthermore, within the multiservice offer, television and services such as VoD may become a key element in the fight for the customer, as they include a very important differential factor - content (ownership of exclusive rights enable the operator to have a differential offer from that of their competitors). Different players are involved in the value chain of a digital video distribution service (such as VoD) as shown in the following figure.



* Only available in the USA.

Source: EITO 2005

4.2. Fixed operators' strategy

We have seen the rising interest of telecommunications operators to incorporate television and Video on Demand services to their offering throughout 2004. This dynamic should form part of the general trend to transform their business models into an entertainment and communications over triple-play offering.

4.2.1. The "triple-play" offering

The concept of triple-play offering (voice, broadband and television) as an essential aspect to be able to compete, has defined the operators' strategies. The progressive loss of the voice business to mobile operators, and the threat of cable operators, which, on incorporating voice, in many cases using VoIP technology, to their offering of television and broadband, bundle a triple-play offering which has proven to be successful with customers, has forced the fixed operators to look for options of incorporating television in their offering and, therefore, be able to compete with the cable offering.

We should also consider that broadband has become the strategic line in the fixed operators' business. One of the main challenges they are going to face, with respect to the revenue they receive for providing ADSL broadband services, is to maintain the ARPU (revenue/user), value for the customer, and the business margins, assuming the trend of increased penetration and price reduction. The challenge for these players (to try to protect the ARPU) lies in preventing the content revenue going to other players in the value chain. The challenge for the operators is to incorporate services and contents of value for the user, with the aim of increasing their revenue and avoiding customer loss. These operators' decision to start providing TV and VoD services should be understood as part of this strategy.

4.2.2. Key reasons to enter the TV market

We can evaluate different reasons, both offensive and defensive, which justify this movement by the fixed operators. The following table summarises the key reasons.

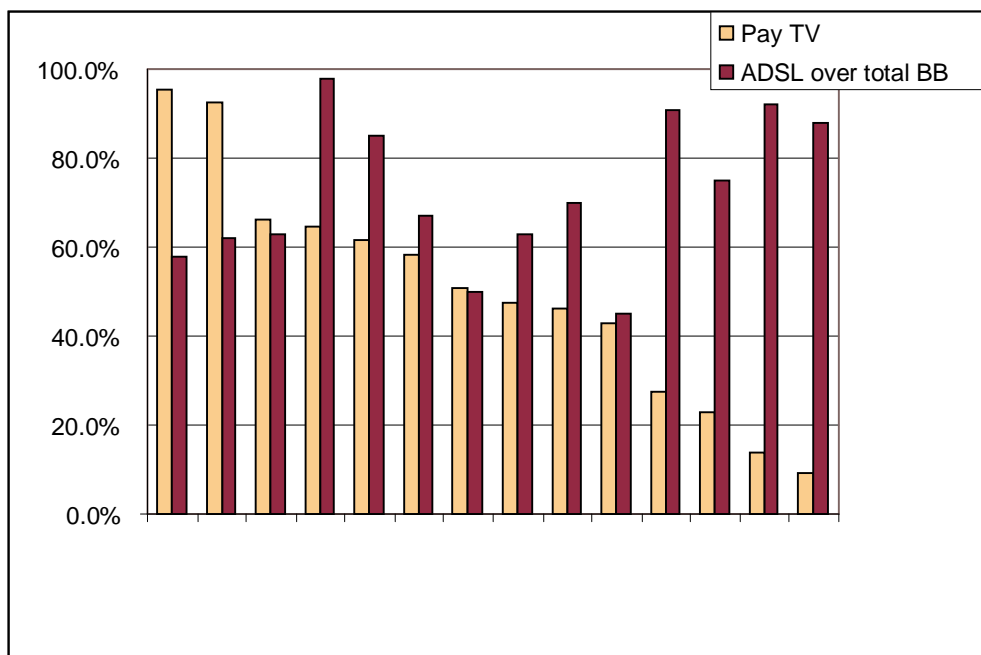
Key reasons to enter the TV market	
Offensive	Defensive
To make use of the existing infrastructure, at reduced scale cost.	To strengthen the relation with customers, reducing the rotation and defending themselves from the risks of VoIP and the service bundles which incorporate the cable operators TV.
To increase the share of the total expenditure of the customers', in particular, their leisure expenses, improving the ARPU.	It allows the incumbent operators to use service bundles, if their TV offering is considered unregulated.
To open a new door to the increase in DSL penetration (a user without PC, would have a DSL service to receive the TV or VoD services).	
To make use of the relation with content owners, within a total television digitization scenario in 2012 in most countries.	

This dynamic is not occurring with the same intensity in all countries. The presence and competition of cable operators is the factor which is determining the greater or lesser aggressiveness in the fixed operators' television strategy. The United States and South Korean markets, where there is very high cable penetration and the competition between cable operators and fixed operators is fierce, shows the greatest advances in the new television services offering.

Defensive reasons motivate the movements of fixed operators in those markets with strong competition with the cable operators or alternative unbundled loop-based operators. In markets with less competition, the offensive reasons will lead this evolution.

4.2.3. Market opportunities

To establish if there is a market opportunity in a country, at least two criteria should be considered: the penetration of pay television, as an indicator of the entrance barrier to the new market, and the penetration of ADSL over the total broadband market, as an indicator of the potential users.



Holland, Belgium, Sweden, Germany, Ireland, Denmark, Austria, United Kingdom, Finland, Portugal, France, Spain, Italy, Greece

Figure 9. Penetration of Pay TV in 2004 and the percentage of ADSL connections over total broadband connections in July 2004

Source: Own calculations from European Commission Data

However, other factors should be considered to determine the market opportunity to provide ADSL TV and VoD services, such as the income capacity of the homes to subscribe to value added services, a preliminary analysis of the figure indicates that there is an opportunity to develop these services in Spain, whilst in other countries such as the United Kingdom, Sweden or Holland, the market conditions show a priori greater difficulties to develop ADSL TV and VoD services.

Not all analysts share this assessment of market opportunity. Paying for the television service is a cultural habit established to different extents in countries. This habit is most widespread in those countries with high cable television penetration (USA, Germany, United Kingdom,...). In those countries where terrestrial analogue free-to-air television predominates, and where this habit of paying is therefore not deeply-rooted in the population, the new forms of television will encounter a difficulty rather than an opportunity in this point. In this analysis, it will be those countries with high cable television penetration, together with low cable broadband penetration, that present a better opportunity. Finland, Sweden, Norway, Germany and Ireland would be most attractive as shown on the following graph.

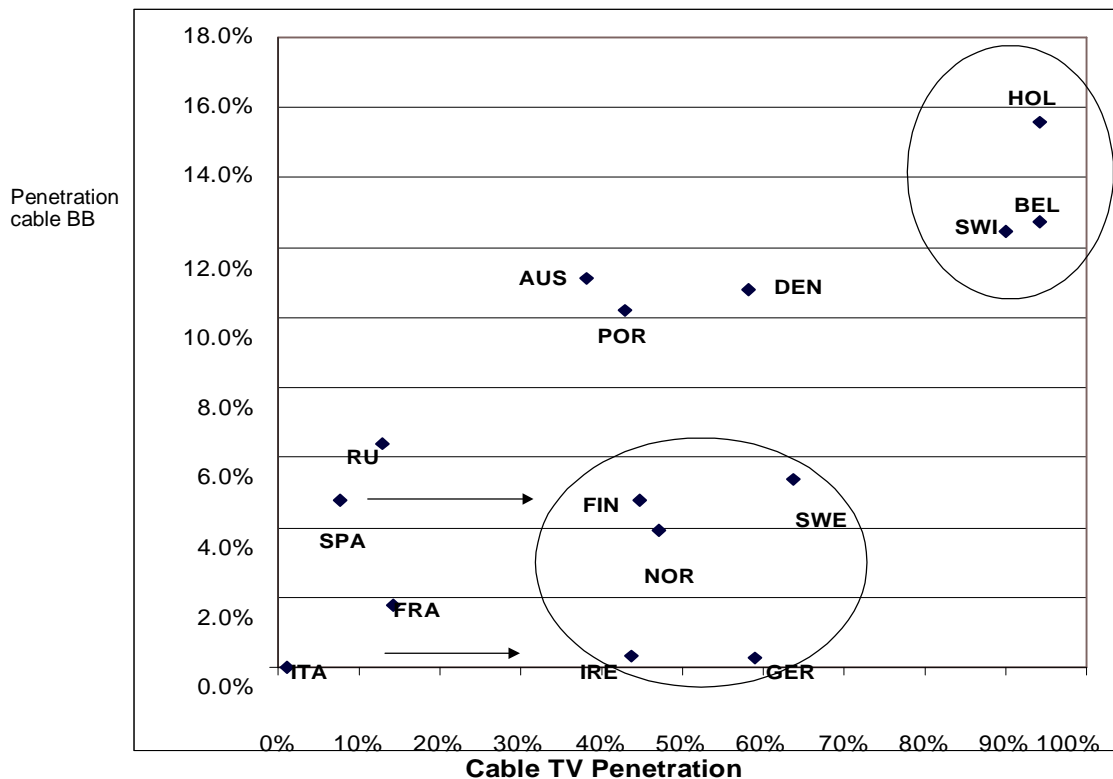


Figure 10. Broadband Cable penetration and cable television penetration of television in 2004

Source: Citigroup. European Telecom: View for 2005

In the Spanish case, this last analysis is considered most appropriate. Spain has an approximately 20% pay television penetration limit which is turning out to be difficult to exceed. The barrier of social habits to pay for television is seen to be a very relevant factor which the new digital video services will have to face.

4.2.4. Strategic decisions

In this business dynamic, three aspects should be evaluated as key strategic operator decisions: the decision on how to incorporate a television service in their offering, the decision on how to dispose of content and the network updating strategy.

Availability of television services offering

Starting from the conviction that the triple-play offering is essential to be able to compete in the market, fixed operators should incorporate television in their traditional voice and data services offering. The operators should evaluate two options, with very different risk levels.

They can choose, as first option, to seek a strategic alliance with DTH or DTT satellite operators. Due to how widespread satellite television is and its limited offering of voice and data, they are a highly interesting ally for the offering of fixed operators. This has been the option initially adopted by all incumbent American operators to compete with the cable operators.

As a second option, the operators would choose to update their telecommunications network, increasing the bandwidth in the access network, to be able to have sufficient bandwidth to provide television services on their network. This is undoubtedly an option involving greater investment and risk. As compensation, it means new digital television services, such as VoD, can be offered and allows the evolution towards real services integration.

Content availability

To form a television offering, the telecommunications operators should have an attractive content offering. The decision on how to choose it is an important strategic decision. The different options involve different risks and the potential revenue levels are also different.

A first option is simply to reach an agreement or alliance with an existing pay TV operator who has the rights to an extensive content offering (typically a satellite operator). This is the strategy France Telecom in France has followed, on forming a partnership with the pay satellite TV operator TPSL, which provides the content for the 'MA Ligne' service.

A second possibility is to package content and launch an own brand offer. This is the strategy followed by Fastweb in Italy and VideoNetworks in the United Kingdom. The investment levels are higher than with the first option, as they are not directly involved with an experienced broadcaster with knowledge of the audiovisual market. As with any brand launch, a large financial effort is also required in commercially launching the service. The telecommunications operator should also provide the set-top box.

The third strategic line is the most aggressive of all those considered, and consists of producing content and/or acquiring the exclusive rights for transmission of certain contents attractive for the audience (films, sport, ...).

In this line, the telecommunications operator is horizontally integrated in the value chain. This is the starting point of cable operators, both in countries where there was cable for the analogue television broadcasting, or in countries like Spain where the cable was deployed later but marketing a content package where the television was a clear differentiating element with respect to the incumbent fixed operator's offering.

All three strategies have a common denominator: when the telecommunications operator decides to start providing TV and VoD distribution services, it needs contents to launch its commercial offer, unlike other businesses like voice and Internet where the operator's main role is provide the user with access to services other players offer.

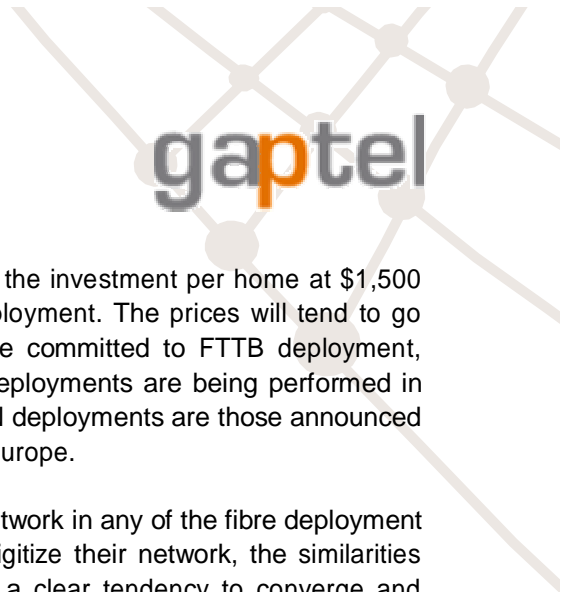
Updating the infrastructures

The decision on which model should be adopted to update the fixed operators' existing infrastructures to enable them to offer television and video services is creating a great debate, especially in those markets with fiercest competition with the cable operators.

The decision should blend the minimum bandwidth necessary to offer voice and Internet services, at least 3 simultaneous TV channels and the length of the copper pairs, which will determine the bandwidth you can get with the different categories of DSL technologies.

Bandwidth requirement is currently set at 20Mbps. This means offering a broadband service of 6Mbps in downward direction and 1 Mbps in upward direction, a voice service (125Kbps in VoIP) and 3–4 simultaneous TV channels, either standard (2Mbps) or high definition in the case of the American market (8 – 10 Mbps). The range of possibilities goes from 6Mbps to 20Mbps but, in general, fixed operators consider that they require 20Mbps to be able to compete with the cable operators. The value of 3 channels is set on the presumption that this will be the maximum number of television receivers in a household. In markets like the American market, where there is particularly fierce competition with cable, the requirement is set at least 30Mbps. This approach should be understood within the need to design a differential service from that of the cable operators, and within the expectations the high definition format is creating.

The network update model, by fibre deployment, is differentiated in the degree of proximity to the end user, distinguishing between FTTB (fibre to the block), FTTP (fibre to the premises), FTTN (fibre to the node). The new advances in DSL technology mean speeds of 20Mbps can be reached on ADSL2+, but for pairs less than 1.5 Km long. The operators will use different deployment models in accordance with how many pairs exceed that 1.5 km limit. The fibre deployments will be more aggressive, the longer the operator's pairs are. In Europe the average length is estimated to be under 2 Km (80% in Italy, 75% in Spain, 50% in the United Kingdom), whilst in USA the pairs tend to be longer (33%).



The estimates made for the American and Canadian market place the investment per home at \$1,500 for FFTP deployment, and between \$300 and \$500 for FTTN deployment. The prices will tend to go down as this market trend accelerates. Very few operators have committed to FTTB deployment, except in particularly propitious markets like Hong-Kong. FFTP deployments are being performed in Korea and Japan, and in the United States to a lesser extent. FTTN deployments are those announced for the United States and which may foreseeably be performed in Europe.

It is interesting to point out that if the fixed operators update their network in any of the fibre deployment categories to offer television services, and the cable operators digitize their network, the similarities between fixed and cable operators will be ever increasing, with a clear tendency to converge and compete in the same markets and on the same network architecture.

4.2.5. Incumbent Fixed Operators

SBC (The United States)

SBC is the main exponent of the American incumbent fixed operators undertaking to incorporate television in their services offering. To do this, both SBC and Verizon have undertaken large projects to update their networks in order to be able to offer video services, and thus compete with the cable operators.

SBC initially signed an agreement with the satellite operator Echostar to incorporate the television service in their offering and be able to complete the triple-play. The fibre deployment plans involve a commitment to investing in network update to be able to offer more advanced video services.

Verizon is the only operator that has maintained its FFTP (fibre to the premises) deployment plan at an estimated cost of \$1,500 per home, and the aim of reaching 2 million homes in 2005. SBC, whose plan was initially similar to Verizon's has committed to the more conventional FTTN (fibre to the node) deployment and ADSL2+ which lowers the cost per home to \$300. SBC's fibre deployment plan, Project Lightspeed, involves a \$5bn investment, with the aim of offering a triple-play service to 18 million homes at the end of 2007. SBC hopes to achieve a 20% pay television market share in 5 years, in the areas where its new network is deployed.

Telefónica (Spain)

Telefónica launched its ADSL TV and VoD service 'Imagenio' at the start of 2004, with an initial test phase in certain geographical areas. Telefónica is now beginning the commercial launch of the service, available in Madrid, Barcelona, Valencia and the Basque Country.

Imagenio offers broadband Internet access from the computer as well as a series of services provided through the television and decoder. Through the service guide, services can be accessed such as the distribution of 36 digital quality TV channels, 15 different stereo audio channels, a video and audio on demand service (called videoclub) with films, series, news, music and documentaries.

Sogecable provides most of the content, although it cannot offer certain contents over which Sogecable holds exclusive rights (football and films). Telefónica is separately negotiating directly with film studios to increase its film offering for the VoD service.

The service subscription has the following offers:

- For users who already have an ADSL connection: free registration and €8.93/month for the TV and Videoclub service plus €6 for the decoder rental.
- For users without ADSL connection: they can exclusively subscribe to the TV and Videoclub for €17€/month (€38.10 for registration fee) plus €6 for the decoder rental.

France Telecom (France)

France Telecom has recently launched an ADSL TV service (Ma Ligne TV service) with initial coverage in France's most important cities and with the strategic aim of gaining 10% of the pay TV market by the end of 2008.

The two most relevant characteristics in the French case are:

- The TV channel broadcasting is provided by the partners of France Telecom (the satellite TV pay platform).
- In the VoD service, France Telecom is the only player that the consumer has contact with, as it manages the offering and the storage of the content from the France Telecom platform.

4.2.6. Alternative Fixed Operators

In many European countries, regulation has favoured that alternative fixed operators' are offering voice (VoIP), television and VoD services together with the ADSL connection, using the loop unbundling mode. It is able to compete with similar offerings to those of the cable operators and with a certain advantage over the incumbent operators that are generally taking longer to bring out similar triple-play packages in their ADSL broadband offering.

The alternative operators are opting for ADSL TV and VoD with a dual purpose: to differentiate their offering from that of the incumbent operator and develop alternative sources of revenue.

Fastweb (Italia)

Fastweb, a telecommunications service company belonging to the e.biscom group, launched a television service over its broadband (FTTH and ADSL) network in the first quarter of 2003.

In March 2004, Fastweb reached the figure of 138,000 customers accessing the company's TV services using a set-top box. From this customer base, approximately 75,000 acquired the TV and VoD service and around 25,000 only use the VoD service. The remaining customers are either waiting to be connected to the service or only receive the minimum free contents included in the basic connection charge (5.40 euros/month). In September 2004, the company already had 161,350 TV customers from a total of 456,000 broadband customers. Therefore, 35% of Fastweb's broadband customers have subscribed to television services.

According to data provided by the company, 20% of its customers do not currently have a PC, meaning they subscribe to broadband connectivity to access the digital video distribution services:

- Broadcasting of the TV signal, with a package to see the 50 channels of the Sky satellite pay television operator and the 10 channels of the Italian digital terrestrial television.
- Video on Demand, with a choice of 5,000 feature films, mainly Hollywood productions.

A series of external determining factors should be borne in mind when analysing Fastweb's success: the lack of cable competition in Italy, the incumbent operator (Telecom Italia) has not yet launched TV/VoD services and a favourable regulatory environment where Fastweb attains the premium content rights from the satellite pay TV operator (Sky Italia) at attractive prices, although it has also reached direct agreements with film studios.

VideoNetworks (UK)

VideoNetworks is an operator which provides a service in the London City area which covers approximately one and a half million homes. This operator's current offering is comprised of 80 TV channels and 1,000 films in VoD (streaming mode).

It began operating in September 2000, using the incumbent British Telecom's wholesale ADSL services. It has recently relaunched its activities with the migration of its customers to unbundled loop. The connection speeds are 512 Kbps (at £27.50/month) and 1 Mbps (at £35/month), bearing in mind that it will offer speeds of 4 Mbps over unbundled loop.

The main milestones in the development of this operator's business for the coming months are:

- The VoIP service incorporated at the end of 2004
- Introduction of MPEG-4 at the start of 2005
- Launching of terminals with DVR to record TV and a download VoD service for the beginning of 2005.
- Gradual increase in service coverage. VideoNetworks plans to invest 75 million pounds to increase coverage to up to 7.8 million homes.

Free (France)

Free is an Iliad group company which has become a relevant player in the French internet access market. In 2002, Free commercially launched its broadband service based on France Telecom's (FT) wholesale offering and started operating in Paris with unbundled access mode. In 2003, Free extended the possibility of unbundling to most of the residential French market. In August it launched the fixed telephone service via the Freebox, Free's ADSL modem, and in December started the audiovisual content offering.

Free launched the ADSL2+ offering in France in October 2004, whereby it aims to consolidate itself as the main broadband television operator. The offering for users in unbundled loop areas incorporates 6Mbps internet access, free national and local fixed telephone calls, and 110 television channels, from which 42 are pay channels and 68 are free channels.

At the end of 2004, Iliad, through its ISP Free, had 17% (1,064,000 customers) of the French broadband market share (6,200,000 customers) and is leader in local loop unbundling with 45% (566,000 lines) of a market which reached 1,590,707 lines at the end of 2004.

On 25 October 2004, Free reached an agreement with the French group Canal+ which meant that the Premium channels, as well as all the CanalsatDSL package channels, could be incorporated in Free's television offering after 24 November 2004. This agreement has allowed Free to complete the free television content offering with a pay offering. In Free's strategy, we should highlight the decided commitment to triple-play, where television, in the most basic mode, is incorporated as a free option which permits access to more than 60 channels. Additionally, a pay channel offering is incorporated, for which free has adopted the strategy of agreement with a pay television operator.

4.3. Cable operators' strategy

4.3.1. Competitive advantages

The triple-play offering has been the main characteristic and the differential value of cable operators in Europe. Their main weakness has been limited geographical coverage. In contrast, in the United States, where the cable operators dominate the television market with over 90% coverage, it has been the lack of voice service which has been limiting the attractiveness of their offering. The incorporation of a VoIP-based voice service by the main American cable operators throughout 2004 has meant a shake-up in the structure of the American telecommunications market, as the cable operators come into direct competition with the fixed operators. They have reacted with plans to deploy fibre which allows them to offer television services, as we have described in the previous section.

The cable operators' great advantage is that they have much greater bandwidth than the fixed operators can obtain with DSL technology. This advantage places them at least 1-2 years ahead whilst the fixed operators deploy their new fibre networks. To attract customers in the combined offering of the three services during this period would consolidate these operators' position and hinder the fixed competitors' plans.

Cable operators also have the important advantage of several years experience in the pay television business. This experience gives them knowledge of elements such as price strategy, designing channel packages, or pay-per-view audiences. Their television service customer base to which they can sell the new services should also be taken as an advantage.

In the new triple-play scenario, the cable operators cannot settle for offering a television broadcasting, broadband and voice service. The incorporation of Video on Demand, and other interactive services, is taken as a basic requirement to be able to compete in the future. In the short term, these operators can offer Near VoD services, which offer greater choice capacity to the user than simply broadcasting the TV signal, but do not meet the interactivity levels of the VoD services.

This new framework requires the cable networks' to develop until the deployed network is fully digitized. In the digitization process, the cable operators initially offer DVB standard-based digital television and DOCSIS standard-based broadband over cable modem. The voice will either be VoIP over the broadband connection, or traditional voice, if the operator deployed copper pairs, as is the case in a large part of the deployments performed in Spain. In this initial model, television is not a service offered over broadband but a differential service.

4.3.2. Situation in Spain

Cable operators have obtained important market shares in those Spanish areas where they operate. Nevertheless, these operators confront two key elements in their business's evolution: limited geographical coverage, and difficulty in accessing attractive content for their television offering.

Cable operators in Spain have shaped themselves, from the start, as alternative telecommunications operators (offering telephone and Internet, with television as a service which enables them to differentiate themselves from the fixed operators' offering), instead of as pay TV operators.

They have developed this strategy for two main reasons: the Spanish users' unwillingness to pay for television and the competition in the Spanish pay television market, largely dominated by satellite. This has, through Sogecable and Audiovisual Sport, the rights to the most attractive content (films and football). The large initial outlay that was necessary to have the most attractive content led cable to opt for an initial strategy of alternative telecommunications operator. This strategy was much less dependent on content to attract customers, and would require a lower initial investment in content.

The arbitral awards of the CMT, after the merger of the digital satellite television platforms, oblige Sogecable to renegotiate the contracts signed to broadcast pay-per-view football matches with the cable operators. In any case, the key to this new situation would be determined by the price at which the cable operators could access their contents, which would doubtlessly complicate the realisation of this decision.

The cable operator has the competitive advantage of greater commercial flexibility, as it is not subject to the dominant operator regulation (which has to request authorization from CMT before marketing a new service/product). Furthermore, the cable operator can overcome its limited geographical coverage, increasing its presence with ADSL technology, via local loop unbundling. The operator Auna is starting to develop this strategy.

Spain's particular situation, where there has been a buyout attempt between the two main cable operators (Auna and Ono groups), forebodes that the investments necessary to complete the digitization, increase coverage and commit to the new digital television service may be delayed or slowed down until the situation is either clarified or defined.

4.3.3. Cable operators

Comcast

Comcast is the main USA cable operator. In this country it is planned that all cable networks (where the penetration reached almost 90% of the population) will be digitized in 2007. In this scenario, these operators are strongly committing to providing new services such as VoD together with high definition video formats.

Comcast ended 2004 with 8.6 million subscribers to the Comcast Digital Cable television service which incorporates VoD, high-definition programmes and DVR functionality options. The VoD service recorded more than 560 million requests in 2004, showing the American customers' growing interest in this service.

At the end of 2004, Comcast had almost 7 million subscribers to its broadband Internet service, holding onto its leadership position in the American broadband market.

Comcast has been among the last cable operators to incorporate VoIP in its service to form a triple-play offering. Comcast's strategy in 2004 has essentially been marked by the incorporation of new services to its digital television offering, both Video on Demand, and high-definition formats.

When we compare the positioning of the television service in American operators, we should highlight the clear difference to European Operators. In the United States, we can assert that the operators compete in the television market, and that the broadband and voice services complement and strengthen the television offering. Operators in Europe compete in the broadband market, and it is the television service that complements the offering.

Ono

Ono is one of the two large Spanish cable operators. At the end of December 2004, Ono had 445,000 customers from its television service and 315,000 from its broadband Internet access.

Ono started its network digitization process in 2002, and at the end of 2004, all its customers could receive digital television, with 60% already receiving this service. In the digitization process, Ono has chosen to keep the copper pair-based voice service they currently use.

In its digitization strategy, Ono has already announced that it will launch a Video on Demand service, based on technology tried and tested by Comcast in the American market, during 2004.

4.4. Satellite Operators' Strategy

4.4.1. Strategic lines

The satellite operators currently dominate the digital television and pay television panorama in most countries, except in those where there is high cable penetration (United States, Germany,...).

The satellite operators, as we already mentioned when discussing cable operators, also have the important advantage of their years of experience in the pay television business. These operators also have an even larger customer base than the cable operators.

Their main disadvantage with regard to the new services lies in the low interactivity this platform can offer. This weakness prevents them from considering a competitive triple-play offering on their own in the face of the fixed and cable operators, which has led them to design an alliance-based strategy. We can identify three alternative strategies: (1) opt for DVR customer equipment to provide digital video services, (2) alliance with fixed operators to bundle services and (3) positioning themselves as content providers to the new fixed operator platforms.

The difficulty in providing interactivity and incorporating digital video services has meant that these operators opt for DVR technology as the medium which will permit downloading the contents to the customer equipment, to be later viewed. This model allows a similar Video on Demand service to be provided as that offered by other platforms. To avoid the delay caused by the wait to download contents in low-traffic hours, the operators can choose to pre-load the most highly in demand contents in the customer equipment. This would enable quicker, undelayed access to it. This approach, easily applied by the satellite operators, nevertheless constitutes an incomplete, and probably transitory, solution, which should be complemented with other options.

The threat of the cable operators' triple-play offering has led to satellite operators looking for alliances with fixed operators in order to attract customers with a combined services offering. The model provides advantages to both types of operators. The fixed operator can incorporate the television service in their offering with a low investment level and risk. The satellite operator can compete in a triple-play offering with cable. The main risk of this approach for the satellite operators is the foreseeable evolution of the fixed operators towards a model which, after updating their networks, provides the television service over these same networks, leaving the satellite operator out in the cold.

In the last few years, satellite operators have formed an important offering of channels and contents. This experience, in many cases together with control over key content, whether films or sports, has shaped many of these operators as content providers for other platforms. In this model, the satellite operator comes to consider content as the key to their business, and the satellite broadcasting as a media, amongst other possible ones, to use this content. This model has been developed with particular emphasis in France.

4.4.2. Situation in Spain

The satellite operator Digital+ clearly dominates the pay television market in Spain. The control over content, the dispute with the cable operators over content access and the still very incipient emergence of the ADSL TV offering, shape a still immature triple-play market in Spain, where the satellite operator has not defined a clear strategy.

4.4.3. Satellite operators

EchoStar (United States)

Echostar is the third operator in the American pay television market and the second in the satellite platform. In 2003 it signed an agreement with SBC to offer its services jointly to the customers under the trade name of *SBC DISH Network*. In 2004 they strengthened the strategy with an integrated offering of the service at \$29.99 monthly and an agreement to jointly develop user terminals which combine the characteristics of satellite television, DVR, broadband and voice.

Echostar has 11 million customers in the American market and has achieved important growth in the last quarter of 2004.

Canal+ (France)

The audiovisual group Canal+/Canal Satellite in France, in addition to its satellite TV offering, in which it has more than 3 million customers, has started to commercialise its content over ADSL. Canal+ has designed its package, CanalsatDSL, to be commercialised over DSL platforms. Canal+ has signed agreements to distribute this content offering with France Telecom, Neuf Telecom and Free, at a basic price of €11 monthly.

The differential model of Canal+ is that it will directly offer its product to the end customer, without using the intermediation of the telecommunications operator who commercialises the broadband. This option again poses questions on the role of operators in commercialising content, between integration in its offering (cable operators' model), or total disintermediation.

4.5. Content Owners' Strategy

The content owners are found at the other end of the value chain. They form the key element within the digital video distribution business.

4.5.1. Strategic lines

These players can choose between two strategic lines. On one hand, the content owners can form alliances with telecommunications operators, thus adopting a multi-platform content distribution strategy. In this line, the content owner opts to form an attractive content package which it later distributes using different platforms, reaching the corresponding agreements with the players operating these platforms. As an example, we can give Sky, the largest digital TV operator in the United Kingdom. Sky distributes its contents via satellite (free-to-air and pay service), as well as via Freeview, the DTT platform formed by Sky, the BBC and Crown Castle.

On the other hand, the content owners can adopt a horizontal integration strategy and directly offer content to the user. An example of this strategy is the joint venture Movielink, where the film studios directly sell its contents to the users using an Internet portal. In this case, the content owner also has to bill and collect payment from the customer. This means it will have to reach an agreement with a player (e.g. an ISP) which provides it with a billing and payment collection solution. Nevertheless, we should point out that the telecommunications operator will keep in contact with the user as he will bill and collect payment over broadband connectivity.

If the content owners initial unwillingness to tackle the digital content distribution business continues, a serious delay in developing the business will come about. The success and standardisation of digital rights management (DRM) services is the key factor for content creators to strongly commit to the new business emerging, where Internet becomes a new window to use its contents.

4.5.2. Content owners

Movielink (USA)

This is a joint-venture of the 5 main film studios (Warner Bros, Paramount Pictures, Universal Pictures, Sony Pictures Entertainment and Metro Goldwyn Mayer).

Movielinks Video on Demand service, which can only be accessed from the USA, currently allows films to be viewed by download or streaming in the user's PC. By virtue of an agreement with Intel, they are working in content management technologies that enable the films to be transferred wirelessly from the computer to the television to be viewed in this terminal.

The cost of a film varies from 1.99 to 4.99 dollars, and it can be viewed as often as desired within a 24-hour period from the time it is purchased. The user can watch it via streaming or downloading it to the computer hard drive.

It has recently launched a programme called EQ (Enhanced Quality) where it has offered two versions of a selection of films during a 2-month period: the standard version and another version offering greater audio and sound quality. From the total purchases made of these films, 25% were of superior quality (EQ). Movielink has therefore planned to extend the programme due to the user's good acceptance.

Moviebeam (USA)

The company Moviebeam, owned by Disney, has been operating in the USA since October 2003 and is an example of the download VoD business model, "Queue and View" or Push (automatic downloads to the hard drive to be viewed at a later stage) format. The means used to download the content is the DTT channels' available capacity at night (it could also be done via satellite).

When the users buy a film which is stored in the Samsung MovieBeam set-top box (DVR) hard drive, they get access to its content for a 24-hour period.

Moviebeam always keeps 100 films available and each week updates 10 new titles (the 10 oldest ones are deleted). The user pays a monthly rental fee for the DVR (\$8.99) and between \$1.99-\$3.99 for each film viewed.

4.6. Manufacturers and suppliers' strategy

Consumer electronics manufacturers and IPTV solution providers are fighting a specific battle to position themselves in the device that will form the centre of the digital home. The options currently focus on 3 elements:

- Set-top Boxes equipped with DVR: option headed by the telecommunications operators.
- PC: option headed by Microsoft, in their Media Center software-based positioning and their IP-TV platform.
- Consumer electronics devices, option headed by Sony, based on the new generation of *Cell* chips, for consumer electronics.

This battle has only taken its first few steps, but it reveals the increasing interest by the new market around the digital home, and the essential roles that the terminal will play in this market.

In this battle to get inside homes, the specific commitment made by Microsoft should be highlighted. Its peculiarity lies in the fact that it is the only company capable of positioning itself in all software, hardware and Internet service components that will be relevant in shaping the homes of the future:

- **Games console**, Xbox, in competition with Sony and Nintendo.
- **PC and Windows operating system** in its entertainment server edition, in competition with DVRs and consumer electronics manufacturers.
- **Audio and video software player**, in competition with Apple and Real Networks.
- **MSN Portal and search engine**, in competition with Google, Yahoo, AOL and Apple.
- **Digital rights management software**, in competition with Real Networks and Apple.
- **IP Television platform**, in competition with other providers such as Thales (supplier of France Telecom).

If Microsoft manages to fit the different pieces together, it will give great competition for the current dominators of each segment (Sony, Google, Apple,...).

4.6.1. Consumer electronics manufacturers

Consumer electronics manufacturers are the players responsible for making the devices available to the users that will allow them to access the digital television and video distribution services.

The current range of products is highly varied, as it goes from simple decoders with no added functionalities (the “zappers”) to integrated digital televisions, passing through set-top boxes with USB port to access content and interactive services, DVRs (Digital Video Recorder), mobile devices and games consoles.

From the different product lines listed, DVR devices, terminals with hard drive, allowing the content distributed to the television to be recorded and stored, are especially worthy of note. In this context, the DVR is a cornerstone in developing the Video on Demand services, especially in the satellite platform, allowing the user to have the possibility of choosing the content they want to view à la carte. In the USA, there are already more than 4.5 million units in use and a potential penetration of 33% in homes over 4 years is estimated.

TiVo (USA.)

TiVo is the main manufacturer of DVRs in the USA and has more than 2 million customers, who acquire, on the one hand, the terminal with the functions of recording digital video (99 dollars, with capacity to record up to 140 hours of programmes) and on the other hand, the TiVo service which costs 12.95 dollars per month. This service consists of the following functionalities:

- Search engine which enables you to search for a certain characteristic (e.g. a film director) from all the recorded television content.
- Automatic programme recording: By selecting the name of a series or programme, it records it every week without having to know the exact time or day when it is broadcast.
- Online recording: The recording of any television content can be programmed from any Internet connection.
- Home entertainment centre functionalities, such as playing digital music, viewing photos, etc.

As part of the services offered by the company, TiVo announced at the start of 2005 that it will launch a service called 'TiVoToGo', which lets its customers transfer television programmes to their laptops. The software (which is free) only works in the Microsoft Windows XP and Windows 2000 operating systems.

Another of the changes that is going to take place in TiVo software (spring 2005) is the introduction of a new format of advertising as an integral part of the software. This change will manifest in a turn around in the company strategy regarding advertising, since from the product launch in 1999, the TiVo marketing strategy has had a tremendous influence on the customers' capacity to skip through the adverts and commercials in order to only watch the programmes that really interest them.

Nevertheless, from March 2005 on, when a TiVo user uses the remote control to quickly skip through adverts, they will see small logos on the screen contracted by 30 of the major USA advertisers. If the user clicks on the logo to access the commercial message, their personal information will be sent to the advertiser (guaranteeing the user's confidentiality and consent), which opens new channels and possibilities for agreed direct marketing. Indeed, TiVo's great competitive advantage lies in the use of the data compiled from the use of the users' terminals.

Finally, we should highlight the announcement made concerning the future joint launch of a download VoD service that would make use of the catalogue and management systems of Netflix and the TiVo terminals and software in use. Netflix is a company distributing digital films via the Web, which offers facilities to select DVDs in their online store, to be later physically delivered by post, (Netflix's current model is a hybrid as it combines **physical delivery and online subscription**).

InOut TV (Spain)

InOut TV is a company owned by the Spanish capital enterprise, Techfoundries. InOut TV has recently started marketing a DTT decoder with hard drive and added services. The product is exclusively distributed in Carrefour supermarkets (in fact, the product's commercial name is Carrefouronline.tv¹²).

This product's associated functionalities and services are:

- DTT dual tuner
- Hard drive (DVR) with 80Gb capacity
- SincroGuía TV, which is a multimedia TV guide, accessible from the TV remote control, with information on the daily programmes.
- Playing multimedia files stored or transferred to the hard drive (photos, music, etc.)
- Time shifting, i.e. the possibility of freezing live transmissions and performing similar functions to that of a video player: fast forward, rewind, pause, repeat...
- PiP (Picture in Picture), function which allows the user to follow the channel via a small window on the television screen, whilst watching a programme (or video, photos or listening to music).

The promotional offer of a DTT decoder plus the hard drive is 375 euros. The price includes 2 years' free service (with all the functionalities listed above). At the moment it is only operational in Barcelona, Madrid and Valencia.

¹² <http://www.carrefouronline.tv>

InOut TV has a very similar business model to that of TiVo, as it markets a set-top box with DVR, together with an electronic television programme information service, which is offered free to those customers who acquire the set-top box.

The sales of this equipment depend, logically, on the penetration of digital television in Spain. Unless the television programme offering is not generalised in Spain with the deployment of DTT, there would not exist the sufficient quantity of programmes that justifies the payment of a charge to use the electronic programme guide (we should remember that in the USA TiVo charges almost 13 dollars a month for a service of these characteristics).

Nevertheless, InOut TV could provide value to its DVR by introducing a download broadband VoD service. For this, it could take advantage of the MediaXpress portal, tools and videoclub catalogue (5,000 films), another of the companies managed by Techfoundries (reproducing in this way the alliance between Netflix and TiVo). MediaXpress has been commercialising a postal DVD rental service in Spain since 2004. Here, the films are selected through a web interface which has a powerful search engine and a tool to recommend titles adapted to the user's preferences.

4.6.2. IPTV Solution Providers

The telecommunications operators' interest in providing TV broadcasting services and VoD via broadband networks, has led to a series of players marketing IPTV platforms.

Alcatel

Alcatel is one of the main providers of commercial IPTV platform solutions. It is a supplier of Fastweb (Italy), Softbank Yahoo!BB (Japan) and VideoNetworks (United Kingdom) amongst others.

The *Alcatel Open Media Suite* is a portfolio of professional products and services which offers software solutions, integration with third-party equipment and, in short, non-proprietary flexible architecture, which permits making use of the broadband network to provide TV and video.

Microsoft

The giant of the computer sector has developed a family of software products (called *Microsoft TV IPTV Edition*) for the end-to-end distribution of digital television services (complementary to the voice and data services) using broadband networks.

It is a solution which allows the digital multimedia content to be coded and protected by *Windows Media 9 Series* technology, to create and manage programme packages as well as the VoD services offering, to finally deliver all these services to the user using a broadband network which ends in a set-top box incorporating Microsoft proprietary software. This solution is in the test phase in several telecommunications operators, among them Swisscom and Bell Canada.

We should state that on 23 February, Alcatel and Microsoft announced a global collaboration agreement to speed up the availability of television services over Internet protocol (IPTV) in broadband operators worldwide.

4.7. Business models

4.7.1. Subscription and pay-per-view

The provision of broadband TV and VoD services is associated to a pay-per-view or subscription framework. Although the operators may include some free contents within the basic broadband connection charge in the initial launch phase, in later phases it will be normal to pay a monthly charge which includes access to IPTV and the viewing of a finite number of contents on demand or simply a framework similar to pay-per-view in pay television: paying for each audiovisual content downloaded or viewed.

The Spanish consumer has shown himself up to now to be unwilling to pay for watching television, meaning that the pay television market has developed to a lesser extent than in most European countries. The existing satellite and cable offerings have remained deadlocked in the last few years at around a 20% penetration in homes, without achieving the massive popularisation of the service. This stagnation is partly caused by the integration process of Vía Digital subscribers in Digital +, which has negatively affected the pay television subscriber base in Spain. The new offering of ADSL TV, as with the case of cable, has the advantage of services bundling, which has shown itself to be an important catalyst.

Even so, it is foreseeable that the initial offering in Spain should be based on a free basic package bundled with their voice and broadband services- pay-per-view or pay-per-content access can also be added to this. This model seems the best adapted to the current situation of the Spanish market.

4.7.2. New advertising models

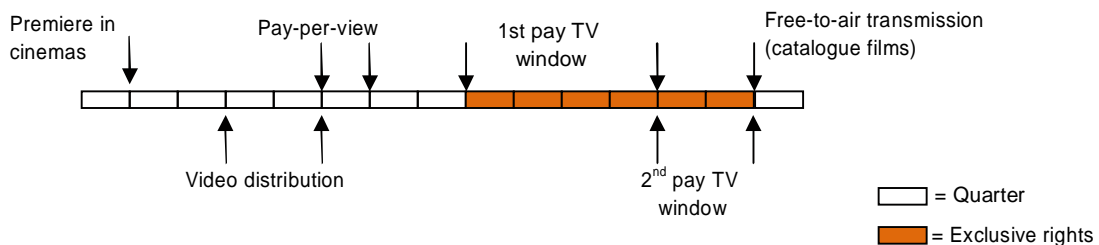
In the new business models we should not discard other means of revenue such as advertising. If we analyse the advertising investment figures provided by the Infoadex studio, television is the conventional medium which invests the greatest amount (41.3% of the total investment of 2003) and that with highest growth (6% with respect to 2002). Internet holds seventh place among the conventional media with 1.3% of the total media investment distribution. In 2003, advertising investment in Internet was 74.6 million euros, 4.8 percent more than in 2002.

The interactivity associated with IPTV and VoD services may generate an increase in advertising effectiveness as it can segment and personalise the target audience. Therefore, in the medium-term, advertising can generate considerable revenue within the business models of the TV and VoD over broadband services.

4.7.3. Windows of Content Use

The new digital video services currently use the same window as they use to broadcast pay television as a window to offer the contents.

Figure 11. Windows of use of film premieres¹³



The telecommunications operators, based on the new possibilities offered by digital video, would find themselves in a negotiation process with the content owners to look for new windows of use. The coincidence with the sales window of films in DVD format (possibility of generating a DVD at home), or even the coincidence with use in cinemas under certain conditions could give a tremendous boost to these new services.

The telecommunications operators' plans to digitize and deploy new infrastructure may be considering scenarios where new windows of content use are agreed. These agreements should be based on the existence of a digital rights management technology that transmits the necessary confidence to the content owners.

4.7.4. Property Rights Management

Intellectual property rights management is holding back the development of digital video services to a great extent. Content owners continue to be apprehensive of the facility it may offer the new digital video services for content piracy.

The new solutions to manage digital rights, based on network architecture, and the streaming viewing options may constitute the first steps to find a technical solution to this problem.

¹³ This is only meant as a guideline as the deadlines may vary.

4.7.5. Content personalization

Personalised contents, whether local or generated by the users themselves, might be the key for differentiating broadband TV and VoD services from the traditional TV signal broadcasting services.

The possibility of forming “local studios” without spectrum license (thanks to the transmission of the TV over IP protocol) would facilitate creating local content which may be a content offering attraction due to the added value that could be generated by the transmission of endless possibilities associated to the user’s daily life: retransmission of the school basketball game, the local *fiesta*, etc.

5. NEW SERVICES AND FORMATS

The digital video services, presented in the previous chapter constitute the main element breaking onto the television scene. Nevertheless, they are not the only ones. This chapter analyses mobile television and high-definition television, two still incipient, elements, which may play an important role in the medium-term.

5.1. Mobile phone television

At present, the mobile operators' main source of revenue is voice and, within the billing for data traffic turnover, SMS clearly dominates. The maturity of both markets (voice and short text messages), together with the launch of third generation services (3G), diverts attention towards the mobile content business in general, and mobile TV in particular.

Nevertheless, there are other technologies which allow mobile television broadcasting services to be offered by a large number of players who had lost this possibility, namely the DVB-H standard, which enables the mobile transmission and reception of DTT (simultaneous transmission of between 10 and 55 channels designed for content viewing on reduced sized screens. This technology may pose serious competition to third-generation mobile technology as regards audiovisual content consumption.

5.1.1. Perspectives for the new services

Mobile digital television is one of the technologies on which most expectations are placed over the next few years. Not everyone has a positive opinion of this type of services, as more than a few think that watching television on a screen the size used by mobile phones will never be an attractive option.

Mobile communication operators, equipment manufacturers and DTT distributors are starting to take the first steps to design a better strategy to attract customers for mobile TV services. We will see the technical and financial feasibility of mobile Digital TV in Japan and South Korea before anywhere else.

Different analysts suggest that designing formats specifically conceived to be viewed on a mobile as the key to the success of these services, thus avoiding a mere replica of conventional programmes on mobiles.

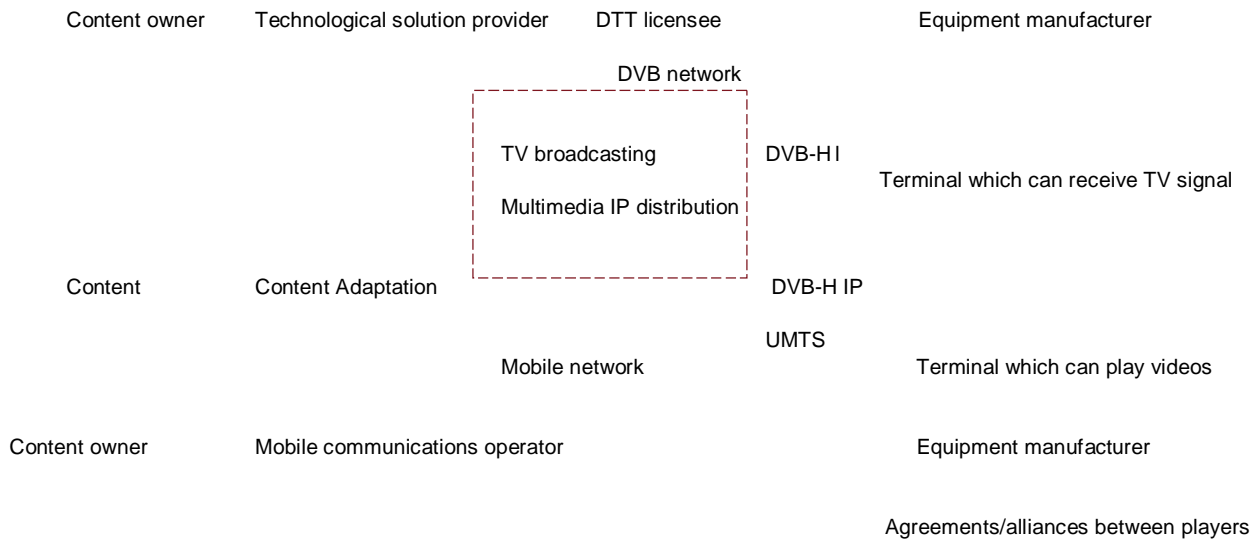
Mobile phone television should be understood as a new format, different to traditional television; a format that new content will be produced for. This approach requires that assigning channels for this new television format be borne in mind when assigning the spectrum.

5.1.2. Players' Strategy

The strategy of the players and the associated business models will strongly depend on the mobile TV broadcasting technologies, amongst which we can distinguish:



- TV via DVB-H, associated to a television broadcasting network.
- TV via DVB-H over IP, associated to a television broadcasting network
- TV via UMTS, associated to mobile phone network.



Source: Own production

When the signal is broadcast via DVB-H, the audiovisual content is directly broadcast to a terminal that can receive a television signal, without the mobile communications operator intervening. The DTT licensee has access to the content via agreements or alliances with content providers or own productions.

The associated business model corresponds to a free-to-air DTT framework, so that the main source of revenue will be advertising (new television consumption habits can be generated and, therefore, new possibilities of advertising revenue).

At present, the development of these services is very limited, mainly due to the low level of DTT penetration and the lack of mobile terminals that can receive TV signals. Nevertheless, the appearance of specialised DTT channels is planned for the mobile in the medium-term, which could condition the number of traditional DTT licenses (the implications in the spectrum and multiplex distributions may be relevant).



If television is broadcast by DVB-H over IP, the content is transmitted, as with the previous case, via the television broadcasting network. Nevertheless, in contrast to TV via DVB-H, investments must be made in the network to provide it with mobile network elements, such as service and cell transfer, quality of service (QoS), international roaming, etc. In order to do this, the DTT licensee will reach an agreement with a provider who will provide it with the corresponding technological solutions. The user's terminal mobile should be able to play video, a characteristic which new terminals currently being marketed are incorporating. Thanks to the television network adaptation, new business possibilities are opening for the DTT licensee, as it can offer streaming or download video distribution services that could generate new revenue, in addition to advertising revenue, that would be obtained by television channel broadcasting.

Finally, TV via UMTS is the mobile communications operators' choice. The mobile network capacity is more limited than the DVB network for TV channel broadcasting, which has meant that the mobile operators are choosing streaming or download video distribution frameworks. The user's mobile terminal should have the capacity to play videos. In this context, the business model is associated to the pay framework (by subscription or via download/streaming).

5.1.3. Mobile operators

Tre (Italy)

Tre (the number 3 in Italian) is the brand with which the operator Hutchison Whampoa (with presence in countries such as the United Kingdom, Australia and Hong Kong amongst others) has commercialised third generation mobile services in Italy.

Tre was commercially launched in March 2003 and at the start of 2005 already has 2,650,000 customers, of which 650,000 were gained between the months of November and December 2004¹⁴. These figures are undoubtedly very positive for this operator that offers the possibility of watching mobile television.

Since September 2004, the company has produced and broadcasted a football television programme of its own called *Minuto 93*, which gives a summary of the goals from match days.

Tre has differentiated its commercial strategy from other operators such as TIM (Telecom Italia Mobile) in the price of its terminals, which range from 19 euros for the most basic terminals to 100 euros for the top of the range terminals. *Tre* subsidises these terminals in exchange for a two-year loyalty contract.

We should also point out that video calls are increasingly widespread in Italy and *Tre* has designed a formula to encourage their use. This consists of each user being able to record their own clip with their mobile and send it to the *Tre* portal. Each time another user downloads that video, *Tre* gives 3 euro cents to the creator of the video clip, which can be paid into their account or directly used to top up their mobile balance.

¹⁴ El País, 2 January 2005. "*Locos por el 'videomóvil'*" article.

Swisscom Mobile (Switzerland)

In November, the operator Swisscom Mobile became the first in its country to launch 3G services. The operator's customers, which exclusively have Vodafone Live! telephones, can access TV channels (SF DRS 1 and 2, TSR 1 and 2, TSI 1 and 2, SF Info, Eurosport, TF1 and MTV) for the following prices: 30 minutes for 4 Swiss francs (SF), 2 hours for 8 SF or all day for 12 SF. The customer can switch from channel to channel as many times as they want during this time.

They can also use a service called "Movie of the month" which offers images, tones, trailers and video clips connected to the film of the month.

NTT DoCoMo (Japan)

DoCoMo has opted for a telephone which can receive digital terrestrial television signals, as well as playing previously recorded programmes. The terminal incorporates a base with a hard drive recorder to permit this second possibility.

5.1.4. Equipment manufacturers

Nokia (Finland)

The mobile phone manufacturer Nokia, together with LG Electronics, is the player experimenting to the greatest extent in the mobile TV business. Nokia is in the test phase of its mobile terminals with the functionality to receive the TV signal in Germany, Finland, the USA and Australia. These terminals are larger in size than the normal ones, as they incorporate an integrated circuit and antenna. However, it is expected that in the near future they will differ little in size from that of the current terminals.

The manufacturer's estimates point to these terminals appearing in Europe in 2005, whilst they will not reach the USA until 2006.

5.1.5. Content owners

Media Republic (Holland)

The Dutch company Media Republic currently offers a TV channel exclusively devoted to the mobile, called 2Go.TV, which the Dutch Vodafone Live! 3G plans to contract. 2Go.TV will bill 0.025 euro per viewing minute, which can be considered attractive to transmit the short video clips foreseen by the channel.

This launch takes place after the success attained with the MMS "soap opera" called "Jung Zuid", which has an audience of 2 million subscribers. Each episode can be downloaded for free, as it is subsidised by the advertising it includes. This has doubtlessly contributed to the success of the series.

5.2. High-definition television

Thanks to the high quality of the image provided, high definition television or HDTV may significantly boost the difference (perceived by the user) between analogue and digital television.

The introduction of high-definition television affects various sections of the value chain, starting from production, through the signal distribution network and ending in the user equipment (it is necessary for the television to have an HDTV tuner).

High definition is pointless for live programmes. It does not give added value with the current trends for decoration and setting in the TV sets (what would be the added attraction of a magazine transmitted in high definition?). Furthermore, the high production cost involved is only justifiable in a certain type of content, such as documentary or film. There are also other types of programmes that due to their very nature do not need improvements in definition, e.g. cartoons.

It therefore seems that the introduction of HDTV will be progressive and limited. Nevertheless, when we analyse the phenomenon of high-definition television, we should differentiate the present situation existing in Europe and the USA.

5.2.1. Situation in the United States

In the United States, the driving force behind the adoption of digital television by the viewers has been the current content offering in high definition, as the three large channels (ABC, NBC and CBS) are broadcasting in high definition at prime-time. Furthermore, the regulating body (FCC) has adopted a proactive role to successfully coordinate the different market players to favour the development of HDTV.

As a consequence of this panorama, fixed and cable operators are strongly committing to HDTV. For instance, as part of its television offering Comcast offers special programmes in HDTV which include sports, fiction series and films. Furthermore, it has started marketing a DVR with capacity to record high definition programmes. On the other hand, the satellite operators (DirecTV and Voom) have a current line-up of 39 high-definition channels.

5.2.2. Situation in Europe

The role of HDTV in Europe is uncertain. Various analysts consider that there is market potential, provided that all the players involved advance in the same direction: equipment manufacturers, content producers and television operators.

If we analyse the satellite operators' strategic plans, it is noteworthy that in Germany the satellite operator Premiere has planned to launch 3 high definition channels by November 2005 to broadcast films, sports and documentaries. BSKyB has planned to launch premium channels and transmit films in high-definition format by 2006.

In the case of DTT, HDTV's high signal transmission capacity demand tremendously hampers transmitting this type of programmes, at least until new TV signal compression systems are developed. In Spain, as with many other European countries, HDTV transmission is impossible in the spectrum availability situation prior to the switch-off.

Nevertheless, and despite the difficulty of introducing the concept of high definition in DTT, this possibility is being considered and planned in some countries. In France, it is planned to broadcast up to 8 high definition channels via the DTT platform aimed at the pay service and in the United Kingdom, although there are still no plans to broadcast high definition channels, the BBC will start to produce all its contents in high definition in 2006. This shows clear support for this television model by the corporation leading DTT in that country.

The leading role which HDTV is starting to play in the cable operators' business models in the USA, considerably contrasts with the little prominence it has in the current offering, and that planned in the short term, by the European cable operators.

Finally, it is worthy to note that tests are starting to be performed in Europe to broadcast HDTV over ADSL, specifically over ADSL2+. In France, the company Envivio announced at the start of this year that it has successfully performed high definition content transmission tests (compressed with the H.264 standard) over the ADSL2+ network belonging to the operator Free.

6. 2008 SCENARIOS

This section presents a projection of the main variables that will characterise the digital television and pay television market until 2008 in Spain.

6.1. Pay television

The evolution of pay television has been characterised by the resistance to exceeding the 20% pay television penetration limit in the homes. In the projected scenario, characterized by the appearance of new players and the incorporation of new services, such as Video on Demand, we have assumed the following hypotheses:

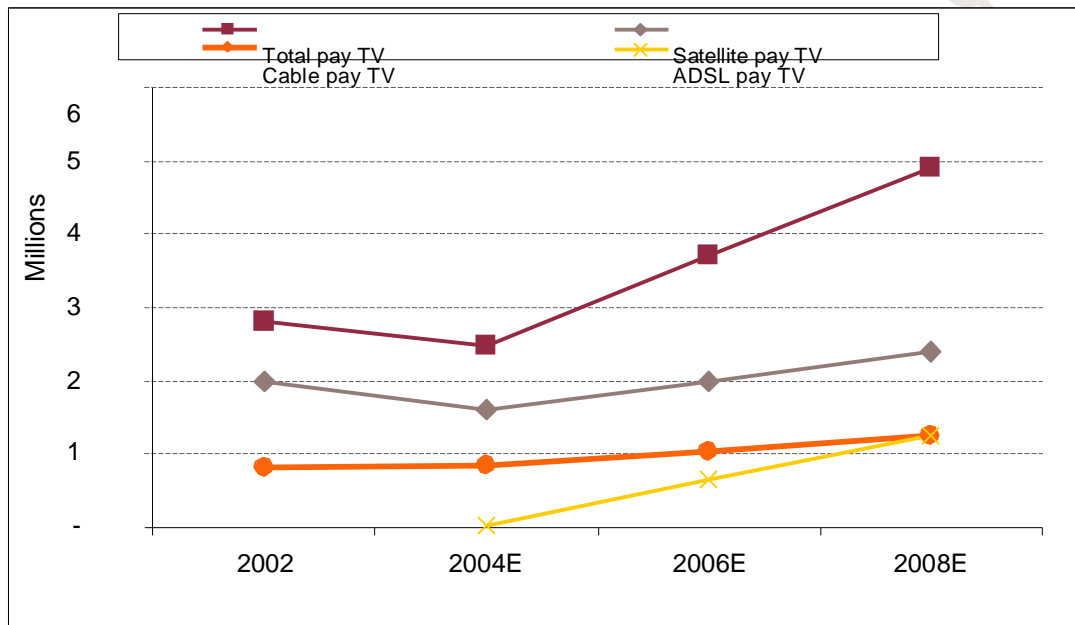
- In 2008, pay TV penetration in Spain reaches levels close to the European average (30% of households).
Subscribers to satellite pay TV reach the figure of 2.5 million in 2008 (assuming the projections reflected by the Sogecable business plans).
- In relation to cable pay TV, the operators' current business plans for network deployment have been considered. It is therefore assumed that (until 2008) the percentage of customers who subscribe to the television services (40% of total customers) is maintained.
- The combination of the previous hypotheses give a customer potential for ADSL TV of 1.25 million subscribed homes in 2008 (21% of total ADSL connections).

The distribution between the different technologies shows the prevalence of the satellite platform dominance, and the advance of the incipient ADSL TV platform. In the case of cable, its growth is basically limited by its coverage.

	31 Dec-2002	31 Dec-2004	31 Dec-2006	31 Dec-2008
% homes with PAY TV	20%	16%	23%	29%
Homes with PAY TV	2.80 ¹⁵	2.48	3.71	4.91
- Satellite TV	1.99	1.60	2.00	2.40
- Cable TV	0.81	0.85	1.05	1.25
- ADSL TV	-	0.03	0.66	1.26

Table 8. Evolution of broadband and pay television by technological typology, in millions of users.

¹⁵ The customers of the disappeared Quiero TV have not been included in the figure of subscribers to pay television in 2002.



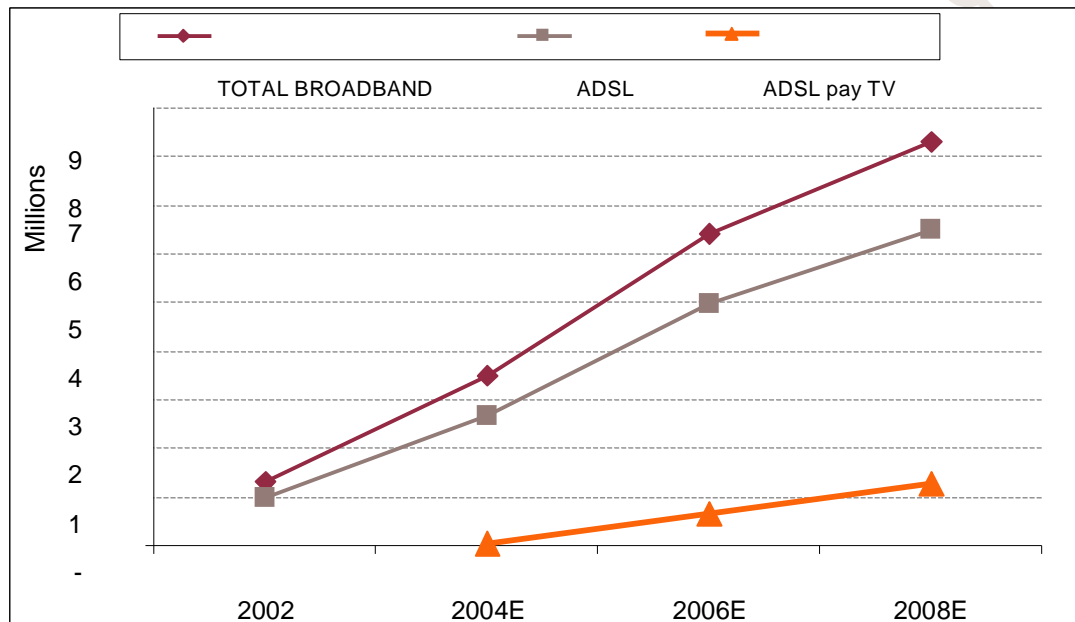
Source: Own calculations

To analyse and project the penetration of ADSL television platforms, we should bear in mind the evolution of broadband in Spain. In 2004, the cable platform started from a 40% penetration of television customers via cable from the total cable customers. In the case of the new ADSL TV, it is projected to reach a 21% penetration (of the total ADSL connections) in 2008.

	31 Dec-2002	31 Dec-2004	31 Dec-2006	31 Dec-2008
BROADBAND	1.29	3.41	5.94	8.41
- Cable	0.33	0.75	1.16	1.58
- ADSL	0.96	2.53	4.45	6.07
- Other	-	0.12	0.33	0.75
Cable customers	1.25	2.14	2.71	3.12
Cable TV	0.81	0.85	1.05	1.25
ADSL TV	-	0.003	0.66	1.26
% Cable TV over % Cable		40%	39%	40%
% ADSL TV over % ADSL		1%	15%	21%

Figure 12. Evolution of broadband television

Source: Own calculations



Source: Own calculation

6.2. Free-to-air television

When analysing free-to-air television, we should evaluate both the evolution of the advertising market, main source of revenue in this type of channel, and the evolution of the transition to digital terrestrial television.

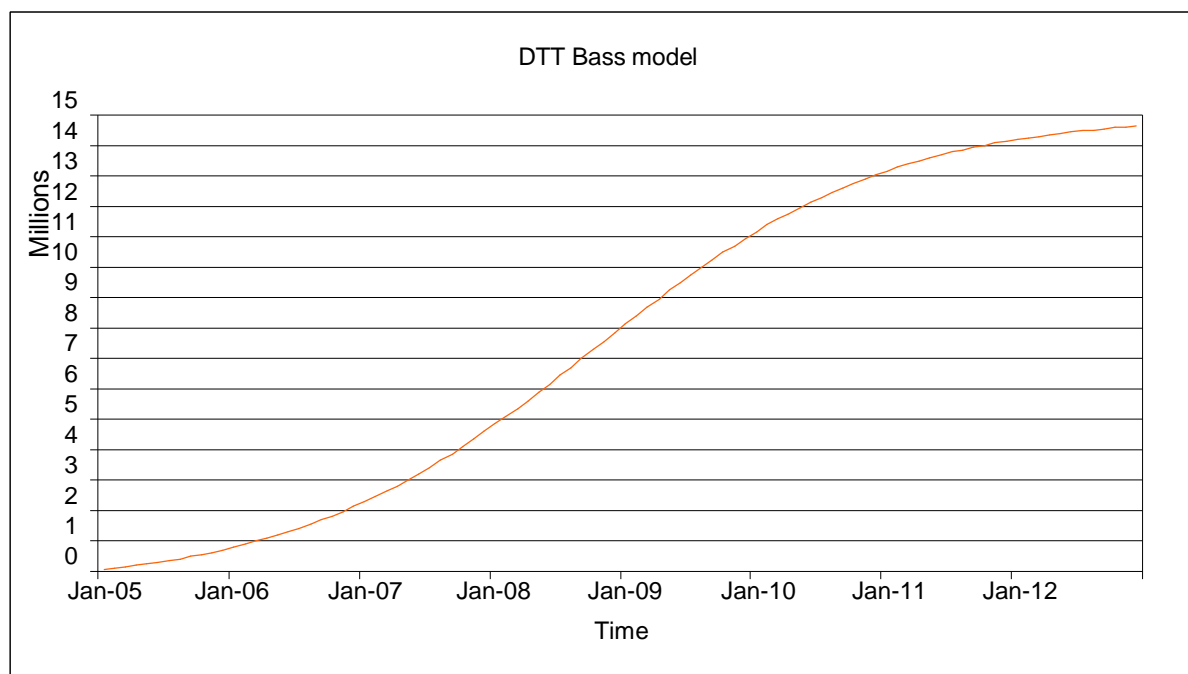
Evolution of DTT penetration

We have few parameters to project the evolution of DTT in Spain. In any case, we should consider that all new technologies or technological products incorporated in the consumer market need a period of time to be assimilated and matured by society. It is assumed that the evolution of the demand for DTT follows a high consumption product template, which may be formulated using a Bass curve (S curve). In this case, there should be a decoder on the market with a price under €80. Taking all of this into account, we can make an estimate of the evolution of the demand for DTT in Spain, in which we assume two starting hypotheses: the base of decoders or televisions with decoder incorporated sold in Spain (40,500 homes are estimated at 1 January 2005) and an asymptote of 15 million homes reached by the end of 2012.

In the theoretical projection considered, it is assumed that the DTT action plan will be applied, assigning the QuieroTV channels before summer 2005. The Christmas campaign will, therefore, be a period of intense commercial activity. The channel licensees will implement an attractive content offering. At the switch-off date, 2010, a penetration close to 80-90% should have been reached. This is undoubtedly a simplistic and optimistic view, given the nature of the difficulties that must be overcome in the Spanish case. A scenario of success is therefore described for the implementation of DTT.

	31 Dec-2004	31 Dec-2006	31 Dec-2008
DTT (figure in millions of homes)	0.04	2.29	8.13
% homes with DTT	0.26 %	14.2%	48%

The projection assumes the evolution of demand associated to a mass consumer product. In this case, there should be a decoder on the market costing under €80.



Source: Own calculations from AFI data

Advertising revenue

The 2004 Spanish advertising market is estimated at around 2,600 million euros, in accordance with the information provided by Infoadex. The average operational cost of a television channel, in accordance with the formats currently dominating the television programmes, is estimated at around €600M, after years of costs reduction and commitment to their own content and series. The two private players, the national coverage public service channel and the regional channels grouped in FORTA currently coexist in that advertising market.

If we assume the application of the recommendations of the committee of experts' report, eliminating advertising from Spanish Channel 2 and reducing it from 12 to 9 minutes in TVE-1 would leave an estimated amount of €134M in 2006 and €417M in 2009. If we add the estimated increase in the market due to the 20% unsatisfied demand (€520M) to these quantities, there would clearly be room in the market for a new player. The impact of the entrance of a new player would be minimal for Telecinco and Antena 3, if the majority of the new player's new advertising revenue came from the audience share gained from TVE1 and the reduction in advertising time in RTVE.

The incorporation of two new entrants in this market raises questions on the feasibility of all players. In this scenario, Telecinco and Antena 3 would irremediably lose audience share. According to analysts' estimates based on the hypothesis that this second entrant would attain 2.5% of audience share both from Telecinco and Antena 3, there would be an effect on the private players' (Antena 3 and Tele 5) revenue of between 9.1% and 10.2%). In this scenario, tension would increase in the television advertising market. In any case, it should be considered that in a dynamic market, different business models may appear, which may give room to the new players.

APPENDIX I. AUDIOVISUAL SECTOR PLAYERS

Free-to-air television

Public service television

Among the television operators which broadcast free-to-air, we have nine public entities: one national (TVE), and eight regional. The eight regional public entities currently manage a total of 18 channels. Of these, 12 are free-to air channels, 4 are via satellite or cable pay platforms (Andalucía TV, TVCI, ETB Sat and Canal Vasco) and just 2 are digital (3/24 in Catalonia and the La Otra in Madrid).

Table 9. Free-to-air regional televisions. Launch and coverage (million users).

Regional television	Region	Coverage	Channels	Launch
EITB – Euskal Irrati Telebista	Basque Country	2.1	Etb1, Etb2	1982, 1986
CCRTV - Corporació Catalana de Radio i Televisió	Catalonia	6.3	TV 3, 33/K3	1983, 1989
CRTVG – Compañía de la Radio Televisión of Galicia	Galicia	2.4	Tvg	1985
RTVM - Ente Público Radio Televisión Madrid	Madrid	5.2	Telemadrid	1989
RTVA - Empresa Pública de la Radio y Televisión de Andalucía	Andalusia	7.3	Canal Sur, Canal 2	1989, 1998
RTVV - Entidad Pública Radiotelevisión Valenciana	Valencia	4.1	Canal 9, Punt Dos	1989, 1997
RTVC - Ente Público Radiotelevisión Canaria	The Canary Islands	0.8	TV Canaria	1999
CMTV - Ente Público Radiotelevisión Castilla-La Mancha	Castille- la Mancha	1.7	Cmtv	2001

Private Television

National

In Spain there are two national free-to-air television stations, Antena 3 and Tele5. There is a national analogue terrestrial television platform, Canal+, two national free-to-air digital terrestrial television platforms, Veo TV and Net TV.

Regional

On a regional level, there is a digital terrestrial television platform, Onda 6 TV, which broadcasts free-to-air for the Madrid region. Foreseeably, Cope TV and Rioja TV, license holders in la Rioja, and Emissions Digitals de Catalunya, belonging to the Grupo Godó, in Catalonia, will shortly start broadcasting.

Local televisions

According to the Census of Local Broadcasters (AIMC, October 2002), a total of 897 local television broadcasters with free-to-air transmission are distributed throughout Spain. Approximately one third are integrated either in a local television network with common contents such as UNE or Cadena Local, or in business groups such as Prisa (Localia TV) or Cadena COPE (Popular TV).

Table 10. Local TV Network – Description

UNE	Invested in by Publimedia, subsidiary of Grupo Telecinco, which manages public use of the network. The Atlas agency, also part of the Grupo Telecinco, provides the contents.
Localia TV	Managed by Promotora de Emisoras de Televisión, SA (Pretesa), subsidiary of the PRISA Group which take care of its local TV operations.
Grupo Canal 47 TV	Network comprised of 43 local broadcasters, all owned by it. The signals of two of these channels, Canal 47 and Tele Local, are distributed via satellite.
Grupo Vocento	Media holding which has dozens of broadcasters. Said TVs are largely integrated in the UNE net. The broadcasting stations, in addition to broadcasting the programmes provided by UNE, transmit the programme blocks and advertising provided by Vocento.
Popular TV	The programmes of this initiative of Cadena COPE are distributed between the broadcasting station's own productions and Popular TV's signal, digitally transmitted via satellite from Madrid.
Televisión Castilla y León (TVCYL)	Group comprised of approximately 20 broadcasting stations. Only three TV's are in partnership: Soriavisión, Tele Aranda and Canal Béjar y Comarca (from Béjar, Salamanca). All the channels are within UNE and the Grupo Vocento. In addition to the programmes provided by these groups, the remaining content comes from common programme slots, together with specific local transmissions of each TV.
Grupo Promecal	Also in Castille-Leon, with coverage throughout the region. The broadcasting stations are owned by the group, and have common regional programmes, around Canal 4 Castilla y León, and local programmes. It also has Canal 6 Navarra, with specific programmes.

Pay television

The end of broadcasting by the digital terrestrial television Quiero TV shaped, at the start of 2004, a pay television offering in Spain limited to the terrestrial analogue transmission of Canal+, the digital satellite of Digital+ and the cable platform operating in each region.

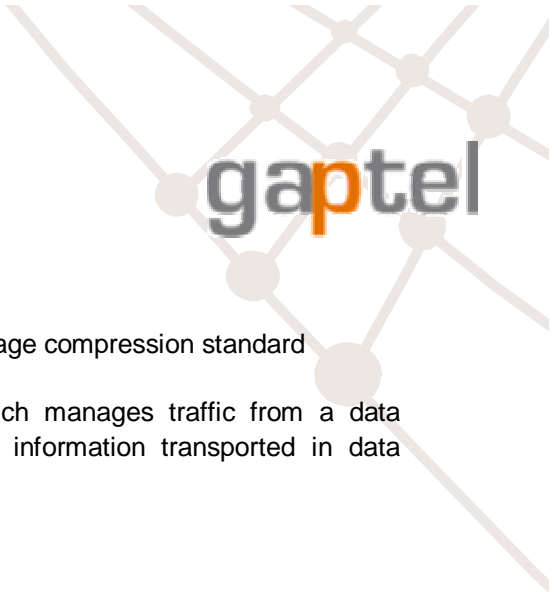
A fourth possibility has recently been introduced in addition to these three options. This is the new service, Imagenio, which offers digital television and audio, TV and PC broadband Internet and Video on Demand via the telephone line using ADSL technology. The following table shows the pay television players in Spain.

Table 11. Pay television. Majority shareholders and investment

Grupo Sogecable	Telefónica de Contenidos	22.23
	Promotora de Informativos	19.71
	Groupe Canal +	8.62
Auna		
Telecomunicaciones	Grupo Auna	100.0
Cableuropa	ONO	100.0
	Bilbao Bizkaia Kutxa	
	Gipuzkia Donostia Kutx	33.1
	Iberdrola Diversificación	19.9
	Endesa de Telecomunicaciones	10
	Stet International Netherlands (Telecom Italia)	10
		6.1
Euskaltel	Government Vasco	3
	Grupo Auna, Operators de Telecomunicaciones	3
		-
	Other	
R Cable	Unión FENOSA	35.6
	Caixanova	28.5
Retecal	ONO	61
	Hidrocantábrico	35
	Hidrocantábrico	46
Telecable	Cajastur	-
	Caja Navarra	
Tenaria	Grupo Auna, Telecommunication operators	19.9
		16.7

APPENDIX II. GLOSSARY

ARPU	“Average revenue per user.”
CMT	Comisión del Mercado de Telecomunicaciones (Telecommunications Market Commission)
COIT	Colegio Oficial de Ingenieros de Telecomunicación (Spanish Official Association of Telecommunications Engineers)
DAB	“Digital Audio Broadcasting.” European digital radio system standardised by the European Telecommunications Standardisation Institute (ETSI)
DMB	“Digital Multimedia Broadcast”
DRM	“Digital Rights Management”
DTH	“Direct to Home”, Satellite television broadcasting directly to the homes and captured by a small parabolic antenna
DVB	“Digital Video Broadcasting.” European digital video broadcasting standard
DVD	“Digital Versatile Disc.” Physical medium, which allows multimedia content to be stored in multimedia format
DVR	“Digital Video Recorder.” Device incorporating a hard drive which records digital video
FENITEL	Federación de instaladores de telecomunicaciones (Spanish Federation of Telecommunications Installers)
FORTA	Federación de Organismos de Radio y Televisión Autonómicos (Spanish Federation of Regional Radio and Television Organisations)
FTTB	“Fibre To The Building”
FTTN	“Fibre To The Node”
FTTP	“Fibre To The Premises”
GPS	“Global Position System”
HDTV	“High-definition television.”
IP	“Internet Protocol”
ISP	“Internet Service Provider”



MHP	“Multimedia Home Platform”
MPEG	“Moving Picture Experts Group.” Video and image compression standard
MPLS	“Multiprotocol Label Switching.” Protocol which manages traffic from a data network, depending on the typology of the information transported in data packets
NvoD	“Near Video on demand”
PDA	“Personal Digital Assistant”
STB	“Set-top box”
DTT	“Digital terrestrial television”
IPTV	“Television over Internet Protocol”
UMTS	“Universal Mobile Telecommunications System”
VoD	“Video on demand”
VoIP	“Voice over Internet Protocol”
VHS	“Video Home System.” Standard of video recording and playing
xDSL	“Any Digital Subscriber Line.” Transmission technologies which enable the local loop to transport up to dozens of megabits per second: A(asymmetric)DSL, V(very high rate)DSL, etc.

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