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Development of Digital Television in the European Union

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Table of contents

Introduction	5
1. Network roll-outs and the availability of digital TV services throughout Europe	16
1.1. Network roll-outs and deployment.....	16
1.2. Availability of Digital TV services	27
2. Digital TV market development	32
2.1. Growth rate and market size	32
2.2. Comparison with the USA and Japan.....	39
3. Main characteristics of DTV services.....	43
4. Market structure and major operators.....	48
4.1. Number of platforms and type of players involved.....	48
4.2. Market concentration and level of integration of the audiovisual chain.....	51
4.3. Technical choices and market organisation	53
4.3.1. Existing digital STB, CA and API systems in Europe.....	53
4.3.2. Market organisation	55
Conclusion.....	58

Table of illustrations

Table 1: Main TV satellite systems in the E.U. (2000).....	19
Table 2: Number of cable connections upgraded for digital transmission (end of 1999)	20
Table 3: Models of DTTV licensing in the E.U. countries.....	21
Table 4: Overview of DTTV roll-out plans in Europe.....	26
Table 5: Existence of Digital Services (mid-2000).....	28
Table 6: Position of digital bouquets by platform, in the European Union (on 30 June, 2000)	30
Table 7 : Digital TV households by country	33
Table 8: Forecast of Digital TV subscribers up to 2005 (in million).....	34
Table 9: Penetration rate of DTV subscribers up to 2005 (in % of TVHH)	34
Table 10: European digital TV households breakdown by network	36
Table 11: DTV revenues in 1999 in the E.U. (in M Euros)	39
Table 12: Digital satellite services in the United States.....	40
Table 13: Digital TV households comparison between the USA, the European Union and Japan.....	42
Table 14: Main US channels available in the European Union	49
Table 15: Conditional access and API systems in Europe	54
Table 16: Level of implementation concerning the 95/47/EC directive in some Member States.....	56
Figure 1: Cable homes passed out of total TV households (1997-2002)	16
Figure 2: Cable homes passed in Europe in 2000 (analogue and digital)	17
Figure 3: Satellite households in Europe in 2000 (analogue and digital) (in % of TV households).....	18
Figure 4: Roll-out of digital terrestrial television in mid-2000.....	23
Figure 5: Growth of Digital TV households number by country at the end of 2000.....	33
Figure 6: Digital Households in % of TVHH*.....	35
Figure 7: Digital subscribers breakdown between cable satellite and terrestrial networks at the end of 1999, (Millions of subscribers).....	37
Figure 8: Digital TV subscriptions revenues since 1996 (in MEuros).....	38
Figure 9: Digital TV homes breakdown between subscription based and free-to-air.....	43

About this report

The study was commissioned by DG XIII of the European Commission in support of the reporting on Directive 95/47 on the use of standards for the transmission of television signals.

Its objective is to provide market data and to monitor the development of digital TV in the 15 countries of the European Union, but not to formulate any policy advice.

The report covers 4 major issues:

- * the availability of digital television in Europe,
- * the analysis of services made available to the consumer,
- * the market structure of digital television,
- * technological issues, including conditional access.

This report constitutes the 2000 update of the two previous editions of the study.

This update has been based on a series of national surveys conducted in June and September 2000. Each national survey proposes an analysis of the digital television market and industry and a brief presentation of the digital service offering of the major providers and key figures.

The study "Development of Digital Television in Europe" was carried out by a consortium led by IDATE (France), together with CDG (United Kingdom), CTI (Denmark), Databank Consulting (Italy) and Techno-Z (Austria).

The opinions expressed in this Study are those of the authors and do not necessarily reflect the views of the European Commission.

Introduction

Terminology used

To make the analysis easier to understand, IDATE and its partners have agreed on the use of a certain terminology which makes it possible, for example, to characterise a particular phenomenon or certain new activities more effectively.

Thus, the terms employed in the text take the following sense:

* "Operator of digital TV services" refers to either "provider of a package of digital Free-to-air (FTA) TV channels and/or interactive data broadcast services" (such as, for instance, the BBC, RAI, ARD digital packages) or "operator of digital subscription TV platforms" (like digital Canal satellite, Premiere World, Canal+Televisie or Via Digital). This is to ensure that all the facets of developments in digital TV are properly taken into account.

"Digital TV platform" can therefore mean "a package of digital FTA TV channels", "a package of interactive data broadcast services" or "digital subscription-TV platform", while a digital TV service rather refers to a digital TV station, a i-TV service or a digital Premium subscription-TV channels.

However, a distinction is made between the various terms when this seems necessary for a better understanding of the analysis.

This study employs the term "Digital TV channel packager" instead of "operator of digital subscription-TV platforms" since it also conveys the sense of the activity of "packager".

* In order to make a clear distinction between the activity of "packager", which implies the "distribution" of several TV channels among households, and that of "supply" or "production" of one or more digital TV channels, it seemed appropriate to use the term "TV channel editor" to designate the role of supplying TV channels.

This distinction has thus made it easier to detect vertical integration moves, given that major TV players are making increasing efforts to take on both these essential functions within the audiovisual value-added chain.

* The concept of "Digital TV households" has in this second report again been used to refer equally to "Digital TV users" or "Digital TV subscribers", as it is clear that at the end of 2000 "Digital TV households" are mainly composed of "Digital TV subscribers". Yet, as the DTV market continues to develop and the digital TV set is slowly introduced on the market, the analysis will have to make a distinction between :

- "Digital TV users", that is consumers having access to free to air digital TV services either through a digital TV set or a digital set top box.
- "Digital TV subscribers" that is consumers who subscribe to at least one digital TV package.

* IDATE defines interactive TV as a service accessible on the TV set that differs from the continuous succession of broadcast video programmes. This definition therefore covers two major categories of service:

- Web access services via the TV set.
- Interactive services produced specifically for use on the TV set, whether or not relating to broadcast video programmes and based on i-TV technologies such as Mediahighway or Open TV. This category thus comprises:
 - Enhanced TV, which consists in accompanying the televised programme (video flow) with related supplementary information.
 - Interactive services independent of TV programmes. This type of service also embraces the broadcasting of text, sound, image and video destined for the TV set but not necessarily calling for a continuous video flow. But this is not excluded either. However, when the two systems are mutually independent, viewers may be able to keep the TV programme they wish to see in the form of a "vignette", while consulting the particular service in question (e-commerce, home banking, news, etc.).

Executive summary

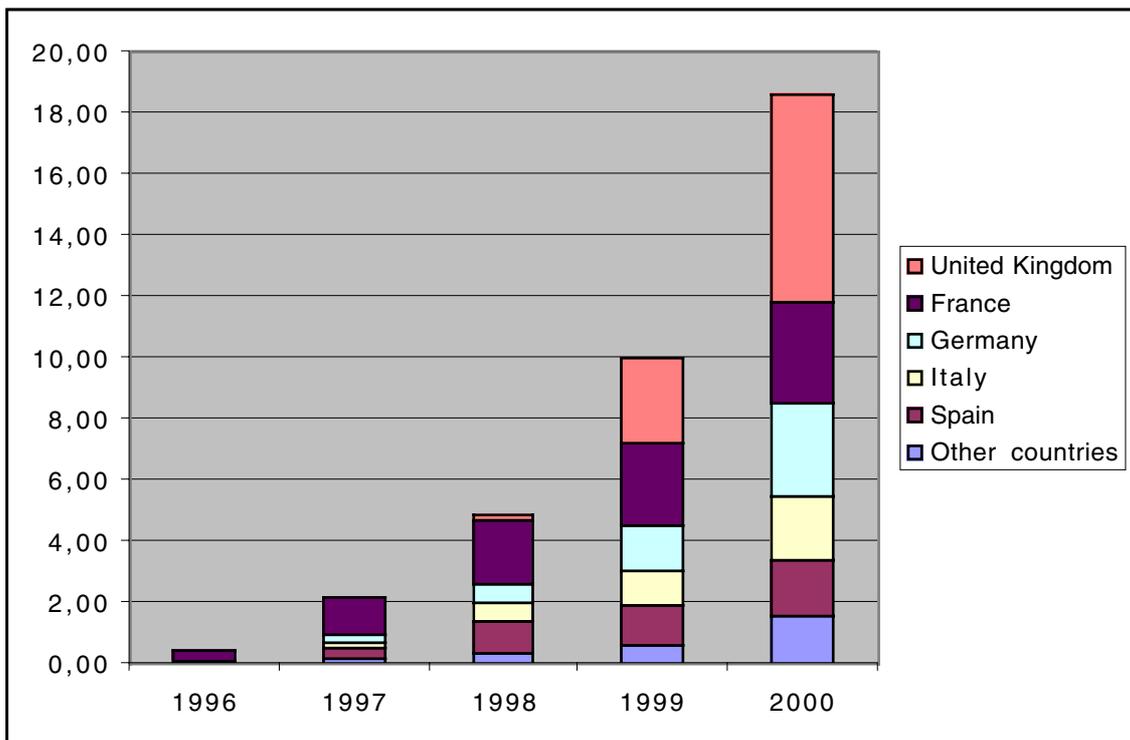
Encouraging market performance

a. Highly sustained growth

Since the beginning of 1996, the EU digital TV market has, on the whole, enjoyed a relatively high growth rate both in terms of numbers of subscribers and in value terms. This trend did not slow down during the recent period: the number of digital households rose to over 18,7 million in 2000 from 10,2 million in 1999, a 83% growth in one year. Here it should be recalled that there were only 2 million at the end of 1997.

Nevertheless, although this trend is encouraging, the digital take up remains relatively low in most of the E.U. Member States, only 12,5% of European TV households were digital TV households at the end of 2000.

Growth in the number of digital TV households by country up to 2000
(Million subscribers)



Source IDATE

IDATE estimates that the number of digital households was around 18,7 million in 2000 and should reach 59,6 million in 2005. It is also forecast that 38% of TV households would be digital in 2005.

b. Subscription-TV continues to drive the market

Throughout Europe, the economic model chosen for digital TV remains largely based on subscription-TV. At the end of 2000, the take-up of free-to-air digital TV was indeed still relatively limited.

Thus, in 2000, in value terms, the digital TV market in the European Union represented 7120 M EUROS showing a 83,5% increase compared with 1999.

	1996	1997	1998	1999	2000 (e)
DTV subscription revenues (in Meuros)	100,5	665,5	1 604,1	3880,9	7120

Source : IDATE

For the moment, the development of new free-to-air digital TV channels seems to be largely constrained by two related factors: advertisers' commercial requirements for large audiences and the relatively limited involvement of commercial TV channel operators in digital TV in certain countries. Some free-to-air digital services have however become available to consumers, as is the case in the UK or in Germany for instance. It has nevertheless to be kept in mind that most of them are simulcasts of analogue services.

Admittedly, given, in a first stage, the migration of existing public or commercial channels to digital broadcasting, and, in a second stage, the expected launch of new channels, an increasing share of licence fees and advertising expenditure should be invested in digital services.

Finally, IDATE estimates that digital FTA households will represent 21% of digital households in U.E by 2005.

c. Digital TV services are available in virtually all EU countries

While in mid-2000, digital TV via satellite and/or cable is available in all EU countries, it is only in the United Kingdom, Sweden and Spain that terrestrial DTV has made its appearance. Digital TV services via satellite were available in 13 of the 15 countries of the European Union (11 in December 1998). Digital services over cable were available in 10 of the 15 countries of the European Union.

DTV platform projects to be launched in the short term are numerous, notably in the Ireland, Finland or Sweden.

Existence of Digital Services (mid-2000)

Country	Satellite	Cable	Terrestrial
Austria	√	√	
Belgium	*	√	
Denmark	√	√	
Finland	√		+
France	√	√	
Germany	√	√	+
Greece	√		
Ireland	√	+	+
Italy	√	√	
Luxembourg	*	+	
Netherlands	√	√	+
Portugal	√		
Spain	√	√	√
Sweden	√	√	√
United Kingdom	√	√	√

+: Digital TV platforms to be launched by the end of 2001.

Source: IDATE

Digitisation of TV channels :

- * almost all TV channels available in Europe via satellite are broadcast in digital standard,
- * dual illumination (simulcast) is nevertheless still dominant over satellite.

Some significant progress in the digitisation of cable networks

The digitisation of cable networks has enjoyed significant progress since the end of 1997. At the end of 2000, probably more than 80% cable connections were upgraded for digital transmission (74% of cable homes passed in 1999).

A clearer picture of DTTV plans in almost all the Member States, but not entirely reflected in the DTTV availability

After the first two DTTV services were launched in 1998 (UK) and in 1999 (Sweden), only one new service became recently available in the E.U., i.e. in Spain (2000).

This slow roll-out of DTTV can be explained by several factors :

- * Regulatory uncertainties (for instance, see section 1.1 of the Irish profile for the RTE case .)
- * Technical issues (non-availability of set-top-boxes in Finland).
- * Commercial TV operators don't seem to be really committed to this broadcasting delivery method. They need large audiences and seem unwilling to help build the market.
- * The high penetration rate of cable and satellite networks certainly hampers the development of DTTV in some member states.

However, subscription-TV platforms over digital terrestrial networks can achieve positive results. At the beginning of 2001, Ondigital (UK) and Quiero TV (Spain) respectively account for 1 million and 210,000 subscribers.

Roll-out of digital terrestrial television in mid-2000



Member States have become increasingly involved in the definition of their DTTV roll-out policy. Most of them have implemented field trials and a growing number have started to upgrade the analogue terrestrial transmitter network to enable digital transmission.

In each of the other E.U. Member States (except Greece, Luxembourg and to a lesser degree Austria), the "technical" conditions for launching DTTV services are now roughly known (method of licensing, period of simulcast, broadcast coverage, etc.)

In the short term, (from 2001-2002) 4 new countries would have access to DTTV in the European Union (Ireland, Finland, the Netherlands and Germany). Finally, the coverage of digital terrestrial broadcasting should reach 90% of the population in the United Kingdom and in Spain by the end of 2000.

An increasing number of services

a. Numerous new services

On the whole, the introduction of digital TV has resulted in obvious changes in the TV market structure with the appearance of new subscription-TV platforms and numerous new TV channels: at the end of 2000, there were more than 30 digital TV platforms in the European Union, compared with 20 at the end of 1998. Since the introduction date of digital TV in Europe, there have been more than 100 new TV channels created each year, while the total figure for the period between 1990 and 1995 was only 150.

According to the European Audio-visual Observatory, there are around 600 digitally broadcast TV channels in the European Union in 2000

b. New types of services as well as new methods of marketing and packaging TV contents

In certain Member States, digital TV compared with analogue TV does not present clear benefits in the eyes of the general public:

- * Prices charged by digital subscription-TV platforms can seem relatively high, in particular in the countries with the lowest GDP per capita.
- * For certain EU countries, the "innovative nature" of digital TV remains rather difficult to demonstrate. In certain countries, the digital TV offering is seen as a pale derivative of the analogue service; the "national component" in the digital offering may, in the case of the smaller countries, be non-existent. Many of the apparently new channels are rehashes of existing channels or repeats.

But it has to be mentioned here that innovation generated by digital TV certainly lies firstly in the strategies that DTV platform providers have adopted in order to maximise revenues per subscriber. Two of the defining factors in the digital TV marketing and packaging domain are without doubt that:

- * the concept of big basic and extended basic is declining,
- * choice and convenience are the key drivers in marketing digital TV to the public but channel packaging has to be kept simple and organised around mini-packages.

Furthermore, digital technology has brought about new types of services. In certain E.U. countries the TV offering is now in a certain way richer, more segmented and varied.

- * Lastly, the recent years have witnessed a rapid development in i-TV services. Almost each of the DTV platforms in the major E.U. markets now includes new i-TV services. i-TV offerings usually comprise: EPG, E-commerce and TV-Banking services, Information and news services, games, or E-mail. The progresses observed in this domain constitutes a major evolution in TV domain, in particular the generalisation of interactive TV-based advertising, direct marketing, listing fees and e-commerce practices will give rise in the short-medium term to new TV programme production methods and also new sources of revenues for the TV broadcasting sector.

A progressively changing market organisation

a. The changing role of European cable-operators

Numerous incumbent cable providers are operating digital TV services, or intend to do so. Thus, together with the promises of broadband Internet and cable telephony, digital TV is the opportunity for the "Nordic cable-operators" to move from the "utility model" to the "Pay-TV" model and to capture a higher share of the value added.

The changing role of cable-operators who are progressively becoming "convergent broadband service providers" has generated conflicts with TV station and digital bouquet providers.

This trend finally results in two different market organisations which can apply to the pay-TV industry and which depend on the delivery mechanism used:

- * terrestrial and satellite where the TV service provider or platform operator does not control the network, that is to say the technical aspects of broadcasting related to the management of infrastructure and signal transport,
- * and cable networks where both functions (carriage and network management / packaging and marketing of services) are coming increasingly under the responsibility of the same operator.

b. A strong trend towards market integration along the TV value chain is to be observed

* A vertical integration is occurring along the TV channel and packaging segments. In this context, the function of DTV service packaging and marketing is considered as the key step in the value added chain by a great majority of market players. The struggle to gain control of this function must therefore be contemplated as the major issue as regards the evolution of market organisation, since as a bottleneck it conceals major risks of distortion of competition and abuse of dominant position, and all the more so since in most of the Member States, the DTV market remains controlled by the analogue TV leaders and powerful companies.

- * To a lesser degree, this trend can be observed along the entire value chain

c. More competition on the TV channel edition segment...

* Together with an increased number of digital pay-TV services, new TV channels have been created (including new free-to-air channels), most of the time under the control of the operators of the services themselves...

Nevertheless, new entrants have entered the TV industry:

- * Major US TV operators.
- * A few independent (from major operators) firms have also successfully entered the TV editing market.
- * Finally, one can also notice major progress in the interactive services segment compared with last year, sector which represents a real opportunity for small size players to get into the DTV market.

d. ... and more generally in the service provision segment.

Thanks to the conversion of cable and terrestrial networks (still to a limited extent) to digital, in a significant number of cases, this increased competition between delivery mechanisms and/or DTV platforms has led to a very dynamic market, thanks to a decrease in service and hardware prices (either directly, through competition, notably large promotion plans, or indirectly (through subsidy of digital set-top-boxes).

* The cable industry has also witnessed the arrival new entrants in national markets which will lead to an increasing number of digital offers in respective markets. Indeed, satellite operators would have to face a stronger competition. Moreover, the sale of Deutsche Telekom network will provide in the mid-term an easiest entry into the market in Germany.

* The prospect of new launches on the terrestrial network will also favour competition. However, the weight of existing players and new entrants will be a key factor.

Therefore, competition on service provision is increasing at a national level.

e. However the subscription-TV market remains concentrated.

The recent period witnessed an increasing concentration in European DTV markets.

* The DTV industry remains controlled by the analogue TV leaders and powerful companies.

* As previously mentioned, this trend has been particularly significant in the cable industry where notably powerful new entrants got into national markets.

* Moreover strong transactions took place between existing major operators.

* One can also consider the increasing involvement of incumbent telecom operators in the cable and/or satellite markets.

* Consequently, it can be inferred that a new entrant would face increasing difficulties to provide a new subscription-based digital platform in the most advanced markets. Even more, if one consider that the subscription markets cannot expand indefinitely and remember that content rights for sports and movies are mostly locked up.

f. "New" market structures partly result from commercial reluctance to negotiate interoperability and from the imperfect interoperability of DTV technologies. CAS technical interoperability is mature; however for the consumer, in reality, it depends on the willingness of operators to conclude commercial deals and implement simulcrypt. Concerning APIs, even if MHP adoption may help, technical interoperability between today's systems remains very limited.

Strategies for rapidly building up a customer base have developed according to two main models in each European country.

* In most countries, subscription-TV and digital set-top-box rental is the primary model. It is to be noted that it is in these countries that digital television has rapidly developed.

* To start with, some operators chose to make decoders available on an unsubsidised, sell-through basis. This strategy has generally met with failure and has led to the adoption of a mixed model that combines sale and rental.

* Except in the British case, STB subsidisation is quite unusual in the E.U.

* In most countries, sell-through of decoders remain relatively limited.

The interoperability between set-top-boxes has still not perfectly materialised.

* Transcontrol at cable head-ends has been more or less given up as it seemed less cost-effective than Simulcrypt agreements.

* Today, interoperability between conditional access systems is mainly organised through Simulcrypt agreements. These agreements are however sometimes difficult to conclude for commercial reasons.

* The adoption of the MHP specifications may help to overcome the interoperability issues resulting from the various APIs available.

Upon completion of this three year report, it may be of some interest to look back at the evolution of the digital TV market since 1997 and consider some key issues for the forthcoming years.

The digital television market has developed strongly since 1997

- * The market value for digital TV grew 665 M Euros in 1997 to 7,1 billion euros for 2000, topping 18,7 million digital households by end 2000.
- * The number of digital channels available throughout Europe strongly increased, reaching 600 in 2000, this number resulting both from the launch of new channels and the simulcast of existing analogue channels.
- * Numerous innovative services have been created, including enhanced pay-per-view and television interactive services such as interactive advertising, information services or e-commerce over the television set. Some of these services have been enabled thanks to the connection of the digital set-top-box to the phone network.

Certain hypotheses that were foreseen did not come to pass

- * It was expected that a retail market for digital set-top-boxes would develop; it has not been the case, despite several attempts to launch decoders for sale. Technical uncertainties have slowed down the acceptance of set-top-boxes as retail purchase by consumers; prices remained high and, above all, pay-TV digital operators chose the rental model, which certainly has been positive for the take-off of the market.
- * Despite significant recent progress, the roll out of digital cable networks is not in line with expectations: in numerous markets cable operators have been primarily involved in consolidation processes, regulatory uncertainties (separation of telephone and Cable TV businesses), operators did not know in the first place which strategy to implement (focusing on broadband Internet access or on bundled offers of triple play type: television, telephone and Internet)
- * Bundling of TV services, telephone and Internet did not develop as fast as contemplated, and remain relatively rare, except in the UK. The late digitisation of cable networks is probably the major explanation, together with technical (e.g. voice over IP) and regulatory (e.g. the process of selling cable assets by Deutsche Telekom) uncertainties

Some key issues will impact the development of digital television in the European Union

- * The economics of cable operations remain uncertain (for instance, UK cable operators remain in the red despite a high rate of bundling between television, phone and Internet access).
- * The scenario for the switch of free-to-air television from analogue to digital is not completely defined.

Where the business model for subscription digital TV services is well known, the "chicken and egg dilemma" may apply to the situation of free-to-air television. A significant number of digital households will be needed to generate enough advertising revenues to support the launch of original free-to-air channels that are not a simple simulcast of existing analogue channels. This new programming will be the key incentive for free-to-air households, who do not benefit from the subsidisation of a set-top-box by a pay-TV operator, to migrate to digital.

The fact that a strong base of pay-TV set-top-boxes has now developed, and that consumers can access free-to-air television using this set-top-box, opens up a first market for advertising supported channels. But this factor should not be overestimated, as free-to-air channels compete in this case with an extended offer of pay-TV channels.

For member states, digital terrestrial television is intended to play a key role in the migration of free-to-air television to digital. Scenarios for its introduction strongly vary between countries and may result in strong differences in the rhythm for the analogue turn-off.

- * Technological developments will, to a certain extent, impact the digital TV market.

Storage capacity provided by hard drive disks incorporated in TV sets and set-top-boxes would lead to new ways of using digital TV programs (watching digital channels on a "VCR mode", pre-recording favourite programs).

The development of broadband networks could promote the delivery of digital television via Internet.

- * Will a pan-European market continue to develop?

A pan-European market could provide some economies of scales as regards the operations of television channels. But the possibility to acquire pan-European rights remains a bottleneck.

Moreover, the need to address the final market on a country per country (or linguistic zone per linguistic zone) is the preferred strategy of television operators. The most likely scenario is therefore the development of pan-European networks of channels active in different European countries (Fox Kids, 13th Street...) rather than true pan-European channels.

1. Network roll-outs and the availability of digital TV services throughout Europe

1.1. Network roll-outs and deployment

The European national markets present different levels of cable and satellite networks roll-out

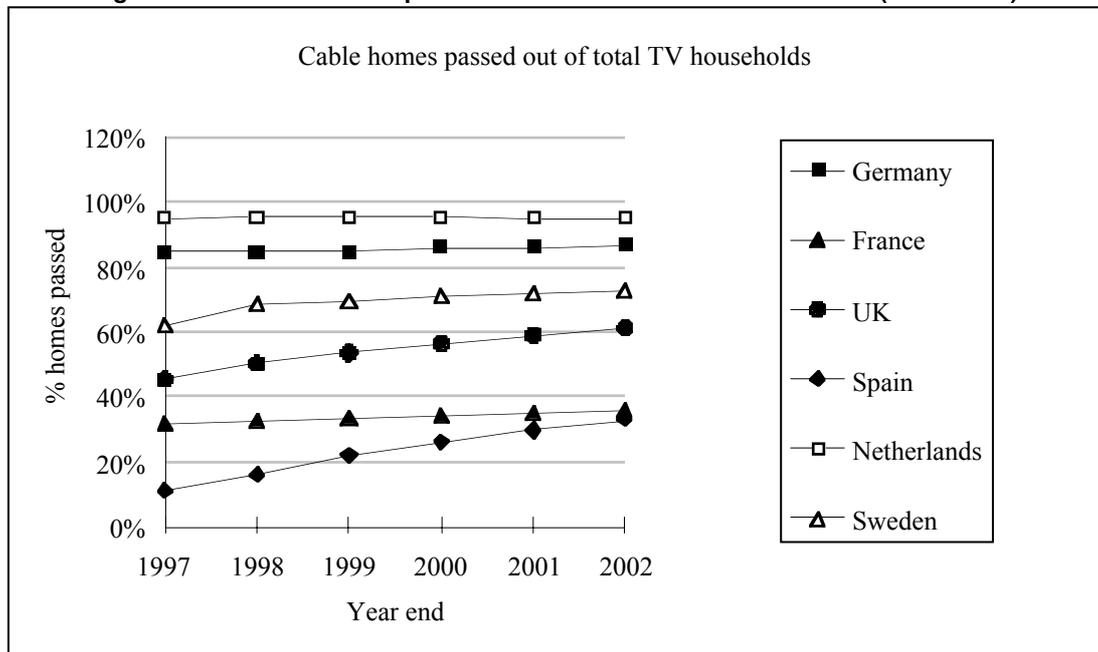
Cable

In 2000, the European Union numbered over 80 million cable homes passed throughout the territory, against 79 million in 1999. About 47 millions homes, representing 31,6% of total TV homes, actually subscribed to the service (analogue and/or digital).

Since 1994, the cable networks roll-out on a European scale has then experienced an average growth rate of 7 % a year.

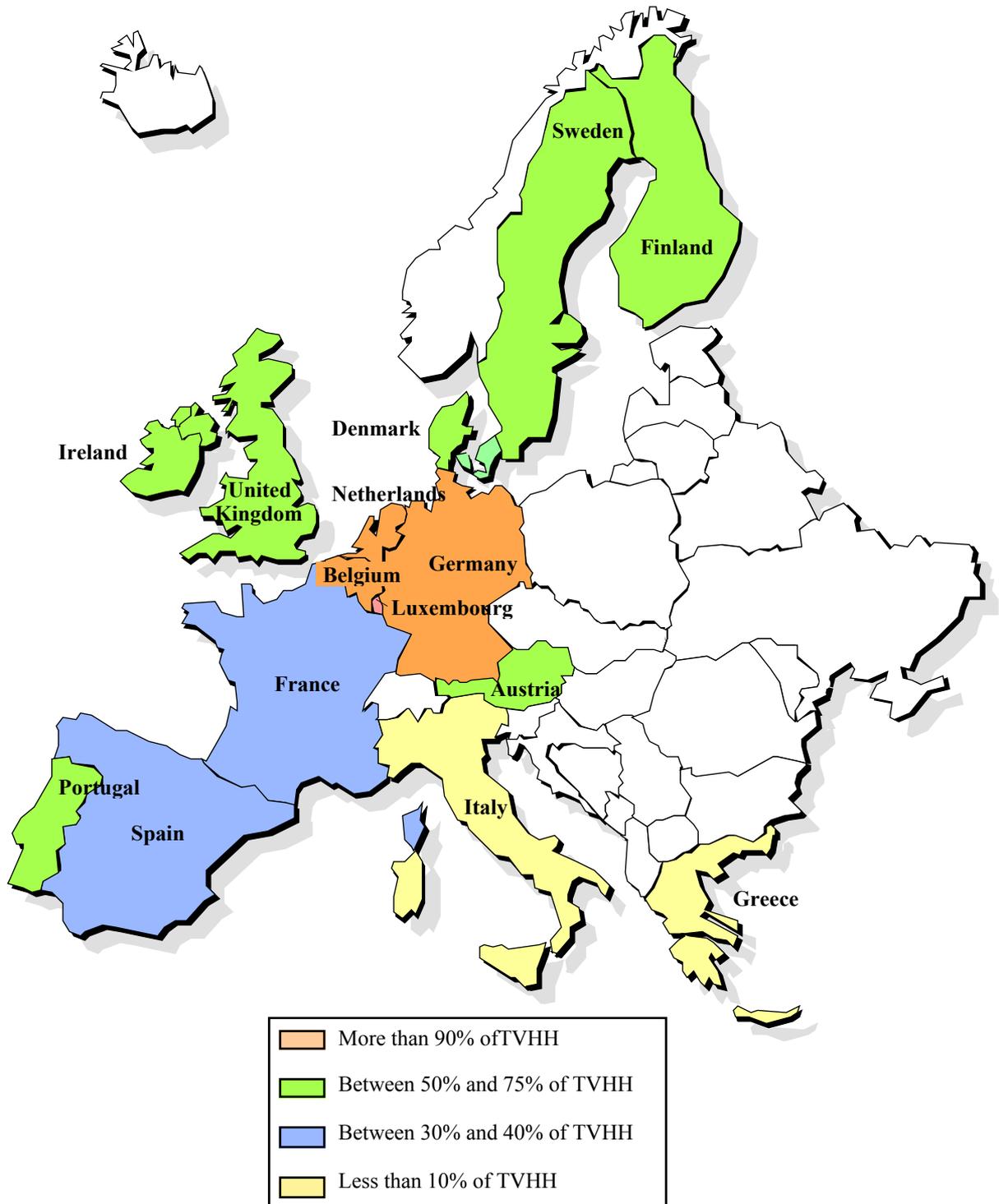
EU Member States, however, have not necessarily all experienced the same trend.

Figure 1: Cable homes passed out of total TV households (1997-2002)



Source: European Audio-visual Observatory, Kagan, Analysys

Figure 2: Cable homes passed in Europe in 2000 (analogue and digital)
(in % of TV households)

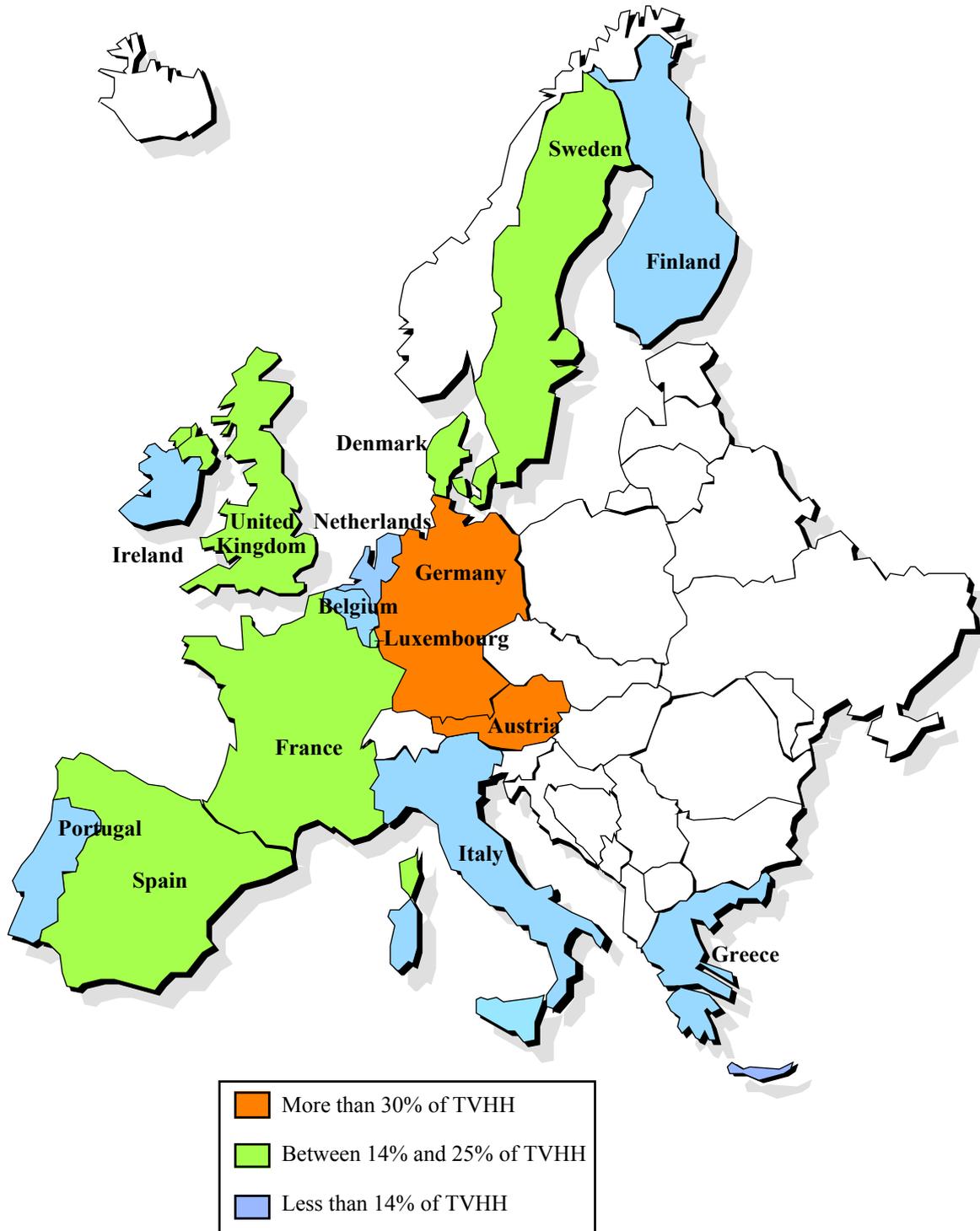


Satellite

At the end of 2000, around 30 million European TV households were equipped with satellite dishes, against 15 million in 1994 (12,5% average annual growth rate).

Therefore, since 1996, the number of European TV households receiving TV exclusively through a terrestrial aerial, has been decreasing from 85,5 million to around 72,8 million in 2000; thus undergoing an average negative annual growth rate of 5,2%.

Figure 3: Satellite households in Europe in 2000 (analogue and digital)
(in % of TV households)



The growth rate of digital network deployment has steadily increased since the end of 1997 and there is now a distinct trend toward the digitisation of cable and terrestrial networks.

Since 1996, Digital Satellite Broadcasting has covered the whole E.U. territory, mainly thanks to the Astra and Eutelsat satellite systems.

Starting in 1994-1995, European satellite system operators proceeded with the investments necessary for making digital transponders available to digital services operators by 1996.

Almost all the TV channels available in Europe via satellite, broadcast in digital standard and they often are encrypted. Yet a large part of these services continue to broadcast in analogue as well in order to ensure a "soft" transition to digital.

Table 1: Main TV satellite systems in the E.U. (2000)

Satellite systems	Digital Platforms	Countries mainly targeted
	BskyB	Great Britain, Ireland
	Canal Satélite Digital	Spain
	Premiere world (DF1, Premiere Digital)	Germany, Austria
	ZDF.vision, ARD Digital	
SES- Astra	ORF, TW1	Austria
	ABsat	France, Belgium, Luxembourg
	Canalsatellite numérique	
	CanalDigitaal	The Netherlands
	Stream	
	RAI	Italy
	D+	
Eutelsat	ABsat	France, Belgium, Luxembourg
	TPS	
	MSG	Germany
	NOVA	Greece
Hispasat	Via Digital TV cabo	Spain Portugal
Thor	Canal Digital AS	Finland, Denmark, Sweden
Intelsat	Canal Digital AS	Finland, Denmark, Sweden

Source : IDATE

The digitisation of cable networks has observed significant progress since 1998. At the end of 2000, probably more than 80% of cable connections were upgraded for digital transmission.

* Detailed statistics are only available for 1999 :

Table 2: Number of cable connections upgraded for digital transmission (end of 1999)

	Homes passed (in thousand)	% of which upgraded	Upgraded for digital transmission
Italy	1,500	100.0%	1,500
Germany	33,300	90%*	29,970
France	7,227	80.3%	5,800
Belgium	3,947	80.1%	4,911
Denmark	1,700	67.6%	1,150
Spain	3,900	53.8%	2,100
United Kingdom	12,700	53%*	6,731
Sweden	2,700	48.1%	1,300
Austria	1,700	47.1%	0,800
Portugal	2,300	37.2%	0,855
Total EU 15	79,089	73.7%	58,279

*estimated on the basis of qualitative data

Source: IDATE

Three DTTV services have been launched since 1998: in UK (1998), in (Sweden) (1999) and Spain (2000). Most of E.U. Member States have implemented field trials and a growing number have started to upgrade the network of analogue terrestrial transmitters for enabling digital transmission.

* Digital terrestrial television (DTTV) in the United Kingdom was launched on 15th November 1998. Currently, about 30 digital services are broadcast via the digital terrestrial network over 6 multiplexes by 4 multiplexes operators (BBC, Digital 3&4, SDN and OnDigital)

* In Sweden, the first regular transmission in the network took place on the 1st April 1999, and covered 50% of the population. Currently, there are six digital networks with capacity for 30 channels. Furthermore, terrestrial TV is expected to expand to 78% of swedish viewers in 2001. If one consider the subscription level, the figure is reaching 13000 by May 2000, increasing by 1000 new households per month.

* In Spain, the National Technical Plan identifies 11 multiplexes (5 national, 4 regional and 2 local). These multiplexes can carry 4 programmes. The target date for the turn-off of analogue transmissions is 2012. Private broadcasters shall start broadcasting in digital no later than 2002. Quiero TV, a subscription-TV package including 14 programmes, already launched its offer in May 2000.

In almost every E.U. Member States, the "technical" conditions to launch DTTV services are now roughly known.

* A detailed analysis of the DTTV roll-out plans in each of the E.U. countries leads to the following observations.

- The allocation of terrestrial capacity generally observes the following principles :

In most cases, priority access or even "gifted" capacity is given to the incumbent terrestrial broadcasters.

Licensing is either multiplex-led or service-led though sometimes it can be of a twofold nature (multiplex and service-led), as it is the case in Spain and is likely to be the case in Ireland.

Licensing	Description
Multiplex - led	Separate licensing of multiplex and programme services
Service - led	Licensing of programme services on predetermined multiplexes which are technically controlled by the terrestrial TV network operator and may commercially controlled either by the terrestrial TV network operator or a third party.

* Simulcasting is the favoured solution to ensure a "soft" transition from analogue to full digital terrestrial broadcasting.

Table 3: Models of DTTV licensing in the E.U. countries

Country	Model of licensing adopted	Simulcasting
UK	Multiplex led	Yes
Sweden	Service led	Yes
Spain	Hybrid	Yes (but not mandatory)
Finland	Service led	Yes
Ireland	Hybrid	Yes
Germany	Service led	Yes ("islands"conversion approach)
Netherlands	Multiplex led	Via cable
Denmark	Service led	Yes
France	Service led	Yes
Italy	Multiplex led	Yes

Source: IDATE

* A 10 to 15 years period of simulcasting is generally envisaged though the turn-off date of analogue broadcasting may be dependent on reaching a certain level of coverage and penetration of digital services.

* Broadcast coverage at launch varies from country to country. In general, in order to limit the simulcast period and speed the DTTV penetration rate up, a rapid network deployment is sought, provided investments necessary to enable digital transmission on a nation-wide level are not too high. Thus by the end of 2002 it is likely that digital terrestrial broadcasting could cover the large majority of the E.U. Member States, 50 to 70% of the population.

* Field trials and test transmissions have been implemented in almost all the E.U. Member States

* Portable reception is variously considered. While in the UK, Sweden, Spain or Finland the discussion about the possible implementation of this "functionality" is or has been closely linked with the extra-costs it entailed for upgrading the network, in Germany, Belgium or in the Netherlands it has

been considered an essential condition for a successful DTTV development since TV households are mainly connected to cable networks. On the other hand, given the peculiarities of DTTV roll-out in Ireland, it is unlikely that portable reception will be implemented. Elsewhere, this issue is still in debate.

* DTTV often represents an opportunity to bring new terrestrial TV programmes to the viewers, to launch pay-TV terrestrial offers or to strengthen or develop local or regional TV stations, such as in Sweden or Spain.

A clearer picture of DTTV plan not entirely reflected in its availability.

* Relative progress has been achieved in Denmark, Italy, France, Portugal and Belgium. In all of these countries, test transmissions are now on-air. However, the DTTV launch is still hung up on either political decisions or procedures, largely dependent on problems of frequency planning, or delayed by cost obstacles.

* In **Denmark**, in November 2000, the Danish Culture Ministry informed that it had given the green light to the development of the terrestrial based digital TV. Denmark should be able to receive up to 20 Danish digital TV channels. It is expected that the new digital terrestrial channels will be on air during 2001.

* In **Italy**, two alternative development strategies have been envisaged:

- If the transition to the digital is not going to be completed before the year 2010, in accordance with the National Frequency Plan, an option would be to realise 4 national SFNs (Single Frequency Networks), for a total of 4 multiplexes and 16 digital programmes.
- In case of an earlier transition to digital, by the year 2006, the Italian government should issue a new Digital Frequency Plan.

* In **France**, the new audio-visual law, adopted by the parliament on June 2000, provides the framework for the set up of terrestrial TV. In particular, the 36 terrestrial digital television frequencies (6 MUX for 6 networks) are allocated by the CSA, on a network by network basis. The first terrestrial digital television broadcasts should begin in the first quarter of 2002, at the earliest and the switch-off date for analogue television transmission is not likely to occur before 2010/2015.

* In **Portugal**, the government has unofficially announced in May 2000 that it will offer only one digital licence in order to ensure the economic viability of the project. DTTV should start in the first half of 2002. The switchover from analogue to digital is foreseen in 2008.

* In **Belgium**, the high cable penetration linked to the weakness of outdoor receiving aerials lead to a portable reception use of DVB-T. According to recent information, a DVB-T transmitter station will be put in operation in the Brussels area in 2001, carrying two multiplexes by the end of 2002. The Flanders region will be covered with 3 to 5 multiplexes.

Figure 4: Roll-out of digital terrestrial television in mid-2000



In the short term (2001-2002) 4 new countries would have access to DTTV.

- * In **Finland**, the plan is that the first multiplex should reach 50% of the population.
- * In the **Netherlands**, political support is given to the DVB-T project from the DIGITENNE consortium¹. Considering that technical trial of DVB-T should start in January 2001, it will effectively be commercialised by May 2001. Full national covering of the network is aimed by 2003.
- * In **Ireland**, following the wrangling with the government about the terms of its participation, RTÉ deferred its plan to begin digital television services in October 1999. This came as a disappointment to the channel. It had wanted to start as soon as possible - particularly before SkyDigital and NTL could get their services off the ground. As a result of this delay, there will be considerable competition from other platforms when DTTV eventually gets off the ground.
- * There is a debate in **Germany** over whether it still makes sense to have a full coverage by terrestrial broadcasting, taking into account that only about 15% of households are receiving TV programmes via terrestrial signal. The transition towards DTTV is however planned to start in 2001 and should be finished by 2010. It has not yet been decided which region should be digitised first.
- * In other parts of the European Union, that is to say in Greece and Austria Digital Terrestrial TV is still not considered as a real priority and the method of implementing it is still only being debated.

Strengths and weaknesses of DTTV technology

Technology strengths	Technology weaknesses
<p>The main strengths of DTTV will be its widespread availability and its capacity over analogue.</p> <p>It will allow virtually the whole of the population of Europe to receive digital services.</p> <p>DTTV's greater capacity will allow broadcasters to offer a wider choice of channels, as well as pay-TV and data services.</p> <p>Users can receive DTTV signals when moving.</p>	<p>For managing pay-TV and interactive services such as Internet access, it means that DTTV has to be combined with another communications technology (usually the telephone) to allow the required interaction.</p> <p>In addition to the unidirectional nature of DTTV, it lacks capacity as compared with cable TV or satellite TV, each of which are expected to have in excess of 100 channels. This will hamper the ability of DTTV to offer potentially popular but bandwidth-hungry services.</p>

¹ The DIGITENNE consortium includes 5 main participants : NOZEMA (national terrestrial broadcast infrastructure operator), NOS (co-ordination body for public broadcasting), VESTRA (association of 14 commercial broadcasters), CANAL+, KPN Telecom and NOB (a national broadcasting production company).

Strengths and weaknesses of DTTV technology (cont.)

Opportunities	Threats
<p>Customers not wishing to subscribe to cable TV or satellite services will have the opportunity to access digital services via DTTV.</p>	<p>DTTV could become a non-attractive television service, considering that terrestrial broadcasting is already weakened in countries with high cable penetration such as the Netherlands and Belgium. In these areas, customers of cable and satellite are likely to migrate to digital cable and satellite.</p> <p>Extent and areas of competition with cable and satellite.</p> <p>Digital terrestrial is a technology which will enjoy varying degrees of success in different countries. As already mentioned, it is unlikely to be a significant distribution mechanism for entertainment services in some countries, and could find niche markets that would exploit its capabilities well. An example of this might be the use of DTTV in Germany for broadcasting to moving vehicles.</p> <p>Finally, it must be noticed that the roll-out of digital terrestrial television services is slow and its success would largely depend on countries' specific implementations. Moreover, the respective national forecasts concerning the analogue switch off (largely depending on the deployment of this network in numerous in numerous markets) seem to be optimistic</p>

Source: IDATE

Table 4: Overview of DTTV roll-out plans in Europe

Country	Belgium	Denmark	Finland	France	Germany	Ireland
Licence granting		?	June 99	First half of 2001	?	Autumn 1999
Licensees			YLE, MTV Oy, Wellnet oy, Suomen TV, City-TV Oy, Oy Ruutunelonen Ab, Helsinki Media Company Oy, Werner Soderstrom Oy, Deuterium Oy			RTE, TV3-Tnag, BBC, UTV, C4, C5, and Digico
Launch Date	2001?	2001 ?	2000/2001	First half of 2002	2001	2001
Launch Coverage		50% ?	50% (70% by the end of 2001)	50%?	"island migration" strategy over a period of 1 to 2 year	98%
Analogue Switch Off		After a simulcast period of 10-15 years	2006	2010/2015	2010	?
Test Transmissions	√ (Early 2000) (Around Brussels)	√ (Since Nov. 1999) (Greater Copenhagen)	√ (Since Oct. 1997)	√ (Since 1997 / Extended in 1998)	√ (In 5 locations since 1997/98)	√
Number of Multiplexes	5 to 7 ?	?	√ (7 when analogue transmission switches off)	6	Possibly 3 at launch	6

Table 5: Overview of DTTV roll-out plans in Europe (cont)

Country	Italy	Netherl.	Portugal	Spain	Sweden	UK
Licence granting	?	During 2000	During 2000	June 1999	June 98	1997
Licensees				TVE, Regional TV operator, A3, Telecinco, Canal+ and Quiero	TV4, Kanal5, SVT, Kunskaps TV, TV8, TV3, Canal +, Nollettaren, Cell Digital TV, Skånekanalen	BBC, ITV, C4, C5, SC4 and Ondigital
Launch Date	?	May 2001	First half of 2002	1st quarter of 2000 and not later than 2002	1/04/99	15/11/98
Launch Coverage	?	?	?	?	50% (78% in 2001)	50/66% (92% in 2000)
Analogue Switch Off	2006/2010 ?	2010?	2008	2012	2008/2012	2006/2010
Test Transmissions	√ Rai experimental DTT service + Mediaset and Telepiu field tests	Forecast for January 2001	√ (Since June 98)	On-air	On-air	On-air
Number of Multiplexes	4	5	4	11	6	6

1.2. Availability of Digital TV services

While at mid-2000, digital TV via satellite and/or cable is available in virtually all EU countries, it is only in the United Kingdom, Sweden, and Spain that terrestrial DTTV has made its appearance.

* In mid-2000, Digital TV services via satellite are available in 13 of the 15 countries of the European Union.

* In mid-2000, digital services over cable are available in 10 of the 15 countries of the European Union.

- Digital cable services appeared throughout the first three quarter of 1999, in the Netherlands, Belgium, Spain and the United Kingdom. They have been recently joined by Luxembourg in November 2000.

Table 5: Existence of Digital Services (mid-2000)

Country	Satellite	Cable	Terrestrial
Austria	√	√	
Belgium	*	√	
Denmark	√	√	
Finland	√		+
France	√	√	
Germany	√	√	+
Greece	√		
Ireland	√	+	+
Italy	√	√	
Luxembourg	*	+	
Netherlands	√	√	+
Portugal	√		
Spain	√	√	√
Sweden	√	√	√
United Kingdom	√	√	√

+: Digital TV platforms to be launched by the end of 2001

Source: IDATE

Most European households have therefore access to an increasing choice of digital TV offers thanks to competing digital networks and platforms.

* In mid-2000, digital TV services are available over the 3 broadcasting networks in the United Kingdom, Sweden and Spain, whilst in Finland, Belgium, Ireland, Portugal and Greece the consumer can only access DTV services via one network.

* Since mid-1999, the most mature markets, saying Italy, Spain, United Kingdom and France, did not present an increase of competition normally involved by the appearance of new platforms. Only in Spain, the arrival of Quiero TV brought a significant change in the market. However, competition is increasingly occurring between cable or satellite services themselves or between satellite and cable platforms, through an extended availability of DTV offerings, new packages and interactive services.

* Digital free-to-air TV packages are progressively appearing. Yet these can often be argued to be "conditional" free-to-air services, since in most of the cases, for legal reasons², the DTV signal is encrypted, as it is the case in Sweden, France, or in the UK.

- In **Italy**, since July 1999, there is a new free-to-air digital offer of the public broadcaster RAI that operates on Eutelsat/Hotbird II.
- In **Germany** besides the free-to-air satellite digital packages of the public service broadcasters, ZDF and ARD, most of the nation-wide receivable commercial programmes such as the package RTL, Sat 1, ProSieben... are transmitted via satellite both in analogue and digital standard.
- In the **UK**, both digital satellite and terrestrial offer, as free, the standalone services of six channels from the BBC together with Channels 4 and 5.

The process of "conditional" FTA services applies for the public DTTV Swedish offering and for the public satellite Austrian DTV package or for the French free-to-air national terrestrial TV channels which are also broadcast via TPS over satellite.

² ...mainly for the payment of licence fees or for programmes rights reasons

Most of the operators involved in DTV have favoured national strategies for the distribution of their TV package

Most of digital services launched in Europe between 1996 and mid-2000 serve one single national market. While obvious technical reasons account for this situation in the case of digital cable TV platforms, legal and marketing reasons apply in the case of digital satellite services: most of the television channels proposed by the digital packages have acquired rights for one territory (e.g. France) and not for one language (i.e. French).

However, some smaller markets are "dependent" on neighbouring countries, such as is the case for Ireland and the United Kingdom, France and French-speaking Belgium, Germany and Austria. In this case, the same services are thus made available to more than one country³.

The Nordic market constitutes the exception, since Finland, Denmark and Sweden are currently served by a same digital satellite service which however offer options for different countries/languages. The reasons can be found in the side of economic rationale as it is clear that profitability for a satellite digital platform in those "small" countries with a common culture lies in a Nordic approach to the market.

Overall, the different national situations suggest that transfrontier programming articulated with national branding and distribution could be the correct balance between economies of scale and proximity to the final customer. However, the country per country negotiation of television rights does not favour this evolution.

There are several DTV platforms planned for launch in the short term

Notably, the following announcements have been made:

- * In **Sweden**, UPC Sverige AB (formerly Stjärn TV) plans to introduce digital TV in the first quarter of 2001. Once commenced, it will introduce 70-80 channels.
- * In **Austria**, Telekabel has announced to launch a digital TV service in Vienna. It planned to digitise its analogue pay-TV offer "Telekino" by early 2001.
- * In **Ireland**, the cable companies NTL and IMC have been rapidly upgrading their networks and will be launching services in the fourth quarter of 2000.
- * In **Finland**, it is expected that three multiplexes will be operational over DTTV by the end of year 2000.

³ ... sometimes in unclear legal conditions : one can consider here for instance the availability of the French satellite DTV bouquets in Belgium.

Table 6: Position of digital bouquets by platform, in the European Union (on 30 June, 2000)

Country	Digital satellite	Digital cable	Digital terrestrial
Germany	<ul style="list-style-type: none"> • Premiere World October 1999 	<ul style="list-style-type: none"> • Premiere World October 1999 • Mediavision September 1999 	<ul style="list-style-type: none"> • Partial launch by zone, late 2000 • A number of trials since 1998 • Theoretical termination of analogue in 2010
Austria	<ul style="list-style-type: none"> • Premiere Digital October 1999 	<ul style="list-style-type: none"> • Premiere Digital October 1999 	<ul style="list-style-type: none"> • Still under discussion • One trial conducted by the ORF • No date planned for termination of analogue
Belgium	<ul style="list-style-type: none"> • No national offer 	<ul style="list-style-type: none"> • Le Bouquet/Canal+ Belgique / January 1999 • Canal Digitaal / April 1998 	<ul style="list-style-type: none"> • Bouquet project by public services but no national policy • No date planned for termination of analogue
Denmark	<ul style="list-style-type: none"> • Canal Digital / October 1998 • TV 1000 / 25 April , 2000 	<ul style="list-style-type: none"> • Tele Danmark Spring 1998 • STOF A November 1998 	<ul style="list-style-type: none"> • Still under discussion • No set policy, but a probable period of simulcast of 10 or 15 years • Trials conducted in Copenhagen since November 1999
Spain	<ul style="list-style-type: none"> • Canal Satélite Digital February 1997 • Vía Digital / September 1997 	<ul style="list-style-type: none"> • Ono May 1999 • Agrupacion de Operadores de Cable 1999 	<ul style="list-style-type: none"> • Launch of Quiero TV, digital terrestrial bouquet in May 2000 (fewer than 100,000 subscribers in September 2000) • Simulcast of national analogue channels should begin in March 2002 at the latest. • Two new national over the air programmes should soon be launched (decision to be made in October) • Simulcast of regional channels will be ensured; one or two new regional channels should be created.
Finland	<ul style="list-style-type: none"> • Canal Digital / October 1998 • TV 1000 / 1 April, 2000 	<ul style="list-style-type: none"> • No national offer 	<ul style="list-style-type: none"> • Partial launch in September 2000 in the south of the country • Starting in late 2000, three multiplexes will be operational and should cover 100% of the population by 2006, date by which analogue broadcasting should have been phased out.
France	<ul style="list-style-type: none"> • CanalSatellite April 1996 • TPS December 1996 	<ul style="list-style-type: none"> • NC Numéricâble / April 1997 • Noos / September 1997 • France Télécom Câble / September 1997 	<ul style="list-style-type: none"> • Adoption of the new Audiovisual Law in August 2000 which covers, notably, the conditions for the launch of digital terrestrial TV. • Calls for tender and awarding of the first licences should take place in 2001. • The actual launch is not likely to take place until the first half of 2002. Simulcast of existing analogue channels is planned. Analogue transmissions are not likely to cease until 2010•2015.
Greece	<ul style="list-style-type: none"> • Nova December 1999 (official launch) 	<ul style="list-style-type: none"> • No national offer 	<ul style="list-style-type: none"> • No government action plan in view. • Analogue's major players do not support digital, for reasons of cost. • Few hertzian frequencies available. • Calls to tender launched in October 1999 for 2 analogue licences for pay•TV services. The beneficiaries must agree to migrate to digital when the time comes.

Table 7: Position of digital bouquets by platform, in the European Union (on 30 June, 2000)

Country	Digital satellite	Digital cable	Digital terrestrial
Ireland	<ul style="list-style-type: none"> • Sky Digital / Early 1999 	<ul style="list-style-type: none"> • NTL 4th quarter 2000 • IMC 4th quarter 2000 	<ul style="list-style-type: none"> • Launch initially planned for autumn 1999, postponed to summer 2000, then to 2001. Services must ensure 98% coverage of the population in order to be awarded a licence. No date planned for the end of analogue.
Italy	<ul style="list-style-type: none"> • D+ / March 1996 (satellite+cable subscribers) • Stream / September 1998 	<ul style="list-style-type: none"> • Stream / September 1996 • D+ / 1998 	<ul style="list-style-type: none"> • Scenarios for the launch of digital terrestrial under discussion.. Probable end of analogue transmission in 2010. Uncertainty regarding the future business model (free or paid).
Luxembourg	<ul style="list-style-type: none"> • No national offer 	<ul style="list-style-type: none"> • Select TV / Launch planned for autumn 2000 	<ul style="list-style-type: none"> • No discussions currently underway.
Netherlands	<ul style="list-style-type: none"> • Canal+ / Late 1999 	<ul style="list-style-type: none"> • Mr Zap (Mediakabel) / February 2000 • Canal+ / October 2000 	<ul style="list-style-type: none"> • Digital terrestrial project developed by the DIGITENNE consortium, regarding programming, service provision and infrastructures. The consortium comprises public and private broadcasters, the analogue terrestrial operator, the incumbent telecoms operator DIGITENNE should obtain a licence for the 5 available multiplexes. The first trials are likely to be begin in January 2001 and the commercial launch in May 2001. The territory should be entirely covered by 2003.
Portugal	<ul style="list-style-type: none"> • TV Cabo Portugal September 1998 	<ul style="list-style-type: none"> • No national offer 	<ul style="list-style-type: none"> • A call for tenders for awarding of a single licence for four multiplexes should be launched late this year. Four national channels will benefit from mandatory simulcast. • Digital terrestrial should be launched in the first half of 2002. Analogue transmission should have been phased out by 2008.
United Kingdom	<ul style="list-style-type: none"> • Sky Digital October 1998 	<ul style="list-style-type: none"> • NTL/CWC / July 1999 • Telewest / November 1999 	<ul style="list-style-type: none"> • Effective launch of Ondigital in November 1998. 92% of the population covered in 2000. The goal is 99.4% coverage, with 95% of homes equipped with a digital reception device, before terminating analogue. Ondigital subscribers numbered 774,000 in late June 2000
Sweden	<ul style="list-style-type: none"> • Canal Digital / June 1998 • TV 1000 / April 2000 	<ul style="list-style-type: none"> • Com Hem / November 1997 UPC Sverige AB / 1st quarter 2001 	<ul style="list-style-type: none"> • Launch of Senda AB on 1 April, 1999 covering 50% of the population. Coverage should reach 78% in 2001. Around 13,000 homes subscribed in mid-2000. Termination of analogue transmission is likely to occur 10 years after the launch of digital terrestrial.

2. Digital TV market development

2.1. Growth rate and market size⁴

Since the beginning of 1996, the E.U. digital TV market has, on the whole, enjoyed a relatively high growth rate. The progresses are particularly relevant in 2000, thanks to the british market.

At the end of 2000, the number of digital TV European households must be around 18,7 million (a 12,5% penetration rate). It represented 10,2 million in 1999 (a 6,9% penetration rate), 4,9m in December 1998 and 395000 at the end of 1996. Therefore between 2000 and 1999 this number almost doubled.

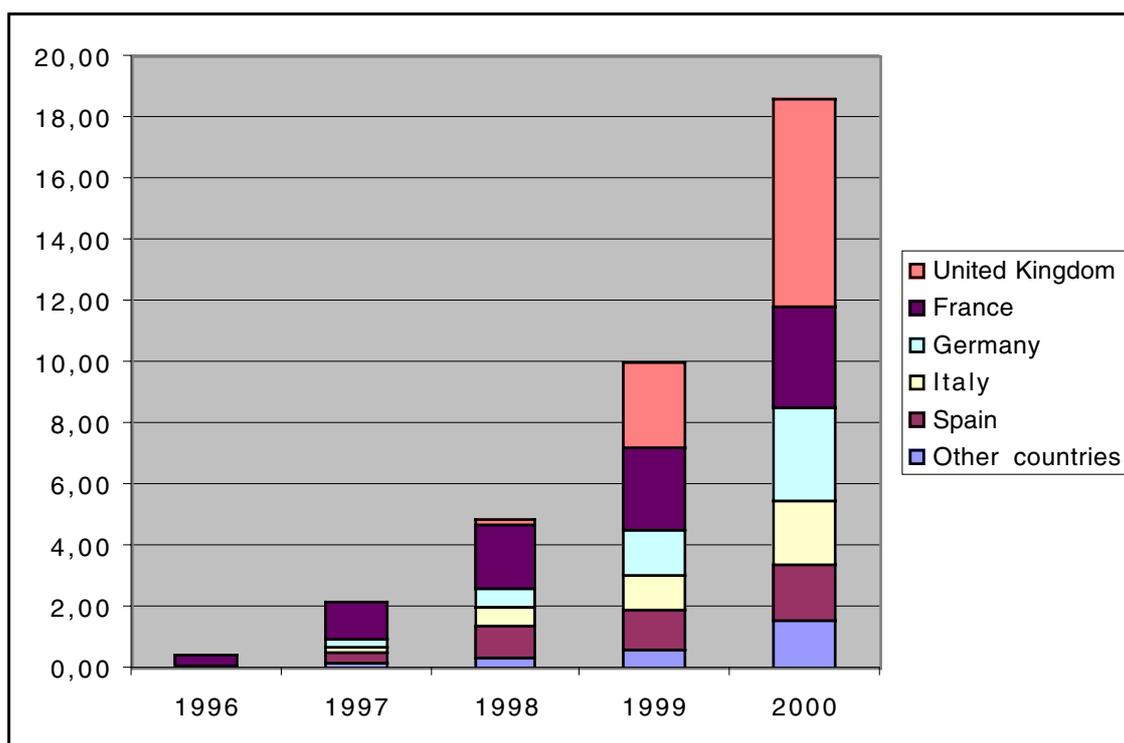
* The most striking event of 2000 in the digital TV domain is certainly the explosive trend observed in the **United Kingdom**: in 1998 the market already numbered 225 000 digital households, by the end of 1999 this had increased to 2,8 million and it finally reached 6,8 million in 2000 (almost all the BSkyB subscribers turned to digital during the year)

* Alongside **Italy** and **Spain**, digital technology has spread by far the fastest into TV homes in **France**.

* **Germany** has observed an impressive trend since 1997. During this period the number of digital households has increased from 220,000 to 3 million in 2000. The country is making up for its delay with a percentage of digital TV households reaching 8,2 %.

* Everywhere else, the growth rate in the digital TV sector is lower in terms of numbers of digital households. The biggest markets show the highest digitisation rate and the gap remains very important with the less populated countries.

⁴ (2000 figures are IDATE estimates)

Figure 5: Growth of Digital TV households number by country at the end of 2000

Source: IDATE

IDATE estimates that the total number of digital households will reach 60 million in 2005, i.e. 38% of TV households :

Table 7 : Digital TV households by country

	2000 (e)	2005 (e)
Austria	0,13	0,78
Belgium	0,22	1,22
Denmark	0,23	0,84
Finland	0,08	0,63
France	3,27	9,49
Germany	3,03	11,06
Greece	0,04	0,36
Ireland	0,10	0,44
Italy	2,13	6,48
Luxembourg	0,01	0,04
Netherlands	0,37	2,08
Portugal	0,13	1,01
Spain	1,85	5,97
Sweden	0,24	1,35
United Kingdom	6,83	17,82
Total EU 15	18,65	59,56

Source : IDATE

Out of this digital households, 47 million would be subscribers to pay services, 13 million will only receive free to air services.

Table 8: Forecast of Digital TV subscribers up to 2005 (in million)

	2000	2001	2002	2003	2004	2005
Austria	0,13	0,20	0,30	0,40	0,51	0,63
Belgium	0,22	0,40	0,57	0,75	0,94	1,12
Denmark	0,23	0,34	0,46	0,58	0,70	0,81
Finland	0,08	0,15	0,23	0,32	0,42	0,53
France	3,24	4,04	4,91	5,85	6,81	7,87
Germany	2,53	3,68	4,93	6,25	7,59	8,92
Greece	0,04	0,08	0,13	0,19	0,27	0,36
Ireland	0,10	0,15	0,20	0,25	0,32	0,38
Italy	2,10	2,31	2,66	3,05	3,51	4,04
Luxembourg	0,01	0,01	0,02	0,03	0,03	0,04
Netherlands	0,37	0,66	0,96	1,26	1,56	1,83
Portugal	0,13	0,21	0,30	0,42	0,55	0,69
Spain	1,82	2,26	2,87	3,60	4,42	5,24
Sweden	0,24	0,38	0,52	0,66	0,85	1,00
United Kingdom	6,53	8,42	10,02	11,08	12,38	13,56
Total EU 15	17,76	23,29	29,07	34,70	40,84	47,03

Source: IDATE

The number of subscribers should reach 47 million by 2005, led by the British, German and French markets.

Table 9: Penetration rate of DTV subscribers up to 2005 (in % of TVHH)

	1999	2000	2001	2002	2003	2004	2005
DTV subscribers in the UE (in million)	9,7	17,8	23,3	29,1	34,7	40,8	47,0
Growth percentage		83,0%	31,1%	24,8%	19,4%	17,7%	15,2%
TV households in the UE (in million)	146,9	148,8	150,4	152	153,5	155	156,4
Penetration rate of digital subscribers	6,6%	11,9%	15,5%	19,1%	22,6%	26,3%	30,1%

Source: IDATE

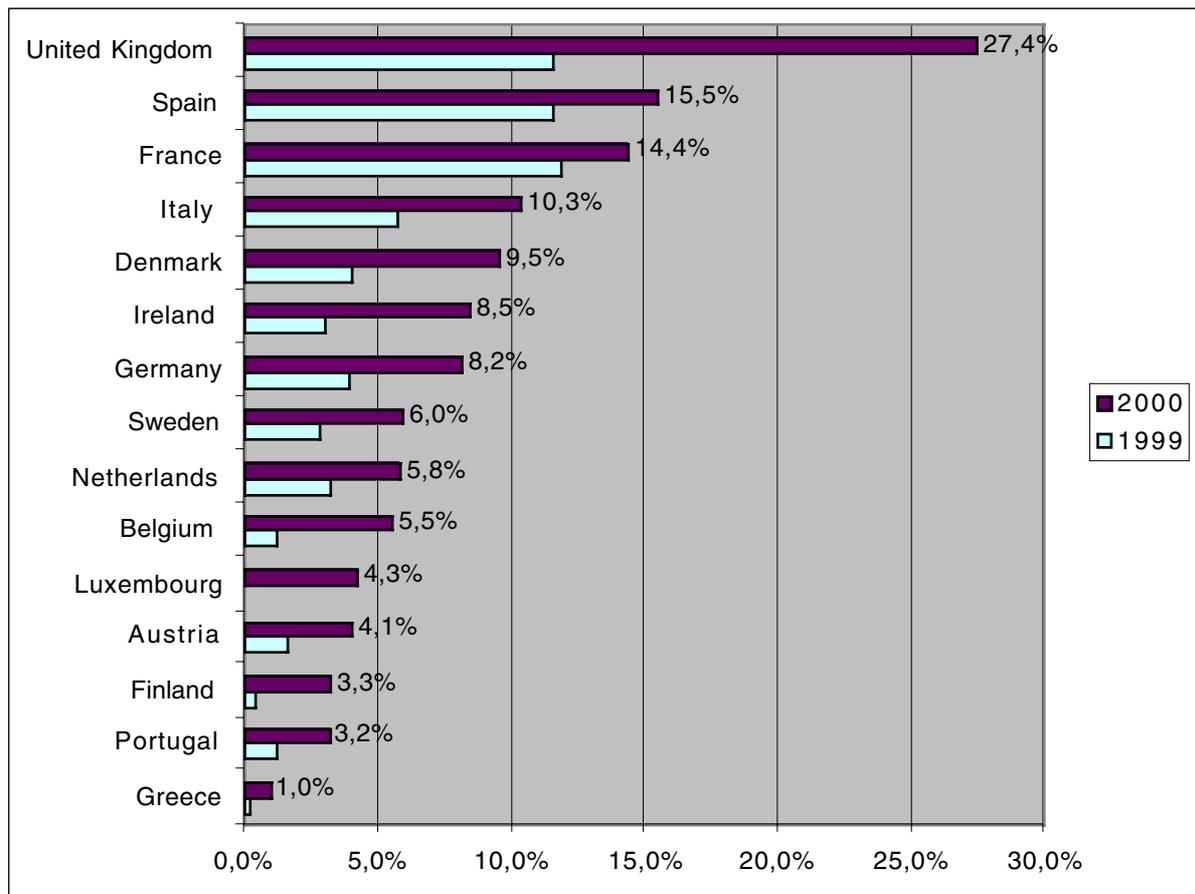
Moreover, including free-to-air viewers, IDATE estimates that the number of digital households should reach 59,6 millions in 2005. It is also forecast that 38% of TV households would be digital in 2005.

Nevertheless, although this trend is encouraging, the absolute number of Digital TV households remains relatively low in most of the E.U. Member States.

Only 12,5% of the European TV households were digital TV households in December 2000.

* The United Kingdom, again, deserves a special mention, since in one year digital TV has achieved a TV household penetration rate of 27,4%, which is without doubt the highest growth rate registered since 1996.

Figure 6: Digital Households in % of TVHH*



Source: IDATE

*Estimated for 2000

A high proportion of digital TV households are subscribers to satellite digital platforms

* On a European scale, in 2000, around 74% of digital households were digital satellite subscribers. This percentage regularly decreased (75% in 1999, 80% in 1998 and 95% in 1996), however the slow down in the decrease observed in 2000 results from the quick conversion of BSkyB subscribers (analogue to digital).

Table 10: European digital TV households breakdown by network

	1999	2000 (e)
Satellite	8.2	14,8
Cable	1.5	2,7
Terrestrial	0.5	1.2
Total	10.2	18,7

Source: IDATE

At the end of 2000, the take-up of free-to-air digital TV is still very limited...

* For the time being, digital free-to-air TV makes sense only in the countries where a large number of non-encrypted -satellite- DTV channels are available to consumers in their domestic language(s) (mainly Germany or Austria) or in the countries where DTV platform-dependent or "conditional" free services have been developed (like in the UK or in Sweden).

* These two conditions largely explain the very low number of European households which have chosen to buy an unsubsidised DVB-MPEG2 set-top-box or an IDTV-set for free-to-air reception. (At the end of 1999, only 150 000 households had bought free-to-air decoders).

... but free-to-air digital services are however gradually becoming available to consumers: most of them are simulcast of analogue services

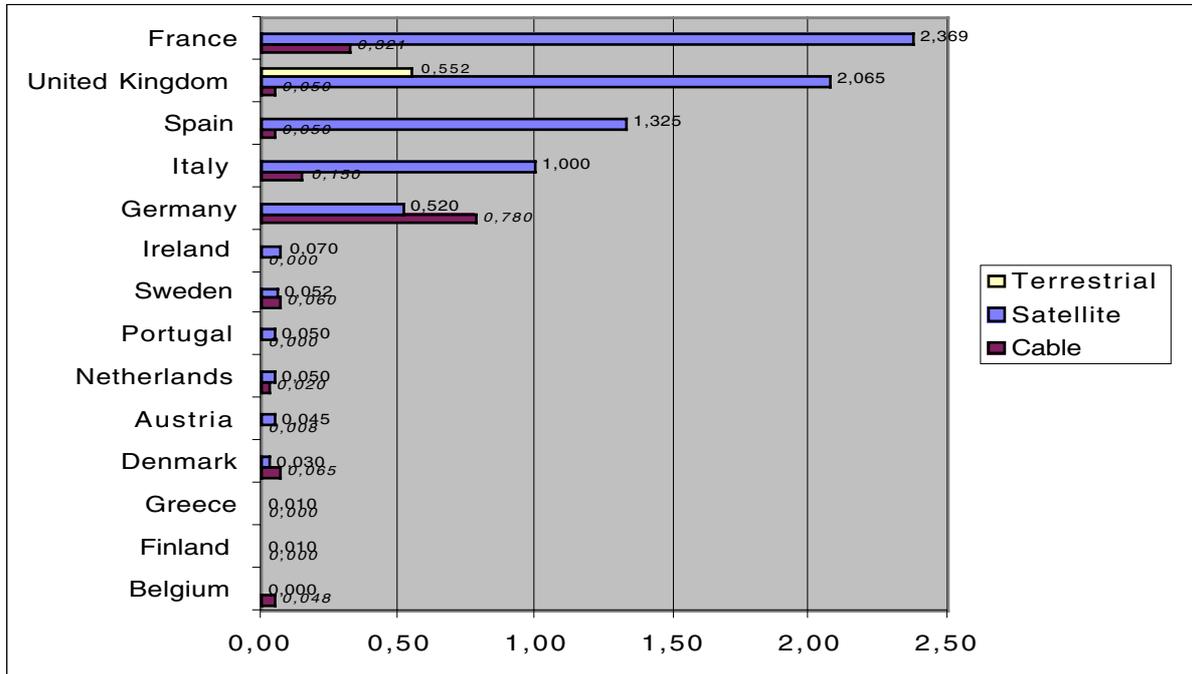
* Nearly all the public TV broadcasters of the European Union have now duplicated their analogue signal into digital format over the existing digital broadcasting networks and particularly over satellite.

* Commercial TV with pan-European coverage (MTV, CNN, VH-1...) have also put digital simulcast into practice...

* One can also note:

- since August 1997, the existence of ARD and ZDF's free-to-air DTV platforms, aimed primarily at the German markets,
- in mid-November 1998, the launch of a DTV package of 9 free-to-air TV stations (including RTL TV, CNN, or NBC) via Eutelsat's satellite system, also dedicated to the German - and Austrian - markets,
- in mid-November 1998, the launch of BBC's Digital terrestrial "free-to-air" package of 12 TV channels, 5 of which are new.
- in July 1999, of RAI's 5 free-to-air thematic DTV stations, aimed primarily at the Italian market,
- some free-to-air digital only pan-european channels have been launched (e.g Wishline, Liberty channel...).

Figure 7: Digital subscribers breakdown between cable satellite and terrestrial networks at the end of 1999, (Millions of subscribers)



Source: IDATE

We estimate that the European Union's DTV market was worth 7,1 billion Euros in 2000. This represents a 83,5% growth from its 1999 value, 3900 M EUROS. .

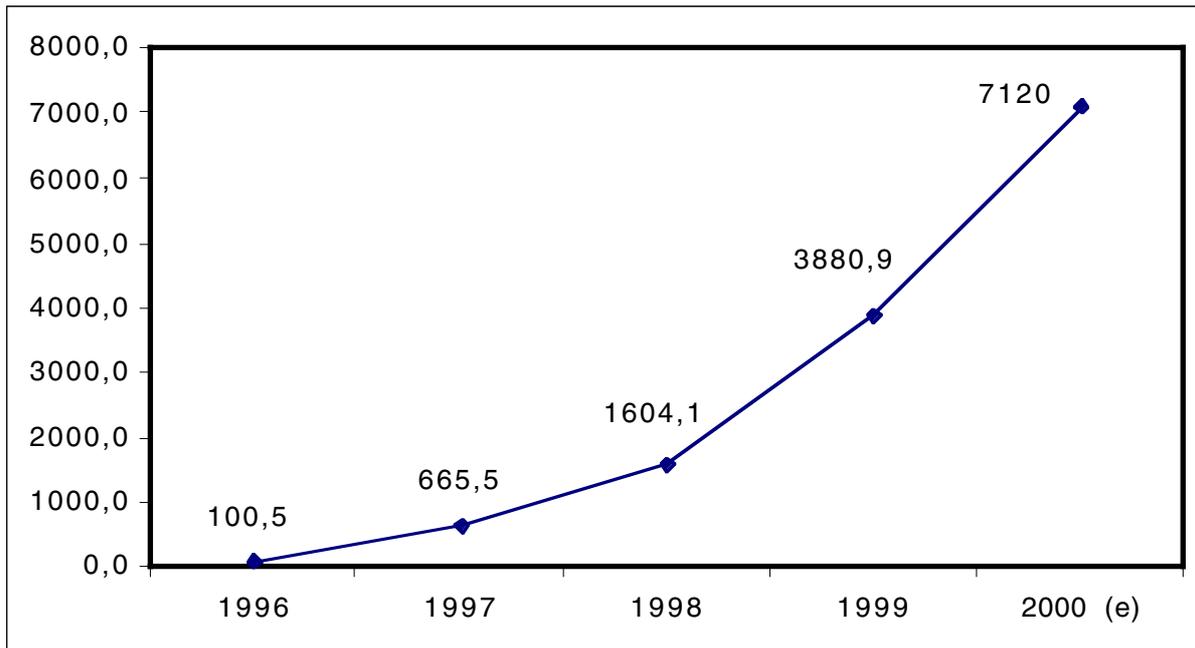
Throughout Europe, the dominant economic model chosen for digital TV is subscription.

* The fact is that platform operators have seen subscriptions and rented or subsidised decoders as the business model that is the best suited to the rapid extension of their services and the growing number of new digital thematic channels.

* Therefore, in 2000 subscription to a digital TV service is still the main source of funding for digital TV in Europe.

- Audiences for TV channels broadcast exclusively in digital form are still small, for this new broadcasting method involves transmission via cable or satellite and most often the use of a special encryption system.
- As a result, the weight of advertising expenditures on these exclusively digital channels, which are nevertheless continuously growing in number, has to be regarded as negligible.
- Admittedly, given, in a first stage, the migration of existing public or commercial channels to digital broadcasting, and, in a second stage, the expected launch of new channels, an increasing share of licence fees and advertising expenditure should be invested in digital services.

Figure 8: Digital TV subscriptions revenues since 1996 (in MEuros)



Source: IDATE

* It is estimated that Digital TV revenues increased by 83,5% in 2000 compared with 1999.

* This trend is similar to the one observed during the previous years, considering that the growth rate of digital TV subscribers has been led by the tremendous growth observed in the UK.

	1996	1997	1998	1999	2000 (e)
DTV subscription revenues (in Meuros)	100,5	665,5	1 604,1	3880,9	7120

Source: IDATE

Table 11: DTV revenues in 1999 in the E.U. (in M Euros)

	Digital TV subscription revenues	Total TV subscription revenues	DTV weight
Italy	326	560	58,1%
Spain	430	877	49,0%
United Kingdom	1647	3670	44,9%
France	1099	3018	36,4%
Belgium	14	93	14,7%
Germany	290	2750	10,5%
Netherlands	11	106	10,4%
Ireland	25	288	8,7%
Austria	14	180	7,7%
Denmark	11	223	5,0%
Greece	5	125	3,6%
Finland	3	75	3,5%
Sweden	8	400	1,9%
Total EU 15	3881	12497	31,1%

Source: IDATE

2.2. Comparison with the USA and Japan

The USA: the Satellite's digital offer drives the market

Satellite: Toward the end of 1998 and the beginning of 1999, the satellite digital TV industry experienced a process of consolidation which resulted in a high growth rate during the past year.

* Digital television was introduced in the United States in June 1994 with the launch of the two satellite services DirecTV and USSB.

* In November 1998, the satellite digital TV industry initiated a process of consolidation, which quickly resulted in a significant decrease in the number of market players. At the end of 1999, there were only two market players remaining: DirecTV and Echostar instead of 6 at the beginning of 1996.

- In December 1998, DirecTV and USSB merged.
- In January 1999, PrimeStar had to hand over its assets to DirecTV.
- The Direct Broadcasting Satellite platforms provide more than 150 channels and interactive services.
- At the end of 2000, 14,5 million households were subscribing to a satellite digital service (representing a 27% increase compared with December 1999).

Table 12: Digital satellite services in the United States

	Launch date	In millions			In % of TVHH		
		December 1998	December 1999	December 2000	December 1998	December 1999	December 2000
Direct TV	1994	6.6	8	9.5	6.7%	8%	9.4%
EchoStar	1996	1.6	3.4	5	1.6%	3.4%	5%
Total		8.2	11.4	14.5	8.4%	11,4%	14.4%

Source:IDATE

Cable: digitisation by forced marches

* Until recently US cable operators did not feel the necessity to digitise their broadcasting infrastructure rapidly. Uncertainties related to the cost and benefits of interactive TV or the Telecommunications regulation framework, as well as strategic priorities aiming to industry concentration and restructuring have considerably delayed their decision.

* U.S cable operators have undertaken heavy investments in upgrading their networks. US cable operators are believed to be investing \$ 33 billion over 5 years. All the US cable operators have therefore announced plans for network upgrading and to rapidly enable new digital services over their networks (DTV, i-TV, VOD, telephony, high-speed, Internet access). Finally, 82% of cable connections were upgraded to allow digital transmission in 2000.

- TCI started to digitise its analogue cable network in 1997.
- Time Warner opted for digital technology as late as 1998. 400,000 of its subscribers were digital at the end of 1999 and 85% of its network was upgraded.
- At the end of 1999, AT&T accounted 2 millions digital subscribers.

* At the end of 1999, 3,5 million households were subscribing to digital cable services (3,5% of TV households).

DTTV: a troubled roll out

* After years of discussion, preparation and continuous disagreements over standards which actually led to the definition of 18 recognised image formats by the ATSC, DTTV was launched in the USA during November 98. The Federal Communications Commission (FCC) took a very active role in the launch of digital television, negotiating with the existing operators the terms and conditions of their migration to digital. The strategy is based on HDTV.

* The timetable included the coverage of the top 10 markets by May 1999, the top 30 by November 1999; the launch of all commercial broadcasters by 2002 and all public broadcasters by May 2003. Analogue switch off is planned for 2006.

- * Actually, the situation is quite unclear:
 - There is little evidence that a viable business model exists for HDTV: TV sets remain unaffordable for the average American household for several years to come, programming over DTTV is still limited, channel editors do not seem to be really involved in the development of this broadcasting method.
 - The inability of improved second generation chips to resolve 8 VSB (modulation standard) reception problems has led the Pentagon, NBC and Pace Micro Technology to echo the call for re-thinking the US DTTV standard⁵. The FCC left the door open for revising it.

In Japan, DTV is driven by satellite services

- * Satellite drives the development of digital television services in Japan, as it drove the development of analogue pay-television:
- * Digital satellite broadcasting started at the end of 1997.
- * Digitisation of cable networks started gradually during the second half of 1999.

Satellite: the only "broadband" network which has begun to broadcast in digital standard

- * Japan is one of the countries where satellite broadcasting is the most advanced. In particular through the BS generation (Broadcasting Satellites), operated by BSAT and counting 9.8 millions subscribers. The offer includes "Wowow" a private pay service, services created by Public Broadcaster NHK and Hi-Vision (high definition TV channel in analogue format).
- * After several generations of analogue satellite services the competition moved to digital with the launch of two new services broadcast through the CS (Communications Satellites) generation satellites:
 - SkyPerfectTV in 1996, a merger (in May 1998) of the two services PerfecTV and JSkyB,
 - and DirecTV Japan launched in December 1997.
- * In March 2000, SkyPerfect TV took over its competitor DirectTV Japan. They respectively own 89,8% and 10,2% of the shares of new group, SkyPerfect TV, which forecast reaching a 3,6 million subscriber base by March 2001. In February 2000 SkyPerfectTV counted 1,7 million subscribers and DirectTV 415,000.
- * As a result, each of the commercial channels created a consortium grouping together their activities in the digital BS television.
- * Furthermore, the NHK planned to launch a digital HDTV service in December 2000 from the BS-4a satellite. It will also broadcast the digital services of Wowow, the 5 new satellite television companies affiliated to the main commercial channels and the services provided by Star Channel.
- * In February 2000, Japan totalled 2,1 million digital satellite subscribers (4,5% of TVHH) against 1 million at the end of 1998. They were 510 000 in 1997 and 158 000 in 1996. Digital TV in Japan therefore seems to be following a growth path which, on the whole, is similar to the one observed in European Union countries.

⁵ A number of broadcasters have petitioned the FCC to allow COFDM modulation to be used as an alternative to ATSC's 8VSB modulation system. VSB suffers from multipath reception difficulties in urban areas. Industry argues that reception difficulties relate only to first generation receivers.

Cable and terrestrial digital transmission in Japan: "on the starting block"

* In June 1999, the MPT liberalised the cable sector to enable potential foreign investments in the Japanese cable companies to develop a more dynamic industry. It also recommended that by 2005 all Japanese cable operators offer their customers Internet access, and that by 2010 all cable networks should transmit TV programmes in digital format. Indeed, the main cable operators progressively digitise their network, in the first place to relay the future digital programmes available through BS satellites.

* According to the MPT, the introduction of digital technology should result in a sweeping consolidation movement: it is expected that 75% of the cable companies will have disappeared by 2010.

* DTTV is expected to be launched in 2003. The MPT has planned for nation-wide coverage by 2006 at the latest. Analogue transmission is planned to be discontinued in 2010 provided that 85% of the Japanese households are equipped with the appropriate digital equipment.

* The transition from analogue to digital will be based on the principle of simulcast. The Japanese DTTV plans also consider HDTV services to be included in the DTTV services line-up. In order to ease the upgrade of the terrestrial transmitters, the Japanese government has announced it would invest 200 billion yen (1,9 billion Euros) in the terrestrial broadcasting industry.

* Japanese terrestrial broadcasters are reportedly sceptical about the commercial rationale for DTTV and several have satellite plans. The original time table for DTTV roll-out has been postponed and the first commercial channel, Nippon TV, has publicly announced that the launch in 2003 was impossible.

* Note that the Japan has developed its own terrestrial transmission system, ISDB-T, which uses COFDM modulation, like the European DVB-T.

Table 13: Digital TV households comparison between the USA, the European Union and Japan

	DTV HH in million		in % of TVHH	
	1999	2000 (e)	1999	2000 (e)
USA	14,9	25,1	14,9%	24,9%
E.U	10,2	18,7	6,9%	12,5%
Japan	2,1	2,9	4,5%	6,2%

(e): estimate

Source: IDATE

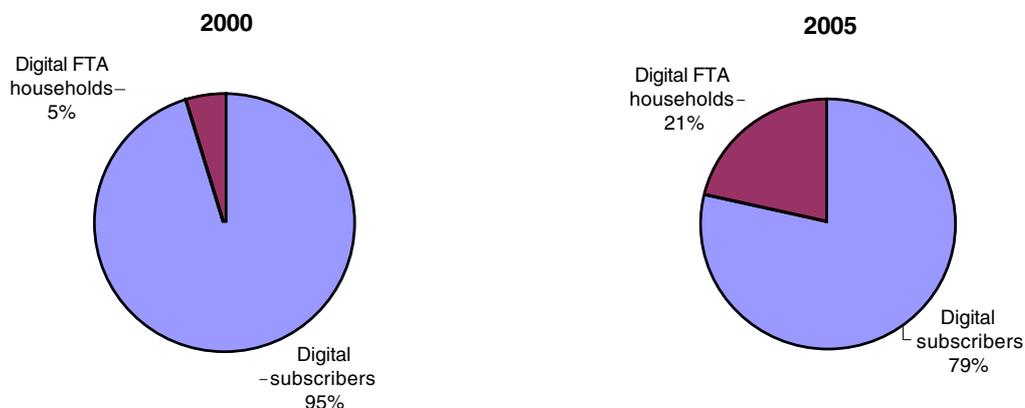
3. Main characteristics of DTV services.

Subscription-TV drives the DTV market

Operators of digital TV services have generally favoured a subscription-based approach for their digital TV offering

This approach was considered as the most relevant because of the bulk of investments they would have to support. Direct financing from subscribers would facilitate return on investment.

Figure 9: Digital TV homes breakdown between subscription based and free-to-air



Source: IDATE

As mentioned earlier, some free-to-air digital services are however gradually becoming available to consumers even if most of them are simulcast of analogue services. IDATE estimates that digital FTA households will represent 21% of digital households in U.E by 2005.

Prices charged by the digital Pay-TV platforms are in some way quite homogenous in E.U member states. This is unfavourable to the "less advanced" members (in terms of GDP).

First, it might be noticed that a strict comparison of prices schemes between the E.U members is not relevant. In fact, prices must depend on a large part of the number of services available. Furthermore, platform operators are not following the same trend in their marketing approach: some are subsidising set-top-box, antennas for satellite reception, others set up special offers for new subscribers, numerous packaging options are also available... For these reasons the analysis of pricing is analysed through a "significant examples" method.

The relationship between the wealth of a country and the level of prices charged by digital platforms in the country is not obvious. Furthermore, choosing the basic option is not necessarily enough if the consumer wishes to benefit to the full from the advantages of digital services. Particularly in countries where the multi-channel free-to-air offering is very widespread, a digital service has no sense unless it provides obvious additional benefits.

* For instance, in Portugal, the lowest GDP/capita in the European Union, the least expensive offer on the market costs 10 Euros for 15 channels. On the other hand, in Austria, with a GDP/capita 2,5 times higher, a combination of family world and Gala World (14 channels) costs 16 Euros with a unique package at 10 Euros.

* Furthermore, in Greece, the cost for the bouquet offered by the only provider NOVA amounts to approximately 300 Euros (buying and installing the satellite antenna together with the set-top box) and the monthly subscription fee reaches 46 Euros.

* In Spain DTV access is more affordable, Madritel is offering a basic option including 21 channels for 8,9 Euros. But, in the case of Via Digital and Canal Satellite Digital, obtaining the basic package worth respectively 14,8 Euros and 15,6 Euros (without the set-top-box rental) and it is necessary to add a 90 Euros connection fee for each. The TV channels offer is however quite large, providing around 45 stations for each.

* In the UK and France, among the richest countries in term of GDP/capita in the European Union, the offer seems to suit the customer's purse well. For instance, Sky Digital offers 78 separately identifiable channels within six Entertainment Packages. They range from Value Pack with five digital channels (cheapest €12 p.m.) via the popular Family Pack (mid price €22 p.m.); to everything comprising Family Pack plus all the premium channels (most expensive €53 p.m.). In France, Canalsatellite and TPS provide both around 35 TV channels on their basic package for respectively 18 Euros and 15 Euros. Their most expensive offer reached 61 Euros and 77 Euros.

Entry-level prices in the DTV market remained roughly the same compared with mid-1999. This observation is also available for the E.U members with the lowest GDP per capita (Portugal, Greece and Spain).

Finally, Canal+ regularly claims that its average revenue per digital subscriber is higher than the one observed in the analogue world. This assumption can be considered as a general rule, the consumer agrees to spend more if the choice is wider.

Digital TV has favoured the launch of a large array of new thematic channels, even if, in certain countries, the innovative appeal of digital TV remains rather difficult to demonstrate. Overall, it is certainly in the TV marketing and TV packaging domains that Digital TV has brought massive innovation.

In some Member States, digital TV compared with analogue TV does not present clear benefits in the eyes of the general public.

* In certain countries, the digital TV offering is seen as a pale derivative of the analogue service in that it is not necessarily richer and/or more varied.

* Moreover, the "national component" in the digital offering can in the case of the smaller countries said to be non-existent: the channels available are mainly foreign channels which are not always dubbed or suited to the country.

The aggression, quality and character of the marketing strategy pursued by digital TV platform operators has a positive impact on the digital penetration rate curve.

* In the United Kingdom, France and in Spain which experienced a successful launch of DTV, market players have not hesitated to allocate a large part of their budget to promoting their digital platforms. They have also tried to implement a suitable "modular" tariff policy.

Innovation generated by digital TV certainly lies firstly in the strategies that DTV platform providers have adopted in order to maximise revenues per subscriber.

- * Defining factors in the digital TV marketing and packaging domain are without doubt that:
 - the concept of big basic and extended basic is threatened,
 - choice and convenience are becoming the key drivers in marketing digital TV to the public but channel packaging has to be kept simple,
 - in an increasingly competitive environment, Digital TV packaging is or has to be designed to maximise revenues per subscriber?
- * It is the packaging of channels and variations in the pricing of premium or optional channels at various levels of access that prevent average revenues from decreasing. Given this fact, strategies adopted include the following principles:
 - offering a reduced rate for subscribers taking basic and premium channels,
 - packaging "weaker" channels with one or two strong brand channels in order to increase the perceived value of the package,
 - creating a perception of choice with the use of multiple mini-packages while splitting channels in such way that the subscribers have to buy several packages to get all the most popular TV channels,
 - offering "bonus" channels with certain combinations of basic plus premium channels,
 - offering new subscribers access to all channels (including options and premium services) at heavily reduced rates or even free for the first few weeks of service and leaving them with the difficult choice of which channels to drop once the offer period expires.

Digital technology has brought about new types of service. In certain E.U. countries the TV offering is now in a certain way, richer, more segmented and varied.

Although films and sport are usually seen as the main attractions, new programme themes are now being offered, sometimes on an exclusive basis, by digital TV platforms thanks to digital broadcasting

In **Spain** more than 50 new channels have been created since 1997 to satisfy the content needs of Canal Satélite Digital and Via Digital. There are about 140 specialist TV channels in the French digital market. In the **United Kingdom**, SkyDigital offers 78 separately identifiable channels – an increase of 20% since 1999.

Growth in the number of TV channels was observed across all channel types, and in particular towards documentary; shopping channels; in domain of entertainment that is to say in the domain of variety-based TV, humour or TV archives services.

Sport and the cinema have far better coverage than in the era of analogue TV.

- * The number of movie channels seems to have reached its peak : the cost of exclusive movie rights is indeed each year higher because of the fierce competition between platform providers on national ground and also throughout Europe.
- * The number of sport channels is expected to keep expanding though it is market niches ("minor sport events") which are likely to be increasingly covered. As is the case for movie programmes, the cost of exclusive rights to major events is rising continuously. This trend should result in a slow-down in the growth rate of "premium" TV channels dedicated to major sport events
- * The most popular sports events (saying football) and recent movies still remain on a general trend offer via thematic packages. However, they can sometimes be included in the channel's line-up, mainly during promotional periods. Confronted with the increase previously mentioned of the costs of the rights involved by such programmes, digital platform operators are more and more developing their PPV offer to be present on this critical market. This trend is a consequence of the battle for these value-added contents which occurred in virtually all the major E.U. markets.

Pay-Per-View services are almost always included in the channel line-up of each currently existing DTV service

Availability of digital PPV channels in the main DTV markets	
France	Canalsatellite: "Le kiosque" / TPS: "Multivision"
Germany	Premiere World: 3
Italy	Stream / D+
Spain	Canal Satèlite: 20 / Via Digital: 30 / Quiero TV: 3
United Kingdom	OnDigital / Sky Digital / NTL

* Digital multiplexed versions of analogue TV channels are also frequent. In offering the same programme at staggered times on several different channels, operators release viewers from their dependence on an imposed programme schedule. This service is available for instance on Canal Plus and its subsidiaries abroad, while a number of public channels, too, have adopted the system for their analogue programmes.

Digital Data Broadcasting services are becoming increasingly available. They are believed to enhance the DTV identity and to create new revenues opportunities.

* 1998 can certainly be considered as year 1 for the launch of i-TV and Enhanced TV in the European Union. An increasing number of projects are announced while almost each of the DTV platforms in the major E.U. markets now includes new i-TV services.

* Except PPV services, i-TV offerings are usually built around the following kinds of service:

- Electronic Programme Guide,
- E-commerce,
- TV-Banking,
- Information and news,
- Interactive games, including games and software downloading channels,
- E-mail functions and High-speed Internet access via the TV set.

* Finally, in almost every EU country the basic interactive service, i.e the EPG, is included in at least one platform.

* Interactive services are usually provided for free by the platform operators.

* The progress observed in this new domain of activity constitutes without doubt a major evolution in the TV domain.

- These new services open the door to new sales methods for material and immaterial goods via the TV set.
- The likely generalisation of interactive TV-based advertising, direct marketing, listing fees and e-commerce practices will give rise in the short-medium term to new TV programme production methods and also new sources of revenues for the TV broadcasting sector.

* Moreover, the adoption of MHP specifications in July 2000 should promote the development of interactive services in the mid-term (cf. 5.3.2).

* In fact, given that subscription-TV platform operators are at the moment using different APIs, editors of i-TV services face the problem of having to convert their services for as much as platforms as i-TV systems in use. The availability of a single norm could therefore help overcome this major obstacle.

It is also interesting to note that the 16:9 format is being increasingly used as a programming differentiator by TV channel operators.

* Because of the intensification of competition on the market, more TV channel editors consider the 16:9 format as a means to differentiate their programming from the others, especially generalist channels and of course movies channels. Furthermore, it should be noted that in countries where there is a lack of digital terrestrial frequencies, the 16:9 format is often foreseen as an opportunity for terrestrial digital broadcasting to differentiate itself

4. Market structure and major operators

4.1. Number of platforms and type of players involved.

On the whole, the introduction of digital TV has resulted in obvious changes in the TV market structure with the appearance of new Pay-TV platforms and numerous new TV channels

As of mid-2000, there were more than 30 digital Pay-TV platforms and some FTA packages in the European Union.

- * These digital TV platforms cover 14 of the 15 E.U. countries.
- * FTA exclusive services are provided by public broadcasters (for instance BBC in the UK and ARD digital or ZDF.vision in Germany), or by commercial channels (RTL World in Germany...).
- * Others are planned to launch during 2001:
 - NTL and IMC in Ireland (over cable),
 - Three multiplexes in Finland (DTTV),
 - UPC Sverige AB in Sweden (over cable)

The number of TV channels has increased extraordinarily since 1996, fuelled in part by the launch of a number of DTV platforms across Europe. According to the European Audio-visual Observatory there are around 600 digitally broadcast TV channels in the European Union in 2000.

- * As a general rule, satellite DTV platform providers have tended to enlarge their channel line-up while the capacity of the terrestrial broadcasting networks was on average closer to 15 to 20 TV channels at launch. Consequently each DTV platform now broadcasts on average between 15 and 60 TV channels.
- * All the platforms have a large proportion of these channels in common: channels broadcasted on a pan-European or even world-wide scale, European public and certain commercial channels broadcast outside their domestic borders, foreign channels, local versions of thematic channels.

While Digital TV platforms have generally favoured "national" strategies of distribution, TV channels seem to prefer a "cross-border" market presence

- * The top 3 channel genres in terms of distribution fall into documentary, sport and music categories. These categories are indeed the ones most easily "adaptable" or translated across national boundaries: most often a local version of these kinds of channel, which can include locally produced programmes (advertising, trailers, captions), is developed in different European languages.

In most countries, digital TV has primarily involved already established national and generally private players.

As a rule, these players hold a strong competitive position in their respective markets.

* Only Canal Plus seems to have succeeded in building up a truly European strategy in the area of digital pay-TV.

* Everywhere else, and whatever kind of DTV service is considered, the players involved with existing digital TV platforms are generally from the national audiovisual sector.

With the advent of digital technology, the European TV world has nevertheless witnessed the arrival of new entrants.

* European national markets have witnessed the entry of powerful players in the cable industry, mainly Callahan, UPC and NTL.

* ... and North American companies in the area of TV channel editing and provision.

- US providers are in particular strongly represented in Kids channels, entertainment and news.

Table 14: Main US channels available in the European Union

Editor	Channels
AOL-Time Warner	CNN TNT Turner Classic Movies Cartoon Network
Walt Disney	The Disney Channel
NBC	CNBC
Viacom	Nickleodon MTV
Discovery communications	Discovery channel
News Corp	Fox kids

Source: IDATE

* Lastly, with the advent of digital technology, the European TV market has seen, in some cases and to a certain extent, the "timid" entry of truly new and/or independent companies.

Evolution of the role of certain market players :

Telecommunications operators, when this has been possible, have generally quickly assumed the strategic function of commercial DTV platform operator.

* Historically, these market players entered the TV sector, long ago in some cases, through their technical operation of cable TV networks.

* But telecommunications operators have moved towards the strategic function of commercial DTV platform operator.

As the market develops, the activity of "content packager"⁶ is considered as a valid strategic choice by an increasing number of market players.

* This "strategic move" gives the market players who opt for it the opportunity to immediately benefit from an installed customer base without having to sustain heavy investments in infrastructure and in marketing. Though this activity naturally calls for contractual and financial commitments with the DTV platform operator, it seems to offer better prospects of profitability. The content packager can indeed:

- count on a quicker return on investment,
- depending on whether the content provided is marketed on a free-to-air or pay-TV basis, bring out the importance of its audience either to the DTV platform operator or to the advertisers.

Digital TV supposes a new role for public channel operators, as well as a gradual change in the positioning of commercial TV channel operators.

* Although they still enjoy a relatively large audience share in most EU countries, public TV channels in their capacity of national generalist channels are being seriously challenged by the ever-keener competition resulting from the arrival of a growing number of new TV channels in their markets.

* Aware of the issues at stake, national public channels (BBC, France Television, RTE, SVT) have generally been quick to draw up a strategic plan for the DTV sector and/or have alerted the public authorities to their need to be able to go into the subscription-TV sector and to develop new, innovative services, especially of an interactive nature, to better defend the notion of public service.

* Accordingly, a large number of public TV channels, including ARD, BBC, ORF, France Television and RAI, have not contented themselves with simply duplicating the analogue signal in digital format, but have also already launched, or are preparing to launch:

- Thematic channels destined to be included in the service plans of TV platform operators. Some of these channels are public service, others are commercial, advertising funded, and sometimes developed in joint ventures with private operators.
- And also interactive data broadcasting services.

* This also applies to certain national operators of terrestrial TV channels, such as TF1 and M6 in France.

* A further point to note is that, in some countries, this question of the changing role of the public TV operator is still being debated at political level, which sometimes explains the minimum level of involvement in DTV on the part of national TV channels. On the one hand, public television channels face groups involved in several segments of the television sector, including subscription television, the fastest growing segment; but, on the other hand, the role of public funded companies may not be to develop pay services, inducing a risk of unfair competition with purely private firms.

⁶ This activity aims at providing a defined package of TV channels to , usually, digital pay-TV platforms.

4.2. Market concentration and level of integration of the audiovisual chain

Various degree of competition characterise each stage of the DTV added-value chain.

Despite the greatly feared of strong concentration trends, the activity of digital TV service provision appeared to be quite "competitive". Competition increases with the launch of new DTV platforms over cable networks and terrestrial transmitter networks.

* Often to be found today is the presence of two to three platform operators on the same broadcasting medium, or increasingly on cable versus satellite.

* In view of the projects in progress, particularly in the cable industry and in the DTTV domain, competition at national level between the different networks will grow with the arrival of new platforms on the various alternative supports. Moreover, a new trend could materialise where the different networks would be willing to provide their own specific services instead of simply carrying an offer already existing on another delivery broadcasting network.

* Therefore consumers will in 2001/2002 at the latest have an increasingly wide choice of offers on different platforms (cable, satellite or terrestrial), and then of different subscription options and offers within the platform.

* Yet all these broadcasting networks, especially digital terrestrial and satellite, will not have the same geographic coverage for quite a long time but, as perfectly illustrated by the the UK case, it seems that this kind of competition could be enough to ensure the consumers the benefits of competition (decrease in price, extended choice, better service quality...).

At the national level, the market becomes more competitive.

* In the most advanced countries, France and the UK, there are respectively 5 and 4 digital subscription-TV operators.

* In mid-2000, in other countries, it was usual to find two to three operators. However, in some markets, such as in Portugal or in Greece, the digital offer is only provided via a single operator.

* In Germany, in the mid-term, competition should increase as a result of the sale by Deutsche Telekom of its networks.

A concentration process is occurring at the European level

* Concentration of the subscription-TV market is taking place in Scandinavia. The larger actors increasingly view the Nordic countries as a single market and the offers in the different countries are just about identical.

* Strong partnerships are taking place between some of the most influent audiovisual groups in Europe. For instance, Kirch and Rupert Murdoch have built a strategic alliance which is supposed to become even closer: reports say that the media moguls negotiate a deal that Murdoch purchases shares of Kirch Media worth several hundred million DM. Murdoch would then replace Springer Verlag as Kirch's partner in the commercial broadcasting and licence rights trading business.

The "opening up" of the market has been guaranteed on numerous occasions by the competition authorities in Europe.

* DG Competition of the European Commission, together with all national competition authorities, has in fact been taking action since 1994, intervening on several occasions, in Germany, Italy, Spain and the United Kingdom to ensure an environment of healthy competition in these markets and to warn against any abuse of dominant position. The Commission has used powers both under the Merger Regulation and Article 85 of the Treaty.

List of major decisions of the European Commission in the field of television competition:

- * BSkyB/Kirch,
- * Vivendi-Canal +-Seagram,
- * Kirch/Richemont/Telepiu,
- * CLT/UFA,
- * British Digital Broadcasting (BDB),
- * BIB,
- * MSG (Bertelsmann/Kirch/Deutsche Telekom),
- * Bertelsmann/Kirch/Deutsche Telekom (Beta research).
- * Bertelsmann-Kirch,
- * TPS (exclusivity of carriage of terrestrial channels).

The regulatory issues

Another approach, mainly supported by the broadcasters, for ensuring "fair competition" and benefits to the consumer appeared through the concept of "open access" to digital platforms and networks. In particular, this issue is being sharply debated in Germany.

The advent of digital TV has introduced a greater degree of competition into the TV channel edition and provision segment. It is on the whole more open to new entrants than the digital TV channel packaging segment but remains in the hands of powerful players.

* With the arrival of digital technology, new TV channels have been created or are about to be launched.

* These new services have encouraged the entry of new players coming from various sectors such as radio, the press, sports, the world of video games and even from the banking and industrial sectors where interactive data broadcasting services are concerned.

A strong trend towards vertical integration is however to be observed between TV channel editing and packaging functions...

* TV channel edition and provision remain in the hands of traditional players in the TV sector. These players are often also involved in the operation of at least one DTV platform.

...and, to a lesser degree until now, all along the DTV value chain.

For instance, in France, the merger Vivendi-Seagram-Canal+ allows this player to be involved in all market sectors. Moreover, Lagardère Group recently acquired 34% of Canalsatellite and 27,4% of Multithématiques.

Another example is coming from Spain where the incumbent telecommunications operator Telefonica is the major shareholder of Vía Digital (digital satellite), Telefónica Cable (digital cable) and Antena 3 (terrestrial analogue). Telefónica also owns the third Spanish radio network, Onda Cero, and the Dutch content provider Endemol, and it has a 30% stake in the production company Mediapark.

In Germany, Deutsche Telekom has a dominant position in the cable TV market, imposed the d-box, operates its own digital service and thus controls infrastructure, content and customer access.

Since 1998, the European cable industry has started on a process of restructuring, one result should be an overall lesser degree of market integration but a higher level of European concentration.

* The new European cable directive 1999/64/CE (Europe's former phone monopolies must separate their telephone and cable TV businesses into legally distinct companies) is without doubt one of the reasons behind this restructuring process. Of course, the cost of network digitisation and low profitability expectations in the short term can also be considered as another reason behind this restructuring process.

* France Telecom, BT and Deutsche Telekom have, to a certain extent, started to either sell their cable assets or separate their phone and cable business.

* In parallel, the restructuring process has certainly also been encouraged by the prospects of the multimedia broadband market. In particular NTL and UPC seem to be very active to build a "pan-European" strategy in the cable domain.

4.3. Technical choices and market organisation

4.3.1. Existing digital STB, CA and API systems in Europe

The "technical" basis for TV households to access digital TV services is still the digital set-top-box.

* Integrated Digital TV sets (IDTVs) arrived on the market with the launch of DTTV in the UK, but the sales are still negligible.

* At the same time, manufacturers and service operators were developing new generations of decoders incorporating new functions, especially for interactive services.

* The new generations of decoder are designed either:

* for handling a wide range of multimedia applications including Internet access via the TV set or a PC...

* or for overcoming the obstacles arising from the absence of (Pay-)TV system standardisation. "Universal" decoders have thus made their appearance in some markets.

For the time being, the DTV market in Europe is also characterised by the co-existence of a relatively high number of conditional access and API systems.

Table 15: Conditional access and API systems in Europe
Conditional access systems in Europe

Systems	Designers
Viaccess	France Télécom
Mediaguard	Seca
BetaCrypt	Beta-Research
n/a	Irdeto
Nagravision	Kudelski
Videoguard	News Data System
Conax CAS3	Conax Telenor
n/a	Telewest

API in Europe

Systems	Designers
OpenTV	OpenTV
TVMediahighway	Seca
Power TV	Scientific Atlanta
Liberate TV Navigator	Liberate
Betanova	Beta-Research

Source: IDATE

A few digital conditional access and interactive TV systems dominate the market: Seca, Viaccess and OpenTV are the main leaders.

* The digital conditional access systems, Mediaguard and Viaccess, appear to be widely used throughout the European Union

* Mediahighway and Open TV are the two most commonly used API systems within the European Union.

* The SECA digital subscription TV system (Mediaguard + Mediahighway) and the combination "Viaccess + Open TV" are the most commonly use in the EC.

4.3.2. Market organisation

Strategies for rapidly building up a customer base have developed according to widely differing models in each individual EU country.

In countries where digital television has developed rapidly, digital set-top-box rental is the primary model adopted.

- * It seems that the rental model is tending to establish itself for a number of reasons :
 - From the consumer's point of view, it represents a kind of subsidy as it artificially reduces the initial cost.
 - It is also a solution that enables the subscriber to avoid problems bound up with the ever-more frequent upgrading of equipment.
 - Being the owner of its decoders, the platform operator can more easily solve problems arising in areas such as the integration of interactive services.
 - Ensures a speedier return on investments than retail equipment markets.

A slow take-off of direct decoder sales is observed.

- * The sale of the decoder has been a failure in a series of cases (Telepiu in its first phase in Italy, DF1 in Germany, Senda in Sweden.)
- * As a rule, consumer electronics manufacturers are putting relatively little effort into marketing their decoders through their usual distribution channels.
- * Lastly, the retail price of a digital TV decoder in most European markets is still fairly high.

The relevance of IDTV seems to be questioned by certain manufacturers

- * Besides, a common manufacturers' approach with regard to IDTV-sets is far from being clearly defined:
 - Some manufacturers are contemplating digital integrated TV sets containing an embedded conditional access equipped with the common interface socket needed socket to plug in additional conditional access systems.
 - Other manufacturers have opted for TV sets which do not include any conditional access systems and where all aspects of conditional access are carried on plug-in modules.

Except for the British case, STB giving away (with conditions) is quite unusual in the E.U.

Technical and commercial interoperability between conditional access systems.

Simulcrypt agreements vs. Common interface

- * Directive 95/47/EC implemented by the European Union is focusing on the conditional access topic and permits use of both interoperability techniques. In particular, each country shall ensure that the operators of CA services "offer to all broadcasters, on a fair, reasonable and non discriminatory basis, the technical services enabling the broadcaster's digitally-transmitted services to be received by viewers authorized by means of decoder administered by the service operators"

Table 16: Level of implementation concerning the 95/47/EC directive in some Member States

	Directive transposed	Directive partially transposed	Supplementary transposition in progress	Complete transposition in progress	National specific arrangements
Germany	√				√
Belgium (french community)	√				
Belgium (flemish community)		√		√	
Spain	√				√
France		√			
Italy	√				√
Ireland	√				
Netherlands		√	√		
United Kingdom	√				√
Denmark	√				√
Finland		√			
Sweden	√				

Source: IDATE

Transcontrol at cable head-ends has to a certain extent been "given up" as it seemed less cost-effective than Simulcrypt agreements.

* Even if the cable operators have the technical capability of implementing transcontrol at each of their cable head-ends, Simulcrypt agreements between television channels carried by satellite platforms and cable-operators appeared in the eyes of certain cable operators to be less costly. Besides, they also enable the latter to maintain control over their subscriber portfolios. This "pragmatic" solution has certainly played a major role in having DTV platforms over cable starting right after those via satellite in France.

Today, interoperability between set-top-boxes is mainly organised through Simulcrypt agreements. These agreements are however sometimes difficult to conclude.

* When Simulcrypt agreements are concluded, each partner keeps a complete control of its "subscriber" portfolio or subscriber base: only technical data is transmitted between partners, without any information regarding the identity of the subscriber.

* However, Simulcrypt agreements have proved to be more easily concluded between non-competing platforms or between an "independent" TV channel and different platform operators for multiple carriage.

* It could finally be thought that, as DTTV is achieving progress throughout Europe and as free-to air public and commercial TV stations are getting more and more involved in digital TV, Multicrypt may be considered by most of the market players (including manufacturers) as the best suited solution for the future of digital TV.

The adoption of the MHP specifications may help to overcome the interoperability issues resulting from the various APIs available in the E.U.

* In February 2000, version 1.0 of Multimedia Home Platform specifications was adopted by the DVB, then ratified in July 2000 by the ETSI as a technical specification. The specification still only covers two levels of interactivity (enhanced and interactive TV), the third level (Internet) will only become available in November 2000. The core choices have been made and stabilised: the use of Java and Havi primitives.

* By achieving consensus around a Java-based API, the European industry has accomplished significant progress in the domain of i-TV.

* This adoption has been reinforced by the involvement of the main API developers: Canal + for Mediahighway and Open TV have announced their support for DVB/MHP.

* Beta Research, which provides the dominant system in Germany, has also announced the adoption of the standard (this is however a consequence of remedies agreed in the framework of the BSKyB/Kirch case).

Conclusion

Digital TV in Europe: more than 30 digital Pay-TV platforms, 600 digitally broadcast TV channels and an estimated installed base of 18,7 million households by the end of 2000 (against 10,2 million in 1999).

a) Satellite and cable still drive the market ; terrestrial roll-out is still slow

Throughout Europe, the economic model chosen for digital TV is subscription-TV. In 2000, the take-up of free-to-air digital TV was indeed still relatively limited and a high proportion (around 74%) of digital TV households were subscribers to satellite subscription-TV digital platforms.

Digital TV take-up so far, however, is limited since 12,5% of TV households are digital households in 2000.

Nevertheless, the growing penetration of digital cable and the expected launch of numerous DTTV platforms will contribute to a higher rate of digital households.

Indeed, following the rapid deployment of satellite digital platforms, the recent period records the enhanced positioning of cable operators on the DTV market.

* Over 80% of cable connections are upgraded to digital. In most Member States, cable-operators wish to offer higher value added services including telephony, broadband Internet and subscription TV. Like satellite operators, they aim at using DTV to segment their offer better, limit the size of the basic tier and increase their TV revenues per subscriber.

However, the current clearer picture of Digital Terrestrial TV plans in almost all the Member States has not been entirely reflected in its actual availability.

* DTTV services have been launched in the United Kingdom (November 98), in Sweden (April 1999) and in Spain (May 2000). The launch of DTTV services is also scheduled for 2001-2002 in Ireland, Germany, the Netherlands and Finland. Moreover in 5 of the other E.U. countries, the launching conditions for DTTV services (method of licensing, turn-off date of analogue transmission, technical coverage of the network, etc) are now more or less known

It should also be noted that public authorities in a number of Member States are heavily involved in promoting digital terrestrial television in order to reverse its long term decline, around 5% per year - notably against satellite⁷, as DTTV enable more services to be transmitted terrestrially. In most national European markets, DTTV offers the prospect of continuity with the existing free-to-air analogue market structure.

Furthermore, digital technology has brought about new types of services. In certain E.U. countries the TV offering is now in a certain way, richer, more segmented and varied

* The recent years have witnessed a rapid development in i-TV services. Almost each of the DTV platforms in the major E.U. markets now includes new i-TV services. i-TV offerings usually comprise: EPG, E-commerce and TV-Banking services, Information and news services, games, or E-mail. The progresses observed in this domain constitutes a major evolution in TV domain, in particular the generalisation of interactive TV-based advertising, direct marketing, listing fees and e-commerce practices will give rise in the short-medium term to new TV programme production methods and also new sources of revenues for the TV broadcasting sector.

On the whole, the introduction of digital TV has resulted in the appearance of new subscription-TV platforms and numerous new TV channels: at the end of 2000, there were more than 30 digital TV platforms in the European Union, compared with 20 at the end of 1998. The number of TV channels has also increased extraordinarily since 1996, fuelled in part by the launch of a number of DTV platforms across Europe.

b) Digital TV meets demand, but one can observe much variation between Member States.

Among the 4 countries with the highest rate of digital TV households (France, the UK, Italy and Spain), two (France and the UK) had a high subscription-TV penetration rate when digital TV was introduced on the TV market, and two (Spain and Italy) had a rather low or medium rate. This allows to assume that growth in digital TV is currently based both on the conversion of analogue subscription-TV subscribers to digital and also from the increase in new subscribers to subscription-TV packages.

Therefore one can logically conclude that Digital TV meets demand, though some differences can be observed between Member States in the level of DTV development.

IDATE identifies four major factors that explain these national peculiarities:

* Legislation: some Member States defined the legal environment for digital TV earlier than others. This specifically applies for instance to DTTV: up to 5 years could intervene between the first country (the United Kingdom) and the last to launch digital terrestrial TV.

* Market size: for obvious reasons, a small market hampers business initiatives (uneconomic business) while a large one attracts new entrants because of profit perspectives. On the whole, countries where two competing digital TV offers co-exist have experienced a faster development than in countries where only one market player offers DTV services.

* Also, the competitive situation of cable networks seems to be a critical parameter.

* Finally, the number of analogue TV channels already available on a market undoubtedly influenced negatively its digital penetration.

⁷ The number of dishes is growing 12,8% pa, mainly at the expense of terrestrial.

c) Subscription is the dominant model.

The share of digital subscription TV revenues in the total of revenues of the TV sector is constantly increasing. Therefore there may in the longer term be some tension between national DTTV projects based, to a large extent on free-to-air TV, and the longer term structural changes brought about by subscription TV. One could foresee a situation where broadcasting could be split between a well-resourced and consolidated subscription TV sector operating at European level and weaker free-to-air national broadcasting systems.

The following observations must indeed be kept in mind:

- * Up to now DTTV plans are being constructed around free-to-air, but the evidence so far is that this is not very attractive. At the end of 1999, only 150 000 households had bought free-to-air decoders.
- * The cost of DTTV set top boxes or IDTV sets will fall over time, but other platforms may be so well established by that time as to render the success of free-to-air DTTV impossible⁸.
- * The late entry of commercial channels - requiring large audiences and therefore high penetration of set top boxes - is a significant feature. The cost of simulcast makes DTTV hard to justify for commercial broadcasters.
- * A number of Member States are trying to achieve a rapid switchover to digital. Market impact, notably on other delivery mechanisms, may be significant.
- * The potential for substitution between cable, satellite and DTTV is not well understood. DTTV appears to have a unique advantage for provision of mobile services. Growth of home networks may reduce the rationale for portability within the home.

d) Interoperability: an issue depending on the willingness of operators

The launch of the first digital services, over satellite, and then over cable and terrestrial networks made it clear that, from a technical point of view, Simulcrypt was a convenient solution to ensure interoperability between the decoders managed by different service providers, while guaranteeing the confidentiality of commercial information.

However, Simulcrypt is dependent on the willingness of operators to conclude commercial agreements. By the end of 1999, such agreements had been concluded in a number of cases, but direct competitors, i.e. two satellite digital platforms in the same country, had not concluded any such agreements.

Interoperability of Application Programming Interfaces, the software that supports the development of interactive services, remains limited as two major systems (MediaHighway and OpenTV) prevailing in Europe, and as competing platforms in the same territory have chosen different ones.

⁸ DTTV is successful in UK because there is a subscription TV operator giving away boxes in competition with BskyB.

However there are signs (MHP platform; Java TV as a standard) that standardisation is making progress and that next generation set-top-boxes will achieve interoperability. It is nevertheless likely that the large number of installed incompatible set-top-boxes will make full interoperability a long process.

Also challenging in this domain is the issue related to the possibility for free-to-air TV channel operators to develop and operate interactive TV services. With the development of DTTV, major generalist free-to-air channels will switch to digital and develop such services. In the short term, most of free-to-air TV channels will be received over set top boxes owned and operated by subscription-TV operators, and will need an agreement with these operators to develop their own interactive services.

e) A progressively changing market organisation.

The changing role of European cable-operators.

It was widely considered that two market organisations for the cable industry co-existed in Europe.

The majority of E.U. countries (Scandinavia, Benelux, Germany, Austria) followed a "utility" model, where the cable-operator sells "access to the consumers" to TV channel operators. In this case, the cable-operator has little power as regards the selection of TV stations, and the TV channels do not receive any fee to be borne by the cable-operator.

On the other hand, France, the United Kingdom, Portugal and Spain followed a subscription-TV model similar to the North-American model. The cable-operator acts as a service provider or packager, selecting channels for a branded package and marketing it to subscribers.

However, this distinction seems to be less and less effective. Numerous incumbent cable providers are operating digital TV services, or intend to do so. For instance, in the Netherlands, Mediakabel is marketing the digital offer Mr Zap ; in Germany, Deutsche Telekom is providing its digital bouquet Mediavision...

Thus, together with the promises of broadband Internet and cable telephony, digital TV is the opportunity for the "Nordic cable-operators" to move from the "utility model" to the "Pay-TV" model and to capture a higher share of the value added. Digital subscription-TV packages are often considered as the easiest way to rapidly develop their installed base of digital multimedia set-top-boxes through rental. This evolution is also mandatory, because cable-operators need new sources of financing to recoup the investments they have either made or will have to make to upgrade their networks and deliver "convergent" services (Telephone, Internet, and TV).

The changing role of cable-operators who are progressively becoming "convergent broadband service providers" has generated conflicts with TV station and digital bouquet providers.

This trend finally results in two different market organisations which can apply to the pay-TV industry and which depend on the delivery mechanism used:

* terrestrial and satellite where the TV service provider or platform operator does not control the network, that is to say the technical aspects of broadcasting related to the management of infrastructure and signal transport,

* and cable networks where both functions (carriage and network management / packaging and marketing of services) are coming increasingly under the responsibility of the same operator.

A strong trend towards market integration along the TV value chain is to be observed.

* Vertical integration is occurring along the TV channel and packaging segments. In this context, the function of DTV service packaging and marketing is considered as the key step in the value added chain by a great majority of market players. The struggle to gain control of this function must therefore be contemplated as the major issue as regards the evolution of market organisation, since as a bottleneck it conceals major risks of distortion of competition and abuse of dominant position, and all the more so since in most of the Member States, the DTV market remains controlled by the analogue TV leaders and powerful companies.

* To a lesser degree, this trend can be observed along the entire value chain .

More competition on the TV channel edition segment...

* Together with an increased number of digital pay-TV services, new TV channels have been created (including new free-to-air channels), most of the time under the control of the operators of the services themselves.

Nevertheless, new entrants have entered the TV industry:

* Major US TV operators have benefited from the development of the DTV market.

* Some independent (from major operators) firms (so far a very limited number) have also successfully entered the TV editing market.

* Finally, one can also notice major progress in the interactive services segment compared with last year. This sector represents a real opportunity for small size players to get into the DTV market.

... And more generally in the service provision segment.

Thanks to the conversion of cable and terrestrial networks (so far to a limited extent) to digital, in a significant number of cases, this increased competition between delivery mechanisms and/or DTV platforms has led to a very dynamic market, thanks to a decrease in services and hardware prices (directly, through large promotion plans, or indirectly through subsidiation of the digital set-top-boxes).

* The cable industry has also witnessed the arrival new entrants in national markets which will lead to an increasing number of digital offers in respective markets. Indeed, satellite operators would have to face a stronger competition. Moreover, the sale of Deutsche Telekom network will provide in the mid-term an easiest entry into the market in Germany.

* The prospect of new launches on the terrestrial network will also favour competition. However, the weight of existing players and new entrants will be a key factor.

Therefore, competition on service provision is increasing at a national level.

However the subscription-TV market remains concentrated.

The recent period witnessed an increasing concentration in European DTV markets.

* The DTV industry remains controlled by the analogue TV leaders and powerful companies. As previously mentioned, this trend has been particularly significant in the cable industry where notably powerful new entrants got into national markets.

* Moreover strong transactions took place between existing major operators.

* One can also consider the increasing involvement of incumbent telecom operator into the cable and/or satellite markets.

* Consequently, it can infer that a new entrant would face increasing difficulties to provide a new subscription-based digital platform in the most advanced markets. Even more, if one consider that the subscription markets can not expand indefinitely and remember that content rights for sports and movies are mostly locked up.

f) Towards a pan-European TV market?

The economic power and the nature of the market players involved in the DTV market raise the question of the Europeanisation of the DTV market in regard to:

- * the broadcasting coverage of TV channels,
- * technical standards,
- * the increasing regional strategy focusing of major groups.

TV channels: some signs of a pan-European market.

At least four reasons can be found when obstacles to market Europeanisation are considered:

- * Television markets remain mainly organised on a national basis.
- * Public TV channel operators, who have still to be considered as a significant component of the television industry, are defined as purely national operators.
- * Moreover, television programming rights are traded on a national basis.
- * Finally, digital TV remains dominated by subscription-TV, and a subscription-TV product has to be marketed on a national basis.

However, some signs of a pan-European market are appearing.

- * Most theme channels, which form the bulk of the subscription-TV offerings, are easier to export, leading the way to pan-European channels with a programming partly common to all countries and some programs specific to one individual country. The presence of Canal Plus and its programming arm Multithématiques in several E.U. countries favours this trend.
- * The key issue in the development of a pan-European market remains the possibility for TV channels to acquire pan-European rights.
- * Thematic channels originating from North America build their programming on self-owned rights that they control for the whole European market. The acquisition of both North American and European rights for all the European markets can prove to be more difficult for the European TV channels, and this is one of the reasons why several TV players tend to team up to be in a position to acquire pan-European rights.

Digital platform operators: focusing on an European or regional strategy?

- * The simplest way for a DTV platform operator to implement a transnational strategy is to primarily "think regional". This choice can be made according to a "language community" factor. That has already been the case for some operators, such as BskyB in the UK and Ireland, Kirch which markets Premiere World in Germany and Austria, or for the Scandinavian operators.
- * However, operators can go further, following the European strategy of Canal +. For instance the cable operator UPC is building a pan-European strategy and continually gets involved in new markets. The recent partnerships which occurred between different country-based operators could confirm this new trend.

Limited progress towards the integration of DTV into a "convergent offer of product".

- * Internet access by satellite has still to develop.
- * The development of telephony and fast Internet over broadband cable networks is still limited.
- * Nevertheless, "new" cable operators will foster bundled offerings and results will be critical for the economic prospects of cable.
- * Digital terrestrial TV is primarily based on traditional TV services.