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Development of Digital TV in Europe

2000 Report

Sweden

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1 Digital TV Market Overview

1.1 Roll-out of Digital Services

1.1.1 Satellite Digital Services

The Swedish market for satellite services features both services regulated by the national content regulator and those licensed by the UK authorities in accordance with the Television without Frontiers directives. At the beginning of year 2000, there were about 750,000, or 18.8%, of Swedish households, subscribing to satellite TV. The subscription to digital satellite TV was considerably lower with only 0.9% of the TV households. Canal Digital has until the present moment been the sole provider of digital satellite. VIASAT - the other actor on the Swedish satellite market - has just launched its digital services.

Canal Digital is owned by the French CANAL+ and the Norwegian Telenor, and has a total of ca. 280.000 (May 2000) digital subscribers in Sweden, Norway and Denmark. It introduced its digital services during the summer of 1998, although subscription was not possible until late autumn the same year. The services include the national public service channels SVT1, SVT2 and SVT24, Swedish commercial channels Kanal 5 and TV4, as well as 26 ‘theme’ channels and 22 pay-per-view channels.Decoders are available for rental.

Canal Digital is currently trying to reach out to a broader customer base for digital TV. It has developed a cash-and-carry package after a Southern Europe model, which includes everything needed to watch digital TV. This simplifies sales and thereby enables supermarkets and department stores to offer their products, rather than just specialist shops.

VIASAT is owned by Modern Times Group (MTG) AB. VIASAT has a million subscribers, of which about 40% are in Sweden. An announcement was made on 19th July 2000 about introduction of digital satellite TV in the other Nordic and Baltic regions from September 2000. This move is partly due to dampened growth in subscription revenue for analogue satellite TV. Further, the introduction of digital satellite TV can now be done at considerably lower costs, as the price of set top boxes and satellite capacity has been reduced substantially. This reflects a significant change in VIASATs approach towards digitalisation - previously it maintained that the costs could not be justified by the marginal benefits in terms of more channels. New interactive and commercial potentials may also have contributed to the change in opinion: MTG has already introduced a digital TV channel for e-commerce named PIN (Product Information Network) in England, which is a part of Sky Televisions platform.

The strong position of Canal Digital is now challenged by VIASAT. The future market structure is therefore likely to induce added dynamism but also technical dilemmas for the viewers. While Canal Digital uses Media Highway as API, VIASAT uses Open TV. This rules out the option of easy switching between the suppliers’ networks and makes the usage of interactive services from the other network impossible. The users are therefore left with the risk of unfortunate lock-ins as the chosen network may not provide the desired services in the future. Also regarding

Conditional Access the two providers have chosen different technologies (Canal Digital, Conax and VIASAT, Via access). Neither of the providers have at present any intentions of changing these. However, the lock-in effect is limited by the fact that decoders are rented.

1.1.2 Cable Digital Services

2.7 million Swedish households have access to a cable network, which is the equivalent of 67.6% of the Swedish households with TV. About half of these (1,348,000) are connected to Com Hem's broadband network (previously Telia Infomedia TeleVision), which provides access to digital TV and broadband Internet. Out of the total 'TV households' in Sweden, 1.5% actually subscribed to a digital cable package, and out of these 43,000 households had acquired a digital TV box at the beginning of 2000[1]. Com Hem is a subsidiary of Telia, which started digitalisation of its cable network in 1997. The services include among others the public service channels SVT1, SVT" and SVT24, commercial channels such as TV3 and Kanal 5, as well as pay TV, e.g. Canal+ and TV1000.

UPC Sverige AB (formerly Stjärn TV) is a part of the Dutch broadband provider UPC. It has 250,000 subscribers and plans to introduce digital TV in the first quarter of 2001. Originally, it planned to launch digital cable TV in 1998. Once commenced, it will introduce 70-80 channels.

It is still uncertain when other major operators such as Sweden On-line with 188,000 subscribers and KabelVision with 350,000 subscribers will start digital TV broadcasting. However, Sweden On-line is upgrading its broadband network for return-traffic and state that they want to broadcast digital TV over the Internet[2].

Upgrading costs do not seem to be the only reason why most actors are hesitating when it comes to providing digital TV as a separate service. Certainly as far as Sweden On-line is concerned, this is not due to lack of trust in the future of the digital market, but rather reflecting a strategy of integrating the broadband services into a single marketing proposition.

1.1.3 Situation of MMDS

MMDS is non- existent in Sweden. The Swedish National Post and Telecom Agency has however started the licensing procedure for high capacity radio access systems.

1.1.4 Situation of XDSL

XDSL services are launched commercially in Sweden. There is no provision of TV services on XDSL.

[1] http://www.digitalforum.nu
[2] www.sol.se

1.1.5 Situation of Terrestrial Digital Television

On 13 November 1997, the Swedish government decided to introduce terrestrial digital TV. Broadcasting began in 1 April 1999, covering 50% of the population with three networks allowing for 12 channels. Terrestrial TV is expected to expand to 78% of swedish viewers in 2001.There are now 4 digital networks with capacity for 18 channels.

There were about 34,000 subscribers at the end of October 2000, but this number rose to approx. 13,000 by May 2000, and about 1,000 new households sign up each month. The sudden rise is likely to be a result of the introduction of TV3 and Kanal 5, which launched DTT programmes on 31 January. The late start was due to a dispute between TV3 and the TV authorities Radio-& TV-verket about the rules for advertising on the network. MTG, the owner of TV3 wanted to have the right for advertisement breaks within programmes, which is against the current regulations. The Ministry of Culture is currently reviewing the 'Radio-and-TV law' to obtain a more level playing field for broadcasters on the Swedish market for advertising-financed television. According to a recent statement by Granskningsnämnden (The Swedish Broadcasting Commission) TV 3 has the possibility to use advertisement breaks within programs, as TV 3:s transmissions are governed by the law in UK.. TV3 and Kanal 5 are sending free-to-air at present. Kanal 5 will remain free-to-air, but from January 2001, the viewer will be cahrged SEK 115 (Euro 13.5) per month for TV3, ZTV and TV8 and another SEK 59 (Euro 7) per month for Viasat Sport.Digitag sees this uncertainty as a reason for the low subscription numbers, which are considerably lower than market predictions.

Actor in DTTV multiplex

Teracom

Teracom is a state owned company Teracom Ltd. The company has a de facto monopoly when it comes to operate the Swedish analogue Radio/TV network. The de-facto monopoly is based upon licensing requirements issued by the Ministry of Culture. Teracom used to be part of Televerket, the former monopolist, now Telia AB, which is the incumbent telecom operator in Sweden.

The public institution Teracom undertook the actual construction and operation of the network, and is now the multiplex operator. Apart from its role in digital TV, Teracom also owns and operates the Swedish analogue Radio/TV network. Teracom was founded in 1992. It took over activities that were earlier performed by the state telecom. Teracom is a limited company 100% owned by the Swedish State. Teracom also owns 50% of Senda AB and Boxer TV-Access AB; 30% of Boxer has been sold to the insurance company Skandia.

In 1997, the Government suggested (and the parliament accepted) that a digital terrestrial network should be built, covering some limited areas in Sweden. After evaluation by the Digital TV Committee the network could be expanded. On the 11th of April this year Teracom suggested to the Government and the Digital TV Committee that the current network för DTTV should be expanded to cover the whole of Sweden. Another 2 digital networks should be built nationwide with some capacity for another (one or two) TV-channels. Significant capacity should be earmarked for other mobile services such as mobile Internet access. On the 17th of May this year the Digital TV Committee suggested that the current network should be expanded to cover the whole of Sweden. That means that the transmissions (4 multiplexes) that now covers regions will cover the whole of Sweden. The Government has suggested accordingly to the Parliament. The Parliament has not yet decided to accept the proposal. Teracoms suggestion about two extra channels for mobile services has been left without response from the Government.

Another main objective of the decision of the Parliament is that technology should be open. Various content providers should compete within the framework of common technological platform.

Of note is the fact that, in order to provide telecommunications services over the terrestrial network, a licence from Swedish National Post and Telecom Agency is needed. Before granting such a licence applications are to be dealt with through an open tender procedure. Teracom has not yet applied for such a license.

Senda

Senda AB was established as a neutral actor to co-ordinate the usage of multiplexes. It is also in charge of the administration of Conditional Access (CA) system and the Electronic Programme Guide EPG. When a company has been granted a licence, it must sign a contract with Senda to determine the responsibilities and rights of the two parties, in particular with respect to access control and EPG. Senda AB is owned by Teracom Koncernen and SVT, each owning 50%. Senda is financed by charging customers for the CA card and a subscription fee.

Boxer

The main objective of Boxer TV Access AB is to stimulate the further diffusion of terrestrial digital TV, primarily by developing the market for digital TV boxes by direct sales to households and through strategic alliances. The aim is to simplify the distribution, usage and handling of digital TV boxes. Boxer TV introduced renting of digital TV boxes in October 1999.

DTTV Market Structure

Unlike the market for satellite- and cable services, terrestrial TV is provided through a centralised model. The government makes the decisions on the state of terrestrial TV. Radio-och TV-verket (Radio and TV Authorities) scans the applications on the basis of the following aspects:

- Background and overall aims
- Market segment
- Market vision

- Business plan
- Investments
- Budget for the first two financial years
- Capital

It then presents a proposal for the government, which makes the final decision.

The results are a mixture of advantages and disadvantages for the different market actors.

For the end customer, the centrally planned structure may result in a transparent and homogenous market with convertible technology, which gives potential access to all available services offered through terrestrial digital TV. However, because of the slow decision-making process involving different layers of government evaluation, the market is not allowed to respond and expand as quickly as when commercial actors, or indeed a single governmental unit, are responsible for its development. The conflict between TV3 and the regulatory bodies may therefore suggest that the centralised system may delimit choice for the users. From the content providers' perspective, the terrestrial digital TV is only one distribution channel, and therefore a regulatory framework does not diminish the competitive element. At the same time, it may limit their capability for adjusting to competitive pressures, and be forced to produce special programme formats, e.g. broadcast films without interruptions of commercials. Thus, they may well experience the worst of both worlds, which is reflected by the slow start of TV3 and Kanal 5. On the other hand, the public service broadcasters have an advantage as they are finacially secure, and consequently they can concentrate on continuing their public service obligation.

The downstream part of the DTTV market, i.e. the distributor (Senda) and the infrastructure provider with direct contact to the end customer (Teracom), has had its profit-maximising motives delimited by societal aims. This limits the organisational development of these organisations, especially in terms of vertical integration and ownership.

Historically, the Swedish government has been a major actor in the Swedish mass communication market. The structure that has been created with Senda and Teracom seems to suggest that it has no intention of changing this, and a digital terrestrial TV network with publicly controlled network providers enables it to continue this.

Official bodies and Commissions

Radio-& TV-verket (The Radio-& TV Authority)

The Authority presents proposals concerning both analogue and digital terrestrial broadcasting.

It also registers all organisations that transmit broadcasts, including satellite and cable TV.

The Swedish Broadcasting Commission (Granskningsnämnden för radio och TV)

The Commission's task is to monitor broadcastings to ensure that they conform to the regulations and licences that the government has decided upon. In certain cases this can also be done by the Office of the Chancellor of Justice (Justitiekanslern, JK) as well as the Consumer Ombudsman (konsumentombudsmannen, KO).

The Digital Television Committee (Digital-TV-Kommittén)

The Committee consists of members of the parliament. It evaluates on the first stage of the roll-out of terrestrial digital TV in Sweden. This is done from a legal and technical viewpoint. In particular, it reviews the licensing procedures and inter-organisational collaboration. The Committee also examines new and alternative services and forms for distribution.

It is to produce at least two official reports on the digital market.

1.1.6 Market Development

The digital TV infrastructure in Sweden is regarded as the most developed in the Nordic region. Digital TV services including pay-per-view TV and interactive services are available in all three forms, satellite, cable and terrestrial.

However, with a total of 115,000 digital households or 2.9% of TV households[3], digital TV has yet to achieve a major role in the Swedish TV market and it is estimated that analogue TV will remain for another decade. Nevertheless, compared with the 1998 total of 58,000 digital households, there is a considerable progress. Equally important, the range of services is developing with an increased focus on interactive services and convertibility of a range of broadband services, which enable entirely new possibilities. This expansion of the scope of TV markets may be central to the development and diffusion of digital TV in Sweden, where the two public service channels SVT1 and SVT2 together with TV4 have 75% of the viewers. Together with commercial Swedish TV3 and Kanal 5, the five channels account for 90% of the viewers[4]. Thus, the mere addition of channels through digital TV is not going to make a difference.

One of the central issues regarding DTV in Sweden has been the role of terrestrial TV in the digital markets. Until recently, it was unknown whether DTTV was going to remain complementary to the private digital initiatives by continuing to serve only the part of the population that did not have access to cable or satellite. However, with the recent expansion of the popular commercial TV channels and other services that are currently only being distributed through cable and satellite, the terrestrial network looks more and more like a competitor, as different networks will be available to the consumers. The slogan of the development of the Swedish terrestrial network has been ' A digital market for all' and a broad-customer base may have a virtuous effect. However, a governmental top-down approach gives rise to a new issue regarding crowding out of private initiatives by public engagement into the market, and several private actors are now voicing their discontent[5]. The high capacity of cable and satellite for

[3] See table 1.2
[4] www.digitag.org
[5] www.kabeltv.se

channels does not seem to represent any decisive significant competitive advantage in Sweden, given the importance and limited availability of Swedish programming, whereas the potential mobility (which cable and satellite cannot propose) could give the terrestrial network some competitive edge for future development.

1.1.7 Barriers to Competition or Market development

Previously, the high price of digital set top boxes for consumers and the high cost of upgrading networks was seen as important barriers to entry. However, it is now possible for viewers to rent boxes for all three kinds of digital broadcasting. The cost of upgrading has dropped to such an extent that firms such as VIASAT now revise their cost-benefit analysis. Further, interactive services exist on all three-distribution channels contributing to the potential revenue. However, regardless of future potentials, the continuous low penetration of actual subscribers constitutes an absolute limit to the market holding off the smaller commercial enterprises, which may contribute to the variety and innovation of services, but cannot afford to take such long-term risky investments.

1.2 Details of Services

1.2.1 New services

In general, the innovative services occurring in the Swedish market can be seen as realisations of the potential ability to create segmentation and aggregation of digital services. Segmentation has created a potential for choice. This has resulted in a larger provision of pay-per-view (e.g. Bio Hema) and à la carte-type options where the viewer can design a selection of channels, films and music that are most suited for the individual household[6]. The Swedish service providers have also exploited Segmentation within the individual programs. Canal Digital provided Formula 1 coverage with seven different NVOD channels, from which the viewer could choose. This service was then extended to all the Formula 1 events as a single option for € 83.

This discrimination increases the amount of potential viewers, but as prices for the individual components are not negotiable for the Swedish market, it also enable the service providers to carve out the consumer surplus.

Another example of segmentation is the increasingly advanced on-line shopping. 3 May 2000, SAS and the TV-channel E-TV launched on-line sales of travels via interactive digital terrestrial TV. Dates, destinations and hotels can be chosen by using the remote control. E-TV also

[6] Music Choice consists of 40 digital music channels with direct access to music library with more than 300 000 titles.

provides on-line CD-shopping and weather forecasts. Other examples include reservations for events such as sport and theatres, such as Ticket at Viasat.

Segmentation implies the use of an Electronic Program Guide (EPG) which provides an aggregated overview of the individual digital services and enables individual division of these, much like Internet search engines. Further, the aggregation ability is used for opinion polls. On the night of the Eurovision Song Contest, viewers could vote whether the right song won or not via the terrestrial digital TV-network. Similarly, TV3 viewers can vote on the player-of-the-match for ice hockey games.

The opportunities that come about as a result of the combined effect of divisibility and aggregation, has spurred increased collaborative R&D activities between the different stakeholders.

In June 1999 Com hem launched Com hem Development Partner, which currently have five members, Cell TV consulting, Active TV, Digiscope, Visionik and Projector. These are either content providers or developers of solutions of e-commerce. The purpose of the collaboration is to create new interactive TV-services, and one of the first projects is to develop interactive TV-commercials.

Further, during the summer 2000, Com hem and Eurosport are to launch new interactive TV-services. Initially, these will take the form of access to statistics, news and games.

1.2.2 Details of DTV offers

The following tables outline the available services on the Swedish market. Several of the services indicated in the table are also available in analogue form, but the digital market has brought about some developments for both public and commercial TV.

Public Service Channels: SVT1 and SVT2 are available in analogue and digital form. However, the news station SVT24 is only available in the three digital platforms. Furthermore, digital TV gives access to the public service channels from Denmark, Norway and Finland.

Regional TV: Nollettan and Skanekanalen are available in analogue over cable, but only in digital over terrestrial. **Commercial TV**: Following the developments of digital TV, the commercial channels are in general spreading over all three digital networks. TV3, Kanal5, TV8 and Canal+ were only available on the terrestrial network but are now available through multiple networks. Of note is the fact that TV3 and TV1000 are only available on Viasat, while, Kanal 5 and Canal+ are only available on Canal Digital.

Innovative Services: As mentioned above, a range of new services has been offered digitally:

- 6 pay-per-view channels on Telia's cable TV network and 22 NVOD channels on Canal Digital's satellite services
- 40 music channels
- 6 radio channels

- Electronic Program Guide
- Interactive games
- Interactive services, such as shopping channels

Table A: Channels on digital terrestrial television

Multiplex	Operator	Free to air	Subscription	Coverage by 2001
1	Senda	SVT 1 SVT 2 SVT 24 SVTRegional: SVTSYD SVT VÄST SVT ÖSTNYTT24 SVT MITT SVT MÄLAR-KANALEN		78%
2	Senda	TV 4 TV 4 Regional: TV 4 Stockholm TV 4 Göteborg TV 4 Norr e-TV Skånekanalen	NollEttan Television	78%
3	Senda	K-world	Canal+* Kanal 5	78%
4	Senda		TV3 TV 8 TV 1000* ZTV VIASAT Sport	78%

The first multiplex consists of public service channels provided by Sveriges Television.

The second multiplex is used by TV4, which provides a mixture of news, entertainment and documentaries. e-TV is an interactive channel where viewers can purchase e.g. CDs, watch music videos and get up to date weather forecasts. Nollettan is a regional channel that covers news, sport and entertainment for the region of Östergötland. Skånekanalen fulfil a similar function for the Skåne region, while it also uses the opportunities of digital TV to create an interactive contact between citizens and local authorities.

The third multiplex is used by Canal +, Kanal 5 and K-world. Canal+ specialises in block buster movies and direct coverage of major national and international sport events such as the English Premier League, NHL and NBA. Kanal 5 focuses on Swedish and international TV drama series and films. K-world (Knowledge World) covers documentaries, films and music and distributes products related to learning and knowledge.

TV3 in multiplex 4 provides family entertainment, sport and documentaries. TV8 specialises in financial information and documentaries as well as financial news from the global financial markets. TV1000 shows films, and major sport events and concerts. ZTV concentrates on the youth and covers a range of music, talk shows, entertainment and culture. Viasat Sport is a sport channel that shows international football, golf and horse racing as well as other major events.

Table B: Digital Terrestrial Channel Types

Channel type	Number in type	Comments
Free to view	7	Three national public service channels, one commercial-based national station, two regional channels and one shopping channel.
Primary channels	5	Currently these are not being charged for, but this is only temporarily
Premium channels	5	3 from Canal+, TV1000, NollEttan Television

The Primary channels TV3, Kanal 5, TV8, ZTV and Viasat Sport will be included in one or more packages at a later date.

Price (Some examples)

Channels	€ per month
Basic entry :	12 € (offer for 36 months)
TV1000	24 €
Canal+	24 €
NollEttan Television	1.5 €

Although the free-to-air channels are free once the viewer is connected, there are both connection and ‘card’ fees. It costs € 35 to be connected and viewers have to pay a yearly subscription or ‘card’ fee of € 35.

Table C : Digital Satellite Channel Types

Channel type	Number in type	Comments
Non-subscription	5	Based on the existing terrestrial broadcasters. Public service channels STV1, STV2, and STV24. Also: Kanal 5, TV4 and KIOSK(#).
News	5	Sky News, CNN, CNBC, Sky News, BBC World
Entertainment	6	Hallmark, Eurotica (also stand-alone: € 8), Adult channel, K-world, Cinecinemas(also stand-alone € 8), BBC Prime, Eurosport
Documentaries	7	Four Discovery channels, Adventure One, National Geographic, [.tv]
Kids	5	Fox Kids, Nicklekodeon, Cartoon Network, TCC, TCM
Music	3	Two from MTV,VH-1, Music Choice (20 channels)
Premium movies	3	Three from Canal+
Stand-alone premium Channels	6	TV Finland (€ 9 per month) DR 1&2 (€ 17 per month) NRK International (€ 17 per month) Manchester United (€ 6 per month) ORT International (€ 12)

(#): Pay-per-view: € 3.5 per film, other program prices vary

Prices (Some examples)

Channels	€ per month
Canal Entertain	€ 15
Canal+	€ 23
Canal Entertain & Canal+	€ 35 (€ 39 from second year of subscription)

Canal Entertain includes the channels listed in News, Entertainment, Documentaries, Kids and Music. There is a connection fee of € 47 and a yearly service charge of € 29 from the second year onwards. Viewers can rent the satellite dish for € 8 per month.

Table D: Digital Cable Channel Types

Channel type	Number in type	Comments
Non-subscription	5	SVT 24, TV-Guiden, Music choice, Bio Hemma(#), Q24 shopping channel
News	5	BBC World, Bloomberg, CNBC, CNN, Sky News.
Entertainment	12	BBC Prime, Eurosport, Hallmark, TV6, TV 8, VIASAT Sport***, DR 1*,FTV*, NRK*, RaiUno*, TV Polonia*, Playboy channel**
Documentaries	6	Two Discovery channels, National Geographic, Avante, K-world, Travel channel.
Lifestyle	1	Extreme
Kids	4	Fox Kids, Nickelodeon, Cartoon Network, TCM
Music	3	MTV 2, VH-1, Muzzik
Stand-alone premium Channels	7	Two channels from Canal+ (€ 23 per month) Two from TV1000 (€ 23 per month) TV Chile

(#): Pay-per-view

*: Not part of package – part of à la Carte menu or bought individually for € 3.5 per month

**: Not part of package - part of à la Carte menu or bought individually for € 6 per month

***: € 7 per month when bought individually

Price (Some examples)

Channels	€ per month
Large package	€ 21
The 'à la carte' menu (Choice of five channels for the price of three)	€ 14

The large package includes the channels mentioned in the sections News, Entertainment, Documentaries, Lifestyle, Kids and Music. Apart from the exceptions listed in the above ('*' and '**'), channels can be bought individually for € 5 per month. The programme card costs € 29 the first year and € 23 for every subsequent year. The digital TV box can be purchased on-line from Com hems home page for € 333. Alternatively, it can be rented through specialist stores.

1.3 Operators and Market Structure

1.3.1 Concentration of the Pay-TV Market

In 1999, the digital pay-TV market share accounted for a mere 1.9% of the total pay-TV market. The market is still therefore dominated by future potential rather than immediate profits. In the following, the pay-TV market share for each of the distribution forms is examined in terms of subscriptions, which also includes basic service charges. It should therefore be noted that this does not reflect the share of exclusive pay-TV stations, but rather the total value of the transactions undertaken between viewers and digital operators, including charges for free-to-air services.

- In 1999 Canal Digital had 52.000 digital subscribers, which was 9% of the total market for satellite subscription.
- There were 60.000 viewers who subscribed to Com hems digital cable packages, which is about 2.7% of the total cable TV market.
- The terrestrial digital network covered 50% of TV households in Sweden, yet only 3,000 viewers subscribe to DTT pay-TV. This low figure must be seen in the light of the early stage of DTT and the fact that the primary channels are still shown free of charge, leaving only premium channels as pay-TV.

Over all taking into account both cable and satellite, and both analogue and digital transmissions, the pay-TV market is highly competitive.

1.3.2 Agreements between Satellite Operators, Cable Operators and DTT Operators

Although actors expect further innovation and vertical integration, there has been little tradition for horizontal co-operations. Some of the services are available in multiple distribution forms but no technical agreements have been made between the operators. Thus, when a service such as Canal+ is available in all distribution forms, it is because the access system has been adopted for each system separately. However, the following industrial organisations may change this trend.

Industrial organisations

NorDig

NorDig is a Nordic collaboration project that started in November 1997. It is based on DVB standards and seeks to produce a technical specification for a set top box, which can receive digital TV regardless of the form of distribution. However, it will not undertake manufacturing or place any orders. The members operating on the Swedish market are:

Sveriges Television, TV4, Canal Digital, MTG, Senda, Teracom, Telia and SBS.

Digital Forum

The aim is to distribute information concerning digital services through brochures and a web site. It consists of the following members: Canal Digital, Svenska ElektronikFörbundet, Kanal 5, CANT (Central Antenna Association), Senda, SRL (Swedish Radio- & Home Electronics Providers), UPC Sweden, Sveriges Television, Com hem, Teracom, TV 4, and Viasat.

1.3.3 Vertical Integration

In the following, the major vertical integrations and strategic alliances are reviewed. These have been undertaken by four significant players on the market for digital TV services in Sweden, namely Canal Digital, MTG, Telia and UPC.

Canal Digital

Canal Digital was founded in 1997[7] as a 50-50 joint venture between the French TV-group Canal Plus and the Norwegian telecommunications company Telenor. Canal Plus is the leading pay-TV channel in Europe with 13.6 million subscribers, while Telenor owns three satellites and has activities within cable TV, mobile phone networks and provision of Internet services.

Canal Digital was made to target the Nordic region and has activities in Denmark, Norway and Sweden. It has 1.1 million subscribers out of which 280,000 are digital. 100,000 of these are Swedish digital subscribers. Furthermore, Canal Digital sells TV-commercials for the Nordic market that are to be shown on the international channels that Canal Digital distributes, such as CNN, Discovery etc.

Canal Digital has a strategic alliance with SBS, as the SBS-controlled channels Kanal 5, TVNorge and TVDanmark are distributed in all of Canal Digital’s program packages, analogue as well as digital.

MTG

As regards television, the MTG group operates TV3, ZTV, TV6, TV8, TV1000 and the Danish channel 3+, and owns a stake in TV4 and VIASAT. Apart from the channels outlined in the above, MTG owns the production companies Strix Television and Sonet. It also owns the properties company (rättighedsbolaget MTG Media Properties and a number of firms that provide services to the TV corporations, such as SDI (subtitles and dubbing) and InTV (tele-text).

Beside satellite, VIASAT does the marketing for the cable TV-network company Kabelvision, and has made a deal to provide the content for Kabelvision's network. Kabelvision is owned by Netcom, a division of Stenbecksfären.

[7] Digital satellite service provision started first in 1998

Telia

Its cable TV-network division Com Hem will soon own the second largest cable TV-network in Europe and has considerable growth, particularly in Estland and Lithuania. It was the first to provide digital TV-services in Scandinavia. Telia also manages a pay-per view channel "Bio Hemma" which is offered to Com hem subscribers, Telia has entered a market which traditionally has been dominated by the TV-channels.

UPC-SBS

The aborted (May 2000) UPC-SBS merger would have been another key step in the vertical integration process on the Scandinavian markets, as SBS owns all of Kanal 5 in Sweden and TVDanmark in Denmark, and has the majority stake in TVNorge (50.7%). The project was withdrawned due to the "turnmoils" on the financial markets[8].

The structure of the digital TV industry in Sweden is experiencing increased vertical integration and the entrance of large global players. A further example is the fact that TV3 and TV1000 are only available on Viasat, while, Kanal 5 and Canal+ are only available on Canal Digital.

Underlying this tendency is the belief that convergence will give rise to new value-added services, which will expand the digital market considerably.

8 'Because of the continuing turmoil in the financial markets, we have reluctantly taken the decision not to proceed with the acquisition of SBS. Given UPC's current share price levels it is simply notpractical to complete the transaction.' Mark Schneider, Chairman and CEO of UPC.

1.3 Technical Issues

1.3.4 Decoder Issues

CA and API used for the different networks and the set top box providers:

Set Top Boxes

Set Top Boxes

Name	*Provider*	*CA*	*API*	*Free to air compatibility*	*16:9 compatibility*	*Integrated Modem*
MACAB (DBC-101)	MACAB/SAGEM	Viaccess	Open TV	Yes	Yes	Yes
ISD 4150MTG	MACAB/SAGEM	Embedded Viaccess (+ DVB CI)	Open TV	Yes	Yes	Yes
DVB65S	Triax	Embedded Viaccess (+ DVB CI)	Open TV	Yes	Yes	Yes
MediaMaster, S, C and T	NOKIA	Embedded Viaccess (+ DVB CI)	Open TV	Yes	Yes	Yes
VACI-5350 & VA-OTV	Humax	Embedded Viaccess (+ DVB CI)	Open TV	Yes	Yes	Yes
Philips digital box	Philips	Conax	Media Highway	Yes	Yes	Yes

Until recently, Nokia was the sole provider of set top boxes for digital terrestrial reception:

Features of NOKIA Mediemaster 9820T

- Complying with Nordig standards	- Video format 4:3 and 16:9
- Full DVB compatibility	- OTA programmable
- MPEG-2 decoding	- PCMCIA decryption module
- Flash memory and RAM memory 4Mbytes	- Integrated Viaccess
- Connections for TV/VCR, audio, PC, analogue satellite receiver, modem	

Since October 2000, Boxer supplies a new Sagem box for digital terrestrial television.

Set top boxes from MACAB/Sagem and the cable version of Nokia mediamaster can be used for Com hem's digital cable TV.

The Canal Digital rental service includes a Phillips set top box, but the satellite version of NOKIA Mediamaster can also be used for Canal Digital.

1.3.5 16:9

The 16:9 format has only played a minor role in the introduction of digital TV in Sweden, and the initial diffusion of 16:9 TV sets was relatively slow. However, the recent growth of TV sets reflects a changing tendency. Canal+ Blue has, however, provided several movies and sport events in 16:9 format.

16:9 TV sets

As of 31 of d ecember	*1994*	*1995*	*1996*	*1997*	*1998*	*May 1999*	*December 1999*
16:9 TV sets (Thousand sets)	0	0	0	8	30	55	85

1.3.6 Portable reception

Portable and mobile reception was used as an argument in favour of development of terrestrial digital TV, and the prospects of mobile access to digital services are one of the reasons for the increasing investment in digital networks in Sweden.

The terrestrial network is planed for a degree of portable reception.

1.4 Conclusion

At the end of 1999 there were over 100.000 digital TV subscribers in Sweden. During the year, the digital TV market underwent considerable developments. Digital broadcasting over the terrestrial network started on 1 April 1999. Also, while several big players previously did not perceive it as market worth entering, both UPC Sverige and Viasat are now changing their strategies.

Viasat, the major satellite pay-TV operator in Sweden has started parallel transmission of digital satellite services. This is likely to have a considerable impact on the development of digital TV market in Sweden. Until now, Canal Digital has been the sole provider of digital satellite transmissions. Furthermore, it will also affect the digitalisation of the cable networks that have alliances with VIASAT.

The digitalisation of popular channels from MTG such as TV3 has had influence on the development of terrestrial digital TV in Sweden, which in the beginning had tremendous difficulties in attracting the consumers. MTG's channels were not available in the terrestrial network because of a problem regarding regulation of advertising. According to Swedish law, TV advertisements have to be placed in between programs. MTG has accepted to conform to regulation with the precondition that the government change the practice, and adopt common EU regulations within two years.

The underlying reason for many of the developments has been the level of development of different infrastructures and the increasing prospects of convergence, which has enabled the first interactive commercial services and which in the long run opens the digital TV market to new possibilities, such as B-2-B transactions.

The convergence of markets that were previously separated has produced alliances, which were unlikely before. In Sweden, the UPC purchase of Stjärn TV represents a similar case to that of AOL and Time Warner, reflecting increasing expansion of major international players into several media sectors.

UPC bought Stjärn TV and its network with 240,000 households for more than € 464 million (€ 0.46 billion), or € 1907 (€ 1900) for each viewer. Compared to the deals in the US, it reflects that although changes are beginning to take place, the viewers are perceived to be worth a lot less and that the digital TV market is still in its infancy. The development has been driven by technological prospects, rather than large subscription bases and there is still a considerable gap between the connected households and households that are actually subscribing to digital services.

The regulation of the digital market has not yet matured either and the many governmental bodies in the terrestrial network are likely to become a bureaucratic burden to adaptation. In the long run, increasing convergence may make it increasingly difficult for a central organisation to manage the complex interactions and ensure the necessary growth and diversity of the network

2 Key figures for the Swedish market[9]

2.1 Country fundamentals

	1993	1994	1995	1996	1997	1998	1999
Population (millions)		8.818	8.839	8.846	8.849	8.855	8.862
Households (millions)		4.199	4.209	4.212	4.214	4.217	4.220
GDP (billion Euros)		174.216	183.597	206.273	209.582	212.003	223.908

2.2 Equipment

As of 31 of December	1993	1994	1995	1996	1997	1998	1999
TV households (millions)		3.670	3.710	3.750	3.790	3.830	3.997
TV households (% of total households)		87,4	88,1	89,0	89,9	90,8	94,7
TV households with 2 TV sets or more (millions)		1.350	1.410	1.490	1.560	1.630	1.715
TV households with 2 TV sets or more (% of TV Households)		36.8%	38.0%	39.7%	41.2%	42.6%	42,9%
TV households with 16:9 Television sets (millions)		0.000	0.000	0.000	0.008	0.030	0.085
TV households with 16:9 Television Sets (% of TV Households)		0.0%	0.0%	0.0%	0.2%	0.8%	2,1%
VCR households (millions)		2.680	2.860	3.040	3.220	3.300	3.480
VCR households (% of TV households)		73.0%	77.1%	81.1%	85.0%	86.2%	87,1%
Digital STB households (millions)		0.000	0.000	0.000	0.000	0.031	0.115
Digital STB households (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.8%	2,9%
IDTV[10] households (millions)		0.000	0.000	0.000	0.000	0.000	0.000
Digital TV households (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.0%	0,0%
Digital households[11] (millions)		0.000	0.000	0.000	0.000	0.031	0.115
Digital households (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.8%	2,9%

[9] Until 1998 all amounts are in ECU

[10] Integrated Digital TV Set

[11] Sum of Digital STB homes and digital IDTV Households

2.3 Television market estimates

Million Euros	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*
Analogue TV Market							
Public founding	365.510	317.580	375.320	387.730	363.280	378.695	
Advertising	221.000	221.160	238.080	288.010	312.310	423.249	
Subscription	148.000	147.000	162.000	168.000	364.335	392.541	
Total analogue TV	734.510	685.740	775.400	843.740	1,039.925	1,194.485	
Digital TV Market							
Public founding	0.000	0.000	0.000	0.000	0.000	7.335	
Advertising	0.000	0.000	0.000	0.000	0.000	8.197	
Subscription	0.000	0.000	0.000	0.000	1.000	7.603	
Total digital TV	0.000	0.000	0.000	0.000	1.000	23.135	
TV Market							
Public founding	365.510	317.580	375.320	387.730	363.280	386.030	
Advertising	221.000	221.160	238.080	288.010	312.310	431.446	
Subscription	148.000	147.000	162.000	168.000	365.335	400.144	
Total TV market.	734.510	685.740	775.400	843.740	1,040.925	1,217.620	

2.4 Details of the subscription-TV market

Cable

	1993	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*
Home passed (millions)	2.100	2.100	2.200	2.450	2.600	2.700	
Of which digital (millions)	0.000	0.000	0.000	0.690	1.100	1.300	
Home passed (% of TV households)	57.2%	56.6%	58.6%	67.0%	67.9%	67,6%	
Of which digital (% of TV households)	0.0%	0.0%	0.0%	18.2%	28.7%	32,5%	
Analogue Basic Subscribers (millions)	1.830	1.850	1.900	1.930	2.000	2.140	
Digital package subscribers (millions)	0.000	0.000	0.000	0.000	0.025	0.060	
Analogue Basic Subscribers (% of TV households)	49.9%	49.9%	50.7%	50.9%	52.2%	53.5%	
Digital package subscribers (% of TV households)	0.0%	0.0%	0.0%	0.0%	0.7%	1,5%	

Satellite

	1993	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*
Satellite households (millions)		0.390	0.450	0.510	0.610	0.700	0.750
Satellite households (% of TV households)		10.6%	12.1%	13.6%	16.1%	18.3%	18,8%
Satellite subscribers (millions)		0.280	0.390	0.400	0.430	0.500	0.560
Satellite subscribers (% of TV households)		7.6%	10.5%	10.7%	11.3%	13.1%	14,0%
Of which digital (millions)		0.000	0.000	0.000	0.000	0.006	0.052
Of which digital (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.2%	1,3%

Terrestrial TV

	1993	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*
Analogue Pay-TV services							
Pay-TV subscribers (millions)		0.000	0.000	0.000	0.000	0.000	0.003
Pay-TV subscribers (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
***Digital TV services**							
Homes covered (millions)		0.000	0.000	0.000	0.000	0.000	1.999
Homes covered (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.0%	50,0%
IDTV households (millions)		0.000	0.000	0.000	0.000	0.000	0.000
IDTV households (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.0%	0,0%
Pay-TV households (millions)		0.000	0.000	0.000	0.000	0.000	0.003
Pay-TV households (% of TV households)		0.0%	0.0%	0.0%	0.0%	0.0%	0.1%