European cable CEOs face parallel challenges of upgrading networks, introducing new products, and improving operations - while market consolidation continues.

Competition is intense - and it will get even tougher. DSL gains share and Sat is leading digital TV. DTT now widely available.

Yet, Cable is fighting back:
- Basic TV offering is not seriously under threat and serves as competitive anchor.
- New products continue to be launched: Internet and digital (free/pay) TV will continue to drive ARPU increases.
- VoIP waiting in the wings, wide scale introduction to 2006.
- Over two thirds of networks will be two-way, >600 MHz by 2006.
- Management focus on marketing, sales and customer service.
1 European Cable Basics

The European Cable Survey 2004 covers cable operators from ten different countries with a widely varying background. Although all participants originally started with analog distribution networks, they now operate in distinctly different competitive environments:

- Cable penetrations from below 20% to over 90%
- Digitalization from 5% to over 40%
- Revenue share of new services between less than 10% and up to 90%

Before addressing the core strategic issues of cable CEOs, the following paragraphs provide a short overview of key characteristics of the European cable market.

**High penetration in Europe due to state funding in 80s and 90s**

The highest penetration rates can be observed in countries where large parts of the initial investment were provided either directly by the government, or indirectly through state-owned utilities or the incumbent telecommunication company (Belgium, the Netherlands, Switzerland, Denmark, Germany, Sweden). Although state intervention abated in the 1980s and 90s, it still plays a role in countries such as the Netherlands, where regional governments are currently considering building a new Fiber-to-the-Home (FTTH) infrastructure to compete with existing cable networks.

Countries where cable investment was largely left to private investors such as the UK, Spain, and Italy show a lower penetration.

Higher penetration rates are also supported by a higher population density, so that countries like Belgium or the Netherlands have a cost advantage in the connection of additional homes over countries such as France.

**Terrestrial still in the lead, but cable and sat are catching up**

Overall, terrestrial TV still has a strong market position. The competitive situation, however, varies widely by national market. In some of the larger European countries such as Italy, Spain, France, the UK, or Portugal, terrestrial TV still has a market share of more than 50%, but the smaller countries tend to be dominated by cable as the leading access technology.

In the coming years, it can be expected that terrestrial distribution will lose ground to access by cable and satellite. Spain, Portugal, and Italy, for example, are the fastest growing cable markets in Europe. Technically advanced networks in these countries should have the potential to provide additional services such as digital TV at the expense of terrestrial. In France, further consolidation
In all countries, digital satellite accounts for over 50% of the total digital TV access.*

Satellite number one for digital TV

With cable and terrestrial built out using mainly analogue technology, satellite now accounts for over 75% of the digital access technologies. Due to the late start and the high cost of upgrades, digital cable and digital terrestrial (DTT) follow with 19% and 4% respectively. DTT has by far the smallest share, since many countries have only recently introduced DTT - such as the Netherlands or Germany - and still have to expand the coverage, or have only planned to do so, such as Austria. The two countries with the highest share of DTT, Sweden and the UK, are also the countries with the longest DTT history. They launched DTT in 1998 and 1999, respectively.

Within cable, the digital penetration varies widely by country and will usually be much lower than within the satellite population. An exception is France, where digital CATV has already become such an integral part of the basic offering that there is no longer a clear distinction between these two types of subscribers.

2 The CEO agenda: New products and process optimization

Expansion into new services compensates for saturated TV access market

After years of growth and expansion, cable access has reached saturation. Network expansion and market consolidation are no longer the top priorities of European cable CEOs.

The foray into non-utility markets, such as Internet, has strongly increased the cable operators’ awareness of other competing access technologies, be it DSL or satellite. With increasing competition from alternative access technologies, cable operators have to develop new approaches for marketing, sales and retention as well as for increasing the attractiveness of their products.

The increased market focus has to be backed by superior operational efficiency in order to satisfy customer demand. Efficient and smooth internal processes are the basis for the introduction of new services, as well as for the extension of the existing services.

In all countries, digital satellite accounts for over 50% of the total digital TV access*

Digital TV access technology, Source: SES/Astra (2002)
* Countries with participants marked in bold

Saturation in Cable TV access is being responded to by the introduction of new digital services and process optimization

What relevance do the following issues have for your company over the next 2 years?
The Cable CEO Agenda: New products, process optimization, and market consolidation

**Saturated CATV access market**
- Low growth
- Competition from Satellite TV
- Limited further network extension

**New products**
- Internet
- Digital TV

**Process optimisation**
- Cost cutting
- Leverage resources
- Synergies
- Critical mass new services

**Market Consolidation**
- Formation of national / international players
- Integration of functions

**New revenue streams**
- Diversification
- Synergies
- Critical mass new services
- New revenue streams

---

3 **Competition: Low in TV, high in Internet**

Cable operators find themselves in two main competition arenas: the TV market with competition from satellite and terrestrial distribution, and the Internet market with DSL.

Cable operators foresee a stagnation of their own market share and satellite is perceived as cable’s main competitor for TV access. Operators that expect satellite to gain market share tend to put a higher priority on competitive issues than those that assume a stable satellite market share. The latter see little potential for capturing market share from analog terrestrial.

---

**TV access: Cable with little room for growth**

<table>
<thead>
<tr>
<th></th>
<th>Strongly decrease</th>
<th>0</th>
<th>Strongly increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
<td>-2</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Satellite</td>
<td>-0.8</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td>Analog terrestrial TV</td>
<td></td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Digital terrestrial TV</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How will the market shares of TV access infrastructures develop in your country over the next 3 years?
Berlin is a showcase for an opportunity arising from the digitalization of terrestrial TV. As a result of the switch-over, the terrestrial market share dropped by 2% with two-thirds of households migrating to cable. A high cable availability was the basis for the strong migration.

Some disturbance to the relatively stable market balance can be expected from TV over DSL. DSL operators throughout Europe have started to offer movies on a pay-per-view basis. There are also first attempts to use DSL as a basis for a broadcast TV offering. The development of this new TV infrastructure will have to be monitored closely in the future, as a TV offering via DSL could pose a threat to cable’s strongest USP: one-stop shopping for TV and Internet.

**Internet over cable continues to grow but with fierce competition from DSL**

In many European countries cable had a head start at being the first technology to offer broadband access. However, between 2001 and 2003, cable operators throughout most European countries lost some ground when the incumbent telco and strong ISPs started to push DSL onto the mass market.

Contrary to most cable operators, the incumbent telco usually reaches 70-95% of all households within a country. Therefore, overall market share losses of cable operators within the broadband market may not reflect the actual situation of a particular cable operator. An individual cable operator may indeed be able to maintain its strong broadband market share within its own footprint.

However, strong competition within a growing market also has its advantages: with dropping prices and strong marketing efforts from all broadband operators, overall penetration usually develops much faster than within monopoly markets. In 2003, the strongest growth rates for broadband penetration were realized in countries with comparable market share in both DSL and cable.

Wireless Internet access technologies such as WLAN and UMTS will complement fixed line access solutions, rather than result in additional competitive pressure. WLAN solutions in particular can be used to install in-house networks that are fed via cable Internet.

**Showcase Berlin: Cable expands market share following terrestrial digitalization**

<table>
<thead>
<tr>
<th>Access Technology</th>
<th>Pre switch off</th>
<th>Post switch off</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite</td>
<td>9.8%</td>
<td>7.8%</td>
<td>-2%</td>
</tr>
<tr>
<td>Terrestrial</td>
<td>82.0%</td>
<td>83.6%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Cable</td>
<td>8.1%</td>
<td>13.1%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Market share distribution pre and post-digital switchover (% of households)**

- **Program variety**
  - 40.0%
- **Forced by landlord**
  - 21.4%
- **Better quality**
  - 20.9%
- **Cable already existent**
  - 12.1%
- **Attractive price**
  - 9.6%
- **No alternative**
  - 4.1%

* Mainly cable
** Mainly satellite

**Main reasons for switching access technology (% of households switching to cable or sat)**

- **Cable Internet is expected to increase its market share but not as fast as DSL**

<table>
<thead>
<tr>
<th>Access Technology</th>
<th>Strongly decrease</th>
<th>Strongly increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
<td>-1.2</td>
<td>0.9</td>
</tr>
<tr>
<td>Dial-up (POTS/ISDN)</td>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>DSL</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>Wireless (e.g. WLAN, UMTS)</td>
<td>1.1</td>
<td></td>
</tr>
</tbody>
</table>

How will the market shares of Internet access infrastructures develop in your country over the next 3 years?
4 Market structure: Consolidation to continue

Market consolidation has moved down somewhat on the agenda of cable operators and investors – following a wave of mergers and acquisitions in 2000/2001. Still, some notable consolidation is taking place in the already highly concentrated markets.

The most significant example is the takeover by Kabel Deutschland of the other three regional Level 3 (regional distribution) network operators iesy, iesy, and KabelBW. The integrated Kabel Deutschland will directly and indirectly reach 85% of all German cable subscribers.

The main driver for the ongoing consolidation of smaller regional cable operators into larger national networks is the necessity to reach critical mass for the introduction of new digital services, either digital TV or Internet. Attractive content deals for digital TV demand a minimum reach and hence a sufficient power to negotiate.

Although international consolidation is expected to continue with only moderate speed, international cable operators are expected to be the group with the highest probability for seeking long-term ownership in cable. So far the internationalization of cable operators has been only partly successful. While UPC still maintains a network of 13 European cable subsidiaries, with nine of them under the top three in their respective country, NTL has been less successful in maintaining its European network of cable operators. Having bought most of its subsidiaries between 1999 and 2001, NTL refocused on its core markets, the UK and Ireland, and divested its subsidiaries in Germany (iesy), Switzerland (Cablecom), France (noos) and Sweden (B2) in 2002/03 to ease its financial burden.

Private equity players such as Goldman & Sachs, Apax Partners, Providence, and Apollo dominate the current M&A activities in Europe.

Vertical integration was pushed during a time when attractive content was perceived as especially valuable, and while prices for content licenses were exploding. Since then, the market has seen various content providers struggling with expensive content deals that were not justifying the initial investment. As a consequence, cable operators have learned that a combination of different content sourcing approaches is the best way to offer superior value for money. They can provide customized services. As an open platform that combines cooperation with TV stations with other cable operators, and as the resale of packages from other platforms (e.g., BskyB, Premiere, or Canal+).
5 Products: The long road from basic TV to triple play

Developing additional revenue streams is an essential goal of European cable operators. Within a few years, nearly all European cable operators have developed from a pure utility-driven business model - covering only analog TV - to offering TV and Internet at a minimum.

Marketing of Internet and digital TV products are core challenges for cable operators. With stable Voice over IP technologies now available, the next step for nearly all survey participants is the introduction of cable telephony.

The breakdown by country shows that most European cable operators have so far managed to establish additional revenue lines.

Some markets have succeeded to establish a balanced revenue mix. However, they are only partially comparable to an average cable operator, as they have provided additional services from the start. A better benchmark for traditional cable operators is the relatively advanced providers in Belgium, Netherlands, and Portugal that have managed to develop a new product revenue share of about 30-40% based on largely upgraded networks. The majority of traditional cable operators, however, are still firmly rooted in the more mature analog TV market.

**Upselling increases total ARPU and locks in cable customers**

By expanding the number of products sold to a single subscriber household (revenue generating units, RGU), cable operators not only increase their ARPUs, but also attempt to lock in their customers by offering one-stop shopping.

---

**In most countries the main revenue stream is basic cable TV**

<table>
<thead>
<tr>
<th>Country</th>
<th>Basic</th>
<th>Digital Pay TV</th>
<th>Internet</th>
<th>Telephony</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romania</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Countries with participants marked in bold

**Number of products sold to single households increases steadily**

---

**Total RGUs per basic subscriber (%)**

- **Median**
- **Max**
- **Min**

<table>
<thead>
<tr>
<th>Year</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>136%</td>
<td>148%</td>
<td>158%</td>
<td>162%</td>
<td>166%</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>116%</td>
<td>123%</td>
<td>126%</td>
<td>131%</td>
<td></td>
</tr>
</tbody>
</table>
New services will account for 36% of revenue in 2006

Operators expect strong increase in new service revenues

New services such as Internet and digital TV do not only help to leverage the existing customer base, but also to deliver higher ARPU. As a consequence of an increased share of new service subscribers from 8% to 16%, the respective revenue share is expected to rise from its current 23% to 36% in 2006.

RGUs and their respective revenues per service in 2003 and 2006
(Revenue per service in % of total subscribers, Total=100%)

Strongest ARPU growth rates in digital TV

New high ARPU services improve revenue potential of individual subscriber

High ARPU growth rates are expected for digital TV. The largest growth driver for digital TV will be the upselling of specialized packages (e.g., sports, lifestyle, family) on top of the basic digital package.

Cable Internet as been introduced as a high-bandwidth product. To reach the mass market, cable operators throughout Europe follow two strategies: reducing the prices for the Internet access and/or introducing entry products with less bandwidth (and lower prices). ARPUs will slightly decrease as a consequence.
5.1 TV: Migration to digital TV is main challenge

One of the main challenges of European cable operators is market penetration of digital TV.

The future revenue potential for analog TV is relatively restricted:

- Low number of channels provides only limited room for differentiation and additional content
- Without additional content and differentiation ARPU will only very limited growth potential (2-3% p.a.) and hence will not be able to rise above a certain level. At present only a few cable operators are able to reach analog ARPU above the 20 € mark with
- Price increases are usually tightly regulated by national or regional authorities

Network upgrade and digitalization are what differentiate cable from satellite and terrestrial TV, and they also create additional capacity for the introduction of pay packages.

Although it is a core strategic issue, the market introduction of digital TV has so far only succeeded in a few cases. While a few operators reach penetration rates above 30% (such as in Poland, Switzerland, and France), most operators have not even crossed the threshold of 5%. However, major players such as KDG and CableCom are currently moving forward with digitalization, which is expected to triple the average digital penetration in the next two years.

Analog TV slowly being phased out from 2006

For most cable operators, the analog basic access with a broad channel offering is still the core product. Analog TV currently seems to be untouchable: none of the operators has decided to reduce the number of analog channels in order to push their digital TV offering at this point in time. However, there are signs that this trend will occur in the medium term.

As can be expected, the early movers that plan to completely switch to digital prior to their peer group are companies that already have an above average digital TV penetration. The participants estimate that the final switchover will be between 2009 and 2012 (median: 2010).

Market forces, not regulation, are expected to drive digitalization

Despite the slow start of digital TV and the indecisive stance of media regulators towards digitalization, there is a common belief that the successful migration to digital TV can only be reached by a liberal and market-driven approach. None of the forced migration scenarios finds much support within the cable community, be it the digital
TV migration by law or by common decision of cable operators. Another important measure will be a simulcast phase in consensus with industry partners. This is in line with the plan of most operators to have a simulcast period in the middle of the transition decade.

**Premium pricing for digital basic**

The irresistible digital TV offering is supposed to combine a large basic digital package at low costs with subsidized Set Top Boxes, supported by a reduced attractiveness of the analog package.

However, realism and wishful thinking clash in the planned pricing of the digital access package: although low cost access packages are named as the main driver for digital TV penetration, nearly all cable operators expect that their customers will accept a premium on digital.

**Major growth potential expected from additional content packages**

The main revenue drivers of digital TV are additional special interest packages. A more detailed analysis of the digital TV ARPU reveals the two major revenue streams:

- A “digital access” bundle including the current analog access fee, plus the surcharge that was deemed appropriate by the respondent
- Additional charges for additional digital TV channels or packages

Subscriptions to additional packages are expected to generate more than 50% of digital TV revenues.

**Content creation and packaging**

Most cable operators obtain their digital content from a variety of sources. Depending on the mix of content sources, two major groups of operators can be differentiated:

- “Resale and package”: most operators focus on the cooperation with TV stations and the resale of packages from other platforms, such as BSkyB, Premiere, or Canal+, partly supplemented by the cooperation with satellite operators.
- “Do it yourself”: a smaller group of operators actually creates their own channels based on the acquisition of original content. In addition, they create their own packages in cooperation with other cable operators as well as with TV stations.
**Interactive TV will concentrate on gaming, betting, and pay-per-view - but remains a side issue**

Interactive TV, once the presumed killer application for digital TV, has still not gained momentum – and is not expected to do so in the foreseeable future.

Just as there is unity on the low revenue share of Interactive TV service, cable operators have a clear perspective on the potential three most successful services:

- Gaming (7 respondents)
- Video on demand / Pay-per-view (6 respondents)
- Betting (5 respondents)

All other services (e.g., shopping, PVR, eGovernment) were only named by one or two of the respondents.

The main barriers to the introduction of interactive TV services are cost issues, i.e., the costs of upgrading the network as well as the high costs of service. In combination with an unclear differentiation, these barriers result in the low expectations discussed above.

**Pay TV might get stuck between costs of service and unclear differentiation**

Bad news for operators: although cable operators expect to receive a significant share of their digital TV revenues from selling additional packages, they foresee more obstacles in introducing Pay TV than for digital TV alone. The combination of high costs of service on the one hand and unclear differentiation/lack of attractive content on the other hand could significantly reduce the probability of success for additional TV services.

A commonly opted-for strategy is the concentration on low to mid tier Pay TV packages that focus on the needs of specific consumer groups including foreign language, documentary, and lifestyle.

**Retail market for Set Top Boxes will gain momentum**

An addition to the availability of cheap, potentially subsidized Set Top Boxes, the introduction of a retail model can also drive the market. One in two operators believes that the digital TV business model will see a shift from the currently prevailing rental model to a more retail-driven market. Retail models for digital cable are currently being introduced in major European markets such as the Netherlands and Germany.

So far, a hurdle to the implementation of a retail model has been the low penetration of digital TV in combination with the lack of a common Set Top Box standard. The European landscape of Set Top Box technologies continues to be fragmented. Only one in four operators uses or supports Set Top Boxes based on MHP. The rest support other standards, such as VB Standard, Irdeto, or Open TV.
Despite this fragmentation, high Set Top Box prices are not named as one of the main obstacles to the successful market implementation of digital TV. The majority (75%) does not provide subsidized boxes.

**Clear differentiation against Satellite TV is missing**

On average, European cable operators do not feel that they have a clear, single differentiator versus satellite. The sales proposition consists of a set of advantages that is only convincing when presented as a package.

Due to the much larger content offering, the competitive positioning of cable TV versus digital terrestrial TV is much more accurate. Interestingly, the upgradeability of cable is perceived as a relatively weak sales argument compared to digital terrestrial TV – despite the fact that there is no back channel available with digital terrestrial TV.

Cable operators are aware of their challenge: the most frequently named hurdles to the introduction of digital TV are the lack of a clear value-added and an unclear differentiation against the competitors.

### 5.2 Internet: Currently dominated by mid-speed offers

**Growth story continues**

The number one priority of most operators is the market introduction of cable Internet. However, they operate in two different tracks. While a group of more aggressive players reached penetration rates ranging between 13% and 17% in 2003, other operators have not even crossed the 3% penetration line.

The gap between cable operators with a high penetration and those lagging behind is expected to widen. In most European countries, telecom operators are pushing DSL products. If cable operators cannot build onto a sound market share and reputation, the harder it will be for them to create a momentum for their cable Internet as times goes on.

**Mid-speed drives the market**

Most European cable operators have developed a range of packages with different access speeds:

- Entry level, low-speed packages (< 128 kBit/s) that are positioned versus ISDN
- Mid-speed packages (128 – 512 kBit/s) that fulfill the need for more bandwidth and attractive pricing
- High-speed packages with more than 512 kBit/s that are positioned as a clear alternative to DSL

The share of revenues from low-speed packages will be reduced in the future, while the share of revenues from...
both mid and high-speed packages will continue to grow further.

**High penetration = High ARPU?**

The highest Internet ARPUs are currently reached in countries with high cable Internet penetration, such as the Netherlands, Belgium, and Switzerland. Italy is a special case with Internet as the lead service.

By being first in the market - often well ahead of DSL - operators in these countries were able to build a large, high ARPU customer base that mostly subscribed to high-speed packages. As first movers, they were able to set prices in the broadband market.

The subsequent introduction of mid-speed packages diluted the first movers' high ARPU, but to a lesser degree than for cable operators that started with a mix of high and mid-speed packages and entered the market at a later stage.

The high ARPU in Italy stems from the fact that broadband Internet is the leading cable service, and is based on a dedicated FTTH network from e.Biscom.

**ARPU remain under pressure**

Internet ARPUs have been facing strong pressure over the last two years. The growing competition from DSL operators, namely the incumbent and price aggressive ISPs, as well as a growing share of low cost access packages, have driven down ARPUs. From 2002 to 2003, prices dropped on average by 23%; a further reduction of 10% is expected for 2004.

The future stabilization of Internet ARPUs can be realized by offsetting further price decreases with a growing share of more expensive mid and high-speed packages. Moreover, with higher penetration, the cost of service can be brought down with a higher share of peering agreements.
No single main differentiator between cable Internet and DSL

<table>
<thead>
<tr>
<th>Weak</th>
<th>Strong</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>

One-stop-shopping / Bundling

<table>
<thead>
<tr>
<th>Weak</th>
<th>Strong</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.5</td>
<td>1.2</td>
</tr>
<tr>
<td>1.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bandwidth

<table>
<thead>
<tr>
<th>Weak</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Lower price

<table>
<thead>
<tr>
<th>Weak</th>
<th>Strong</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Always-on

<table>
<thead>
<tr>
<th>Weak</th>
<th>Strong</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>0.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ease of installation

<table>
<thead>
<tr>
<th>Weak</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

Own portal

<table>
<thead>
<tr>
<th>Weak</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
</tr>
</tbody>
</table>

**Bundling is the main sales argument**

As with digital TV, cable operators do not see a single key differentiator for cable Internet vs. DSL. A combination of advantages, including bundling, bandwidth, and lower prices, is used in order to convince consumers to switch to cable Internet.

Three to four years ago cable operators pushed their own portals for cable users, but this is no longer an issue. Instead of positioning themselves as proprietary access platform and content provider, cable operators today concentrate on their core competence: access provision.

**Hurdle of expensive cable modems overcome by rental model and subsidies**

Even though cable Internet has reached excellent penetration rates in some European countries, the overall market is still comparatively small, especially compared to the market potential of DSL. Major economies of scale in the production of cable modems have not yet been reached. Due to many delays in the roll out of cable Internet, several equipment manufacturers have even withdrawn from the market.

The hurdle of high modem costs is overcome by the distribution of subsidized cable modems: more than 50% of the operators provide subsidized cable modems. The range of the subsidy varies greatly, from a few Euros up to 80 €.
5.3 Cable telephony: Ready for a fresh start

Although cable telephony was being promoted as a “must-have” and as a differentiating factor just a few years ago, many cable operators postponed its actual introduction while they waited for the breakthrough in Voice over IP.

Ready to start as a niche product - but when?

Now, with Voice over IP ready for implementation, nearly all cable operators are waiting in the wings for a fresh start. Currently, two operators are about to launch their telephony offering, with another two following in 2005, and the rest in 2006 and 2007.

Telephony will not be offered as a major core product by the new entrants, but rather as a niche product and supplement to cable Internet (four out of six new entrants). In addition to marketing their telephony infrastructure to the end user, three out of ten cable operators with telephony plans or products also supply other telecom operators with dark fiber.

The main hurdle to the introduction of cable telephony is the ability to reach a critical mass of customers. Telephony is a product whose acceptance depends highly on its consistent availability and reliability.

All other hurdles are more or less in line with the evaluation of market entry barriers for cable Internet: costs of modem, network upgrade, and unclear differentiation / unclear value-added of the product.

The majority of cable operators already offer or plan to offer cable telephony

<table>
<thead>
<tr>
<th>Offered</th>
<th>Planned</th>
<th>Neither offered nor planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephony</td>
<td>Entry</td>
<td>Neither offered nor planned</td>
</tr>
<tr>
<td>offered</td>
<td>planned</td>
<td>planned</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Market introduction of cable telephony

Lack of critical mass is the main hurdle for cable telephony

<table>
<thead>
<tr>
<th>Hurdle</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of critical mass</td>
<td>5</td>
</tr>
<tr>
<td>High costs of cable modem</td>
<td>3</td>
</tr>
<tr>
<td>Cost of network upgrade</td>
<td>3</td>
</tr>
</tbody>
</table>

Which do you consider to be the main hurdles to new service introduction? (Check several if applicable)
6 Operations

6.1 Value chain: different levels of commitment by product

For TV services as well as for Internet, a core value chain has emerged throughout Europe: virtually all aspects of network operation and customer management are covered by cable operators, while content creation has moved out of cable operators’ focus.

A similar business model will develop for telephony: the common denominator for telephony is the provisioning of the access network. The majority of operators also plan to be involved in the management of the customer relationship.

6.2 Marketing and Sales: Key success factors to support transition to multi-product offering

Within both of the cable operators’ target markets, be it the mature, low-growth TV market or the high-growth, highly competitive Internet market, one competence will be the key to success: marketing and sales. Cable operators are well aware of this challenge.

Advertising channels with local impact still preferred

Although cable TV is deemed a local market in which it is hard to advertise, cable operators are becoming increasingly skillful in using all available advertising channels.

There are only marginal differences concerning the use of channels for TV, Internet, and telephony services. An exemption to this rule is TV and radio advertising. Slightly more operators use these channels to promote their Internet product than to advertise their TV product. Mass marketing tools appear to be used to raise the general awareness for the product before focusing on a more local level.

High growth, high marketing expenses

Marketing expenses (including media and trade marketing) vary significantly, with a slight positive correlation between the spending level in 2003 and the RGU growth rates.

Average usage and effectiveness of advertising channels for TV

Wide spread of marketing spending level

Total marketing spending (incl. media and trade marketing) per RGU (€/RGU/p.a.), excl. one extreme value
**Direct sales channels still dominant, Internet underleveraged**

At present, direct sales channels are employed most frequently. A shift towards a larger share of retail channels can be expected, as operators increasingly use retail to distribute cable modems and Set Top Boxes in particular.

Most sales channels are used equally for TV and the Internet. Exceptions are:

- Direct sales via key accounts that are mainly employed for TV products (62% vs. 38% for Internet/telephony)
- Direct sales via Internet which is mainly used to sell Internet access (54% vs. 38% for TV)

Direct ordering over the Internet is assumed to be the most effective sales channel, so it can also be expected that this channel will be better leveraged in the future.

**High churn in new services demands increased retention activity**

Within a highly competitive environment, customer retention will become increasingly important. At this point, cable operators have on average implemented 2.4 and 2.2 retention measures for TV access and new services, respectively.

Analog TV usually has a churn rate of about 6-8%, Internet and digital TV currently experience churn rates of about 17%.

The main tool for retaining digital TV and Internet subscribers are outbound retention calls and bundled tariffs. In addition to emphasizing the listed retention tools, survey participants stressed the importance of high product quality as the best retention tool.

European cable operators have on average 6.4% “TV pirates,” with a large spread of 2% to 15%. The detection of TV pirates can provide additional growth potential. However, the overall potential is limited within the mature TV market. The higher the basic penetration of homes passed, the lower the share of TV pirates.

In line with the importance of this issue, most cable operators use a combination of up to five different measures to uncover TV pirates and pressure them to “voluntarily” subscribe to cable TV access.

The most common method are blockings. Most users decide that not having TV is a highly undesirable option, making this tool very efficient. Mailings and outbound calls are usually used as first steps in the conversion of a TV pirate.

**Digital TV churn expected to come down**

<table>
<thead>
<tr>
<th>Year</th>
<th>Analog TV</th>
<th>Digital TV</th>
<th>Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>8.1%</td>
<td>17.5%</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>8.9%</td>
<td>17.9%</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>8.1%</td>
<td>13.8%</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>7.7%</td>
<td>13.8%</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>7.7%</td>
<td>14.2%</td>
<td></td>
</tr>
</tbody>
</table>

**Average churn rates for the different services**

**Blockings are the most favored measure against TV pirates.**

- Blocking: 12
- Mailings: 8
- Outbound calls: 6
- Awareness campaign: 5
- Door-to-door / own personnel: 5
- Door-to-door / free agents: 3

**Usage of different anti-piracy measures**
6.3 Customer Service: a wide variety of performance levels

The importance of customer service will increase as the main differentiator towards satellite and terrestrial TV and will be a mandatory requirement to compete with the Internet service.

The great variation in call center performance shows that only a few European operators emphasize service quality.

Monthly billing still prevalent

Billing is one of the major cost drivers of customer service. Many cable operators try to reduce the number of billing cycles.

Not all services are equally fit for a reduced number of billing cycles. The higher the share of usage based pricing, the more billing cycles are needed. Telephony and Pay TV, especially pay-per-view services, therefore have a high share of monthly bills.

In the past, there has been much discussion on the use of combined billing. Combined billing does not only help to reduce cost, but it also supports the “one-stop shopping” claim. Currently about 70% of all operators offer combined bills.

6.4 Personnel productivity mainly driven by share of new products

On average, European cable operators have increased their productivity from 2002 to 2003 (+18%). Future productivity gains are expected to be less spectacular with 4% to 7%. This trend shows that many cable operators have already implemented major cost-cutting programs.

The variance of productivity levels is rather high; its main driver is the number of RGU-per-basic subscribers. The more additional services - especially digital TV and Internet - are sold to a single customer, the lower the productivity rate. A comparatively low productivity rate therefore has to be seen in light of the share of new products that a cable operator has actually sold.
Over the last few years, cable operators throughout Europe have focused on expanding their bandwidth. 32% of homes passed are connected to a network that is capable of transmitting interactive services.

**Small operators are frontrunners in upgrading, aiming at 700 MHz**

Small operators are at the forefront with respect to network upgrades. Financial market developments after the year 2000 were the key retarding factors for large-scale upgrades.

Large operators intend to significantly increase their upgraded footprint with respect to their network coverage in upcoming years. This development is remarkable and shows how cable operators are striving to position themselves as providers for new digital and interactive services. The fact that cable operators own the only alternative last mile to the customer seems to finally play a role in shareholders’ and executives’ business models.

Network experts already know that although it is a shared medium, coax is - from a physical perspective – significantly superior to an unshielded copper line. Marginal CapEx for an additional customer is much lower than in the DSL case if the network is already upgraded. But DSL availability and penetration is rapidly rising, and TV over DSL is already knocking on the market’s doors (e.g., France, the UK). Thus, cable operators know that the only chance to compete against hundreds of Satellite channels and the future contender - TV via copper line - is to upgrade the networks. Then, more than just Internet can be offered: due to the fact that VoIP technology is entering maturity, telephony can nowadays “easily” be realized as an add-on product. It offers significant value-added, can help to reduce churn due to product bundles, and can increase exit hurdles for customers.

Upgrade strategies changed significantly over last years, at least for larger operators. Between the late 1990s and 2001, the “862MHz”-paradigm was prevalent, imposing lots of costly fiber line build-up. Today, upgrade technology suppliers developed flexible devices that can be used on the basis of the existing network, offering easy-to-install 614MHz / backchannel upgrades without capital intensive digging. Due to these market-driven equipment innovations, larger operators are also planning large-scale upgrades.
The structures of in-house networks are on average still evenly distributed between star- and tree-like topology.

<table>
<thead>
<tr>
<th>Year</th>
<th>Star structure</th>
<th>Tree structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>2006</td>
<td>59%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Share of homes passed that are connected to an in-house network of star-like and of tree-like topology

Network extension is being pursued in an opportunistic way, and profitability criteria are becoming most important.

Network availability meets highest standards

In-house distribution will increasingly be built as a star-network

The bottleneck is caused by the vast number of in-house networks that all also have to be upgraded. Nowadays, in-house networks account for approx. 80%-90% of total upgrade CapEx, given that all buildings are upgraded at the same time. Here, in-house network quality is significantly impacting total CapEx, i.e., star-like network structures are much less costly to upgrade than older networks with tree-like topology.

Comparable to the coax distribution network, there exists a "star-network" paradigm where star-networks are said to be a prerequisite for the offering of interactive services. However, alternative technologies can lead to a much smoother management of the in-house network upgrade "bottleneck." Technologies like Ethernet-over-Coax, WLAN and others can help to find pragmatic and capital-preserving ways to connect customers of new interactive services to the newly upgraded interactive distribution network.

Network extension reduced to a minimum level

Within the mature cable market, network extension is of rather low priority. The rate of newly connected homes will decrease in the future, usually in line with reduced construction activity. Today, the network is only being extended if profitability criteria are being met. This stands in sharp contrast to the 90s, where – at least in part – large subsidies were granted in order to raise the network’s footprint and the number of homes passed.

Network availability meets highest standards

With respect to network quality, cable operators can meet the high availability criteria of a telephone operator. This is important for the introduction of interactive services.

In the late 90s, operators with telephony-enabling upgrades installed battery backups as a prerequisite to meet reliability requirements. There are three reasons that special reliability enhancing technologies such as battery back-ups, redundancies, etc. may not be necessary today and why regulators might have to adjust their requirements: first, as outlined above, availability is already very high, and even equivalent to that of a telecom operator. Second, the concept of primary line may be obsolete as DECT handhelds have largely penetrated EU households. The most likely outage of a network is a power outage, and in those cases the handhelds cease operation. Third, mobile phone penetration is approaching saturation, and an emergency caller can still use an alternative infrastructure.
8 Profile of Participating Companies

Thirteen companies participated in the 2004 EUROPEAN CABLE SURVEY. The group consisted of three cable companies offering full triple play (TV, Internet and telephony), nine with double play, and one operating analog TV. All participants originally started as TV cable operators. The broadband or telephony-oriented operators from Spain, Italy, and the UK are not included in the survey, making the panel more comparable.

The participating operators cover major European regions (ten different countries) and represent a total of over 18.6m subscribers.

The cut-off point for participation was set at a minimum of 300,000 subscribers.
Abbreviations

ARPU  Average revenue per user (€ / subs / month)
CA   Conditional Access
CAGR  Compound annual growth rate
CapEx  Capital Expenditure
CATV  Cable TV
DSL  Digital subscriber line
DTT  Digital terrestrial TV
FTE  Full-time-equivalents
FTTH  Fiber-to-the-home
HC  Homes connected
HP  Homes passed
ISP  Internet service provider
M&A  Mergers and acquisitions
RGU  Revenue generating units
STB  Set Top Box
Solon Management Consulting has been advising entrepreneurs, investors, and banks in the German and international cable market since 1996.