

February 2008

# Telecom operators

## In the eye of the telecom-media storm



- In the upcoming all-mobile world, fixed is not dead
- Local critical size is crucial: from seven to four operators per country
- On new services, telecom operators face rising pressure from Internet giants and equipment manufacturers
- Will pan-European consolidation be the solution?

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## Executive summary

The principal structuring trend in the European Technology, Media and Telecom (TMT) sector during the next few years will be the advent of mobile broadband. This will be the key driver of revenue growth throughout the value chain: in access, offsetting the decline in traditional telecom revenues; in equipment, with the multiplication of connected devices; in Internet services, notably in online advertising. We estimate a CAGR of 3.8% for the sector between 2007 and 2012, slightly faster than GDP growth.

At the level of local access, increasing investment requirements linked to fibre roll-out together with fixed-mobile convergence will accelerate domestic consolidation. This should preserve the value of access. In services, however, competition will intensify between the various players along the value chain (operators, manufacturers and Internet leaders). This rise in competition leads us to envisage two possible extreme scenarios: a commoditisation of telecom operators, or consolidation on a grand scale across Europe.

This report is the seventh annual industry report published by Exane BNP Paribas in association with Arthur D. Little. To prepare it, we conducted 71 meetings with managers of TMT companies in 12 countries.

### **Fixed will not die in the coming “all mobile” world**

Voice has already migrated massively to mobile handsets. Now that mobile broadband is ready, more and more devices will be connected anytime, anywhere, through wireless networks: laptops, PDAs, music players, personal cameras, games consoles, etc. This tidal wave will have wide-ranging consequences for the telecom industry, not the least being a stiff battle for customers between fixed and mobile operators, and, paradoxically, a greater need for fixed-mobile network integration.

How big can mobile broadband become? In our view, a target of 50% population penetration by 2012 is not out of reach. This implies revenue CAGR of 2.6% over 2007-12e for mobile operators, a re-acceleration from the current growth rate of ~2%, and a flattish fixed market (-0.4% CAGR) despite the growth of TV and content revenues, as more customers become “mobile only”.

In several countries, the home market may become limited to households interested in a high-end TV experience and in home-specific services (security, etc.) provided by fixed players. Austria could be followed by Portugal, Sweden, the UK and Germany. On the other hand, mobile broadband should remain a complement to rather than a competitor of fixed broadband in France, Spain and the Netherlands.

Is fixed dead? No. The more bullish one is on the mobile broadband take-up the less one should expect wireless infrastructure to suffice. Mobile operators will boost their network reach and capacity, but wireless technology will not bring the same performance at the same cost as fixed networks – especially when the latter move to fibre. Operators will want their customers' devices to be always connected to the best available network for each location – so mobile devices will use fixed infrastructure, through WiFi and Femtocells.

*Please refer to important disclosures at the end of this report*

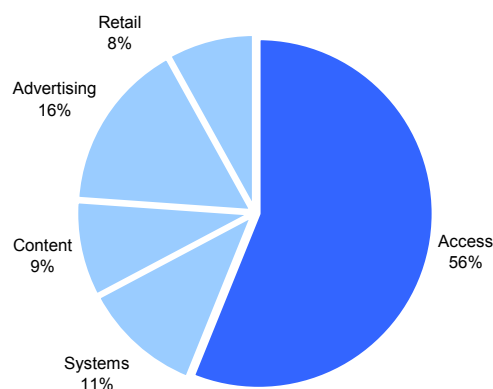
Consequently, whether visible to the customer or behind the scenes, fixed infrastructure providers will keep a significant share of the market value. Assuming that 20% of “mobile broadband” traffic will actually be carried through fixed infrastructure, which will be paid for by mobile operators to fixed providers, we conclude that fixed-line revenues will actually grow by 1.7% pa; conversely, mobile operators’ gross profit will grow by only 1.0%e pa, significantly less than the 2.6% expected rise in revenues.

Mobile broadband will be a driver of fixed-mobile integration. Customer demand for fixed-mobile convergent products has yet to emerge, but integration makes sense: 1) it will facilitate the development of fixed-mobile convergent offers; 2) it offers scope for significant cost synergies; 3) buying a fixed asset is a way for a mobile pure-player to hedge itself strategically. Mobile cannot do without fixed, and vice-versa.

### Telecom operators face rising pressure in the value chain

The move to “all-IP” is an opportunity for operators to try and catch fast-growing services and content revenues. However, building complex new offers such as IPTV, mobile TV or location-based services requires that operators manage ecosystems with device manufacturers, systems players, Internet leaders and content providers – but operators have a poor track-record at collaborating, and the TMT space is getting more competitive rather than more collaborative.

**Chart 1: Share of each sub-sector in total TMT EBITDA (Europe, 2006)**



Source: Arthur D Little, Exane BNP Paribas

Telecom operators have to date occupied a prime spot in the value chain, with more than half of the overall TMT EBITDA attributable to access. However, their situation is increasingly challenged by the:

- ongoing fight for content. This is not new, but will not improve as content becomes a more important part of operators’ strategies. We reaffirm our view that gross margins will decline;
- tightening grip of fast-growing global giants on Internet services and on their monetisation through online advertising. The upside potential for operators seems limited as they will be unable to capture advertising revenues; the downside risk is considerable as Google is pushing strongly for mobile open access;
- growing likelihood that operators will have to share service revenues with the leading device and systems manufacturers, both on mobile (Apple iPhone, Nokia Ovi) and fixed (battle around the box now involving Sony, Microsoft, Cisco, etc.).

## Towards Europe-wide consolidation?

More and more factors are pushing telecom operators to pursue size both locally and at the pan-European level.

First, local consolidation will continue in 2008, especially on the fixed side. The many subscale broadband providers are under mounting pressure as a result of the move to triple-play and fibre, and in some cases from mobile broadband competition. They will be bought by larger fixed players and/or by mobile operators.

The average number of fixed and mobile access players in the European markets will fall progressively from seven to four. This local consolidation could boost the valuations of the fixed operators by 18% compared to a status quo scenario, and the sector's overall valuation by 6%.

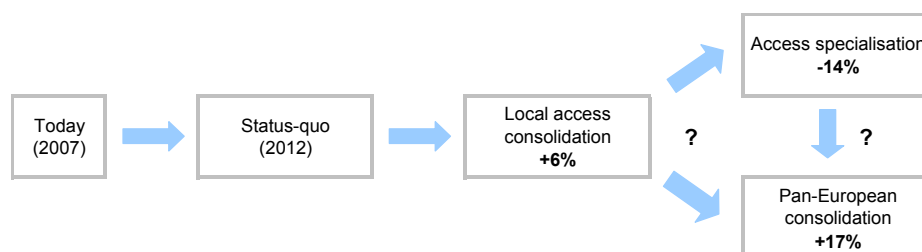
Second, global size is becoming a significant issue. It is increasingly clear that larger multi-country operators have more clout than smaller peers in negotiations with Internet leaders and device manufacturers – who are trying to extend their influence in the value chain.

However, it is far from certain that smaller operators (incumbents in smaller countries and large challengers which will remain after the local consolidation phase) will lose out as a result. This is because they will have the option to “play ball” with global Internet leaders and manufacturers i.e. to open their networks to their services and share more value with them, in order to continue offering customers an attractive proposition. We see two possible scenarios: access specialisation and pan-European consolidation.

– “Access specialisation”. In this scenario, smaller operators would protect/grow their market share by giving away a share of the sector's potential revenues and margins in the services and content area to Internet leaders and manufacturers. This would be a negative scenario for “orthodox” leading pan-European operators because they would lose out in terms of market share to the smaller players, and would be unable to recoup it through growth into services. On our estimates, the sector's value could be cut by 14% compared to the status quo, as the leakage of value in the services area would more than offset the benefits accruing from local consolidation;

– “Pan-European consolidation”. In this scenario, large operators would respond to the threat of the previous scenario by acquiring many smaller players in other countries, both local incumbents and challengers. This would increase the ability of the telecom services industry to defend its share of the services market against Internet leaders and manufacturers. The sector's valuation could increase by 17% compared to the status quo.

**Chart 2: Possible sector scenarios, impact on sector valuation**



Source: Arthur D. Little, Exane BNP Paribas

We do not expect sweeping consolidation moves in 2008, but it could start in 18-24 months. In the meantime, further local consolidation is likely in many markets, and we should see some signs of “access specialisation” in several markets.

### **Country specifics: Germany up, Spain down**

Country-specific factors will remain a very important differentiator between European telecom operators. There is a considerable diversity in the growth potential and competitive situation within Europe hence the implications of the general scenario presented in this report vary from country to country.

We believe that Germany is the most attractive market, combining above average growth potential, in particular in mobile, and potential for consolidation. The outlook in the UK remains the most uncertain as competition will probably remain above average even after consolidation. France offers good medium term visibility but longer term, consolidation benefits could be offset by the entry of a fourth mobile operator. Finally, the Spanish market has been very healthy but visibility is not great, with below average growth potential in mobile, above-average downside risk on fixed prices, a slowing economy and challengers which remain committed.

## Arthur D. Little – Exane BNP Paribas report, seventh edition

We present below the conclusions of our report “Caution – Work ahead” published on 13 March 2007. We have split them into two categories: our on-target projections and topics on which we were over- or under-optimistic.

### On-target projections

“We have shaved our forecasts for the mobile segment to 1.9% growth per year”. In 2007, the European mobile sector grew by 2%.

“We continue to expect a reduction in margins and returns on capital employed”. In 2007, EBITDA margins have declined by circa 50bp in both mobile and fixed-line.

“Operators will step up initiatives such as outsourcing of networks and/or network sharing, development of wholesale businesses and virtual operators, and partnerships with media groups and Internet leaders”. We have seen:

- Vodafone and Orange share networks in the UK and Spain, T-Mobile and Hutchison share networks in the UK, Wind and Hutchison Italy put their masts together and sell them, etc.;
- Italian mobile operators sign with MVNOs for the first time, Vodafone UK open its network to Asda, Orange Spain to KPN/Symio, etc.;
- Google, Microsoft and Yahoo sign a number of deals with operators – and Google push strongly in the USA for “open access” on mobile.

“We expect leaders to counter-attack based on purchase of content”. We have seen more operators invest in content (e.g., France Telecom on football rights in France).

“Challengers who do not have critical mass are under the greatest pressure. We expect consolidation”. We have seen accelerating consolidation of alternative carriers in 2007.

“Mobile operators should partner or merge with alternative operators” to rollout ADSL services. Vodafone has bought Tele2 Italy & Spain, SFR bid on Neuf Cegetel, etc.

“We believe that the mobile data market will pick up pace starting in late 2007”. In the last months of 2007, we have seen a take-up of mobile broadband in many markets, with the launch of iPhone in large European markets, the growth of mobile data cards in Austria and Sweden, etc.

“We see potential for improvement of markets in the Netherlands – fixed and mobile – and to a lesser extent in fixed-line in France”, and risk of “increasing pressure in Belgian mobile”. These forecasts have proven right.

### What we had over- or underestimated

“It becomes easier for new mobile players to enter the market”. Iliad is more than ever interested in the fourth licence in France, quoting capex of only EUR1bn to cover France. However, it remains uncertain whether it can succeed.

We expect leaders to accelerate the deployment of fibre and the launch of convergent offers. Actually, fibre rollout was slow in 2007, due to technical and regulatory hurdles, and convergent offers have not met overwhelming demand from customers yet.

“We have slightly raised our estimate for the fixed-line business to -1.1% per year”. In 2007, fixed-line incumbents’ revenues have continued declining by circa -1.7%.

“We see potential for improvement in mobile in Germany & Austria, but increasing pressure in French & Spanish mobile”. The German & Austrian mobile markets have remained very competitive, while the French & Spanish markets were not disrupted.

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### Telecom operators

Alltel (USA), Belgacom/Proximus, Bolloré Telecom (France), Bouygues Telecom, BT UK, Deutsche Telekom AG, Fastweb, France Telecom France, France Telecom Spain, H3G Austria, Iliad, Italtel, KPN-Telfort, mobilkom Austria, Mobistar, Neuf Cegetel, O2 UK, ONE (Austria), ONI (Portugal), Orange UK, SFR, Sonaecom, Swisscom Group, Swisscom Schweiz AG, T-Mobile Austria, TDF, Telecom Italia, Telekom Austria, T-Online, Telefonica Spain, Telenet, Telenor Sweden, TeliaSonera Sweden, Vodafone Germany, Vodafone Italy, Vodafone Portugal, Zapp (Portugal)

### Cable operators

Codice/Alditel (Belgium), Ono, UPC Austria, Virgin Media (UK)

### MVNOs and retailers

Boost/AT&T (USA), Darty (France), Eftel (Sweden), FNAC Portugal, Phone House (Portugal), Uno Mobile (Italy), Yesss! (Austria)

### Media and Internet

Accedo Broadband (Sweden), Google France, komdat.com (Austria), Lagardère Active, MSN France, ORF (Austria), Sogecable (Spain), Vivendi, Zattoo (Switzerland)

### Systems

Alcatel-Lucent France, Alcatel-Lucent Italy, Casa Systems (USA), Ericsson Austria, Ericsson Sweden, Gemalto, Microsoft France, Nokia France, Nokia Sweden, Nokia Siemens Networks France, Nokia Siemens Networks Germany, Nokia Siemens Italy, Thomson France

### Regulators

ARCEP (France), PTS (Sweden)

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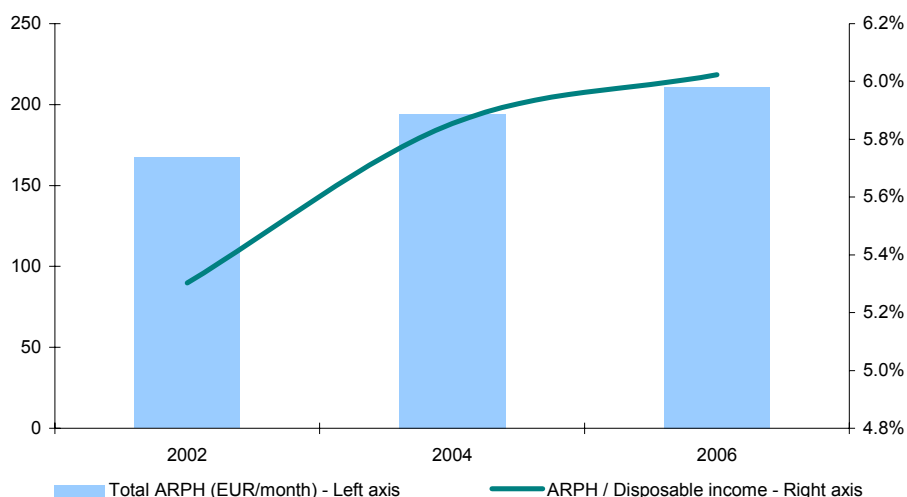
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## New sources of growth

### 2002-2006: Access was the main growth driver

During the past four years (2002-2006), revenues in the broader TMT sector in Europe have grown by an average of 6% a year, faster than the overall economy, representing a growing share of the disposable income of Western European households: from 5.3% in 2002 to 5.8% in 2004 and 6.0% in 2006.

**Chart 3: Telecom, IT and Media spending (EUR/month per household)**



Source: Arthur D Little, Exane BNP Paribas

The TMT average revenue per household (ARPH) has gone up from EUR167/month in 2002 to EUR212/month in 2006. This has been mainly driven by access revenues, i.e. the core business of telecom operators, which have grown 9% per year (see table). Access represented only a third of TMT revenues in 2002 but accounted for half of the growth over the period. In access, fixed voice has been declining, but mobile voice and fixed Internet have grown strongly.

**Table 1: Telecom, IT and Media spending, EUR per month per household in the five largest European countries**

EUR/month/household	2002	2004	2006	CAGR 2002-06	2006 % of total
Access	59.3	77.8	84.0	9.1%	39.7%
Systems	34.8	37.8	41.1	4.3%	19.4%
Content	17.1	18.3	21.8	6.3%	10.3%
Advertising	33.9	35.9	37.5	2.5%	17.7%
Retail	22.1	24.2	27.2	5.3%	12.8%
<b>Total</b>	<b>167.2</b>	<b>194.0</b>	<b>211.6</b>	<b>6.1%</b>	<b>100.0%</b>

Source: Arthur D Little, Exane BNP Paribas

As shown in Chart 1 (page 4), access represents more than half of the total EBITDA generated in the TMT sector – we estimate 56% in 2006.

In the table above and in the following tables in this introductory part of the report, these figures have been restated from revenues as reported by the companies – so as to present trends in different sub-segments:

- Access revenues include retail revenues of telecom operators and cable providers, excluding content revenues (e.g., mobile content and pay TV revenues) and excluding the distribution gross profit – which we have integrated in the Retail revenues.
- Systems integrate software and hardware revenues derived from equipment directly used by the customer, i.e. including mobile handsets, set-top-boxes, computers and TV sets, but excluding the network-related equipment. Like in the case of Access, we have reallocated the distribution gross profit on Systems to the Retail sub-segment.
- Content revenues integrate all types of content i.e. television, music, games, etc., including content sold by telecom operators. We have also reallocated the distribution gross profit to the Retail sub-segment.
- Finally, Advertising corresponds to both offline and online advertising revenues.

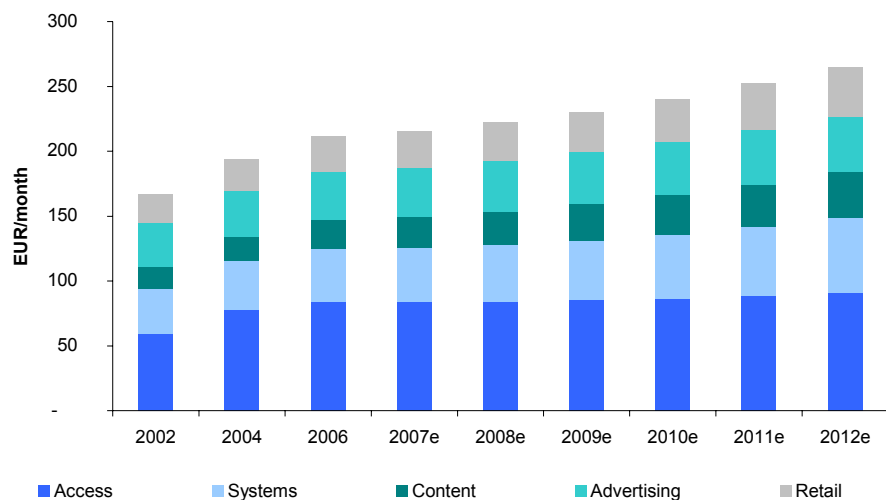
As such, these figures are not similar in their presentation to the figures we present in other parts of the report regarding telecom operators' revenues. The latter do include both Access and Content revenues, as well as some of the Retail revenues and some Advertising revenues.

### 2007-2012: New sources of growth

In the next five years, we expect the broader TMT sector in Europe to continue growing ahead of GDP: 3.8% per year, with revenue per household going up from EUR215/month in 2007e to EUR265/month in 2012e. However, the growth drivers should be radically different from those of the past few years. We expect the main growth drivers to be:

- Broadband, with both mobile broadband and fixed broadband growing strongly. We expect 11% growth pa for mobile data and fixed broadband in the next 5 year;
- Online advertising: 10% CAGR expected;
- Systems (6% CAGR expected).

**Chart 4: TMT revenue per household, forecasts**



Source: Arthur D. Little, Exane BNP Paribas

Access revenues, which include both fixed and mobile data and voice, should grow by 1.5% per year, i.e., more slowly than GDP. This is because we expect voice revenues to decline, with fixed voice down more than 10% a year and mobile voice down by around 2% a year.

Compared to previous years, there was no clear consensus on the sector's growth potential among the 71 companies we met. This is interesting as it could prompt a variety of strategies for the coming years and ultimately result in winners and losers, depending on who made the right bet.

Regarding the overall TMT market growth, expectations ranged from "flat" to +5% CAGR, a wide range.

Companies expecting flat revenues, i.e., a more conservative outlook than ours, were in Austria, the UK and Portugal. They base their forecasts on the assumption that household TMT budgets cannot expand forever but will at best keep pace with inflation, especially in a tighter economic environment.

However, these companies are outnumbered by those expecting growth of 3-5%, which is in line with our estimates. They expect revenue growth to be supported by a progressive shift in spending from other areas towards the TMT market. This is expected to happen for video (lower cinema box-office and DVD rental, more for pay-TV, VOD, etc.), music (already noticeable for some years), advertising (less offline ads, more online), etc. A major factor supporting these trends is the rise of the "new generation" with rising purchasing power. Players sharing these expectations were notably in Sweden, Italy, Switzerland and Austria; this group also included global manufacturers.

### Telecom: no consensus on fixed versus mobile outlook

The general view of companies we talked to is that despite the expected growth of the broader TMT sector, European telecom operators' revenues will not increase much in the coming years – despite the growth of fixed and mobile broadband. This is in line with our expectation of 1.4% revenue CAGR for access over 2007-2012e – as shown in the table below.

**Table 2: Access market estimates**

EUR/month/household	2002	2004	2006	2007e	2008e	2009e	2010e	2011e	2012e	CAGR 2002-06	CAGR 2006-12e
Mobile voice	24.0	34.2	36.7	36.3	35.6	35.1	34.1	33.3	32.3	11.2%	(2.1%)
Mobile data	4.2	6.0	8.2	9.2	10.2	11.5	12.7	14.1	15.5	18.3%	11.3%
Fixed telephony	23.9	22.1	20.9	17.7	15.1	13.1	11.1	9.1	7.8	(3.3%)	(15.1%)
Internet & data	7.2	15.5	18.2	20.4	23.1	25.6	28.6	32.0	35.6	26.1%	11.8%
<b>Total Access</b>	<b>59.3</b>	<b>77.8</b>	<b>84.0</b>	<b>83.6</b>	<b>83.9</b>	<b>85.4</b>	<b>86.5</b>	<b>88.6</b>	<b>91.2</b>	<b>9.1%</b>	<b>1.4%</b>

Source: Arthur D. Little, Exane BNP Paribas

However, as the following table shows, there was no consensus on the respective growth profile of fixed and mobile access among the people we talked to. CAGR expectations on mobile ranged from "-10% to flat" to "+4% to +5%", with operators in Austria and Germany the most negative, and operators in the USA the most positive.

These figures compare to the current service revenue growth of circa 2% in European mobile, with mobile voice contributing negatively by 0.8%, offset by SMS growth, and non-SMS data contributing +1.9% to European mobile growth (see chart 5 below).

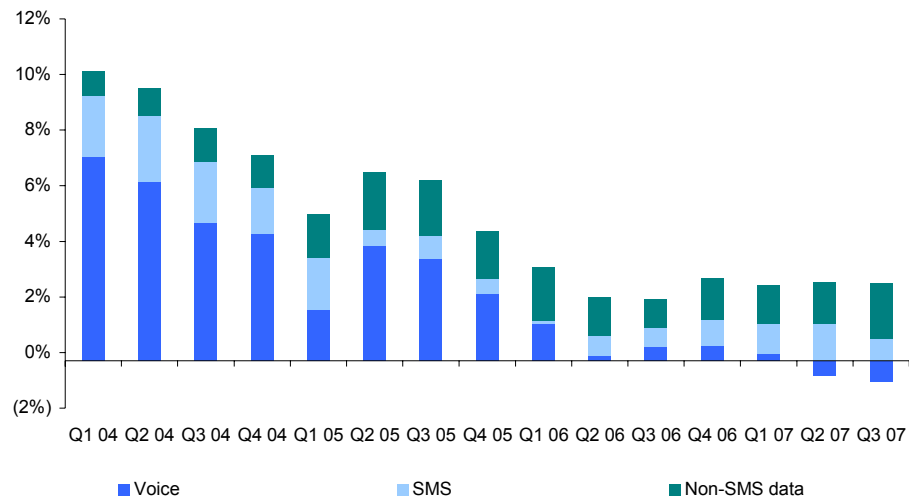
**Table 3: Different views on outlook for fixed and mobile\***

CAGR expectations	Mobile	Fixed
Austria	-10% to =GDP	NA
Germany	-10% to +5%	0% to 3%
France	=GDP	NA
Italy	NA	0% to +10%
Portugal	=GDP or >GDP	NA
Netherlands	>= GDP	Stable decline
Spain	NA	NA
Switzerland	>GDP	=GDP
Belgium	+3% to +5%	+3% to +5%
United Kingdom	+4% to +5%	Decline
USA	+4% to +5%	+3% to +5%

\* These figures are not a "consensus" view of players of each country, as only a few responses have been given in each country on this particular question.

Source: Arthur D. Little, Exane BNP Paribas

**Chart 5: European mobile service revenue growth, contribution of voice, SMS and non-SMS data**



Source: Arthur D. Little, Exane BNP Paribas

Most operators expect strong growth in mobile broadband revenues, driven by huge growth in 3G data traffic, but they have different views on two issues:

1) how this data traffic growth translates into data revenue growth. In particular, for many operators, revenue acceleration is not expected in 2008, but more in 2009, when adoption of more advanced handsets (smartphones) and other connected devices (PCs, GPS units, etc.) will have grown;

2) the revenue trend for mobile voice, as voice prices are expected to continue falling (notably in Germany, France, Austria, Portugal and Switzerland), notably due to regulation of roaming and termination rates. Some believe that mobile voice runs a high risk of commoditisation, like fixed voice did a few years ago. However, a few operators in some countries expect voice traffic to offset this, thanks to ongoing fixed-mobile substitution (UK, USA).

Regarding fixed-line, the range is from operators expecting a decline, to some expecting "+3% to +10%" revenue growth. Interestingly, this year, there were not more players expecting fixed-line to decline or to be flat than players expecting mobile to decline or to be flat.

Companies expect fixed access revenues to remain more or less flat or even to decrease, but they see (uncertain) growth for fixed operators coming from:

- addressing unmet needs, notably broadband, which is no longer a luxury and is becoming a “must-have”;
- tapping into other spending areas such as home entertainment – even though a minority expressed doubts on the profit contribution from these additional revenues (pointing to low margins brought by IPTV and more generally by content sales).

### Online advertising: widespread optimism

Together with broadband (see above), online advertising and systems will be among the main markets to benefit from the current TMT trends in Europe, in particular the growth in personal use.

Industry players foresee strong growth in online advertising revenues, with one uncertainty linked to the economic context. The consensual view is that there will be a further massive change in mix, from offline to online advertising – with online advertising expected to grow between 10% and 15% per year, or even more. We forecast 10% CAGR in online advertising.

The rationale for this is that technology is playing against traditional advertising, as consumers can increasingly skip advertising, so advertisers need to change the way they operate. At the same time, digital advertising holds huge growth potential which remains to be explored, both on the “traditional” fixed Internet and on mobile. As detailed in pages 46-50, online advertising enables better targeting of audiences and is viewed as more efficient than offline advertising by more and more players.

### Systems: solid growth ahead

On the systems side (hardware and software related to mobile phones, devices such as the iPod, set-top-boxes, television sets, etc.), we expect strong growth driven by the multiplication of connected devices and increasing renewal rates.

The players that we talked to are positive about the prospects for systems revenues, which they expect will grow between by 3% and 15% a year in the coming years. Our forecasts point to growth accelerating to almost 6% a year until 2012e, driven mainly by consumer electronics – see table below.

This growth encompasses both the mobile and the fixed markets, with the latter experiencing a shift towards the “connected home” or “intelligent home” – yielding a wide-ranging evolution in home terminals (boxes, etc.), with strong growth in particular in the application layer, but also in TV sets and terminals. A success factor for terminals is expected to be the “value per square meter”, with a push towards flat screens, wireless connections, digitized content, etc.

The players that are more cautious on the growth potential of systems point out that consumers are sceptical about technological hardware, because the devices and other content items that they have purchased in the past have become obsolete faster than they expected

**Table 4: Systems revenues estimates**

EUR/month/household	2002	2004	2006	2007e	2008e	2009e	2010e	2011e	2012e	CAGR 2002-06	CAGR 2006-12e
Consumer elect.	16.8	19.2	22.4	23.2	24.6	26.5	29.5	32.6	37.2	7.5%	8.8%
Computer hardw.	12.8	12.7	12.7	12.8	13.0	13.6	13.8	14.3	14.5	(0.2%)	2.3%
Comm. equipment	5.3	5.9	6.1	6.1	6.2	6.2	6.2	6.4	6.4	3.7%	0.8%
<b>Total Systems</b>	<b>34.8</b>	<b>37.8</b>	<b>41.1</b>	<b>42.1</b>	<b>43.9</b>	<b>46.3</b>	<b>49.5</b>	<b>53.3</b>	<b>58.0</b>	<b>4.3%</b>	<b>5.9%</b>

Source: Arthur D Little, Exane BNP Paribas

## The coming all-mobile world: is fixed dead?

There is a growing trend from shared usage towards personal usage for TMT devices and services. Voice has migrated massively onto mobile handsets and this will continue. Now that mobile broadband is ready, we foresee strong growth in this market, driven by the need to connect all devices: laptops, PDAs, music players, personal cameras, game consoles, navigation systems, etc., at anytime and anywhere.

This expected tidal wave will have wide-ranging consequences for the telecom industry, which can be summarised as follows: intensified battle for the customer between fixed and mobile operators, and, paradoxically, an increasing need for fixed-mobile integration at the network level.

First, the battle for the customer will intensify between fixed and mobile operators, and more customers will become “mobile only”. In several countries, the home market may become limited to households interested in a high-end TV experience and in home-specific services (security, etc.) – which will continue to be provided by fixed players rather than mobile. After Austria, this could be the case in Portugal, Sweden, the UK or Germany. Conversely, mobile broadband should remain a complement rather than a competitor to fixed broadband in France, Spain and the Netherlands.

How big can mobile broadband be? In our view, a target of 50% population penetration by 2012 is not out of reach. This would lead to 2.6% revenue CAGR over 2007-12e for mobile operators, a reacceleration compared to the current growth of ~2%, while the fixed market would be flattish (-0.4% CAGR) despite the growth of TV and content revenues, as fixed operators would lose more customers.

The more bullish one is on the mobile broadband take-up, the less one should expect wireless infrastructure to suffice. Mobile operators will boost their network reach and capacity, but wireless technology will not bring the same performance at the same cost as fixed networks. Operators will want customers' devices to be connected to the best available network depending on their location at all times – so we expect mobile devices to increasingly use fixed broadband infrastructure, through WiFi and/or Femtocells.

As such, fixed infrastructure providers will keep a significant share of the market's value, be this visible to the customer or behind the scenes. Assuming that 20% of the “mobile broadband” traffic will actually be carried through fixed infrastructure, which will be paid for by mobile operators to fixed providers, we conclude that fixed-line revenues will actually grow by 1.7% pa, and, conversely, that mobile operators' gross profit will grow only by an estimated 1.0% pa, significantly less than the 2.6% expected for revenues.

Paradoxically, mobile broadband will be a driver of fixed-mobile integration. Industry players are increasingly convinced of the necessity for operators to become integrated. Such integration is not urgent from a customer demand point of view, but we believe it makes sense: 1) developing fixed-mobile convergent offers will be easier; 2) we see significant cost synergies; 3) last but not least, for a mobile pure-player, buying a fixed asset is a way to hedge itself strategically.



## From shared to personal: tidal wave expected

After voice, which has already migrated massively onto mobile handsets (almost half of the traffic now originates from mobile networks in Europe), usage is now becoming increasingly personal on broadband:

- On the offer side, mobile broadband is ready for prime time: 3G/HSPA networks and handsets are available, rich services are being launched, flat-rate pricing is increasingly wide-spread;
- On the demand side, we see a growing need to connect an increasing number of portable devices: personal computers, which are increasingly laptops as opposed to desktops, but also PDAs, music players, games consoles, etc. All these devices are personal rather than family devices. They will be increasingly connected, everywhere, through “pervasive” always-on networks.

As such, everybody expects strong growth on the mobile broadband market. We agree.

### More and more personal devices, increasingly connected

Many players that we have interviewed believe that the main battle they need to fight is not for the home, but for the consumer. This view was expressed not only by mobile operators, but also by incumbents, retailers, manufacturers, etc. This is consistent with the trend we observe that usage of communication and entertainment services will increasingly be personal rather than shared, as shown in the following table.

**Table 5: From shared/home usage to personal usage**

Applications	From shared usage...	...to personal usage	Comments/Examples
<b>Voice</b>	Fixed phone	Mobile phone	39% of voice originates on mobile networks (Europe 5, 2007)
<b>Email etc.</b>	Desktop PC	Laptop PC, handheld devices	Strong growth of Blackberry, Gmail and Y!Mail available on mobile phones
<b>Internet</b>	Desktop PC	Laptop PC, handheld devices	Strong growth in Laptops, WiFi, Datacards, Ultra-small laptops (MacAir, eee-PC etc.)
<b>Music, Video, Photo</b>	Living-room CD, DVD, stereo	Personal multimedia player	iPod, iPhone, etc. Mobile music download services, Ovi by Nokia, Flickr on Y!Go
<b>Gaming</b>	Game console on TV	Portable game console	Nintendo DS, Sony PSP etc.
<b>TV</b>	Living-room TV	Multi-room TV, non-linear usage, mobile TV	Set-top-boxes, VOD, Youtube & other, TV over 3G, DVB-H

Source: Exane BNP Paribas, Arthur D Little

The move from Home to Personal is already well underway for voice, with mobile operators carrying 39% of the overall voice traffic in the five largest European countries in 2007, almost double the share they carried in 2001 (20%). This was driven by the growing penetration of mobile handsets in the population (113% in Europe currently) and the push of mobile operators towards bigger and bigger voice bundles.

The next step is the “personalisation” of the computer. With the move from desktop computers to laptops, the penetration of PCs is increasing (now 60% of households in Europe) and so is the number of households that are multi-equipped (more than 40% of households in the USA currently). This corresponds to a situation where there is one computer per person rather than one computer per home. The arrival of ultra-small laptops (such as Apple’s MacAir, a new laptop by Lenovo or the inexpensive eee-PC from Asus) is a perfect example of this trend. With broadband penetration at around 50% of households in Europe, PCs are connected to the Internet at home. In the past few years, the generalisation of WiFi connectivity in laptops has enabled “mobility” within the home and in WiFi hotspots, and there was a step-change in 2007 with the arrival of 3G data-cards and USB sticks for the mass-market. We expect a Europe-wide take-up of offers enabling laptops to be connected everywhere, not only in WiFi hotspots.

Finally, portable electronic devices are spreading fast: smartphones and PDAs, music players such as the iPod, portable games consoles such as the PSP, personal cameras, as well as many hybrid devices (music players/phones, PDA/phones, very small laptops, etc.). These devices will increasingly be connected to the Internet through wireless networks, potentially generating revenues from paid services and/or advertising. Famous examples of connected devices include RIM's Blackberry, Apple's iPhone (blending the iPod multimedia capabilities with a smartphone enabling mobile internet browsing) and Sony's PSP (which is WiFi enabled; Sony has announced a partnership with Skype to enable VoIP on the PSP). Other types of devices will be connected, including CCTV cameras, navigation systems, alarm devices, etc.

There are diverging views in the industry as to whether there will be all-in-one devices for all applications and content (voice, internet, video, music, etc.), but there is a strong consensus on the idea that these devices (whether there are plenty of specialised devices or all-in-one devices) should enable services and content to be accessible anytime, anywhere. Solutions are being developed to enable customers to use their (personal) content on all kinds of devices, regardless of the access network.

### **Home market: a niche segment?**

The trends we have described do not mean that the home market will disappear. However, we expect it to be increasingly associated with the specific needs of the family, which are not fulfilled at the personal level. These specific needs concern:

- Entertainment in the home environment, in the living room, around the large, shared TV screen: television, video on demand, management of content (pictures, music, etc.);
- Connection of home appliances, and home-related services such as security, health or metering (as of today, these remain future markets rather than large markets);
- And, for some market segments, the home office.

TV consumption is becoming more personal to an extent, with the development of multi-TV equipment at home and mobile TV. However, in our view, this does not mean that fixed-mobile substitution can happen on the TV market: 1) from a demand point of view, mobile TV corresponds to a different use than fixed TV. For instance, experience shows that the sessions are much shorter; and 2) from a technical point of view, 3G networks are point-to-point networks which are not well suited for the mass broadcast of TV content. They cannot cope with the capacity needed for mass-TV consumption as each additional TV viewer increases the capacity used on the network. Mass-market mobile broadcast TV depends on the advent of new broadcast technologies such as DVB-H, which require different frequencies, different licences and the rollout of a different network. This is why we believe that IPTV (in particular HDTV) will increasingly be the main reason for customers to keep their fixed-line.

Nevertheless, in the future, the home concept may be relevant for a smaller number of customers than currently. It should remain relevant for the "structured families", older people and, more generally, households keen on a high-end TV service (triple-play, IPTV, HDTV etc.), but it should be less relevant for other segments such as students, mono-families or "double-income-no-kids". These latter segments may not all be interested in IPTV and other home-specific services, and therefore may have no reason to keep a full-fledged home product.

Operators interviewed confirmed that it will be easier to sell mobile broadband as a replacement to fixed broadband to the youth market, in particular students, who do not necessarily find it natural to pay a fixed-line rental and who are more financially constrained.

Confirming this trend, some European triple-play pioneers we talked to highlighted that they must move away from their “triple-play only” approach and start proposing more segmented offers, as some customers want only single- or double-play products, i.e., do not want the TV product.

**Table 6: Who needs a Home product?**

Services	Students, mono-families, etc.		Structured families, older people, etc.	
	Mobile	Home	Mobile	Home
Voice	Yes	No	Yes	Maybe
Broadband access	Yes	Maybe	Yes	Yes
TV	Maybe	Maybe	Maybe	Yes
Home security etc.	No	Rare	No	Yes

Source: Arthur D. Little, Exane BNP Paribas

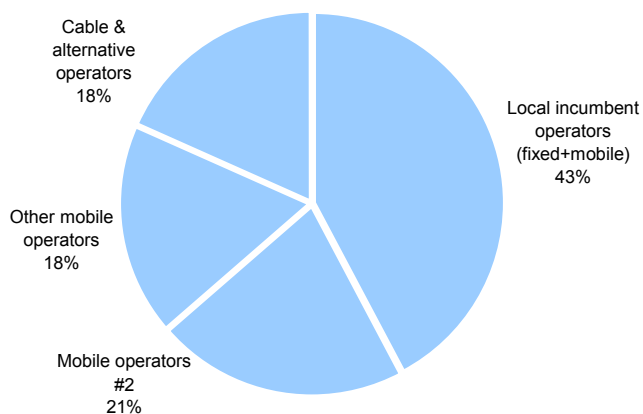
Customers who are not interested in television can be divided into two sub-segments:

- Those that only have basic Internet access requirements (e.g., email, surfing, etc.), who could be very well served with mobile-only products;
- Those requiring a very powerful broadband connection when at home (heavy users such as gamers, etc.), who will need to keep a fixed broadband line, acting as a “booster” to their mobile broadband connection when they are at home.

## Mobile will further cannibalise fixed revenues

Fixed-only operators, mobile-centric players and integrated operators all have different focuses, but there will increasingly be overlaps and therefore competition between them.

**Chart 6: Market shares of the European telecom services market (2007)**



Source: Arthur D. Little, Exane BNP Paribas

### Who’s going to provide what? Increasing overlaps

We expect competition to grow between fixed and mobile operators, not only on voice, as has been the case for a few years, but also on broadband – progressively blurring the barriers between what each type of operator stands for in the eyes of the customer.

**Mobile-centric operators pushing quickly into fixed-line.** We expect mobile-centric operators to continue to focus primarily on mobile services, but they will increasingly compete with fixed operators in several areas.

Some mobile players we talked to say that they continue to see the home market just as a niche segment. In particular, some who have recently launched fixed broadband offers still believe this is more a “nice-to-have” than a “must have”, stating that 1) demand from mobile customers for fixed products is limited to specific customer segments, and that 2) it is not easy for a mobile operator to create value from a fixed broadband offer, especially in competitive fixed markets. They nevertheless reckon that in three years time, customers may expect integrated “any service on any device at any location”, and then their convergence offers may take centre-stage.

An increasing number of mobile players see the fixed market as a growth area for them – notably in Austria, Germany and Portugal. They highlight their ability to cross-sell fixed services to their mobile customer base, and definitely expect their entry into fixed broadband to increase the competitive pressure in the fixed market.

Many mobile players also see the opportunity to bundle fixed services into their offerings as a good way to protect their existing mobile revenues. For leading mobile operators, the priority has now moved to reducing churn. They believe that customers with multi-play offerings should show lower churn rates.

Most do not expect to go into the home-specific products such as television or security, at least not at this stage, but some have a more aggressive stance, stating that the battle has started with broadband and that the next step is IPTV. One operator explicitly said it targets to increase its overall market share of telecom services from 20% to 25% over the next five years, with an offer covering ADSL-based voice and broadband but also television, highlighting that pay-TV is the market with the highest growth potential.

Finally, many believe they need to have a full fixed-mobile proposition in the corporate market – in which convergence and one-stop shopping is happening faster than on the residential market.

Fixed operators we have talked to generally take this push from mobile operators into broadband very seriously. In Austria, where mobile broadband is the most developed, fixed operators feel really threatened and have already taken steps to improve their broadband offering – e.g., with the launch of IPTV products – to curb fixed-line losses.

**Fixed-only operators at a crossroads.** The fixed-only operators (ISPs, cable operators, BT) already (or plan to) provide the whole range of home services, but should they try to extend their offering towards mobile? Fixed-only operators we have talked to are divided regarding this question:

- Some said they remain focused on the home proposition, a market on which they continue to see strong growth, with potential to grow broadband penetration and ARPU, thanks to TV and content. These operators see mobile products as just a nice add-on;
- Some others (incumbents, alternative carriers and cable operators) believe they need to move towards mobile and are ready to invest heavily in mobility.

Alternative carriers often hold the view that a fixed-mobile convergent product will be sought by clients if and only if it enables them to reduce their expenditure, but this is not an issue for an operator that is not yet present on the mobile market – who has nothing to lose on this market hence is ready to be aggressive on prices. Some cable operators want to position themselves as providers of content over any screen i.e., the TV, PC and mobile. They all face questions on how to enter the mobile market. The MVNO route is considered attractive by some cable operators (NTL’s acquisition of Virgin Mobile in the UK; MVNO launched by Telenet in Belgium; Ono’s MVNO in Spain). Many fixed operators look beyond MVNOs and consider acquiring spectrum to rollout their own network (e.g., Iliad in France, BT in the UK).

Not many mobile operators see fixed players as a threat. Most believe that WiFi is complementary to rather than in competition with mobile. However, some mobile operators, notably in France, do believe in this risk – saying that a new entrant from the fixed market (e.g., Iliad with the fourth mobile licence) would have nothing to lose when entering the mobile market and could significantly impact market prices.

**Integrated operators go for bundling.** The integrated operators (all incumbents, some challengers like Wind in Italy, SFR/Neuf Cegetel after the merger in France, Sunrise in Switzerland, Orange UK and Spain) will of course try to provide the whole range of home and mobile services, with a double objective:

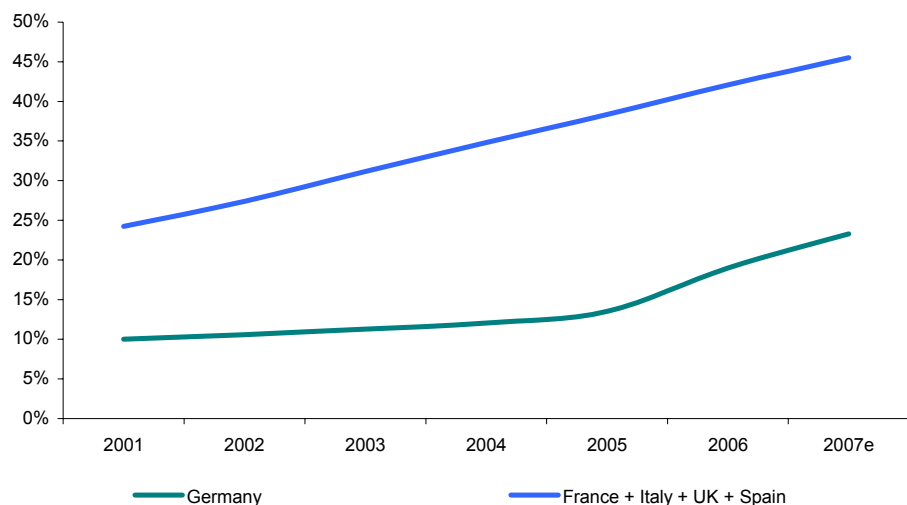
- Customer retention: most incumbents highlight that for them, it is critical to retain control of the access lines. Experience shows that multi-play customers are stickier than mono-play customers (churn 20% lower for a triple-play customer than a double-play one, according to some operators). Therefore, the move towards bundles (triple-play, quadruple-play) primarily serves this customer retention target;
- ARPU growth: operators will aim to add “value creating services” i.e., new convergent services that customers would be ready to pay for. However, even the most advanced incumbent operators in terms of convergence seem to have made little progress in the past few years in identifying and launching such services.

Of course, incumbents believe that the move towards fixed-mobile convergence is an advantage for them. However, many incumbents now reckon that: 1) there are regulatory issues which block them from bundling fixed and mobile before their smaller competitors can also do so, and 2) they are not fully ready as they continue to have separate organisations “seeing” clients from the two different angles (fixed, mobile) and are not yet able to “reconcile” these two angles.

**Not new but still vivid: fixed-mobile competition on voice**

Fixed-mobile substitution on voice traffic is not a new trend. Voice traffic has been migrating from fixed to mobile networks for many years in Europe, and mobile now represents almost 50% of the total outgoing voice traffic in many European countries: we estimate an average of 45% in France, Italy, Spain and the UK in 2007 but still only 23% in Germany.

**Chart 7: Share of voice traffic originated on mobile networks**

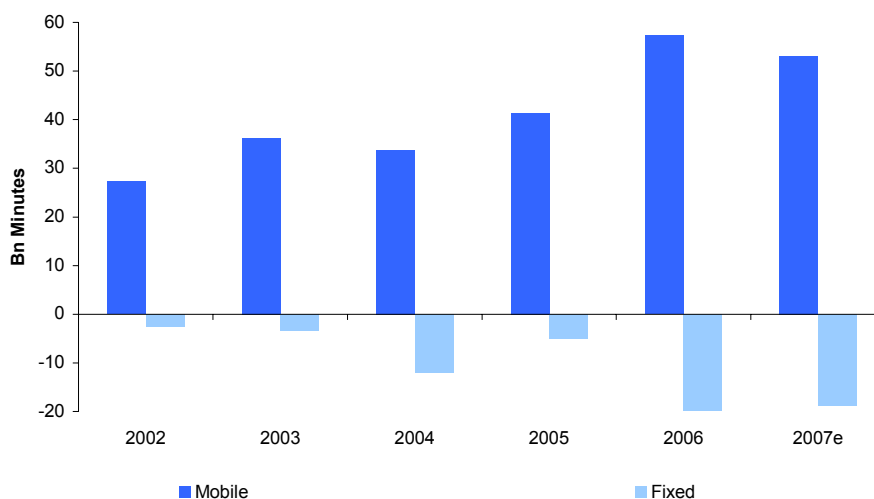


Source: Arthur D. Little, Exane BNP Paribas

The share of traffic originated on mobile networks has increased by 3.5-4.0% per year over 2001-2007 in most markets, driven by a rapid decline in mobile voice prices (around -8% per year in 2001-2005, accelerating to -12% pa in the last two years). In Germany, the migration has accelerated strongly in 2006-2007, together with the much faster drop in prices, driven by E-Plus. Charts 7, 8 and 9 are based on data from regulators, the European Commission and operators. In these calculations, the “fixed” traffic includes both traditional voice traffic on traditional fixed networks and voice-over-IP traffic originated on ADSL lines through boxes.

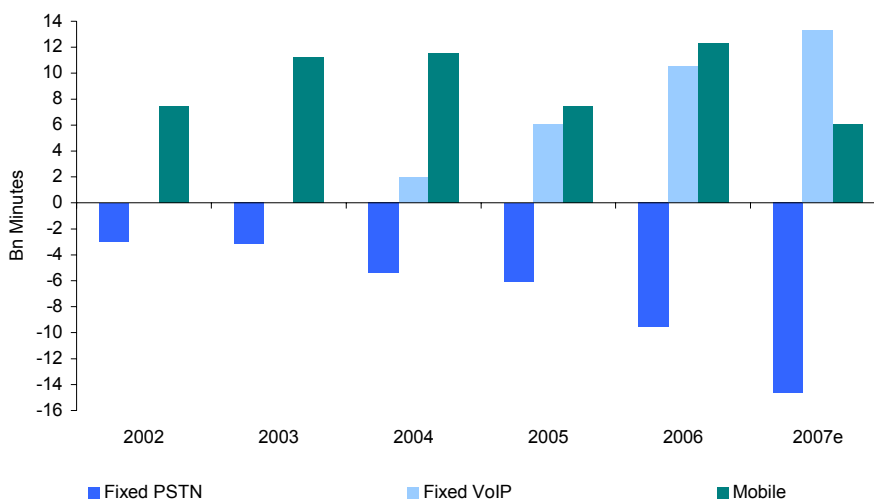
We expect fixed-to-mobile substitution to continue, driven by a further decline in prices (due to regulation and competition) as well as by different commercial initiatives from mobile operators: 1) ongoing prepaid-to-contract migration; 2) a further push of larger bundles (towards unlimited bundles); and 3) in particular, home-zone tariffs, targeting not only fixed voice traffic revenues but also fixed subscription revenues.

**Chart 8: Incremental voice traffic, yoy, fixed versus mobile (Europe big 5)**



Source: Arthur D. Little, Exane BNP Paribas

**Chart 9: France – Incremental voice traffic, yoy, fixed versus mobile and the impact of fixed VoIP**



Source: Arthur D. Little, Exane BNP Paribas

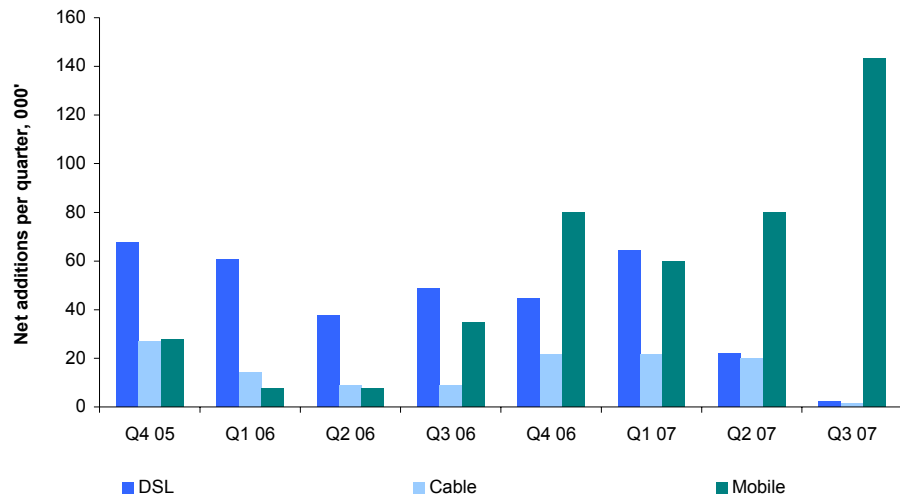
We note that even in the countries where fixed-line VoIP traffic is the most developed, such as France, the fixed-to-mobile substitution trend continues. Based on the French regulator's market data, we can see that the mass development of IP-based fixed traffic since 2005 has not led to a significant slowdown in mobile traffic growth. Indeed, VoIP has grown in replacement of traditional fixed voice traffic (which is declining extremely quickly), but mobile traffic growth has continued.

### New: fixed-mobile competition on broadband

In several countries, mobile operators are now challenging ADSL and cable operators on the broadband market, with offers based on 3G/HSPA data-cards or USB sticks (also referred to as "dongles") which enable users to connect laptop computers to the internet both at home (like an ADSL or a cable connection) and while on the move (in a much more widespread manner than WiFi hotspots).

The most extreme example of the mobile operators' offensive is Austria, where mobile operators have captured two thirds of broadband net additions in 2007e (after 35% in 2006), and almost 100% of the net additions in Q3 07 (see chart below).

**Chart 10: Austria – mobile is capturing broadband market growth**



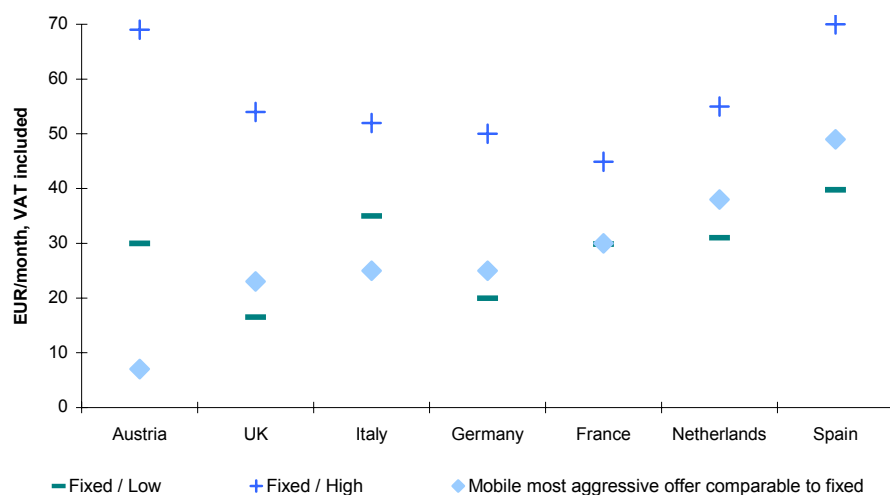
Source: Arthur D. Little, Exane BNP Paribas

Traditionally, the mobile broadband offerings were aimed at low profile users, but since mid-2007, mobile operators are also targeting heavy users, with offers including 3Gbytes of data traffic or more for around EUR20/month i.e., cheaper than equivalent fixed-line broadband products (the most recent mobile broadband offers from H3G and T-Mobile are virtually unlimited flat-rates respectively proposing 15Gbytes for EUR24/month and 10Gbytes for EUR25/month). Prepaid mobile broadband products were successfully launched by three of the four mobile operators, in a niche of the broadband market, offering more flexibility than fixed broadband. These are the reasons for the acceleration in mobile broadband in Austria since 2007.

The Austrian fixed operators feel materially threatened by this offensive from mobile operators, which is having a significant impact not only on broadband market shares, but also on market prices, as mobile operators are considered to offer better value offers than fixed line. On the other hand, the Austrian mobile operators wonder whether the incumbent will succeed in responding with fixed-mobile bundles and/or higher bandwidth or more attractive content. One such offer launched recently by Telekom Austria has apparently met early success; this offer includes the fixed-line rental, fixed broadband at 2Mbit/s and a mobile SIM card for EUR20/month.

This trend is also developing in other countries, notably in Sweden and Portugal. As shown in the chart below, there are now several countries where mobile operators are launching mass-market mobile broadband offers for laptops with very competitive prices compared to fixed-broadband offers. This is the case in Germany and the UK (of course, not all offers are comparable in terms of speed, traffic allowance, etc.).

**Chart 11: Comparison of monthly prices of fixed and mobile broadband in Europe – January 2008\***



\* For fixed-line, we present the range of the cheapest to the most expensive broadband offer, depending on speed, etc. including the cost of line rental (if not included in the offer, we add the line-rental to the price of broadband). For mobile, we use the lowest price on the market for offers including at least 500MB of traffic per month.

Source: Arthur D. Little, Exane BNP Paribas

We do not believe that such a trend will develop everywhere. In particular we believe that France, Spain and the Netherlands are unlikely to see mobile broadband access compete head-to-head with fixed broadband access. Depending on the country, this could be due to one or both of the following reasons:

- The intrinsic “strength” of fixed networks: with ADSL2+, fixed operators have made big inroads with very high speed offers and/or IPTV/triple-play products, which mobile operators cannot match;
- The absence of a mobile-only challenger which would be ready to aggressively target the mobile broadband market and would have nothing to lose on the fixed broadband market.

This is why Spanish and French fixed operators are very relaxed about the cannibalisation risk from mobile broadband, unlike some of their peers in other countries, and see mobile broadband as a complement to fixed broadband rather than a competitor.

**Table 7: Is mobile broadband a large risk for local fixed broadband players?**

	Aggressive pricing?	Triple-play stickiness	Mobile-only challengers	Total rating
Austria	1	0	1	2
UK	0	0	1	1
Italy	1	(1)	1	1
Germany	0	0	1	1
Netherlands	0	(1)	1	0
Spain	0	(1)	0	(1)
France	0	(2)	0	(2)

Source: Arthur D. Little, Exane BNP Paribas



## Putting numbers on mobile broadband...

How will this growing fixed-mobile competition impact telecom operators' revenues? We have built a simplified sector revenue model to answer this question.

We start from the assumption of a strong take-up of mobile broadband penetration: we estimate that mobile broadband penetration could grow from around zero currently (on the residential market) to 50% of Europe's population in five years time (50% of inhabitants, not households) – implying a rapid adoption rate of 10% of the population each year, i.e., faster than the current adoption rate of 3G.

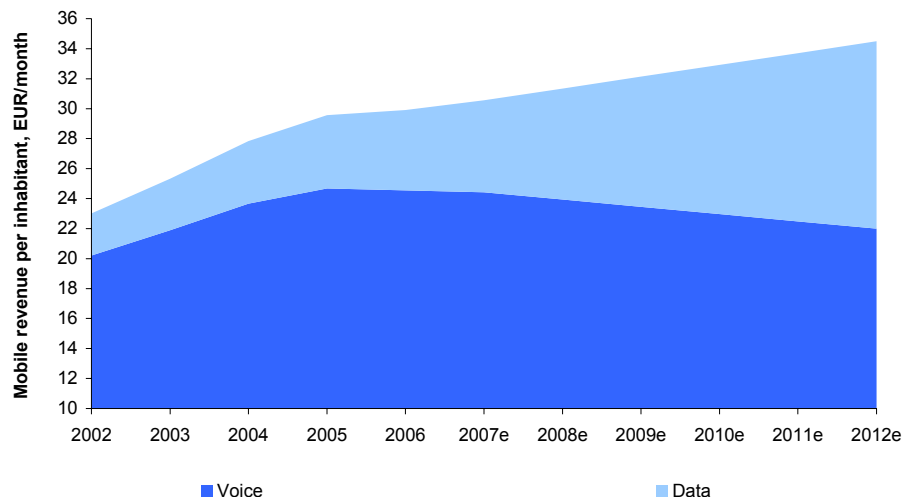
We believe that such a penetration level is ambitious but can be reached:

- Some operators, including Vodafone's CEO Arun Sarin, have recently said that they see a 25% population penetration as a credible target for mobile broadband in the next few years.
- Mobistar's management explained that the target market of its mobile broadband access offers represents 63% of the Belgian population, which it splits into three categories: 1) households which are already mobile-only: 35% of the population; 2) households which have a fixed-line but say they would be ready to get rid of it if their mobile operator provided a broadband service: 28% of the population; and 3) other households, which would keep their fixed line in any case. Only the last category, representing only a third of the population, is not part of Mobistar's target market.
- Regarding the expected pace of penetration of such products, our estimate of 10% each year is very high, but can be compared to other similar products: 1) the current pace of penetration of 3G handsets is around 9% per year, and 2) on fixed broadband, growth in penetration is higher than 10% of households per year in many countries. As such, if mobile operators manage to capture a large share of the future broadband net additions (as they do in Austria), they could grow their customer base very quickly.

To get to revenue estimates, we assume that mobile broadband customers would pay an average of EUR20/month, in addition to mobile voice revenues of EUR22/month. At the same time, other mobile customers are expected to spend only EUR5/month on mobile data.

These assumptions lead to average revenue per inhabitant of EUR34.5/month for the mobile providers in 2012e, compared to EUR30 today, i.e. 2.6% CAGR during the period, reaccelerating compared to the current growth of ~2%.

**Chart 12: Trends in mobile revenue per inhabitant in Europe: voice versus data**



Source: Arthur D. Little, Exane BNP Paribas

### ...and on its potential impact on fixed revenues

What will happen to fixed-line revenues if 50% of the population subscribe to mobile broadband access in five years time?

To answer this question, we have assumed that by 2012, two thirds of these mobile broadband customers will keep a fixed-line contract, while one third will not find it useful – hence the direct revenue billed by the fixed operators for these customers, representing 17% of the whole market, falls to zero.

This assumption may seem harsh. However, many industry players believe that customers are not ready to pay broadband twice, i.e., that mobile operators' push for broadband will have a negative impact on fixed broadband. This is consistent with the experience of the most advanced markets such as Austria.

For those customers taking mobile broadband but also willing to keep their fixed-line contract (representing an estimated 33% of the overall market), we have assumed that they will do so because they are particularly interested in the TV product provided by the fixed operator. We have therefore taken a bullish stance on their fixed-line ARPU: EUR61/month versus the current EUR53, driven by a high TV & Content ARPU of EUR15/month.

Finally, for the customers not (not yet?) subscribed to mobile broadband (50% of the market), we have assumed that these are lower-end customers and that their fixed-line ARPU will reach EUR48 in the long run. On average, this leads to blended fixed-line revenues per inhabitant of EUR19/month, virtually flat compared to today.

**Table 8: Modelling the next stage of Fixed-Mobile substitution**

EUR/month per inhabitant Penetration	2007 Total / Average	2012 scenario			Total / Average	2007-2015e CAGR
		Mobile broadband customers		Other		
Mobile BB/inhabitant	0%	50%	50%	50%		
Of which cutting/keeping their fixed-line	100%	<b>Cut fixed BB</b>	<b>Keep fixed BB</b>			
<b>Total share of the market</b>	<b>0%</b>	33%	67%	100%	<b>100%</b>	
Fixed BB penetration as a % of households	55%	17%	33%	50%		
Fixed BB penetration as a % of inhabitants	23%	0%	90%	90%	75%	
		0%	38%	38%	31%	
<b>Revenues to fixed providers</b>						
Fixed narrowband customers	31.0	0.0	28.0	28.0	23.3	
Access	13.0	0.0	13.0	13.0	10.8	
Voice	18.0	0.0	15.0	15.0	12.5	
Fixed broadband customers	53.0	0.0	61.0	48.0	44.3	
Access	13.0	0.0	13.0	13.0	10.8	
Voice	13.0	0.0	8.0	8.0	6.7	
Internet	25.0	0.0	25.0	20.0	18.3	
TV & Content	2.0	0.0	15.0	7.0	8.5	
<b>Fixed provider revenue</b>	<b>19.8</b>	<b>0.0</b>	<b>26.4</b>	<b>21.1</b>	<b>19.4</b>	<b>(0.4%)</b>
Access	6.0	0.0	6.0	6.0	5.0	(3.6%)
Voice	7.0	0.0	4.0	4.0	3.3	(13.8%)
Internet	6.3	0.0	10.3	8.3	7.6	3.7%
TV & Content	0.5	0.0	6.2	2.9	3.5	47.4%
<b>Mobile provider revenue</b>	<b>30.3</b>	<b>42.0</b>	<b>42.0</b>	<b>27.0</b>	<b>34.5</b>	<b>2.6%</b>
Voice	23.8	22.0	22.0	22.0	22.0	(1.6%)
Data, TV & Content	6.4	20.0	20.0	5.0	12.5	14.2%
<b>Total Fixed &amp; Mobile</b>	<b>50.0</b>	<b>42.0</b>	<b>68.4</b>	<b>48.1</b>	<b>53.9</b>	<b>1.5%</b>

Source: Arthur D. Little, Exane BNP Paribas

All in all, in such a scenario, the sector's revenue growth points to 1.5% per year, of which +2.6% per year for mobile providers and -0.4% per year for fixed providers.

This clearly shows that when taking a bullish view on mobile broadband, one should not forget the negative consequences for fixed broadband penetration growth and fixed providers' retail revenues.

## **Fixed infrastructure will remain key, visible or not**

In an increasingly mobile world, can operators rely solely on wireless infrastructure to provide the best offer to customers in the long run?

We believe not. Wireless will never bring the same bandwidth, capacity and quality at the same cost as fixed-line technologies.

Of course, customers are not interested in the kind of access alternatives available (xDSL, fibre, cable, 3G, WiFi, etc.) but in the “final product” i.e., the ability to connect their devices with high-performance access: “no hassle” fast broadband with a good quality of service, at a reasonable cost.

To make sure that the customer experience is always as good as possible and that the cost is optimised, operators will make sure that customers’ devices switch networks depending on their current location. They will be connected to 3G/HSPA networks when “on the move” but to fixed broadband infrastructure when at home or in the office – through local-area wireless connection such as a WiFi link or a 3G Femtocell.

We therefore expect that, visible for the customer or not, the fixed infrastructure providers will keep a significant share of the market’s value. Even for mobile broadband customers, 10% of mobile revenues could easily end-up in fixed operators’ pockets.

### **Mobile infrastructure is not enough**

Mobile networks are becoming more widespread, faster and cheaper by the minute. However, we believe that current and future mobile networks based on 3G/HSPA technologies will remain limited in terms of indoor coverage, capacity, reliability and cost compared to fixed-line networks.

For voice, the mobile infrastructure is sufficient. However, capacity requirements should grow at an exponential rate driven by 1) the penetration of mobile broadband services and 2) the new Internet services, such as YouTube, which consume more and more bandwidth. In this context, operators increasingly need to offer a lot of capacity at the lowest possible cost – and mobile-only infrastructure will not be an option.

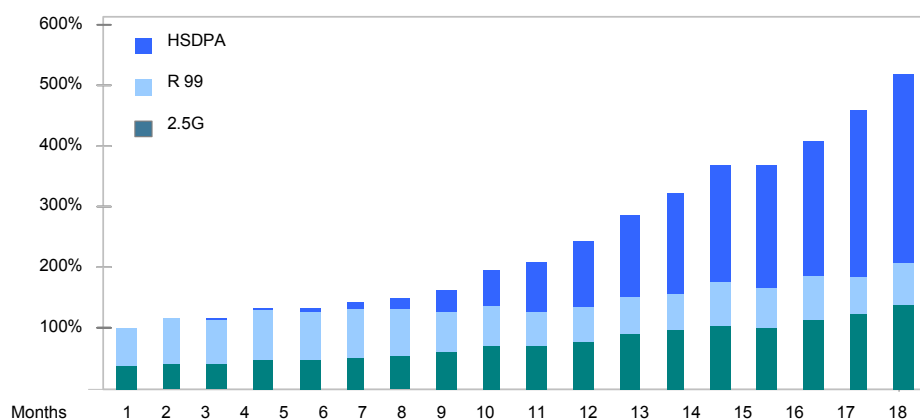
A few people that we met disagree: one mobile operator argued that the mobile broadband offering is equivalent to fixed broadband; another said that it had no capacity problem on its 3G network despite the surge in mobile data traffic, because it is able to upgrade capacity easily at limited cost and this can be done “within days”. This may be the case for some relatively small mobile operators with a lot of spare spectrum. But the majority of players we talked to said that mobile infrastructure is too slow, too expensive and insufficiently reliable to replace fixed infrastructure. Cable and fibre, in particular, are considered far superior.

One short-term problem for mobile networks is that some operators have underestimated the volume of data that consumers will use. Hence even though base stations can theoretically provide download speeds of up to 14Mbit/s, the actual speed is limited by backhaul capacity of only 2Mbit/s – requiring operators to increase their backhaul opex and/or capex significantly.

More fundamentally, whereas capacity in a 3G network is shared between the different users in each cell, each customer in a fixed network gets its own dedicated capacity. Consequently, increasing capacity requires boosting cell density (i.e., reducing the size of each cell), which results in an exponential rise in costs.

In the most advanced countries for mobile broadband such as Austria, network capacity is already one of the main issues for mobile operators. Data traffic is increasing by 10% per month in Austria. The chart below shows the way the data traffic is currently growing in a typical mobile network: in around one year following the launch of HSDPA, the total traffic has tripled.

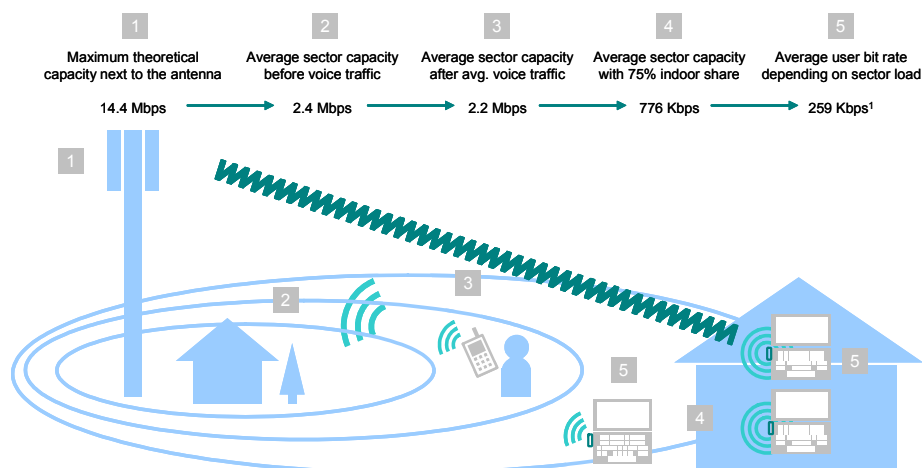
**Chart 13: Development of data traffic in a mobile network**



Source: Arthur D. Little, Exane BNP Paribas

The feedback is that existing 3G/HSDPA radio access network infrastructure is not delivering the expected overall capacity and bit rates that operators want to offer to mobile data users. We believe that this is notably due to the high share of indoor mobile broadband usage and the resulting issues in terms of propagation. As shown in the chart below, the capacity drops from 2.2Mbit/s outdoors to 0.8Mbit/s indoors.

**Chart 14: HSDPA downlink capacity – What is the bit rate for the end user?**

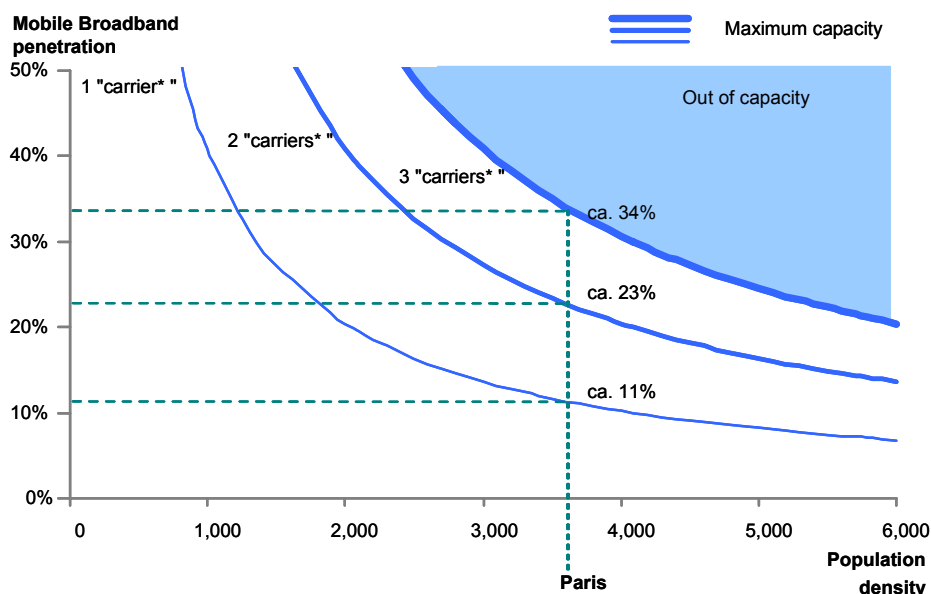


Source: Arthur D. Little, Exane BNP Paribas

We have built a model to assess the maximum potential penetration of mobile broadband in the customer base of mobile operators, assuming they fully rollout and utilise all capacity made possible by the HSDPA technology.

Assuming that the operator activates the three carrier frequencies in its mobile network, the physical limitation is estimated to be around one to two base stations (Node B's) per square kilometre in an urban area. This leads to a maximum capacity which can be provided by a HSDPA network – depending on the population density of the area considered. For instance, in the case of a city like Paris (3700 inhabitants per square kilometre) the limit would be that the operator could provide a 1Mbit/s download speed to a maximum of 30-35% of its customer base.

**Chart 15: HSDPA capacity limitations**

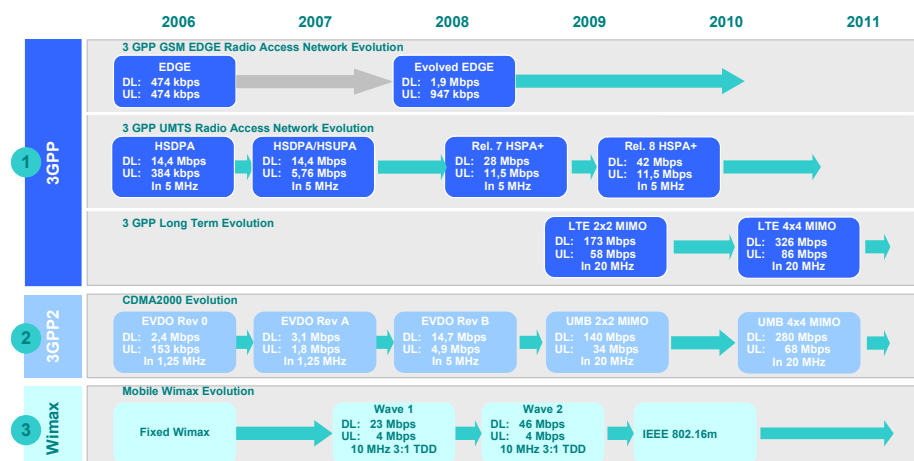


\* "Carriers" are sub-sets of the capacity available in each base station; the maximum capacity available to each operator is three "carriers".

Source: Arthur D. Little, Exane BNP Paribas

Finally, looking to the coming years, even if mobile network speed and capacity increases significantly (see the chart below), we believe that the unit cost of mobile access in Europe will remain 10-100 times higher than that of fixed access, even in the long run. The gap between fixed and mobile access will not narrow as mobile networks get faster, stronger and cheaper, because fixed infrastructure will progress in a similar (or even more radical) way, with the arrival of fibre access networks (Fibre to the home, Fibre to the curb). FTTx can bring 100Mbit/s or even much more, both on the downlink and the uplink, with a very low marginal cost – once the costly installation is done.

**Chart 16: Change in 3GPP, WiFi and WiMax technologies**



Source: Arthur D. Little, Exane BNP Paribas

As such, some Austrian mobile operators have already concluded that they will have to partner with fixed infrastructure providers to cope with the increasing need for speed and capacity – and this is our conclusion too.

### Femtocells and UMA: blending mobile and fixed

There are two technologies that enable the connection of a mobile device to a fixed infrastructure:

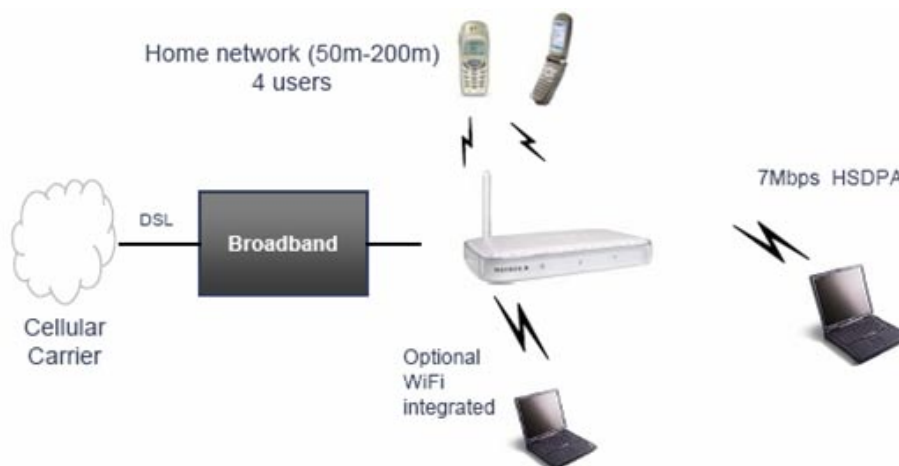
- UMA (for Universal Mobile Access): this technology enables dual mode (GSM/WiFi) phones to handle the connection to both the usual GSM network and to existing WiFi hotspots (themselves connected to a DSL, cable or fibre link);
- Femtocells: these are boxes which create a mini-mobile coverage area within a home or office. Like a WiFi box, the Femtocell plugs into a fixed link (DSL, cable or fibre) and connects devices wirelessly. The Femtocell transforms the mobile traffic (voice and data) into IP packets which are then transferred onto the fixed broadband link. The difference with a WiFi box is that any 2G or 3G mobile handset can seamlessly connect to a relevant 2G or 3G Femtocell, while only UMA dual mode GSM/WiFi handsets can seamlessly connect to a WiFi hotspot.

The UMA technology is commercially available as of today, even though it comes with only a limited handset line-up, and is currently limited to 2G/WiFi, with a roadmap towards 3G/WiFi remaining unclear (in particular, service does not include seamless data handover). UMA is only supported by France Telecom, BT, TeliaSonera and T-Mobile US, and therefore it does not enjoy, at this stage, the same kinds of economies of scale as mainstream 2G or 3G phones.

Also, UMA carries a “disintermediation” risk for mobile operators on voice. The risk is that customers bypass the mobile operator’s network for voice calls: customers can in theory make voice calls in VoIP mode, connecting their UMA device to WiFi boxes/hotspots which are not controlled by the mobile operator and which can offer free VoIP.

Regarding Femtocells, equipment is not yet available. However, it should be ready by mid-2008. There is a large and supportive group of companies interested in Femtocells, of which many operators: trials by key players such as Vodafone, Telefonica/O2 and many others have started in 2007. Vodafone CEO Arun Sarin said on 31 January 2008 that 2009 may be the year of the Femtocell.

**Chart 17: Femtocell**



Source: Arthur D. Little, Exane BNP Paribas

The big advantage of Femtocells is that they work with all mobile handsets (no need to replace handsets as in the case of UMA), provide a seamless user experience and come with no risk of “piracy” from other players. Femtocells still face technical issues (need to work on the way they integrate into the radio network) and there could be regulatory uncertainties – even though these should be lifted as the technology matures, in our view.

In September 2007, the US mobile operator Sprint launched the world’s first commercial Femtocell service, promoting a flat voice tariff and better coverage at home. This service, called “Airave”, requires an existing Sprint voice service and costs an additional USD15 per month for individuals and USD30 for families. Customers get unlimited calling and enhanced indoor coverage within the 460m<sup>2</sup> area covered by their Airave equipment. There is automatic handover of handsets between the Sprint network and the Airave. It is compatible with all CDMA handsets.

### **WiMax: unlikely to play a significant role in Europe**

WiMax technology enables very fast and cheap wireless connectivity – a kind of “super-WiFi” which theoretically competes with 3G/HSPA. However, we do not believe that this competition will happen in Europe – where we expect WiMax to remain confined to two applications:

- as a complement to DSL in areas that are too far away from DSLAMs. This is a niche market corresponding to around 10% of lines depending on the country;
- wireless broadband access in specific areas, potentially as large as cities. This could enable the provision of nomadic broadband connectivity for PCs, for instance.

WiMax is more cost effective than 3G in a greenfield situation. In practice, however, the cost advantage cannot play because for existing mobile operators rolling out WiMax requires rolling out a new network, while 3G networks can be upgraded progressively at marginal costs (from 3G to HSDPA, then to HSUPA, etc.).

Moreover, a big obstacle for WiMax is the lack of terminals. Equipment makers such as Samsung, Motorola and Nokia are working on terminals, and Intel is pushing to integrate WiMax into PC chips – as it did with WiFi. However, we do not expect WiMax terminals to be available at a reasonable cost before a few years, and in the meantime, 3G networks and handsets will have continued to make progress and will have become cheaper.

## Fixed infrastructure will get a share of the mobile broadband market

As detailed above, we believe that strong growth in mobile broadband revenues and traffic cannot come without mobile operators relying significantly on fixed infrastructure. What are the strategic and financial consequences of such a statement?

The quick conclusion could be that all mobile operators need to own fixed assets. However, before looking at this strategic question (pages 34-38) it is necessary to assess how much value can be “recaptured” by fixed infrastructure supporting mobile broadband offers. In other words, is the need for a fixed-line infrastructure a “small” or a “big” question for mobile operators?

On average, 30-40% of mobile operators’ traffic corresponds to usage at home. As such, assuming that all mobile devices could seamlessly connect to the mobile and the fixed networks, 30-40% of mobile operators’ traffic would mechanically be carried by fixed networks. Obviously, this is the high-end of the share of traffic which will actually be captured by fixed infrastructure.

In our simple sector model below (see table 9), which follows-up on table 8 above, we have assumed that 20% (instead of 30-40%) of the mobile traffic of “mobile broadband” customers will actually be carried through fixed local loop infrastructure (via a WiFi box or a Femtocell installed in the customer’s home).

For this 20% of traffic, we have assumed that mobile operators would pay half of their relevant voice and data access revenues to the fixed infrastructure operators (assuming that they are separate entities, for the sake of the calculation).

**Table 9: Fixed infrastructure will get a share of the mobile broadband market**

EUR/month per inhabitant	2007 Total / Average	2012e scenario			Total / Average	2007-2012e CAGR
		Mobile broadband customers Cut fixed BB	Keep fixed BB	Other		
<b>Voice revenue</b>	<b>31.3</b>	<b>22.0</b>	<b>26.3</b>	<b>26.4</b>	<b>25.6</b>	<b>(3.9%)</b>
Paid to fixed provider	7.4	0.0	4.3	4.4	3.6	(13.4%)
Paid to mobile provider	23.8	22.0	22.0	22.0	22.0	(1.6%)
Share of mobile traffic through fixed network		20%	20%	0%		
Mobile provider traffic through fixed network	0.0	4.4	4.4	0.0	2.2	
<b>Internet, TV &amp; Content</b>	<b>18.8</b>	<b>20.0</b>	<b>42.2</b>	<b>21.7</b>	<b>28.2</b>	<b>8.5%</b>
Paid to fixed provider	12.3	0.0	22.2	16.7	15.7	5.0%
Paid to mobile provider	6.4	20.0	20.0	5.0	12.5	14.2%
Share of mobile traffic through fixed network		20%	20%	0%		
Mobile provider traffic through fixed network	0.0	4.0	4.0	0.0	2.0	
Total Mobile traffic through fixed network	0.0	8.4	8.4	0.0	4.2	
Share of relevant revenue paid to fixed provider	0%	50%	50%	50%		
Paid by Mobile provider to fixed provider	0.0	4.2	4.2	0.0	2.1	
<b>Total revenue including double counting</b>	<b>50.0</b>	<b>46.2</b>	<b>72.6</b>	<b>48.1</b>	<b>56.0</b>	<b>2.3%</b>
Fixed provider	19.8	4.2	30.6	21.1	21.5	1.7%
Paid by customers	19.8	0.0	26.4	21.1	19.4	(0.4%)
Paid by mobile provider	0.0	4.2	4.2	0.0	2.1	-
Mobile provider	30.3	42.0	42.0	27.0	34.5	2.6%
Traffic through fixed network	0.0	8.4	8.4	0.0	4.2	-
Rest of traffic	30.3	33.6	33.6	27.0	30.3	0.0%
<b>Direct costs</b>	<b>(10.8)</b>	<b>(13.7)</b>	<b>(20.6)</b>	<b>(12.2)</b>	<b>(15.3)</b>	<b>7.1%</b>
Fixed provider	(4.1)	(1.1)	(8.0)	(5.5)	(5.6)	6.1%
Mobile provider	(6.7)	(12.6)	(12.6)	(6.8)	(9.7)	7.7%
Traffic through fixed network	0.0	(4.2)	(4.2)	0.0	(2.1)	-
Rest of traffic	(6.7)	(8.4)	(8.4)	(6.8)	(7.6)	2.6%
<b>Gross profit</b>	<b>39.2</b>	<b>32.5</b>	<b>52.1</b>	<b>35.9</b>	<b>40.7</b>	<b>0.7%</b>
Fixed provider	15.6	3.1	22.7	15.6	15.9	0.3%
Mobile provider	23.6	29.4	29.4	20.3	24.8	1.0%
<b>% gross margin*</b>	<b>78%</b>	<b>70%</b>	<b>72%</b>	<b>75%</b>	<b>73%</b>	<b>-</b>
Fixed provider*	79%	74%	74%	74%	74%	-
Mobile provider*	78%	70%	70%	75%	72%	-

\* Our gross margin estimates integrate not only the effect analysed in this part (i.e., the potential impact of the use of fixed infrastructure by mobile operators) but also the progressive margin dilution linked to the change in revenue mix (more content revenues with lower margins).

Source: Arthur D. Little, Exane BNP Paribas



Based on these assumptions, it turns out that of the EUR42/month revenue received by the mobile operator for each mobile broadband customer, the mobile operator pays EUR4.2/month to the fixed-line operators. This is equivalent to EUR10/month per household (2.4 persons per household), i.e., is equivalent to the mobile operators paying the unbundling fee to the fixed-line operator for being able to use the fixed-line infrastructure.

The financial consequences are that:

- thanks to this wholesale activity, the fixed-line revenue CAGR is boosted to 1.7% compared to -0.4% excluding this effect;
- these payments lead to a progressive reduction of mobile operators' gross margin, pointing to a 300bp decline in total over the period, in addition to the natural dilution of the gross margin expected due to the change in revenue mix (more content revenues with lower gross margin). As such, mobile operators' gross profit would grow by only 1.0% pa when revenues grow by 2.6%.

The table below highlights the sensitivity of the gross profit CAGR of fixed and mobile operators depending on the assumptions we make on the share of mobile traffic routed onto fixed networks (from 0% to 40%) and on the revenue sharing arrangement between the mobile operators and the fixed infrastructure provider (from 30% to 60% of relevant mobile revenues paid to the fixed player).

- In the “best case” for mobile (i.e., no traffic routed on fixed networks), the growth of mobile operators' gross profits reaches 1.8%;
- In the “worst case” for mobile (i.e., 40% of traffic on fixed networks and 60% of relevant revenues paid to fixed players), the mobile gross profit would decline by 0.6% per year despite mobile operators' 2.6% revenue CAGR, while the fixed players would enjoy gross profit CAGR of 3% despite the expected loss of direct customers.

In conclusion, fixed-line operators will certainly lose a share of their direct customers because of mobile competition on broadband, but they will ultimately recapture a share of these revenues indirectly, as mobile operators pay them for the use of their fixed infrastructure, necessary to get the best-possible connection for the mobile broadband customer when at home.

**Table 10: Sensitivity of mobile and fixed providers' gross profit CAGR to the share of traffic routed over fixed networks**

Mobile gross profit CAGR		Share of traffic on fixed networks				
		0%	10%	20%	30%	40%
Paid to fixed	30%	1.8%	1.8%	1.7%	1.6%	1.5%
	40%	1.8%	1.6%	1.3%	1.1%	0.8%
	50%	1.8%	1.4%	1.0%	0.6%	0.1%
	60%	1.8%	1.3%	0.7%	0.0%	(0.6%)
Fixed gross profit CAGR		Share of traffic on fixed networks				
		0%	10%	20%	30%	40%
Paid to fixed	30%	(1.7%)	(1.1%)	(0.5%)	0.1%	0.7%
	40%	(1.7%)	(0.9%)	0.0%	0.7%	1.5%
	50%	(1.7%)	(0.7%)	0.3%	1.3%	2.2%
	60%	(1.7%)	(0.5%)	0.7%	1.9%	3.0%

Source: Arthur D. Little, Exane BNP Paribas

## **Fixed-mobile integration: if not for the customers, do it for the shareholders**

For the first time in many years, the idea that fixed-mobile integration is the way forward for telecom operators is becoming consensual across the sector. Depending on the players we talked to, the rationale for fixed-mobile integration was expressed in terms of the ability to develop bundled services, i.e., seen from the commercial angle, and/or in terms of network and costs synergies.

Our view is that such integration is not at all urgent from a customer demand point of view, but it does make sense for several reasons: 1) when customer demand will be there, it will enable to rollout fixed-mobile integrated services more easily; 2) for a mobile pure-player, buying a fixed asset is a way to hedge itself strategically and to make sure that the fixed operator does not become a competitor on the mobile market; 3) we identify significant potential fixed-mobile integration cost synergies.

### **Growing sector support for fixed-mobile integration**

Many operators we have talked to, notably in France, the UK, Italy, Spain, Austria, Switzerland and Portugal, expressed the view that “the race is on” to provide fixed-mobile integrated offers. This follows:

- the launch of significant products in several countries: convergent products launched by integrated incumbents such as the “Unik” phone from Orange in France and Spain, TeliaSonera’s similar UMA offer in Denmark, Belgacom’s recent fixed-mobile broadband bundles as well as fixed-mobile bundles from Swisscom and Sunrise in Switzerland – one of the countries where fixed-mobile bundles are most aggressively marketed; mobile offers from fixed alternative carriers such as the “TWIN” phone from Neuf Cegetel in France, Telenet’s MVNO in Belgium, Ono’s MVNO in Spain and Fastweb’s plan to launch a MVNO in Italy; finally, home products from mobile operators such as ADSL offers by Vodafone and Telefonica/O2 in Germany and the UK;
- fixed-only operators’ interest in developing their own mobile networks, including Iliad’s bid for the fourth mobile licence in France and BT’s reiterated interest for spectrum in the UK – with the aim of capturing a share of the still very profitable mobile voice revenues, but also a share of the upcoming mobile broadband market;
- several M&A deals in the last few months, notably the acquisition of Tele2 Italy and Spain by Vodafone and the acquisition of Neuf Cegetel by SFR.

From a commercial point of view, many industry executives believe that a key success factor for operators will be control of a multi-product portfolio and the ability to propose fixed-mobile bundles. They argue that many customers are looking for a “one stop shop” and a full service offering. Moreover, once sold to a customer, such fixed-mobile bundles can act as a barrier to entry and a means to reduce churn strongly. Specifically, as we have shown earlier, many mobile operators believe that they need to provide fixed broadband, and several fixed alternative carriers and cable operators said they need to integrate mobility services in their bundles.

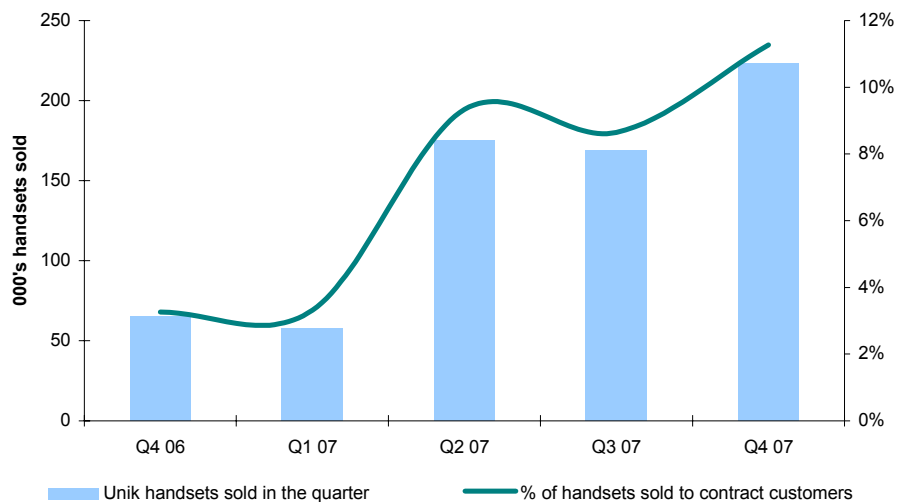
As such, many players take the view that, even though no operator has demonstrated that fixed-mobile integration is a big advantage, the way forward is to become an integrated operator. Observers expect mobile operators to go on buying fixed assets.

## Demand? No strong pull from customers

Some players – mostly mobile operators – have doubts on the need to offer convergent products, and we agree that demand from customers remains quite limited as mobile is regarded as a personal lifestyle product and not as a location-related physical product.

Only 3% of European households have so far subscribed to such fixed-mobile bundles (and 2% to quadruple-play products). In France, where France Telecom has been pushing its Unik product aggressively in the past few quarters, the group has sold almost 700k such handsets at year-end 2007. This is a large number in absolute terms, but it represents only 4.4% of Orange France's contract customers. On our estimates, Unik handsets represented around 10% of Orange France's handset sales to contract customers in the second half of 2007, despite the multiplication of Unik handsets, a significant commercial push, and the opening of the Unik option to all forms of mobile contracts by mid-2007, including the low-end contracts ("Forfaits Bloqués").

**Chart 18: Unik handset sales by Orange in France**



Source: Arthur D. Little, Exane BNP Paribas

Moreover, we note that beyond the technical issues, one commercial issue for fixed operators willing to enter the mobile market and vice-versa is the brand recognition. For instance, will customers consider "Vodafone" as a legitimate brand on the DSL market?

## Technical standpoint: better to be integrated, but not mandatory

Can a mobile operator offer an integrated product to its customers without owning a fixed infrastructure into the homes, i.e., without being a fixed broadband provider itself? The answer is yes. In fact, a mobile operator can use any existing fixed broadband connection (DSL or cable) that the customer has at home, without the fixed broadband provider knowing. To do this, it could use either of the two mechanisms that we have described above:

- UMA: the mobile operator can sell UMA phones to its customers, which will then be able to connect to a WiFi-box provided by any fixed-line operator. The only issue here is that for the GSM/WiFi UMA phone to properly connect to such a WiFi box, the customer has to enter the WEP key (a very long 24 digit number) into its handset – the first time it connects it. Then, the box will act as a gateway for the mobile handset, which will therefore have access to the mobile operator's services through the fixed broadband line;

– Femtocell: the mobile operator can sell a Femtocell to its customers, which they can plug into any fixed broadband connection they have at home, DSL or cable. When customers come into the coverage area of the home Femtocell, their mobile handset connects to this Femtocell rather than to the mobile network. Sprint, the US mobile operator – which does not own a fixed infrastructure –, has launched such a service (see page 31).

However, there are limitations to such architecture, and we believe that integrating a fixed and a mobile network enables to propose simpler and richer solutions to customers, in at least two ways.

First, controlling the fixed infrastructure would enable the mobile operator to better control the quality of service offered when the customer is connected to the fixed link. In the case where the mobile operator entirely relies on third party fixed broadband connections, it has no control on the speed and reliability of these connections. If a customer has a connection problem when at home, the mobile operator will be unable to tell its customer whether the problem arises from its handset or from its fixed connection, which can lead to a frustrating experience for the customer.

Second, in the case of the UMA architecture described above, customers have to enter a “WEP” key into the mobile handset each time they connect to a different box. Consequently, the customer will connect to only a few boxes rather than a lot of different boxes. This experience is not as rich and easy as could be offered by a fixed operator: a fixed broadband provider could make sure that the UMA handsets connect automatically to any of its customers’ WiFi boxes anywhere – as is the case of WiFi boxes of Iliad (Free), Neuf Cegetel and France Telecom in France. For instance, France Telecom’s Unik phone can now connect to any of the operator’s 30,000 WiFi sites in France, of which 10,000 are public. A pure-play mobile operator cannot replicate such offers – unless it signs a strategic partnership with a fixed broadband provider.

### **Acquisition of fixed assets: a cheap strategic hedge for mobile operators**

We believe that operators’ moves towards fixed-mobile integration, in particular the acquisition of fixed assets by mobile operators, are at this stage mostly a way of “hedging” from a strategic point of view.

If demand for convergent services were finally to pick up, the operators would be ready. The cost of their initiatives have at this stage been limited (e.g., Vodafone paid less than EUR800m for the acquisition of Tele2 Italy and Spain, compared to its market capitalisation of more than EUR120bn). These moves can be seen as operators buying options for the future.

In the meantime, these deals will avoid a situation where the fixed-line operators that are being acquired enter the mobile market too aggressively (for instance, Neuf Cegetel’s MVNO and TWIN phone are aggressive from a pricing point of view). In other words, fixed-mobile integration is a way to consolidate the market before fixed-mobile competition gets tougher.

Such consolidation has a huge value for mobile operators. For instance, we have estimated that in a worst-case scenario, the entry of Iliad as fourth mobile operator in France could reduce the valuation of the three pre-existing mobile players by an average of 16%. As shown in the table below, this assumes that the fourth player gets a 10% market share in the long run (2015), reduces the average market ARPU by 4%, with a 400bp negative impact on EBITDA margins.

**Table 11: The strategic value of buying out potentially aggressive fixed-line players**

EURm	Orange France			SFR			Bouygues Telecom		
	Base case	4th licence	Impact %	Base case	4th licence	Impact %	Base case	4th licence	Impact %
<b>Customers (m)</b>									
2007e	25.4	25.4	-	19.5	19.5	-	9.6	9.6	-
2015e	27.4	24.5	(11%)	23.6	21.1	(11%)	11.9	10.6	(11%)
<b>ARPU (EUR/month)</b>									
2007e	31.2	31.2	-	36.0	36.0	-	39.7	39.7	-
2015e	30.1	29.2	(3%)	29.5	28.3	(4%)	37.9	36.0	(5%)
<b>Service revenues (EURbn)</b>									
2007e	9.26	9.26	-	8.24	8.24	-	4.45	4.44	-
2015e	9.90	8.62	(13%)	8.32	7.17	(14%)	5.36	4.57	(15%)
<b>EBITDA margin / service revenues</b>									
2007e	41.8%	41.8%	-	42.7%	42.7%	-	31.5%	31.5%	-
2015e	42.7%	38.7%	(4.0%)	43.6%	39.6%	(4.0%)	31.5%	27.5%	(4.0%)
<b>EBITDA - Capex (EURbn)</b>									
2007e	2.92	2.92	-	2.56	2.56	-	0.80	0.80	-
2015e	3.03	2.38	(21%)	2.55	1.98	(22%)	1.04	0.74	(29%)
<b>DCF (EURbn)</b>	<b>26.245</b>	<b>22.180</b>	<b>(15%)</b>	<b>25.117</b>	<b>21.159</b>	<b>(16%)</b>	<b>8.875</b>	<b>6.985</b>	<b>(21%)</b>

Source: Arthur D. Little, Exane BNP Paribas

The aggregate value destruction risk for the three mobile operators (between the scenario with three players and the worst-case scenario with four players) amounts to EUR10bn, which is very impressive compared to the market capitalisation of Neuf Cegetel or Iliad (respectively EUR7.2bn and EUR3.4bn).

### Significant fixed-mobile integration synergies

We believe that fixed-mobile integration can create significant opex and capex synergies. In the table below, we present a generic analysis of a scenario where a large mobile operator buys a relatively large alternative operator. It shows that the combined opex base can be cut by around 3% and the combined capex base by 10-15%. Everything being equal (i.e., assuming that none of these gains are passed on to customers, an unlikely best case), this would lead to a 6% boost to the combined EBITDA and 16% boost to the combined operating free cash-flow (EBITDA-capex).

The main potential areas for savings are in our view (see table below):

- On the network: many mobile operators have historically built their transmission and backbone networks using leased lines. With the move to mobile broadband, they need to significantly upgrade the capacity not only of their radio access network (with HSDPA technology) but also of their backhaul (links connecting the base stations to the rest of the network). This is an important part of the capex related to the move to mobile broadband. On the fixed side, large alternative carriers have been managing high bandwidth and large capacity broadband for a while, driven by the take-up of ADSL2+. Integrating mobile and fixed can help reduce the mobile operator's capex, we estimate by around 15-20%;
- On commercial costs: acquisition and retention costs represent 10-20% of revenues for both fixed and mobile operators, depending on the country. Integrating fixed and mobile can enable synergies: lower acquisition costs thanks to cross-selling, use by the fixed broadband provider of an existing network of own shops built by the mobile operator, etc. We estimate that the combined acquisition costs can be reduced by around 5% and retention costs can also be reduced. In this area, execution is key: leveraging the distribution network of a mobile operator to sell fixed broadband services has not always proven successful, nor has the move towards a single brand. Moreover, in our 2007 report, we had looked at the question of fixed-mobile bundling and concluded that the benefit from lower churn and lower commercial costs could be more than offset by the revenue loss linked to the discount that the operator has to offer the customer to lock it in.

Experience shows that customers know that their churn is going to be lower when they are locked on a fixed-mobile convergent product, so they subscribe only if they get a large discount on the overall price. The balance between the value creation linked to the lower churn and the value destruction linked to lower revenues will in our view depend on the competitive scenario in each country;

- Interconnect costs: mobile termination payments can represent 10-15% of a fixed operator's revenues. Once integrated into a mobile operator, the traffic towards the customers of the mobile operator becomes intra-group revenues and costs, enabling increased flexibility for the operator (if it is not in a dominant position/regulated on this issue);
- Other areas of potential savings include general and administrative, IT, network maintenance, customer service, etc. See table below.

Importantly, the figures we give only relate to one kind of situation, and although such synergies can be extracted in most cases, their size will differ significantly depending on the position and size of the two merging operators. Incumbents merging their fixed and mobile domestic divisions (KPN, Belgacom, France Telecom, Swisscom, etc.) can in theory see very large synergies but these can be strongly reduced by organisational and regulatory hurdles.

**Table 12: Example of possible fixed-mobile integration cost synergies**

	Mobile operator	Fixed alternative carrier	Total mobile + fixed	Savings, mobile operator	Savings, fixed operator	Mobile operator with fixed	Fixed operator with mobile	Mobile + fixed after savings	% gained
Revenues	100.0	20.0	120.0			100.0	20.0	120.0	0%
Opex	(63.4)	(15.2)	(78.6)			(63.0)	(13.3)	(76.2)	(3%)
<b>EBITDA</b>	<b>36.6</b>	<b>4.8</b>	<b>41.4</b>			<b>37.0</b>	<b>6.7</b>	<b>43.8</b>	<b>6%</b>
Capex	(11.0)	(3.4)	(14.4)			(9.2)	(3.4)	(12.6)	(13%)
<b>OpFCF</b>	<b>25.6</b>	<b>1.4</b>	<b>27.0</b>			<b>27.9</b>	<b>3.3</b>	<b>31.2</b>	<b>16%</b>
<b>Opex (as a % of revenues)</b>	<b>63.4%</b>	<b>76.0%</b>	<b>65.5%</b>	<b>(1%)</b>	<b>(13%)</b>	<b>63.0%</b>	<b>66.4%</b>	<b>63.5%</b>	<b>(3%)</b>
Interconnection	14.5%	8.0%	13.4%	(3%)	(30%)	14.1%	5.6%	12.7%	(6%)
IT	4.5%	3.0%	4.3%	0%	(10%)	4.5%	2.7%	4.2%	(1%)
Network	15.0%	11.0%	14.3%	0%	(15%)	15.0%	9.4%	14.1%	(2%)
Unbundling	0.0%	30.0%	5.0%	0%	0%	0.0%	30.0%	5.0%	0%
SAC	10.0%	11.0%	10.2%	0%	(30%)	10.0%	7.7%	9.6%	(5%)
SRC	7.0%	2.0%	6.2%	0%	(30%)	7.0%	1.4%	6.1%	(2%)
Customer service	5.0%	4.0%	4.8%	0%	(15%)	5.0%	3.4%	4.7%	(2%)
G&A	3.4%	4.0%	3.5%	0%	(20%)	3.4%	3.2%	3.4%	(4%)
Other	4.0%	3.0%	3.8%	0%	0%	4.0%	3.0%	3.8%	0%
<b>Capex (as a % of revenues)</b>	<b>11.0%</b>	<b>17.0%</b>	<b>12.0%</b>	<b>(17%)</b>	<b>0%</b>	<b>9.2%</b>	<b>17.0%</b>	<b>10.5%</b>	<b>(13%)</b>
Access	6.1%	-	-	(3%)	-	5.9%	-	-	-
Transmission	3.3%	-	-	(40%)	-	2.0%	-	-	-
Backbone + PFS	1.7%	-	-	(20%)	-	1.3%	-	-	-
<b>EBITDA margin</b>	<b>36.6%</b>	<b>24.0%</b>	<b>34.5%</b>			<b>37.0%</b>	<b>33.7%</b>	<b>36.5%</b>	<b>2.0%</b>
<b>OpFCF margin</b>	<b>25.6%</b>	<b>7.0%</b>	<b>22.5%</b>			<b>27.9%</b>	<b>16.7%</b>	<b>26.0%</b>	<b>3.5%</b>

Source: Arthur D. Little, Exane BNP Paribas

## Rising pressure on telcos in the value chain

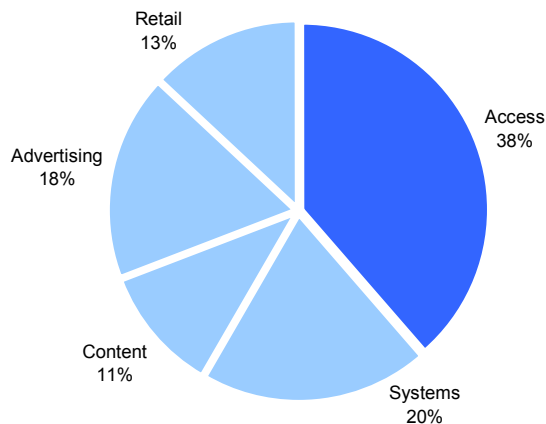
With the prospect of limited growth in the TMT market, the industry participants are naturally attracted to the higher growth, higher profitability areas i.e., fixed and mobile broadband, systems and advertising.

In the traditional value chain, each type of player had a clearly defined area of expertise and dominance: operators dominated networks and voice services, manufacturers dominated equipment and devices, and media groups sold content. The move to “all-IP” gives operators the opportunity to try and reach into the markets of other players, and other players the opportunity to step into the operators’ arena.

Operators want to develop new services and content offerings. However, at the same time, they face increasing competition both from equipment players, such as Nokia and Apple, who want to extend beyond the devices market, and from Internet leaders, such as Microsoft and Google, on the services and systems side.

The operators will face many hurdles in the competition with these global firms over control of future convergent services and we believe that they will struggle to capture a significant share of the new revenue streams beyond access.

**Chart 19: Breakdown of the European TMT market by value (2006)**



Source: Arthur D. Little, Exane BNP Paribas

### Need for an ecosystem, but trend towards competition

The operators must build an ecosystem. This means developing collaboration between content, equipment and access players – across the industry. The more operators move towards services that are far from their core communication capabilities (e.g., towards entertainment, security, machine-to-machine services), the more it is clear that they cannot do everything on their own:

- On fixed-line, it is obviously difficult for a single player to handle all aspects of a triple-play offer alone. Fixed-line operators envisage developing more partnerships not only on content and services (music, TV, movies, Internet content and services, etc.) but also on hardware and systems, including the boxes, IPTV platforms, PCs hardware and software. The aspects that operators want to keep in-house are product development and management, and, of course, the customer relationship.

- On mobile data, the operators are moving away from their “walled garden” service platforms. Many operators even see a partnership with Nokia, with its Ovi service platform, as an opportunity rather than a threat because it is a faster and cheaper way to develop innovative services while getting a share of revenues.

In competitive markets, challengers tend to pick the “low hanging fruit” (e.g., E-Plus has attacked the German mobile market through prices and multi-branding), forcing leaders to find new ways to differentiate themselves. It therefore becomes more important for leaders to create an ecosystem of key partners, including equipment vendors. However, operators have a poor record at collaborating.

For example, the failure of operators to co-develop a standard for “presence” on mobile left the door open to Microsoft whose MSN Messenger is now the *de facto* standard. Similarly, in fixed-mobile convergence the incumbents need manufacturers to develop new handsets and equipment enabling fixed-mobile convergent products, with which they hope to be able to fend off aggressive single-play challengers. However, progress has been hampered by the failure to agree a common route: some operators favour UMA, e.g., France Telecom, others Femtocells, e.g., Telefonica/O2.

More importantly, the TMT value chain is becoming more competitive. The overwhelming feedback from our meetings with TMT players is that the convergence battle has already started, spreading from the traditional competition around triple-play (incumbents versus unbundlers and cable operators), to growing fixed-mobile competition (see pages 17-26) and stirring a general battle to “connect the devices”.

The table below highlights some high-profile moves between the different areas of the TMT market.

**Table 13: Examples of moves between the different areas of the TMT market\***

Move	Who?	Doing what?	Example
From access to content	Fixed operators Fixed operators Fixed operators Mobile operators Mobile operators Telecom operators	IPTV Music download Acquiring pay-TV and/or VOD companies Content download (music, video, etc.) Advertising Bidding on football rights	Most broadband providers in Europe Iliad, Neuf Cegetel Swisscom acquisitions Most mobile operators (portals, etc.) Vodafone, Orange, etc. Belgacom, France Telecom, etc.
From access to devices	Mobile operators Fixed operators	Subsidising mobile handsets Renting home gateways	Virtually all mobile operators Most broadband providers in Europe
From content to access	Satellite players TV & Radio stations Internet players Internet players	Offering broadband MVNOs Fixed & mobile email, Instant Messaging, VoIP Considering launch of mobile operator	Sky in the UK NRJ in France, MTV in Germany MSN, Yahoo, Google, Skype, etc. Google participation in US auctions
From content to devices	Internet players	Launching OS for mobile handsets	Google launch of Android
From devices to access	Devices manufacturers	Take a share of service revenues	RIM Blackberry, Apple iPhone
From devices to content	Devices manufacturers Systems manufacturers	Content download (music, video, etc.) Home multimedia platforms	Apple iTunes, Nokia Ovi Microsoft, Cisco

\* This analysis focuses on the consumer market. We have not included the link-ups between telecom operators and systems integrators/IT services on the business market, such as the moves of BT, KPN (Getronics) or Belgacom (Telindus), another important aspect of convergence.

Source: Arthur D. Little, Exane BNP Paribas

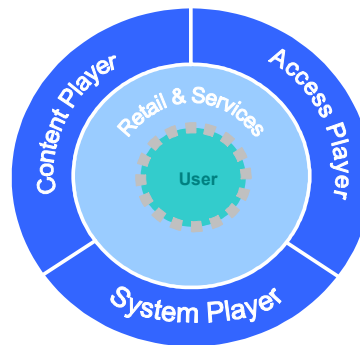


These moves suggest that each player is trying to secure the dimension to which it has access while growing into the other dimensions so as to become the gatekeeper on the new connected devices and so control the services offered.

At this stage, telecom operators are the players in the value chain with the strongest relationship with the customer, in particular the billing relationship. This is a very important asset for controlling in the value chain.

However, many other players are trying to establish a direct point of contact with the customers by entering the “retail & services” space. This explains why the chart below appears a more appropriate representation of the TMT industry than the traditional “chain”.

**Chart 20: The TMT ecosystem / value chain**



Source: Arthur D. Little, Exane BNP Paribas

Two opposing scenarios can be drawn: the integration of the value chain and the disintegration of the value chain.

– **Integration of the value chain.** In this scenario, telecom operators manage to influence the key elements of the chain that they do not produce themselves, i.e., equipment and services. In particular, they influence the design of handsets and devices in accordance with their requirements and also the design of services. This allows them to maximise their share of revenues from the new services and avoid cannibalisation of their legacy revenues.

– **Disintegration of the value chain.** From the telecom operators’ point of view, this scenario could also be called “access specialisation” or “commoditisation” (see pages 70-71). In this scenario, operators lose-out to rising global players on equipment and on services – and increasingly become access-only players. This would be a problem not only for revenues but also in terms of ability to differentiate through “sticky” services. In the worst case, telecom operators could become “behind the scenes” wholesale providers for new services that would be provided by, for example, Nokia, Apple, Google and Microsoft and hence could lose at least part of their most important customer relationship.

Several events in 2007 show that operators need more than just a legacy customer relationship if they are to preserve their share of the value chain: many recent events seem to validate the progressive disintegration of the value chain.

In the pages below, we look successively at:

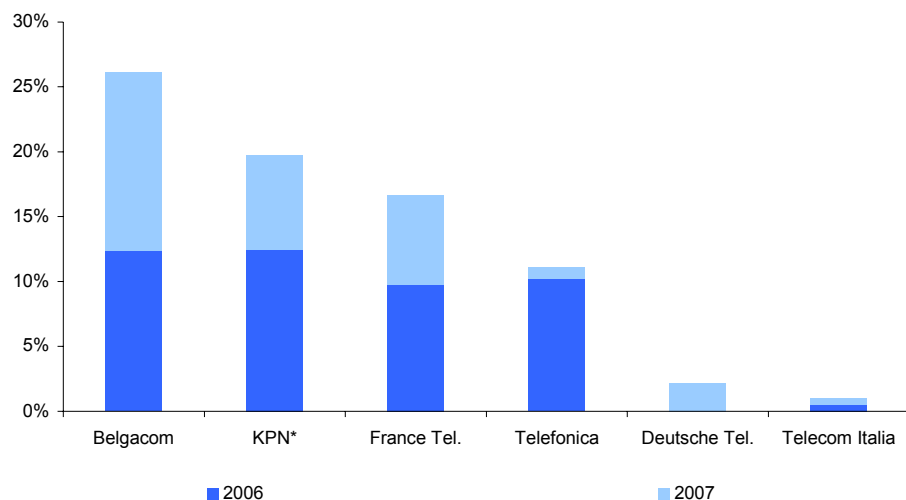
- the relationship between access providers (in particular telecom operators) and content players. We conclude that the balance of power is likely to remain roughly stable over time, depending on the concentration of each market;
- the relationship between access providers and Internet giants such as Google. We conclude that the Internet giants will grow at the expense of telecom operators. The potential upside for telecom operators from online advertising is more than offset by the disintermediation risk on other content revenues linked to the “open access” trend – without mentioning the risk of disintermediation on access revenues;
- the relationship between access providers and giants in the devices and systems area, such as Nokia, Apple or Cisco. We conclude that the growing ambition of the latter in terms of capturing service revenues is a significant and credible threat for telecom operators.

## Content versus Distribution: armed status quo

The move to all-IP is an opportunity for telecom operators to try and capture new revenue streams in content, with additional services such as IPTV, video on demand (VOD), mobile TV, music download, online gaming, etc. These are opportunities not only to increase customer stickiness (reduce churn) by “encircling the customer”, but also to grow ARPU, on both fixed and mobile.

In fixed-line, the shift towards IPTV accelerated sharply in 2007. On a sample of European incumbents (see chart below), the average penetration of IPTV in the fixed broadband customer base increased from 8% at year-end 2006 to 13% at the end of 2007, with Belgacom, KPN and France Telecom significantly above the 15% mark.

**Chart 21: IPTV customers as a % of incumbents' fixed broadband customers**



\* For KPN, we have included all TV customers, including those of KPN's Digitenne offer, based on DVB-T technology (DTT); KPN plans to progressively convert this customer base to IPTV, started in mid-2007.

Source: Arthur D. Little, Exane BNP Paribas

Many of the players that we have talked to are optimistic about the revenue potential for operators of content services, quoting examples that show that consumers are willing to pay for extra value-added services: catch-up TV, music libraries on demand, video-on-demand (VOD), etc.

More and more incumbent and cable operators believe that distributing “strong” content is crucial to differentiation, hence to attract new customers and keep existing customers. Some players even quoted content as one of the main “scarce resources” in the industry. In Switzerland, the incumbent acquired the largest pay-TV player in the market and bought into an international VOD player. Most executives predict high growth rates for all these new content delivery platforms (e.g., +20–30% pa for IPTV) and the general belief is that the mass market is now ready.

Telecom operators are looking increasingly to acquire blockbuster content and exclusive rights – with exclusive football rights as one of their targets. As one telecom operator put it, “content is key, although we see fewer people willing to pay for content”. This highlights the question raised by such moves into content.

As the table below shows, the ability of operators to leverage content can have significant implications for their free cash-flows. Based on this very simple model, we see that the long term free cash-flows of operators could vary by an order of magnitude of +/-10% depending on the gross margin that they generate on content. In the table below, we include a “worst case” with a gross margin of 30% and a “best case” with gross margin of 60%, leading to sector 2012e operating free cash-flow variation by respectively -9% and +9% compared to the core scenario where gross margin on content is assumed to reach 45%.

**Table 14: Sensitivity of telecom operators’ long term free cash-flow to the gross margin on content**

EUR/month per inhabitant - 2012e	Low gross margin	Core scenario	High gross margin
<b>Fixed provider revenue</b>	<b>19.4</b>	<b>19.4</b>	<b>19.4</b>
Access	5.0	5.0	5.0
Voice	3.3	3.3	3.3
Internet	7.6	7.6	7.6
TV & Content	3.5	3.5	3.5
<b>Mobile provider revenue</b>	<b>34.5</b>	<b>34.5</b>	<b>34.5</b>
Voice	22.0	22.0	22.0
Data & Content	12.5	12.5	12.5
Access	8.0	8.0	8.0
Content	4.0	4.0	4.0
Advertising	0.5	0.5	0.5
<b>Total Fixed &amp; Mobile</b>	<b>53.9</b>	<b>53.9</b>	<b>53.9</b>
<b>Gross margin on Content</b>	<b>30%</b>	<b>45%</b>	<b>60%</b>
<b>Gross profit on Content</b>	<b>2.3</b>	<b>3.4</b>	<b>4.5</b>
Fixed	1.1	1.6	2.1
Mobile	1.2	1.8	2.4
<b>EBITDA</b>	<b>17.9</b>	<b>19.0</b>	<b>20.2</b>
Fixed	6.4	6.9	7.5
Mobile	11.5	12.1	12.7
<b>OpFCF</b>	<b>11.6</b>	<b>12.8</b>	<b>13.9</b>
Fixed	3.8	4.3	4.9
Mobile	7.8	8.4	9.0
<b>OpFCF difference versus Core scenario</b>	<b>(9%)</b>	<b>0%</b>	<b>9%</b>
Fixed	(12%)	0%	12%
Mobile	(7%)	0%	7%

Source: Arthur D. Little, Exane BNP Paribas

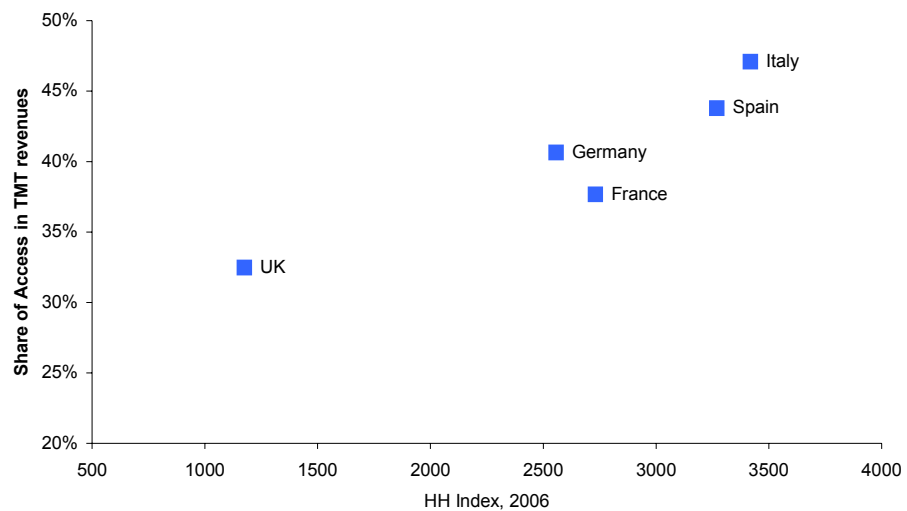
Will operators succeed in creating value with such initiatives? Will they be able to take value away from content players or will they give away more to content players than they can get from their customers?

We believe that the operators' ability to create value in this space will depend on the relative concentration of the media industry and on the access/distribution players:

- If the access/distribution market is very concentrated, it is unlikely that the competitive game will lead to content being “given away” to customers or to overpayment for exclusive rights;
- On the other hand, if the access/distribution industry is very competitive and the content side very concentrated, it is likely that distributors will give content away to customers and/or overpay for exclusive rights.

This is illustrated clearly in the chart below: the higher the concentration of an access market (the higher the HHI index) the higher the share of the broader TMT market captured by access providers.

**Chart 22: Strength of Access in TMT revenues versus HH Index (2006)**



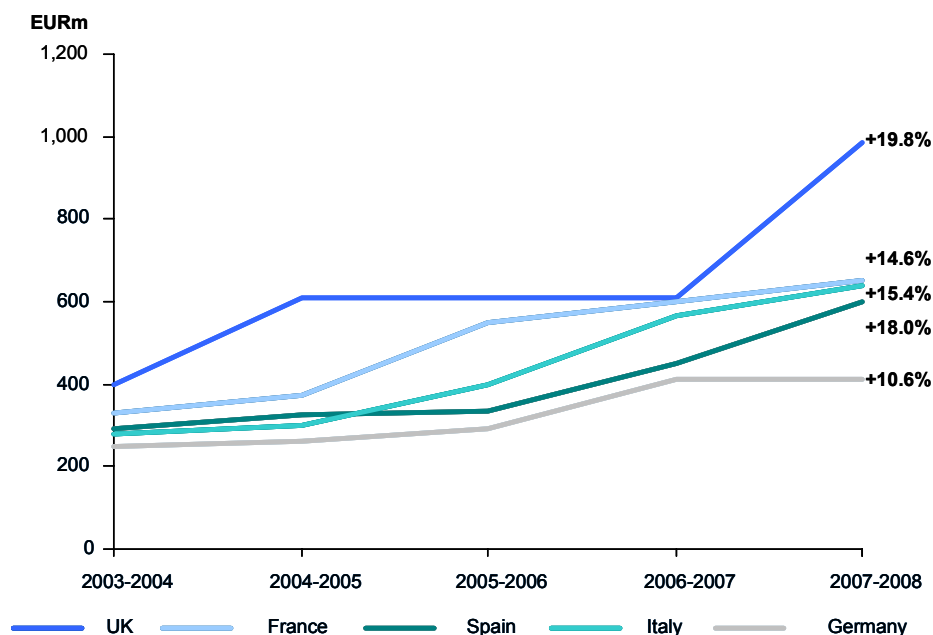
Source: Arthur D Little, Exane BNP Paribas

Will telecom operators lose out to content providers? Admittedly, the arrival of IPTV leads – at least initially – to a multiplication of distribution platforms. The content providers could theoretically turn this to their advantage as it should enable them to put pressure on the traditional cable or satellite pay-TV platforms.

For example, the cost of the football rights may be driven up by competition between access providers. Incumbent telecom operators, with growing customer bases on IPTV and strong cash-flow generation, are now serious competitors for football rights: a few years ago, Belgacom paid EUR36m a year for premium football rights in a bid to boost its entry into the TV market; Versatel/Tele2 have acquired football rights in the Netherlands; France Telecom has just confirmed its ambitions in content by agreeing to pay EUR203m a year for French football rights, including 38 live Saturday night matches, video-on-demand rights and mobile rights.

We believe that an annual bill of EUR203m is justified for France Telecom by the potential revenue stream over the next few years. Based on our forecast that Orange will have 4m IPTV customers in France in 2011, the figure of EUR203m corresponds to circa EUR3/month per IPTV customer: it should be possible to recoup this through the launch of special packages for football fans priced at EUR5-10/month.

Chart 23: The rising cost of football rights



Source: Arthur D. Little, Exane BNP Paribas

However, there are several limits to this “leakage” of value from access providers towards content players.

First, many telecom operators remain cautious and see many uncertainties regarding demand for these new services and the willingness of customers to pay: Will all these new services really become mass-market, or remain confined to some early adopters? Are customers ready for interactive services (versus passive entertainment such as TV)? Will the technology remain intimidating or will it be possible to build offers that are simple and attractive enough for the mainstream market? Are people ready to add a few euros per month to their bill for new services, or will they demand that new features are included in their flat-rate bundle, as are voice and data traffic? Will they be ready to buy content (IPTV, VOD, etc.) or will they just want a reliable connection – in a world where content is seen as free on the Internet (music, video, etc.)? Which device will get most of the customers’ attention: the PC, the TV or the mobile handset?

Second, the benefits of content concentration will be limited by regulation: Sky Italia was obliged to sell its content to all distribution channels in a non-discriminatory way; a carry-forward obligation has been imposed on Canal+ in France; the UK regulator has recently investigated Sky UK following a complaint lodged by cable operator Virgin Media.

Third, the fragmentation of IPTV platforms cannot last forever. This business increasingly requires critical size and IPTV providers will ultimately consolidate.

Finally, if the large IPTV providers feel that the balance is swinging too far in favour of the content providers they may decide to develop their own content; some have already started to do so: France Telecom’s sports channel is a response to Canal+’s dominance and many incumbents have struck direct deals with US majors for movies and drama.

Conversely, it is not certain that telecom operators will displace value from the content providers. We believe it is unlikely that operators become “all mighty” versus content providers as the operators will face increasing competition on the content distribution market from non-access based service providers.

This is obviously the situation in music distribution, with Apple's iTunes and other websites getting the lion's share, and Nokia integrating a music distribution service in its Ovi platform (see pages 50-52). This leaves very little room for telecom operators.

In the TV market, television stations and media groups have created websites giving customers direct access to content. Such Internet-based services are at least a "potential competition" for access players.

In the video distribution market, Youtube and similar websites generate huge video downloading traffic, and a few high-profile Internet start-ups, e.g., Bubblegum, are trying to build global audiences in pay-VOD, competing with the VOD capabilities of local access operators.

All in all, we believe that telecom operators will win a share of the content distribution market. However, they are not the only new players in this market – they face web-based players – so the value they will be able to create should remain limited compared to the size of their other businesses. Moreover, the value creation or destruction will strongly depend on the concentration of the access/distribution market.

## **Rising Internet giants**

Online advertising is one of the fastest-growing markets in the broader TMT sector. Many operators see it as an attractive opportunity (see official statements notably from Vodafone, Telefonica and France Telecom).

However, we believe that only a handful of global advertising platforms will emerge, such as Google or Microsoft. Microsoft's recent bid on Yahoo! is a prime example of the increasing concentration of this market. The operators are unlikely to get a seat at the table and will (need to) partner with the global Internet platforms.

These Internet leaders will increasingly behave like competitors to operators, taking a growing share of the value created in new services and potentially eating into the operators' traditional business. Indeed, a share of traditional services (e.g., mobile voice) could migrate to advertising-funded business models, cannibalising legacy revenues on some limited market segments.

### **Online advertising: growth from Internet penetration, targeting & mobile**

Almost all the players we interviewed agree that there is considerable potential in targeted online and mobile advertising. The online advertising market has already developed strongly (representing 10% of global advertising revenues) but the growth potential remains huge, from three angles:

First, the growth in broadband Internet penetration will continue to broaden the target audience hence increase the size of the online advertising market.

Second, the unit value of online advertising will increase through more precise targeting. For telecom operators, this represents a revenue opportunity: selling information about users and communities so as to enable more accurate targeting of advertising. There are limits as to how much information can be gathered from customers and used (regulation, customers' perception of intrusion), but targeting will make advertising more efficient for customers — and also potentially less boring — as the information will be more relevant to them, hence increasing the value of adverts.

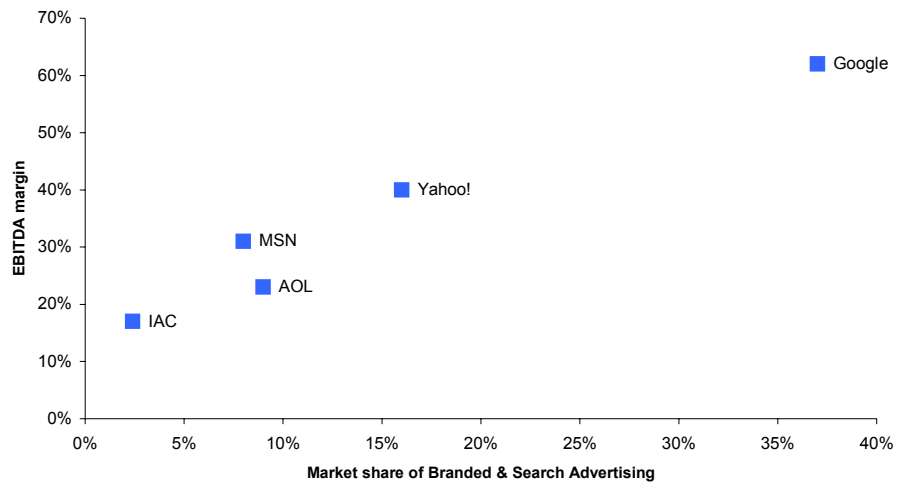
Third, the advent of mobile Internet will bring a very large new audience and will enable even more accurate targeting. The novelty and attractiveness of mobile advertising notably lies in 1) the great amount of information that operators have on each individual mobile customer, including location, and 2) the ability to touch customers at a moment closer to when they have a specific interest in buying a product, hence when they are more receptive to advertising.

Many players have identified mobile advertising as a growth driver, including mobile operators (Vodafone, Telefonica, France Telecom etc.), Internet leaders (Google, Microsoft, Yahoo, etc.) and equipment makers (Nokia, which has recently acquired Enpocket, a key ad-distribution platform on mobile). One application which perfectly embodies the specific benefits brought by mobility in terms of advertising is the local search engine linked to a mapping and geo-localisation system – as targeted by Google with Google Maps or by Nokia with its Navtech acquisition and Ovi platform.

### Towards a few global online advertising players

The online advertising market is not a game for small or inexperienced companies. As can be seen in the chart below, size is crucial to profitability in this business – and this is about size on a global basis.

**Chart 24: Share of search vs. EBITDA margin – Online advertising players, 2007**



Source: Arthur D. Little, Exane BNP Paribas

Indeed, we see at least two factors for success in online advertising: audience and technology.

- Audience is important both in quantity (unique users, pages seen) and quality (a highly qualified audience is worth much more). Audience can be attracted through portal/content, a search engine, and community-based content and services. To succeed in either of these potential audience drivers requires high investment (in particular for search) or network effects (community-based) – hence size matters, on a global basis;

- Technology is necessary in order to be able to offer optimization tools to advertisers, and to make it possible to advertise on different connected devices: PCs, mobile phones, game consoles, search portals, IPTV. These optimisation tools require huge investment.

Global Internet leaders are engaged in a very rapid expansion game: the following table highlights the accelerating M&A activity from Google, Yahoo and Microsoft in the past year – which recently culminated with Microsoft’s USD44.6bn bid on Yahoo with a 62% premium on the previous share price of Yahoo. Some people we interviewed expect only one or two of the existing global leaders to survive.

**Table 15: M&A in the online advertising market**

Date	Target	Description	Type	Bidder
2003	Applied Semantic	Advertising technology	Advertising	Google
2003	Sprinks	Sponsored links system	Advertising	Google
2003	Overture	Internet advertising provider	Advertising	Yahoo
2005	TeRepondo	Performance based advertising network	Advertising	Yahoo
2006	DMarc Broadcasting	Radio advertising software	Advertising	Google
2006	Massive Inc	Ingame advertising	Advertising	Microsoft
2006	Adinterax	Online ad network	Advertising	Yahoo
2007	Double Click	Online ad network	Advertising	Google
2007	Measure Map	Blog analysis	Advertising	Google
2007	Adscape	Video game advertising	Advertising	Google
2007	AdEcn	Advertising exchange platform	Advertising	Microsoft
2007	aQuantive	Global digital marketing and advertising solutions	Advertising	Microsoft
2007	Screen Tonic	Mobile advertising	Advertising	Microsoft
2007	Right media	Online ad network	Advertising	Yahoo
2007	Blue Lithium	Online ad network	Advertising	Yahoo
2008	Yahoo	Global Internet player	Advertising	Microsoft

Source: Arthur D. Little, Exane BNP Paribas

Given the size effect in the online advertising market, we do not believe that telecom operators will be able to replicate their own advertising platforms to compete with Google and the others. Telecom operators will therefore have to partner with the latter. This is now a consensual view among telecom operators we spoke to, many of which claim that Google has a complementary business model and is a logical partner.

### Medium term friends, long term enemies

The revenue opportunity for telecom operators should, however, be put in context and the long term risks should not be forgotten. What is at stake?

For telecom operators, the revenue opportunity is small compared to their existing revenues and profits. We currently estimate the mobile advertising revenue opportunity in Europe at circa EUR5bn in 2012e. This is equivalent to around EUR1.0/month per inhabitant and circa 3% of total mobile service revenues. Our forecast is more bullish than the figures quoted by some executives we met, who cite potential mobile advertising revenues in the “tens of millions” (EUR or GBP) or “up to EUR100m in five years time”, representing around 2% of individual mobile operators’ revenues.

On the other side, Internet giants and other service providers are using the operators’ access infrastructure and “making money on it”, transferring more and more value from local operators to the rest of the value chain.

Thanks to their expanding services, Internet leaders can increase the stickiness of their offerings with customers (for instance, the usage of Google expands thanks to applications such as Gmail, Google Maps, Google News, etc.). They are creating a customer relationship which increasingly competes with the telecom operators’ customer relationship. This is the risk of disintermediation of operators, in the long run.

The strong push from Google towards mobile “open access” in the USA shows that this is a serious issue. Lobbying from Google and other Internet leaders have led the US regulator to dedicate one band of spectrum (the “C block”, auctioned in January-February 2008) to a mobile network operator who would commit to opening its network to any mobile device and any service.



Google's aim is to end the current situation where mobile devices are sold (hence controlled) by mobile operators, which make sure that applications running on mobile devices are developed by them or their partners, hence bring revenues to them and their partners, not to others. The development of "open access" could lead to a very different situation in which Google and the likes could develop their own revenue streams from mobile Internet services, in particular advertising revenues, without the operators knowing.

This would compete with the mobile operators' own data services (which already generate significant revenues, e.g., ring-tones, music download, personalisation services), and could lead to a situation close to the one we know on the fixed Internet, where telecom operators provide access, while Internet leaders provide services and capture the related revenues.

In the table below, we show that a bullish long-term scenario on mobile advertising (revenues doubled versus core scenario) could increase mobile operators' operating free cash-flow (EBITDA-capex) by 5% compared to our core 2012 scenario, while an "open access" scenario in which mobile operators' content and advertising revenues would be halved (assuming a strong capture by Internet leaders on such data revenues, but no capture on telecom core revenues i.e. voice and data access) would cut operating free cash-flow by 13% compared to the core scenario.

**Table 16: Mobile advertising opportunity versus "Open access" threat**

EUR/month per inhabitant - 2012e	Core scenario	Advertising doubled	"Open access" Content & advertising halved
<b>Mobile provider revenue</b>	<b>34.5</b>	<b>35.0</b>	<b>32.3</b>
Voice	22.0	22.0	22.0
Data, TV & Content	12.5	13.0	10.3
Access	8.0	8.0	8.0
Content	4.0	4.0	2.0
Advertising	0.5	1.0	0.3
<b>Gross margin</b>	<b>72%</b>	<b>72%</b>	<b>73%</b>
Voice	75%	75%	75%
Data, TV & Content	66%	66%	69%
Access	75%	75%	75%
Content	45%	45%	45%
Advertising	80%	80%	80%
<b>Gross profit</b>	<b>24.7</b>	<b>25.1</b>	<b>23.6</b>
Voice	16.5	16.5	16.5
Data, TV & Content	8.2	8.6	7.1
Access	6.0	6.0	6.0
Content	1.8	1.8	0.9
Advertising	0.4	0.8	0.2
Other costs	(12.6)	(12.6)	(12.6)
<b>EBITDA</b>	<b>12.1</b>	<b>12.5</b>	<b>11.0</b>
Capex	(3.7)	(3.7)	(3.7)
<b>OpFCF</b>	<b>8.4</b>	<b>8.8</b>	<b>7.3</b>
EBITDA margin	35.0%	35.6%	34.0%
Capex/sales	(10.7%)	(10.5%)	(11.4%)
<b>OpFCF difference versus Core</b>	<b>0%</b>	<b>5%</b>	<b>(13%)</b>

Source: Arthur D. Little, Exane BNP Paribas

### **Advertising-funded models: a limited threat to legacy revenues, for now**

Online advertising can be seen as potential additional revenues – as described above – but also as a new way to fund telecom services and content, which could otherwise have been funded through pay-per-use or subscription mechanisms.

The potential to fund new services through advertising rather than through customer billing represents upside for operators, as it offers a way to develop a revenue stream that may not have developed otherwise. Many players believe that customers are not ready to pay for content on mobile, as they do not pay for most content on the fixed Internet, so developing advertising revenues is a positive.

However, there will also be instances where advertising will “compete” with customer billing as a way to fund existing revenues. This is the business model of an MVNO like Blyk in the UK: customers get free airtime in exchange for viewing advertising content. Some players expect advertising to fund new forms of VoIP services both on mobile and at home.

At this stage, the majority of the people we talked to expressed doubts on the viability of ad-based business models for existing telecom services on the grounds that the potential advertising revenues are too low – limited to market niches (e.g., price-sensitive students). The opportunity is considered to be even narrower in countries where prices for telecom services are already very low – e.g., in the Austrian mobile market.

We, however, believe that the underlying sector trends are in favour of ad-funded business models for telecom services: 1) the growth of fixed and mobile Internet audiences will develop the advertising revenue opportunity, and 2) the reduction in the unit cost of telecom services (e.g., declining mobile termination rates) will make it easier to finance the costs through advertising.

### **Systems & devices giants: renewed ambition**

In complex markets such as home/triple-play, mobile data and fixed-mobile convergence, telecom operators reckon the need for them to build ecosystems, notably with equipment manufacturers.

We have already pointed out that they have a limited track-record in building ecosystems. Moreover, we see a new threat emerging, as systems and devices manufacturers such as Nokia, Apple and Sony show growing ambitions in the value chain. These manufacturers try to leverage on their strong consumer electronic brands, with two aims:

- To push operators to pay them a share of the service revenues that operators get from their customers, in order to build recurring revenue streams (e.g., Apple’s iPhone);
- And if possible to develop a direct relationship with customers on new services (e.g., Apple’s iTunes, Nokia’s Ovi) or to build an audience which can be monetised through advertising (Microsoft, Cisco: see below).

The way for manufacturers to impose their vision of the value chain is to try and impose products and technology trends. This trend will be increasingly difficult for operators to resist, as manufacturers are global, dwarfing operators, and they will be growing steadily in the coming years. Indeed, we expect the market for systems and devices to grow by almost 6% per year, driven by the growing number of types of devices which will be connected to networks and by increasing renewal rates.

We therefore expect operators to be under rising pressure from leading manufacturers, i.e. to have to share an increasing part of the value with them. Ultimately, as is the case with Internet leaders, the risk is that manufacturers develop their own customer relationships, which could lead to further commoditisation of telecom operators.

### **Mobile: iPhone will not remain an isolated case**

On the mobile side, there is growing tension between some device manufacturers and operators. Devices are a key element of the mobile value chain, which operators have tried to integrate as much as possible so as to control services and associated revenues. However, this is facing increasing resistance from manufacturers, with many examples showing that equipment manufacturers have growing ambitions.

Two recent examples show that manufacturers can go beyond their traditional supplier role in the value chain, can become visible for the customer and can negotiate a share of service revenues from operators:

- The first example of such a product is RIM's Blackberry. RIM built a complete offering including the device (the famous Blackberry) and the service (push email on mobile), and then negotiated with mobile operators a share of service revenues. The product was not developed by telecom operators in the traditional value-chain, and this has led to a product which is clearly identified by customers as separate from the traditional telecom products and services;
- In 2007, Apple's iPhone came with many firsts in terms of the organisation of the mobile value chain. With this product, Apple embeds both a specific device (the iPhone) and the services around it (in particular iTunes). Moreover, Apple's deals with operators were the first large exclusive deals between a device and specific operators in each country (AT&T in the USA, T-Mobile in Germany, O2 in the UK, Orange in France), and it came with what is supposed to be a very aggressive revenue sharing scheme. Details have not been disclosed, but some operators are rumoured to pay Apple up to 35% of service revenues, for a given period of time.

The iPhone and Blackberry are relatively niche products which arguably address new revenue areas for telecom operators, hence revenue sharing with Apple and RIM can be justified and has limited impact overall anyway. However, could their business model be expanded to the mass mobile market, and what would be the impact of such a scenario on telecom operators?

We believe that the most significant move in this respect is the launch of Nokia's Ovi services platform late in 2007.

Ovi supports services which have been developed internally by Nokia such as Music Store, Geo-localisation and Games, but also existing social networking sites such as Flickr, Facebook and Myspace. This is a completely new positioning for Nokia, which seems much more credible than its previous attempt (Club Nokia in the late 1990s). Nokia expects three revenue sources for Ovi: direct revenues from download of content and subscriptions, revenue sharing with operators on access subscriptions, and advertising on sites/portals.

Nokia is said to have already secured revenue sharing deals with large mobile operators and we expect most mobile operators to agree to Nokia's demands. This reflects a significant change in operators' mindset and bargaining power. What operators get from Nokia is up-and-running mobile data services which could generate significant additional revenues, but at the same time, this comes at the cost of a progressive reduction of the operators' share of value.

Of course, not all device manufacturers have the same means as Nokia, so others may find it difficult to replicate Nokia's move into services. One could then say that if telecom operators lose out to Nokia, it will remain an isolated case and operators will keep a strong hand versus other device manufacturers.

However, this is without counting the potential partnerships that other device manufacturers can sign with software and services companies such as Google. In particular, Google has recently announced that it is designing a software platform/operating system for mobile handsets. This platform, called Android, will enable mobile phones to run Google applications and services, as well as any other application designed for it. It will be pre-installed on many devices manufactured by Google's partners, which already include Intel, HTC, LG, Qualcomm, Samsung and Motorola.

In conclusion, we expect all these platforms sponsored by manufacturers and systems players (Blackberry, Apple's iTunes, Nokia's Ovi, Google's Android, etc.) to capture an increasing share of new revenue streams from mobile operators, and to enable some of these new competitors to develop a direct relationship with customers.

In the table below, we have shown the dilutive impact that revenue sharing with device manufacturers could have on mobile operators' free cash flows. We have assumed that for some "special devices" like the iPhone, supposed to help operators differentiate, the operators would be ready to share 10% of their revenues with the device manufacturers, on average. We have made no assumptions on other factors such as potential additional market share, ARPU, or reduced acquisition costs or churn, to keep the model as simple as possible. For all the other "normal devices", we have assumed no revenue sharing at all – i.e. operators keeping the gross margin assumed in the simple base-case model. The table shows that if we assume that "special devices" represent 10% of total handsets sold, the total operating free cash flow would be reduced by 4%, and if we assume that they reach 20%, the impact is -8%.

**Table 17: Impact of revenue sharing with device providers on operators' operating free cash flow**

EUR/month per inhabitant - 2012e	Scenarios on penetration of "Special devices"		
	0%	10%	20%
<b>Mobile provider revenue</b>	<b>34.5</b>	<b>34.5</b>	<b>34.5</b>
Voice	22.0	22.0	22.0
Data, TV & Content	12.5	12.5	12.5
Access	8.0	8.0	8.0
TV & Content	4.0	4.0	4.0
Advertising	0.5	0.5	0.5
<b>Gross margin depending on devices</b>			
Normal devices	72%	72%	72%
Special devices	62%	62%	62%
<b>Penetration of special devices</b>	<b>0%</b>	<b>10%</b>	<b>20%</b>
Blended gross margin	72%	71%	70%
<b>Total gross profit</b>	<b>24.8</b>	<b>24.5</b>	<b>24.1</b>
Other costs	(12.8)	(12.8)	(12.8)
<b>EBITDA</b>	<b>12.1</b>	<b>11.7</b>	<b>11.4</b>
Capex	(3.7)	(3.7)	(3.7)
<b>OpFCF</b>	<b>8.4</b>	<b>8.0</b>	<b>7.7</b>
<b>OpFCF impact</b>	<b>0%</b>	<b>(4%)</b>	<b>(8%)</b>

Source: Arthur. D Little, Exane BNP Paribas

## Home: battle around the box

On the Home side, operators have made a giant leap forward with the “box” concept. They have gained a foothold in the household. The box is an excellent platform to sell their own services, such as IPTV, VOD and others.

However, we expect to see more concepts such as “the Sony home” or “the Pioneer way of life” – which will increasingly compete with the operators’ ambitions for their boxes. Hardware players are seeking to create attractive offerings by developing complete bundled systems (hardware + applications) that customers will know are “plug-and-play”. Therefore, some expect to see partnerships and acquisitions of hardware providers (e.g., modems, set-top boxes, computers) and application providers by large consumer electronics companies such as Sony.

On the opposite front, actors from the computer and networking worlds are pushing into the home entertainment market:

- Intel, AMD and Microsoft are working on a USD100 instant-on computer, which could be used to build a standardized home network centre. Apple could also be preparing such a standardized computer infrastructure for the home;
- Some gateway/computer manufacturers could launch “operator agnostic” boxes, partnering with Google for instance (long-standing rumours around a “Google box”);
- In early 2008, Cisco presented a move to conquer the consumer market by entering the living room. This will encompass a new set of Cisco-branded set-top boxes, which will integrate Cisco's networking know-how (to let users pause a movie in one room and watch it in another or view web videos on television), and a home-grown media and content delivery software (“Entertainment Operating System”), handling content distribution, social networking platform and content search tool. Cisco said that the platform will likely be paid through advertising agreements. Cisco is trying to get a share of the market addressed by Microsoft and Google.

These initiatives will compete with the strategic plans of fixed operators. Along similar lines as in the mobile industry, the walled garden established by IPTV providers may not be sustainable, i.e. customers should be able to access TV and other services provided by several service providers, not only their access provider.

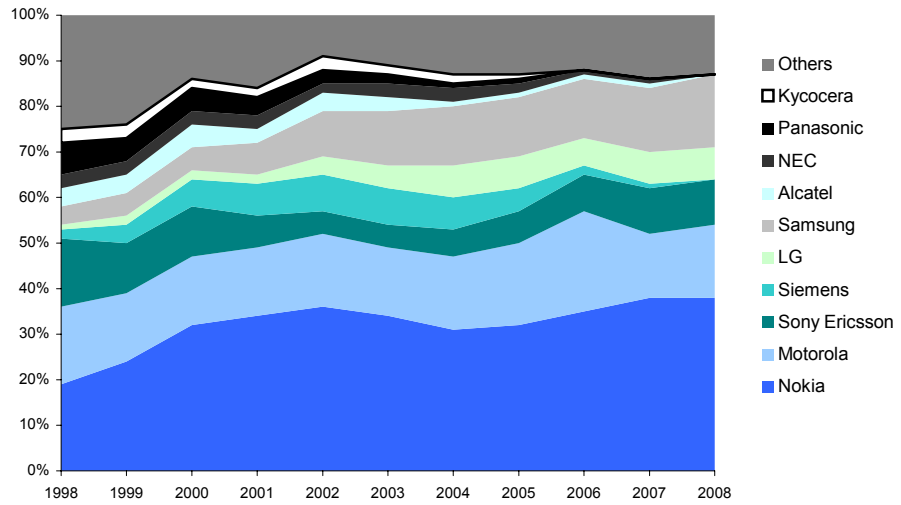
## Equipment players are increasingly global

Manufacturers need to be global, for at least two reasons: 1) competition is tough in the equipment market, driven in particular by the push of Asian players in the past few years; and 2) critical mass is key because investments to develop ever-evolving products, to manage low-cost production and to market the products globally are huge.

Consolidation has already been under way in this market for a few years: Cisco/Scientific Atlanta in 2005, Ericsson/Marconi in 2005, Nokia/Siemens in 2006, Alcatel/Lucent in 2006... and everybody expects the trend to continue, with only a few survivors expected at the global level.

The following chart illustrates this trend on the handset business: in 1998, ten players had 75% market share; in 2008, we expect 86% of the market for only five players – which is not a surprise when looking at the second chart below, showing that the profitability of handset manufacturers is strongly correlated to their market share.

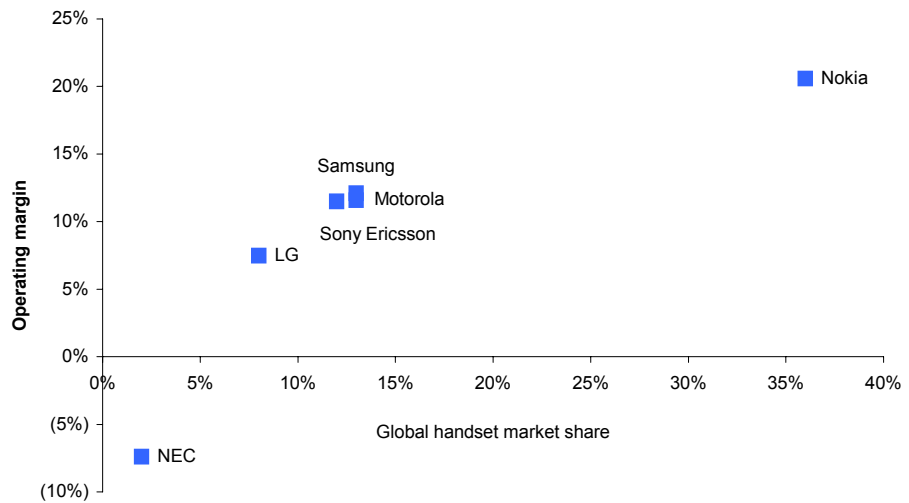
**Chart 25: Market share in Global Handsets market (1998-2008)**



Source: Arthur D. Little, Exane BNP Paribas

The new trend observed, with leading equipment/device manufacturers partnering with Internet companies and other service and content providers (see above), is another element putting global leaders at an advantage over smaller equipment manufacturers.

**Chart 26: Global market share versus operating margin of handset manufacturers, 2007**



Source: Arthur D. Little, Exane BNP Paribas

## Will regulatory pressure abate? Unlikely

Regulation has been a key driver of the sector's changes in the past few years. The current work at the European level regarding the future regulatory framework led to press headlines giving the impression that regulation will make less of an impact in the coming years. We believe this view is misplaced. As expressed again recently by the EU Commissioner, the key target of the Commission remains to foster competition in the telecom services market.

Below, we highlight four tools of which some are "old" and some are "new" through which regulators will have a strong influence on the sector, influence both on the competitive pressure within the sector between telecom operators, and on the position of telecom operators in the value chain:

- **Mobile termination rates:** regulators could close the gap between leaders and challengers by moving to bill & keep or by drastically reducing MTRs. Making the mobile market more competitive would also have the consequence of reducing the bargaining power of mobile operators versus their global partners/competitors;
- **Fibre regulation and network separation:** encouraging network separation and/or sharing of passive infrastructure could reduce the barriers to entry in fixed-line access. Lower barriers to entry could reduce operators' bargaining powers versus other players in the value chain;
- **Net neutrality:** if regulators were to enact strict net neutrality, access network operators could lose an important bargaining power versus large Internet and content players such as Google;
- **Spectrum regulation:** a lot of spectrum will be made available in the coming years. This is good news because it means more capacity available for mobile data traffic growth (although the cost of acquiring such spectrum remains an uncertainty), but also bad news, because this will provide opportunities for new players to enter the market and increase competitive pressure on access.

### Mobile termination rates: large uncertainty on the value of mobile access

Mobile termination rates (MTR) have declined by 14% per year in the past three years, reaching around EUR0.09/min at the end of 2007, on average in the large European countries. In 2008, there is good visibility on a milder decline (-12%e in average).

MTR have not been quoted as one of the main uncertainties by companies we talked to, probably because there is very good visibility on the rates for 2008, but we believe that, in fact, MTR are a key long term uncertainty for the sector.

Consensus and our forecasts are based on long-term mobile termination rates of around EUR0.05/min, but many voices among regulators and industry experts say that they could actually be reduced much more in the long term, for two reasons:

- Mobile operators' unit costs are seen as significantly lower than EUR0.05/min by some economists and regulators (e.g., ARCEP);
- Fixed-mobile convergence will reduce the relevance of keeping separate termination regimes for fixed and mobile.

As such, one should not rule out a scenario where MTR would be below EUR0.03/min in the long run. The impact of such a scenario would be twofold. First, lower MTR would mechanically lead to lower termination revenues. Termination revenues currently represent 15% of mobile revenues, on average.

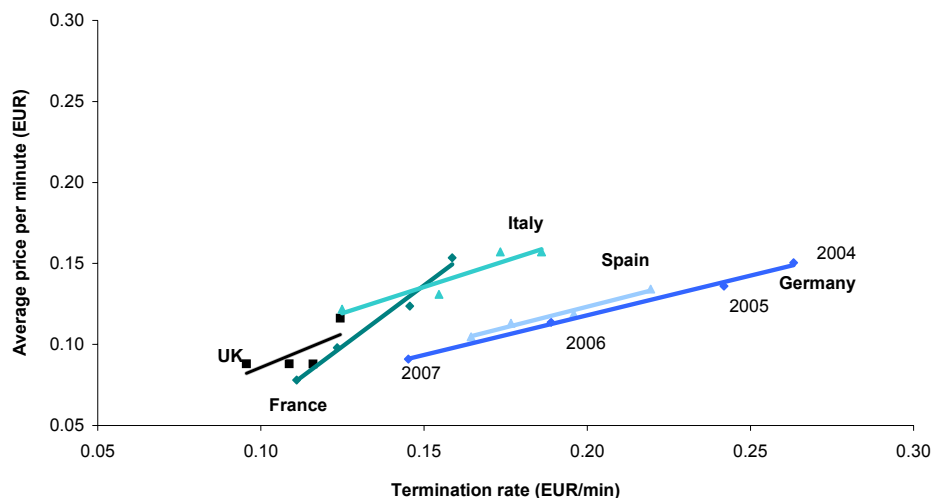
**Table 18: Mobile termination rates in seven European countries**

Country	Operator	2005	2006	2007	2008	2009	2006/05	2007/06	2008/07	2009/08
France	Orange	12.5	9.5	7.5	6.5	6.2	(24.0%)	(21.1%)	(13.3%)	(5.0%)
	SFR	12.5	9.5	7.5	6.5	6.2	(24.0%)	(21.1%)	(13.3%)	(5.0%)
	Bouygues Tel.	14.8	11.2	9.2	8.0	7.2	(24.0%)	(17.8%)	(13.4%)	(10.0%)
Netherlands	KPN	12.8	10.1	10.0	9.5	7.8	(21.4%)	(0.8%)	(5.0%)	(18.4%)
	Vodafone	12.8	10.1	10.0	9.5	8.0	(21.4%)	(0.8%)	(5.0%)	(15.8%)
	T-Mobile	14.5	12.4	11.9	10.9	9.3	(14.5%)	(4.0%)	(8.4%)	(15.1%)
UK (pence)	Telefonica/O2	5.6	5.6	5.7	5.7	5.7	0.0%	0.5%	0.5%	0.5%
	Vodafone	5.6	5.6	5.7	5.7	5.7	0.0%	0.5%	0.5%	0.5%
	Orange	6.3	6.3	6.2	6.0	5.9	0.0%	(2.4%)	(2.4%)	(2.4%)
	T-Mobile	6.3	6.3	6.2	6.0	5.9	0.0%	(2.4%)	(2.4%)	(2.4%)
Italy	TIM	14.1	11.7	10.6	9.5	8.9	(17.5%)	(9.0%)	(10.8%)	(5.8%)
	Vodafone	14.1	11.7	10.6	9.5	8.9	(17.5%)	(9.0%)	(10.8%)	(5.8%)
	Wind	16.5	15.0	12.2	9.5	8.9	(9.4%)	(18.4%)	(22.5%)	(5.8%)
Germany	T-Mobile	13.2	11.0	8.8	7.9	7.1	(17.0%)	(20.0%)	(10.0%)	(10.0%)
	Vodafone	13.2	11.0	8.8	7.9	7.1	(17.0%)	(20.0%)	(10.0%)	(10.0%)
	E-Plus	14.9	12.4	9.9	8.9	8.0	(16.5%)	(20.0%)	(10.0%)	(10.0%)
	Telefonica/O2	14.9	12.3	9.9	8.9	8.0	(17.0%)	(20.0%)	(10.0%)	(10.0%)
Spain	Telefonica	13.9	12.4	10.3	8.7	7.2	(10.6%)	(17.1%)	(16.0%)	(16.7%)
	Vodafone	14.1	12.6	10.5	8.7	7.2	(10.6%)	(17.1%)	(16.6%)	(17.4%)
	Orange	15.7	13.3	11.1	9.1	7.3	(15.0%)	(16.8%)	(18.5%)	(19.8%)
Belgium	Belgacom	12.7	12.2	8.8	8.0	7.8	(3.6%)	(28.3%)	(8.8%)	(2.6%)
	Mobistar	16.3	15.4	11.0	8.6	7.8	(5.3%)	(28.6%)	(22.0%)	(9.4%)
	Base	19.6	19.0	13.8	9.9	8.6	(3.2%)	(27.4%)	(28.0%)	(13.8%)
<b>Average</b>		<b>13.4</b>	<b>11.7</b>	<b>9.9</b>	<b>8.7</b>	<b>7.9</b>	<b>(13.1%)</b>	<b>(15.2%)</b>	<b>(11.8%)</b>	<b>(9.4%)</b>

Source: Arthur D. Little, Exane BNP Paribas

Second and more importantly, lower MTR would lead to a more even playing field between mobile leaders and challengers. The chart below shows the very strong correlation between termination rates and average prices on each market in the past few years. Many leaders have developed a disproportionate share of on-net traffic, on which they do not pay interconnect fees to other players; challengers, on the other hand, face high interconnect payments for all their cross-net traffic, and have a higher proportion of cross-net traffic than leaders. As such, challengers are limited in the aggressiveness of their offers compared to leaders. A reduction of MTR would most probably lead to challengers going more aggressively towards unlimited cross-net flat rate tariffs, hence putting more pressure on leaders. This would lead to lower outgoing prices and to lower market shares for the leaders.

**Chart 27: Strong correlation between termination and market prices**



Source: Arthur D. Little, Exane BNP Paribas



### **Fibre regulation, network separation: keys for the value of fixed access**

Fibre regulation and network separation are two tools available to regulators to try to create or preserve a competitive level playing field on the fixed access market. As such, they could have a large impact on market shares and prices on fixed broadband markets, hence on the long term free cash-flows of fixed operators.

Most incumbent operators we interviewed stressed that there will be a strong link between regulation and their investment decisions into fibre access networks: they want predictability, and they want their potential returns not to be taken away by regulation which would force them to sell fibre at low wholesale prices to their competitors.

At the same time, regulators and alternative carriers stress that in the absence of strict regulation, the move to fibre could lead to a re-monopolisation of the fixed local loop by incumbents. The European Commission and many national regulators have affirmed that they will make sure that this does not happen.

In most advanced countries (the Netherlands, France and Italy), the debate has moved to precise issues, on two fronts: access to existing ducts and/or rollout of new ducts in a collaborative way, and sharing or swapping of vertical/in-building fibre:

- In Italy, many players believe that Telecom Italia cannot go it alone, given the high cost of the necessary rollout (of which 70% could correspond to ducts and other passive elements), and they want the government: 1) to sponsor the rollout of a single nationwide duct infrastructure (corresponding to the non-replicable infrastructure); this rollout could involve operators, utilities, building manufacturers, building owners, etc.; and 2) to make sure that competition plays for all remaining replicable parts (fibre, electronics, platforms, services, customer interface, billing, etc.).
- In France, the regulator is expected to publish a decision on wholesale access to France Telecom's ducts in H1 2008; France Telecom has already made a proposal public, but alternative carriers have been critical, quoting high fees (EUR10 per meter) and difficult operational conditions (e.g., requirement to build a separate technical room at least five meters away from the existing one). The regulator has also proposed that the government passes a law enabling "symmetrical regulation" i.e. regulation of both the incumbent and alternative carriers as regards the access to new fibre installed in buildings, so that customers in each building can have the choice of their fibre provider regardless of which operator has installed the vertical fibre in this specific building. This could lead to regulation by the end of 2008.
- In Spain, the regulator has disclosed in January 2008 the guidelines for future regulation of new generation networks. These guidelines envisage the availability of a temporary wholesale bit-stream offer over the incumbent's fibre network, and impose non-discriminatory access to ducts, although without the intention to impose a regulated access offer to existing ducts. The wholesale offer temporality could be different by region, depending on their degree of competition. In addition, the regulator intends to regulate in-building fibre wiring, but leaves the options open (symmetrical or asymmetrical obligations). Alternative carriers argue that these guidelines are too vague and give an advantage to Telefonica.

In a "worst case" scenario for incumbents, the move to fibre could lead to a market with no more barriers to entry than the ADSL unbundling-based market. This would mean competitive pressure along the lines of those we know today in countries like the UK or Germany, with 1) unchanged market shares, 2) difficulty to grow ARPU even with new services and faster bandwidth, and 3) ongoing churn and high commercial expenses.

In a “best case” scenario, the move to fibre could lead to consolidation of the fixed triple-play market around two or three large operators, including the incumbent and the local cable operator (if any) – a situation similar to the one observed in the USA, where 1) market shares of remaining players would increase, grabbing the ones left by smaller operators who would exit the market, 2) ARPU could grow thanks to new services and higher bandwidth, and thanks to lower competitive pressure, and 3) churn and commercial expenses could be better controlled.

As shown in the table below, the sensitivity of an incumbent operator’s long-term operating free cash flow to such key variables is huge. We have assumed an ARPU variation of +/-10% around our core scenario of EUR19/month per inhabitant, market share variations of +/-5% versus our core scenario of 50% and churn varying from 10% in the bull case to 20% in the bear case. This leads to revenue variation of +/-20% for the incumbent fixed-line business in the long run. Even assuming that this is partially offset by management adapting the cost base and capex to the situation, this leads to huge OpFCF variations of +46% and -35% versus the core scenario.

Importantly, the uncertainty on the value of the fixed-line access is however not specifically linked to the fibre question.

Indeed, the European Commission is committed to opening up the existing broadband markets based on local loop unbundling, and if this is not sufficient, through a separation of the incumbent’s fixed line network. On 28 November 2007, Viviane Reding said: *“We must accelerate our regulatory efforts in areas where competition has been slow and where persistent bottlenecks remain. (...) In cases where such discrimination is persistent and cannot be resolved by behavioural remedies, functional separation would remove incentives to discriminate between service providers. That is why the Commission proposes to provide the national regulators with the power to impose functional separation as a new remedy”.*

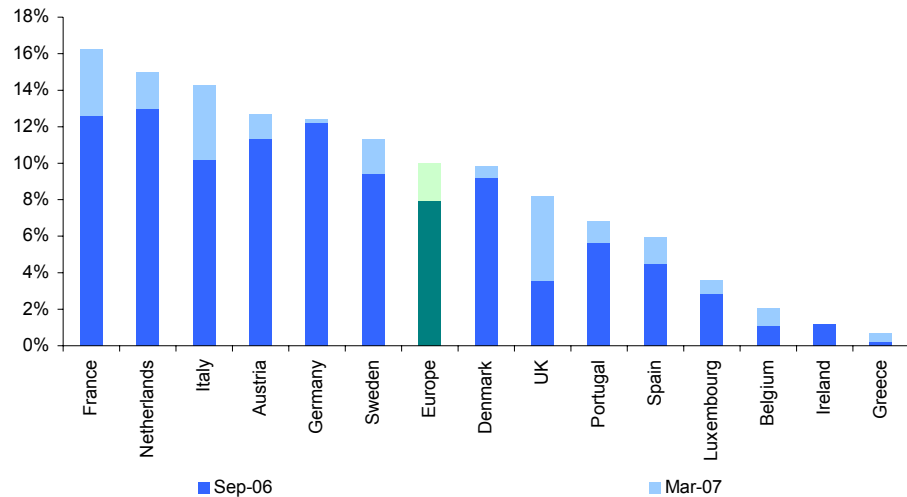
**Table 19: Sensitivity of an incumbent’s free cash-flow to competitive pressure**

EUR/month per inhabitant, 2012e	Bear case	Core scenario	Bull case
<b>1. ARPU difference vs. core scenario</b>	<b>(10%)</b>	<b>0%</b>	<b>10%</b>
<b>Fixed market value</b>	<b>17.4</b>	<b>19.4</b>	<b>21.3</b>
Access	4.5	5.0	5.5
Voice	3.0	3.3	3.7
Internet	6.8	7.6	8.3
TV & Content	3.2	3.5	3.9
<b>2. Incumbent’s market share</b>	<b>45%</b>	<b>50%</b>	<b>55%</b>
Incumbents revenue	7.8	9.7	11.7
<b>3. Churn</b>	<b>20%</b>	<b>15%</b>	<b>10%</b>
Commercial costs	(0.5)	(0.5)	(0.4)
% of revenues	(6.7%)	(5.0%)	(3.3%)
Other costs	(4.9)	(5.7)	(6.6)
% of revenues	(62%)	(59%)	(56%)
<b>EBITDA</b>	<b>2.5</b>	<b>3.5</b>	<b>4.8</b>
Capex	(1.0)	(1.3)	(1.5)
<b>OpFCF</b>	<b>1.4</b>	<b>2.2</b>	<b>3.2</b>
<b>EBITDA margin</b>	<b>31%</b>	<b>36%</b>	<b>41%</b>
Capex/sales	(13%)	(13%)	(13%)
Revenue difference versus Core	(19%)	0%	21%
EBITDA difference versus Core	(30%)	0%	37%
<b>OpFCF difference versus Core</b>	<b>(35%)</b>	<b>0%</b>	<b>46%</b>

Source: Arthur D. Little, Exane BNP Paribas

Countries where unbundling is well advanced (such as France or the Netherlands) are in our view not concerned by network separation, but the countries where broadband competition has remained slow, such as Portugal and Belgium, could be those where the tool will be used. In Spain, despite relatively weak competition, the regulator has already said that it will not separate the incumbent's network. Switzerland is in a different situation, as it is not part of the EU, and unbundling regulation remains much more in favour of the incumbent.

**Chart 28: Unbundled lines as a % of total fixed lines**



Source: ECTA, Arthur D. Little, Exane BNP Paribas

### More spectrum means more capacity: good and bad at the same time

According to one manufacturer, broadband traffic in mobile networks is predicted to grow at least 30-fold by 2012. According to the International Telecommunications Union (ITU), a total of 1,300-1,700 MHz of spectrum is needed for mobile broadband services through 2020. Spectrum award will therefore return as a key regulatory theme. As can be seen in the table below, 2008 will be an active year in this respect, with a lot of spectrum in different frequency bands up for sale.

**Table 20: Upcoming spectrum awards**

Time	Country	Band	Comments
Jan-08	USA	700 MHz	Auctions: Many interested parties, One block with Open access provision drawing interest from Google
Sep-08	UK	2.5-2.6GHz	Auctions: Interest from existing mobile operators and potential new entrants (BT)
2008	France	2.2GHz, 900MHz	Beauty contest: Fourth 3G licence in France, Interest from Iliad
2008	Italy	3.5GHz	Beauty contest: Interest from mobile and fixed players, WiMax applications
2008	Germany	2.2GHz	Allocation of additional spectrum
2008	Netherlands	2GHz and 2.6GHz	Auction of additional spectrum
2008-2009	Europe	900MHz	Refarming of 2G spectrum for 3G rollout, big advantage for rural areas
H1 2009	UK	600-800MHz	Auctions: Award of Digital Dividend spectrum (tbc)
??	France	600-800MHz	Beauty contest: Award of Digital Dividend spectrum (tbc)

Source: Arthur D. Little, Exane BNP Paribas

This is good news because it means more capacity available for mobile data traffic hence it will enable operators to boost services, usage, hence revenues. However:

- The cost of this spectrum for operators is a significant uncertainty. These future cash outflows are not captured by consensus estimates or by the market, in our view;
- More fundamentally, these spectrum awards will be opportunities for new players to enter the market and increase competitive pressure on access.

The spectrum bands which are useful for telecom services are those in the UHF area i.e. between 300MHz and 3GHz. The table below gives more details on the current and future use of the most important sub-bands between 600MHz and 3.5GHz.

Importantly, the value of all bands is not equal: with lower frequencies, each cell site can cover a larger area hence operators can rollout a network with good coverage at a lower cost than with higher frequencies.

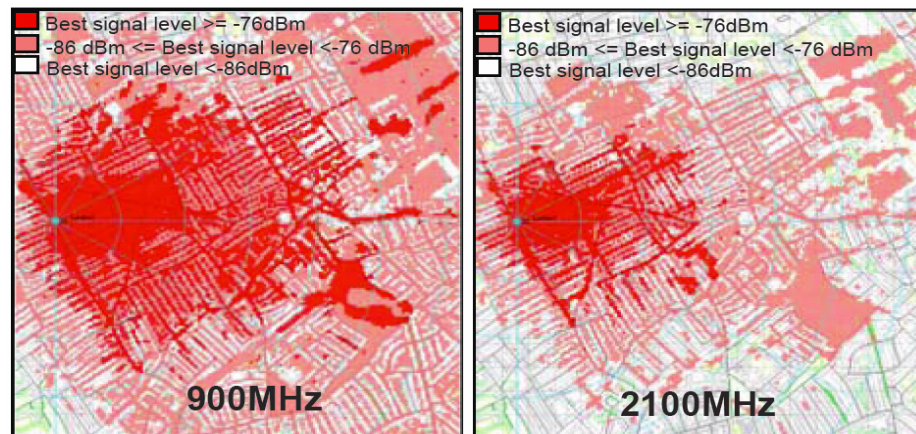
**Table 21: Spectrum bands, current and possible usage**

Band	Name	Current use	Future use
600-800 MHz	Digital dividend	Analogue TV	Wireless broadband, Mobile TV, More digital terrestrial TV (SD& HD), Local TV...
900 MHz	-	GSM	3G
1.4-1.5 GHz	L Band	-	Mobile TV, Satellite radio, Wireless broadband
1.8 GHz	-	GSM	3G
2.2 GHz	-	3G	3G
2.5-2.6 GHz	Extension Band	-	3G, LTE, WiMax
3.5 GHz	-	-	WiMax, Fixed wireless access
10-40 GHz	SHF	Satellite broadcasting	Fixed wireless access

Source: Arthur D. Little, Exane BNP Paribas

As such, the award of spectrum in the 600-800MHz band in the USA should draw particular interest, and so will, in Europe, the questions of 1) refarming of 900MHz, i.e. the ability for mobile operators to use spectrum currently allocated to 2G services for rolling out 3G networks, and 2) the digital dividend (600-800MHz spectrum), with the switch-off of analogue TV scheduled for 2010-2011 depending on the countries.

**Chart 29: Coverage area of a cell site depending on the frequency**



Source: Arthur D. Little, Exane BNP Paribas

In most cases, the award of such spectrum is not reserved for existing mobile players. As such, it could draw interest from potential new entrants:

- Pure-play fixed-line operators we have met have again expressed strong interest in the mobile market. For instance, Iliad in France and BT in the UK have officially expressed interest for upcoming spectrum (fourth 3G licence in France; upcoming 2.5GHz auctions and other upcoming auctions in the UK);
- Other potential bidders for spectrum include Internet players such as Google – which is participating in the US 700MHz auctions in early 2008. Google has a strong interest in the mobile Internet market, as we have seen. The group's strategy is not to become a mobile network operator, but to foster the rollout of "open" mobile networks, i.e. to avoid that mobile network operators close their networks to Google's services.

On the other hand, governments will likely not disrupt existing licensees. For instance, in the Netherlands, the 900MHz band has always been in possession of KPN and Vodafone, and mid-2007, the ministry has extended their licence until 2013.

In our view, a scenario with disappointing growth in mobile data traffic and many new entrants is an unlikely scenario, but so is a scenario with a lot of growth in mobile data traffic and no new entrant.

We believe that the most likely scenario is that data traffic will grow strongly and that this will attract new entrants to the market – a scenario in which top-line growth can be good, but returns will be under check due to regulation and competition. As we have detailed in page 37, we believe that the entry of an additional mobile operator in a specific country could very significantly affect the balance of the market and lead to lower profits for existing players.

### **Net neutrality: shaping the relationship with Internet and content players**

Many players we have talked to highlight the risks associated with the current situation on fixed-line networks, where customers buy unlimited ADSL or cable broadband offers and increasingly use capacity-hungry applications such as video download or streaming (Youtube, etc.).

Since the general pricing pattern is flat fees, customers will not pay for this growing usage, but at the same time, this usage will at some point exceed the capacity installed in the operators' networks, both at the local access and core network levels, and operators will need huge investments to cope with this growing demand.

As such, pure service providers (i.e. Internet leaders such as Google and other service providers over the Internet) are in a situation where they can stimulate their own revenues by encouraging customers to use more and more services, richer and richer content, without facing the risk of paying for the investments which will be required in the networks supporting the growing data traffic.

This is the starting point of the debate about network neutrality, which is ongoing globally and can potentially affect all markets. Putting it simplistically, the two extreme options for regulators are:

1. To view the access operator (telecom operator) as an unavoidable “middle man” between the service providers (Internet leaders, content providers, etc.) and the customer. In this case the service provider has to conclude an agreement with access operator to use its network to deliver the service to the customer. The access operator can charge a fee for letting the service provider use the network. It therefore keeps total control over what services are being used by its customers, and may choose not to prioritize some service providers' services in its network. This is a scenario in which access operators would strongly increase their power versus service providers;
2. To force the access operators, through legislation, to deliver all service providers' services to the customers and to guarantee a certain level of quality in the service. This is the “network neutrality” scenario, in which service providers have the power and operators have no control over services. In such a scenario, operators could not use their dominance on access to impose their own services.

Currently, operators are able to differentiate the quality of service of their access network depending on which service the customer is using. For instance, the operator can ensure that the quality of its video-on-demand service is perfect, but that the quality of a web-based VOD service would not be ensured. Should “network neutrality” be enforced, operators could end up getting a much lower share of revenues of the services and content market, hence lower overall revenues.

## Pan-European consolidation? Not just yet

There is an increasing number of factors pushing telecom operators to get bigger.

First, many factors push for domestic access consolidation to continue in 2008. This will mainly affect fixed-line, where there are still many subscale broadband providers which we believe are under mounting pressure due to the move to triple-play and fibre. They will be bought by larger fixed players and/or by local mobile operators. This should lead to only a few solid fixed and mobile network players in each country. We have built a scenario where we can see the average number of local access players per country (fixed and mobile taken together) falling from the current level of seven down to four by the end of the expected consolidation phase. We estimate that this phase of consolidation could increase the valuations of fixed operators by 18% compared to a status quo scenario, and the valuation of the overall sector by 6%.

Second, global size is becoming a significant issue. It is increasingly clear that large multi-country operators have more negotiating clout versus rising global giants such as Internet leaders and devices manufacturers than their smaller peers. Does this mean that smaller operators (i.e. incumbents in smaller countries and large challengers which will remain after the local consolidation phase) will lose out? This is far from sure, because smaller operators will have the option to “play ball” with global Internet leaders and manufacturers i.e. to open their networks to their services and share more value with them, so as to continue being able to offer customers an attractive proposition. We see two possible scenarios:

- We call the first one “Access specialisation”: in this scenario, smaller operators would protect/grow their market share by giving away a share of the sector’s potential revenues and margins in the services and content area to Internet leaders and manufacturers. This would be a negative scenario for “orthodox” leading pan-European operators, because they would lose out in terms of market share to the smaller players, and they would not be able to recoup this through growth into services. In this scenario, the sector’s value would be cut by 14% due to the leakage of value in the services area more than offsetting the benefits from the local access consolidation on fixed-line;
- We call the second scenario “Pan-European consolidation”: in this scenario, large operators would respond to the threat of the previous scenario by acquiring many smaller players in other countries, both local incumbents and challengers. Regulators would probably not allow further consolidation on the access market (i.e. the number of access networks would remain around four per country), but this would increase the ability of the telecom services industry to capture a larger share of the services market from Internet leaders and manufacturers. In this scenario, the sector’s valuation would increase by 17%, thanks to the larger share of the services market captured by the industry.

We do not expect pan-European consolidation in 2008 but it could start in 18-24 months. In the mean time, we should see further domestic consolidation in many markets, but also some worrying signs of access specialisation in several countries.

## Pressure to get bigger...

The development of the sector is putting increasing pressure on operators to get bigger:

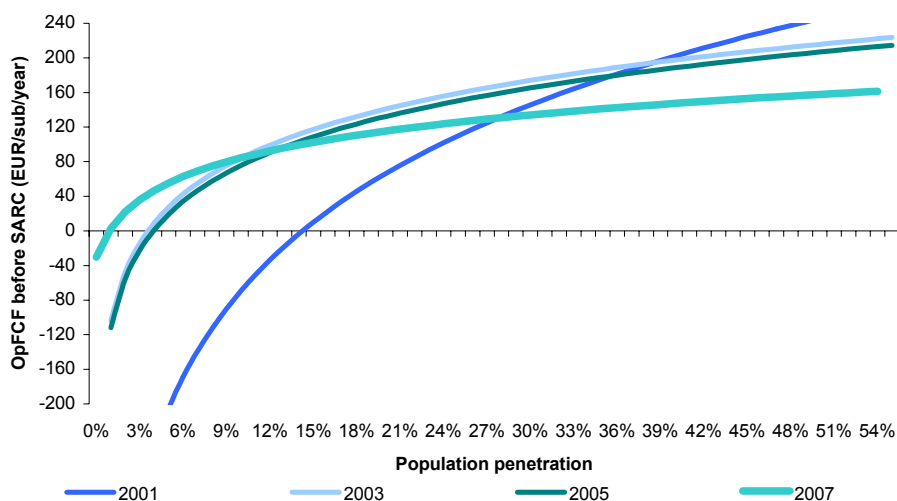
- At the local level. This is not new: local critical size will remain a key factor for telecom operators' margins. The rollout of new networks, in particular fibre, will put operators without large free cash flow in a difficult situation. Also, presence in both fixed and mobile in a given country can enable synergies (see pages 37-38);
- At the global level. This is much newer, in our view. Global size will become more important as operators increasingly face negotiation with global Internet, content and equipment players. In this respect, being an operator with 2m customers in ten different countries or being a local leader with 20m customers in a single but large country can have similar benefits.

### Local critical size is a must

Almost all players now believe that critical mass is necessary at the local country level, and this is triggering a wave of consolidation in the local broadband markets, as we had been predicting: exit of Tele2 from Italy and Spain, exit of Deutsche Telekom from the Spanish broadband market, ongoing consolidation of the French and UK broadband markets, initial moves between German alternative carriers, etc.

Given the size of fixed costs in the telecom operators' business, margins remain heavily correlated with local market share, both in mobile and in fixed-line – as can be seen in the charts below.

**Chart 30: Correlation between local market share and profitability – Mobile (operating free cash flow per customer, before commercial costs)**



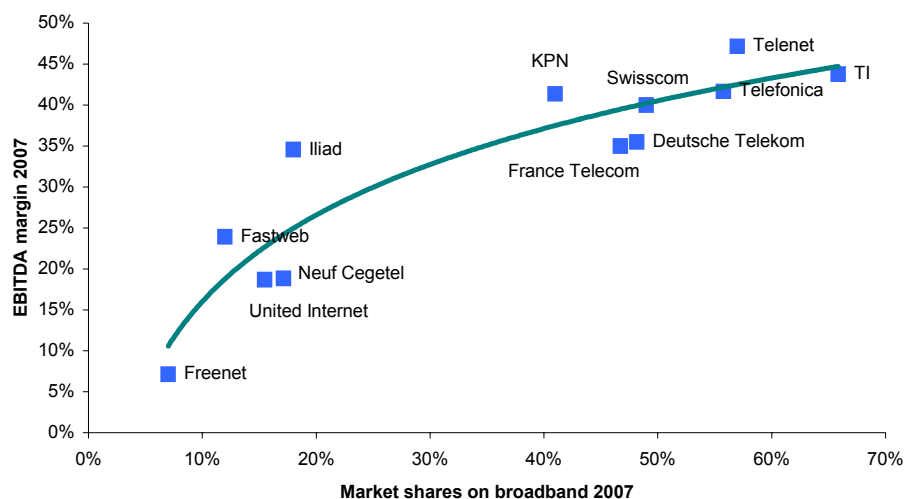
Source: Arthur D. Little, Exane BNP Paribas

**Network, in particular fibre, requires local critical size** – The largest area of fixed costs for telecom operators remains the network. Both for fixed and mobile players, the reach of the network will remain a differentiating factor, and its scalability will become increasingly important. Volumes of traffic will grow strongly and not all networks will be able to handle real-time services such as video conferences, TV, telephony in a reliable way. This will require further investments, both in fixed-line and in mobile networks.

Such investments in best-in-class networks require local critical size:

- On the mobile side, most operators claim that they have reached critical mass (around 10% market share, on our estimates). This means that one should not expect widespread consolidation in European mobile markets, in our view;
- On the fixed side, the move towards triple-play and the upcoming rollout of fibre infrastructure means that there are many more actors feeling that they do not have critical size.

**Chart 31: Correlation between local market share and profitability – Fixed (EBITDA margin)**



Source: Arthur D. Little, Exane BNP Paribas

Even though some players question the need for faster bandwidth beyond the 20Mbit/s allowed by ADSL2+, the move to fibre will in our view happen:

- History shows that usages are driven by the availability of bandwidth rather than the opposite (with Youtube and other video-based applications a striking example of how fast new services can use available bandwidth). We expect the rollout of FTTx to lead to radical growth in data traffic, with a rapid rise in downstream and upstream usage, respectively driven by TV multi-equipment, HDTV, etc. and by sharing of personal content. Operators without a cable or FTTx infrastructure may rapidly be left behind. Even some cable operators consider that they could, at some point, move to FTTH;
- In competitive markets, operators may decide “quicker than optimal” rollout of fibre, in a “prisoner’s dilemma”-like process. Even though it would be better for the community of operators to go for a slow rollout, no player can afford to see its competitor(s) take too much of a lead in fibre rollout, because it could endanger its long term market share. Thus each player will probably roll out fibre quicker than it would have done without this competitive pressure.

**Commercial impact requires size** – Finally, critical size appears key for an operator to have an impact on its market. Changing customer behaviour (i.e. developing new usages) or gaining market share requires a significant commercial footprint, in particular a large physical retail network as well as an online distribution network.

**Content requires size, local or global depending on the type of content** – More and more operators are looking at differentiating versus competitors through content. This requires 1) investing in new service platforms (for IPTV, HDTV, VOD, time-shifting, etc.) and in monetising tools for this content (advertising, billing, CRM, etc.).



All this represents large investments (for instance, the cost of an IPTV platform is EUR1m per TV channel) – hence requires local scale; and 2) buying content rights (movies, sports, music, the most popular series, etc.). Depending on the type of content, this requires either local critical size (e.g., for football rights in a specific country, what matters is the number of customers in this specific country) or global size (for instance, an operator’s negotiating clout versus US majors on movies or music depends on its global size).

### **Global critical size becoming a significant issue**

A growing number of industry players believe they need to have not only local critical size, but also global critical size, citing the need to stand out in the negotiation with global equipment makers, global Internet giants and, to a lesser extent, global content providers.

This view is not consensual but it is now shared by a larger number of operators. Interestingly, it is not only large operators that believe in the benefits of size; small operators too point out the drawbacks linked to their small size. For instance, one told us that it has become virtually impossible to negotiate local adaptation of equipment manufacturers’ products at a reasonable cost, and the same with global Internet players. This company noted that it could be forced to use open-source platforms, which could in the end reduce its ability to differentiate.

**The standards issue** – A key reason put forward by operators on why there is a need for them to reach critical size on a global scale is the necessity to acquire clout with providers on the development of technologies and standards. Indeed, operators would prefer to be able to define single standards but are facing global equipment and systems players that compete on technologies, and operators have generally been unable to unite and push for a specific standard.

- Convergent technologies: UMA is pushed by France Telecom, BT and a few others, while Femtocells seem supported by Vodafone and Telefonica/O2, and SIP is pushed by some other players and manufacturers.

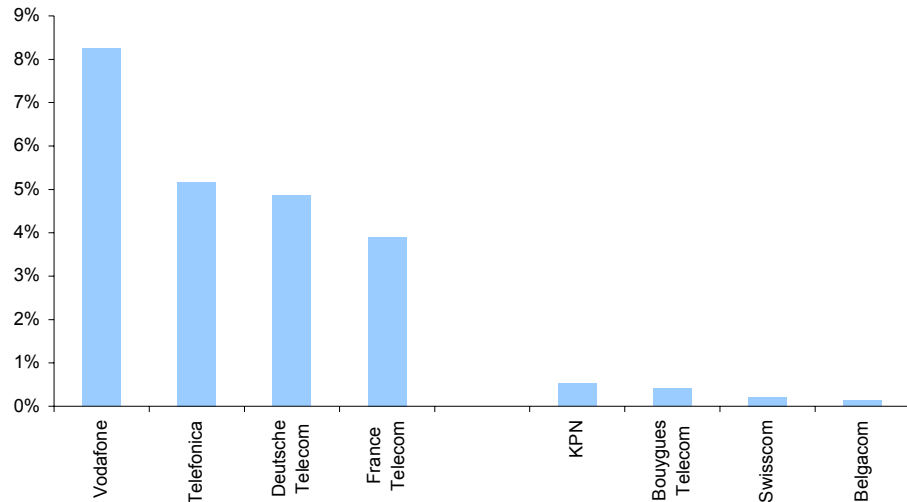
- Within-the-home technologies (i.e., technologies connecting different devices inside the home to the phone or cable socket, as well as different home devices together): Several technologies and standards compete, including WiFi (which means that cables can be got rid of, but which has some limitations in terms of speeds, quality and reach), power-line technology (which enables existing electrical wiring to be used and is now developing fast) and fibre (which could be the ultimate long-term solution).

- Operating systems for devices: Competition is ongoing between Microsoft (Windows platform and related products) and open source technologies, with Google’s Android as a high-profile newcomer. There seems little prospect of an industry standard emerging and this poses a double problem. First, it will hinder the development of new services – as it will be very difficult to ensure the compatibility of all kinds of devices (mobile handsets, TV sets, computers, music players, cameras, etc.) and all types of content (music, pictures, video, etc.) so that they all “talk” to each-other. Second, the lack of control by telecom operators on the operating systems running on mobile devices will lead to a lack of control on services used by customers – hence it will be very difficult for mobile operators to get revenues from these services.

**Buying power on mobile devices** – Being large enables a mobile operator not only to buy handsets at a lower price, but also to ask handset manufacturers to design exclusive handsets. For instance, Vodafone recently highlighted the launch of its very low cost handset series designed exclusively for the group by ZTE for its emerging markets operations. Vodafone Essar (India) said it had sold 1m of such handsets in the first two months.

The chart below shows that Vodafone, Telefonica and France Telecom are more than ten times bigger than local players such as Bouygues Telecom, Belgacom or Swisscom in terms of handsets purchasing. We believe that smaller operators could benefit in being integrated in bigger groups.

**Chart 32: Size of some operators in terms of share of total global handsets sales (2007)**



Source: Arthur D. Little, Exane BNP Paribas

**Negotiating with Internet giants** – Finally, small operators said that their negotiating clout versus global advertising specialists is a growing concern. It became clear in 2007 that global Internet giants have focused their efforts on signing partnership agreements with the largest telecom operators rather than with smaller players.

This does not mean that small operators will not get the same services and content ultimately, but they may get these services later than larger operators, and/or they would need to give-up a higher share of revenues to the Internet leaders than larger operators.

### **...or just smarter and more disruptive?**

According to an overwhelming majority of players – and we agree – the most important key success factor for an operator is to provide a good quality, simple, reliable service. As we have seen, there is strong potential for further growth in adoption and usage, yet the current lack of simplicity remains a significant obstacle for customers, and there is a need for a clear value proposition, simple to set up, use and maintain.

To achieve this, it is not necessary to be either the local leader or a global operator, but to be focused. Also, small operators can be the first to spot and leverage new business models, for instance using partnerships with equipment makers and Internet players, outsourcing or sharing their network, etc.

As such, we believe that small operators can stay in the game, assuming they chose one of the two following routes:

- The low cost approach. For instance, on the mobile market, operators can continue focusing on “no frills” offers, as E-Plus and Wind have been doing respectively in Germany and in Italy for the past few years. This approach can be expanded to the next growth market i.e. mobile broadband, as shown by Tele2 in Sweden;
- The innovative customer-friendly player approach, bringing the latest technologies to customers ahead of the pack (e.g., Iliad on the fixed broadband). Interestingly, E-Plus is now thinking about new business models, i.e. partnering with software providers and Internet leaders (Microsoft, Yahoo, etc.).

### **Opportunities for new business models and lower prices**

As detailed in our 2007 report (Caution – work ahead), agility is an increasingly important factor for success among telecom operators. This refers to the ability of an operator to spot and analyse new trends quickly, and to rapidly launch new offerings adapted to the new environment. This notably implies being able to “sacrifice holy cows”, as one industry player put it, and to sign ever-changing types of agreements with different kinds of partners, implementing new business models.

For instance, walled gardens cannot survive because they are too slow to adapt and do not fit with customers’ aspirations. The web has created expectations by consumers that everything should be open and interoperable, and consumers reject any limitation.

**Partnerships** – The best way for an operator to differentiate through innovative products and services may not be to try and “reinvent the wheel” by himself, but rather to sign the right partnerships with the most innovative companies, including:

- The consumer electronics manufacturers – such as Sony, Nintendo, Microsoft, etc. so as to be able to integrate the latest game consoles or home entertainment centres in their offerings;
- The handsets makers – Nokia, Apple, etc., because handsets and devices are more than ever an essential element of the customers’ buying decision. Moreover, as seen with Apple’s iPhone, partnering with such players can be the fastest and best way for operators to propose a breakthrough service – i.e. Apple has done what many others have tried for many years in terms of user interface on a mobile handset, and this has led immediately to very strong data usage by customers;
- The Internet leaders – Google, Yahoo, etc. so as to be able to integrate their services notably in mobile offerings.

Global leaders are more interested in partnering with large operators, but this does not necessarily exclude medium sized operators. For instance, to sell its iPhone in Europe, Apple has preferred to partner with the local leader in each large European country than to sign with Vodafone, despite the presence of Vodafone in all these countries.

Equipment makers and Internet players will in our view keep the opportunity to sign better deals (for them) with smaller players. Smaller players will be more eager to sign a deal with Google, so Google will get a better revenue share from a deal with a small player than with a leading operator. For instance, Bouygues Telecom was the first to sign with MSN in France; Hutchison was the first to launch a product based on partnerships with Internet leaders in the UK (X-Series).

**Agility** – Many industry players highlight that they lack the relevant skills internally. To assemble the right skill set, they need to reorganise and also to find the right complementary partners. In this respect, incumbents face specific hurdles, and challengers are at an advantage.

For incumbents, the challenge is to reduce strongly their headcount while at the same time keeping and/or recruiting new skills, able to design and roll out new types of IP-based services, as well as content specialists. For large incumbents, be it in the telecom or media space, one way to increase agility is to create separate, independent business units which can act like start-up companies.

This is what media groups have historically done for their Internet divisions, or what telecom incumbents have also done with Internet service providers (e.g., listing of T-Online by Deutsche Telekom, Wanadoo by France Telecom, Terra by Telefonica). These moves can later be reversed by reintegrating the business unit when necessary (as has often been the case).

Integrated incumbents also face specific organisational issues when they try to launch convergent fixed and mobile services, as internal fixed and mobile business units each defend their existing business. In the move towards mobile broadband, a mobile challenger will find it easier to launch aggressive offerings than an integrated incumbent, because the latter will face cannibalisation issues with its fixed-line broadband business. This is currently evidenced in Sweden, where the most aggressive operator on the mobile broadband market is Tele2, which is much less exposed than its competitors Telenor and TeliaSonera to the fixed market.

**Lower fixed costs through outsourcing** – As we highlighted in our 2007 report, many operators are moving towards a business model with lower fixed costs. This is achieved through outsourcing of more and more functions, including the network, as well as network sharing. The key functions which operators expect to keep in house are the billing relationship, network planning & quality assurance and specific software elements, which enable it to differentiate. Other functions, such as network and IT rollout and day-to-day operations will increasingly be outsourced.

**All paving the way for flat-rate pricing** – The move towards a leaner, more agile operator, relying more and more on strategic partnerships, will lead to an industry with lower overall costs, and in particular lower fixed costs. This trend will naturally be driven by challengers, which are more open to such changes – and more able to implement them quickly, as they face less organisational hurdles.

We believe that such a route can be used by challengers to continue being aggressive on prices – as in a market which is at least partially commoditised, pricing will be an important differentiating angle. In particular, the move towards flat-rate pricing is still, understandably, being resisted by many leaders, but we expect challengers to be the main force behind a continued move towards such flat rate pricing.

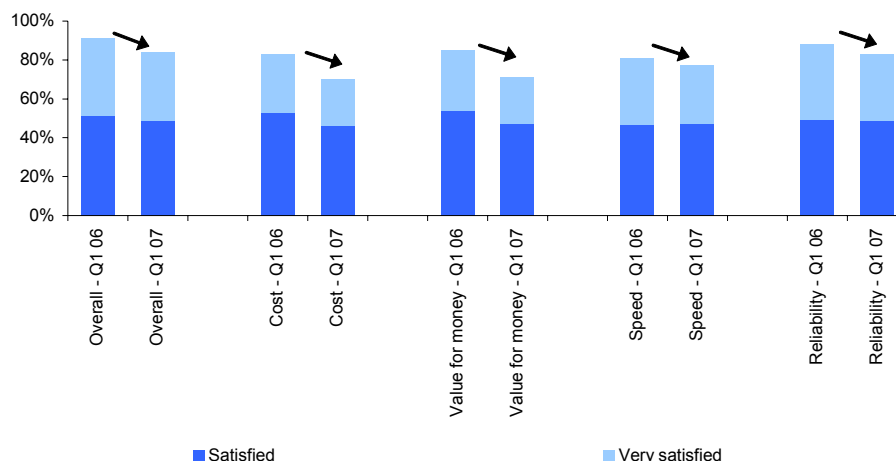
### **The main weakness of operators remains service quality**

When asked to identify main success factors in the converging TMT market, the overwhelming majority of industry players quoted quality of service – which requires a strong effort in terms of customer relations, the design of simple, well targeted offers, as well as a best-in-class network.

**Customer relation** – This is a concern in particular in the fixed broadband market, which has been plagued by issues concerning the installation (unbundling process, box set-up, etc.), the ongoing service (service cuts, disappointing Internet speed, etc.) and the call centres (difficult to reach, poor ability to solve problems... and expensive). Many players believe that in such a market, just providing a good quality service with a good call centre will be the most important differentiating factor – at least for the next two years. Some differentiate by offering free installation of their equipment in the home by a technician, and/or a free call centre, etc.

Operators highlight that the quality of the interaction with customers, the ability for an operator to become a trusted provider, will be key not only to gain customers but also to retain the existing customers, and also to foster adoption of new services by the customer base, hence to grow ARPU. The quality of the customer relations of a service provider has little to do with its size – assuming it has reached local critical size.

**Chart 33: Residential customer satisfaction regarding Internet service in the UK**



Source: Ofcom

**Simplicity** – Operators are more and more convinced that success will not come from overly sexy and innovative services, but “just” from making technology easy to use for the mass market – which is easier to say than to do, obviously. This quest for simplicity is valid for all types of operators (incumbents, alternative carriers, mobile operators, etc.) and all types of offers (e.g., making sure that the installation of the home box is really plug & play; that the user interface of a video-on-demand service is straightforward and encourages usage; etc). To reach this target, operators must better understand their customers. This is not a question of size but of culture and focus.

One recent example of this “quest for simplicity” is the announcement by KPN that it is to reduce the number of its brands from more than 10 to three, focused respectively on the low, medium and high-end of the market, for all their fixed and mobile services in the Netherlands.

**Exploiting all points of contact** – For operators, distribution will remain essential in terms of acquiring customers and managing the relationship with existing customers. Rolling out and managing a strong distribution network requires critical size locally. However, distribution is not only about retail stores (physical shops in the high streets and high profile Internet portals), but also about more “intimate” points of contact with the customer such as home boxes and mobile devices:

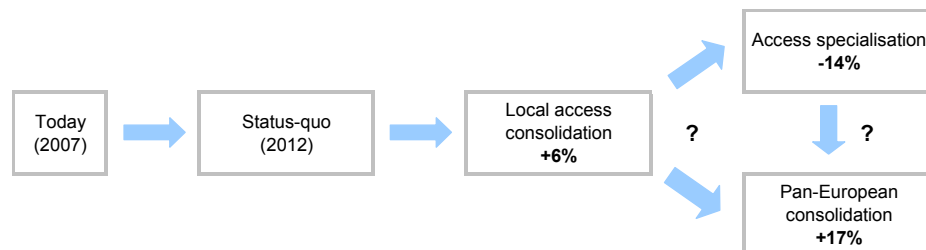
- For fixed broadband providers, the box is a key point of contact with customers, enabling them to promote and sell new services and content, and to differentiate versus competition. There is one box per household, so the box is not as personal as mobile handsets. However, each box “touches” several individuals per household, hence each box can enable services to be sold to several individual clients;

– For a mobile provider, the same argument can be made about handsets and devices. However, mobile handsets are much less under the control of mobile operators than boxes are for fixed broadband providers. Moreover, as we have seen, the trend is for device manufacturers to try and integrate their own distribution platforms into handsets, competing with mobile operators (e.g., Nokia’s Ovi) and making it even harder for operators to differentiate on services.

## Sector scenarios: towards pan-European consolidation?

On the access network side, many factors push for continued local consolidation. Subscale fixed-line broadband providers will continue to consolidate as they face the move to triple-play and fibre rollout. They will be bought by larger fixed players and/or by local mobile operators. We do not expect significant in-market consolidation between mobile operators (because there are few possible combinations which would be allowed by regulators except the exit of Hutchison 3G operations in the UK, Italy, Austria and Sweden), but the end-game should be the presence of a few solid fixed and mobile network players in each country. The question is not whether this consolidation will happen, but rather when and to what extent (i.e. how many players left in each country).

**Chart 34: Possible scenarios**



Source: Arthur D. Little, Exane BNP Paribas

On the services side, telecom operators are under increasing pressure from global content and Internet players, as well as devices & systems providers. Large multi-country operators are better placed to negotiate with these global players than smaller peers. We can therefore imagine a “status quo” scenario, in which local leaders would increasingly “reign” over local challengers, the latter struggling with the need to invest in new services and new networks. This would be a “death by a thousand cuts” scenario for small players.

However, such a scenario does not look like a stable equilibrium. Indeed, in such a situation, small players would try disruptive moves to stop losing/grow market share. As we have seen, small operators would have a strategic interest in playing the game of Internet players and global manufacturers against the large “orthodox” telecom operators. Then, depending on the response from leaders, this could lead to two very different scenarios:

– **Scenario 1 - Specialisation on access:** In this scenario, the phase of local access consolidation would be followed by a situation where the remaining challengers (e.g., Wind, E-Plus, Iliad, etc.) would decide to aggressively play the “access-only” card, continuing to grow market share on access while giving away the value of services to other players in the value chain. This would derail the large operators’ “orthodox” strategic goal of tightening-up the value chain. This would be a negative scenario for the sector as a whole, because a larger share of the overall TMT value would be captured by global equipment manufacturers and Internet players. It would be particularly negative for large operators (incumbents and global mobile operators), because they would continue losing market share to smaller ones and would not be able to recoup this loss through new revenues from services.

– **Scenario 2 – Pan-European consolidation:** In this scenario, we would see large telecom operators buying more and more smaller operators, i.e. both local incumbents in medium-size countries (e.g., Belgacom) and large challengers in other countries (e.g., Iliad, Wind). Such acquisitions would not be risk-free (uncertainty on price paid; integration issues), but in the end, the European sector would be composed predominantly of a few large pan-European telecom operators, which would be in a position to better impose their views on the rest of the value chain. In the short term, the winners would be the shareholders of companies being bought out, and in the long term, the whole sector would benefit – provided that regulators would allow it.

### **Access market consolidation: down from seven players per country to four by 2009?**

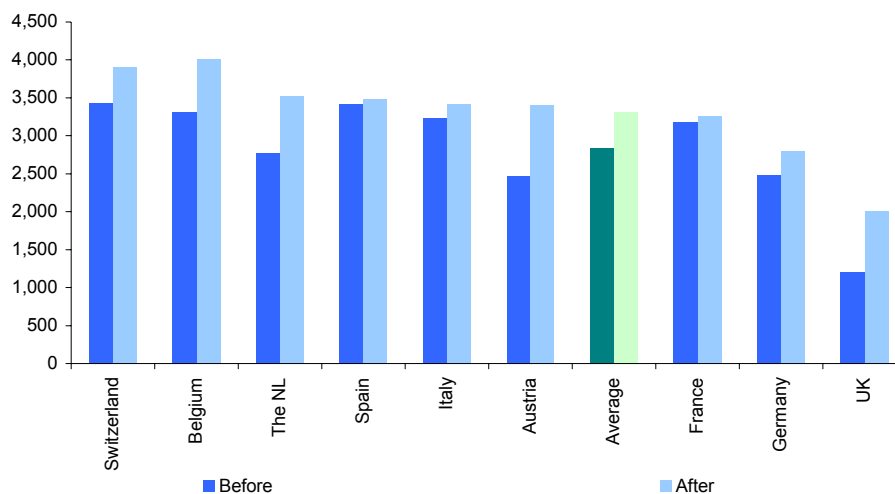
We believe that we will see further, and potentially faster, local access market consolidation in 2008. It will be boosted in countries where FTTx rollout becomes a reality; we believe that announcements are possible in France, Italy or Spain.

In every market, there is space for one or more challengers to the local incumbent and Vodafone (present in most markets). However, these challengers need 1) critical size – hence small challengers will be consolidated, and 2) preferably presence in both fixed and mobile – hence we will see more fixed-mobile tie-ups.

We have looked at how this local access consolidation game may take place in each country. The possible country scenarios drawn in the table below show that it seems reasonable to assume that over a period of time, the average number of access operators per country will have reduced from seven currently to around four.

This scenario of local access consolidation would lead to an average concentration index in Europe of 3,330 versus 2,860 currently (HHI, calculated as the sum of squares of the players’ market shares in the fixed and mobile markets, taken together). As such, Europe would, on average, be as concentrated as Spain, Italy and Belgium are today.

**Chart 35: Change in HHI in local access consolidation scenario\***



\* Based on 2007 market shares.

Source: Arthur D. Little, Exane BNP Paribas

The UK and Germany are currently the most competitive countries, i.e., they have the largest number of significant players. They will probably remain the most competitive, because they are larger countries in which 10% market share means more revenues (hence a better critical size) than in smaller countries, and in any case, it will be more difficult and lengthy to find a path towards consolidation. For instance, many pan-European players are present in the UK (Vodafone, Telefonica, France Telecom, Deutsche Telekom) while BT is a unique fixed-only player and BSkyB is the only satellite pay-TV operator in Europe having committed so strongly to access.

On the other hand, in smaller countries, where there are today less operators, such as Switzerland, Belgium or the Netherlands (following a phase of very active consolidation on both the fixed and mobile markets – a quite unique case in Europe), we see relatively “easy” scenarios which could lead to further consolidation – but they may be difficult to achieve from an regulatory standpoint.

Companies we talked to expect such consolidation to happen soon. Here are some examples:

- In the UK, where everybody believes that there are too many broadband providers. One person said that six players should be enough, which is incidentally the number of players in our local access consolidation scenario for the UK. Another person expects Tiscali UK to be sold first, and expects further rounds to be driven, in the next couple of years, by acquisition of broadband providers by mobile operators – in line with our view;
- In Italy, local executives expect that Tiscali and other smaller residential & business ISPs to be acquired. This should happen from the end of 2008, according to some;
- In Germany, there are many subscale fixed infrastructure operators and consolidation is expected, potentially involving United Internet, Versatel, Freenet and QSC. Also, Vodafone has confirmed it is negotiating a buyout of the minorities of its fixed-line operator Arcor;
- In Spain, it seems logical to most players that the market will end-up with four fixed and mobile players;



- In Austria, players expect a consolidation of the cable market and also the exit of smaller players in the mobile market (MVNOs at least, Hutchison potentially). This is what we have implemented in our consolidation scenario;
- In Belgium, players expect further consolidation in the fixed broadband market, as there are still a few subscale unbundlers (e.g., Scarlet) and cable operators remain fragmented (Telenet in Flanders, VOO in Walloon, Coditel in Brussels...). Some expect further fixed-mobile consolidation in the future, for instance through a merger between Mobistar and Telenet, pointing to a long term market structure with only three players;
- In France, local players see two possible scenarios for the rollout of fibre: fixed-mobile consolidation, as started by the SFR/Neuf Cegetel acquisition, because mobile operators have enough cash-flows to finance the rollout, or fibre capex sharing between alternative carriers – which some see as the “logical solution but hard to implement”. All in all, executives expect the market to consolidate to four fixed-mobile operators (in line with the scenario we show in the table above).

**Table 22: Possible consolidation scenarios on local access: from 7.0 to 3.9 players per country, on average**

Number of fixed & mobile players	Before	After	Possible local access consolidation scenarios
Switzerland	5	3	Orange Switzerland buys Cablecom, Sunrise buys Tele2
Belgium	5	3	Merger between Mobistar and Telenet (and other cable?), KPN buys remaining small players
The NL	6	3	VOD buys Versatel/Tele2 and Others, DTE teams-up with Cable
Austria	7	3	DTE buys Tele2 (fixed), One acquires H3G and is then merge with UPC
<b>Average</b>	<b>7.0</b>	<b>3.9</b>	-
Spain	6	4	VOD buys Jazztel, Ono buys Yoigo
Italy	7	4	VOD buys Tiscali, Swisscom/Fastweb buys H3G, Wind buys remaining small players
France	6	4	Iliad gets 4th mobile licence and buys Alice (TI); Bouygues Tel and Cable team-up
Germany	10	5	KPN buys Versatel, QSC & Freenet, TEF/O2 buys TI Germany (Hansenet) & United Internet
UK	11	6	BT buys H3G, VOD buys Tiscali, FTE buys CPW, DTE teams-up with Virgin, TEF buys Others

Source: Arthur D. Little, Exane BNP Paribas

### Europe-wide consolidation is unlikely to start in 2008

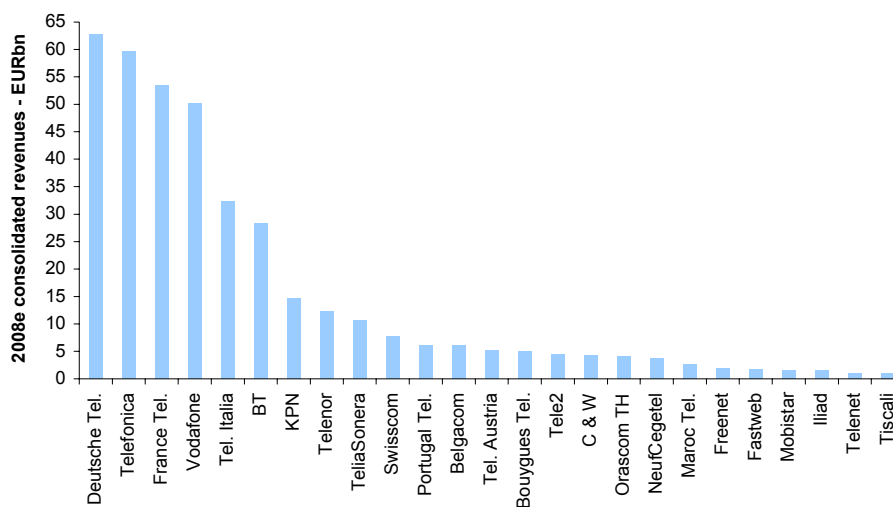
As shown in the chart below, there are currently more than 25 significant players around Europe (i.e., in the eight countries we have looked at). In our local access consolidation scenario, we expect this number to come down to 17, which is still a very large number and would still include six large incumbents (Vodafone, France Telecom, Deutsche Telekom, Telefonica, Telecom Italia and KPN), four smaller incumbents (Swisscom, BT, Belgacom and Telekom Austria) and seven significant challengers (of which SFR, Wind, Bouygues Telecom, Hutchison 3G, Iliad).

Under our “Pan-European consolidation” scenario, we see large incumbents acquiring smaller incumbents and challengers, ultimately reducing the overall number of players in Europe from 17 to between 5 and 10. This would give the remaining giants a stronger grip on the value chain, preventing smaller operators from playing the game of global Internet leaders and device manufacturers.

We have heard a few suggestions of a further acceleration in footprint expansion by large incumbents:

- Some (most?) large incumbents are looking at M&A in emerging markets, in particular Asia and Africa, but also explicitly in Europe – although they highlight that they will be very selective and cautious. In February 2008, France Telecom announced that it had reached its Net debt/EBITDA target of 2x at end-2007 and the board officially increased the group’s flexibility to look at acquisitions. France Telecom’s management publicly said that the group needs to get bigger in the global competition game;
- Conversely, several managers at incumbents in smaller countries (Scandinavia, Benelux, Portugal) see their markets as “too small for independence” and expect to “eventually end-up” being bought by larger pan-European groups. Also, BT could be one of the first groups targeted in such a consolidation scenario.

**Chart 36: Consolidated revenues of listed European telecom operators (2008e)**



Source: Arthur D. Little, Exane BNP Paribas

However, we believe that such massive consolidation is very unlikely in the short term, i.e. certainly not in 2008, for several reasons.

First, large operators will try to regain control in the value chain by other means. We expect more agreements between handset manufacturers and mobile operators about developing exclusive handsets with improved access to mobile operators' own services platforms; the launch of more mobile broadband offers for laptops, based on USB sticks under mobile operators' own brands; the acquisition by telecom operators of technologies in the services world (e.g., instant messaging, online advertising, content aggregation, web2.0, fixed-mobile convergence, etc.);

Second, large incumbents are not ready to extract the potential synergies of a large M&A deal at this stage. They currently have their hands full with many subjects, including, on the commercial side, the rollout of new services (mobile broadband, IPTV, VOD, etc.), on the "back office" side, the overhaul of networks (fixed-mobile integration, rollout of next generation technologies, etc.) and more cost cutting, and on the corporate side, the integration of many recent acquisitions;

Third, as we have seen above, the consolidation will first take place at the local level, and this will not be finished by year-end 2008 in our view;

Finally, given the current situation of financial markets – in particular the tight credit market, making it difficult to raise more than a few billion euros –, it would be extremely surprising to see any large incumbent take the risk of launching any very large bid. The situation seems likely to remain difficult at least for the first part of 2008.

## Sensitivity of sector outlook to different scenarios

We put numbers to these different scenarios in the table below, comparing them with our “base case” (pages 25-33), in which the sector retail revenue grows by 1.5% pa over 2007-2012e ( -0.4% on fixed, +2.6% on mobile), and the sector EBITDA is flat due to ongoing margin dilution, driven by 1) a mix effect: growth of lower-margin content revenues and 2) expected reduction in access gross margin of mobile operators, due to the need that we foresee for them to use fixed infrastructure (modelled through wholesale payments to fixed players).

We have first looked at the “local consolidation” scenario, i.e., mostly fixed broadband consolidation in each market. We have modelled its impact as a 10% increase in fixed access revenues versus the “status quo” scenario, a reduction by 200bp of fixed-line commercial expenses as a % of revenues, and no change to mobile estimates, overall pointing to 2012e OpFCF increased by 25% for the fixed-line market, leading to a DCF valuation increased by 18% on fixed-line, and +6% on the European sector.

We have then modelled the “access specialisation” scenario, based on the “local consolidation” scenario but with a large leakage of value on content & advertising revenues (-50% on both fixed and mobile revenues, gross margin of 30% versus 45%), and a 5% capture of Access revenues (fixed and mobile) by other players in the value chain (Internet players and manufacturers). This leads to 2012e OpFCF reduced by 19% compared to the status quo scenario, leading to a 14% reduction in the sector DCF valuation, of which -7% on fixed (which still benefits from local access consolidation) and -18% on mobile.

Finally, we have modelled the “Pan-European consolidation” scenario, based on the “local consolidation” scenario, but with a 50% increase in content & advertising revenues and a higher gross margin on these revenues (50%). This leads to 2012e OpFCF increased by 24% compared to the “status quo” scenario, pointing to a sector DCF valuation increased by 17% (+33% on fixed; +9% on mobile).

The scenario of status quo may be likely in some countries in the short term (showing signs of “victory” by leaders), but there are signs that the “Access specialisation” scenario is going to materialise in some other countries, notably Germany, the UK and Austria – and the scenario for the French market depends strongly on the question of the fourth mobile licence. There is no sign at this stage that the “Pan-European consolidation” scenario is about to happen, but we believe it could happen in 18-24 months time.

**Table 23: Sensitivity of sector outlook to scenarios**

EUR/month per inhabitant Scenarios	2007	Status quo	2012e scenarios		Pan-European Consolidation
			Local Consolidation	Access Specialisation	
<b>Fixed revenue</b>	<b>19.8</b>	<b>19.4</b>	<b>20.9</b>	<b>18.3</b>	<b>22.7</b>
Voice & Access	12.9	8.3	9.1	8.7	9.1
Internet Access	6.3	7.6	8.3	7.9	8.3
Content & Advertising	0.5	3.5	3.5	1.8	5.3
<b>Mobile revenue</b>	<b>30.3</b>	<b>34.5</b>	<b>34.5</b>	<b>30.8</b>	<b>36.8</b>
Voice	23.8	22.0	22.0	20.9	22.0
Data Access (incl. SMS)	4.4	8.0	8.0	7.6	8.0
Content & Advertising	2.0	4.5	4.5	2.3	6.8
<b>Total revenue</b>	<b>50.0</b>	<b>53.9</b>	<b>55.4</b>	<b>49.1</b>	<b>59.4</b>
Voice	36.8	30.3	31.1	29.6	31.1
Data Access	10.7	15.6	16.3	15.5	16.3
Content & Advertising	2.5	8.0	8.0	4.0	12.0
<b>EBITDA</b>	<b>19.0</b>	<b>19.0</b>	<b>20.0</b>	<b>16.6</b>	<b>22.0</b>
Fixed	7.5	6.9	8.0	6.4	8.9
Mobile	11.5	12.1	12.1	10.1	13.1
<b>OpFCF</b>	<b>12.8</b>	<b>12.8</b>	<b>13.8</b>	<b>10.4</b>	<b>15.8</b>
Fixed	4.9	4.3	5.4	3.9	6.3
Mobile	7.9	8.4	8.4	6.5	9.4
<b>Gross margin</b>	<b>78%</b>	<b>73%</b>	<b>73%</b>	<b>74%</b>	<b>72%</b>
Fixed	79%	74%	74%	75%	73%
Mobile	78%	72%	72%	73%	71%
Voice & Data Access	80%	77%	77%	77%	77%
Fixed	80%	80%	80%	80%	80%
Mobile	80%	76%	76%	76%	76%
Content & Advert., Fixed & Mobile	50%	45%	45%	30%	50%
<b>Commercial costs % of revenues</b>	<b>(13%)</b>	<b>(13%)</b>	<b>(12%)</b>	<b>(12%)</b>	<b>(12%)</b>
Fixed	(10%)	(10%)	(8%)	(8%)	(8%)
Mobile	(15%)	(15%)	(15%)	(15%)	(15%)
<b>Other costs % of revenues</b>	<b>(27%)</b>	<b>(24%)</b>	<b>(24%)</b>	<b>(27%)</b>	<b>(23%)</b>
Fixed	(31%)	(28%)	(28%)	(32%)	(26%)
Mobile	(25%)	(22%)	(22%)	(25%)	(21%)
<b>EBITDA margin</b>	<b>38%</b>	<b>35%</b>	<b>36%</b>	<b>34%</b>	<b>37%</b>
Fixed	38%	36%	38%	35%	39%
Mobile	38%	35%	35%	33%	36%
<b>Revenue CAGR</b>		<b>1.5%</b>	<b>2.1%</b>	<b>(0.4%)</b>	<b>3.5%</b>
Fixed		(0.4%)	1.2%	(1.5%)	2.8%
Mobile		2.6%	2.6%	0.3%	3.9%
<b>EBITDA CAGR</b>		<b>(0.1%)</b>	<b>1.1%</b>	<b>(2.7%)</b>	<b>2.9%</b>
Fixed		(1.7%)	1.2%	(3.0%)	3.5%
Mobile		0.9%	0.9%	(2.5%)	2.6%
<b>OpFCF difference versus Status(quo)</b>			<b>8%</b>	<b>(19%)</b>	<b>24%</b>
Fixed			25%	(10%)	46%
Mobile			0%	(23%)	12%
<b>DCF valuation versus Status(quo)</b>			<b>6%</b>	<b>(14%)</b>	<b>17%</b>
Fixed			18%	(7%)	33%
Mobile			0%	(18%)	9%

Source: Arthur D. Little, Exane BNP Paribas

## Country specifics

Country-specific factors will remain a key differentiating factor among European telecom operators. This is because of the differences in growth potential and levels of competition within Europe; the general scenario detailed in this report has different implications for each country.

Overall, we believe that Germany is the most attractive market because it combines above-average growth potential in fixed broadband and even more so in mobile; prices have already fallen substantially and are now close to the European average; there is no risk of the competitive dynamics deteriorating – as competition is already quite fierce; and consolidation on fixed broadband should progress.

On the other hand, the UK market looks the most uncertain, as the mobile and fixed markets are already very developed, competition is tough and will remain tougher than average – even when consolidation takes place.

The growth potential in France is below average in both fixed and mobile, but the downside risk on fixed and mobile is lower than in most other countries. The problem is that consolidation benefits could be offset by the probable entry of a fourth mobile operator.

Finally, competition in Spain has been very mild on both fixed and mobile, whereas growth has been strong. This has led to a situation where the growth potential in mobile now appears below average and where there is above-average downside risk on fixed broadband prices. As such, with a slowing economy and challengers which remain committed, the future appears less rosy than a few years ago.

**Table 24: Summary of country analysis (qualitative marks illustrating relative positions of different markets)**

	Market growth potential		Downside risk on prices		Competitive situation		Overall rating
	Mobile	Fixed	Mobile	Fixed	Current	Future	
Germany	2	1	0	0	(1)	0	2
Netherlands	0	(1)	(1)	1	1	1	1
Belgium	0	0	(1)	(1)	1	1	0
Italy	0	1	0	(1)	0	0	0
France	(1)	(1)	1	1	0	(1)	(1)
Switzerland	0	(1)	(1)	0	1	0	(1)
Spain	(1)	0	0	(2)	1	0	(2)
United Kingdom	(1)	(1)	0	0	(2)	1	(3)

Source: Arthur D. Little, Exane BNP Paribas

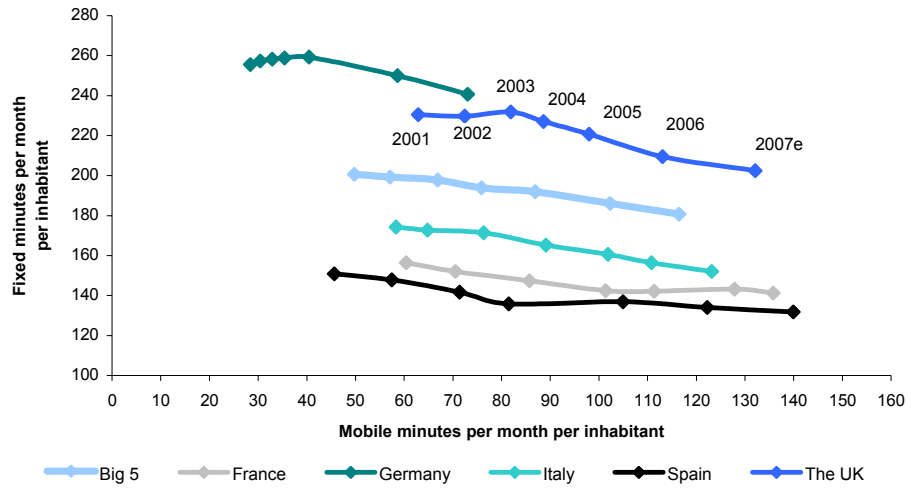
### Growth potential in different countries: Germany ahead of the pack

First, concerning mobile, Germany appears to be the market with the most growth potential and Spain the market with most downside risk:

- In terms of mobile traffic volumes, all countries will grow, in our view, but Germany has the strongest potential, while Spain and France have weaker-than-average prospects (see chart 37 hereafter, indicating the number of mobile minutes per inhabitant versus the number of fixed minutes per inhabitant in the different countries);
- In terms of mobile revenues on a per inhabitant basis, Germany is clearly behind the curve and hence has the most growth potential, while the UK and Spain are the most advanced markets – see chart 38 hereafter;

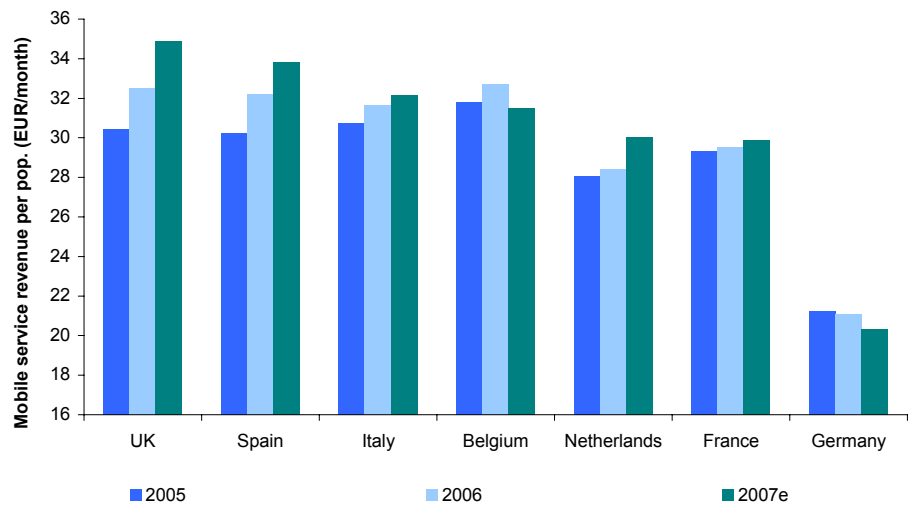
– Finally, in terms of prices, the countries where the average mobile voice revenue per minute (a good indicator of the average price in our view) is the highest are the Netherlands, Belgium and Spain – hence these are the countries where the downside risk on prices appears the strongest, theoretically.

**Chart 37: Fixed versus mobile minutes per inhabitant in five European countries**



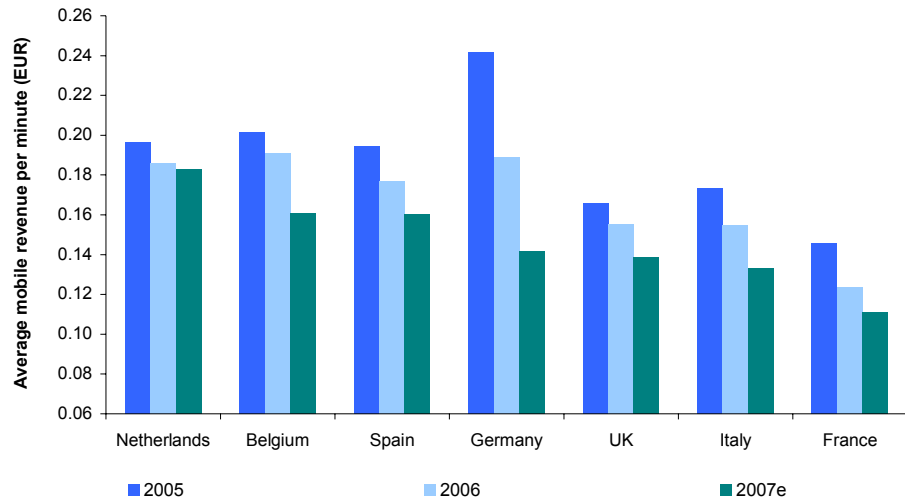
Source: Arthur D. Little, Exane BNP Paribas

**Chart 38: Mobile service revenue per inhabitant (EUR/month)**



Source: Arthur D. Little, Exane BNP Paribas

**Chart 39: Average voice revenue per minute, mobile (EUR)**

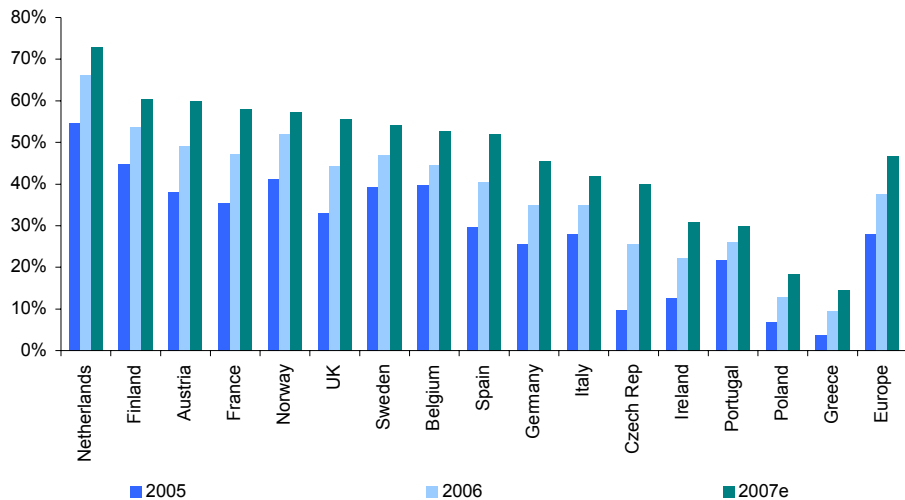


Source: Arthur D. Little, Exane BNP Paribas

Second, on the fixed-line side, Germany again looks the most attractive market:

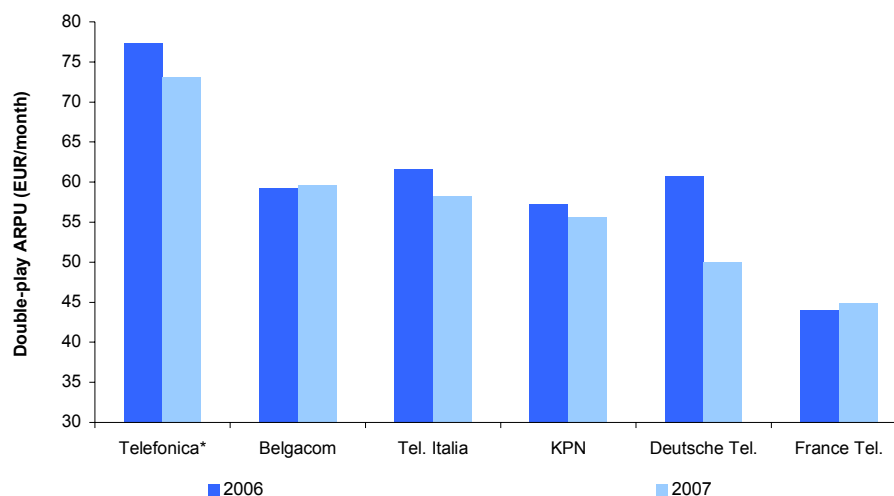
- In terms of broadband penetration, all European countries can still grow. We expect broadband penetration of 80-90% or more over the next five years. However, on a relative basis, Italy and Germany have the best potential, while the Netherlands, France and the UK have lower-than-average potential;
- In terms of fixed broadband ARPU, Spain and Belgium are the countries with the highest levels (see chart below) so are theoretically the most at risk (however we see more risk in Spain – due to the recent launch of aggressive offers by Orange – than in Belgium, where the market should remain duopolistic); on the other hand, Germany and France look safe, as prices have already reduced strongly.

**Chart 40: Broadband penetration in European countries**



Source: Arthur D. Little, Exane BNP Paribas

**Chart 41: Estimated double-play ARPU of large European incumbents**



\* The calculation for Telefonica is not comparable with other countries', as fixed-line revenues also include higher-ARPU business customers and the company does not give the split. However, looking at the prices of broadband offers, we believe that Telefonica is one of the incumbents with the highest fixed ARPU anyway.

Source: Arthur D. Little, Exane BNP Paribas

### **Competitive pressure: sustainable differences?**

We believe that the number of players and HHI index (sum of squares of market shares of different players) are good indicators of the competitiveness of a market. The HHI index is the one used by antitrust authorities to assess the level of competitive pressure in many markets. Based on these metrics (see table 25 hereafter):

- The most competitive markets appear to be the UK, Germany and Austria, and the least competitive markets Switzerland, Spain and Belgium;
- The markets that improved most in 2007 i.e., where the HHI index rose the most or where the number of players fell the most, are the Netherlands and France; Italy too clearly deteriorated.

Finally, regarding potential for consolidation in the coming years, all countries could see significant consolidation (with the average number of players dropping from seven to four on average), but the countries where we see the largest “improvement potential” (measured by the possible reduction in number of players or potential growth in HHI) are the UK, Austria, Belgium and the Netherlands – even though competitive pressure is already limited in the two latter – while France, Spain and Italy are the countries where there is the most limited potential for improvement.



**Table 25: Summary of number of players and HHI index, yoy evolution**

	Fixed	Mobile	Convergent
<b>Number of significant players</b>			
UK	9	5	11
Germany	9	4	10
Austria	4	4	7
Italy	6	4	7
<b>Average</b>	<b>5.8</b>	<b>3.7</b>	<b>7.0</b>
The Netherlands	5	3	6
France	5	3	6
Spain	5	4	6
Belgium	5	3	5
Switzerland	4	3	5
<b>% yoy change</b>			
UK	(10%)	0%	(8%)
Germany	29%	0%	25%
Austria	(20%)	(20%)	(13%)
Italy	20%	0%	0%
<b>Average</b>	<b>(9%)</b>	<b>(6%)</b>	<b>(13%)</b>
The Netherlands	(29%)	(25%)	(33%)
France	(29%)	0%	(25%)
Spain	(17%)	0%	(25%)
Belgium	(17%)	0%	(29%)
Switzerland	0%	0%	0%
<b>HHI</b>			
UK	1,841	2,306	1,203
Austria	3,259	3,215	2,464
Germany	2,614	2,962	2,480
The Netherlands	3,314	3,458	2,773
<b>Average</b>	<b>3,302</b>	<b>3,409</b>	<b>2,833</b>
France	3,186	3,594	3,179
Italy	4,293	3,176	3,234
Belgium	3,927	3,967	3,315
Spain	3,870	3,750	3,418
Switzerland	3,414	4,254	3,435
<b>% yoy change</b>			
UK	4%	(1%)	2%
Austria	13%	12%	3%
Germany	(12%)	0%	(3%)
The Netherlands	34%	11%	14%
<b>Average</b>	<b>4%</b>	<b>0%</b>	<b>3%</b>
France	10%	(1%)	16%
Italy	(8%)	(6%)	(5%)
Belgium	1%	2%	4%
Spain	4%	0%	5%
Switzerland	0%	(9%)	(5%)

Source: Arthur D. Little, Exane BNP Paribas

### France: fixed consolidation, mobile risk

The pressure on small alternative carriers has increased strongly with the success of triple-play and the upcoming fibre rollout, leading to a first phase of consolidation – which will continue (Alice/Telecom Italia France is now for sale). Fixed-mobile integration is also progressing quickly: SFR has bid for Neuf Cegetel; Bouygues Telecom is showing interest in Alice. We expect this local consolidation to continue in 2008 and to be the main focus – alongside fibre rollout.

The fixed market is doing well: prices and market shares are stable and triple-play adoption is progressing, leading to a rebound in ARPU. There is further upside potential on fixed ARPU, which is still one of the lowest in Europe.

The mobile market is safe for now, but many executives believe the situation is not sustainable. Most agree that if one operator or a new entrant were to decide to decrease prices, it could lead to rapid changes. As such, the risk of a fourth mobile entrant is very significant. Iliad's potential entry into the mobile market is a risky project for the group, but we believe it makes strategic sense and could create value. It would be negative for the three existing mobile operators (see pages 36-37).

Mobile broadband is an opportunity, but much more limited than in some other countries (fixed broadband is very cheap and IPTV is well developed). SFR has started to be active on this front (launch of mass-market offer at EUR30/month). In theory, Bouygues Telecom is in the best position to seize this market opportunity because it has nothing to lose (yet) on fixed broadband, but it is late in terms of 3G coverage.

The two main uncertainties for the French market concern Bouygues Telecom and Iliad: will Iliad get the fourth mobile licence? Will Iliad and Bouygues Telecom remain independent players, or come together, or team-up with one of the other players (e.g., Numericable)? We believe the most likely scenario is that Iliad will get the fourth licence and the market will structure around four fixed-mobile operators: Orange, SFR/Neuf Cegetel, Iliad and Bouygues Telecom/Numericable.

### **Germany: Market conditions remain tight – upside risk on usage and consolidation**

The 2006-2007 period proved particularly tough for the sector in Germany. Prices were slashed on both mobile voice and fixed broadband, but volume growth did not make up for it. In mobile, prices per minute converged to the European average at circa EUR0.14 per minute, a 25% decline, whilst volumes grew around 20%. On broadband, prices were down by around 20% whilst penetration grew in line with EU peers, by 10 percentage points, and remains below the average at 46% versus 53%.

This year is set to be more positive as pricing pressure should abate. On mobile, the challengers E-Plus and O2 have clearly indicated that they do not intend to lower prices further as their price per minute is close to termination rates. Elasticity remains below one for T-Mobile and Vodafone but the mid-term growth potential is significant. The average ARPU is EUR18/month versus a European average of EUR26 due to lower usage. We expect the decline in mobile voice revenues to slow in 2008, notably thanks to milder termination rate cuts (-10% versus -20% in FY07), and the overall mobile market may start growing again from 2009, thanks notably to mobile data.

On broadband, most alternative players seem unwilling to further lower their prices and prices are no longer at a premium to EU peers. The incumbent has also reduced prices strongly and has managed a strong rebound in its market share of net additions (44% in FY07). An acceleration of unbundling and the introduction of naked DSL will keep the pressure on the incumbent, but the pricing gap with competition is low enough to enable a stabilisation of the market share. A distinctive feature of Germany is the difficulty for IPTV products launched by several operators – including the incumbent – to get significant traction in the market. This is linked to the largely available and attractive multi-channel free TV in Germany.

The main structural change in the market should come from a consolidation of the broadband players. With Telefonica/O2 and Vodafone committed to be strong on broadband and some of the smaller operators struggling, we believe many players may have been acquired by year end.

### **Spain: gradual deterioration expected – Still better than most markets**

In the Spanish telecom market, 2007 was another year of growth (single digit), thanks to solid volume growth (GDP outpaced average growth in Europe) but also thanks to pricing discipline, despite an increase in competitive pressure. We expect a slowdown from 2008, as GDP growth in Spain should converge with the European average and competition will continue to increase with more aggressive pricing. We believe, however, that the market is likely to remain more favourable than most as concentration is expected to remain high.

On the fixed market, competition should get fiercer on triple-play. Orange is gradually improving its offer, which helped it increase its market share on net additions to 26% in Q4 07. The cable operator Ono is still struggling with integration issues (Auna) and has a relatively weak financial position, but does have a sound platform and has announced the future upgrade of its network (DOCSIS 3.0) to be able to offer 100Mbit/s to its clients. At this stage, differentiation has been more based on content and quality of service than pricing, making for a healthier market, but this may change: we note that Orange recently introduced much more aggressive triple-play prices. One relevant uncertainty is content; there are many rumours around a sale of Sogecable with potential suitors including Sky, Vivendi, France Telecom or even Telefonica.

On the mobile market, new players are emerging. More than ten MVNOs have launched or are expected to launch, notably KPN with its Symio brand. The fourth mobile operator Yoigo (TeliaSonera), although extremely far away from any economic return, exceeded its customer number target of 400k by end-2007 and targets 1m customers by end-2008. So far the impact of the new players has been muted but future growth in the mobile market is unlikely to be very different from the European average as penetration and revenue per capita is among the highest whilst the economic growth will slow down. Moreover, TeliaSonera's CEO has said that if Yoigo's targets are not met, he would reconsider the strategy in Spain i.e., possibly exit the market.

Overall, we do not expect significant changes in the market structure of the industry with new entrants (Ono on mobile, Vodafone on fixed) being offset by further consolidation (e.g., Jazztel).

### **Italy: Bersani shock is behind us – benign competitive environment – wild card is fixed network separation**

The Bersani decree (forbidding top-up fees for prepaid cards) proved disruptive for the Italian mobile market as Telecom Italia and Vodafone did not try to offset this lost revenue through price increases. Volume growth did not offset the price declines and mobile service revenues fell. We do not expect any new regulatory shock on mobile or any deterioration in the competitive environment in 2008, with Hutchison 3G continuing to focus on its bottom line to maximise the value of the business, whilst Wind continues to gain market share thanks to its already attractive pricing. As such mobile revenues should stabilise in 2008.

On the broadband market, we expect prices to gradually decline to stimulate penetration (43% versus 53% in Europe). The pricing of a flat double play offer remains more expensive than in France, UK or Germany yet unbundling prices are the lowest. New entrants were unwilling to make aggressive new offers as unbundling provisioning was difficult, but things could improve. IPTV services are growing but there are factors hampering their adoption, including competitive offerings by DTH and terrestrial television players.

We do not expect significant competition from mobile on broadband access, as the performance of mobile broadband does not match that of fixed broadband in Italy. The fixed-mobile battle is more around the home, with aggressive bundling propositions from several players (Telecom Italia, Vodafone, Fastweb, etc.) who see an opportunity of up/cross-selling additional services.

The Italian market is already quite concentrated. As such, there is not room for plenty of M&A: Tiscali Italy could be up for sale, leading Wind, Vodafone and Fastweb to compete on the deal. We do not expect Hutchison to exit the market just yet as management seems to have an ambitious price in mind for the business.

Finally, a key element that could change the picture is the separation of the incumbent's fixed network and the strategy of the new management regarding the roll-out of FTTH. Many scenarios are possible (functional separation, full separation) but until the dust settles with regards to the political leadership in the country, the issue is unlikely to be solved.

### **United Kingdom: competition moving to broadband (fixed and mobile)**

The UK fixed broadband market has been competitive for a while, with six significant players remaining even after the first round of consolidation. Many different forms of bundled offers compete, with broadband as an add-on to pay-TV from Sky, O2 and Vodafone offer fixed as add-on like Orange, "free" broadband from Carphone Warehouse, etc. All these bundles come with significant discounts to customers.

Competition has mostly been on pricing at this stage, but triple-play is becoming more important. In addition to Sky, three operators sell TV/content offers: Virgin Media, BT and Tiscali/Homechoice, and Orange plans a service for 2008. Most players believe that Sky is likely to remain very strong given its power in content and its scale, but regulators may move in and push for a more level-playing field.

The mobile market has also remained competitive, but unlike other markets, competition has led to strong revenue growth in the past couple of years, as operators have been able to push customers towards bigger bundles (GBP35/month and above). However, this came with lower EBITDA margins, as they were pressured by somewhat uncontrolled increases in interconnect costs at most players, due to fast-growing cross-net usage. This seems to have stabilised now, but the power of an independent retail channel is likely to remain a specific feature of the UK market – leading to higher churn and commissions, despite the ongoing efforts of operators.

As triple-play is not yet very developed, the UK market seems ideal for a rapid penetration of mobile broadband. There are now several mobile broadband offers priced aggressively compared to fixed broadband (GBP10-15/month for mobile broadband), from Three UK, T-Mobile and Vodafone. Network sharing deals will enable operators to improve 3G coverage at a more competitive cost.

Consolidation seems very likely in the coming quarters, mainly affecting the fixed broadband market. We expect M&A between fixed players, as well as mobile operators buying fixed assets. An exit of Hutchison is always a possibility, but it looks less likely after its network sharing deal with T-Mobile. Moreover, if Three UK were for sale, we would not rule out that BT could be the buyer, maintaining a market with five mobile operators.

### **The Netherlands: consolidated**

The Dutch market has strongly consolidated over the past few years, both on the fixed-line market (exit of many subscale ISPs and unbundlers) and on the mobile market (from five to three players, with Telfort bought by KPN and Orange NL bought by T-Mobile).

The battle for the home in the Netherlands is now primarily between cable companies (with penetration of more than 95%) and fixed telecom operators. In broadband, the battle is almost over, with penetration having reached more than 70% and DSL technology having 60% market share. However, the battle has just started in the TV market, currently dominated by cable operators. DSL operators have entered the TV market with DVB-T and IPTV, bundling their offer with broadband and/or telephony and are rapidly gaining share (7-8% market share in two years).

On the mobile market, competition has softened very significantly. Mobile operators have not yet packaged their offerings with fixed products.

### **Belgium: good visibility on fixed broadband**

The current de-facto duopoly between Belgacom and cable could in theory be threatened by potential disruptive moves from several players willing / needing to improve their position on the fixed access market: VOO in Walloon and KPN/Base after the acquisition of Tele2.

In the mobile market, the main risk is the willingness of Base to aggressively expand into the contract market – which was recently reaffirmed by KPN management.

There is a potential for mobile broadband to partially cannibalise the low end of the fixed broadband market, given the high prices of low-end fixed broadband offers compared to mobile broadband. However, we expect the fixed to remain protected by higher speeds and content, as triple-play/IPTV has a high penetration in Belgium.

### **Austria: fixed incumbent striking back with convergent products**

The fixed-line market remained an oligopoly in 2007. Outside Vienna, neither unbundlers nor cable operators can compete with Telekom Austria's nationwide coverage. However, as competition on the mobile market remained extremely fierce, all four mobile players turned to compete on mobile broadband access (from competition on voice), with typical mobile broadband offers around EUR20-25/month for virtually unlimited capacity, and entry-level offers from EUR7/month (for 500Mbytes of capacity, already a very decent capacity) plus a growing number of prepaid mobile broadband offers. Two of the four mobile operators have more than 85% HSDPA population coverage. As a consequence, broadband growth slipped in 2007 from fixed players to mobile operators – an important negative for the revenue growth of Telekom Austria, Tele2 UTA and UPC/Chello.

On the mobile segment, there is no clear consensus amongst people interviewed about the prospects for 2008. For some, H3G is likely to remain very aggressive in particular on the data market. Moreover, for the same most "bearish" people interviewed, the reduction of the interconnection rates to EUR0.0572/min. (symmetry to be reached by end-2008) is likely to prevent any price increase (as lower termination rates are good news for the margins of smaller mobile competitors). For other mobile operators interviewed, competition will calm down and further price cuts are unlikely. They believe that competition is now predictable, with upside potential if H3G is acquired.

Fixed-mobile bundling has started, driven by Telekom Austria, the only integrated (fixed and mobile) operator in Austria. After having upgraded its network to cover 70% of the Austrian population with ADSL2+, in mid-November 2007 Telekom Austria launched a bundle including the fixed line rental, 2Mbit/s Internet access and a mobile SIM card for EUR20/month (communication on the mobile were billed per minute at EUR0.05 to any mobile network and EUR0.03 to fixed line networks). During the summer, the group also launched an IPTV product at EUR5 per month to compete head-on with its major fixed competitor UPC/Chello as well as mobile operators, as the only condition to get this IPTV offer is to subscribe to the incumbent's fixed line rental (EUR16/month). Mobile operators interviewed are paying very close attention to the success of this bundled offer launched by Telekom Austria. We expect the development of more and more types of bundles (fixed broadband + fixed voice + mobile broadband, fixed data + fixed voice + mobile voice, mobile voice + mobile TV, mobile data + Playstation, etc.).

### **Sweden: positive outlook for mobile voice and data**

The Swedish mobile market rebounded in 2007. While mobile revenues were flat year on year in 2006, they were up 7.5% yoy in H1 07 according to the Swedish regulator. Fixed-mobile substitution seems to be finally accelerating, although from a low level. According to the regulator, only 35% of the traffic originated on mobile networks in H1 07 despite relatively low prices (EUR0.10-0.11/min). Fixed-mobile substitution is also taking place on the data market and should be the biggest driver for mobile growth in 2008. Since summer 2007, the three mobile players have been very actively marketing mobile broadband. Tele2 offers mobile broadband for ~EUR10 per month, EUR5 less than the price of its low-end, price-leading offer on fixed broadband.

On the broadband market, the incumbent's key focus in 2007 was to become a significant player on the TV market. In February, it started offering free IPTV. At the end of the year, close to one-third of the incumbent's broadband subscriber base had subscribed to free IPTV. The product was expected to be free for a year so what will matter in 2008 is whether customers will be ready to pay for such a service.

### **Switzerland: competitive pressure will remain limited**

Competition pressure in the telecommunications sector in Switzerland remains limited and we do not expect this situation to change significantly in the medium term.

The broadband market has two main players, Swisscom and Cablecom, and some small alternative carriers (Sunrise, Tele2, EconoPhone). The competition on pricing remains limited as: 1) the regulatory framework still does not enable alternative carriers to buy DSL lines wholesale at a sufficient discount versus retail pricing; and 2) given the high GDP/capita in Switzerland, customers are less sensitive to pricing. Rather than reducing prices, Swisscom is progressively adding enhanced features into its broadband offers (e.g., increasing bandwidth).

Triple-play is not a must-have at this stage. In 2007, Swisscom underestimated the cost of connecting a TV customer (CHF1300/line), leading it to halt the commercialisation of its IPTV offer. When this problem is solved (renegotiation with manufacturers) Swisscom will be able to compete more efficiently with Cablecom, which is promoting triple play packages to its TV customer base. However, cable TV is included in the rents in many cases in Switzerland and cable TV penetration is over 90%. This gives a good advantage to Cablecom over Swisscom in this triple-play game. The incumbent has made bold vertical integration moves, acquiring the largest pay-TV as well as a movie theatre provider, plus stakes in international VOD providers and gaming companies.

The high price of unbundled local loops and the lack of critical size should block small alternative carriers from being competitive on triple play. More competition could be expected in the future with local utilities rolling fibre networks, partly funded by municipalities, to provide infrastructure on a wholesale basis to alternative carriers.

On mobile, the three-player market shows stability in terms of market shares: Swisscom still has 60%, and Orange and Sunrise each 20%. ARPU is under pressure due to regulatory cuts on roaming and termination rates, but historically operators have not competed on prices. Even though Sunrise has recently made a new move with contract price plans without a base fee and including free on-net calls, we believe that competition is still very much focused on quality of service and image. The incumbent is strongly pushing fixed-mobile bundles and this trend is followed by competition.

M&A could interfere with this “peaceful” picture: Orange Switzerland could be sold, as the operator lacks critical size and fixed-line activities; Sunrise, owned by TDC which was acquired by private equity firms through a LBO, could also be sold. However, given the regulatory framework (unfavourable to alternative carriers) and the customers’ attitude (not attracted by aggressive prices), chances for a new entrant to change the market and gain rapidly market shares would remain low.

### **Portugal: increasing competition on triple-play, and mobile versus fixed**

The Portuguese telecommunications market is undergoing profound change, with consolidation (Sonaecom acquiring the residential subscriber base of Oni as well as Tele2 Portugal; PT Multimedia acquiring regional cable operators), fixed-mobile competition (on voice and broadband), accelerated development of triple-play and the launch of MVNOs. These trends are expected to continue impacting the market over the next few years. In particular, Portuguese players do not yet seem satisfied with their positioning and we expect further M&A.

On the fixed / triple-play market, we expect competition to get tougher. After its spin-off from Portugal Telecom, PT Multimedia (now Zon) launched a telephony service, which we expect to be successful in terms of subscribers, because Zon can leverage on its pay-TV and broadband customer base. On the other hand, the incumbent has launched IPTV, hence competing directly with Zon's triple-play offer. Sonaecom had also launched its own IPTV product. IPTV is expected to grow fast in the coming years. Moreover, the launch of DTT is expected in 2008 and will allow for new free-to-air TV and Pay-TV offers. However, given the high levels of penetration of competing platforms in the TV market, including cable, DTH and IPTV, DTT will face a significant challenge in order to differentiate and gain market share.

Fixed versus mobile competition will continue, with a growing focus of mobile operators on the broadband market, where they have launched aggressively priced offers. This will lead to accelerating mobile broadband additions, an important growth driver for mobile operators in the coming years. On the voice side, mobile operators are pushing home zone offers, which have been performing well. However, voice revenues will decline due to the strong pressure on mobile termination rates in 2008 – which will converge to European average.

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### Stock Rating (vs Sector)

Outperform: The stock is expected to outperform the industry large-cap coverage universe over a 12-month investment horizon.

Neutral: The stock is expected to perform in line with the industry large-cap coverage universe over a 12-month investment horizon.

Underperform: The stock is expected to underperform the industry large-cap coverage universe over a 12-month investment horizon.

### Sector Rating (vs Market)

Outperform: The sector is expected to outperform the DJ STOXX50 over a 12-month investment horizon.

Neutral: The sector is expected to perform in line with the DJ STOXX50 over a 12-month investment horizon.

Underperform: The sector is expected to underperform the DJ STOXX50 over a 12-month investment horizon.

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					US Law	French Law		
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