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Telecom Operators

Caution – work ahead

- **Accelerating decline in voice to be offset by siginificant take-off in data?**
- **Reorganization of the value chain: necessary but not without risk**
- **Critical size and agility: has anyony got both?**
- **Renewed ambitions of leaders and intensified pressure on challengers: M&A activity to gather pace**

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Executive summary

Strategic reorientation: unavoidable, and beneficial in the near term...

More than ever, European telecom operators must juggle between shrinking revenues in their traditional businesses on the one hand, and opportunities to capture growth in attractive new markets on the other, driven by the development of fixed and mobile broadband.

Against this background, carriers will step up initiatives to cut costs and secure growth. They are gradually acknowledging that they cannot be present at every link in the value chain, and that even on those links that constitute their core business, they can create more value by joining forces with partners. This should result in a variety of 'innovations', such as:

- outsourcing of passive and even active infrastructures and/or network sharing in both fixed line and mobile;
- development of wholesale businesses and virtual operators (MVNOs, MVNEs, FVNOs, CVNOs[1], etc.);
- partnerships with media groups and increasingly with Internet leaders.

These movements will:

- enable companies to trim costs and capex: all else being equal, the outsourcing of passive or active infrastructures and network sharing can increase carriers' operating free cash flow by up to 10%;
- stimulate market growth: partnerships with media groups and Internet leaders have demonstrated that they can stimulate usage without incurring a significant risk of cannibalisation in the near term.

… but it will make carriers more fragile in the long run

While this fragmentation of the value chain appears inevitable, it is not without risk in the long run. With regard to virtual operators, our simulations show that the scenarios in which they create value for carriers are few. Moreover, Internet leaders will be increasingly difficult for carriers to control, and could ultimately capture most of the value created by new services and possibly even some of the carriers' traditional revenues. Involving these new players in services also means that operators will gradually lose their ability to differentiate through their service offering.

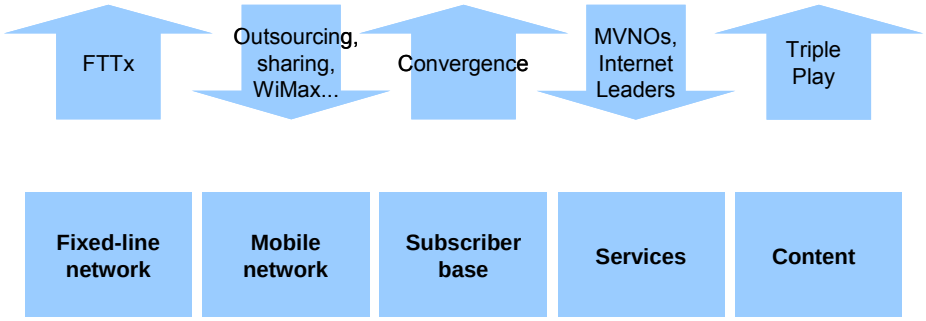
Moreover, the accelerated decline in costs and capex will lower barriers to entry in the mobile networks. This poses a significant risk for the operators already in place, as it could become easier than expected for new mobile or nomadic players to enter the field (Yoigo in Spain, the fourth mobile licence in France, WiMax in the UK).

Leaders on the offensive – but challengers still have ammunition

We believe that the incumbent operators will continue to fight. We expect them to reinvest in a counter-attack based on the purchase of content, the deployment of fibre and the launch of convergent offers – trying to create new barriers to entry. However, they face a high risk of cannibalising their existing revenues, and their lack of flexibility remains a problem amidst the quick changes in the markets and business models today.

[1] MVNO: Mobile Virtual Network Operator; MVNE: Mobile Virtual Network Enabler; FVNO: Fixed Virtual Network Operator; CVNO: Converged Virtual Network Operator.

Chart 1: How barriers to entry will evolve



Source: Exane BNP Paribas, Arthur D. Little estimates

Mobile operators must rapidly offset the fall in barriers to entry on the network side by developing wholesale offers as well as by extracting maximum value from their subscriber base. Beyond the straight convergence offers that have already been launched, they could partner or merge with alternative operators (ADSL or cable) to roll out full quadruple-play services.

The leading alternative carriers are ideally positioned to benefit from these trends, but they will have to take the risk of investing (in FTTx and convergence).

Challengers, fixed and mobile, who do not have critical mass are under the greatest pressure. We expect to see a wave of strategic moves: consolidation with local competitors when possible to attain critical mass, mergers between mobile and fixed-line players in the same country to develop convergent offers, or possibly a takeover by an international carrier. Some of these operators could generate hefty synergies and be successful in reorienting their strategy.

No growth without new business models

The telecom services sector in Europe is still mammoth in terms of revenues and profitability. In 2006, revenues in the eight countries[2] that compose our sample are estimated to have reached EUR250bn and EUR51 per month per inhabitant. The EBITDA margin is estimated at 39%, for a Capex/Sales ratio of 13%, yielding an estimated return on capital employed (ROCE) of almost 16% (after tax).

But despite the strong growth expected in mobile data and fixed broadband, we are expecting almost no further growth in the sector as a whole. Total revenues are projected to edge up by 0.3% per year between 2006 and 2010. In the residential market this leads to revenues per inhabitant of almost EUR53 per month in 2010e. Compared to last year's report, we have shaved our forecast for the mobile segment (to +1.9% per year) and slightly raised our estimate for the fixed-line business (to -1.1% per year).

Table 1: Revenue per inhabitant on telecom services in Europe

EUR/month per pop.	2005	2006	2007e	2008e	2009e	2010e	Change 2010e vs 2006 (EUR/month)
Fixed voice	16.1	14.9	13.6	12.1	10.6	9.1	(5.8)
Mobile voice	23.5	23.7	23.8	23.6	23.1	22.4	(1.4)
Fixed data	5.7	7.4	8.7	9.9	11.1	12.3	4.9
Mobile data	4.8	5.5	6.4	7.2	8.1	8.9	3.4
Total	**50.1**	**51.5**	**52.4**	**52.9**	**52.9**	**52.6**	**1.1**

Source: Exane BNP Paribas, Arthur D. Little estimates

[2] Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain, United Kingdom

In mobile data, we believe increasingly firmly that the market will pick up pace starting in late 2007. Apart from technological and tariff blockages, which are being resolved, the key point is that carriers have understood that in order to develop new mobile services (TV, marketing/advertising, music, email, instant messaging and so on), they must forge partnerships with specialists in these domains, in particular media groups and Internet leaders.

We have analysed these various business models and conclude that the principal opportunities for carriers are access to broadband services, mobile TV and marketing via mobile phones.

But voice, on fixed-line and mobile, still makes up the lion's share of carriers' revenues (EUR39/month per inhabitant), and the trends are worsening steadily. Fixed-line voice revenues are declining and we confirm our expectation of a forthcoming decrease in mobile voice revenues – in the countries where they have not yet begun to fall.

There is still significant potential for fixed-mobile substitution, and we believe that mobile traffic will increase rapidly. Unfortunately, however, the increase will be accompanied by a sharp drop in prices. Elasticity could improve in some countries (such as Germany) but may well deteriorate in others (Italy, the UK, Spain and France).

While fixed-mobile convergence has yet to have much of an impact on sector trends, it is gradually becoming a reality. Many incumbent carriers, mobile and fixed, have launched convergent offers. Many fixed-line operators would like to invest in their own mobile or nomadic infrastructure. As a consequence, we reiterate our conclusions from last year: at the end of the day, the impact of convergence will likely be more negative than positive for the incumbents.

Finally, we still feel more optimistic regarding the prospects for fixed-line broadband, the segment we expect to remain the sector's main growth driver. Half of this segment, however, is captured by the alternative carriers.

We continue to expect a reduction in margins and returns on capital employed: for 2010e, we forecast a ROCE (after tax) of 14% in the mobile segment and 12% in fixed, compared with 19% and 13% respectively in 2006.

Conclusion by country: a switch-up may be ahead

Based on the 85 interviews we conducted in 13 countries, we conclude that the trends by country will continue to vary dramatically, and 2007 could be the year of a switch-up, as the markets that have 'suffered' hold potential for improvement (the mobile segment in Germany, the Netherlands and Austria; fixed-line in the Netherlands and to a lesser extent France), while some of the markets that have historically been more protected may see a heightening of competitive pressure (mobile in Spain, France and Belgium).

Arthur D Little – Exane BNP Paribas report, sixth edition

Below is a reminder of the conclusions in our 21 February 2006 report, *Facing off on convergence.* We have split them into two categories: our on-target projections and overestimated or underestimated topics.

On target projections

"Fixed-mobile convergence will begin in 2006".

Convergence fuels "stiffer competition"; notably "fixed-line operators have (…) a real opportunity to develop in mobility. The best-positioned are the small alternative operators positioned on broadband, which have little to lose on fixed voice and much to gain in investing in mobile". This has been confirmed by the offers launched by Neuf Cegetel, Iliad, Telenet, BT and NTL/Virgin in 2006.

"WiFi paves the way for hybrid offers blending the benefits of a mobile offer (for voice) and of broadband wireline access (when the user is at home, the office or in a hotspot)". "On voice, WiFi could accelerate the fall in mobile rates". The hybrid GSM/WiFi handsets did arrive in 2006. Fixed-line operators used them to offer VoIP on WiFi at lower rates than those of the traditional mobile offers.

"The pressure on pure mobile operators is mounting, but they still have many cards to play... Mobile operators need to broaden their strategies, for both offensive and defensive reasons". In May 2006, Vodafone announced an updated strategy: aggressive offers on voice (home zone), but also its entry into the ADSL market, in partnership with fixed-line operators.

For the integrated incumbent operators, theoretically well placed for convergence, "their ability to develop convergent offers could be hampered by operational and regulatory roadblocks". In particular, France Telecom and Deutsche Telekom have launched convergent offers, but Telecom Italia was blocked by the regulator.

Concerning the development of new convergent offers, we were expecting a "higher level of value-sharing with Internet services specialists and content providers". Many partnerships were forged in 2006 between the operators and media groups, but also with Internet leaders.

Our scenario assumed "new price cuts" in mobile services, which "will continue to fuel mobile traffic growth". We anticipated a slowdown in the telecoms market, with notably growth of 3.1% pa in the mobile market in the 2005-2010 period. The European mobile market grew by 3.2% in 2006, with an acceleration in price declines and faster growth in traffic.

We expected competitive pressure to intensify "in the French and UK mobile markets and to a lesser extent (…) in Belgium. In Germany, fixed-mobile substitution should accelerate, driven by the drop in mobile rates and home zone offers; the fixed-line is also under attack from mobile in Portugal, Austria and the UK. The risk in Italy and Switzerland seems fairly limited". All of these forecasts were accurate.

What we under-estimated

We expected “accelerated development of mobile broadband”, which did not materialise in a significant way in 2006.

Regarding WiMax technologies, we estimated that “By around 2008-2009, these technologies should have progressed sufficiently to enable fixed-line operators to compete with mobile operators [also] on voice”. We still anticipate such a development, but in 2009-2010 at the earliest.

“Convergence should increase competitive pressure on the mobile markets in (…) Spain and The Netherlands”. In reality, convergence in these two markets remains insignificant.

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Germany: Debitel, Ecotel, E-Plus, Ericsson, O2, Universal Music, T-Mobile

Italy: Fastweb, Italtel, Mediaset, Nokia, Vodafone Italy, Wind

The Netherlands: KPN

Spain: American Greetings, BT, Ericsson, GiGiGo, Orange, Telefonica Moviles, Vodafone Spain, Warner Spain

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Switzerland: Alcatel, Bakom, Cablecom, Ericsson, Orange, Sunrise, Swisscom

UK and Ireland: BT Retail, BT Wholesale, GSM Association, O2 Ireland, Ofcom

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1. Some growth is out there, with new business models

We confirm our relatively unoptimistic view of revenue growth in the sector overall over the coming years. We expect +0.3% pa in 2006-2010e; we have shaved our forecast for the mobile segment (to +1.9% per year) and slightly raised our estimate for the fixed-line business (to -1.1% per year). We expect margins and ROCE to decline (14% for mobile and 12% for fixed line in 2010e, versus respectively 19% and 13% in 2006). We detail these estimates on pages 49-54.

Mobile data remains the biggest trump card for sector growth. We have lowered our estimates for mobile data as 2006 was disappointing, but we are increasingly confident that this market will accelerate from the end of 2007. Apart from pricing and technological obstacles, that are currently being resolved, the key point is that operators have understood that the development of new mobile services (TV, marketing/advertising, music, email, instant messaging, etc) will be carried out by partnerships with specialists in these domains. Our analysis of the different business models leads us to conclude that the major opportunities for the operators are the billing of access to broadband services, mobile TV and marketing on mobile (see pages 12-28).

With respect to voice, 2006 was more negative than anticipated in terms of price declines on mobile. We have maintained our revenue forecasts for mobile voice at a 1% reduction pa in 2006-2010e:

– Fixed-mobile substitution still harbours strong potential. We expect a more rapid fall in mobile prices per minute, but accompanied by a stronger rise in volumes. Overall, we expect elasticity to be close to one, not based on the calculation per subscriber (MOU per subscriber versus price per minute) but for the whole market (total mobile traffic versus price per minute). Elasticity is likely to improve in some countries (Germany), but could deteriorate in others (Italy, UK, Spain, France): see pages 29-34;

– Fixed-mobile convergence has yet to have a significant impact on sector trends. However, many offers have been launched by operators, with incumbents, mobile and alternative operators firmly committed. In particular, many fixed-line operators are planning investments in mobile (2G/3G/HSDPA) and nomadic (WiMax) infrastructure. We reiterate our conclusion of last year, namely that the impact of convergence is likely to be negative for incumbents (pages 35-42).

Finally, we remain more optimistic than ever on fixed-line broadband, which will continue to be the sector's key growth driver, with broadband penetration increasing sharply (to reach 80% in 2010e versus 45% at the end of 2006) and ARPU supported by triple play and new usages (see pages 43-48).

The table below outlines our expectations in terms of revenue per inhabitant.

Table 2: Revenue per inhabitant on telecom services in Europe

EUR/month per pop	2005	2006	2007e	2008e	2009e	2010e	% change 2010e vs 2006
Fixed voice	16.1	14.9	13.6	12.1	10.6	9.1	(5.8)
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Total	**50.1**	**51.5**	**52.4**	**52.9**	**52.9**	**52.6**	**1.1**

Source: Exane BNP Paribas, Arthur D. Little estimates

1.1. Mobile broadband: acceleration potential

Mobile multimedia remains the new frontier for mobile operators. To date, growth in usage and revenues has been disappointing, but a combination of phenomena should accelerate market growth:

– subscriber equipment levels are becoming significant, and HSDPA provides a true mobile broadband experience;

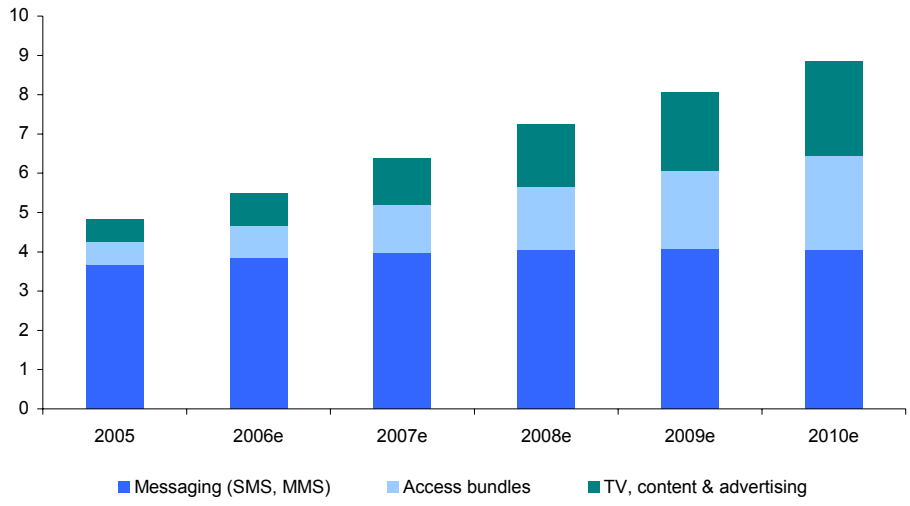
– operators are gradually adopting more attractive pricing, notably virtually unlimited packages;

– many opportunities exist to transpose the usage and business models of fixed Internet to the world of mobile: instant messaging, TV, music, advertising, etc. Mobile operators are aware of this potential and are rapidly forging partnerships in these areas, both with media groups and Internet leaders such as Yahoo, Google and Microsoft.

Leaving aside the professional applications, we see three major opportunities: 1) TV on mobile (we conclude that investment in a DVB-H network could be profitable if there is just one network per country), 2) marketing on mobile, notably advertising (an opportunity which implies partnerships and the sharing of value), and 3) access to broadband services (Internet access, email, instant messaging, access to community websites). Mobile music is also an opportunity, but the efforts of some operators appear disproportionate relative to the value that they can hope to gain.

In 2006, non-messaging data ARPU represented EUR1.6/month, and contributed 1.5% to the mobile market's overall growth, i.e. half of the total. In 2010e, we expect non-messaging mobile data revenues of EUR5/month per inhabitant, corresponding to data ARPU of EUR3.8/month (given anticipated mobile penetration of 127%). This forecast has been lowered slightly from last year, but still implies an acceleration in data ARPU in the coming years.

Chart 2: Revenues from mobile data services (EUR/month per inhabitant)



Source: Exane BNP Paribas, Arthur D. Little estimates

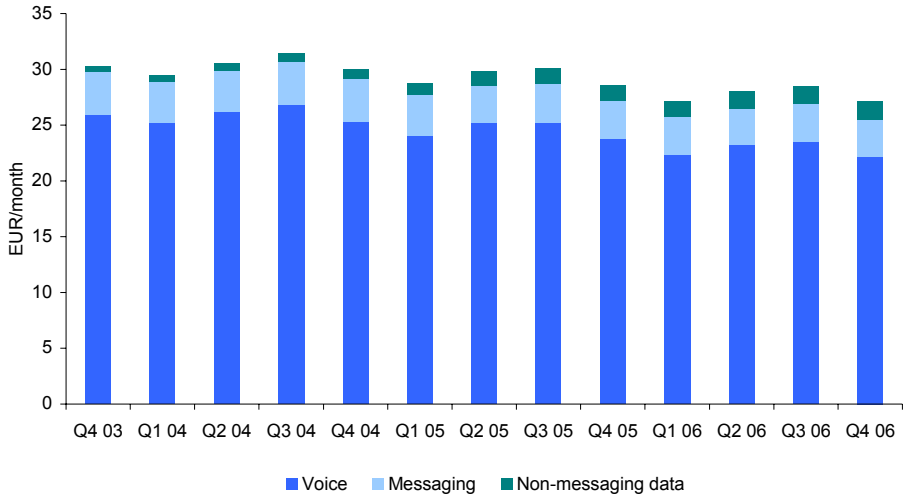
This forecast integrates EUR2.5/month per inhabitant from mobile broadband access (mass market and corporate) and EUR2.5/month per inhabitant in revenues corresponding to mobile content (including mass market applications such as TV, advertising and other content, and applications for companies). We note that few operators dare to advance forecasts, but those which do estimate a range of EUR2 to EUR3/month in 2010 for mobile content revenues. Moreover, our forecasts integrate SMS ARPU of EUR3.2/month in 2010e, corresponding to revenues of EUR4/month per inhabitant.

Current mobile multimedia revenues

We estimate, based on our selection of major European countries (Germany, the UK, France, Italy, Spain, the Netherlands and Belgium), that mobile operators' data revenues excluding messaging (SMS) exceeded EUR6bn in 2006. This figure is high, but represents only 5.6% of operators' services revenues.

On average total ARPU of EUR27.7, we estimate that data ARPU reached EUR4.9/month in 2006, of which EUR3.3 from messaging and EUR1.6 from new applications.

Chart 3: ARPU for a selection of operators*



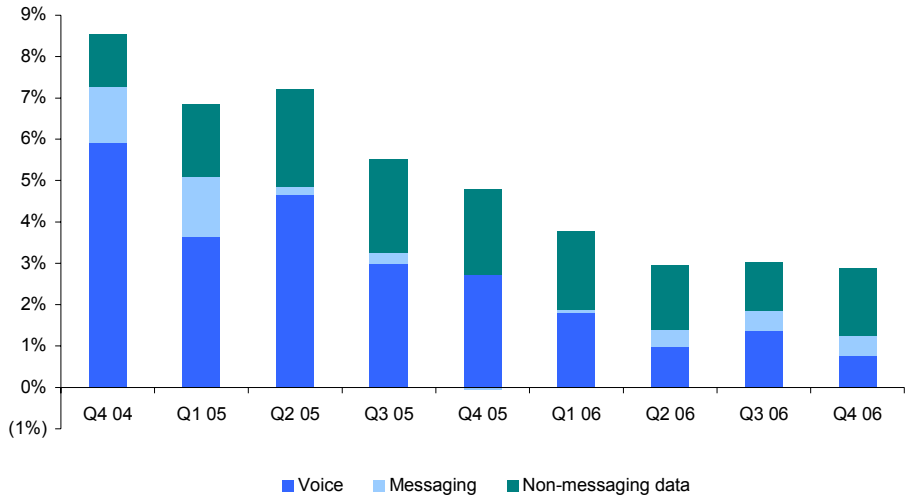
**Total voice ARPU and data ARPU based on all mobile operators in Germany, Belgium, Spain, France, Italy, the Netherlands, the UK; non-messaging data ARPU estimated based on data published by Vodafone, TIM and O2.*

Source: Exane BNP Paribas, Arthur D. Little estimates

However, in a mobile market that is slowing sharply (growth of around 3% in 2006 versus 6% in 2005 and 10% in 2004), the contribution from new data services is increasing, as can be seen in the chart below. In 2006, new services contributed about 1.6% to the market's growth, or half of total mobile market growth. Whereas voice increased by around 1.5% yoy and messaging (SMS) by around 3% (in value), revenues from new services increased by around 35% in 2006.

We have based our figures on data published by operators such as Vodafone, O2 and TIM Italy and on our interviews with other operators – which have confirmed that non-SMS data ARPU accounts for around 5% of operators' services revenues. However, this figure varies greatly from one operator to another, ranging from 3% to 8% at the end of 2006, or in terms of absolute value, from EUR0.5/month to EUR2.0/month. The media groups that we interviewed confirmed that revenues from mobile content remain weak compared to their other activities.

Chart 4: Contribution to service revenue growth



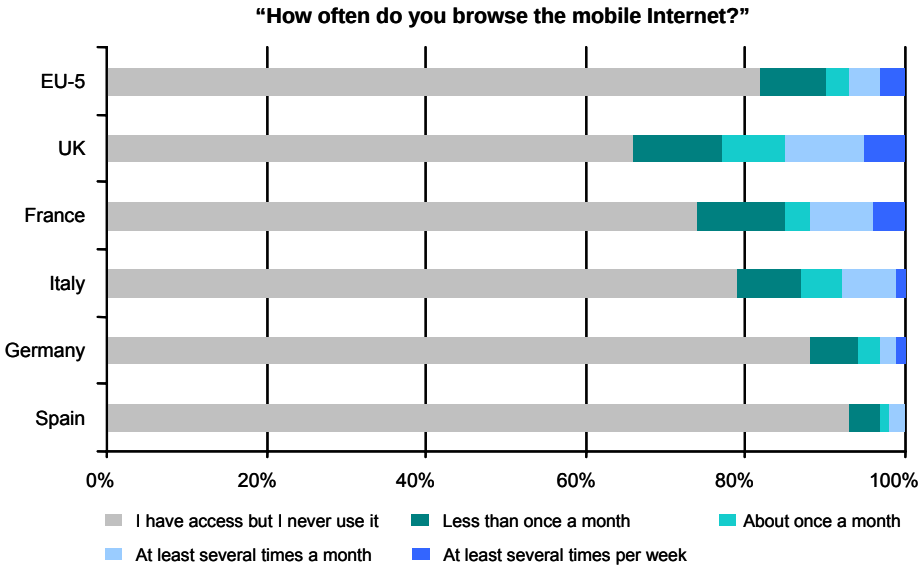
Source: Exane BNP Paribas, Arthur D. Little estimates

Numerous sticking points

Overall, the main players in the sector – including incumbents, leading and challenging mobile operators, service and content providers and equipment suppliers – are disappointed in the growth rate of these new services.

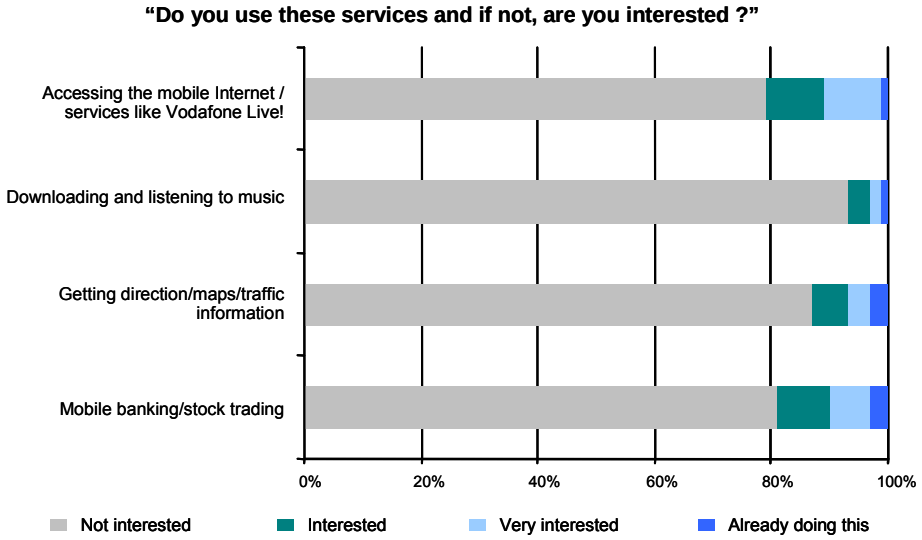
Customers claim to be aware of the existence of these services (the rate of awareness varies between 40% and 80% depending on the service), but make little use of them. For example, in Europe, more than 80% of customers with access to Internet services on their mobile phone do not use them and over 80% claim to be either only slightly interested or not interested at all in these services (depending on the service).

Chart 5: Usage of mobile data services remains weak



Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 6: Customers lack interest in these services



Source: Exane BNP Paribas, Arthur D. Little estimates

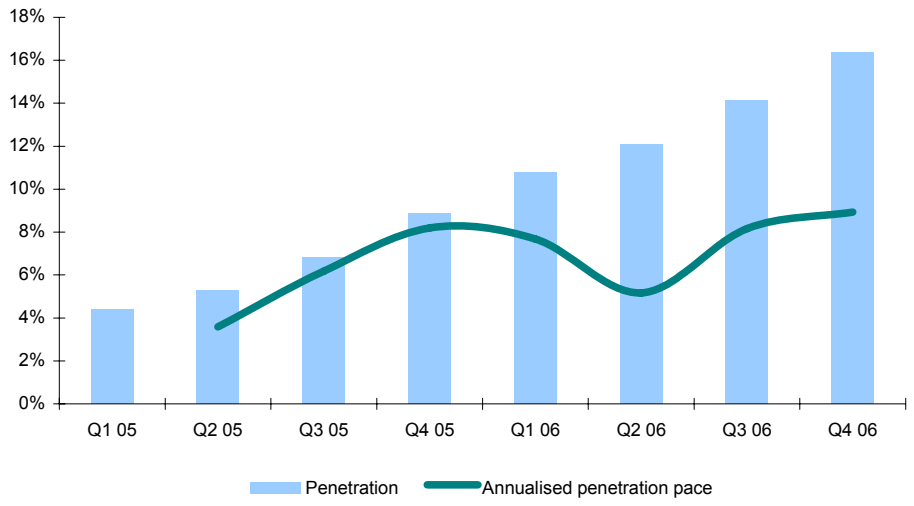
Sticking points remain numerous, but we believe that many are in the process of being resolved, and that the situation is likely to improve overall from 2007, as described below.

3G penetration is only just reaching critical size

According to figures released by the major European operators, around 40 million customers owned broadband mobile handsets (3G or EDGE) [3] at the end of 2006, versus fewer than 20 million at end-2005 and around 5 million at end-2004.

The increase is significant even though the penetration rate remains weak and did not exceed 10% until Q2 06. The annual pace of penetration has not increased that much since the end of 2005 (an increase of around 8% per year), and we expect around 20% of subscribers to be equipped by the end of 2007.

Chart 7: Broadband mobile handset penetration rate



Source: Exane BNP Paribas, Arthur D. Little estimates

3 Data from Orange France, UK and Spain, TIM Italy, Telefonica Moviles Spain, Vodafone UK, Germany, Italy and Spain, Hutchison 3G UK and Italy and SFR.

Moreover, many operators believe that use of these services will not increase considerably until customers are equipped with HSDPA handsets (the new version of 3G handsets, which allows for bandwidths of above 1.5Mbit/second versus around 200kbit/second for the first version of 3G). At present, HSDPA is virtually only available in the form of data cards for PCs. The real HSDPA mobile handsets are expected to be launched during 2007: Vodafone has said that it will have around 10 types of HSDPA handsets at the end of 2007.

Progress has been made in terms of handset ergonomics – and hence in the ease of use of new services – but there is still a long way to go as can be seen, for example, with the recently presented Apple iPhone, which is innovative in terms of ergonomics (touch-sensitive screen, etc.).

Pricing remains complex and rates expensive

Mobile multimedia services have historically come with expensive and complex pricing, combining packages, billing of traffic, billing per use, etc.

Many operators have now understood that a simpler and clearer pricing policy was one of the keys to encouraging customers to use these services. In fixed-line services, the huge success of ADSL-type broadband offers is due, in our view, not just to the higher speed provided by these offers, but also to the simplicity of the unlimited packages.

Mobile operators have started to launch unlimited multimedia packages for mobile handsets, but:

– most of the time, they are still limited to certain types of usage, for example a package that only contains Internet access, another package for email and/or instant messaging, and yet another for unlimited TV on mobile;

– moreover, prices are relatively high: EUR5-10/month per service package, which is added to the price of the basic voice package.

Table 3: Unlimited mobile data packages (EUR/month)

Operator	Country	Internet access	Internet + TV	Mail / IM	TV / VoD
O2	UK	7	-	5	-
T-Mobile	UK	11	-	-	8
Three	UK	7	-	7	-
Orange	France	-	6	6	6
SFR	France	7	7	-	7
Bouygues Telecom	France	10	-	10	-
Ten	France	-	-	5	-
T-Mobile	Germany	9	-	-	-
E-Plus	Germany	4	-	-	-
Vodafone	Spain	3	-	-	-
TIM	Italy	10	-	-	5
Wind	Italy	3	-	3	-

Source: Exane BNP Paribas, Arthur D. Little estimates

Most players expect unlimited (or almost-unlimited) packages, which include unlimited broadband access and a package of basic services (e.g. TV), to eventually become the norm. This development is expected by the majority of service providers and content providers and is accepted, and even encouraged, by many operators.

However, some operators, generally incumbents or leading mobile players, are resisting this trend. TEM Spain bills a given amount for each connection of ten minutes; TeliaSonera bills SEK9 (EUR1) per day when the customer connects to the services, independently of the number of connections, time spent or data volume during that day. We believe that these methods of billing are not ideal for encouraging usage, and that given the pricing approaches being gradually introduced by their competitors, these methods will be difficult to sustain over time.

Obviously, the unlimited package is not necessarily viable for all types of usage. For example, for music downloads, customers seem to prefer to pay per track downloaded as opposed to an “all you can eat” package.

An ecosystem that is still under construction

Providing a mobile multimedia service equivalent in quality to that given by fixed-line Internet providers is somewhat of a challenge. In order to achieve this goal, mobile operators would have to:

- develop mobile-specific content, or adapt and optimise existing content (for example on fixed Internet) to the mobile environment;
- ensure inter-operability with fixed Internet services;
- adapt all of these services and content to the multiplicity of mobile handsets.

Until now, mobile operators have wanted to control services available on their portals (e.g. Vodafone live!, Orange World). This implied that they had to simultaneously negotiate and find operational solutions with a large number of service and content providers, content aggregators and so on, with the risk of providing an unattractive offer in terms of content.

Some of the operators that we interviewed claimed to be ‘disappointed’ by the attitude of media groups that were, according to them, unwilling to adapt to the mobile market – with content tariffs that were too high, highly complex rights systems and so forth. In reality, we believe that it is the ‘integrated’ approach of certain mobile operators that is unrealistic.

The analogy with fixed Internet is enlightening. In fixed Internet, a multitude of ‘facilitators’ (content aggregators, diverse services platform providers, etc.) have appeared over the past ten years, allowing various players to be put in indirect touch with content providers upstream and with end users downstream. However, fixed Internet is intrinsically more ‘simple’ than mobile Internet ‘thanks to’ the omnipresence of Windows as the sole operating system for PCs, as opposed to the existence of two different kinds of operating systems on the mobile market: several generic OSs (such as Symbian), and some ‘open’ OS (Windows at the top end of the market, Linux for low-cost offers).

How can a mobile operator manage all the functions necessary for the running of a mobile multimedia platform internally? Moreover, is this the most economically viable solution, considering that multiple mobile operators exist in each country and that each content or service provider must, in such a setup, speak with (and adapt to the need of) each mobile operator?

The mobile multimedia ‘ecosystem’ – an idea which we explored in our first report in 2001 – is still largely under construction.

Complex marketing

Mobile multimedia is a new market. Moreover, mobile operators are not necessarily considered by customers as legitimate players in the new services and content market. Encouraging customers’ interest in this market, on top of the cost of the initial launch of these services, involves constant marketing which implies costs and/or cooperation with numerous partners.

What markets, what potential?

No killer application has emerged from the pack

A wide variety of revenue sources currently contribute to non-SMS data ARPU. Our interviews confirm that there is no mobile multimedia 'killer application' as such, but rather a multitude of gradually developing services on several niche markets, primarily on the corporate and youth markets. The situation differs materially by country. The following services were quoted:

- access to mobile broadband via 3G data-cards and USB sticks, mainly on the corporate market but also, to an increasing extent, on the mass market in certain countries (Austria);
- access to professional mobile applications (Intranet, SAP, etc.);
- access to emails, chiefly via Blackberry-type handsets, and more generally personal communication and web community services (email, IM, file sharing, especially photos, videos, etc.);
- music, in the form of ringtones and, increasingly, full track downloads;
- games, both those that can be downloaded and gambling;
- access to information, weather reports, stock prices, etc.;
- mobile television and video;
- adult content.

Impact on operators' EBITDA if they capture a share of related markets

The arrival of broadband on fixed line and on mobile and of convergence represents opportunities for telecom operators to develop their activity beyond the telecoms services market, which has scant growth potential.

Operators can capture:

- a chunk of certain existing markets, primarily media (marketing/advertising, music, video, games) and digital distribution;
- a portion of the annual growth of consumers' overall spending.

The table below shows the respective 'sizes' of these various opportunities. While they are significant when taken as a whole, each is small compared to the current scale of the telecom service market.

For example:

- assuming that operators capture 5% of the advertising market, this would contribute 1.8% to their revenues and 0.8% to their EBITDA;
- assuming they capture 20% of the music market, this would contribute 0.4% to revenues and 0.3% to EBITDA;
- assuming they capture 5% of consumers' spending growth (more than their current weight of around 3%), this would represent 2.2% of their annual revenues.

Table 4: Related markets smaller than the telecom services market

USDbn	Worldwide industry size				Revenues and EBITDA potential for telecom operators			
	Revenues	EBITDA margin (%)	EBITDA	Capture (%)	Revenues	%	EBITDA	%
Telecom Industry	1,600	15-40	440					
Potential growth areas:								
Marketing/Advertisement	575	10-16	75	5	29	1.8	4	0.8
Digital distribution	505	25-35	152	10	51	3.2	15	3.4
Music	33	-	7	20	7	0.4	1	0.3
Filmed-entertainment	100	-	20	10	10	0.6	2	0.5
Video games	20	-	4	10	2	0.1	0	0.1
Total	**1,233**	**21**	**257**		**98**	**6.1**	**23**	**5.1**
Annual growth of consumption expenditure (2005)	**708**	**20**	**142**	**5**	**35**	**2.2**	**7**	**1.6**

Source: Exane BNP Paribas, Arthur D. Little estimates

Television on mobile: an investment that could be profitable if it is shared

The television and video market is larger than that of music, but most players believe that it will be harder to adapt it to the mobile realm.

Polls taken of users after testing mobile TV on DAB or DVB-H technology in Europe (especially the UK, Finland, France, Spain and Germany) have been largely positive; 60-80% of those polled said that they were satisfied with the service, while 40%-70% were prepared to pay for this service. The usage time of the testers was often high: 120-140 minutes per week, in 6-10 sessions of 20-25 minutes.

Certain commercial launches were also presented as successes, notably those by 1) Hutchison 3G in Italy, which launched its own DVB-H service (160k subscribers signed up for its World Cup-related services, both broadcast and video on demand), and by 2) Swisscom Mobile (1,000 new subscribers per day for its news clip service, billed at CHF9/month).

That said, most players are sceptical on the potential of mobile television, which has now been launched by many operators in EDGE or 3G technology. These cautious comments come from Austria, Spain, Italy, Germany, Sweden, France, Switzerland and Belgium.

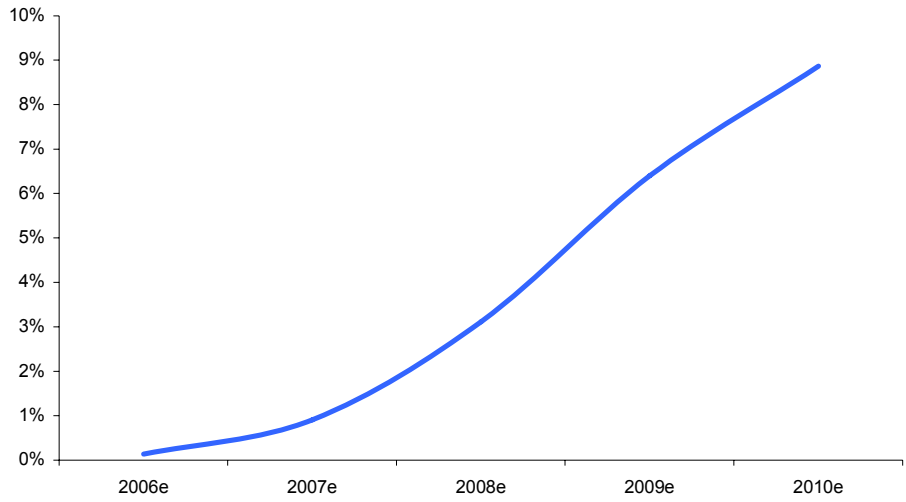
The doubts are rooted in the size of handsets' screens, which are ill adapted to watching television. Operators are thus questioning whether there is sustainable demand, once the initial hype fades, for mobile television. Several operators stated that they consider mobile television to be a means of setting themselves apart from rivals rather than as a significant source of revenues or profits.

The stakes. To gauge the potential of this market, we have built a penetration model for mobile television in Europe:

– assuming DVB-H mobile handsets (we take this technology as an example among others) represent 10% of total handsets sold to contract customers in 2008, 20% in 2009 and 25% in 2010, and that the subscription rate of equipped customers is 60% in 2010, we arrive at a subscription rate to DVB-H reaching 9% of total mobile subscribers (i.e. almost 40m subscribers at end-2010; see chart below);

– assuming that the basic subscription is billed at EUR5 per month, to which are added revenues from premium channels and additional services (interactive services via 3G), revenues generated by DVB-H could hit EUR3.0bn in 2010, or 2.3% of mobile operators' services revenues by then.

Chart 8: DVB-H development scenario in Europe (% of mobile customers)



Source: Exane BNP Paribas, Arthur D. Little estimates

There is thus significant potential, but two questions remain:

– the ability to bill mobile television like an additional service. The competitive landscape could prompt operators to build this service into their packages, as they do for several types of service. This could be dangerous insofar as 1) there is a risk that mobile television could cannibalise other types of usage (lower usage of voice and/or SMS while the customer is watching television), and 2) the cost of mobile television for operators, in particular the payment of content to media groups, would no longer be billed as such, which would effectively 'give' a portion of the existing wireless telephony revenues to content providers;

– the role of operators in the value chain. In pay television, channels receive 50% of the value of the market, while aggregators (bouquets) take 35% and distribution networks (satellite operators) 15%. A similar model could be implemented for mobile television. Telecom operators could thus receive between 10% and 50% of the value of the market, depending on whether they act as aggregators or whether they have built a network. Depending on the scenario, the contribution of mobile television to operators' gross margin would vary in 2010 from between 0.3% and 1.7% (see table below), but the initial scenario would imply practically no investment, unlike the second.

Can investing in a DVB-H network be profitable? The capex needed to deploy a DVB-H network is estimated at EUR3-4 per inhabitant, or EUR200m-300m for countries like France or the UK. This would cover around 65-70% of the population.

As the second table below illustrates, assuming the operator building the infrastructure receives 20% of the market's revenues, the ROCE is only higher than the cost of capital if there is one DVB-H network (or perhaps two) built per country (this assumes that there is no scale effect at the EBITDA margin level, which underestimates the sensitivity of ROCE to the number of networks).

Table 5: Mobile television development scenarios in Europe

	2006e	2007e	2008e	2009e	2010e
Average customers (000s)	361,189	387,471	408,727	425,378	437,864
% contract gross sales	12	11	11	11	11
Contract gross sales (000s)	43,343	42,622	44,960	46,792	48,165
% handset renewals	15	15	15	15	15
Handsets renewed (000s)	54,178	58,121	61,309	63,807	65,680
Total new handsets (000)	**97,521**	**100,742**	**106,269**	**110,598**	**113,845**
DVB-H handsets / total sold (%)	**0.5**	**3**	**10**	**20**	**25**
DVB-H handsets sold (000s)	488	3,022	10,627	22,120	28,461
Cumulative DVB-H handsets sold (000s)	488	3,510	14,137	36,256	64,718
Subscription to DVB-H (%)	100	100	90	75	60
DVB-H subscriptions	488	3,510	12,723	27,192	38,831
Penetration of DVB-H services (%)	**0**	**1**	**3**	**6**	**9**
DVB-H ARPU (EUR/month)					
Basic subscription fee	5.0	5.0	5.0	5.0	5.0
Premium fee per channel	2.5	2.5	2.5	2.5	2.5
Penetration of premium channels (%)	12	12	12	12	12
Number of channels per premium subscriber	1.3	1.3	1.3	1.3	1.3
Premium ARPU	0.4	0.4	0.4	0.4	0.4
Additional services ARPU	0.0	0.3	0.5	0.8	1.0
Total DVB-H ARPU	**5.4**	**5.6**	**5.9**	**6.1**	**6.4**
DVB-H services revenues (EURm)	**32**	**238**	**899**	**2,004**	**2,978**
ARPU contribution on total customer base (EUR/month)	**0.0**	**0.1**	**0.2**	**0.4**	**0.6**
% of total services revenues	**0.0**	**0.2**	**0.7**	**1.6**	**2.3**
Gross profit for mobile operator (EURm)					
Max (50% of revenues)	16	119	450	1,002	1,489
Min (10% of revenues)	3	24	90	200	298
% of total gross profit					
Max (50% of revenues) (%)	**0.0**	**0.1**	**0.5**	**1.1**	**1.7**
Min (10% of revenues) (%)	**0.0**	**0.0**	**0.1**	**0.2**	**0.3**

Source: Exane BNP Paribas, Arthur D. Little estimates

Table 6: ROCE inversely proportional to the number of networks built

Number of DVB-H networks per country	**1**	**2**	**3**	**4**
Cumulative capex in DVB-H network, per pop	3.5	3.5	3.5	3.5
Cumulative capex in DVB-H networks (EURm)	1,212	2,423	3,635	4,847
2010e revenues from DVB-H services (EURm)	2,978	2,978	2,978	2,978
Share of revenues for infrastructure providers (%)	20	20	20	20
EBITDA margin of infrastructure providers (%)	45	45	45	45
EBITDA of infrastructure providers (EURm)	268	268	268	268
Post-tax EBITDA/Cumulative capex (%)	14	7	5	4

Source: Exane BNP Paribas, Arthur D. Little estimates

It is therefore logical that operators have sought to mutualise the costs of building a DVB-H network, and have been very cautious overall on this technology:

– in Germany, mobile operators have built a consortium to build a national DVB-H network together and to share the costs;

– in France, TDF is expected to build a DVB-H network, which will then be let to different types of users, television channels and mobile operators;

– in Italy, there are two DVB-H networks; one is deployed by Mediaset and let to TIM and Vodafone, and the other belongs to Hutchison 3G Italy;

– in Spain, the UK, Belgium and Austria, the structure of the market remains uncertain as the regulatory situation has not been established, or the necessary agreements between the MUX provider, the licence holders and mobile operators are not yet in place. In particular, in the UK, DVB-H will be very late (2010-2012) because the spectrum is not yet available.

DVB-H is no longer the only possible technology; several players also cited MBMS. Unlike DVB-H, which corresponds to a network completely separate from the 3G network, MBMS relies on the 3G network of mobile operators – and thus gives a role naturally more important to operators in the value chain. MBMS has received backing from Ericsson – which indicates that technology will be 'on the market' at end-2007. Nokia remains DVB-H's main backer, but has also said that it wants to promote MBMS take-up. The operators we spoke with that cited MBMS are located in Germany, Italy, Austria and Belgium.

Mobile music: a real market, but is it worth the cost of conquering it?

The operators and majors are, on the whole, very upbeat on the potential yet to be unlocked in the wireless music market. There is no lack of examples of significant successes in this area:

- in Germany, one major has indicated that its biggest summer hit in 2006 sold 200k units in the form of CDs, 200k via Internet and 500k via mobile handsets (including ringtones and full track downloads);
- in France, SFR recently lowered the price of downloading a full music track to EUR0.99, putting it in direct competition with downloading services such as iTunes on the fixed Internet. In October 2006, SFR stated that it was in the top three of legal downloading platforms in France and that SFR Music had carried out 1.5 million downloads in H1 06 (versus 830k announced between the launch of the service in June 2005 and end-2005). At end-2005, SFR said that 10% of its 3G subscribers (which totalled one million at the time) were users of SFR Music, and that these subscribers had downloaded 340k full tracks, i.e. an average of three to four per month and per active user;
- in the UK, Three (Hutchison 3G) said in November 2006 that since its launch customers had downloaded over five million music tracks and 20 million video clips. In the autumn of 2006, each Three UK customer downloaded around 3.5 full tracks in two months, and Three puts its share of mobile music downloads in the UK at 75%.

These figures need to be interpreted cautiously, especially given that operators regularly offer promotions on music downloads and include paying downloads in the statistics alongside free ones. That said, many players consider that distribution via mobiles has a bright future. It could represent 25-30% of total music sales by 2010:

- according to one major, the sale of music in CD format will decline 50% over the next five years, and the share of fixed and wireless Internet will rise from 5% (each) to 25% (each) by 2010;
- according to one content aggregator, trends should follow the example of South Korea, where more than 50% of music sales are digital, and 60% of these sales are made through mobile handsets (in other words, around 30% of total sales are via mobile handsets).

Key success factors include the integration of MP3 players in handsets, which is being developed successfully (for example SonyEricsson's Walkman and Nokia's N9x) and will continue to develop (under pressure from initiatives such as Apple's iPhone). Also, the technical climate is reassuring for the majors; given that majors and operators control the entire mobile music distribution chain, the risk of piracy appears much lower than on fixed line Internet.

We believe, however, that the opportunities for operators should be put into perspective:

- first, as shown in table 4 above, music is still a small market in relation to that of telecom services (USD33bn versus USD1,600bn worldwide). Assuming that operators capture 20% of the market, they would only boost their EBITDA by 0.3%;
- second, the portion of this market that would be captured by operators will remain limited since, at best, their role in the value chain will be that of a distributor.

Will operators find their place in this market? For a piece of music sold at between EUR0.99 and EUR2.00 (tax included) to the customer, content rights represent for the operator a cost of around EUR0.70-0.80. This leaves them with razor thin margins once they have covered other costs (technical platforms, billing, marketing, etc.).

The economic equation is much less favourable on full track downloads than on ringtones. Distributors' margins can reach 60-70% with ringtones versus 10-15% with downloads of full tracks. Ringtone prices are often higher (there is no reference price such as the EUR0.99 established by iTunes on fixed line Internet) and the cost of the content is sometimes lower.

Some of the operators we have spoken to believe that volume growth will eventually lead to an improvement of the economic equation, chiefly by gradually lowering the weight of fixed costs (service platforms, etc.).

Others, however, believe that the majors do not leave them enough economic leeway, and that it is time to change business model. For example, Hutchison 3G has launched X-Series in Europe; this is an offer in which the mobile operator takes the role of 'pipe' provider and allows customers to access fixed Internet content, in partnership with Internet leaders such as Yahoo and Skype.

Interestingly, the operator which has thrown in the towel is one that took the lead in pioneering the music market in Europe, thus implicitly leaving the role of digital music distributor to players already active in this market, i.e. Internet leaders, the majors and Apple (with iTunes, and, soon, iPhone in Europe).

Mobile marketing: an opportunity and a threat

Several operators have publicly disclosed their plans to develop in mobile advertising and more generally in mobile marketing. These include Vodafone (since the presentation of its new strategy on 30 May 2006) and France Telecom (Investor Day of 15 December 2006).

Many operators consider this an important opportunity, the idea being to use their mobile portal's audience/reach and the knowledge they have of their customers to generate additional revenues.

These revenues can complement or supplant subscription or traffic revenues, as both models (paying and free ad-revenue-financed) can coexist for a while, each on particular market segments (advertising can be particularly attractive on the youth market).

We see three types of opportunities:

– promotional 'push' messages: this is a market that already took off with SMS and is poised to grow on the back of falling SMS wholesale prices, the development of promotional MMS, and new potential related to the geo-localisation of customers;

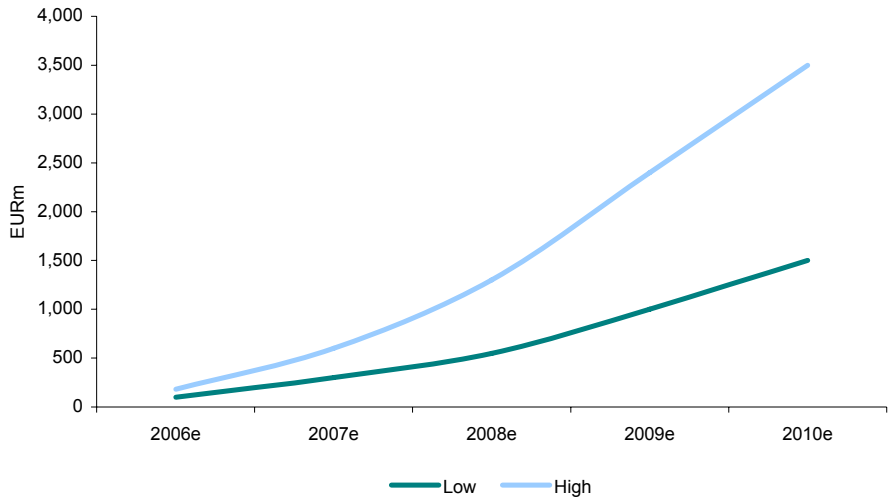
– the selling of advertising space: the development of 3G has created more complex mobile Internet pages with more space available for advertising. A key market is obviously that of sponsored links developed by search engines such as Google;

– 'rebound' techniques, i.e. interactive applications for which mobile is an effective means of communicating with customers.

We estimate the potential size of the mobile marketing market in Europe by taking the example of the Japanese market. We project that the European market will attain the size of Japan's by 2010, and have modelled two scenarios: a high-end scenario based on the real size of the Japanese market, and a low-end scenario that adjusts this market by taking into account the relative underdevelopment of mobile data ARPU in Europe in relation to Japan.

As the chart below illustrates, the range obtained is EUR1.5bn-EUR3.5bn in 2010, EUR0.3-0.6/month per subscriber, or between 1.1% and 2.7% of the services revenues expected in 2010e. This corresponds to between 3% and 7% of the estimated advertising market, and appears consistent with the size already achieved by fixed line Internet in the advertising market in a country such as France: 7% in 2005, 9% in 2006 and probably 11% in 2007 according to people we spoke with.

Chart 9: Scenarios on the mobile advertising market



Source: Exane BNP Paribas, Arthur D. Little estimates

The development of mobile marketing is likely to take time, however, as it will, for example, be necessary to adapt the advertising content to wireless handsets–and to change mobile subscribers' way of thinking about advertising.

Revenues 'in addition to' or 'in place of'? Mobile marketing is a new source of revenues that can be added to existing revenue streams or replace certain sources of revenues. Google's CEO recently made headlines by saying that his company may be in a position to launch a free, ad-financed mobile telephony service.

We believe that making such a service work will be difficult at present, except in special customer niches. Given the revenue per minute of a mobile call (around EUR0.15) and the price at which it is possible to bill a promotional SMS (EUR0.30), an SMS ad would have to be received every two minutes of calling time to generate revenue equivalent to that of a mobile operator. Given the average usage of European customers (around 150 minutes per month), this would require around 75 ad messages per month, or nearly three per day.

That said, it appears possible to finance part of the cost of a mobile communication via advertising. This is critical for operators, who are aware that part of the value of mobile traffic could slip through their fingers if they do not position themselves correctly on the mobile advertising market.

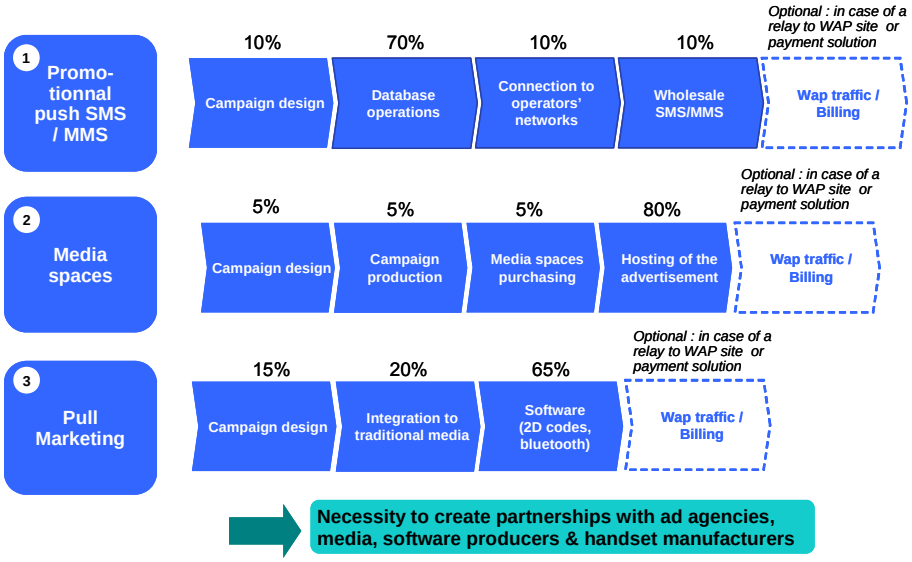
Note that this type of business model is currently being tested in the USA on the youth segment, with 1) the Sugar Mama offer of the Virgin Mobile MVNO: the customers gain one free call minute either through watching a video clip on their PC or through receiving SMS on their mobile, and by answering questions proving that they have retained the message; 2) the Xero Mobile start-up, which plans to test a mobile offer financed by advertising on American students.

What place in the value chain? As in the case for music and television, operators cannot develop the mobile marketing market alone. And, as we have seen, it is in their interest to join forces with sector specialists rather than see such specialists develop the market 'against' operators.

Operators will thus need to strike partnerships with several types of players: ad agencies, software editors and handset manufacturers, and Internet leaders such as Google and Yahoo, most of whose business revolves around Internet advertising, via their portals and search engines. As the chart below illustrates, the portion of the market that accrues naturally to mobile operators varies from 10% to 80% based on their place in the value chain and the chunk set aside for their partners.

Vodafone has announced a mobile marketing partnership with Yahoo in the UK.

Chart 10: Mobile marketing – value chain



Source: Exane BNP Paribas, Arthur D. Little estimates

Access to mobile broadband services

The billing of access to mobile broadband services is in our view the biggest revenue opportunity for operators. In our core scenario, we expect that the corresponding ARPU will hit EUR1.9/month in 2010 (i.e. EUR2.4/month per inhabitant) versus around EUR0.6/month in 2005 and EUR0.8/month in 2006.

The main engine of this growth will be the quickening penetration of 3G and HSDPA in the customer base: this penetration will reach around 16% at end-2006 versus 9% at end-2005. We expect it to reach 75% at end-2010 (see table below). We assume that the operators will decide in the next few years to accelerate the migration of customers to 3G, as doing so will allow them not only to pocket additional revenues (potential usage of new data services) but also to optimise costs (better utilisation of their network and their 3G spectrum).

Thus, the number of mobile subscribers with 3G handsets should gradually exceed the segment of subscribers who are genuinely interested in a broadband access service. We therefore expect that by around 2010, only half of the subscribers equipped with 3G handsets will subscribe to a 3G broadband access service, which is a little more than one third of the total subscriber base. We assume a monthly price of EUR5/month, which brings total revenues to EUR10bn in 2010, i.e. a contribution of EUR1.9/month to total ARPU in Europe.

Table 7: Scenario of mobile broadband subscription revenue growth

	2005	2006e	2007e	2008e	2009e	2010e
Total subscribers (000)	340,809	372,156	399,050	420,573	437,393	449,985
Net additions (000)		31,347	26,894	21,523	16,820	12,592
Churn rate (%)	22	22	22	22	22	22
Churned users (000)		74,978	81,874	87,791	92,526	96,226
Renewal rate (%)	14	14	14	15	15	15
Renewals (000)		47,713	52,102	59,858	63,086	65,609
Total handsets sold (000)		**154,039**	**160,870**	**169,172**	**172,432**	**174,428**
% of total base		41	40	40	39	39
3G penetration (%)	**9**	**16**	**27**	**40**	**58**	**75**
3G equipped (000)	30,246	60,886	108,058	168,871	252,422	336,431
3G net additions (000)		30,641	47,172	60,813	83,551	84,009
3G churned		3,025	9,133	23,773	37,152	55,533
3G handsets sold		33,665	56,305	84,586	120,702	139,542
3G handsets sold/total sold (%)		**22**	**35**	**50**	**70**	**80**
3G customers equipped with broadband subscription (%)	90	85	75	65	56	51
Subscribers (000)	27,221	51,753	81,044	109,766	141,356	171,580
% of total base	8	14	20	26	32	38
Average revenue per subscriber (EUR/month)	**7.5**	**5.4**	**5.1**	**5.1**	**5.0**	**5.0**
Broadband access revenues (EURm)	2,454	3,349	4,968	6,687	8,464	10,260
Broadband access ARPU (EUR/month)	**0.6**	**0.8**	**1.0**	**1.3**	**1.6**	**1.9**

Source: Exane BNP Paribas, Arthur D. Little estimates

These revenues will be driven by the arrival of more and more unlimited packages, reflecting a shift in operators' strategic positioning. They were initially focused on the development of their own mobile multimedia services (portals, music, etc.), but are increasingly shifting their focus towards access to existing services:

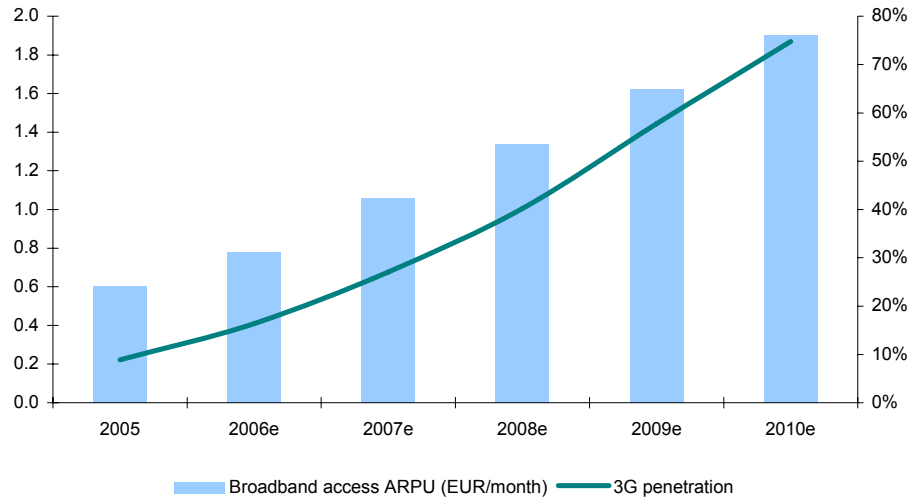
– for several years T-Mobile has offered 'Web'n'walk', which provides open access to Internet on mobile handsets. It has one million customers on this offer in Europe, 640k of which in Germany;

– three UK has just launched its X-Series offers, with an unlimited 'base' subscription at GBP5/month and a premium offer at GBP10/month. We believe that this example could be followed by other operators;

– in Austria, mobile operators have positioned themselves as rivals to fixed-line Internet access suppliers, as they believe that 3G can partially replace ADSL. In 2006, mobile operators realised 40% of broadband net adds (fixed and mobile), i.e. as many as ADSL, with cable capturing the remaining 20%. The mobile operators thus have 17% of the fixed+mobile broadband customers. We are a little more circumspect for the rest of Europe, as we believe that wireline will continue to outstrip wireless in speed, cost and service quality.

Our forecasts assume that fixed-mobile substitution will be much less strong on broadband access than on voice, at least by 2010. We project that the market share of mobile operators on broadband access (fixed + mobile) will reach 25% by 2010.

Chart 11: Penetration of 3G and mobile broadband access ARPU



Source: Exane BNP Paribas, Arthur D. Little estimates

Web2.0: an opportunity to develop access and audience

Many operators are jockeying for position to reap the windfall from Web2.0 and UGC (User Generated Content). Mobile operators' interest in UGC stems from the fact that this content is free for those who use it directly. Moreover, it is local, and thus often holds greater appeal for customers than content produced by the majors, which is not free. Many operators we spoke with said that they have plans in this area.

Some operators remain sceptical, however, especially as regards the quantity and quality of the content that the average customer has to share with the web community, and regarding the price that they are prepared to pay to download the content of the other members of the community. Yet experience seems to illustrate that, in the USA, there is a link between the development of Internet sites like MySpace and YouTube, and that of broadband Internet access.

Two approaches are possible: 1) 'organic' growth, i.e. the development by an operator of his/her own community site; this is what Three UK did with 'See Me TV', a pioneering service launched in October 2005, which generated 12 million downloads in 12 months; 2) 'external' growth, in partnership with sector leaders. In the USA, Verizon Wireless signed a partnership with YouTube in November 2006. Vodafone has recently announced agreements with MySpace and YouTube.

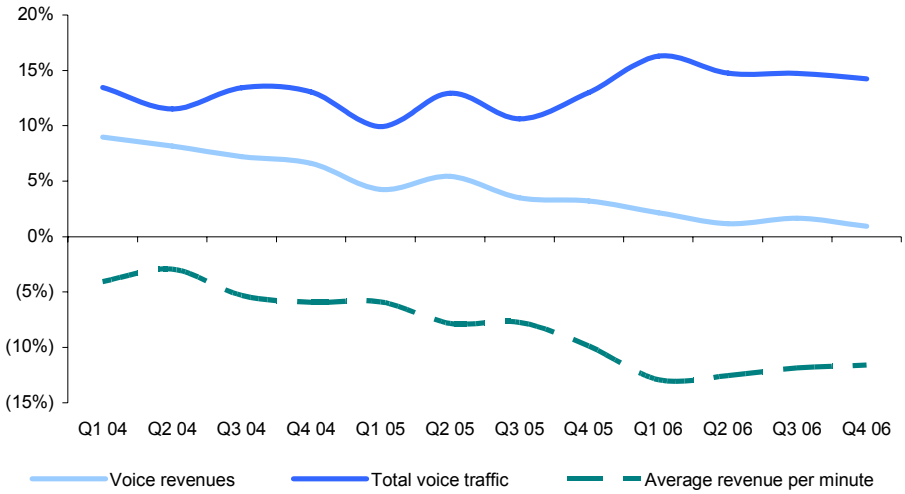
Note: access to a site like YouTube from a wireless handset with Internet access does not work if the operator has not taken the steps needed to adapt and convert the site's content. A partnership is thus necessary if the operator wants to exploit the content of existing sites.

We believe that the choice of 'organic' growth may, in reality, already be closed to operators, insofar as it appears very difficult to recreate ex-nihilo the wealth and diversity of the communities set up by sector leaders. However, as we saw above, building a partnership with an established leader means accepting revenue sharing (for example, sharing advertising revenues).

1.2. Mobile voice market under constant pressure

Revenue growth in the mobile voice market in Europe dropped from 4% in 2005 to +1.5% in 2006, impacted by an accelerated decline in prices: -12% yoy in 2006 versus -8% in 2005. Traffic growth accelerated, but elasticity remained below one (see following chart).

Chart 12: Mobile voice market in Europe (the seven countries in Table 8): revenues, traffic and average revenue per minute



Source: Exane BNP Paribas, Arthur D. Little estimates

The contribution from reductions in termination rates, down 15% yoy, remained significant, with an estimated impact of -3% on European growth (an equivalent decline is expected in 2007). However, the acceleration was linked to a fall in outgoing call rates, notably in Germany (down almost 25% yoy in 2006), and, to a lesser extent in France and Italy.

Table 8: Mobile voice trends in Europe: key figures by country (% change)

	Q3 04	Q4 04	Q1 05	Q2 05	Q3 05	Q4 05	Q1 06	Q2 06	Q3 06	Q4 06
Voice revenue trend										
France	6.1%	6.1%	3.2%	4.5%	3.8%	0.8%	(0.2%)	(2.0%)	(0.8%)	(0.4%)
UK	10.8%	7.4%	1.1%	0.8%	1.0%	4.7%	5.2%	5.1%	5.8%	4.3%
Germany	6.3%	7.6%	4.0%	5.5%	3.2%	2.4%	(0.8%)	(1.9%)	(2.2%)	(4.6%)
Spain	12.5%	8.6%	9.9%	13.1%	8.4%	11.2%	9.9%	7.4%	6.7%	6.2%
Italy	5.0%	7.8%	7.2%	5.9%	2.9%	(0.2%)	(0.9%)	(0.7%)	(0.3%)	2.1%
Netherlands	(0.7%)	(2.5%)	(1.7%)	4.7%	1.7%	2.3%	0.3%	(1.0%)	0.5%	(4.8%)
Belgium	3.8%	0.5%	1.8%	5.8%	2.3%	2.3%	3.1%	0.8%	3.3%	(1.3%)
Total	**7.2%**	**6.6%**	**4.3%**	**5.4%**	**3.5%**	**3.2%**	**2.2%**	**1.2%**	**1.6%**	**0.9%**
Total voice traffic trend										
France	14.5%	15.9%	8.1%	13.1%	11.0%	16.3%	19.8%	18.0%	15.2%	13.1%
UK	7.2%	9.7%	8.5%	9.3%	10.3%	9.0%	10.1%	9.6%	13.6%	13.6%
Germany	10.2%	10.7%	9.5%	12.7%	11.4%	17.9%	26.7%	26.8%	28.6%	26.4%
Spain	17.3%	17.0%	23.0%	26.2%	25.5%	24.3%	22.4%	17.2%	14.9%	17.0%
Italy	21.6%	13.0%	6.9%	8.9%	1.0%	3.6%	8.5%	8.1%	8.4%	7.9%
Netherlands	8.1%	11.9%	6.8%	14.1%	10.5%	10.2%	13.0%	4.2%	(0.1%)	2.7%
Belgium	9.4%	12.2%	10.6%	9.1%	7.8%	9.7%	12.4%	15.4%	14.7%	12.7%
Total	**13.4%**	**13.1%**	**9.9%**	**13.0%**	**10.6%**	**13.0%**	**16.3%**	**14.8%**	**14.7%**	**14.2%**
Price per minute trend										
France	(7.3%)	(8.5%)	(4.6%)	(7.6%)	(6.5%)	(13.3%)	(16.7%)	(17.0%)	(13.8%)	(12.0%)
UK	3.3%	(2.1%)	(6.8%)	(7.8%)	(8.4%)	(3.9%)	(4.4%)	(4.1%)	(6.9%)	(8.2%)
Germany	(3.6%)	(2.8%)	(5.0%)	(6.4%)	(7.4%)	(13.2%)	(21.8%)	(22.6%)	(24.0%)	(24.6%)
Spain	(4.1%)	(7.2%)	(10.6%)	(10.4%)	(13.6%)	(10.6%)	(10.2%)	(8.3%)	(7.1%)	(9.3%)
Italy	(13.9%)	(6.9%)	(3.9%)	(7.3%)	(2.7%)	(7.5%)	(11.5%)	(10.5%)	(10.0%)	(7.1%)
Netherlands	(8.2%)	(12.9%)	(7.9%)	(8.3%)	(7.9%)	(7.2%)	(11.2%)	(5.0%)	0.7%	(7.4%)
Belgium	(5.1%)	(10.4%)	(7.9%)	(3.0%)	(5.1%)	(6.7%)	(8.3%)	(12.7%)	(9.9%)	(12.4%)
Total	**(5.3%)**	**(5.9%)**	**(5.9%)**	**(7.8%)**	**(7.7%)**	**(9.9%)**	**(12.9%)**	**(12.5%)**	**(11.9%)**	**(11.6%)**

Source: Exane BNP Paribas, Arthur D. Little estimates

Substantial drop in prices, but sharp contrasts

We looked at a sample of countries in order to analyse why the price decline accelerated in 2006 versus 2005, focusing on the following:

– the impact of lower termination rates (table below, column D) was on average neutral in 2006 compared to 2005 for all of the countries studied, with a negative 1-2% impact in France, Germany and Belgium and a positive impact in the UK (+5% estimated), as rates did not decline in 2006 contrary to 2005;

– the impact of changes in contract prices (column F), estimated on the basis of a selection of contracts offered by different operators in each country, for around 200 minutes each month (NB: to simplify the calculation we did not include partially unlimited offers, see below). In Germany, the drop in prices exceeded 10% (impact of the new E–Plus offers, which obliged Vodafone and T-Mobile to substantially reduce the price of their subscription packages). There were also declines, albeit less steep, in the UK (effect of T-Mobile's Flext) and in Belgium, while in Spain, the prices of basic packages remained unchanged. There was a slight price hike in France (Orange's mini packages, introduction of a new range of packages by Bouygues Telecom, which have a higher face value);

– the introduction of new offers and promotions by the operators, for example, 1) new packages which include an unlimited part, notably for traffic to fixed-line and onnet traffic: three free numbers at Orange and SFR in France, Bouygues Telecom's Neo packages, the 'Stop The Clock', 'Free Weekend' and 'Family' offers from Vodafone UK, the new packages from Orange UK, such as 'Magic Numbers', the unlimited packages from E-Plus/Base in Germany, the Vitamina offer from Vodafone Spain and the almost unlimited offers from Mobistar in Belgium; and 2) SIM-only offers, including those of the incumbents (KPN, T-Mobile Germany, etc.);

– the changes to prepaid tariffs, often pushed down by MVNOs;

– the mix effect, e.g. the fact that customers have been able to migrate from prepaid to a package, or vice versa, or from one package to another.

The following table groups together the latter three factors, whose impact cannot be quantified separately given the information available to us, in column G.

Table 9: Analysis of the accelerating drop in prices in some European countries in 2006 vs 2005

Yoy price changes (%)	FY05 (A)	FY06 (B)	Acceleration (C = B - A)	Termination (D)	Outgoing price acceleration (E = C - D)	Contract pricing changes (F)	Other effects (G = E - F)
France	(8.2)	(14.8)	(7)	(1)	(5)	4	(9)
UK	(6.8)	(6.0)	1	5	(4)	(4)	0
Germany	(8.2)	(23.3)	(15)	(1)	(14)	(12)	(3)
Spain	(11.4)	(8.7)	3	0	3	0	3
Belgium	(5.7)	(10.9)	(5)	(2)	(4)	(2)	(1)
Average	**(8.0)**	**(12.7)**	**(5)**	**0**	**(5)**	**(3)**	**(2)**

Source: Exane BNP Paribas, Arthur D. Little estimates

It seems that the reasons behind the accelerated drop in prices vary from one country to another.

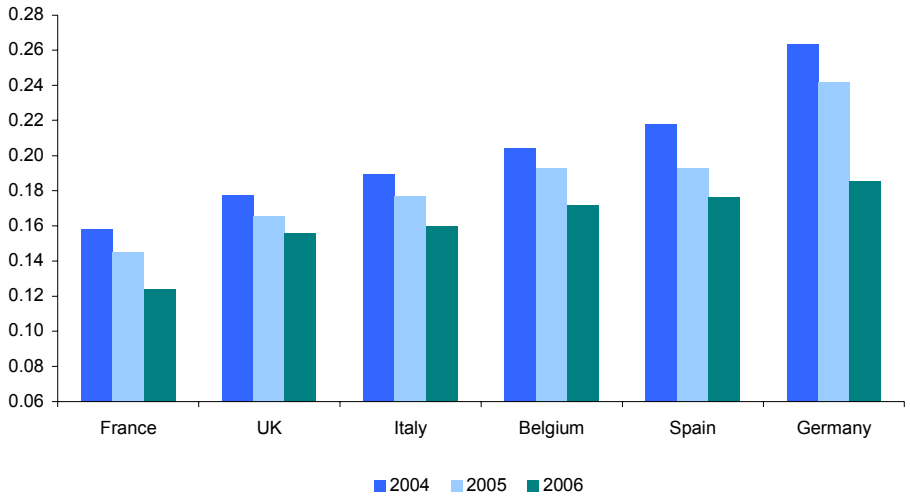
– In France, new subscription packages with an unlimited component, led to both a mix effect (e.g. customers optimising their billing by changing from a four-hour to a three-hour package to make the most of the unlimited part) and also increased usage (and therefore a decline in average prices).

– In Germany and the UK, the price of subscription packages fell.

– In Spain, the 'other effects' had a positive impact.

– in Belgium, all of the effects had a similar impact (termination, contract pricing changes, other effects).

Chart 13: Average mobile price in a selection of countries (EUR/min.)



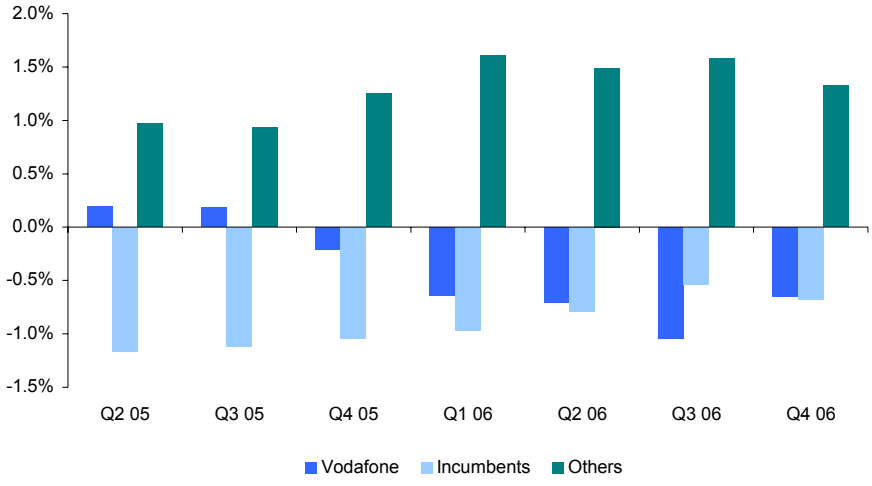
Source: Exane BNP Paribas, Arthur D. Little estimates

We expect a drop in mobile voice revenues

While mobile prices are heading towards those of fixed (average price per minute of EUR0.15 at end 2006 versus EUR0.20 in 2004), some are hoping for an improvement in the elasticity of demand, which would enhance the revenue trend.

We think that mobile voice will remain under pressure, with revenues that should, we think, start to decline. We expect a 1.3% annual decline (2006-2010e). The usage growth will pick up in some countries, but in most, the trends may deteriorate, at a time when regulation and its consequences remain a key uncertainty.

Chart 14: Market share of European mobile operators, by type of player



Source: Exane BNP Paribas, Arthur D. Little estimates

As the previous chart shows, the challengers are still winning market share from the leaders, both from the incumbents and from Vodafone's subsidiaries.

As such, we think that:

- the leaders will continue to try to stabilise their market share, making notable efforts in terms of onnet offers and increasingly on convergent offers. Incumbents (such as Orange France and Proximus) are likely to focus on such convergent offers, as are several Vodafone subsidiaries (e.g. Italy, Germany);
- the challengers will continue to push big bundles at cheaper rates and/or will increasingly introduce unlimited offers (Orange Spain, Bouygues Telecom, E-Plus, etc.);
- the competitive edge from onnet offers will gradually lose steam, given the lower termination rates which are likely to continue into 2007 and beyond. Lower termination rates mean that the challengers will be able to offer lower prices not only for calls to fixed lines and for onnet but also for cross net: in France, Bouygues Telecom started to lead the way in 2006 with the Neo packages; in the UK, Three UK has put a particular emphasis on cross net offers; in Spain, Yoigo has adopted a single tariff approach (EUR0.12/minute to all networks); in Germany, E-Plus launched a new offer in 2007 called Zehnsation, with a single tariff of EUR0.10/min to all networks (minimum billing of EUR10/month). In Austria, the low-cost tariffs based on a single rate to all networks have mushroomed ('Bob' on the mobilkom austria network, 'Yesss!' on the network of 'One', etc. are offered at rates as low as EUR0.05/minute, with a EUR5/month minimum consumption, and EUR0.08/minute, without minimum consumption);
- finally, we expect a bigger dose of unlimited communications in the packages. This trend is not necessarily negative; it is in theory compatible with stability or even a rise in ARPUs. However, this depends on the way that operators manage the trend and on the initial level of prices in the country. Moreover, this trend could be dangerous if and where MVNOs become large. Indeed, the wholesale price of mobile traffic sold to the MVNOs could be linked less and less to the reference price of packages (divided by the number of minutes included), and could therefore drop more quickly, giving the MVNOs more room for manoeuvre.

The consequences of these price declines will be different in different markets, depending on the elasticity in each:

- the situation is uncertain in Germany, where usage growth potential is enormous and traffic is beginning to pick up substantially owing to a steep general fall in prices, large packages and home zone offers. The prices of bundles had stopped falling for around six months in H2 06, but the 20% cut in mobile termination rates at end-November 2006 gave some breathing room to E-Plus, which launched Zehnsation in early 2007;
- in France, the situation is also uncertain, as MVNOs and Bouygues Telecom are capturing market share; at this stage, the MVNOs have only a limited impact on operators, who retain the bulk of the value;
- in the UK, certain operators believe that the 'voice & text' market has reached a saturation point, as most customers have migrated to very large packages in recent years–and they do not come close to using them completely;
- in Italy, trends are likely to deteriorate: elasticity is good, but the fact that operators are now prohibited from charging for the top-up of pre-paid cards could have a very negative impact on mobile operators in 2007, depending on whether they are able to offset this by raising tariffs;
- in Spain, risk is also rising as the regulator has been ratcheting up pressure on prices (per-second billing) while competition is heating up from all ends: onnet tariffs from TEM, recent MVNO arrivals (Carrefour at EUR0.15/min) and the new entrant Yoigo (78k new customers in two months);

– Belgium, Switzerland and Ireland are also likely to witness a deterioration in trends: in Belgium, there has been a sharp drop in termination tariffs (-36% so far in 2007) and expectations of a fresh wave of competitive pressure; in Switzerland, ARPU and voice revenues are expected to continue falling; in Ireland, regulatory pressure and tougher competition notably from Meteor, acquired by Eircom, are expected to bring ARPU more into line with the European average (currently EUR47 versus EUR28 in Europe).

Termination rates: double 'kiss cool' effect

As we have noted above, falling termination rates have a twin impact:

– there is a mechanical impact on revenues of operators (and their costs): as interconnection revenues represent on average 20% of services revenues, a 15% decrease in interconnection prices has an impact of roughly -3% on services revenues;

– a knock-on effect on retail prices, in particular thanks to the breathing room this decline gives to the challengers (which have a higher proportion of cross-net traffic and thus more interconnection costs than the leaders).

The following table illustrates that:

– the average decline in termination rates will be 16% in 2007, equivalent to that of 2006 (15%);

– there will be an acceleration in Germany, Spain, Austria and Belgium, but a slowdown in Italy, and relatively unchanged trends in France, the UK and the Netherlands;

– long-term visibility is good in the Netherlands, in the UK (decision of Ofcom, which could however be appealed), in Italy and in Spain, but it is low in France and Germany (decisions have only been taken for 2007 for the moment); uncertainty has recently reappeared in Austria following the cancellation of the planned glide path by the anti-trust authority;

– prices will remain highest in Italy, even after the declines to come between now and 2009.

We believe that this pressure from the regulator is likely to continue as long as sector ROCE remains high. However, it also reflects 'consumer' pressure partly linked to a problem of image and recognition of the operators. One of the challenges facing the operators is therefore to come across more positively to the regulatory authorities and the customers. In this respect, note that the operators could enhance their image by focusing on their drive for sustainable development and their potential impact in terms of helping to reduce the use of resources. The sector can highlight the fact that telecommunications are a tool enabling consumers and companies to increase their efficiency and to avoid unnecessary travel: the environmental benefits of tele-working, video-conferencing, e-business, etc. (see chart below).

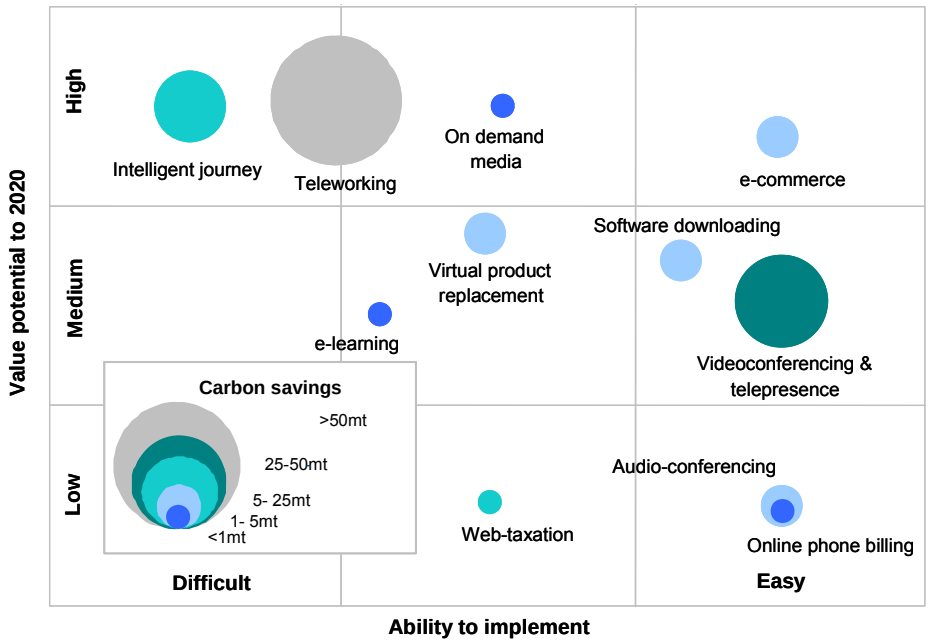
Table 10: Mobile termination rates in Europe (Euro cents)

Country	Operator	2005	2006	2007e	2008e	2009e	2006/05 (%)	2007/06 (%)	2008/07 (%)	2009/08 (%)
France	Orange	12.5	9.5	7.5	6.5	5.7	(24)	(21)	(14)	(12)
	SFR	12.5	9.5	7.5	6.5	5.7	(24)	(21)	(14)	(12)
	Bouygues Tel.	14.8	11.2	9.2	7.6	6.5	(24)	(18)	(18)	(14)
Netherlands	KPN	12.8	10.1	8.3	6.4	5.5	(21)	(18)	(22)	(14)
	Vodafone	12.8	10.1	8.3	6.4	5.5	(21)	(18)	(22)	(14)
	Others	14.5	12.4	9.4	7.1	5.5	(15)	(24)	(25)	(22)
UK (pence)	O2	5.6	5.6	5.7	5.7	5.7	0	0.5	0.5	0.5
	Vodafone	5.6	5.6	5.7	5.7	5.7	0	0.5	0.5	0.5
	Orange	6.3	6.3	6.2	6.0	5.9	0	(2.4)	(2.4)	(2.4)
	T-Mobile	6.3	6.3	6.2	6.0	5.9	0	(2.4)	(2.4)	(2.4)
Italy	TIM	14.1	11.7	10.6	9.5	8.9	(17)	(9)	(11)	(6)
	Vodafone	14.1	11.7	10.6	9.5	8.9	(17)	(9)	(11)	(6)
	Wind	16.5	15.0	12.2	9.5	8.9	(9)	(18)	(23)	(6)
Germany	T-Mobile	13.2	11.0	8.8	7.5	6.7	(17)	(20)	(15)	(10)
	Vodafone	13.2	11.0	8.8	7.5	6.7	(17)	(20)	(15)	(10)
	E-Plus	14.9	12.4	9.9	8.4	7.6	(17)	(20)	(15)	(10)
	O2	14.9	12.3	9.9	8.4	7.5	(17)	(20)	(15)	(10)
Spain	TEM	13.9	12.4	10.3	8.7	7.2	(11)	(17)	(16)	(17)
	Vodafone	14.1	12.6	10.5	8.7	7.2	(11)	(17)	(17)	(17)
	Amena	15.7	13.3	11.1	9.1	7.3	(15)	(17)	(18)	(20)
Austria*	T Austria	10.8	8.8	7.1	6.8	6.8	(18)	(20)	(4)	0
	T-Mobile	13.1	11.2	9.2	7.2	6.8	(15)	(18)	(21)	(6)
	One	13.2	11.8	10.3	8.3	6.8	(11)	(13)	(19)	(18)
	Hutchison 3G	19.6	16.0	12.3	8.5	6.8	(18)	(23)	(31)	(20)
Average		**13.2**	**11.2**	**9.5**	**8.0**	**7.2**	**(15)**	**(16)**	**(15)**	**(10)**

** Originally planned but recently cancelled by the anti-trust authority.*

Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 15: Opportunities to reduce CO2 emissions



Source: Exane BNP Paribas estimates, Arthur D. Little

1.3. Fixed-mobile convergence: an emerging reality expected to have a negative impact

We devoted our report last year to convergence, in particular fixed-mobile convergence. As we expected, convergence started for real in 2006 as offers were launched throughout Europe, and we stand by the conclusions we reached last year:

– in the medium term, fixed-mobile convergence should result in stiffer competition on retail markets as fixed-line operators are entering the mobile market by combining MVNOs and new technologies (WiFi) while mobile operators are attacking ADSL;

– new technologies (WiFi, WiMax) will help break down the borders between wireline and mobile networks, thereby lowering barriers to entry, in particular on mobile infrastructure.

We would add the following nuances to last year's report:

– convergent offers will probably take longer than initially planned to develop from a commercial standpoint, as demand for convergent services may have been overstated;

– fixed-line operators nonetheless appear determined to launch mobile services. Some appear even more interested in mobile than we initially believed and are seriously considering investing in their own mobile infrastructure. To encourage customers to take up their offers, they appear ready to offer very attractive prices, hence the deflationary trends that we expect;

– mobile operators were quick to react, as they began moving into ADSL in 2006 via partnerships (reselling) or acquisitions. This will give them a foothold in a key segment of the convergent market, i.e. convergence for voice and Internet access, but not on the entire quadruple-play market as such;

– for incumbent operators, the overall impact of convergence is likely to be negative, despite the scope for savings, especially in commercial costs.

1.3.1. Convergence is a reality

Many fixed-mobile convergence offers were launched in 2006 (see table 11), and nearly all of the players we have talked to agree that many more will be rolled out in 2007.

Table 11: Examples of convergent offers launched in Europe

Date	Operator	Country	Type of operator	Name of offer	Details
Sept. 05	BT	UK	Fixed incumbent	Fusion	Mobile-Bluetooth handsets + MVNO - Initial offer
Sept. 05	Mobistar	Belgium	Mobile	ADSL	ADSL offer based on ULL
May 06	Telecom Italia	Italy	Incumbent	Unico	Mobile-WiFi handset + VoIP calls (blocked by regulator)
June 06	Neuf Cegetel	France	Altnet	TWIN	Mobile-WiFi handset + MVNO - Free VoIP calls on WiFi
June 06	France Telecom	UK	Integrated op.	Orange	Free DSL broadband for mobile contract customers
Aug. 06	Telenet	Belgium	Cable	Quad-Play	Quadruple-play packs based on MVNO
Aug. 06	NTL/Virgin	UK	Cable	Get More	Quadruple-play packs based on Virgin Mobile MVNO
Aug. 06	Deutsche Tel.	Germany	Incumbent	T-One	Mobile-WiFi handset - Cheap VoIP calls at home
Sept. 06	O2	Germany	Mobile	O2 DSL	ADSL offer based on ULL
Sept. 06	Vodafone	Germany	Mobile	Flat 3	ADSL offer based on resale
Sept. 06	Vodafone	Italy	Mobile	VodafoneCasa	ADSL offer based on resale
Oct. 06	Iliad	France	Altnet	-	Mobile-WiFi handsets - Free VoIP calls on WiFi
Oct. 06	France Telecom	France	Incumbent	Unik	Mobile-WiFi handsets - Unlimited VoIP calls at home
Nov. 06	France Telecom	Spain	Integrated op.	Unik	Mobile-WiFi handsets - Unlimited VoIP calls at home
Jan. 07	UPC/T-Mobile	Austria	Altnet + Mobile	Fixed & mobile Internet	xDSL + HSDPA card (B2B offer)
Jan. 07	BT	UK	Fixed incumbent	Fusion V2	Mobile-WiFi handsets + MVNO - Cheap VoIP on WiFi
Jan. 07	Vodafone	UK	Mobile	At Home	ADSL offer based on resale
Jun. 07	SFR	France	Mobile	ADSL	ADSL offer based on resale

Source: Exane BNP Paribas, Arthur D. Little estimates

Most of these offers focus on the home, the first requisite point of passage for convergence. They can be broken down into four groups, based on the type of operator that has developed them.

Mobile offers launched by fixed-line operators

Such offers include Neuf Cegetel's TWIN, BT's Fusion and Telenet's MVNO. Others could follow in Italy (Fastweb has officially declared that it wants to launch an MVNO) and in Spain (cable-operators in the residential market; BT on the corporate market). We are referring here to fixed-line operators without mobile licences (we deal with integrated incumbent operators further on), and which thus have to reach MVNO agreements with mobile operators.

The integration of WiFi in wireless handsets allows them to bypass the mobile network for all of the calls made in WiFi hotspots, especially those made at home (where over 30% of all mobile calls are made). Fixed-line operators thus have a much more attractive cost base than pure MVNOs, and can offer much lower rates (unlimited VoIP calls on Neuf Cegetel's TWIN phone in WiFi hotspots for EUR5/month).

WiFi requires no licence and is very inexpensive. The technology is already integrated in some of the 'boxes' used for ADSL access, and should be found in a growing range of devices, e.g. PCs, televisions, cameras, MP3 players, and increasingly present in wireless handsets.

Fixed-line operators' mobile offers are 'offensive', as the operators have nothing to lose and everything to gain on the mobile market; their rates are aggressive (up to a 40% reduction in relation to incumbent operators' offers).

This trend should thus lead to:

- increasing pressure on the price of mobile calls made at home, with a theoretical impact on ARPU of 10-15% (i.e. free mobile voice in the home: see last year's report);
- the appearance of one or two credible 'mobile operators' in countries where the number of mobile operators is limited (e.g. France and Belgium), which will result in markets that are more fragmented, more competitive and ultimately less profitable.

The response of mobile operators on voice and ADSL

As projected, in 2006 mobile operators developed several voice offers that pre-empted or responded to fixed-mobile convergence offers, based on two concepts:

- unlimited or quasi-unlimited contracts, launched notably by Bouygues Telecom in France, E-Plus in Germany and Mobistar in Belgium;
- 'home zone' offers, especially those launched by Vodafone in Germany and Italy, which have especially low rates for calls made from the home.

Certain mobile operators have also begun making a greater effort to develop Internet access via the mobile network (HSDPA technology), along the lines of Austrian mobile operators, which have captured 17% of the Internet access, fixed-line, mobile and cable markets combined. The Austrian mobile operators are pushing HSDPA with aggressive offers. One is offering 1Gbyte for EUR20/month, T-Mobile has a promotion at EUR10/month on all of its HSDPA offers, mobilkom austria is offering the first six months free for its HSDPA offers at 7.2Mbit/s. Outside of Austria, note that Vodafone Spain has launched a similar offer.

However, mobile operators quickly realised that they could not stop there and that they would have to propose, at least to some of their customers, Internet access offers via ADSL. Vodafone moved into ADSL via partnerships with fixed-line operators (BT in the UK, Fastweb in Italy, Arcor in Germany) and O2 invested in its own infrastructure (acquisition of Be in the UK).

For example, in Germany, 'convergence' is currently being driven mostly by mobile operators, especially Vodafone and O2, each of which is trying to capture an increasing share of customer bills. To this end they have begun pushing bundles which include mobile voice (replacing fixed-line, including the line rental) and Internet access (ADSL).

These developments are both defensive and offensive:

- they are defensive because they seek to head off the combined threat of alternative carriers who push aggressive mobile offers (see above) and of incumbent operators, which are also banking on convergence (see below);
- they are offensive because they allow mobile operators to expand their target market: on voice, they promote further fixed-mobile substitution, on both traffic and line rental, while on ADSL, they can obtain a part, albeit small, of a growing market, with low risk.

Incumbent operators' convergent offers

Convergence is viewed by incumbent operators as an opportunity to develop new revenues via new services, and more importantly as a way to lock in customer loyalty:

- France Telecom and Deutsche Telekom have launched offers based on mobile-WiFi handsets (France Telecom's Unik and Deutsche Telekom's T-One). These offers' rates are on a par with or even higher than those of separate offers;
- Telecom Italia sought to launch an offer in the summer of 2006 but was blocked by the regulatory authorities;
- KPN could release new convergent offers in the months to come, both on voice and data;
- finally, Telefonica and Belgacom have bought out their mobile subsidiaries' minorities: Telefonica is reorganising so as to exploit convergence, and Belgacom is expected to launch convergent offers in 2007.

'Integrated challengers'

Integrated fixed-mobile challenger operators have existed for years (Wind in Italy, Sunrise in Switzerland), but the ranks of this category have swelled in recent years as new subsidiaries of incumbents have joined the fray:

- in Spain, Amena after being acquired by France Telecom, was reorganised to launch convergent services; the group's Unik handset was launched in December 2006, and quadruple-play offers should follow;
- in the UK, Orange UK and Wanadoo UK have been merged by France Telecom, and the operator has launched a free ADSL offer for Orange's mobile subscribers with a subscription of more than GBP30/month;
- in Denmark, TeliaSonera launched 'Home Free', an offer based on a mobile-WiFi handset and VoIP;
- in Sweden, Telenor acquired alternative fixed-line operators (Glocalnet, Bredbandsbolaget), then a mobile operator (Vodafone Sweden) and is now positioning itself as an integrated operator.

Adoption of convergence has been slow – but we expect a negative long-term impact on incumbent operators

At end-2006, few customers had migrated to convergent offers. For example:

- in France, France Telecom's Unik has attracted only 64k customers (versus an initial target of 100k), and Neuf Mobile had 100k customers at end-January 2007 (although much fewer customers were equipped with TWIN);
- in the UK, Orange's combined mobile+ADSL offer had won 250k customers by early March 2007, versus around 100k at end-September 2006;
- in Belgium, Telenet had 21k activated SIM cards at end-2006.

We expect the pace to pick up in 2007, fuelled by the arrival of a larger number of offers and a wider selection of handsets. Several operators have the potential to sign up hundreds of thousands of customers.

What price decrease?

Several factors suggest that convergence will have a deflationary impact on the revenues of incumbent operators:

- according to many operators, customers will demand a substantial reduction for handing over all of their requirements, fixed-line and mobile, to a single provider, as customers are well aware that this will lead them to be much more loyal. Note that this operators' vision is more negative than the message from a market research study that we have seen which indicates that 86% of customers would prefer to have a single supplier for both fixed and mobile, that 70% would prefer to have a single bill and a single customer service, and that just 30% would demand a rate reduction to subscribe to a convergent service;
- moreover, convergent offers of alternative carriers' or challengers come with heavy discounts: up to -40% on incumbent operators separate offers. These reductions have been made possible by 1) technologies such as WiFi (see last year's report) and by 2) the fact that new entrants (who have nothing to lose) accept a lower return on capital than operators already present in this market (the mobile leaders' ROCE is generally above 20%);
- finally, certain operators also fear that convergence will have a negative impact on mobile data revenues, insofar as customers will download more from fixed-line networks and transfer data directly onto their wireless handset, thus bypassing mobile networks, which therefore would lose a revenue opportunity.

Obviously, the risk of prices falling varies by country, based on the initial price level and operators' returns.

Impact on customers' discounted value?

Can this ARPU decline be offset by lower costs at integrated operators? We believe that the costs generated by a quadruple-play customer will eventually fall below the sum of the costs of two customers (triple-play and mobile), but our calculations lead us to believe that the net discounted value of the 'converged' customer is unlikely to be higher.

The table below assumes the following:

– a quadruple-play ARPU 10% below the sum of fixed and mobile ARPU taken individually, i.e. EUR67.5 versus EUR75 per month;

– a much lower churn rate compared to the average mobile churn and triple-play churn, i.e. a churn of 14% versus 25% and 15% respectively on mobile and triple-play. Assuming an unchanged average unit cost of acquisition and retention, this would lead to a 25% decrease in commercial costs;

– unchanged direct costs, but a 10% decrease in operating costs (reflecting the significant savings possible on customer management costs) and a 5% decrease in capex (reflecting the integration of fixed and mobile networks, including the scope to optimise the mobile network thanks to the use of WiFi at home).

This leads to a discounted value of quadruple-play customers of EUR1,035 versus EUR721 for triple-play and EUR299 for mobile, i.e. a practically unchanged total (+1%).

Table 12: Impact of convergence on discounted value of a customer

EUR/month	Fixed	Mobile	Sum	4-Play	Difference	Diff. (%)
ARPU	45.0	30.0	75.0	67.5	(7.5)	(10)
Direct costs	(11.3)	(7.5)	(18.8)	(18.8)	0.0	0
Gross profit	33.8	22.5	56.3	48.8	(7.5)	(13)
Opex	(11.3)	(6.6)	(17.9)	(16.1)	1.8	(10)
SARC	(4.5)	(4.5)	(9.0)	(6.8)	2.2	(25)
EBITDA	**18.0**	**11.4**	**29.4**	**25.9**	**(3.5)**	**(12)**
Capex	(5.9)	(3.9)	(9.8)	(9.3)	0.5	(5)
OpFCF	12.2	7.5	19.7	16.6	(3.0)	(15)
% of service revenue						
Direct costs	(25)	(25)	(25)	(28)		
Gross margin	75	75	75	72		
Opex	(25)	(22)	(24)	(24)		
SARC	(10)	(15)	(12)	(10)		
EBITDA	40	38	39	38		
Capex	(13)	(13)	(13)	(14)		
OpFCF	27	25	26	25		
Churn rate (%)	15	25	18	14	(4)	(20)
Customer life-time (years)	6.7	4.0	5.7	7.1		
Equivalent one-off SARC (EUR)	(360)	(216)	(576)	(576)	0	0
Recurring annual OpFCF, excluding SARC (EUR)	**200**	**144**	**344**	**281**	**(63)**	**(18)**
Discounted customer value (EUR)	**721**	**299**	**1,021**	**1,035**	**14**	**1**

Source: Exane BNP Paribas, Arthur D. Little estimates

Table 13: Sensitivity of 'customer value' to ARPU versus the reduction of churn

		ARPU difference					
		(20%)	(15%)	(10%)	(5%)	0%	5%
Churn reduction	0%	(67%)	(46%)	(25%)	(4%)	17%	38%
	5%	(63%)	(42%)	(20%)	2%	24%	46%
	10%	(59%)	(36%)	(13%)	10%	32%	55%
	15%	(54%)	(30%)	(6%)	18%	42%	66%
	20%	(49%)	(24%)	1%	27%	52%	77%
	25%	(43%)	(16%)	10%	37%	64%	90%
	30%	(36%)	(8%)	20%	49%	77%	105%
	35%	(28%)	2%	32%	62%	92%	123%

Source: Exane BNP Paribas, Arthur D. Little estimates

The table above shows the sensitivity of this result to assumptions regarding the decline in ARPU and regarding churn. It shows that the discounted value of the customer is up significantly only in certain combinations of assumptions, which in our view are not the most probable. For example, if we assume that churn is down by 10%, ARPU must not be down by more than 7%, and a EUR10/month fall in ARPU would only work if churn fell by at least one third.

Over and above the impact in terms of value per subscriber, the overall effect on the incumbent operator will clearly depend on its market share on the convergent market compared to its share of the fixed and mobile markets.

Importantly, in our view, convergence is a new opportunity for challengers, especially alternative carriers, to win market share.

Alternative carriers are in the best position

The calculations above concern incumbent operators, who have fixed and mobile customer bases. Their challenge is migrating these subscribers to a convergent offer. The positions of mobile operators and alternative carriers are different, as convergence is for them an opportunity to develop in a new market:

- alternative carriers can complement their triple-play offer with a mobile service;
- mobile operators do not propose genuine quadruple-play offers at this stage, but they have launched offers combining voice with double-play ADSL access (Internet and telephone).

Market studies show that these customers equipped with both fixed and mobile prefer buying a quadruple-play service from their fixed operator rather than from their mobile operator.

We thus stand by the conclusion we reached last year, i.e., that alternative carriers have the least to lose and the most to gain from fixed–mobile convergence.

Fixed-line operators want to launch new nomadic or mobile networks

The hype about WiMax has subsided, and sector players' views are now mixed, with many taking a cautious stance on WiMax.

That said, several new mobile infrastructure operators could emerge in 2007, confirming fixed-line operators' ambitions in mobile:

- a fourth mobile licence (2G/3G) could be awarded in France, perhaps to Iliad and/or Noos-Numericable; moreover, several operators with WiMax licences are expected to offer nomadic broadband access services (this is the stated objective of Bolloré Télécom and Iliad) or, at a later date, mobile services (this would however require that their licences be modified). Iliad considers nomadic broadband access to be its next growth driver, following on the heels of fibre;
- in Italy, all of the alternative operators are interested in 3.5GHz frequencies, which would enable them to launch WiMax. The allocation is scheduled for June 2007. The total cost of the licences remains uncertain;
- in the UK, BT has indicated its interest in re-entering the mobile market via licences which will be allocated in the 2.5GHz frequency range at year-end. BT could use these frequencies to launch a WiMax network. The regulator, Ofcom, has been consulting with the parties involved (these discussions continued until 9 March 2007). Ofcom appears optimistic concerning the number of candidates that could be interested in WiMax;
- in the Netherlands, cable operator Casema has shown a strong interest in 2.5GHz frequencies, which would enable it to enter the mobile broadband market in a similar way to that envisaged by BT.

Provided technological innovation continues (although visibility on this is murky), WiMax could have a material impact (both direct and indirect) on the mobile market in several major European countries. In the UK, there is potential for a genuine mobile offer by 2009-2010; in Italy and France, there is potential for nomadic broadband, in partial competition with 3G/HSDPA.

What purpose will WiMax serve and what type of impact might it have? We stand by the conclusions we reached last year:

– **Backhaul**: WiMax can be used to make point-to-point wireless links which would, for example, be an alternative solution to leased lines or fiber optics to link an operator's local points of presence. Clearly, this application will not have a material impact on the structure of the sector;

– **Fixed broadband access**, as a complement or competitor to ADSL. WiMax can provide an alternative to wireline solutions for fixed broadband Internet access. However, in western Europe, given the penetration already achieved by fixed broadband, and the price levels on the market, WiMax will be mainly used in regions not covered by ADSL, i.e. rural areas. This is the business model of the WiMax offer developed by TDF, which is positioning itself as a carriers' carrier in this market. TDF believes that the addressable market corresponds to around 9% of the lines in France. According to TDF, the business model functions with only 100k customers, thus illustrating that 1) the business model has low fixed costs and that 2) the technology is not expensive (see table). This WiMax usage is also not disruptive;

Table 14: Key elements of TDF's business model in WiMax in France

	% of lines	Lines (m)
Lines with no ADSL	3	1.02
Lines with ADSL at 512k only	6	2.04
Total target market	9	3.06
Minimum number of customers		0.10
% penetration		3.3
Wholesale ARPU (EUR/month)		21
Minimum annual revenues (EURm)		25.2

Source: Exane BNP Paribas, Arthur D. Little estimates

– **Nomadic broadband**, in partial competition with 3G/HSDPA: from the end of 2007-early 2008, WiMax will make it possible to offer nomadic broadband access for portable handsets (PC or PDA). This is the business plan of certain WiMax operators in France (Bolloré, Iliad, etc.). The model that we developed in our report last year showed that such an offer could be proposed for a rate of EUR20-25/month, with the low end of the range corresponding to the cost of an operator that can exploit synergies with an existing fixed-line activity, and the high end corresponding to a stand-alone WiMax operator. This WiMax usage could have a negative impact on mobile operators, even though it only allows 'nomadic' rather than 'mobile' services; the revenues that they hope to develop in the next few years in broadband mobile access could be partly cannibalised by rivals who base their offer on WiMax, and the presence of additional competitors could lead to lower market prices;

– **Mobile telephony**, competing with 3G/HSDPA on telephony and broadband access. This option remains very uncertain, for several reasons: for an operator, such an offer would imply: 1) that its license allows it to offer mobile services, which is not the case today for WiMax licenses in France, for instance; 2) that the operator deploys a dense network allowing mobility, based on WiMax 802.16e technology. This appears possible on 2.5GHz frequencies (those that are going to be attributed in the UK) but not on 3.5GHz frequencies (those of WiMax operators in France and those that are going to be attributed in Italy in 2007) and 3) that genuine mobile handsets are available at a reasonable cost, which will not be possible before 2009-2010, depending on the source. At present, it appears that only the licenses to be attributed in the UK in 2007 will permit the launch of a genuine mobile service by 2009-2010. The model that we developed last year pointed to a minimal monthly rate of EUR26-32/month for a 'mobile telephone and broadband' offer, with the low end of the range corresponding to the case of an operator enjoying synergies with a pre-existing fixed unit, and the high end to a stand-alone operator. Even though this remains a very hypothetical possibility for the moment, it is a long-term threat for mobile operators, not because WiMax would make it possible to develop a much cheaper offer than those that it would make available on their 3G/HSDPA networks, but because WiMax would make it possible to introduce one or several additional competitors on the mobile market, with a potentially negative impact on prices and/or margins.

Concerning these last two applications of WiMax (nomadic broadband and mobile telephony), we would stress that the business model appears to be even more effective if the nomadic service is launched by a fixed operator with nothing to lose on mobile and can maximise synergies with its fixed activity (network, customer base, access to content, convergent services, brand, distribution network). This has been confirmed by our discussions: several operators have insisted on the marginal nature of their investment in WiMax, stressing that they will be able to leverage on their existing infrastructure.

Table 15: Overview of WiMax in Europe

Country	Operator	Position regarding WiMax
Austria	WiMax Telecom	Active WiMax operator
Austria	Telekom Austria	Nationwide licence
Austria	UPC	Nationwide licence
Belgium	Belgacom	-
Belgium	FT / Mobistar	Officially open to it
Belgium	KPN / Base	-
France	FT / Orange	No license
France	Vodafone / SFR	Regional licences
France	Bouygues Telecom	No license
France	Iliad	National licence
France	Neuf Cegetel	Regional licences
Germany	DT / T-Mobile	No
Germany	Vodafone	Maybe
Germany	KPN / E-Plus	-
Germany	Telefonica / O2	Yes
Italy	Telecom Italia / TIM	Maybe
Italy	Vodafone	Maybe
Italy	Wind	Maybe
Italy	Hutchison 3G	Maybe
Italy	Fastweb	Interested
Italy	Tiscali	Interested
Netherlands	KPN	No
Netherlands	Vodafone	Maybe
Netherlands	Casema	Interested
Spain	Telefonica / TEM	Iberbanda (small)
Spain	Vodafone	Maybe
Spain	FT / Orange	Very small
UK	Vodafone	Maybe
UK	FT / Orange	-
UK	Telefonica / O2	-
UK	DT / T-Mobile	-
UK	BT	Interested
UK	Hutchison 3G	No

Source: Exane BNP Paribas, Arthur D. Little estimates

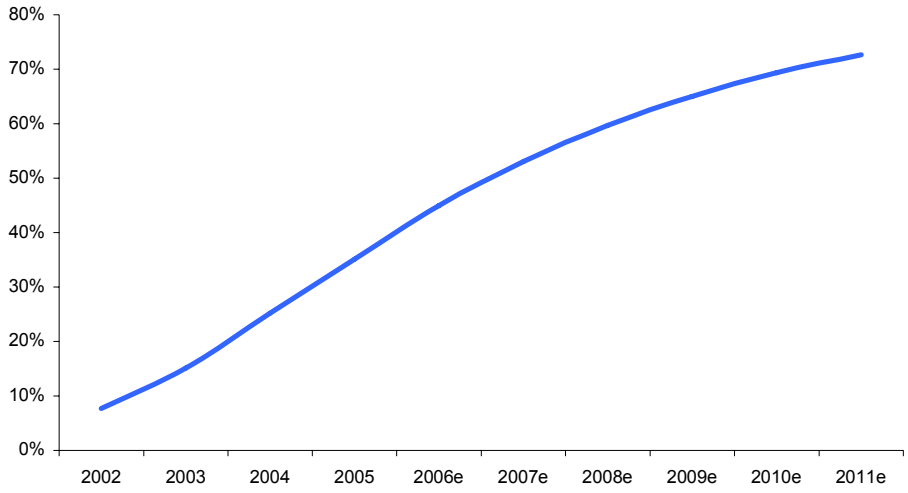
1.4. Fixed broadband: all-out growth

In the coming years, fixed broadband will be the main growth driver in the sector, with potential both in terms of penetration, which we believe could average 80% in Europe, and ARPU, helped by the development of new services (triple-play, video-on-demand, HDTV, etc.).

Penetration: strong potential remains

At end-2006, broadband penetration in Europe averaged 45%, according to our estimates (number of fixed broadband lines, including ADSL and cable, divided by the number of households and SOHOs), fluctuating greatly from one country to the next. Average penetration grew 10% pa in 2004, in 2005 and again in 2006.

Chart 16: Broadband penetration in Europe (as a % of households and SOHOs)



Source: Exane BNP Paribas, Arthur D. Little estimates

Almost all the players we have met with expect growth to continue at the same pace in the next few years, at least until 2010. In particular, we heard very positive comments on expected growth in Italy, the UK, France, Belgium and Sweden.

Many sector leaders notably do not believe that current PC penetration is an insurmountable obstacle, for several reasons:

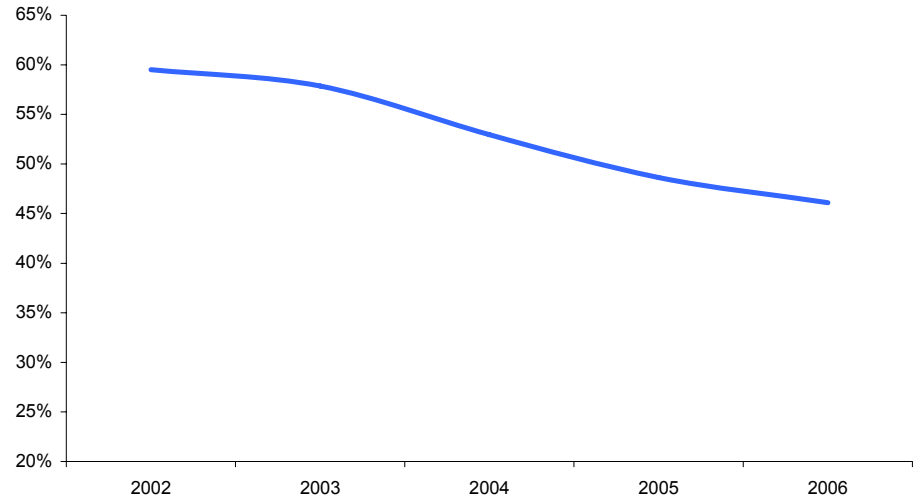
– households are increasingly buying PCs to be able to subscribe to broadband Internet;

– operators could develop products that give customers broadband access without PCs (e.g. Neuf Cegetel's easybox);

– with triple-play products, broadband becomes attractive for Internet access as well as for TV and unlimited telephone use. This is further reinforced by the increase in incumbent operators' basic line-rental fee: indeed, considering this increase, alternative carriers' ADSL offers are sometimes more attractive, even for telephone use alone, than incumbents' traditional telephone offers.

All players should benefit from this growth. As seen in the chart below, the incumbents continue to lose market share, but at a slightly slower pace. Average market share declined from 60% at end-2002 to 46% at end-2006e, but the annual loss should come to less than 3% in 2006, versus around 4% in 2005 and almost 5% in 2004.

Chart 17: Incumbents' average broadband market share



Source: Exane BNP Paribas, Arthur D. Little estimates

However, the situations vary broadly from one country to the next: strong decline in Germany, new negative trend in Italy, but quasi-stability in France, Spain, the UK, Belgium, etc., and even an increase in Austria.

The markets are not in the same phase in the cycle: some players are consolidating (AOL Europe and Tele2 have exited some countries) but new entrants are arriving on the ADSL market. This is notably the case with mobile operators (Vodafone, O2, etc.). The market share stabilisation in some countries may therefore be fleeting.

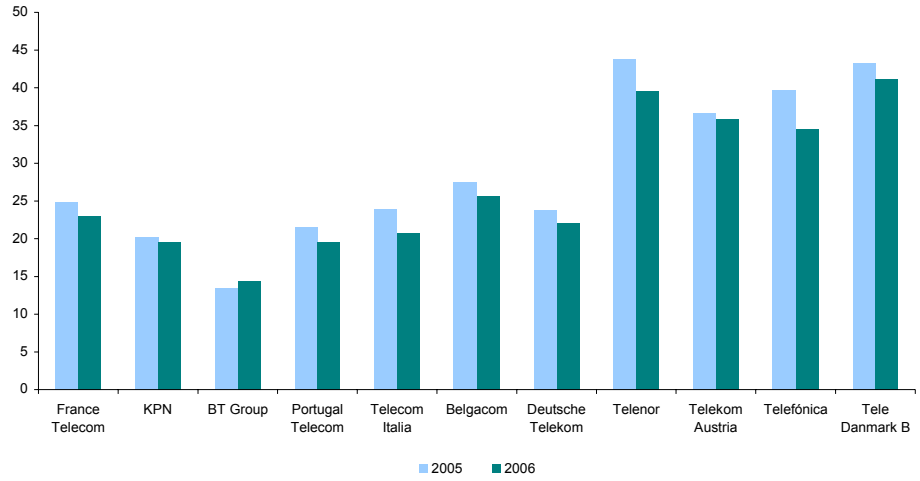
Chart 18: Change in incumbents' broadband market share

Source: Exane BNP Paribas, Arthur D. Little estimates

ARPU: real rebound potential…

ARPU has fallen off strongly in the past few years, due to competition from unbundling. ADSL ARPU dropped 6% pa on average in 2003-06, winding up at an average of EUR23/month.

Chart 19: ADSL ARPU comparison (EUR/month)



Source: Exane BNP Paribas, Arthur D. Little estimates

'Basic' Internet access products are still the focus of competition in many countries, but the markets are increasingly moving towards more complete service offerings: double-play (telephone + Internet) and triple-play (telephone + Internet + television).

This shift is positive for ARPU, as triple-play ARPU is EUR35-65/month, depending on the player (alternative operators or incumbents) and the country (see chart above, which reflects price differences from one country to the next).

Of course, this triple-play ARPU is not strictly comparable to the EUR23/month calculated on ADSL revenues declared by the operators, because it includes not just broadband Internet access (the only item currently included in ADSL revenues declared by the operators), but also a telephone subscription (EUR12-15/month, depending on the country), voice calls to fixed lines (ARPU of around EUR10/month) and a TV offer (often for an additional fee). Initially, migration to such offers has a negative impact, when customers who use the telephone the most migrate, but we expect a neutral or positive effect thereafter. Thus, in countries that are 'ahead of the curve', like France, in particular, ARPU is already rising at some alternative operators that do not have traditional revenues to defend.

This was confirmed by the players that we met with, although expectations differ from country to country: in France and Sweden, they expect ARPU to increase in the next few years, thanks to price stabilisation and the development of new services; but in the Netherlands, Belgium and Austria, players expect ARPU to continue to decline.

VoIP was the first service that a large number of Internet access providers offered, on top of access, strictly speaking. We expect voice ARPU (including voice over IP and classic voice) to decline in the coming years, but we note the key strategic advantages related to the launch of this service:

– for alternative operators, customers were promised free or very inexpensive telephony, which proved to be a very strong commercial argument;

– for incumbents, it was a necessity to minimise voice revenue cannibalisation.

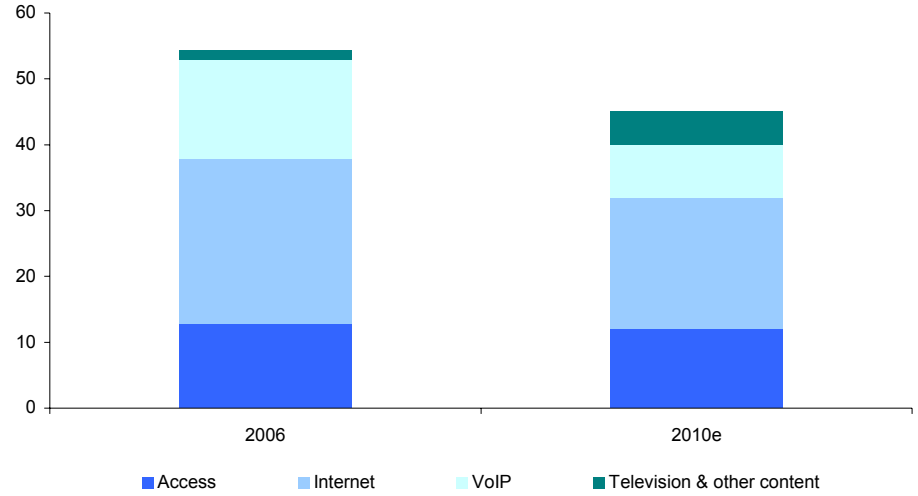
Thus, in countries where VoIP was quickly included in broadband access packages, which was almost all of Europe, customers lost interest in independent VoIP services such as Skype and Vonage.

Beyond this, higher speeds (ADSL 2+, launched in many countries, can reach a downstream connection speed of 20Mbit/s) have opened the door to TV over ADSL (IPTV) and therefore to triple-play.

Many operators have only recently launched an IPTV service (Telecom Italia in Italy and in France, Deutsche Telekom in Germany, France Telecom in Spain, BT in the UK, Swisscom in Switzerland), but others launched this service a while ago and are now seeing penetration rates in the neighbourhood of 10% of their broadband subscriber base. This is true in France, with Iliad (more than 700k customers at end-2006 based on our estimate), France Telecom (577k customers reported at end-2006) and Neuf Cegetel (more than 300k customers at end-2006), as well as in Belgium with Belgacom (103k at end-Q3 06), in Spain with Telefonica (383k customers at end-2006) and in Italy with Fastweb (350k at end-2006e).

As the chart below illustrates, we expect total triple-play ARPU of EUR45/month in 2010 (on average in Europe), of which EUR5/month comes from IPTV and other content.

Chart 20: Generic ARPU model: triple-play broadband ARPU (EUR/month)



Source: Exane BNP Paribas, Arthur D. Little estimates

Sector players are very positive on TV over IP, in terms of number of potential customers and their ability to monetise the service, thanks in large part to the next stages in its development: VoD and HDTV:

– in France, Iliad has said that 1.8m-2.9m videos were sold on demand in 2006, of which 40% by Iliad alone, even though it had just launched its service;

– regarding HDTV, some expect that, in five to ten years, TV will be broadcast almost exclusively in high definition.

Lastly, increased speeds generate new uses for the Internet, which in turn generate demand for higher speeds:

– community-based content (Web2.0 services such as blogs, MySpace, YouTube, etc.) is now clearly a very strong driver of usage growth. In France in 2006, 10% of searches done through search engines related to Internet video download services (YouTube, DailyMotion, etc.);

– interactive games: several major sector players expect a step-up in online game growth; Vivendi recently cited the highly successful launch of its new version of *World of Warcraft*; and

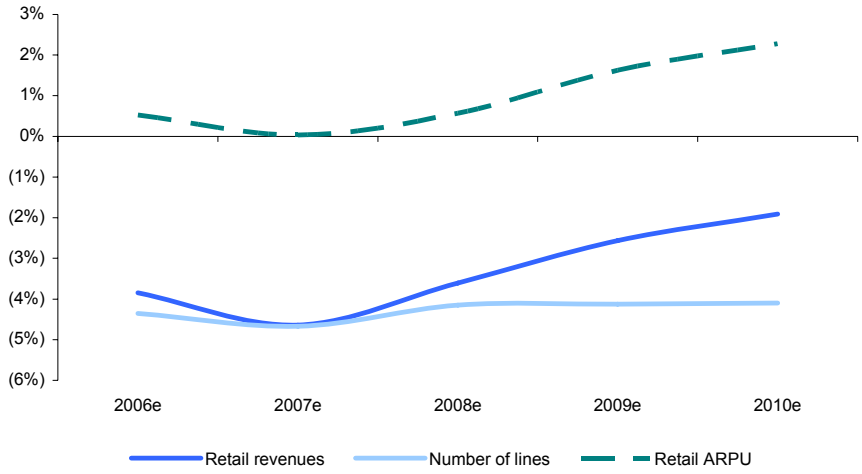
– many other uses such as remote backup (HomeSafe from BT, NeufGiga from Neuf Cegetel, etc.).

The need for speed will increase as these many uses and HDTV expand. Current applications require speeds of 2-10Mbit/s, but the 'average' need in 2010 will be much higher than 10Mbit/s. This implies operators will have to make new investments to roll out more powerful networks: FTTC/VDSL and FTTH (cf. pages 97-99).

…but potential that will not suffice to reach the inflection point at incumbents' fixed line activity

In our opinion, this expected increase in ARPU, estimated at +1% on average per year over 2006-2010e in Europe, will allow incumbent fixed-line operators to improve their retail revenue trends and partially offset the loss of fixed lines expected at a constant rate of -4% per year over the next few years (see chart below). We nonetheless expect an average drop in fixed-line operators' retail revenues of around 3% per year over 2006-2010e.

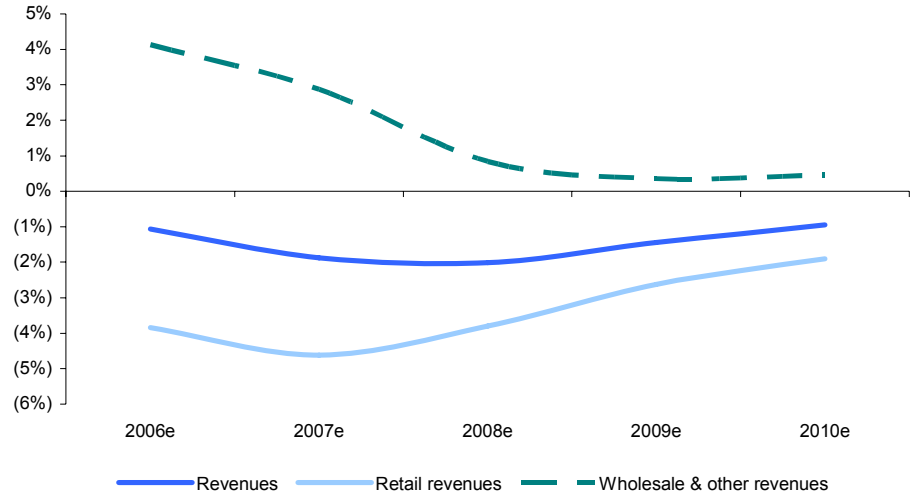
Chart 21: Change in incumbents' fixed-line revenues (retail revenues only); contribution from line losses vs ARPU



Source: Exane BNP Paribas, Arthur D. Little estimates

The chart below also factors in the wholesale revenues (notably unbundling) and corporate market revenues of incumbents. It shows that the expected improvement in terms of retail revenues will compensate for the slower growth of other revenues, leading to a 1.5% drop pa in incumbents' fixed-line revenues over 2006-2010e.

Chart 22: Change in incumbents' fixed-line revenues: contribution of retail revenues versus other revenues



Source: Exane BNP Paribas, Arthur D. Little estimates

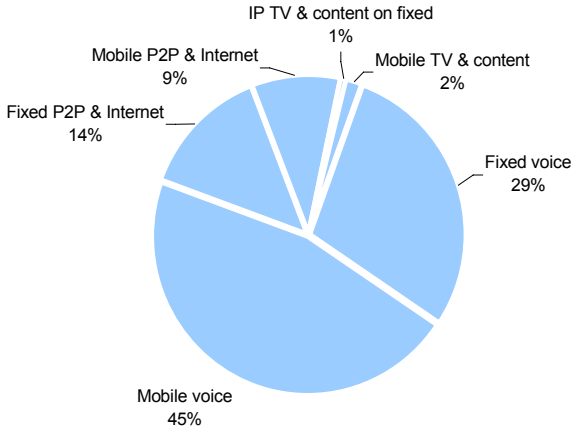
1.5. Our scenario, weak growth, declining ROCE

We estimate that in 2006, telecoms services represented revenues equivalent to EUR51/month per inhabitant in Europe ([4]), excluding the corporate market. This breaks down as follows:

– EUR22/month for fixed-line (corresponding to EUR57/month per fixed line) and EUR29/month for mobile, or

– EUR39/month for voice (fixed and mobile) and EUR12/month for data (fixed-line Internet access, mobile data, fixed-line and mobile content).

Chart 23: Telecoms services revenues in Europe, 2006 (EUR/month per inhabitant)



Source: Exane BNP Paribas, Arthur D. Little estimates

Our updated forecasts for the coming years are as follows:

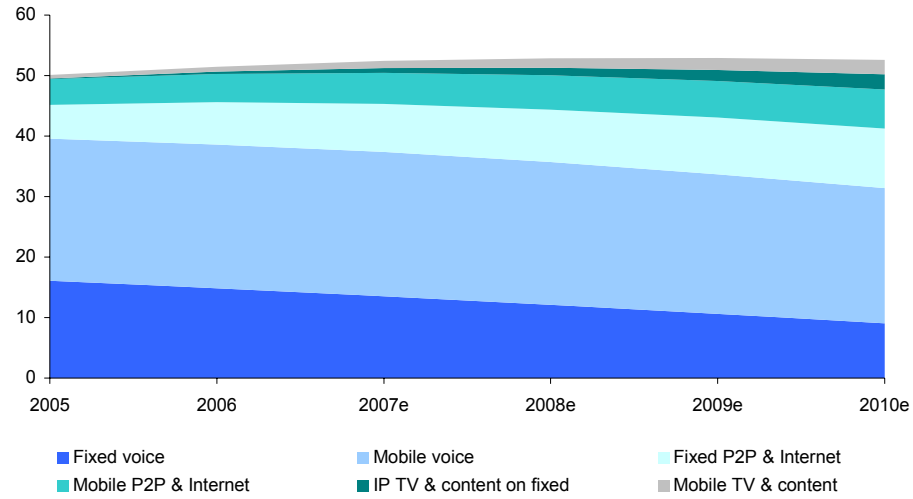
– for the sector overall, average growth of 0.3% in the 2006-2010e period, equivalent to +0.7% in 2005-2010e, practically unchanged compared to our estimate last year of +0.8% in 2005-2010e;

– growth in mobile of 1.9% pa in 2006-2010e, equivalent to +2.2% in 2005-2010e, compared with our +3.1% forecast last year. This revision stems from our lower expectations for mobile data, incorporating the weaker-than-anticipated performance in 2006;

– a decline of 1.1% pa in fixed-line in 2006-2010e, equivalent to -0.7% in 2005-2010e, compared with our -1.3% estimate last year.

[4] Countries: Germany, Belgium, Spain, France, Italy, Netherlands, Portugal, UK

Chart 24: Telecom services revenues in Europe (EUR/month per inhabitant)

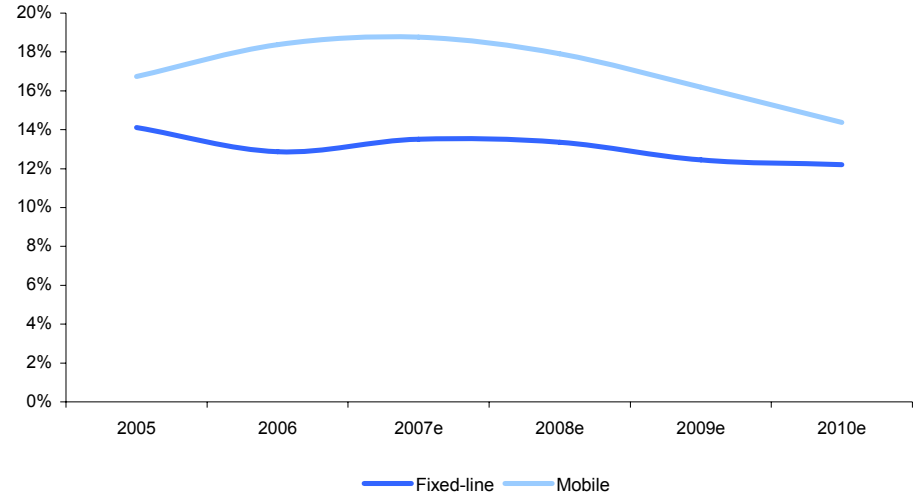


Source: Exane BNP Paribas, Arthur D. Little estimates

Also, we expect the sector's average EBITDA margin to contract by 250bp between 2006 and 2010e, with the average margin on mobile dropping from 38% to 35%, and that on fixed-line, from 40% to 39%.

Given our estimated Capex/Sales, flat at around 14% in fixed-line, and rising from 12% in 2006 to 13% in 2010e in mobile, we expect ROCE to decline, particularly in mobile (see chart below).

Chart 25: ROCE of fixed-line and mobile operators in Europe



Source: Exane BNP Paribas, Arthur D. Little estimates

We outline below the core assumptions underlying our estimates and the sensitivity of our estimates to key parameters.

Voice traffic: accelerated fixed-mobile substitution

We expect mobile penetration to reach 127% in 2010e, versus 105% at the end of 2006 (based on our eight-country model), meaning growth of 4.9% pa in mobile subscribers (average number of SIM cards) compared with +9% in 2006.

This 127% penetration level in 2010, which is coherent with the expectations of sector players, will stem from:

– deeper penetration of some currently underpenetrated market segments, notably the under-15 age group, the over 65s and immigrants;

– an increase in the number of SIM cards per subscriber, linked to two phenomena: additional SIM cards for data terminals (PCs, connected PDAs, etc.) and double SIM cards, reflecting the fact that more and more customers will use a number of operators at the same time to optimise their bill.

We expect the fixed-mobile substitution trend to continue for voice traffic, fuelled by growth in both mobile penetration and traffic per subscriber. We estimate that mobiles will generate 58% of outgoing traffic in 2010e, versus 38% in 2006e, i.e. growth in outgoing mobile traffic of 12% pa (+7% pa for minutes per subscriber), to be compared with +15% in 2006. Given the anticipated weak growth for total voice traffic, this mobile growth will be achieved to the detriment of fixed-line. We estimate that traffic on fixed-line networks will fall by 8% pa.

The average rate per mobile minute should fall by 12% pa in 2006-2010e for outgoing traffic, as a result of 'classic' competition between mobile operators, but also because of fixed-mobile convergence and competition from fixed-line (unlimited VoIP packages). This compares with -12% in 2006. We expect a 13% pa decline for interconnection (mobile termination) in 2006-2010e, versus -15% in 2006e.

The 'Central' column in the table below sums up these assumptions.

Table 16: Parameters on voice – and alternative scenarios on voice

	2006	2010e		
		Nicer markets*	Central	Tougher markets*
Outgoing voice traffic CAGR (%)				
Fixed		(9.6)	(8.5)	(6.4)
Mobile		13.4	12.5	10.5
Total		1.0	1.0	1.0
% originated on mobile	38	60	58	54
Mobile MOUs	142	194	188	170
Outgoing voice prices CAGR (%)				
Fixed		(2.0)	(3.2)	(5.4)
Mobile		(11.0)	(12.0)	(13.0)
Voice revenue per pop. (EUR/month)				
Fixed	14.9	9.1	9.1	9.1
Mobile	23.7	24.0	22.4	20.1
Total	**38.6**	**33.0**	**31.4**	**29.2**
Voice revenue per pop. CAGR (%)				
Fixed		(11.6)	(11.6)	(11.6)
Mobile		0.2	(1.5)	(4.1)
Total		**(3.8)**	**(5.0)**	**(6.8)**
Total market CAGR (voice & data) (%)				
Fixed		(1.1)	(1.1)	(1.1)
Mobile		3.2	1.9	0.2
Total		**1.0**	**0.3**	**(0.5)**

** 'Nicer markets' corresponds to a scenario where pressure on mobile prices is weaker, but where fixed-mobile substitution in nevertheless stronger; 'Tougher markets' corresponds to a scenario where pressure on mobile prices is stronger, but where fixed-mobile substitution is slowing.*

Source: Exane BNP Paribas, Arthur D. Little estimates

Fixed broadband and mobile data: strong growth

Fixed broadband penetration is set to continue at a rapid pace: we expect 80% penetration at end 2010 on average in the eight European countries studied, versus 45% at the end of 2006. This represents an average nine-point gain in penetration every year, compared with 11 points gained in 2006.

ARPU in the retail market should be EUR45/month in 2010e, including EUR12/month for network access (the equivalent of the fixed-line rental), EUR20/month for Internet access, EUR8/month for voice and EUR5/month for TV and other content. This constitutes an estimated drop of almost 5% pa in broadband ARPU between 2006 and 2010e.

Given the mix effect (as a result of the migration from narrowband, where ARPU is lower, to broadband, where ARPU is higher, albeit declining), this means that the fall in fixed-line revenues will only be modest.

Mobile data ARPU should rise from EUR5.2/month in 2006 to EUR7.0/month in 2010e, representing revenues per inhabitant of EUR8.9/month (based on the anticipated 127% penetration rate).

Within this ARPU, we expect a 3% fall pa in ARPU on messaging (SMS and MMS), from EUR3.7/month in 2006 to EUR3.2 in 2010e, and a 25% increase pa in ARPU on non-messaging data, from EUR1.6/month in 2006 to EUR3.8/month in 2010e, half of which on broadband access and the other half on TV and other mobile content.

The 'Central' column in the table below sums up our assumptions for data ARPU.

Table 17: Parameters on data services – and alternative scenarios on data services

	2006	2010		
		Strong	Central	Weak
Mobile data ARPU (EUR/month)				
P2P	3.7	3.2	3.2	3.2
Internet	0.8	2.9	1.9	1.2
TV & content	0.8	2.9	1.9	1.2
Total	**5.2**	**9.0**	**7.0**	**5.6**
Fixed broadband ARPU				
Access	12.8	12.0	12.0	12.0
Internet access	25.0	19.0	20.0	21.0
Voice traffic	15.1	8.0	8.0	8.0
IP TV & content	1.4	4.0	5.0	6.0
Total	**54.4**	**43.0**	**45.0**	**47.0**
Data revenue per pop. (EUR/month)				
Fixed	7.4	11.5	12.3	13.1
Mobile	5.5	11.7	8.9	7.3
Total	**12.9**	**23.2**	**21.2**	**20.4**
Data revenue per pop. CAGR (%)				
Fixed		9.3	10.8	12.2
Mobile		16.4	10.1	5.8
Total		**12.5**	**10.5**	**9.6**
Total market CAGR (voice & data) (%)				
Fixed		(1.6)	(1.1)	(0.6)
Mobile		4.1	1.9	0.6
Total		**1.3**	**0.3**	**(0.1)**

Source: Exane BNP Paribas, Arthur D. Little estimates

Anticipated contraction in the gross margin

Lastly, the 'Central' column in the table below shows our assumptions regarding operators' gross margin on these new data services, i.e. the breakdown of value of these services between the operators and their media and Internet partners.

We expect this gross margin to narrow slightly as a result of two factors:

– growth in content revenues, diluting the average margin;

– margin contraction on some services, owing to an expected broader sharing of revenues with partners (content groups, Internet leaders).

Table 18: Gross margin on data services – and alternative scenarios on gross margin

		2010e		
	2006	Strong	Central	Weak
Gross margin on mobile services (%)				
Voice	70	70	70	70
P2P	73	65	65	50
Internet	100	100	90	80
TV & content	52	60	45	35
Total	**71**	**71**	**69**	**65**
Gross margin on fixed broadband (%)				
Access	100	100	100	100
Internet access	100	100	100	100
Voice traffic	60	50	50	50
IP TV & content	51	55	45	40
Total	**88**	**86**	**85**	**84**
Gross profit per pop (EUR/month)				
Fixed	**18.2**	**17.6**	**17.4**	**17.3**
of which voice	10.1	5.1	5.1	5.1
of which data	8.1	12.5	12.3	12.2
Mobile	**20.7**	**22.3**	**21.5**	**20.6**
of which voice	16.6	15.7	15.7	15.7
of which data	4.1	6.7	5.9	4.9
Total	**38.8**	**39.9**	**38.9**	**37.9**
Total market CAGR (voice & data) (%)				
Fixed		(1.1)	(1.1)	(1.1)
Mobile		2.1	1.9	2.1
Total		**0.4**	**0.3**	**0.4**
Gross profit CAGR (voice & data) (%)				
Fixed		(2.0)	(2.2)	(2.3)
Mobile		2.1	1.3	0.3
Total		**0.0**	**(0.6)**	**(1.1)**

Source: Exane BNP Paribas, Arthur D. Little estimates

Sensitivity: best case / worst case

We have updated our alternative scenarios on the various parameters presented previously, leading to a best-case scenario combining the highest expectations across all parameters, in terms of both voice and data, and a worst-case combining the lowest expectations.

The previous tables regarding voice and data outline our assumptions, and the table below shows the sensitivity of the results to these two extreme scenarios. It shows that:

– in the best-case scenario, sector revenues would grow by 1.9% pa in 2006-2010e, of which +5.3% pa in mobile and -1.6% in fixed-line. EBITDA would rise by 1.7% pa. This gives 2010e sector ROCE that is more than 100bp higher than in our core scenario, with, notably, ROCE remaining at close to 17% in mobile.

– in the worst-case scenario, total revenues would decline by 1.0% pa in 2006-2010e, of which -1.4% in mobile and -0.6% in fixed, leading to an annual 2% decline in EBITDA in the sector. Sector ROCE in 2010e is around 100bp lower than in our core scenario, and ROCE in mobile is on a par with that of fixed.

We detail on page 78 an alternative scenario combining stronger growth on mobile data services and weaker gross margin for operators. This gives the same ROCE as in our core scenario, but with stronger market growth.

Table 19: Sensitivity of earnings to best-case and worst-case scenarios

EUR/month	Core	Best	Worst
2010e figures			
Revenue per pop (ex corporate)	**52.6**	**56.4**	**49.4**
Fixed	21.4	20.7	22.0
Mobile	31.2	35.7	27.4
Voice	**31.4**	**33.2**	**29.0**
Fixed voice	9.1	9.2	8.9
Mobile voice	22.4	24.0	20.1
P2P & Internet access	**16.3**	**17.4**	**15.9**
Fixed P2P & Internet	9.9	9.5	10.2
Mobile P2P & Internet	6.5	7.9	5.7
TV & content on telecom networks	**4.9**	**5.8**	**4.5**
IP TV & content on fixed	2.5	2.0	2.9
Mobile TV & content	2.4	3.8	1.6
Revenue CAGR 2006-2010e (%)	**0.3**	**1.9**	**(1.0)**
Fixed	(1.1)	(1.6)	(0.6)
Mobile	1.9	5.3	(1.4)
Gross margin CAGR 2006-2010e (%)	**(0.6)**	**1.5**	**(2.4)**
Fixed	(2.2)	(2.6)	(1.9)
Mobile	1.3	5.6	(3.1)
2010e EBITDA margin (%)	**37.0**	**38.7**	**35.9**
Fixed	39.1	38.8	39.5
Mobile	35.0	38.6	32.0
EBITDA CAGR 2006-2010e (%)	**(0.4)**	**1.7**	**(2.0)**
Fixed	(1.2)	(1.8)	(0.5)
Mobile	0.5	5.3	(3.8)
2010e ROCE (%)			
Fixed	12.2	12.1	12.4
Mobile	14.4	16.8	12.4
Total	**13.3**	**14.4**	**12.4**

Source: Exane BNP Paribas, Arthur D. Little estimates

2. Value chain fragmentation: opportunities but also risks

Deflationary pressure on operators' traditional activities is strong. This forces them to reduce costs by all means possible, but also to step up initiatives to create additional sources of growth. These include MVNOs to address niche markets, the launch of new Internet-type services and content offers. To optimise these opportunities they need to forge partnerships with different types of players, but they must also enhance customer relationships (CRM, distribution networks etc.) and have top-class infrastructure, which means investing in new network technologies (3G, FTTx, NGN).

Faced with this abundance of challenges, sector players are reconsidering the historical integrated operator model and rethinking their business model and value chain.

They are becoming increasingly aware that they cannot be present on all links in the chain, and/or that it is not necessary and/or that even on those positions which constitute their core business, they can create more value by forging partnerships.

The number of initiatives is growing and will continue to grow, at all levels:

– outsourcing of passive and even active infrastructure, and/or network sharing, in both fixed-line and mobile;

– development of virtual operators: mobile virtual operators (MVNOs), mobile virtual operator enablers (MVNEs), fixed-line virtual operators (FVNOs), convergent virtual operators (CNVOs) etc.);

– partnerships with media groups and increasingly with Internet leaders.

All of these trends provide opportunities to 'optimise the value chain':

– by lowering costs and capex: all else being equal, the outsourcing of passive or active infrastructure and network sharing can increase operators' value by 3-8% depending on the scenario;

– by stimulating growth: virtual operators have proved that they can help an operator to accelerate growth (example of KPN boosting E-Plus in Germany by increasing the number of brands and MVNOs). In addition, the partnerships with media groups and Internet leaders have demonstrated that they could stimulate usage without the risk of significant cannibalisation in the short term.

But the risks are real:

– the decline in costs and capex will significantly lower the barriers to entry, notably in mobile. This will have an impact on the competitive landscape and therefore on the value of the sector in the medium to long term;

– virtual operators can only create value for the operators if their positive effect in terms of market stimulation is strong but without them capturing large market share or impacting prices significantly;

– the Internet leaders could capture most of the value created in new services, and possibly a part of the operators' historical revenues. In short, it is worth taking up the challenge, but uncertainty is strong.

2.1. The value chain

The chart below illustrates the telecoms value chain, as we see it, with six links in the chain:

– passive infrastructure. In the case of mobile, the masts on which the antenna (BTS), are installed, and in the case of fixed-line operators, the ducts in which are installed the fibre optics or copper cables, or even the dark fibre itself;

– active infrastructure, constituting the transmission equipment, switching, routing, etc., strictly speaking, the network;

– customer management: for mobile, this corresponds to HLR or home location register;

– services: the management of calls, data flows (e.g. Internet and Intranet access). This link in the chain is becoming increasingly complicated with the integration of convergent services between fixed-line and mobile and between telecoms and media (TV, music and so on);

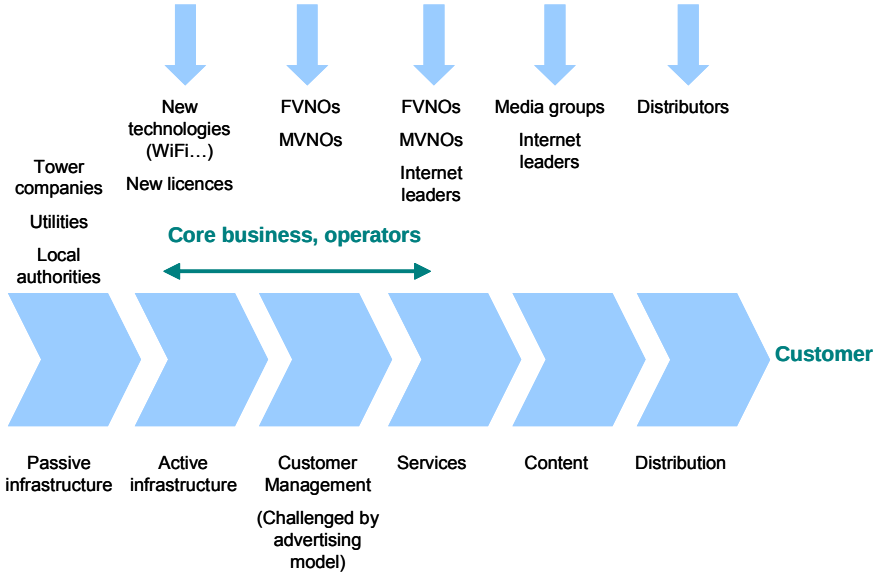
– content;

– distribution, which makes the 'physical' link with the customer: directly-owned stores or indirect distribution, telephone and online sales etc.

As the chart below shows, historically, the core business of telecom operators ranges from infrastructure (in particular active infrastructure, i.e. the network) to customer management (including voice, data) to services. Media groups and leading Internet companies specialise in content, and distributors, in distribution.

However, this historical breakdown of roles will be increasingly challenged, and the examples of value chain 'fragmentation' are growing. We believe this trend will gather pace in the coming years. Fragmentation is taking place at all levels of the value chain, with several phenomena occurring simultaneously. For instance, new companies are arriving on certain positions on the chain, operators are leaving others and players are moving from one position to another. In the following paragraphs, we give concrete examples of the scale of these movements.

Chart 26: Value chain



Source: Exane BNP Paribas, Arthur D. Little estimates

2.2. Infrastructure innovation: cutting costs – and also barriers to entry

Telecoms operators have always considered that the network was an integral part of their core business. But this position is undergoing dramatic change, with many exceptions emerging.

Outsourcing, network sharing, to name but some

Several different trends are developing at the same time.

– *Outsourcing of passive infrastructure*. This trend emerged some years ago, notably in relation to mobile. A number of operators handed over the construction and/or management of their masts to tower companies (such as TDF in France, National Grid Wireless in the UK). European operators are lagging behind their US counterparts in this domain, with only 20% of masts being outsourced in Europe compared with 80% in the US.

– *Outsourcing of active infrastructure* by mobile operators to equipment manufacturers like Ericsson, Nokia and Alcatel. The latter, which manufacture the networks' active equipment, are willing to install this equipment and/or to ensure its day-to-day running. This trend is currently gathering pace.

– *The sharing of infrastructure with competing operators*. This development notably began in France and in Sweden to reduce the cost of mobile network coverage in rural areas. The trend is likely to find fresh momentum with the deployment of 3G networks in less dense areas. However, this approach is also destined to be used in the deployment of new networks such as DVB-H (notably in France and in Germany). It is also likely to develop in fixed-line for the deployment of new infrastructure for FTTH (among the ideas being put forward by the French regulator are shared ducts and shared 'vertical' infrastructure).

– *The 'separation' of Network and Services* is a growing theme for the domestic fixed-line activities of incumbent operators. This is exemplified by BT Openreach, which Telecom Italia is seeking to replicate in Italy. Within the framework of the anticipated revision of European directives governing regulation of the sector, the European Commission could grant national regulators the authority to impose the separation of fixed-line networks and services.

These trends (apart from the separation of fixed-line networks) have been confirmed by almost all of players that we have interviewed, whether they be operators (both leaders and challengers), equipment manufacturers, regulators or tower companies. The number of 'pitches' made by manufacturers and tower companies to operators is growing and the operators are becoming increasingly receptive.

The challengers were the first operators to outsource mobile networks, notably in 'small' countries. Given their lack of critical size, these players strove to optimise their cost base from the very beginning. The leaders were under less pressure, as their size ensured lower unit costs. Also, they were held back by a stronger technological culture. However, this is changing rapidly. In 2006 and early 2007, Vodafone and France Telecom announced plans to outsource and/or share some of their mobile networks.

Outsourcing breeds outsourcing: in any given country, once an operator outsources its network, competitors must follow so as not to lose ground in terms of costs. For the manufacturer which has taken on one network, the opportunity to take on a second or even a third becomes even more attractive, as synergies can be developed between the different networks.

The vast improvement in the quality of outsourced services, which according to several sources is now on a par with that obtained inhouse, is also driving this trend.

Only two of the thirty mobile operators that we interviewed are against outsourcing their networks, believing that network management is one of their key competencies. That said, they are not necessarily opposed to the notion of outsourcing new infrastructures.

NB. Outsourcing does not only concern the networks. Other functions such as call centres, IT, billing and even the hosting of services platforms are also part of this trend.

Table 20: Mobile network outsourcing and sharing – acceleration since 2006

Period	Country	Operator	Type	Counterpart	Comment
2001-2004	France	Bouygues Telecom	Outsourcing	TDF	'Almost all' masts
2002	Austria	Telering	Outsourcing	Alcatel	2G network field operations (including maintenance; 30% reduction in opex)
2002	Germany	T-Mobile, O2	Sharing		3G networks in both the UK and Germany
2002	The NL	Telfort	Outsourcing	Ericsson	2G and 3G network (planning, design, rollout, maintenance)
2002	UK	T-Mobile, O2	Sharing		3G networks in both the UK and Germany
2003	Austria	One	Outsourcing	Alcatel	2G and 3G access & transmission networks (planning, rollout, supervising, operations, maintenance)
2003	Spain	Amena (Orange)	Outsourcing	Ericsson	2G network (maintenance and operations)
2004	Belgium	Base	Outsourcing	Alcatel	2G network (rollout and some field operations)
2004-2006	Switzerland	Orange	Outsourcing	Nokia	3G network (design, rollout, maintenance; cost/SIM down 11% in 2006, 48% in 2007; 3700 GSM, 1000 UMTS, 1500 microwave sites)
2004-2007	France	Orange, SFR, Bouygues Telecom	Sharing		2G network in 'zones blanches' (1071 sites in first phase, 900 more to come)
2005	Italy	Hutchison 3G	Outsourcing	Ericsson	3G network (full outsourcing incl. provision of multimedia services; transfer of 750 employees)
2006	Belgium	Mobistar	Outsourcing	Ericsson	2G network (connection, field interventions, maintenance and supervision, 150 employees transferred to Ericsson; -30% on EUR90m opex & capex base)
2006	Belgium	Telenet	Wholesale	Mobistar	MVNO deal, to provide quadruple-play services
2006	Czech Rep.	Vodafone, T-Mobile	Sharing		'Exploring network sharing'
2006	France	Neuf Cegetel	Wholesale	SFR	MVNO deal, to enable hybrid mobile-WiFi service
2006	Germany	Vodafone, T-Mobile, E-Plus, O2	Sharing		DVB-H network (rollout and operations)
2006	Italy	Vodafone	Wholesale	Fastweb	ADSL wholesale
2006	Spain	Orange, Vodafone	Sharing		2G and 3G networks in rural areas (1200 2G sites, 5000 3G sites by 2010)
2006	Spain	Yoigo	Outsourcing	Ericsson	3G network (radio, network and service equipment)
2006	The NL	Vodafone	Outsourcing	Ericsson	2G and 3G networks (rollout, operation of access network)
2006	Turkey	Vodafone	Outsourcing	Motorola	2G network (full outsourcing of rollout and operations for 8 years; USD2bn contract)
2006	UK	Hutchison 3G	Outsourcing	Ericsson	3G network & IT infrastructure (for 7 years; transfer of 1000 employees; USD2.5bn?)
2006	UK	Vodafone	Wholesale	BT	ADSL wholesale
2006-2007	France	France Telecom, Iliad, Neuf Cegetel	Sharing		ARCEP decision to push for sharing of passive infrastructure in FTTH rollout
2006-2008	Italy	Telecom Italia	Separation		Discussing separation of fixed-line infrastructure with regulator
2007	France	Orange, SFR, Bouygues Telecom	Outsourcing	TDF	DVB-H network (to be rolled out and operated by TDF for mobile operators and broadcasters; EUR150m/year)
2007	The NL	Orange	Outsourcing	Ericsson	2G and 3G networks (for 5 years; rollout, operations and field maintenance; 190 employees transferred)
2007	The NL	KPN	Outsourcing	TDF	Sold 25 broadcasting masts (kept the equipment on the masts)
2007	UK	Orange, Vodafone	Sharing		3G networks first, maybe 2G networks later (4000 base stations in medium term, -20/30% on GBP300m opex & capex base)
2007	Germany	KPN/E-Plus	Outsourcing	Alcatel	Aim to save EUR100m over 3 years (80% in opex, 20% in capex); 750 staff to be transferred

Source: Exane BNP Paribas, Arthur D. Little estimates

The benefits: all players can optimise their activities

The operators have to focus their efforts and management's attention on marketing and service provision (e.g. creation of innovative services, content aggregation, improving time-to-market and service quality) and on customer relations via the CRM and the distribution networks (the trend among operators to invest in their own stores). The ricochet effect is that operators are increasingly outsourcing other, non-core, activities.

In addition, outsourcing reduces costs. External partners are in a position to lower costs as they can 1) improve the management of the assets concerned, given that they constitute their core business, 2) be more flexible on personnel costs, and 3) share the outsourced assets between several operators so as to optimise their return.

As we demonstrate in this section, the different systems of outsourcing and network sharing can have a significant positive impact on operators' cash flows: value creation of up to 5% of a mobile operator's value for the outsourcing of masts, +6% for outsourcing a network to an equipment supplier, +3% to +8% for network sharing between operators.

Outsourcing of masts: value creation could reach 5% for the operators

In the table below, we have used as an example the business model of the leading French tower company TDF to assess the potential savings in the event of a mast being shared by several operators.

Based on TDF's 2006 accounts, we estimate that these costs break down into personnel costs (EUR35k per site), which we assume are fixed costs, and other costs that we assume to be variable. The latter, which include site rental and energy costs, also total EUR35k per site (however, we do not have a detailed breakdown).

To simplify our cost calculation, we have assumed that these accounts reflect a situation where each mast is on average used by two operators or broadcasters. Then we have modelled the required minimum revenue per site, assuming that the tower company targets after-tax ROCE of 15% (this is a working assumption), based on the number of operators on each site. Our findings show that when two operators, as opposed to one, use the mast, the required minimum revenue per mast drops by EUR33k pa, and when the mast is shared by three operators, this requirement drops by a further EUR11k pa.

Table 21: Our model of savings linked to mast sharing

Impact of site sharing on tower company P&L per site	**Assumption: two operators per site**		**Scenarios – number of operators per site**		
	EURk	**% of revenues**	**1**	**2**	**3**
Revenues	126	100	63	126	189
Labour costs - assumed fixed costs	35	28	35	35	35
Other (energy, site renting, etc.) - assumed variable costs	35	28	17	35	52
Total Opex	70	55	52	70	87
EBITDA	57	45	11	57	102
Capex	(25)	(20)	(25)	(25)	(25)
OpFCF	**32**	**25**	**(14)**	**32**	**77**
Total Opex+Capex	95	75	77	95	112
Minimum EBIT for 15% post-tax ROCE	-	-	6	6	6
Minimum revenue for 15% post-tax ROCE	-	-	83	100	118
Minimum revenue per operator	**-**	**-**	**83**	**50**	**39**
Potential cost reduction from sharing	**-**	**-**		**33**	**11**

Source: Exane BNP Paribas, Arthur D. Little estimates

Thus, based on the calculated amount of savings linked to site sharing (between EUR11k and EUR33k per site depending on the case), we estimate the annual savings range for an operator outsourcing 4,000 rural sites at between EUR44m and EUR132m. We have then calculated the potential value creation, applying a broad EBITDA multiples range, i.e. a 'low' multiple of 5x (the low point of mobile operators' recent valuations) and a 'high' multiple of 15x (in line with that of US tower companies).

Admittedly, in the event of disposal of these sites, the totality of this value creation would not be captured by the operator alone, but would be shared with the tower company. Assuming a 50/50 split of the value creation (and an enterprise value of EUR20bn for the operator, on a par with the valuations of leading players in major European countries), the potential value creation for the operator ranges between 0.6% and 5.0% of its enterprise value.

Table 22: Potential value creation for a major mobile operator

Annual saving per site (EURk)	11	33
Number of sites in rural areas to be outsourced	4,000	4,000
Annual saving (EURm)	44	132
Value of saving - low end (5x EBITDA)	220	660
Value of saving - high end (15x EBITDA)	660	1,980
Share of 'value creation' captured by operator (%)	50	50
% of operator valuation - low end*	0.6	1.7
% of operator valuation - high end*	1.7	5.0

** Assumption: the mobile operator's EV is fixed at EUR20bn.*

Source: Exane BNP Paribas, Arthur D. Little estimates

Outsourcing of mobile networks: +1.5% on EBITDA and +6% on OpFCF

The savings generated by operators that have outsourced their networks vary between 20% and 30%. These figures have been provided by the equipment manufacturers but they have been confirmed by several operators. For example, Mobistar recently announced that it expected that savings from outsourcing its network to Ericsson would ultimately reach 30% of related costs and capex.

These savings apply both to network costs, which in the case of Mobistar represent 4% of total costs and 2% of revenues, and to investments, which account for one third of Mobistar's annual capex and 4% of its revenues.

In our view, the lower the operator's market share the higher these percentages, as network opex and capex are partly fixed: they depend in part on traffic routed by the network, but also on territory covered, independently of traffic or customer numbers.

The following table summarises our model of the impact of outsourcing on the operator's margins in Mobistar's case. It shows that, all else being equal, outsourcing could boost Mobistar's EBITDA by around 1.5% and its OpFCF by almost 6% in the medium term.

This trend clearly raises the risk that the operator could become increasingly dependent on the equipment supplier responsible for its network: will the operator be able to maintain the upper hand vis-à-vis the equipment supplier over the long term?

Table 23: Model of outsourcing impact in the case of Mobistar

Mobistar (EURm)	2006	2007e	2008e	2009e	2010e	2011e	2012e
Mobile services revenues	1,411.6	1,381.5	1,371.2	1,389.7	1,410.7	1,432.7	1,451.0
Mobile operating expenses	(793.8)	(775.1)	(767.5)	(775.8)	(788.1)	(798.5)	(810.2)
Network opex in outsourcing deal	(30.0)	(30.0)	(30.0)	(30.0)	(30.0)	(30.0)	(30.0)
Mobile EBITDA	617.8	606.3	603.7	613.9	622.6	634.1	640.8
Mobile Capex	(165.2)	(162.0)	(155.0)	(154.5)	(158.5)	(164.5)	(172.5)
Network capex in outsourcing deal	(60.0)	(60.0)	(60.0)	(60.0)	(60.0)	(60.0)	(60.0)
EBITDA – Capex	452.6	444.3	448.7	459.4	464.1	469.6	468.3
% of total Opex in outsourcing deal	4	4	4	4	4	4	4
% of total Capex in outsourcing deal	36	37	39	39	38	36	35
Saving (%)							
Opex	0	(15)	(20)	(25)	(30)	(30)	(30)
Capex	0	(15)	(20)	(25)	(30)	(30)	(30)
Mobile services revenues	1,411.6	1,381.5	1,371.2	1,389.7	1,410.7	1,432.7	1,451.0
Mobile operating expenses	(793.8)	(770.6)	(761.5)	(768.3)	(779.1)	(789.5)	(801.2)
Network opex in outsourcing deal	(30.0)	(25.5)	(24.0)	(22.5)	(21.0)	(21.0)	(21.0)
Mobile EBITDA	617.8	610.8	609.7	621.4	631.6	643.1	649.8
Mobile Capex	(165.2)	(153.0)	(143.0)	(139.5)	(140.5)	(146.5)	(154.5)
Network capex in outsourcing deal	(60.0)	(51.0)	(48.0)	(45.0)	(42.0)	(42.0)	(42.0)
EBITDA – Capex	452.6	457.8	466.7	481.9	491.1	496.6	495.3
Impact on EBITDA (%)	**0.0**	**0.7**	**1.0**	**1.2**	**1.4**	**1.4**	**1.4**
Impact on EBITDA (%) – Capex	**0.0**	**3.0**	**4.0**	**4.9**	**5.8**	**5.7**	**5.8**

Source: Exane BNP Paribas, Arthur D. Little estimates

Sharing of mobile infrastructure: potential value creation of 3-8%

Orange and Vodafone recently announced two agreements, one to share their mobile networks in rural areas in Spain, and the second to share their 3G networks in some areas of the UK.

In the UK, Vodafone and Orange have signed an agreement of intention on sharing their 3G radio access network (RAN). Both existing and new sites come under this agreement. The operators are moreover looking at the possibility of sharing their 2G networks when the technical solutions are available. Such an agreement raises competition issues, and is thus subject to the scrutiny of the regulator. Vodafone told investors that:

- the ultimate goal is to share around 4,000, i.e. one third of its 12,000 base stations;
- the cost base (opex and capex) affected at Vodafone UK is GBP300m pa;
- the aim is to reduce costs (opex and capex) by 20-30%, meaning savings of GBP60-90m; France Telecom confirmed this 20-30% savings level at its FY06 results presentation;
- but these savings will be made only gradually, as the agreement will not have a significant impact in the first three to four years.

Over time, the impact of this agreement on Vodafone UK would be +1.5% at EBITDA level, and +7% on OpFCF (EBITDA-Capex).

In Spain, the agreement concerns:

- the existing 2G network: Orange has said that 1,200 2G sites would be dismantled by the end of 2008, reducing operating costs for each operator;
- the 3G network under construction: 5,000 sites built in rural areas by the end of 2010 will be shared by Orange and Vodafone, enabling the operators to achieve their coverage plan with a smaller individual investment.

Table 24: Model of impact for Vodafone UK of network sharing with Orange

Vodafone (GBPm)	FY05/06	FY06/07e	FY07/08e	FY08/09e	FY09/10e	FY10/11e	FY11/12e
Revenues	4,703	4,813	4,939	4,985	5,034	5,079	5,061
SARC	(775)	(700)	(712)	(722)	(727)	(727)	(724)
Direct costs	(1,217)	(1,371)	(1,445)	(1,459)	(1,473)	(1,487)	(1,482)
Operating expenses	(1,088)	(1,145)	(1,196)	(1,208)	(1,220)	(1,231)	(1,227)
Network expenses concerned	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Other expenses	(988)	(1,045)	(1,096)	(1,108)	(1,120)	(1,131)	(1,127)
EBITDA	**1,623**	**1,596**	**1,587**	**1,597**	**1,614**	**1,634**	**1,629**
Capex	(665)	(640)	(530)	(540)	(570)	(590)	(595)
Network capex concerned	(200)	(200)	(200)	(200)	(200)	(200)	(200)
Other capex	(465)	(440)	(330)	(340)	(370)	(390)	(395)
EBITDA – Capex	**958**	**957**	**1,057**	**1,057**	**1,044**	**1,044**	**1,034**
Opex & Capex base concerned by sharing	**(300)**	**(300)**	**(300)**	**(300)**	**(300)**	**(300)**	**(300)**
Assumed share of Opex	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Assumed share of Capex	(200)	(200)	(200)	(200)	(200)	(200)	(200)
Saving from sharing (%)	**0**	**0**	**(5)**	**(15)**	**(20)**	**(25)**	**(25)**
Assumed Opex saving	0	0	5	15	20	25	25
Assumed Capex saving	0	0	10	30	40	50	50
Revenues	4,703	4,813	4,939	4,985	5,034	5,079	5,061
SARC	(775)	(700)	(712)	(722)	(727)	(727)	(724)
Direct costs	(1,217)	(1,371)	(1,445)	(1,459)	(1,473)	(1,487)	(1,482)
Operating expenses	(1,088)	(1,145)	(1,191)	(1,193)	(1,200)	(1,206)	(1,202)
Network expenses concerned	(100)	(100)	(95)	(85)	(80)	(75)	(75)
Other expenses	(988)	(1,045)	(1,096)	(1,108)	(1,120)	(1,131)	(1,127)
EBITDA	**1,623**	**1,596**	**1,592**	**1,612**	**1,634**	**1,659**	**1,654**
Capex	(665)	(640)	(520)	(510)	(530)	(540)	(545)
Network capex concerned	(200)	(200)	(190)	(170)	(160)	(150)	(150)
Other capex	(465)	(440)	(330)	(340)	(370)	(390)	(395)
EBITDA - Capex	**958**	**957**	**1,072**	**1,102**	**1,104**	**1,119**	**1,109**
Impact on EBITDA (%)	**0.0**	**0.0**	**0.3**	**0.9**	**1.2**	**1.5**	**1.5**
Impact on EBITDA (%) – Capex	**0.0**	**0.0**	**1.4**	**4.3**	**5.7**	**7.2**	**7.3**

Source: Exane BNP Paribas, Arthur D. Little estimates

Data recently published by the operators on unit costs per base station are as follows:

– for the previous example of Vodafone UK, assuming that one third of the quoted GBP300m corresponds to operating costs, the operating cost per base station is GBP25k pa (i.e. EUR36k/pa) and capex per base station is GBP50k (EUR73k);

– Yoigo, the fourth mobile operator in Spain recently announced capex per site of EUR50k-70k.

If, to assess the impact of measures envisaged in Spain, we retain the same operating cost per installed site in rural areas as in the case of Vodafone UK (EUR36k pa), then each operator could make savings of EUR40-45m/pa at cruising speed (beyond 2008), i.e. an impact of 1.5-2.0% on Vodafone Spain's EBITDA. Assuming that the savings would be identical in absolute value for Orange Spain, the impact on its EBITDA would be 4-5%.

With respect to investments, based on capex per site of EUR70k, the 30% saving could correspond to around EUR20m pa. Hence, the eventual total potential impact on OpFCF (EBITDA-Capex) of +3.5% on Vodafone and +11% on Orange.

Assuming that the benefits at the EBITDA level endure (to infinity) but that those at capex level last only for a limited period (during the network rollout), the discounted value (DCF) 'created' by these network sharing agreements is +3% on the valuations of Vodafone Spain and Vodafone UK, +5% for Orange UK and +7.5% for Orange Spain (assuming that the impact is the same for Orange as for Vodafone in absolute value).

Nonetheless, these theoretical calculations assume that the operators would achieve the same coverage on a stand-alone basis. This is not coherent with Vodafone's statement that it would not extend its coverage beyond a predefined proportion of the population (60% in Spain; 80% in the UK) if an economic solution is not found. Thus, in reality, the true benefits of these network sharing agreements lie:

– partly in savings, notably concerning existing sites in areas already covered;

– partly in an improvement in the service provided to the customer: extension of the addressable market and increased competitiveness of the operators involved, via the expansion of their 3G coverage.

Risk of lower barriers to entry

As we have just seen, the growing recourse to outsourcing, network sharing and mast disposals will optimise operators' costs and capex. This will further add to the downward trend created by lower-priced equipment.

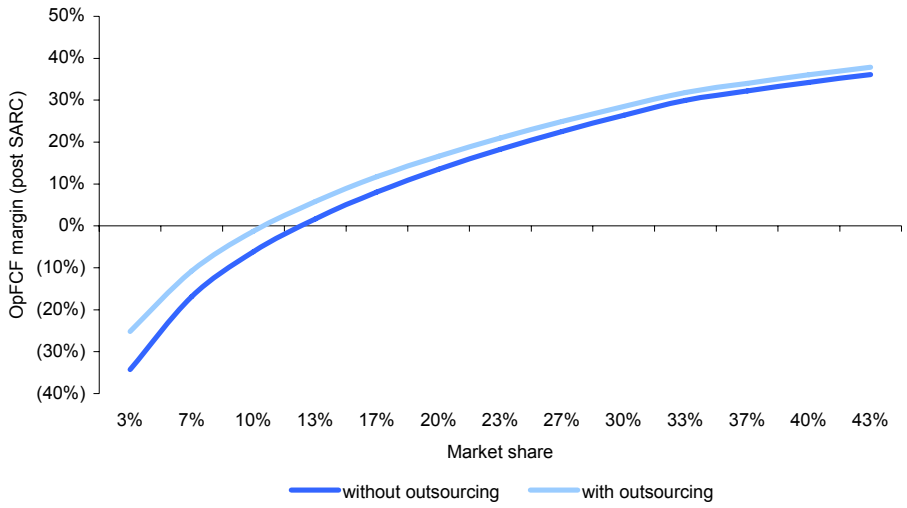
Is this accelerated reduction in costs positive for the sector? In our view, the answer is yes in the short term, but no in the long term. In fact:

– in the current competitive environment, much of this cost reduction is likely to be passed on to the customer in the form of lower rates, which means that the 'size' of the sector's capital, revenues and profits should decline gradually.

– also, lower costs will translate into lower barriers to entry in the sector, easing the urgency for the consolidation of some markets or even rendering it easier for new challengers to enter. This could intensify competition in some markets.

The chart below shows an operator's OpFCF margin depending on market share: these are the results of a theoretical model based on the experience of mobile operators in Europe (regression carried out on a selection of 35 European mobile operators, 2006 data: see page 101).

Chart 27: OpFCF margin according to market share – impact of outsourcing



Source: Exane BNP Paribas, Arthur D. Little estimates

We then integrated into this model the potential benefits of network outsourcing and network sharing, as previously estimated – we have seen that these measures could generate savings equivalent to around 6% of a leading operator's OpFCF, and even more for a challenger with a weaker market share. This chart shows that thanks to these savings, the critical size required to attain positive OpFCF could be lowered from a market share of 12% to 10%.

This reduction in critical size is not positive in terms of market structure. Such measures can in fact dampen operators' motivation to consolidate the market. It could even open the market gates to new operators:

– many of the 'most pressured' challengers have already announced the outsourcing of their networks, notably Hutchison 3G in the UK and Italy. Since savings from these measures are not generated immediately, these players are likely to get a second wind when these savings feed through in the coming years.

– many of the leaders have not ruled out moves in this direction. This would enable them to widen the gap with challengers in terms of cost structure.

Table 25: Companies that have already outsourced or share their mobile networks

Country	Operator	Year	Announcement
France	Orange	2004	Sharing rollout in rural areas
	SFR	2004	Sharing rollout in rural areas
	Bouygues Telecom	2004	Sharing rollout in rural areas
	Bouygues Telecom	2001	Sites to TDF
UK	Vodafone	2007	Sharing 3G with Orange
	Orange	2007	Sharing 3G with Vodafone
	O2	2002	Sharing 3G with T-Mobile
	T-Mobile	2002	Sharing 3G with O2
	Three	2006	Outsourcing network
Germany	T-Mobile	2002	Sharing 3G with O2
	Vodafone		
	E-Plus	2007	Outsourcing network
	E-Plus		
	O2	2002	Sharing 3G with T-Mobile
Italy	TIM		
	Vodafone		
	Wind		
	Three	2005	Outsourcing network
Spain	TEM		
	Vodafone	2006	Network sharing with Orange
	Orange	2003	Outsourcing network
	Orange	2006	Network sharing with Vodafone
	Yoigo	2006	Outsourcing network
Netherlands	KPN		
	Vodafone	2006	Outsourcing network
	T-Mobile		
	Orange	2007	Outsourcing network
	Telfort - CONSOLIDATED	2002	Outsourcing network
Belgium	Belgacom		
	Mobistar	2006	Outsourcing network
	Base	2004	Outsourcing network
Austria	mobilkom austria		
	T-Mobile		
	Telering - CONSOLIDATED	2002	Outsourcing network
	One	2003	Outsourcing network
	Three		

Source: Exane BNP Paribas, Arthur D. Little estimates

– the prospects for cost and capex optimisation opened up by network sharing and outsourcing make the business plans of new or potential entrants more credible. In Spain, Yoigo has appointed Ericsson to build its 3G network, and the stated average cost per base station is only EUR60,000. In France, Noos Numericable, which is a candidate for the fourth mobile licence, appears very confident that it can roll out a fourth network with initial capex of only around EUR1bn, also by outsourcing to a hardware manufacturer. Finally, Vodafone has surprised positively on the cost of the rollout of Telsim's network in Turkey by Motorola.

Separation of fixed-line networks: the aim is for more competition

In its review of the European directives that determine the legal framework of the European telecoms sector, the European Commission is currently pushing for functional separation between the incumbent operator's fixed-line network (the fixed-line local loop, in which it has a near-monopoly) and its services division. The aim is to have a situation similar to that in the utilities sector. Commissioner Viviane Reding has already stated that she would look favourably on such a development.

In practical terms, the new directives could give national regulators the power to impose functional separation in the event of unsatisfactory competition in the services market. Functional separation means the creation of a separate company that owns the network assets (i.e. the local phone lines) and is in charge of providing access to these lines to the various service providers (unbundling of the local loop). The network company should have a different board to that of the incumbent operator, although it could still be controlled by the incumbent, i.e. separation of ownership is not required.

The aim would be to ensure that the network operator treats the various service providers – i.e. both the incumbent's service division and its competitors – equally. In return for this separation, regulators may then loosen the constraints on the retail services offered by the incumbent's services division.

The official draft of the Directives should be published around mid-2007. Initial indications should be available in the spring. The Directives could be implemented in 2009-2010.

UK, Italy and Sweden leading the way

This type of organisation is already in place in the UK following an agreement between regulator Ofcom and BT. The agreement led to the creation of BT Openreach, which is in charge of the local access network. The results have been paradoxical:

– in operational terms, unbundling conditions have improved greatly since the creation of Openreach. Unbundling has sharply accelerated in the UK, which is not good news for BT. In early 2007 BT has regained the freedom to set the prices of its wholesale ADSL products as the number of unbundled lines has exceeded 1.5m;

– however at the same time, BT's market value has risen sharply, since many investors believe that Openreach should be valued like a utility, i.e. on an EBITDA multiple of 8x as opposed to 5-6x for telecoms operators.

In Italy, Telecom Italia and the regulator AGCOM have started talks about a similar arrangement. Telecom Italia's motivation is the possible lifting of the over-zealous regulation that applies to its retail products, while the regulator wants to improve unbundling conditions. However, these talks will take time, and a new framework cannot be expected until 2008.

In Sweden, the regulator PTS recently set out proposals for developing the Swedish broadband market. The aim is for 100% of households to have access to broadband, and for effective competition to exist between TeliaSonera and alternative operators. In particular, the regulator wants local loop unbundling conditions to improve.

As a result, it is proposing a functional separation between TeliaSonera's fixed-line local loop network and its services division. In practical terms, the remuneration of management in the network division will depend on unbundling targets; there is to be no communication between network and service staff; human resources will be separate and the network unit will not be permitted to sell retail services, among other constraints.

PTS notes that the European regulatory review may enable it to impose a separation of this kind in 2009-2010. However, it wants the government to adopt local legislation allowing it to happen sooner.

More of a risk than an opportunity for incumbents

In our view, a separation of this kind may have genuine benefits for governments and/or incumbent operators:

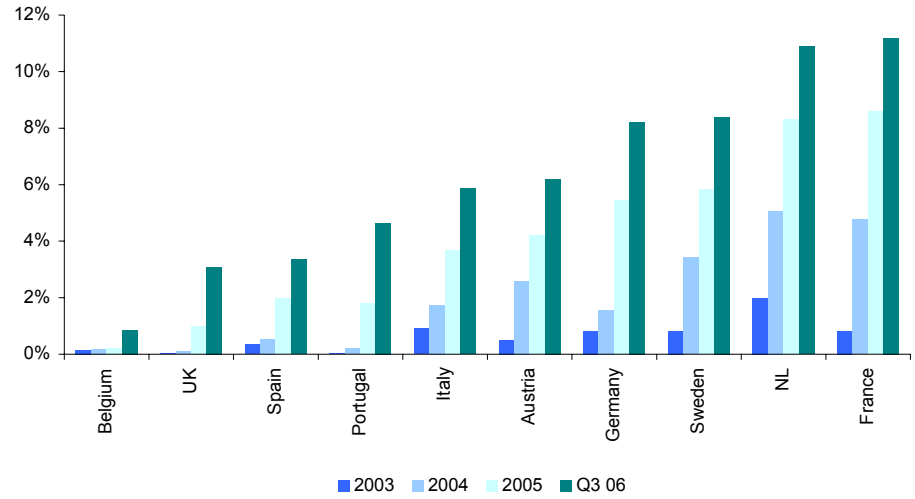
- constraints on retail offerings could be lifted, allowing incumbents' services divisions to become more responsive and play a pro-active role in the triple-play and quadruple-play markets, and therefore maintain their market share;
- depending on the organisation adopted, it could be possible to get the network company to bear a large proportion of the incumbent's fixed-line division's staff costs, making the services division more flexible;
- finally, if network tariffs were regulated on the basis of a pre-set return on capital, the network could be encouraged to maintain a high level of capex and carry out an extensive deployment of modern infrastructure (FTTx). This is one of the Swedish regulator's political objectives.

However, we see two major potential drawbacks for incumbents.

Firstly, national regulators would have the power to separate network and services operations if there were inadequate competition in the downstream market, i.e. in countries where there is little unbundling. This separation could lead, as in the UK, to faster unbundling and increased competitive pressure on the incumbent's services division. As chart 28 shows, the countries where unbundling is least developed are Belgium, the UK and Spain. Although this situation is partly due to strong cable operators, this is not the sole reason.

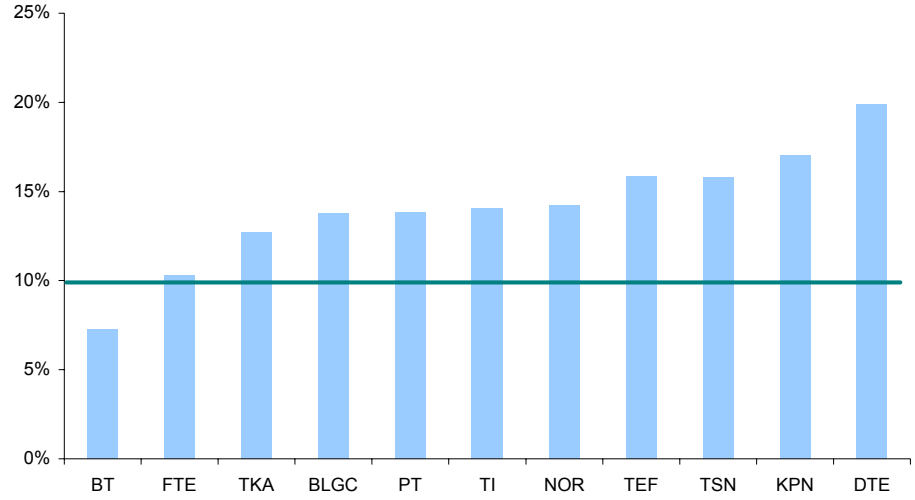
The return on capital authorised by the regulator for the network division would not necessarily be as high as the returns that incumbents are currently enjoying. As chart 29 shows, we expect 2007e after-tax ROCE figures of 8% for BT's fixed-line division, but 20% for Deutsche Telekom's (see chart 29). It appears unlikely that regulators will authorise returns of over 10%. This explains why a regulated return could be good news for BT, which has a very low ROCE. However, this is not the case for most other operators.

Chart 28: Unbundling penetration in Europe



Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 29: Estimated ROCE of incumbents' fixed-line divisions*



** ROCE = (EBITDA – capex – tax) / asset base (10 times average capex per year between 2003 and 2010e)*

Source: Exane BNP Paribas, Arthur D. Little estimates

Thus, one country where such a separation would probably have a positive or neutral impact is France, as France Telecom's ROCE on fixed-line is already low. However, in France, unbundling is well developed, thus the regulator is unlikely to require the separation of network and services operations due to inadequate competition in broadband. Conversely, regulators could decide to separate network operations in order to improve unbundling conditions in Italy, Portugal and Spain. The incumbents in these countries have ROCEs of 14-16%, which may therefore fall.

2.3. Virtual operators: what is good for an operator is not necessarily good for the market

The arrival of numerous mobile virtual network operators (MVNOs) is the most striking and oldest example of fragmentation at the heart of the telecoms' value chain. MVNOs use the infrastructure of the operators and act as substitutes to these operators in terms of customer management and provision of service. Naturally, they do not completely replace operators in these domains, but they both complement and compete with their services.

'Real' and 'fake' MVNOs, MVNEs, FVNOs, CNVOs…

An increasing number of players can be classified as virtual operators.

– The 'real' MVNOs. The historical example is Virgin Mobile in the UK, which is highly independent in terms of its offers (services and prices), customer management, etc. Numerous 'real' MVNOs now exist in the UK, the Netherlands, Germany, Belgium, and more recently in France and Spain (even though their level of autonomy is not always comparable).

– The 'fake' MVNOs, i.e. the MVNOs that are totally or partially controlled by the operator which launches them. For example certain MVNOs launched in Germany by O2 (Tchibo) and E-Plus (some MVNOs are merely new 'brands' launched by the operator E-Plus), and some offers launched in France by Orange (brand franchise with M6 mobile) and Bouygues Telecom (Universal Music Mobile). Other examples are the M-Budget offer launched by the retailer Migros with Swisscom Mobile and mobilkom's Bob (Telekom Austria Group).

– MVNEs, which are the enablers that set up MVNOs for companies outside the telecoms sector. This category includes some operators (E-Plus in Germany, Telfort in the Netherlands), as well as independents such as Transatel and Spinbox, and large new entrants from the hardware and IT sectors (e.g. IBM, Logica and Alcatel-Cap Gemini).

– CVNOs, i.e. new convergent virtual operators. The typical example is the TWIN service launched by Neuf Cegetel in France based on an MVNO agreement with SFR for calls made outside the home and a WiFi connection for calls made inside the home (Telenet's quadruple-play offer in Belgium is also a CVNO, based on Mobistar's network).

– FVNOs. The concept of a virtual operator now also exists on the fixed/ADSL market. Current FVNOs on the ADSL market include Vodafone in Italy (with Fastweb) and in the UK (with BT) and SFR and Darty in France (with Neuf Cegetel and Completel respectively).

The KPN success story

Voluntarily launching MVNOs on its own network can allow an operator to strongly increase its sales force, with two types of benefits:

– MVNOs provide additional distribution networks for the operator. In a market where growth is becoming a rarity, adding new distribution networks makes operators more efficient in their search for customers in new segments with low penetration rates (e.g. youth, immigrant communities), and therefore continues to stimulate market growth;

– for a given operator, increasing the number of MVNOs also means increasing the number of brands, enhancing its chances of being recognised by potential customers and therefore of gaining market share.

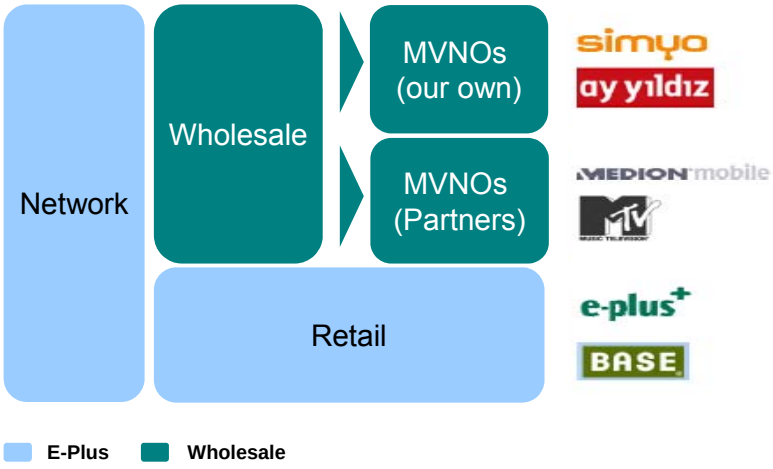
Moreover, commercial costs related to the conquest of MVNO customers are paid by the MVNOs and not the operators, so that this constitutes a form of 'low cost' growth for the operators in the short term.

KPN's multi-brand strategy in mobiles, especially in Belgium (via its subsidiary Base) and Germany (E-Plus) is a perfect example of this approach. The strategy allows KPN to propose segmented offers with different brands, specialised teams, offers that are not cannibalised by each other and which are adapted to the specific needs of each segment.

Base introduced MVNOs and this multi-brand approach with long-lasting success: Base has succeeded in maintaining growth levels well ahead of the Belgian market way beyond its launch phase, moving up from a market share of 9% at the beginning of 2003 (in services revenues) to 15% at the end of 2006, and its EBITDA margin increased from 14% in 2003 to 42% in 2006.

At the beginning of 2005, KPN adopted a similar strategy in Germany in order to turn around its subsidiary E-Plus, which was on the verge of being left behind by competitor O2. E-Plus launched new, more aggressive offers via several MVNOs introduced in the course of 2005 and via new brands (see below).

Chart 30: E-Plus' new brands



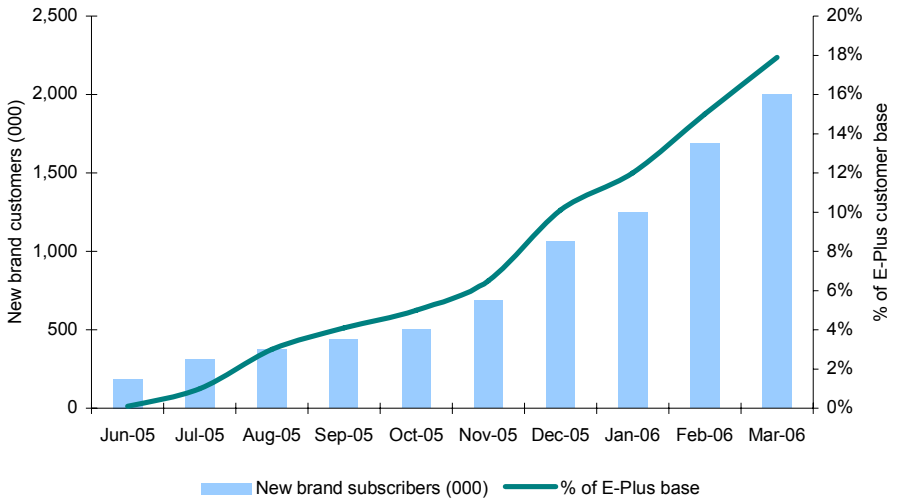
Source: KPN

Between June 2005 and March 2006, new brands launched by E-Plus attracted two million customers, i.e. 18% of E-Plus' subscriber base at the end of 2006.

The result is shown in the chart below: E-Plus began to gain market share during 2005, with service revenue growth remaining between 5% and 11% since the beginning of 2005 while the German market was progressively slowing.

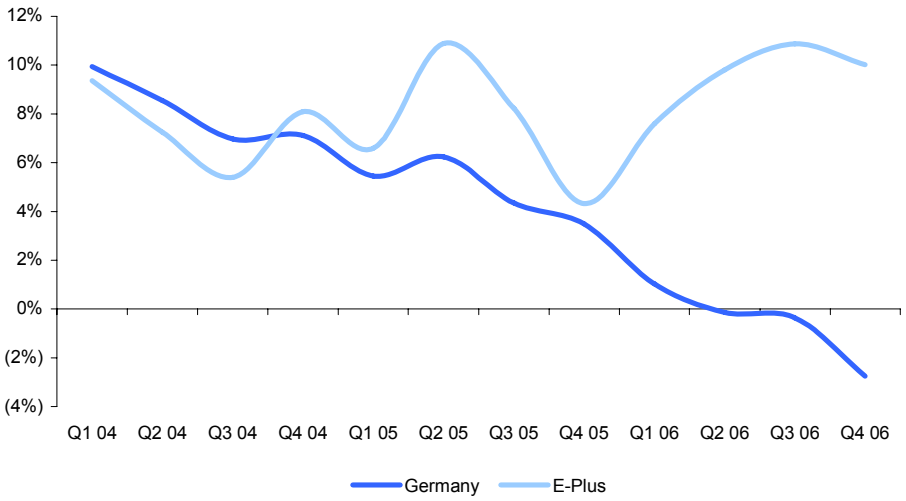
The company's profitability was also good. The EBITDA margin first dropped to 21% in H1 05, versus 25-30% previously, but then climbed back to over 30% in 2006.

Chart 31: The success of new brands launched on E-Plus' network



Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 32: E-Plus' yoy service revenue growth versus German market growth



Source: Exane BNP Paribas, Arthur D. Little estimates

E-Plus' management believes that there are still many opportunities to develop partnerships with MVNOs, notably for example with alternative fixed-line operators (see below), and that the wholesale operator business model is the best choice. Also, KPN plans to export this strategy to other European countries. Other operators that we have interviewed wish to pursue a similar strategy, notably challengers in countries such as Switzerland, Belgium, Austria and now Spain as well.

Virtual operators, convergence facilitators

As described in pages 35-42, fixed-mobile convergence offers are destined to grow. Pure players, that are only present on either the fixed market or on the mobile market, consider this trend as both a threat and an opportunity. If they do not launch similar offers, then they are at risk of losing customers to integrated operators pushing convergent offers. However, a fixed-line operator has nothing to lose and everything to gain by entering the mobile market, and vice versa.

Many operators have made this move: Vodafone is launching ADSL offers and Neuf Cegetel and Telenet are entering the mobile market.

However, Vodafone is launching its ADSL offer as an FVNO using BT's network in the UK and Fastweb's in Italy, and Neuf Cegetel and Telenet are MVNOs on SFR and Mobistar's networks respectively. They will, therefore, profit from another form of value chain fragmentation, gaining a place on a new market without having to invest massively. This method minimises the operator's initial financial commitment and, as a result, the risk associated with the new project.

This trend is favoured by the technological move towards all IP. Thanks to IP, services are becoming less reliant on networks. An operator can control a service from beginning to end, even if that service uses multiple networks including ones that it does not own.

A real risk of value destruction

For a given operator, encouraging the development of MVNOs on its network undoubtedly accelerates growth and creates value.

However, a first risk of such a strategy is that the operator's growth is dependent on various small players, of which some will not be profitable. For example, in Germany, many of the small MVNOs will not survive. Moreover, the customers of some of these MVNOs are attracted by the low prices and are not loyal customers. This situation could therefore have a negative impact on the operators that host these various MVNOs unless they end up buying their client base at a favourable price.

More fundamentally, is the strategy of increasing the number of MVNOs positive or negative for the value and growth of a country's mobile market?

First, we analysed the impact of existing MVNOs in different countries, splitting countries into three groups:

- the first group included the UK, the Netherlands and Belgium, where MVNOs have been present for many years;
- the second group included France and Germany, where MVNOs were launched in 2005;
- the third group included Italy and Spain, where MVNOs are in their early stages (launched at the end of 2006 in Spain, currently under negotiation in Italy).

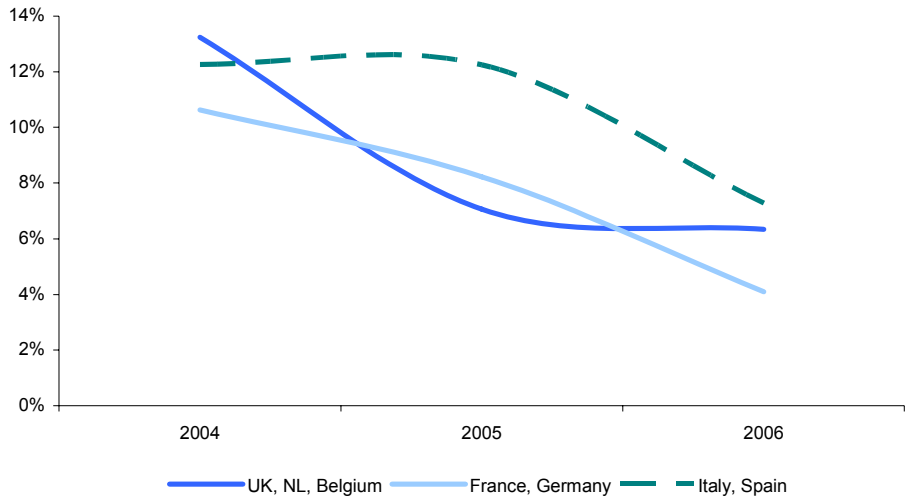
We have calculated the service revenue growth of these markets (the total services revenues of all operators in each market) over the past three years, adjusting for tariff cuts imposed by regulators (such as call termination fees).

As highlighted in the chart below, the impact of MVNOs does not appear marked, and if anything, it could be slightly negative:

- the growth rates of all three groups were similar in 2004 and in 2006, and all slowed over this period;
- on average, over this period, the countries with no MVNOs showed the highest growth. However, in Spain, the market was helped by a population and economy which displayed stronger growth than the majority of the other countries analysed here. Moreover, Hutchison 3G Italy plays the role of a competitive thorn that a major MVNO could play, notably in data services (where revenues rose rapidly in Italy);

– in France and Germany, growth slowed significantly in 2006, and we believe that MVNOs contributed to this slowdown, notably in Germany where they greatly accelerated the rate of price cuts (-24% yoy in 2006 versus -8% in 2005 based on our estimates).

Chart 33: Adjusted growth of services revenues in three groups of countries: those with MVNOs for many years (UK, Benelux), with MVNOs since 2005 (France, Germany) and without MVNOs (Italy, Spain)



Source: Exane BNP Paribas, Arthur D. Little estimates

To go beyond this first analysis, we have created a very simple model simulating the different impacts of MVNOs on a country's operators.

Table 26: Simulation of the impact of MVNOs on the operators

	Before MVNOs	With MVNOs			Impact (%)	
		Operators' Retail	MVNOs	Total	Retail	Total
Number of customers	100.0	95.0	15.0	110.0	(5.0)	10.0
ARPU	25.0	23.8	21.4	23.4	(5.0)	(6.3)
Services revenues	**30.0**	**27.1**	**3.8**	**30.9**	**(9.8)**	**3.1**
Operators' gross profit	22.5	20.3	1.9	22.2	(9.8)	(1.4)
SARC paid by operators	(4.5)	(4.1)	0.0	(4.1)	(9.8)	(9.8)
Other Opex	(6.6)	(6.0)	(0.8)	(6.8)	(9.7)	3.1
EBITDA	**11.4**	**10.3**	**1.0**	**11.3**	**(9.8)**	**(0.7)**
% of services revenues						
Operators' gross margin	75	75	49	72	0	(3)
SARC paid by operators	(15)	(15)	0	(13.1)	0	2
Other Opex	(22)	(22)	(22)	(22)	0	0
EBITDA margin	**38**	**38**	**27**	**37**	**0**	**(1)**

Source: Exane BNP Paribas, Arthur D. Little estimates

The main variables are as follows:

– market share gained by MVNOs and their impact in terms of stimulating subscriber growth. Our core assumption is a 10% increase in the number of market subscribers, the idea being that the MVNOs can grow the market given the existence of some underpenetrated segments. They can work in these market segments in a more targeted way than the operators. We have also retained a cannibalisation rate of 5% of the operators' existing subscribers. The market size thus increases from 100 to 110, with operators' having 95 direct subscribers and 15 subscribers via the MVNOs;

– the MVNOs' impact on the market's average ARPU, reflecting their impact on prices compared to their impact on stimulating usage in terms of both voice and data traffic. We have retained a core assumption of a 5% drop in ARPU, and have supposed that ARPU of MVNOs is itself 10% lower than that of operators;

– the difference between the wholesale price paid to the operator by the MVNO and the average retail market price. Our core assumption includes a 35% discount. We also assume that marketing costs corresponding to MVNO customers are supported by the MNVOs themselves and not by the operators, which partly compensates for operators' weaker gross margins on these customers.

The table above highlights that based on these assumptions, the impact of MVNOs on operators' EBITDA is slightly negative.

The table below presents a sensitivity analysis. It shows that assuming that the MVNOs obtain a wholesale price that is at least 35% lower than the average retail price, the impact on operators' EBITDA is only positive if the market ARPU is reduced by less than 4% – in other words, if MVNOs strongly stimulate voice and data usage to compensate for lower prices (in the first table, we continue to suppose that the impact of the MNVOs is to increase market subscriber numbers by 10%). Assuming a negative impact of 6% on ARPU, breakeven is only reached when the number of total subscribers in a market increases by more than 15% (second table).

Table 27: Simulation of impact of MVNOs on operators – Sensitivity analysis

		Impact on ARPU (%)					
	(0.7)	**(10)**	**(8)**	**(6)**	**(4)**	**(2)**	**0**
Discount (%) MVNOs wholesale prices / average retail price	**15**	(1)	1	3	5	8	10
	25	(4)	(1)	1	3	5	7
	35	(6)	(4)	(2)	0	2	5
	45	(8)	(6)	(4)	(2)	0	2
	55	(11)	(9)	(7)	(5)	(3)	(1)

		Impact on ARPU (%)					
	(0.7)	**(10)**	**(8)**	**(6)**	**(4)**	**(2)**	**0**
Stimulation of market in number of subscribers (%)	**5.0**	(8)	(6)	(4)	(2)	0	2
	10.0	(6)	(4)	(2)	0	2	5
	15.0	(4)	(2)	0	2	5	7
	20.0	(2)	0	2	5	7	9
	25.0	0	2	5	7	9	11

Source: Exane BNP Paribas, Arthur D. Little estimates

Moreover, in a scenario where we assume that MVNOs trigger a strong increase in the number of subscribers in the market, we implicitly assume that the MVNOs themselves win a large share of these new subscribers.

Ultimately, independent MVNOs with large subscriber bases are a potential danger to operators, as they could put the different networks in competition with one another, obtain lower wholesale prices and finally have a more negative impact on the prices and/or share of value kept by operators.

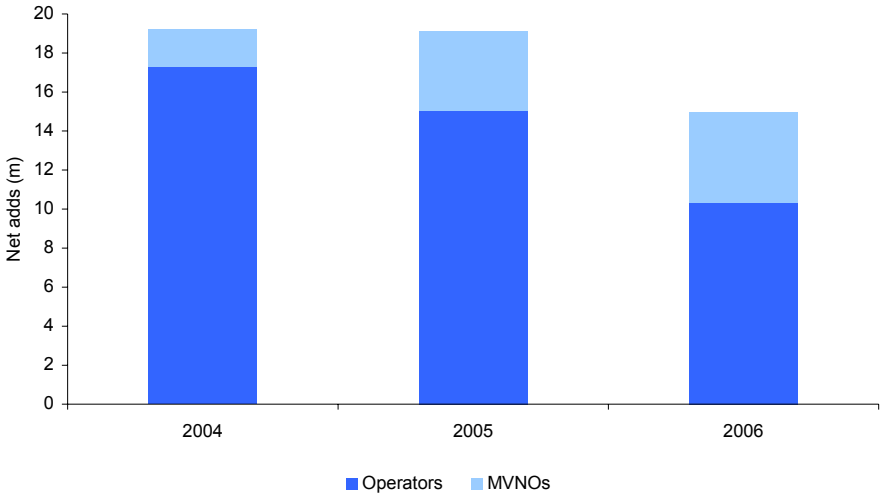
Experience does not enable us to judge the capacity of operators to ultimately control the situation:

– as the chart below shows, MVNOs' share of net adds in the countries where they were launched have grown in recent years, to reach 30% in 2006. In Austria, the segment of MVNOs and low-cost offers have already reached 30% of the total market.

– in France, at this stage, the players believe that the operators have strict control of the MVNOs, and that the MVNOs are under threat from new initiatives such as quadruple-play, unlimited packages, WiFi, etc.;

– in countries where MVNOs are the most developed, the mobile leaders have had to (or now have to) adapt their strategy to gain presence in the segment of MVNOs and /or of low cost offers: this is the case in Austria, Germany and Belgium.

Chart 34: MVNOs' share of net adds in Germany, France, the UK, Belgium, The Netherlands



Source: Exane BNP Paribas, Arthur D. Little estimates

In 2007, Spain should be the test market: the operators interviewed see a coming together of substantial changes in the structure of the Spanish market from 2007, with the relaunch of Orange (in Q4 06), the arrival of Yoigo (the 3G new entrant subsidiary of TeliaSonera) and many MVNOs. The players are expecting Yoigo and the MVNOs to capture only 10% of the market in the coming years, but they fear that prices and margins will be affected.

2.4. Media groups: partners and competitors

Growth opportunities for operators depend on the inclusion of increasing amounts of content in their offering, including TV and video on demand on both fixed-line and mobile, music, games and so on. They also depend on the operators' capacity to adapt to new business models, in particular for advertising.

Operators and media groups have learnt to understand each other

The operators have understood that they will be able to exploit these new opportunities via partnerships, especially among media players: content providers, aggregators, advertising agencies, etc. Numerous partnerships have been signed in recent years in all of the areas mentioned. The following table summarises recent partnerships involving mobile operators.

Table 28: Partnerships between mobile operators and media groups

Operator	Partner	Area	Comments
Vodafone	Universal Music Group	Music	Music over 3G
Vodafone	UEFA	Sport	Specific package for football fans on 3G
Vodafone	Sky UK	Pay TV	Pay-TV packages over 3G
SFR	Canal+	Pay TV	Pay-TV packages over 3G, including Eurosport
TIM	Serie A Italy	Sport	Specific offer for football fans
TIM	Sky Italy	Pay TV	Several Sky channels on DVB-H network
Vodafone Italy	Sky Italy	Pay TV	Several Sky channels on DVB-H network
Vodafone Italy	BuenaVista Int. TV	Pay TV	Lost, Desperate housewives
3 Italy	Sky Italy	Pay TV	Several Sky channels on DVB-H network
3 Italy	World League Championships	Pay TV	Several Sky channels on DVB-H network
3 Italy	Mediaset	Free-to-air TV	Popular Italian broadcast channels
Orange	20th Century Fox	VOD	'24 hours' show on VOD
Orange	BBC	Free-to-air TV	Live BBC news over 3G
Orange	Sony, EMI, Warner, UMG…	VOD	VOD of musical content (video clips) on PC and mobile
Telefonica Moviles	40 Principales	Radio	-
Three UK	Warner	Music	Full-track downloads
Three UK	Ministry of Sound	Music	Full-track downloads
Three UK	BBC, MTV, etc.	Pay TV	Pay-TV packages over 3G
Three UK	Reuters, ITN, etc.	News	News on 3G
T-Mobile	Sony, UMG…	Music	Music over 3G

Source: Exane BNP Paribas, Arthur D. Little estimates

In the early days, the apparently diverging interests of, and cultural differences between, telecom operators and media groups made for tricky negotiations. However, the two sides now have a better understanding of each other and have developed smoother working relationships.

In particular, the operators have accepted that their gross margin on content cannot equal that on their conventional telecom services and that the richer content of the new services may mean that margins are generally lower than on 'legacy' content services. For example, whereas gross margins on premium SMS or ringtone services were between 40% and 60%, the margin on full-track downloads is below 20%.

Similarly, France Telecom explained during the Investor Day on 15 December 2006 it was aiming for an average gross margin on direct content costs at least equal to 50%, but that the margin would be closer to 35% on PC or TV VoD, 40% on games and ringtones and 5% on full-track music downloads.

The situation is tougher among smaller operators, with those that we have met targeting a gross margin of 20-30% on mobile content. The margin on i-mode content (KPN, Bouygues Telecom, Wind) is around a mere 10%, although in this case the operator has the advantage that i-mode is a turnkey system.

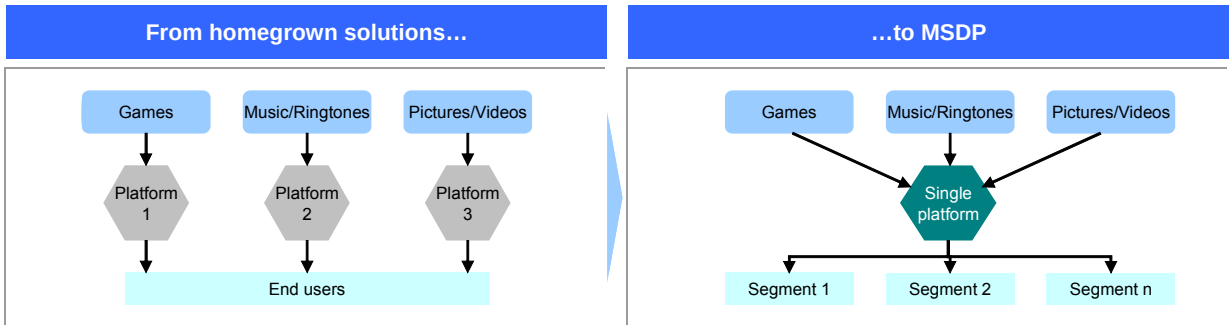
MSDP, a new concept

A new type of relationship between operators and content suppliers is emerging. Historically, the relationship involved each operator implementing a specific dedicated platform for each type of content – even for each content supplier. This is gradually giving way to a more efficient structure in the form of Mobile Service Delivery Platforms (MSDP) which provide a unique interface between one or more operators and the content suppliers (Chart 35).

By taking a transversal approach to the market and the various market segments, the MSDP is in a position to coordinate the provisioning and marketing of different types of content over the networks of several operators. This means that adapting content to networks and to handsets can be industrialised and amortised across several operators and marketing efforts can be optimised. By simplifying the production process, MSDPs not only reduce the cost of new content, they also make it more reliable and more flexible.

Operators are able to establish propriety MSDP, but the MSDP role could also be taken by external players. Several web majors come to mind, including Google, Yahoo and Microsoft, who play a similar role on the fixed-line Internet, or handset makers such as Nokia, which offer downloading platforms (music, games, etc.).

Chart 35: The MSDP concept



Source: Exane BNP Paribas, Arthur D. Little estimates

Here are a few examples of MSDP success stories:

– a Portuguese operator which outsourced the provision of its multimedia services to an independent MSDP gained a sharp reduction in costs linked to these services: a 50-60% reduction in personnel dedicated to the marketing of these services, and a drop in technical costs. At the same time, revenues generated on the sale of games jumped 48% in six months;

– US-based Cingular renewed early 2007 its MSDP contract with Motricity, a partnership which led, in a period of around one year, to a three-fold increase in data services sales;

– Telenor outsourced its mobile multimedia portal to Volantis; revenues generated by the portal have quadrupled.

Enriching the offer to expand use

Telecom operators and media groups have realised that they stand to gain by co-operating. Operators that struck partnerships with several media players have usage rates far above the average; a case in point is Hutchison 3G with mobile music in the UK.

The telecom operators and the media groups depend on each other.

1) Content will be crucial for much of the future growth among operators. Consequently, it is in the operators' interest to offer as broad a spectrum of content and services as possible, rather than to control all content delivered over their network. More and more fixed-line and mobile operators are opting for this 'open' approach and become 'content usage enablers', i.e., providing the interface between content and the network.

2) For the content suppliers, the objective is to have multiple distribution networks. The motivations of media groups are both offensive and defensive:

- Offensive: the media groups need to build audience. Broadband TV is complementary to satellite in some zones while mobile TV has a complementary role to normal domestic TV. They also have the opportunity to broadcast the same content on multiple formats. For example, a 'Digital Distribution' business unit has been set up by Warner Entertainment to distribute its content on VoD, electronic sell-through, electronic rental and on mobile.

- Defensive: the media groups know that consumption of traditional TV is declining. They therefore need new distribution outlets. This is the rationale behind their partnerships with fixed-line broadband operators and mobile operators (3G or DVB-H).

The strengths of telecom operators and media groups seem evenly balanced, hence the possibility of win/win agreements – each side has something the other needs.

The operators' main strength is that they hold many of the keys necessary to access customers: the network (thus control over service quality), handsets, billing, and SIM cards. All the operators and media groups that we have met identify this command over access as crucial:

– The billing relationship is all important for the media players, who see this as the route to monetising their content. This is particularly true for mobile, where customers are used to paying and have not got into the bad habit of expecting free content, unlike on fixed-line Internet.

– The operators have very detailed subscriber information, which they can monetise among numerous partners, such as content suppliers and advertising agencies.

For most media players, their principle asset is content. In some cases this is enhanced by exclusive rights (e.g., football rights) and/or strong local content. This gives them a strong hand in negotiations with distributors/operators.

The free TV channels have a different kind of strength given that their business model is based on advertising. This business model makes them more independent of distributors such as telecom operators, even though the risk of audience fragmentation forces them to react. Their strength is their brand, the size of audience they control and/or their credibility. Several telecom operators cited the negotiating power of the big TV stations; for example, Free's problems obtaining broadband distribution rights to TF1 and M6 in France and the BBC's refusal to allow mobile distribution by Hutchison 3G in the UK.

The table below illustrates an alternative scenario on the development of mobile data, which, in our view, is attractive for the operators. Starting from the premise that a larger opening up could stimulate usage growth, we have combined our 'worst case' scenario in terms of revenue sharing with media groups and Internet leaders (i.e. higher share of revenues shared) with our best-case in terms of market growth. The conclusion is that although mobile operators' EBITDA margins would be weaker than in our core scenario, this combined scenario would lead to stronger EBITDA growth for mobile operators by 2010, fuelled by stimulation of the market.

Table 29: Alternative scenario on data, with more sharing but stronger growth

	2006	2010e	
		Central	Data Alternative
Mobile data ARPU (EUR/month)			
P2P	3.7	3.2	3.2
Internet	0.8	1.9	2.9
TV & content	0.8	1.9	2.9
Total	**5.2**	**7.0**	**9.0**
Mobile data revenue per pop. (EUR/month)	5.5	8.9	11.7
Gross margin on mobile services (%)			
Voice	70	70	70
P2P	73	65	50
Internet	100	90	80
TV & content	52	45	35
Weighted average	**71**	**69**	**65**
Mobile gross profit per pop (EUR/month)	**20.7**	**21.5**	**22.1**
ow voice	16.6	15.7	15.7
ow data	4.1	5.9	6.4
Mobile market CAGR 2006-2010e (%)			
Revenues		**1.9**	**4.1**
Gross profit		1.3	2.1
EBITDA		**0.5**	**1.5**
EBITDA margin (%)	38.0	35.0	33.6

Source: Exane BNP Paribas, Arthur D. Little estimates

Partners and competitors

How will these partnerships evolve? Is their not a risk that the media groups will capture a growing share of the value ('content is king')?

Most of the players that we met believe that the balance of forces between the telecom operators and the media groups will remain more or less unchanged. However, some believe that it could tip in favour of the operators.

This minority argues that client access is likely to be perceived as increasingly important by all participants in the value chain. This will further strengthen the position of the operators. Mobile operators could increasingly act as gatekeepers for an ever rising amount of services and content.

Moreover, they believe that consolidation will create larger and more powerful operators compared to the media groups, the size of which is more limited.

Also, the operators' ambitions as aggregators (broadband pay-TV bouquets) are pitting them against traditional TV aggregators such as the satellite and cable TV platforms (CanalSatellite in France, Sky in the UK, and the cable operators in the Netherlands). Several media groups stressed that they increasingly saw the telecom operators as competitors in this area.

This is because compared to the satellite TV operators, the telecom operators have a network which makes it easier to offer interactive applications (up- and downloading) such as triple-play offers. Some of the telecom operators are gradually building up subscriber bases comparable in size to those of the pay-TV bouquets, giving them the strength to buy content directly.

However, the balance of forces between the telecom operators and the media groups varies considerably from country to country in accordance with the structure of the national telecoms and media markets. For example, in the UK and Italy the scales could tip in favour of the media groups.

– In the UK, BSkyB seems to be impregnable. The company has launched a triple-play offer in direct competition to cable and to all the Internet access providers, who until recently offered no more than double play. Moreover, several players and observers fear that BSkyB's strength will allow the group to capture a share of the mobile market's value. The mobile operators have launched mobile TV offers in partnership with BSkyB. However, some fear that if this proves successful they will have no option but to offer Sky to their subscribers or risk seeing their subscribers walk away. This would give BSkyB an even stronger hand over the operators and the opportunity to grab an ever increasing chunk of the mobile market's value. This point of view is shared by several players and observers of the UK market. Note however that after the merger between NTL and Telewest, and the acquisition of Virgin Mobile MVNO by NTL, the new entity is ready to counterattack.

– In Italy, some of the companies that we met believe that the local media groups are very powerful compared to the telecom operators.

This raises the issue of whether the media groups will try to compete directly with the telecom operators. Apart from BSkyB, few have tried to do so and few are looking to do so. In our opinion, a natural extension for the media companies would be to develop a specialist music MVNO business.

– In France, the NRJ radio group has launched an MVNO under the NRJ Mobile brand. Although its success is as yet still limited, we cannot rule out similar moves by some of the majors or TV groups in some countries.

– Apple is said by some observers to be interested in the launch of MVNOs. Apple is already present in services and content (iTunes) and equipment (iPod and soon the iPhone). The company could decide to go further and try to establish its own subscriber bases through MVNOs. Moreover, as the iPhone offers WiFi connection it could bypass the mobile networks by using WiFi VoIP.

2.5. Internet leaders: Pandora's box has been opened

Internet leaders like Google, Yahoo and Microsoft were long seen by operators as potentially dangerous competitors rather than partners. Since 2006, however, things have completely changed. This has positive implications for the development of new mobile services, although the longer-term picture remains unknown.

Partnerships on the rise

The first carriers to view Internet leaders as partners were the small mobile players (mainly E-Plus, Bouygues Telecom and Wind) and the MVNOs (for example Ten in France and MVNOs in Austria). Partnerships made sense since these operators 1) had less than the leading operators in terms of human and financial resources to develop services in-house that could compete with those of the Internet leaders, and 2) saw in these partnerships an opportunity to share the positive brand image of the Internet leaders.

Since 2006, though, the pace has accelerated:

– Hutchison 3G announced the launch of its X-Series line-up. Since its founding in 2003, this company had positioned itself as a 'digital distributor' in partnership with media groups, especially in music, TV and so on. It was successful in developing new usages but was unable to turn its efforts into profits. On 1 December 2006, Three UK announced an important strategic change, launching its X-Series packages combining unlimited web access (starting at GBP5 per month) and partnerships with Google, Skype, Yahoo, eBay, etc.

Table 30: Partnerships between mobile operators and Internet leaders

Operator	Partner	Area	Partnership / Comments
T-Mobile	Google	Search	Mobile Internet Search and Co-branding
Three Italy	Microsoft (MSN)	IM	Free MSN IM
Three UK	Microsoft (MSN)	IM	Free MSN IM with a GBP15/month voice plan
Three UK	Yahoo	Search	Mobile Internet Search
Three UK	Skype	VoIP	Enabling VoIP on mobile
Three UK	eBay	M-Commerce	Adapting ebay to the mobile/3G
Three UK	Sling Media	TV	Using Slingbox on the mobile/3G
Three UK	Google	Search	Mobile Internet Search
Bouygues Tel.	Microsoft (MSN)	IM	MSN IM on mobile via i-mode
Bouygues Tel.	AOL	IM	AOL IM on mobile via i-mode
O2 Germany	AOL	IM	AOL IM on mobile
KPN / E-Plus	ICQ	IM	ICQ on mobile via i-mode
KPN / E-Plus	Skype	VoIP	Enabling VoIP on mobile
Ten (MVNO)	Microsoft (MSN)	IM	MSN IM on mobile for EUR5/month
Orange	Microsoft (MSN)	IM	Large partnership including rollout of IM on mobile
Vodafone	Google	Search	Mobile Internet Search integrated in Vodafone Live!
Vodafone	Yahoo	Advertising	Develop advertising on mobile (UK)
Vodafone	eBay	M-Commerce	Access to eBay on mobile handsets (first in Italy; Europe in 2007)
Vodafone	MySpace	Community	Photos, e-mail, blog, community, etc. (first in the UK)
Vodafone	YouTube	Community	Access and upload videos & other content (first in the UK)
Vodafone	Google	Maps	Adapting the Google Maps service to mobiles
Vodafone	Microsoft (MSN)	IM	Co-branded application: IM accessible both via PC and mobiles
Vodafone	Yahoo	IM	Co-branded application: IM accessible both via PC and mobiles

Source: Exane BNP Paribas, Arthur D. Little estimates

– Many large carriers, such as Vodafone and France Telecom, have now also forged partnerships with Internet leaders in their domains of excellence, namely web searches, advertising, instant messaging, e-commerce and community content. Implicitly, the carriers were acknowledging that they could enter win/win alliances with these partners rather than trying to create these mobile services from scratch.

These partnerships fragment the value chain in a new way, since the operators share the 'service' link in the chain with their new partners.

Win/win partnerships, at least in the short term

The appeal of these partnerships for mobile operators is obvious. Wireline Internet is an extremely dynamic segment, showing strong growth in both usage and diversity of applications: e-mail, instant messaging (AOL IM, MSN Messenger, etc.), music (iTunes, etc.), video (YouTube, etc.), e-commerce (eBay, etc.), and community sites (MySpace, blogs, etc.).

The services of the Internet leaders have become so common in the eyes of much of the European population that adapting them to mobile phones now seems not only inevitable but also potentially a powerful means of stimulating usage. Being able to access Google News, AOL IM, iTunes and MySpace on a mobile phone could be a reason in and of itself for a customer to subscribe to a mobile broadband package.

The major mobile operators, particularly Vodafone, have understood this, and the partnerships they have entered should lead to service launches in 2007. Together with the rising penetration of 3G and more attractively-priced packages, this should step up the pace of growth in the mobile multimedia market.

With offers such as these, operators have abandoned their early hopes of becoming content and service producers, and hence of capturing the whole value chain. However, they have secured the means to develop mobile Internet usage – and hence to sell mobile broadband packages.

T-Mobile was an early pioneer in the field with its Web'n'walk mobile open Internet access offer. The ARPU of customers on this offer is above average and rising.

More and more operators are likely to follow suit as they have nothing to lose in the short term. These services do not cannibalise any significant pre-existing content sales and the risk to cannibalise voice and/or SMS revenues should be put into context (see below). For the operators, the monthly broadband packages provide an additional revenue stream while the costs of the services provided are borne by the Internet majors.

For the Internet majors, partnerships with mobile operators constitute a twin growth opportunity.

First, the mobile operators are able to bill for services and content that are provided free on fixed-line Internet, including e-mail and images. Second, the mobile market is virgin territory for on-line advertising, which is at the heart of the business models of groups like Yahoo and Google. For them, the revenue potential is all the greater as the operators have access to very detailed subscriber data, including, for example, the location of the customer. This raises the prospect of very targeted – hence highly value added – advertising.

The risk of voice and SMS cannibalisation is more theoretical than real

The operators have long feared that their voice and SMS revenues would be cannibalised by e-mail and instant messaging (IM), two alternative forms of person-to-person communication.

For example, in the UK, the operators seem to be split on this issue. T-Mobile, Three and Orange are open (France Telecom has even signed a global agreement with Microsoft to develop MSN Messenger on Orange mobiles); Vodafone and O2 are, for the moment, still closed.

We believe that IM poses little cannibalisation risk to voice and SMS, for several reasons.

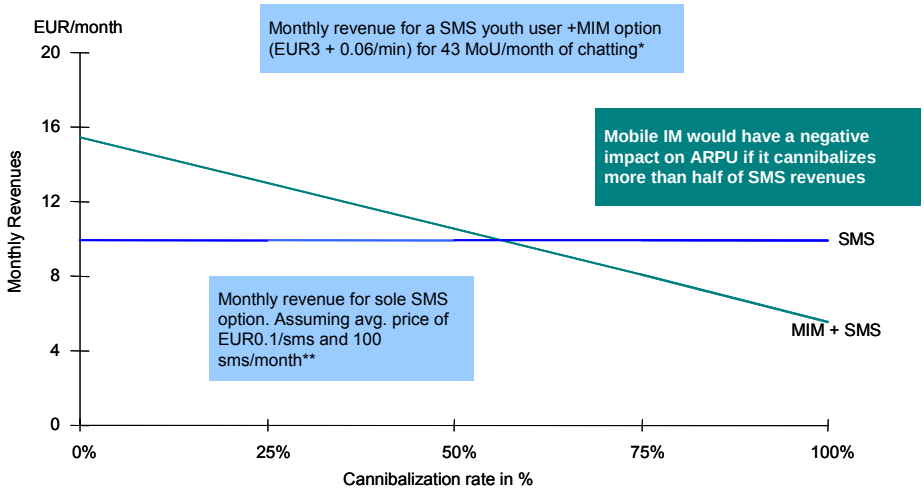
– For a start, the operators that already offer IM services, and the number is growing (see table 30), have not reported evidence of cannibalisation.

– SMS and IM serve different purposes; SMS is used for short messages between individuals, IM is more adapted to long 'conversations' in particular market segments.

– Mobile IM prices are generally set by the operators so as not to threaten voice or SMS revenues. IM users pay a separate subscription. On our calculations, based on a major southern European operator, IM would have to replace over 50% of SMS use for ARPU to fall below the pre-IM level;

– Finally, IM could, according to some, constitute a Trojan horse for the development of VoIP on mobile. We do not believe this, as VoIP on mobile does not allow a satisfactory quality of service, and, in any case, it is less efficient in terms of cost and of spectrum utilisation than classic voice, which is coded on 3G networks at only 9.6kbit/s.

Chart 36: Analysis of SMS cannibalisation by IM



** 20% of MoU for a contract mobile subscriber (European average).*

*** 2 times UK average SMS sent per month.*

Source: Exane BNP Paribas, Arthur D. Little estimates

The operators control the situation for the time being

At the moment, the mobile operators are in a position to be able to control the situation; subscribers are unable to access services provided by the Internet majors without the operators' knowledge.

The Internet services provided by, for example, Yahoo and Google, will not function properly on an operator's handset without a prior agreement. This explains the numerous individual partnerships between operators and Internet majors, e.g., with Three UK for the X-Series services and Vodafone's deals with YouTube and MySpace.

Although the specific terms and conditions of the various agreements are not in the public domain, we believe that they share several features.

They are structured to ringfence the risk of a shift in value, notably ensuring that traffic revenues remain with the operators. We believe that Yahoo, Google and eBay receive a fixed sum from the operators and are remunerated on the basis of their usual models (advertising, sponsored links, commission, etc.). Moreover, the operators negotiate a share of the Internet majors' revenues and so gain incremental revenues in addition to the monthly broadband subscription charge.

The case of Microsoft/MSN is different as the operator usually bills the IM service to the subscriber. The operator thus gains additional revenues that, we believe, are shared with MSN.

The Internet players will win an increasing share of the value

Many operators still see the Internet players as competitors and as a threat to their traditional business models. Some believe that the window of opportunity for constructive partnerships has already closed and that the balance of forces is tipping increasingly towards the Internet players.

We believe that, in time, the operators risk being gradually disintermediated, as a growing proportion of the revenues on new services flow to the Internet majors. There is even a risk of cannibalisation to existing revenues.

The ability of the mobile operators to control the situation, described above, may not endure more than two or three years. Beyond that, the Internet players could become increasingly independent of, and thus competitors to, the mobile operators in the way that they have on fixed-line.

This trend could be fostered by competition between the Internet groups:

- Google appears to be concentrating on seeking partnerships with mobile operators (e.g. with Vodafone on search engines), but is also trying to develop services independently of them (e.g., allowing customers with a PDA to personalise their Google home page on their PDA).
- Yahoo, which admittedly has an agreement with Vodafone on advertising, has just announced (at CES in Las Vegas in January) the launch of an updated version of Yahoo Go, offering a suite of mobile services (e-mail, IM, news, etc.), which can be downloaded direct to a mobile handset via the mobile network but without the operator's 'knowledge' or assistance. In so doing, Yahoo is trying to overtake Google on mobile Internet searches, and thus on the mobile advertising market. Yahoo Go is available on Motorola, Nokia, Samsung and RIM (Blackberry) handsets.

In general, the interests of the Internet majors differ from those of the mobile operators.

The Internet majors want to maximise and monetise their audiences, mainly via advertising. At the same time, they are seeking to develop recurrent revenues with paid options and subscriber services around their communication platforms, including IM and VoIP. Some observers even believe that the Internet majors may launch their own FVNOs or MVNOs, surfing the current trend and taking advantage of the drop in the cost of equipment and network access (fixed and mobile).

This seems unlikely. First, such developments depend on local business models, whereas the Internet groups are global. Second, the margins of virtual operators are much lower than those earned by the Internet players in their core businesses. Third, being a virtual operator requires very different skills than the Internet players currently possess.

For their part, the operators want to find new means of billing for network usage. However, they also want to develop new sources of revenue, in particular from advertising.

Thus a battle is brewing.

The main battle will be fought over the new communication services (e.g. instant messaging), content services (e.g., TV and music), and user-generated content services. This is a growing market with potential for 'paid' revenues and advertising revenues. Each category of player (Internet, mobile operators, media) is trying to ensure that it gets the lions share.

At the same time, there is likely to be a struggle over the operators' historical revenues, i.e., access and voice revenues. Although these are stagnating or declining they remain massive. It would be logical for the Internet groups to try and channel a share to their own coffers.

The first table below shows that even if the market for new services were to grow by 13% pa between 2006 and 2010, and that the traditional markets shrink by 0.6% pa, the operators' revenues would remain flat up to 2010 if their partners managed to win 2% of their traditional revenues and 15% of the new revenues.

Table 31: Change in the European markets, 2006-2010 – Sensitivity of mobile operators' revenues to market share won by the Internet majors

EURm	2005	2006	2010e	CAGR (%) 2006-2010e	Capture (%)	2010 Operators	2010 Operators vs 2006 (%)
Mobile access & voice	101,247	103,856	103,791	0.0			
Fixed access & voice	79,226	80,067	75,428	(1.5)			
Total access & voice	**180,473**	**183,923**	**179,219**	**(0.6)**	2	**175,634**	**(4.5)**
Mobile Content & P2P	18,813	20,766	27,539	7.3			
Fixed Content etc.	297	1,110	8,024	64.0			
Total content & P2P	**19,110**	**21,877**	**35,563**	**12.9**	15	**30,229**	**38.2**
Total	**199,583**	**205,800**	**214,782**	**1.1**	**4**	**205,863**	**0.0**

Source: Exane BNP Paribas, Arthur D. Little estimates

This second table indicates the sensitivity of this revenue outlook to the proportion of revenues captured by the Internet leaders on the two types of market.

Table 32: Sensitivity of mobile operators' revenues in 2006-2010 depending on market share won by the Internet majors on traditional revenues and new services

		Market share (%) on traditional revenues (access, voice, fixed et mobile)					
		0%	1%	2%	3%	4%	5%
Market share (%) won on new revenues (P2P and content, fixed and mobile)	0%	4.4	3.5	2.6	1.8	0.9	0.0
	5%	3.5	2.6	1.8	0.9	0.0	(0.9)
	10%	2.6	1.8	0.9	0.0	(0.8)	(1.7)
	15%	1.8	0.9	0.0	(0.8)	(1.7)	(2.6)
	20%	0.9	0.0	(0.8)	(1.7)	(2.6)	(3.4)
	25%	0.0	(0.8)	(1.7)	(2.6)	(3.4)	(4.3)

Source: Exane BNP Paribas, Arthur D. Little estimates

3. The leaders' renewed ambitions will force challengers to react

Given the underlying market context, operators will have not only to keep a tight grip on costs, but also to invest strongly in their networks in order to continue to provide quality service, to seize opportunities to pare costs and to avoid being buffeted by the arrival of potentially more effective competitors. In this context, the 'ideal' operator combines critical mass and flexibility:

– the need to invest (notably in networks, new services and content) makes critical mass even more important than it has been;

– at the same time, flexibility is more and more key (capacity to keep costs low; need to absorb new lines of expertise, to manage the arrival of new business models and to handle new competitors and partners whose interests and cultures are different).

Incumbent operators have critical mass but they lack flexibility. Mobile leaders are better positioned because they also have critical mass but appear to be more flexible than incumbent operators–at least as regards costs. Leading alternative carriers are well placed as they combine high flexibility and sufficient size on their market.

On the contrary, mobile challengers combine a certain lack of critical mass (and, in particular, a delay in terms of investments) with a relatively unwieldy organisation. Finally, challenger alternative carriers boast flexibility but suffer from a serious lack of critical mass.

Table 33: Rating of different categories of player

	Critical size factor			Flexibility factor			
	Size	Investment	Sub-total	Cost base	Organisation	Sub-total	Total rating
Incumbents*	1	1	2	(1)	(1)	(2)	**0**
Mobile leaders*	1	1	2	0	(1)	(1)	**1**
Mobile challengers	0	(1)	(1)	1	(1)	0	**(1)**
Leading altnets	0	0	0	1	1	2	**2**
Small altnets	(1)	(1)	(2)	1	1	2	**0**

** 'Incumbents' covers both fixed-line and mobile activities, 'Mobile leaders' covers mobile leaders excluding incumbents' subsidiaries.*

Source: Exane BNP Paribas, Arthur D. Little estimates

Leading operators (incumbents, mobile leaders and large alternative operators) are still very ambitious. We expect them to intensify their fight-back from 2007 – with the target to find growth (i.e. to stimulate market growth but also to work on their market share).

The tools they are going to use should include content purchase (on fixed and mobile), fibre rollout (FTTx), convergence offers, opening-up to MVNOs (wholesale operator business model) and an all-out drive on costs.

Mobile and ISP challengers will therefore face tougher times. They will need to be even more aggressive, in terms of pricing, partnerships with Internet leaders and with virtual operators – however we expect them to increasingly explore new strategic avenues to reach critical mass in selected areas.

This could involve partnerships or mergers/acquisitions with complementary players. We expect the pace of such moves to increase: consolidation in fixed and/or mobile, but also alliances between fixed and mobile operators.

3.1. Leaders versus challengers: new confrontation

The challengers continued to gain market share during 2006, but the competitive structure of the major European fixed-line and mobile markets, changed little.

As the table below shows, the HHI index, which measures market concentration, and which we have used for several years to characterise competitive intensity, is relatively unchanged. This index corresponds to the sum of market share squares in a given market. It is commonly used by competition authorities to assess market concentration. On average, in Europe:

– for fixed, the index reached 3,218, up 4% yoy, thanks to an increase in the Netherlands, Austria, France, Germany and Spain, linked to consolidation movement among small ISPs, offset by fragmentation in the UK market (entry of Carphone Warehouse and BSkyB);

– for mobile, the index reached 3,457, stable yoy, as a result of market share losses (in value) among leading players in Germany, Italy and Belgium.

Table 34: HHI index – Change between end-2005 and end-2006

				Yoy change (%)		
HHI (Q4 06)	**Fixed**	**Mobile**	**Convergent**	**Fixed**	**Mobile**	**Convergent**
UK	1,774	2,332	1,176	(10.1)	(0.8)	(5.5)
The NL	2,468	3,114	2,425	28.7	0.4	11.9
Germany	2,959	2,966	2,558	6.5	(4.4)	(0.7)
Austria	3,192	3,392	2,666	10.9	18.4	11.0
France	2,897	3,621	2,732	9.5	(0.5)	4.0
Average	**3,218**	**3,457**	**2,785**	**3.7**	**0.6**	**0.6**
Belgium	3,894	3,898	3,193	1.2	(4.5)	(3.6)
Spain	3,713	3,741	3,269	2.7	0.2	(0.4)
Italy	4,653	3,391	3,419	(4.6)	(2.9)	(3.5)
Switzerland	3,414	4,654	3,627	1.4	1.5	(3.9)

Source: Exane BNP Paribas, Arthur D. Little estimates

How will operators' new strategic choices influence this competitive landscape?

The conclusion that we have drawn after our discussions with operators is that many want to continue to expand on retail markets (including in certain markets that have not achieved critical mass) by financing this commercial push through cost containment, in particular by optimising infrastructure management. In the past, it has been the challengers who have stressed cost cutting, but the leaders are now very attentive and are developing several initiatives in this direction.

Opening up to virtual operators and Internet leaders

Mobile operators are more and more open to MVNOs, for reasons that are both offensive (to find avenues of growth) and defensive (to counter the rise of aggressive MVNOs).

Historically, MVNOs have been introduced by challengers (for example T-Mobile UK or E-Plus), but today the leaders are prepared to enter the low cost offer market, either via new brands launched by the operators themselves or via MVNOs, by positioning themselves more distinctly as 'welcoming' wholesale operators. This is the case of leading operators in Germany, Austria, Spain, Italy, the Netherlands, the UK, etc.

In addition to this interest on the part of several leaders, other operators which have until now remained out of the MVNO fray could take the plunge:

- Bouygues Telecom in France has hitherto shown no interest in MVNOs, but its management has recently been more open;
- the new entrants in the UK and Italy (H3G) and in Spain (Yoigo) have not yet positioned themselves on the MVNO market. For H3G UK and Italy, the reason has probably historically been the high cost of 3G handsets (for MVNOs positioned on the low cost market, 3G handsets are too expensive). For Yoigo, the low deployment of its network gives it poor positioning on the wholesale market. However, this could change in the next few years…

…thus potentially creating a new competitor in the wholesale market in France, the UK, Italy and Spain.

Moreover, most players now appear ready to strike partnerships with Internet leaders, and the pace of the deals is accelerating.

We therefore expect to see the emergence of more MVNOs (as they could enjoy increasingly good network access conditions) and a more open attitude vis-à-vis Internet leaders. It is difficult to predict the long-term consequences of these trends: we expect that the result will be more usage growth, but also more competition and greater sharing of value (see pages 35-54).

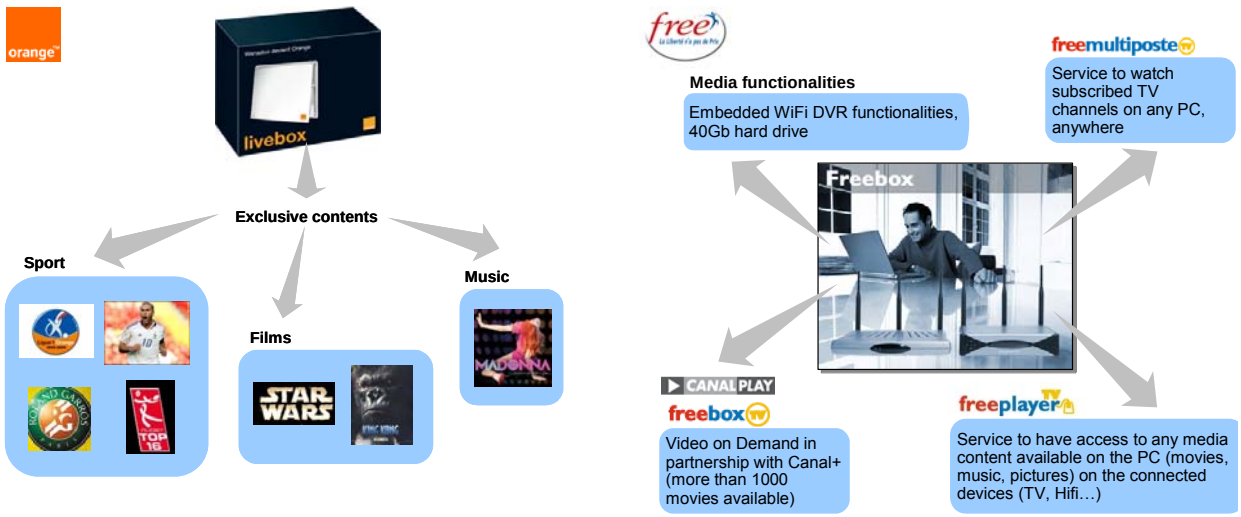
Attitude regarding content: size is key

The question of content tends to divide operators based on their size.

Nearly all leaders (both incumbents and Vodafone subsidiaries) are seeking to develop an ‘entertainer’ business model, via partnerships with media and content purchasing groups, whereas challengers (both mobile and ISP) are looking to carve out positions as ‘enablers’. Another analogy to describe these two approaches is the ‘supermarket’ (operators buy content and resell it in their stores) versus the ‘shopping mall’ (operators host boutiques, each of which sell their own content).

Certain challengers have managed to distinguish themselves from competitors not through content, but rather via technology: this is a critical aspect of Iliad’s business model, as the company has continued to innovate with its Freebox (triple-play, high definition, WiFi, CanalPlay, etc.).

Chart 37: France Telecom is banking on exclusive content, Iliad on technology



Source: Exane BNP Paribas, Arthur D. Little estimates

Convergence: consensus–but mobile challengers are uneasy

Many operators are positioning themselves on the fixed-mobile convergence market. This is the case:

– for incumbent operators and their subsidiaries: KPN, France Telecom, Telefonica, and Deutsche Telekom, although each brings its own nuances (for example, convergence is not considered by all as the best position for all market segments, but it does appear to be important for SOHOs and family markets);

– but also for large mobile operators, e.g. the subsidiaries of Vodafone and O2, SFR, and Mobistar. However, for the moment they are targeting only the convergence market for voice and Internet access (home-zone offers completed by ADSL), and not the quadruple-play market in the strict sense of the term, as at present they are not investing to develop IPTV offers;

– and for many alternative carriers: Wind, Fastweb, Telenet, BT Spain, Telenor Sweden, Neuf Cegetel, and Iliad; even though each has strong nuances here as well. Some have stressed the vast opportunity to develop in mobile while preferring not to employ the term ‘convergence’.

This confirms the analysis we made last year to the effect that fixed-line operators are going to try to establish a mobile foothold while wireless operators will try to forge a presence in landline. Concretely, this implies:

– partnerships and/or reselling (Vodafone FVNO on the networks of BT or Fastweb; Telenet MVNO on the Mobistar network, etc.);

– but also an attraction on the part of these operators for new technologies (WiFi, WiMax) and for new licences (3G in France, WiMax in the UK, etc.).

The category of operators who feel the least comfortable with convergence is mobile challengers, such as Bouygues Telecom, E-Plus, Hutchison 3G Italy and UK (NB: this category does not include challengers who are subsidiaries of groups such as France Telecom, all of which are following the group’s convergence strategy).

At this stage, mobile challengers are responding to convergence by pushing aggressive ‘mobile only’ offers (unlimited voice packages, partnerships with Internet leaders on data services, etc.), and E-Plus is playing the wholesale operator card, having said that it is prepared to be the wholesale supplier for an alternative fixed operator seeking to develop its own convergent offers.

We believe, however, that this positioning will be increasingly difficult to defend in the medium term, and that these operators could cement alliances or M&A transactions to establish themselves on the convergence market.

Further out, the large mobile operators having launched convergent voice+ADSL offers could expand their ambition by targeting the quadruple-play market. To do so, we have not ruled out their joining forces with (or acquiring) operators which already have expertise and/or an activity in IPTV, cable and/or content.

Corporate market: for large players and specialists

Unsurprisingly, incumbents and mobile leaders want to be present in the corporate market, as do certain challengers (e.g. Fastweb, Neuf Cegetel, and Telenor Sweden), who have said that corporate clients enable them to optimise their network's profitability.

From a global perspective, the operators present in this market are fairly optimistic as regards customer demand, as they have witnessed a growing number of applications and rapid growth of data usage, but some have noted that competition is picking up.

Some interesting trends are taking shape:

- some alternative carriers with little presence on the corporate market are now looking to bulk up there, for example in Italy;
- convergence (fixed-mobile, IT-telecoms) is a key theme in the corporate market that has led some alternative carriers who specialise in landline services to corporates to develop (or consider developing) specialised MVNOs for professional use, for example in Spain.

Table 35: Player positioning – Top 3 on each positioning

	Entertainer?*	Convergence?	Low-cost?	Wholesale?	Business?
France					
France Telecom/Orange	√	√		√	√
SFR	√	√		√	√
Bouygues Telecom					
Iliad			√		
Neuf Cegetel		√	√	√	√
Noos Numericable	√				
UK					
Vodafone	√	√		√	√
Telefonica/O2					
France Telecom/Orange		√		√	√
Deutsche Telekom/T-Mobile				√	
H3G UK	√		√		
BT		√		√	√
NTL/Virgin	√	√			
Carphone Warehouse			√		
BSkyB	√				
Italy					
Telecom Italia/TIM	√	√		√	√
Vodafone		√			√
Wind		√	√	√	
H3G Italy	√		√		
Fastweb	√			√	√
Tiscali			√		
Tele2			√		
Spain					
Telefonica/TEM	√	√		√	√
Vodafone	√		√	√	√
France Telecom/Orange		√		√	
TeliaSonera/Yoigo			√		
Ono	√	√			
Germany					
Deutsche Telekom/T-Mobile	√	√	√	√	√
Vodafone/Arcor	√	√			√
KPN/E-Plus			√	√	
Telefonica/O2		√			
The Netherlands					
KPN	√	√		√	√
Vodafone					√
France Telecom/Orange		√			
Deutsche Telekom/T-Mobile					
UPC	√				
Belgium					
Belgacom	√	√		√	√
France Telecom/Mobistar		√		√	√
KPN/Base			√	√	
Telenet	√	√			
Austria					
Telekom Austria	√			√	√
Deutsche Telekom/T-Mobile			√	√	√
One			√	√	
H3G Austria	√				
Tele2		√	√		
UPC	√	√			√

** Entertainer: operator focusing on the consumer market on 'infotainment' services; positioning notably analysed through the purchase of content: video (football), music, etc.*

Source: Exane BNP Paribas, Arthur D. Little estimates

Pressure is mounting on the challengers

The trends which we have just described point to the renewed ambition of leading operators, both incumbents and mobile leaders. We believe they should intensify their counterattacks from 2007 – with the aim to find growth. They should use several tools, including content purchasing (in both fixed and mobile), deployment of fibre (FTTx), launch of convergent offers, partnerships with MVNOs and cost-cutting.

In most European markets, this is likely to refuel the competitive pressure exerted by the incumbents on the challengers, but also the pressure exerted by the mobile leaders (notably Vodafone's subsidiaries) on the incumbents and the challengers.

In this context, we believe that it will become increasingly difficult for the challengers (mobiles and ISPs) to win market share. They will have to be even more aggressive, in terms of pricing and in terms of partnerships with the Internet leaders and with virtual operators.

Probable revival of M&A activity

However, the challengers also have alternative strategic options that are as yet unexplored, namely closer-knit partnerships, mergers and acquisitions.

We see three major options:

- Consolidation with local competitors. This has already begun but will continue in the broadband market, as the small ISPs can either expand (in the footsteps of Neuf Cegetel in France, Carphone Warehouse in the UK, Telecom Italia in Germany and KPN in the Netherlands) or exit the market (example of AOL Europe). This could continue in France (Club Internet), Spain (Ya.com, Jazztel), Italy, Germany, Belgium and the UK. Concerning mobile challengers, consolidation appears possible in some countries, such as the UK (Hutchison 3G), the Netherlands (Orange) and Austria (One);
- Alliances, in the form of partnerships, mergers and acquisitions between mobile operators and fixed-line operators in the same country, like that of NTL/Virgin Mobile in the UK. Such an approach could ultimately harvest substantial synergies via the development of convergent fixed-mobile offers, cost reductions and cost-fertilisation in different market segments. We do not rule out tie-ups like those of Mobistar/Telenet in Belgium or Vodafone/Fastweb in Italy, etc.;
- Acquisition by an international operator. Although the synergies from this type of operation are not as strong as in the case of two operators in the same country, we believe that there is some potential for transborder synergies. A major international operator can endow a local challenger (fixed or mobile) with greater purchasing clout vis-à-vis equipment suppliers (network, handsets), content providers and Internet leaders. They can also provide the capacity to develop in new market segments (e.g. corporate). Rumours persist regarding Bouygues Telecom (KPN).

Such movements could also be encouraged/facilitated by the mobile leaders, which, as we have seen, could endeavour to go further than the 'simple' convergent offers that they have launched so far (voice+ADSL). Eventually, they could seek to enter the quadruple-play market, implying alliances (partnerships or mergers/acquisitions) with players in this domain (triple-play operator via ADSL or cable).

Moreover, we still do not foresee the acquisition of media groups by the operators. This does not appear to be on any of the operators' agendas, and the few instances of telecom/media integration have not delivered the hoped-for benefits. Telefonica is selling Endemol; AOL is selling its access activities in Europe. This is logical: the media groups wish to distribute their content on the largest number of platforms possible, and the telecom operators wish to have access to as much content as possible. There are therefore no potential synergies from integrating a media group with a telecom operator. Undoubtedly, exceptions are always possible, and are even envisaged by some players in Ireland and the UK, as for example the recent attempt by NTL/Virgin to acquire TV group ITV, which was blocked by BSkyB.

3.2. Low costs: a differentiating factor

The major operators are confronting the challengers, which have much lighter cost bases for the most part, and are facing rapid technological and business model development.

In this context, a key success factor will be the ability to operate with the lowest possible cost base.

All of the major operators are working to reduce their costs. They have carried out benchmarking and know their potential points of improvement, and fresh cost optimisation programmes are constantly being implemented. In our view, the opportunities for operators are manifold in terms of network costs, IT systems, customer relations, commercial costs and overhead costs.

However, to achieve a significant reduction in most cost categories, it is crucial to reduce personnel costs – an issue where operators are not equally positioned.

The alternative operators, which have an intrinsically low-cost culture, are the best-placed players with regard to costs in our view, followed by the mobile operators, which do not have any particular constraints in terms of personnel costs. The least best-placed are the incumbents, which often have heavy and complex structures, and some of whom employ a large number of civil servants.

Opportunities are manifold

As we said in our report *More effort required* of January 2005, we believe that cost optimisation opportunities exist for the operators across all of the cost categories.

- Concerning network costs (10-20% of mobile operators' revenues), we have already elaborated on the possibility of outsourcing mobile networks, which offers potential savings of 20-30% on the costs and capex concerned, i.e. an OpFCF gain in the region 1-2% of revenues.
- Another substantial opportunity in terms of network costs, which at this stage is more relevant for the fixed-line activities of incumbents, lies in migration to more efficient technologies, and notably NGN. For example, BT states that migration to its '21CN' will save the company EUR1bn in opex (i.e. 3% of its revenues), while KPN is talking of EUR850m (7% of group revenues). Naturally, these savings necessitate substantial investments (see pages 95-100).
- Interconnection costs (which represent 15-20% of mobile operators' revenues) can be optimised, beyond the reduction in call termination rates, by pushing the development of onnet traffic.
- IT systems are a significant potential source of savings. For example, France Telecom says that IT costs represent roughly 3% of the group's revenues, and that its goal is to reduce this by around 15% over three years, a gain equivalent to 0.5% of group revenues.
- Customer relations costs (7-11% of mobile operators' revenues) also offer strong potential for optimisation, with four levers: 1) the streamlining of offers (the simplicity of alternative operators' offers are often quoted as a reason for their efficiency, 2) better customer segmentation, enabling spending to be allocated in an efficient manner to 'good' customers, i.e. de-averaging of costs (this is a very long-term project on which all of the operators have been working for several years, and the bigger the operator the longer it takes), 3) the development of 'self care' by Internet, which saves on call-center resources (in the throes of development), and 4) the relocation of call centers.

– Commercial costs (around 15% of operators' revenues) are not necessarily a cost reduction target, as this could have a negative impact on the commercial performance, but there are ways that they can be optimised: 1) several operators have pointed to advertising, where spending is often unwise, the cost of which amounts to tens of millions of euros (at least 1% of revenues) for each operator in each country, 2) the reduction of the cost of terminals (mobiles, set-top-boxes, etc.). On this issue, most of the players interviewed said that power was currently in the hands of the operators rather than the equipment suppliers; 3) the reduction in distributors' commissions: many operators are seeking to reduce their dependence on the independent distributors by developing their own stores and investing in online selling.

– All of the operators, both fixed-line and mobile, are striving to reduce overhead costs (representing about 5% of revenues).

Two opportunities for cost optimisation currently exist for a large number of operators.

– Fixed-mobile integration: the full acquisition of the mobile subsidiary is a way to cut costs, by optimising support/administrative and commercial costs (campaign coordination), customer relationship (combining of call centers) and also network costs (NGN). This cost-cutting method is favoured particularly by France Telecom (NeXT programme in France), Telefonica (after the acquisition of 100% of TEM Spain), Belgacom ('One factory' model, after the 100% integration of Proximus).

– Consolidation: examples include the acquisition of Telfort by KPN in the Netherlands and that of Cegetel by Neuf Telecom in France, which have generated substantial synergies.

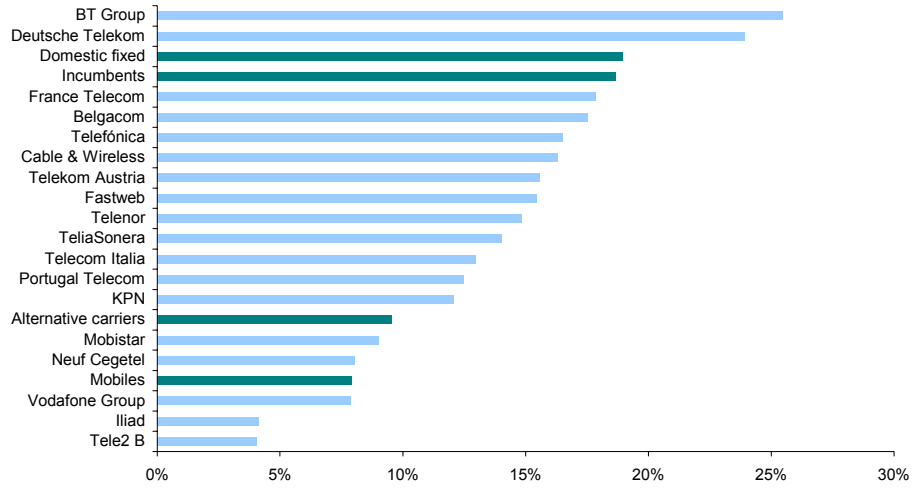
Personnel costs: an obligatory route

At incumbents, personnel costs represent a particularly heavy cost category, at 19% of operators' total revenues. As the chart below shows, this compares with 10% at alternative operators and 8% at mobile operators.

Several initiatives previously mentioned (efforts on network costs, notably IT systems, call centers and support) can only pay off if the personnel costs relative to these different cost categories can be reduced.

In recent years, France Telecom, Deutsche Telekom, BT, KPN, Portugal Telecom, etc.: have all introduced staff cuts. This is set to continue in the coming years.

Chart 38: Personnel costs as a % of revenues



Source: Exane BNP Paribas, Arthur D. Little estimates

These are widesweeping plans: a 14% cut in the total combined staff of these operators over the 2005-2010 period (different periods depending on the operators) corresponding to the departure of 80k employees. However, their potential effect on operators must not be overestimated. These five operators' layoff plans combined bring the total savings in the 2005-2010 period in our estimate to 4% of revenues (all else being equal, notably excluding the unit rise in salaries). In other words:

– the personnel cost/revenues ratios of these operators would drop from 21% to 17%, still much higher than the ratios of mobile and alternative operators;

– revenues per employee would increase from around EUR260k in 2005 to roughly EUR320k in 2010, still well below those of mobile operators (EUR700k) and those of alternative operators (EUR580k).

Naturally, these efforts are all the more complex and slow for operators employing a large number of job-secure civil servants. The four operators exposed to this question are Belgacom, Telekom Austria, France Telecom and Deutsche Telekom (see table below).

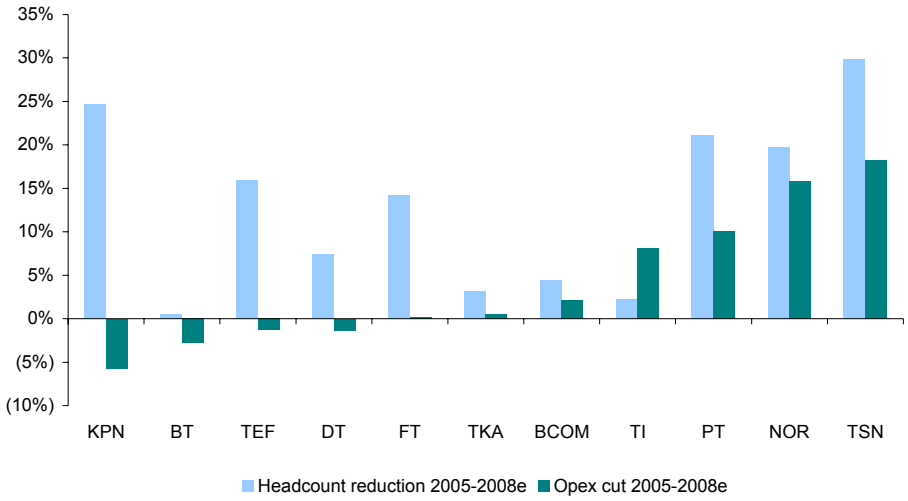
Table 36: Number of employees, revenues per employee and % of civil servants

	Average headcount (2005)	Revenue / employee (EURk)	Civil servants % of employees
Belgacom	16,634	328	52
BT Group	103,000	278	0
Deutsche Telekom	244,170	244	18
France Telecom	196,452	250	44
KPN	29,368	406	0
Portugal Telecom	27,178	235	0
Telecom Italia	85,484	350	0
Telefónica	207,641	182	0
Telekom Austria	14,451	302	48
Telenor	23,200	371	0
TeliaSonera	27,403	344	0
Bouygues	118,484	203	0
Mobistar	1,663	873	0
Vodafone Group	61,672	698	0

Source: Exane BNP Paribas, Arthur D. Little estimates

Nevertheless, this is not the only factor: the chart below outlining our expectations in terms of cost reductions within the domestic fixed-line activities of incumbents in 2005-2008e, shows that personnel costs can fall rapidly, but that total costs can stagnate or even increase, depending on anticipated movements in other cost categories (commercial costs, content costs, etc.)

Chart 39: Estimated cost reductions in fixed-line domestic activities of incumbents – contribution from staff reductions



Source: Exane BNP Paribas, Arthur D. Little estimates

3.3. The need to invest

As we have seen, the strong growth in traffic volumes (data over fixed, voice and data over mobile) goes hand in hand with very rapid deflation in unit prices. In such an environment, old networks will quickly become outmoded in terms of capacity, speed and unit costs.

In addition, for those infrastructure operators that are ready to invest in new networks, the value chain reorganisation (cf. pages 56-84) results in attractive opportunities:

- thanks to network sharing and/or the outsourcing of certain parts of the network, it has never been so cheap to roll out new infrastructure;
- infrastructure operators see numerous potential clients: all kinds of virtual operators, Internet leaders, media groups, etc.

Lastly, infrastructure operators are under a continual threat from new technologies (e.g. WiFi, WiMax) and new licenses (more radio spectrum available, with the regulators planning to award it in a technology neutral way), as well as from renewed interest in 'forgotten' infrastructures (cable in France, for example).

Operators should therefore invest in their networks like never before.

For fixed operators, the main investments will be in FTTx (VDSL/FTTC or FTTH, depending on the country), for mobile operators, in 3G and HSDPA, and, for everyone, in NGNs (new generation networks). But operators will also have to remain pragmatic so as to be able to seize any investment opportunities that may arise in new licenses and new technologies (DVB-H, WiMax, etc.).

Operators are not on equal footing in these different areas. In particular:

- some have a clear edge in 3G, for example, which we believe is now an advantage;
- not all operators are feeling the same competitive pressure to invest in FTTx as quickly as possible;
- lastly, others do not have the resources to make the necessary investments.

Mobile networks: 3G/HSDPA is now a must

For 2007, we expect most mobile operators to step up their investments in their 3G/HSDPA networks, with the notable exception of Vodafone. After that, a new wave of capex is likely in 2008-2010.

Mobile operators consider 3G (UMTS) and HSDPA (High Speed Downlink Packet Access, the most advanced version of 3G accelerating the speed at which data can be downloaded) to be the basic technologies for their mobile networks in the coming years. Some have already made the majority of their investments, but most are planning significant outlays in 2007 and the following years.

Generally speaking, Vodafone's subsidiaries are ahead of the curve, the incumbents' subsidiaries find themselves in a variety of situations, and the independent challengers are laggards:

- Vodafone's European subsidiaries are ahead of the curve, averaging 3G coverage of 60-65% of the population and with HSDPA networks covering 60% of 3G zones by March 2007 – but some subsidiaries have pulled even further ahead of the pack, with 3G coverage of 80% of the UK population, or with HSDPA already covering all of the 3G network in Spain;

– Hutchison 3G is obviously ahead of the curve. As it does not have 2G licenses, it has rolled out 3G networks covering a large part of the population, particularly in the UK, Italy and Austria;

– Telefonica/O2's subsidiaries are behind the curve: TEM Spain is still in an HSDPA investment phase; O2 UK and O2 Germany have just announced capex increases to speed up 3G coverage; O2 Ireland's 3G coverage is not yet complete;

– France Telecom/Orange's subsidiaries are at different stages: Orange Spain and Mobistar are lagging, but Orange UK claims it has 3G coverage of 90% of the population; Orange France's situation is fairly vague, as the operator only discloses its 3G+EDGE coverage, without specifying 3G coverage as such;

– Deutsche Telekom's subsidiaries are also in varying situations: T-Mobile Germany still plans to expand its HSDPA coverage, while T-Mobile Austria is ahead of the curve (like its Austrian competitors);

– E-Plus (KPN) is clearly a laggard as it has said it will make no further 3G investments. The operator has completed the minimum coverage required by law, but is now focused on optimising its 2G network, and has no plans for HSDPA. E-Plus acknowledges it can no longer compete with Vodafone and T-Mobile on the mobile broadband access market (particularly PC datacards for business customers);

– Most challengers and independent operators are laggards: in Italy, Wind has completed HSDPA coverage of large cities only; in France, Bouygues Telecom is targeting 3G coverage of only 25% by end-2007; in Switzerland, Sunrise is only beginning to invest in HSDPA; in Austria, One has said that it is a follower in 3G rollout.

At this stage, soft market demand for 3G services has led some operators to delay some of their new rollouts. Vodafone has said that, in theory, it will not roll out 3G beyond the coverage reached today.

But we believe that a new wave of investments will emerge, helped by several factors:

– 3G equipment costs are declining rapidly: hardware for a 3G Node B costs no more than EUR21k in 2007 with the all-inclusive cost per base station declining to approximately EUR70k; the transition to HSDPA only costs EUR2k-10k per BTS (i.e. EUR30m-150m for a major operator), and the order of magnitude should be the same for HSUPA (High Speed Uplink Packet Access, the technology that will succeed HSDPA, and which will improve the speed of data transfer from mobile handsets to the network);

– the refarming of 2G frequencies, starting at the end of 2007 up until 2009 according to the country: the operators will be able to use the 900 MHz and 1800 MHz frequencies currently used by their 2G networks, for their 3G networks, whereas 3G licences initially confined this technology to the 2.2GHz band. This should reduce the cost of the 3G rollout. In fact, the lower 900 MHz and 1800 MHz frequencies enable each base station to have a wider radius of action. Thus a smaller number of base stations are required to cover a given zone. This should encourage operators to increase their 3G coverage;

– lastly, operators are increasingly open to innovative solutions, allowing them to maximise their returns on investment: network sharing, tower sharing, etc. (see pages 57-67).

Some operators will also invest in other wireless technologies, including DVB-H (mobile TV) and WiMax (very high bandwidth access).

As seen in the table below, these investment plans involve significant amounts for each operator: several hundreds of millions of euros to expand 3G coverage (depending on the country and the operator's size), around EUR100m for HSDPA and for HSUPA, around EUR200m for a national DVB-H network, and several tens to several hundreds of millions of euros for a WiMax network, depending on its scope.

These are affordable amounts, in light of mobile operators' capex levels: in the table below, we have compared these potential investment plans to the revenues of a typical mobile leader (in this case, EUR8bn), assuming that these expenses are made over one, two or three years depending on the circumstances, which leads to a range of 0.3% to 3.5% of revenues.

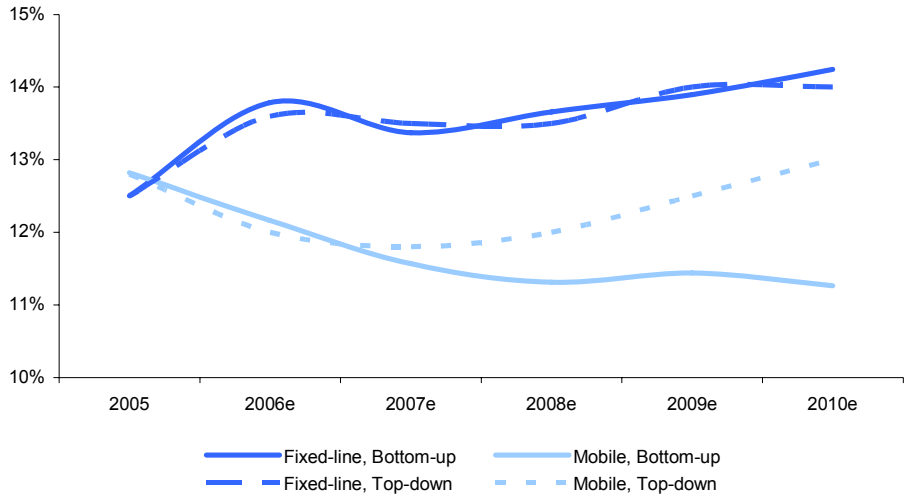
Table 37: Investment plans

	Number of sites	Unit cost (EURk)	Total cost (EURm) Low	High	Spread over X years	Annual spending as a % of revenues* Low	High
3G expansion	3,000-8,000	70	210	560	2	1.3	3.5
HSDPA	15,000	2-10	30	150	1	0.4	1.9
HSUPA	15,000	2-10	30	150	1	0.4	1.9
DVB-H	NA	NA	150	300	2	0.9	1.9
WiMax	NA	NA	60	700	3	0.3	2.9

** Assuming revenues of EUR8bn (typical mobile leader in a large European country).*

Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 40: Aggregate capex/revenues of European fixed and mobile operators –



Source: Exane BNP Paribas, Arthur D. Little estimates

European mobile operators' average capex/revenues was 13% in 2005 and 12% in 2006. We currently expect this ratio to stabilise at about 12% in the coming years. However, for operators that may decide to undertake new rollouts (expanding 3G, DVB-H or WiMax coverage), investments could exceed our current forecasts by 1-3% of revenues in 2008-2010.

FTTx: a new wave of major investment in fixed-line

In fixed-line, operators are currently getting the best from the copper networks which were deployed several decades ago, thanks to ADSL technology. However, with ADSL2+, ADSL technologies are reaching their limits. Countries in which broadband is the most advanced are beginning to migrate towards fibre optic (FTTx technologies). This move also allows fixed-line operators to re-increase the gap with mobile technologies, which are progressing rapidly in terms of speed, capacity and unit costs.

Table 38: European operators' FTTx plans in figures

Country	Operator	Technology	Capex (EURm)	Years	Lines targeted (m)	Capex per line (EUR)	Customers targeted (m)	Capex per customer (EUR)
Belgium	Belgacom	FTTC/VDSL	330	2004-2006	NA	NA	NA	NA
Germany	Deutsche Telekom	FTTC/VDSL	2,200	2006-2008	10.0	220	NA	NA
Switzerland	Swisscom	FTTC/VDSL	373	2006-2008	1.5	252	NA	NA
Spain	Telefonica	FTTH	900	2006-2009	NA	NA	NA	NA
France	Iliad	FTTH	1,000	2006-2012	NA	NA	0.667	1,500
France	France Telecom	FTTH	270	2007-2008	1.0	270	0.175	1,543
Italy	Telecom Italia	FTTC/VDSL	150	2006-2008	3.3	45	NA	NA
Italy	Telecom Italia	FTTH *	9,000	2007-2016	24.0	375	NA	NA
Italy	Telecom Italia	FTTH **	6,700	2007-2016	13.0	515	NA	NA

** This corresponds to a working assumption given by Telecom Italia, but no decision has been taken.*

*** Figures quoted in the press, not confirmed by Telecom Italia.*

Source: Exane BNP Paribas, Arthur D. Little estimates

France, the Netherlands and Belgium are the most advanced countries in terms of FTTx. Broadband development is extremely advanced in these countries and incumbents are under pressure due to the presence of aggressive alternative and/or cable operators in their markets:

– In France, Iliad has announced a EUR1bn investment plan for 2006-2012 (targeted capex per subscriber of EUR1,500 in the initial plan, followed by capex of EUR350 per incremental client). France Telecom responded with a EUR270m plan for 2007-2008 and forecasts a "phase III" at a later date. Neuf Cegetel has also announced that it will invest in FTTH. Finally, the cable operator Noos-Numericable, which is currently updating its network, is rolling out a fibre optic infrastructure to the curb and has already launched a 100Mbit/s offer in Paris.

– In the Netherlands, cable plays a very important role and KPN is investing massively in a FTTC/VDSL2+ roll-out plan.

– In Belgium, Belgacom's fibre optic deployment project, Broadway, is already well underway. The roll-out of FTTC/VDSL started in 2004 (capex of EUR330m).

– In Germany, Deutsche Telekom announced a FTTC/VDSL roll-out programme 18 months ago for an investment of a EUR2.2bn (o.w. EUR700m in 2006, EUR800m in 2007e and EUR700m in 2008e). The group aims to offer coverage in 50 towns and 10 million households. This represents a cost of EUR220 per household. Nonetheless, the market remains focused on ADSL for the moment, where competition is very strong. In our opinion, the incumbent's main aim is to improve its ADSL offers as opposed to rapidly rolling out VDSL.

– In Spain, cable operators are also present on the triple-play market, but Telefonica remains the dominant player. The operator has announced a limited FTTH deployment plan (EUR500m by 2009), but is still awaiting approval from the regulator.

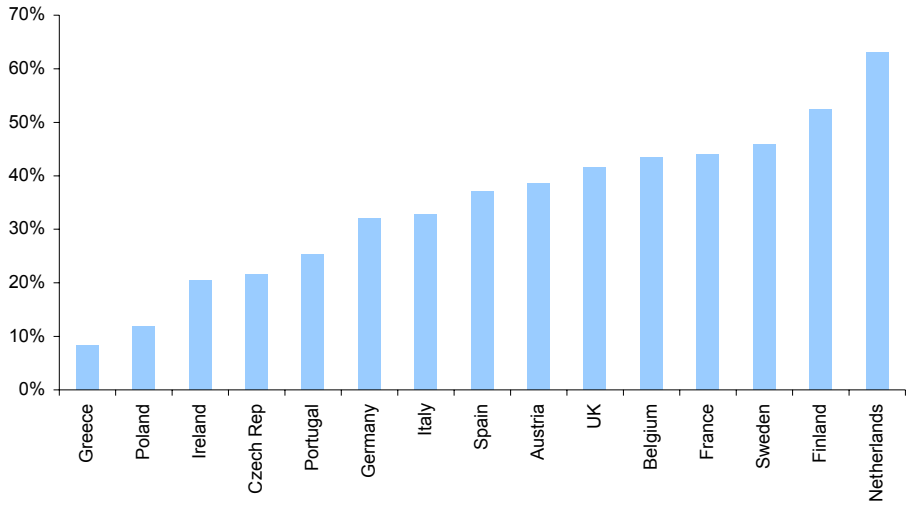
– In Switzerland, where cable is also present in the triple-play market (Cablecom), Swisscom has announced a CHF600m FTTC/VDSL deployment plan for the 2006-2008 period, aimed at coverage for 40% of households;

– In Italy, VDSL should at this stage be the favoured very high speed technology for Telecom Italia and its competitors – apart from Fastweb which already has its own FTTH network, thanks to a total investment of EUR3bn. Telecom Italia's network is already fibre optic-based up to the street cabinets (Socrate project). The company plans to invest only EUR150m over 2006-2008 to provide VDSL for 15% of households. However, uncertainty remains high for all players due to negotiations under way between Telecom Italia and the regulator regarding the separation of Telecom Italia's local network. If such a move is authorised, Telecom Italia could decide to roll out a FTTH network. At the end of 2006 the operator stated that it aimed to cover 100% of the population, i.e. 24 million lines, at a cost of EUR9bn, but the press estimated at the beginning of 2007 that to cover 13 million households (coverage of just over 50%) would cost EUR6.7m over ten years.

– Finally, the UK is clearly a long way behind. BT is currently concentrating on the launch of its Next Generation Network ('21CN': 21 Century Network). This network will be compatible with FTTC/VDSL, but BT's current plan does not include any specific investment to update its copper local loop. Cable revival (rebranding to Virgin Media) could increase pressure on BT.

We believe that in the long term, these technological changes will affect all countries. The key factor is the maturity of the broadband market: France and the Netherlands were the first to branch into VDSL as their ADSL markets are the most competitive ones, with the lowest prices. They are also the first countries where competition started to focus on services (triple play) instead of on prices above all else.

Chart 41: Broadband penetration in Europe (Q3 06)*



** Number of broadband lines (ADSL and cable) divided by (number of households + number of SOHOs).*

Source: Exane BNP Paribas, Arthur D. Little estimates

Iliad is an example of this phenomenon: for the alternative operator the FTTH network has three objectives, reducing opex (by no longer paying unbundling fees to France Telecom), differentiating itself from competitors and therefore increasing market share, and increasing ARPU (by a few euros per month thanks to services that are made possible by very high speed DSL).

As seen in Chart 40, our fixed-line operators' capex estimates factor in an increase in investments over the next few years.

NGN: the key to new services and lower costs

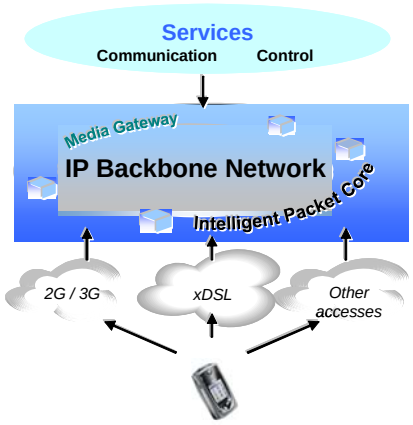
NGN stands for 'Next Generation Network' and involves the updating of the telecom operators' network infrastructure, in particular the switch to all-IP at the heart of the network.

The deployment of an NGN will become obligatory in the long term for all types of operators (integrated, fixed-line specialists and mobile specialists alike) for two reasons:

– NGN will make developing convergent services easier (i.e. giving an ISP the capacity to develop mobile services and a mobile operator the capacity to develop broadband fixed-line services);

– for integrated operators, the migration to NGN will lead to a simpler network infrastructure (compared to separate fixed and mobile infrastructures) and therefore potentially lower costs. Equipment suppliers all agree that incumbents will rapidly migrate to NGN and that by 2010 the separate fixed-line and mobile networks will be merged into one huge combined network.

Chart 42: NGN outline



Source: Exane BNP Paribas, Arthur D. Little estimates

The most emblematic example of an NGN is BT's. The UK incumbent is investing GBP10bn in its NGN called '21CN' (21 Century Network). BT's aim is that more than 80% of its customer base (broadband and voice) will have switched to 21CN by 2010. The network will be capable of hosting all access technologies, from FTTx to WiMax.

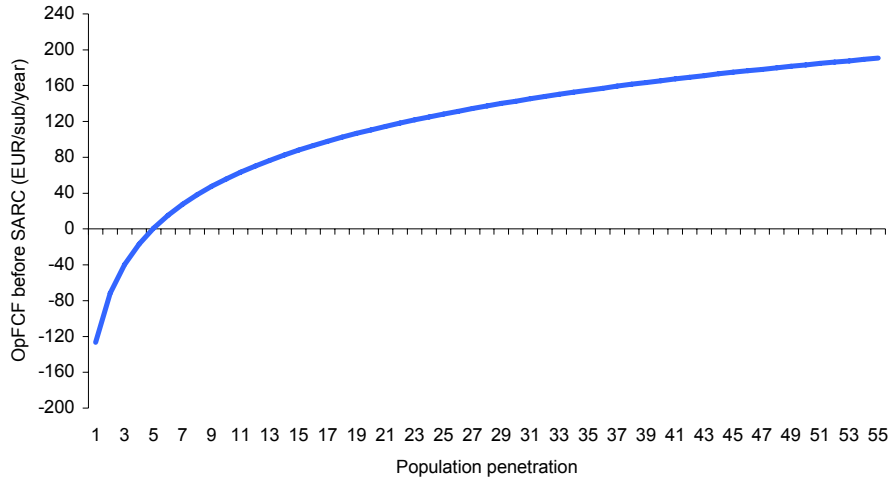
It is extremely difficult to estimate the cost of the switch to NGNs. The investments required are integrated into the operators' guidance, but figures announced by different players are not necessarily based on comparable structures. For instance, BT has estimated the cost at GBP10bn (i.e. almost EUR15bn), whereas Telecom Italia expects to spend EUR3.7bn and KPN between EUR3.3bn and EUR3.9bn over three years.

3.4. Critical mass is key

Size and profitability go hand in hand

As the curve below illustrates, a mobile operator's ability to generate cash is closely tied to its size (measured as the number of subscribers divided by the population of the country in which it operates). This curve was obtained using 2006 data from 35 operators. Over the years, the curve has flattened out, i.e. the profitability gap between leaders and challengers has narrowed, reflecting the efforts made by some challengers to optimise their business model. However, in 2006, an operator with 15% penetration was (on average) still only half as profitable as an operator with 40% penetration: OpFCF per subscriber before commercial costs of around EUR80/year versus EUR180.

Chart 43: The scale effect at mobile operators – OpFCF before commercial costs versus penetration*



** Penetration = operator's number of subscribers / country population; curve calculated by regression from a sample of 35 operators; 2006 data.*

Source: Exane BNP Paribas, Arthur D. Little estimates

In fixed lines, the situations of the leaders (incumbent operators) and challengers (cable-operators or unbundlers) is harder to compare; however, of the challengers, it appears that the biggest operators (those whose market share reaches or surpasses 15%) are often very profitable, whereas the smaller ones are not.

The reasons underlying this scale effect are well known: high network fixed costs (opex and capex) owing to the need to cover a substantial chunk of territory, regardless of the number of customers; commercial costs which are partly fixed costs (advertising, distribution network, etc.); and, at mobile operators, the network externalities, i.e. the benefits of high market share in terms of onnet traffic (club effect for the customer; absence of interconnection customers for the operator).

Current trends reinforce the need for critical size

Trends taking shape in the sector mean that operators will have to continue investing in their networks but will also have to develop new sets of skills in services and content: triple-play offers, convergent fixed-mobile services, etc.

Given this new context, acquiring critical mass appears to be even more important, for several reasons:

- **content negotiation**: be it in fixed or mobile, content will take on increasing importance. And yet, certain key content is billed in the form of fixed costs. This is so, for example, in football broadcast rights, which can cost several hundred million euros pa for a large European country. Other types of content can have temporary exclusivity (for example, a new piece of music available exclusively from a mobile operator before it can be purchased on the mass market); for such agreements, it would be logical for content suppliers to favour operators with large subscriber bases;
- **launch of new services:** new services are increasingly complex (fixed-mobile, mobile-Internet, boxes for broadband access, etc.) and require partnerships with outside players (equipment manufacturers, Internet leaders, etc.). Developing such services demands that operators have a wealth of skills and resources, both of which are easier for larger operators to secure. Large operators will also have an advantage in negotiating with partners;
- **the audience / the 'reach' necessary for marketing and advertising on mobile**: the business model based on advertising, which, as we have seen holds significant potential for mobile operators, is based on audience–i.e. on size. In the field of free TV, it is well known that the advertising market share of television stations is more than proportionate to their size. For example, in France, despite having 35% audience share, TF1 commands 50% of advertising share;
- **onnet traffic**: critical mass is key in voice as well, insofar as the leaders are focusing increasingly on onnet offers and are thus benefiting from large network externalities: 1) an onnet offer has even more value for customers if the operator has more subscribers; 2) an operator's interconnection costs are lower if it has considerable market share, because onnet traffic does not give rise to an interconnection payment.

Critical mass has several facets

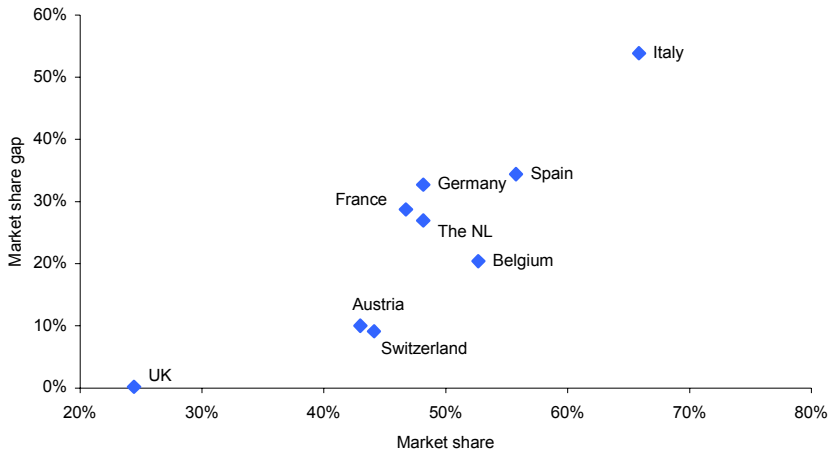
In our view, the primary criteria that make it possible to characterise operators' critical mass (on both fixed and mobile) are market share and the gap in this market share between the leader and the leading challenger.

The most pertinent market shares are both those on the retail market (which are important indicators of the ability to develop new services, monetise audience and negotiate content) and those on the infrastructure market (this is key as regards the ability to retain an edge on the networks). In mobile, the infrastructure market share tends to be close to that of the retail market (except in cases in which there are large MVNOs, mainly in the UK, with Virgin Mobile); in fixed-line, it is also near the retail market share (except in cases in which the unbundlers are still relatively underdeveloped).

We do not believe that overall size (for example the group's revenues or the number of customers it has worldwide) is a key factor in critical mass.

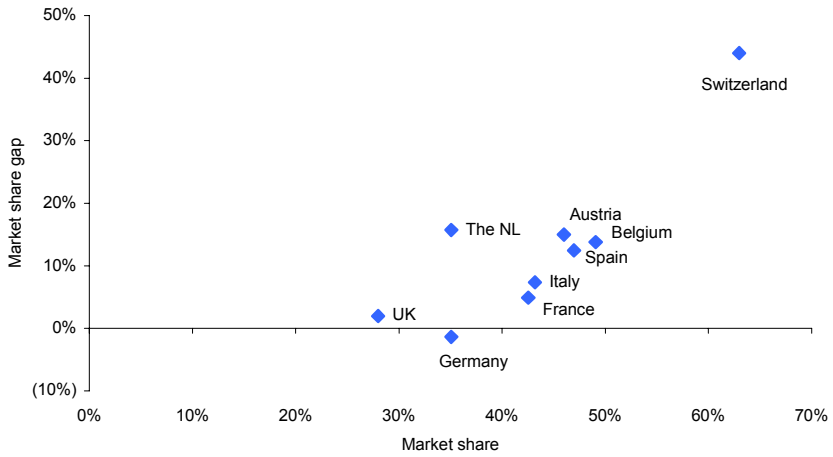
The horizontal axis on the charts below show the market share of incumbents in their domestic markets, in fixed (chart 44) and mobile (chart 45), while the vertical axis reflects the market share gap with their leading challenger.

Chart 44: Fixed broadband markets: incumbents' market share/gap with leading challenger



Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 45: Mobile markets: incumbents' market share/gap with leading challenger



Source: Exane BNP Paribas, Arthur D. Little estimates

But critical mass also needs to be analysed in greater detail, by market segment. For example:

– in fixed line, the regional dimension needs to be taken into account. An alternative carrier can have very strong market share in one city, giving it the critical size needed to invest in a fibre optic network (FTTx) in this city (examples include Iliad in Paris, Fastweb in Milan, Hansenet/TI in German cities, etc.). An overly local approach does, of course, have severe limitations (as the disappointing experiences of cable operators in several European countries underscore), but for an alternative national carrier, being especially strong in a given city is a clear advantage;

– in mobile, many market segments can be identified and addressed by MVNOs, which even if they are small, can have critical mass on specific segments. For example, the instant messaging segment: even a small mobile operator can reach critical mass in this segment through partnerships, for instance by joining forces with Microsoft to provide Instant Messenger on mobile handsets (like Bouygues Telecom in France);

– a final example, the segment of young music fans: Hutchison 3G UK has built an imposing position in this segment, with 75% market share in music downloading by mobile handsets in the UK (according to Hutchison); this can be considered to be critical mass, as this operator can be seen as a favoured partner for content suppliers.

3.5. The need to be flexible and reactive

The new growth opportunities in the sector mean that operators will have to:

- integrate new technological advances, for example in triple-play and content, but also fixed-mobile convergence (for mobile operators moving into ADSL or a fixed-line alternative carrier moving into mobile);
- manage the arrival of new business models, e.g. advertising, which is clearly an opportunity but also a risk (it makes it possible to provide services by bypassing the traditional billing relation between the customer and the operator);
- adjust to new competitors and partners, who often have nothing to lose on operators' traditional businesses, which is not the case for the operators' themselves: fixed operators in mobile, mobile operators in fixed, content providers and other media groups, Internet leaders and innovative start-ups, equipment manufacturers, etc.

Will operators be able to seize the opportunities in a timely fashion while sidestepping pitfalls, adapting to the market's micro-segments (youth, communities, gamers, music fans, professionals, etc.) and working with diverse partners to cement win-win agreements (joint ventures, virtual operator agreements, revenue sharing, etc.)?

To succeed in this complex and evolving environment, the flexibility of the organisation is, in our view, a critical quality.

We consider flexibility to be above all the ability to subject a product or an organisation to a full rethink and to imagine new business models.

Historically, however, disruptive new business models have rarely been invented by the established leaders. The examples are legion, from Google to Apple (iPod/iTunes) and Iliad (the latter has carved out a position as an innovative technical leader on the French broadband market and has maintained a clear edge on services offered to customers thanks to its Freebox; this approach has paid off as handsomely as the investments made by the leader, France Telecom, in content).

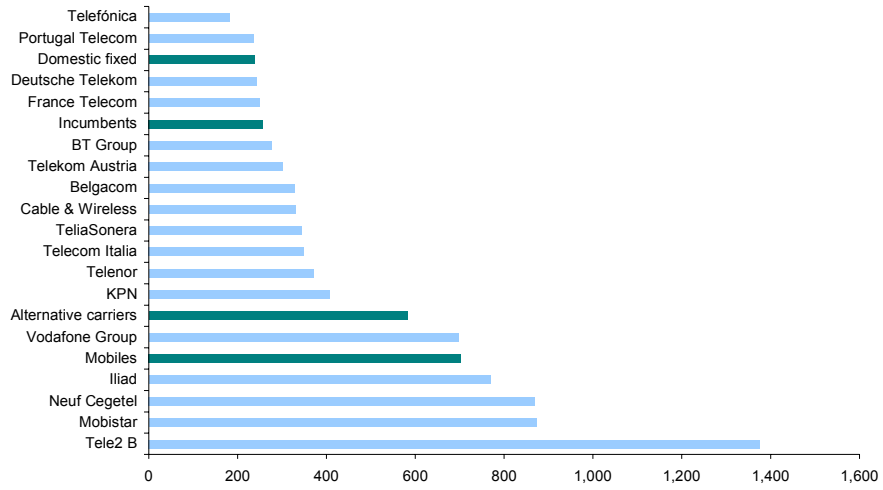
Flexibility and critical mass can thus be viewed as two key–but contradictory–prerequisites for success:

- Most incumbent operators have the critical mass needed to tackle the challenges mentioned above, but they probably lack flexibility and have overly complex structures that prevent them from taking rapid and/or original decisions. This is also the case for Vodafone.
- Conversely, fixed and mobile challengers are often much more flexible and nimble, but often lack critical mass.
- The Internet leaders, who are often viewed as the epitome of flexibility, have now reached global scale and also need to cultivate a start-up mentality. Google recently created a position of Chief Activist to foster this start-up spirit, despite the company's size and long acquisition track record. Yahoo is currently in the midst of a thorough reorganisation, the prime objective of which is to prevent internal conflicts, e.g. between local management teams and the head office, etc.

We believe that a company's organisation is more important than its size or age when pursuing the goal of enhancing reactivity and flexibility.

One pertinent indicator in our view is revenue per employee, which makes it possible to gauge the extent to which a group uses outsourcing – among other things. Those that are heavy users of sub-contractors will probably be better able to shift their focus than those for whom a strategic sea-change would require redeploying many of their own staff. The chart below illustrates that there are significant gaps between operators, independent of their size.

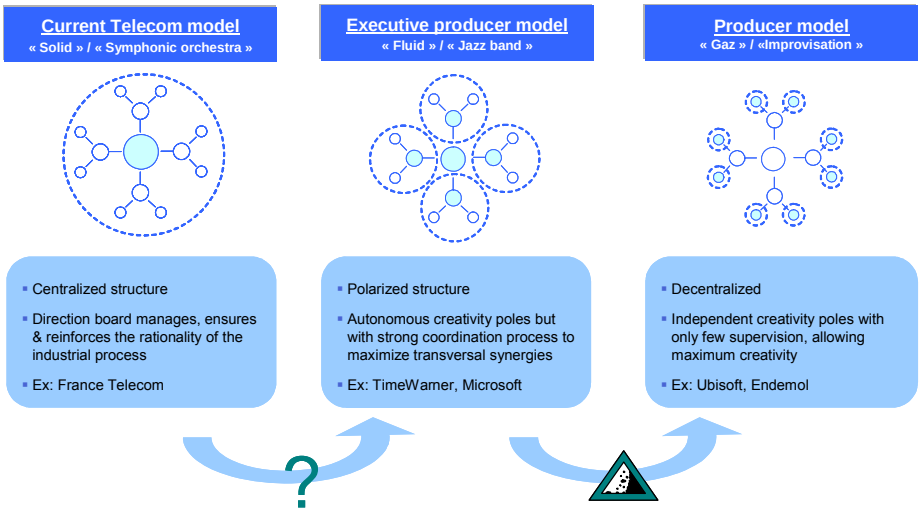
Chart 46: Revenue per employee in 2005 (EURk)



Source: Exane BNP Paribas, Arthur D. Little estimates

Moreover, a very centralised organisation is dangerous in our opinion, as it limits managers' decision-making autonomy. On the contrary, an overly decentralised organisation can also be dangerous if it prevents groups from deriving the full benefit of their size. This is highlighted in the chart below.

Chart 47: Three organisation structures



Source: Exane BNP Paribas, Arthur D. Little estimates

One example of organisation that we consider well adapted to the current environment is the MVNE, i.e. the mobile virtual network enabler. For an operator, developing its own MVNE makes it possible to ensure the development of MVNOs on its network, with the triple advantage of:

- benefiting from the commercial and managerial advantages linked to this 'fleet' of MVNOs, in terms of flexibility, micro-segmentation, etc.: specialised managements, a variety of offers, brands and content, etc. An MVNO can be a very light structure with little to lose (and hence low risk aversion) and much to gain (e.g. we have met an MVNO in a mid-sized country with opex of EUR23k per month for operations and EUR40k per month for personnel, but with revenues of EUR3.9m per month);
- allowing this 'fleet' to benefit from the advantages of the operator's critical mass, for back-office functions, service platforms, content purchases, and possibly distribution, etc.;
- and not completely relinquishing the control of the MVNOs, thus avoiding the risk of cannibalisation or a price war.

4. Analysis by country: changing situations

Situations in the various European countries still show wide variations in many respects. Broadband and mobile markets are at varying stages of development, price levels and margins differ significantly, and there is wide variation in the potential for consolidation and/or new entrants. As a result, trends in the various countries may remain divergent in the next few years.

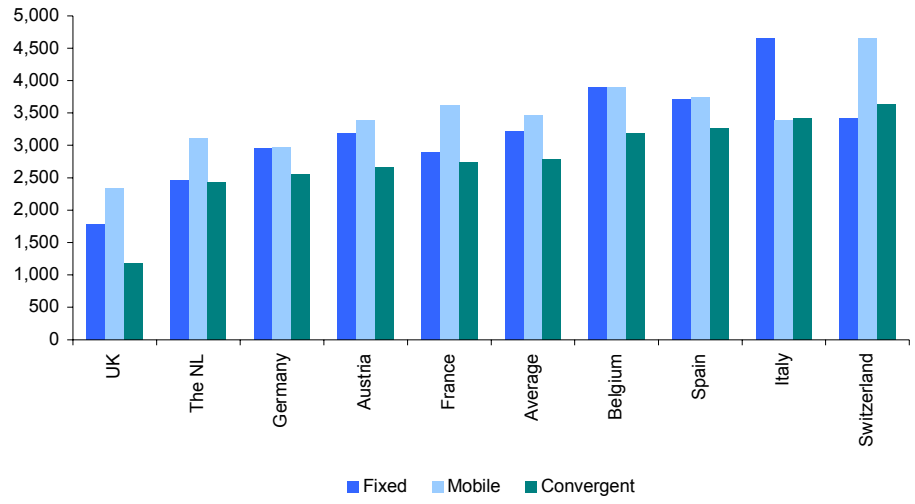
In our view, we are approaching a tipping point where some of the more competitive markets will see conditions improve, while some of the less competitive ones will see a deterioration. This means that:

– we expect the French and Spanish mobile markets to worsen; the Italian and Belgian markets are risky; an improvement is possible in Germany, although uncertainty remains high, as well as in the UK and the Netherlands;

– in the fixed-line market, we expect the UK and Germany to continue deteriorating; even if consolidation happens, pressure is likely to remain strong in France, due to the migration to fibre; the Italian, Spanish and Belgian markets should remain healthy; in Austria, the fixed-line market will remain under pressure from the mobile market.

We expect a high level of M&A activity throughout Europe. We expect fixed-line consolidation in France, Germany and Spain, and mobile consolidation in the UK, Netherlands and Austria. In France, Bouygues Telecom could change hands, and we could see fixed-mobile 'convergence' deals in Belgium, Italy, France and Germany. We may even see telecoms-media deals in the UK.

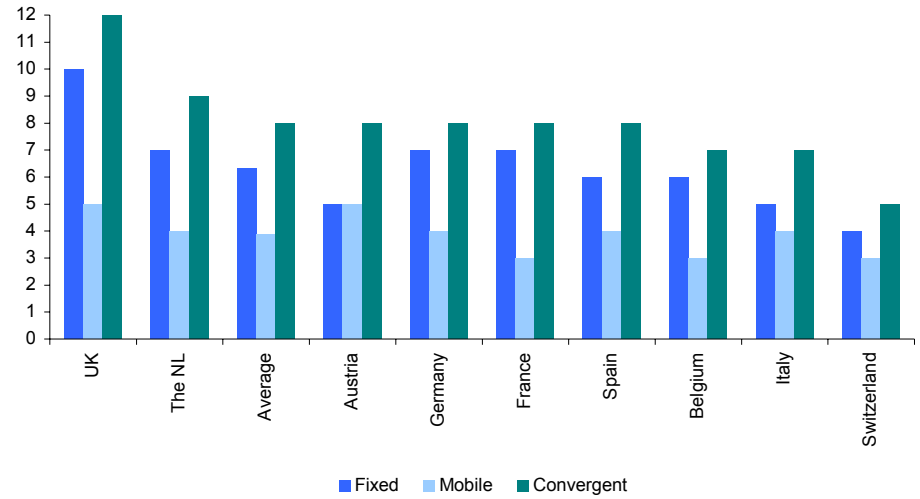
Chart 48: HHI market index on fixed, mobile and convergent markets*



** See table 39 for detailed market share data.*

Source: Exane BNP Paribas, Arthur D. Little estimates

Chart 49: Number of players in the fixed, mobile and convergent markets



Source: Exane BNP Paribas, Arthur D. Little estimates

France: risks in the mobile segment and migration to fibre

There is major uncertainty in the French mobile market, and there is a genuine risk that operators' earnings will deteriorate. The traditional three-operator market structure is looking increasingly unsustainable, given the various opportunities in fixed-mobile convergence. Iliad and Noos Numericable would be candidates for a fourth licence, while there are also Neuf Cegetel's mobile-WiFi offering and WiMax licences owned by Iliad and other players. In addition, Bouygues Telecom could change hands, possibly prompting it to adopt a more aggressive strategy (MVNOs, fixed-mobile convergence etc.).

In fixed-line broadband, we expect the market to restructure around four or five players (France Telecom, SFR/Neuf Cegetel, Iliad, Telecom Italia and Noos Numericable), due to the trend towards triple play, fixed-mobile convergence and super-fast broadband. Prices are already low, and we see potential for a rise in ARPU. However, with four operators battling it out, the migration to fibre could be fast-tracked.

There could be a number of M&A deals in the near future. These would involve consolidation among small ISPs (Club Internet probably, Alice possibly), a change in ownership for Bouygues Telecom and fixed-mobile link-ups.

Germany: a rebound in the mobile market?

The German mobile market is now declining in value terms, due to sharply falling prices. Looking at current SIM card and minute usage, there remains huge volume growth potential. However, revenues will only recover if price-cutting slows, and this is far from certain given the renewed aggression of E-Plus, which resumed the price war in early 2007, and the potential entry of new MVNOs such as those of fixed-line operators, encouraged by E-Plus.

However, the leading mobile operators have a three-fold opportunity to take back control: 1) they are rapidly reducing the price gap with E-Plus and the MVNOs; 2) they have major scope to cut costs (through outsourcing for example), whereas their challengers have already done so; 3) the challengers need to increase capex to roll out 3G networks.

The fixed-line and broadband market should continue to suffer. Prices remain high and there is no lack of competitors: ‘traditional’ players (Freenet, United Internet, Telecom Italia, QSC, Tele2, city-carriers) but also mobile operators competing in voice (traffic and fixed line rental) and increasingly broadband via mobile-ADSL bundles (Vodafone/Arcor, Telefonica/O2).

M&A activity is also likely to increase in Germany. Vodafone could acquire the minorities of Arcor, the fixed-line operator in which it has a 77% stake. Small ISPs could consolidate at some point. There are important questions about E-Plus' convergence strategy: will KPN be satisfied with wholesale deals with alternative operators, or will it want to create its own convergent offerings? In the latter case, will it do so in partnership with a fixed-line operator (ISP/unbundler or cable) or via an acquisition?

UK: stiff competition even if consolidation happens

Termination rates in the UK mobile market will fall less, but competition should remain tough and there appears to be very little upside in ARPU, since most customers use only a small portion of the minute allowances in their bundles.

Mobile operators have various opportunities to improve profitability, through outsourcing or network-sharing, reducing distribution costs or consolidation (Three UK). Nevertheless, convergence and new technologies are likely to keep up the pressure on returns (BT Fusion, NTL/Virgin, WiMax licences etc.).

The UK's fixed-line broadband market is the most fragmented in Europe. After the arrival in 2006 of Carphone Warehouse and BSkyB as well as the rebranding of Wanadoo as Orange, Vodafone and O2 are entering the market in 2007. There is a substantial risk of falling prices and faster unbundling. Medium-term visibility is very low in terms of consolidation and the migration to fibre.

One of the UK market's unique features is the power of media player BSkyB, which could have a major impact on the triple-play and mobile markets. NTL/Virgin is a fully convergent operator, but the other operators could look for alternative solutions via agreements with Internet leaders and/or tie-ups with other media companies.

Italy: uncertainty in the mobile segment

Penetration is high in the Italian mobile market, although there remains growth potential in terms of ‘real’ customers and traffic, with an elasticity of close to one. In addition, TIM, Vodafone and Wind could reduce costs through outsourcing or network-sharing. However, sales could be adversely affected in the short term by the Bersani decree (banning charges for prepay card top-ups) and further out by the possible entry of Fastweb and other alternative operators (Tiscali, Tele2 etc.) via MVNOs and/or WiMax licences.

Wind, Vodafone and Fastweb intend to become convergence players. Telecom Italia also wants to move in this direction, but has at this stage been prevented from doing so by the regulator.

The fixed-line broadband market is very buoyant, and shows major growth potential. There is a degree of uncertainty about the future structure of Telecom Italia's fixed-line business. Its fixed-line network division could be separated as of 2008, and although this could boost unbundling, it could also give greater flexibility to Telecom Italia's services division in terms of the retail offering and costs. The market structure should remain healthy.

Spain: likely deterioration in mobile

The Spanish mobile market is one of the fastest-growing in terms of user numbers, traffic and value. However, it is also one of Europe's most expensive and profitable markets, with three operators and no MVNOs. There is a major risk that the situation will worsen with the arrival of MVNOs and fourth operator Yoigo, along with the commercial revamp of Orange. Large bundles are underdeveloped, which we believe increases the risk in the event of a price war.

In the fixed-line segment, the market remains very healthy and shows strong growth potential. Prices are high, but the risk of price war is limited. Small alternative operators and ISPs have not attained critical mass and are likely to consolidate (Ya.com, Jazztel).

Eventually, the market is likely to revolve around a few ‘convergence’ players including Telefonica, Vodafone, Orange and cable.

Belgium: arrival of convergence in 2007

The mobile market is expected to deteriorate in 2007. On the one hand, termination rates are falling rapidly. On the other, there is limited scope for growth in user numbers, and so a battle for market share is expected. We believe that the decline in outgoing rates should exceed 10% in 2007, after a fall of around 10% in 2006. The latter was driven by several Mobistar initiatives (over ten new offers launched in spring 2006) and the responses of its competitors. In such a context, it is logical that Mobistar recently completed an agreement to outsource its network to Ericsson, ultimately aimed at saving opex and capex equivalent to 6% of its revenues.

Fixed-line broadband already has high penetration, and the market is split between Belgacom and cable. Unbundled ADSL does not have a significant share of the market.

Competition is likely to revolve around convergence. Belgacom, which now owns 100% of Proximus, wants to launch convergent offerings and has adapted its organisation to do so. Mobistar has just introduced an aggressive ‘home zone’ product, while Telenet is offering quadruple play via an MVNO using the Mobistar network. However, both companies feel limited (Telenet in mobile, Mobistar in ADSL), and could soon announce a tie-up. KPN/Base may not be content to sit on the sidelines.

The Netherlands: positive outlook

In the Netherlands, the mobile market has already undergone an initial phase of stiff competition, cost-cutting (network outsourcing in particular) and consolidation (KPN/Telfort). However, there remains potential, with the possible withdrawal of Orange, which lacks critical mass.

Penetration is already very high in fixed-line broadband, and could reach 80% in 2008. Competition is likely to remain strong between KPN, the unbundlers and the cable operators, and the market is moving rapidly towards triple play, HDTV and super-fast broadband.

The incumbent operator could soon make a move into fixed-mobile convergence. No new operators are likely to enter the market.

Austria: fixed-mobile substitution

The Austrian mobile market has remained very competitive, despite T-Mobile's acquisition of Telering. Prices have been cut rapidly, with MVNOs offering prices of EUR0.049-0.07 per minute, followed by the incumbent via its Bob brand. This has caused a very high level of fixed-mobile substitution in voice, but also in broadband. Mobile operators accounted for 17% of all broadband users at end-2006, and 40% of net adds in 2006. We expect further strong growth in SIM cards and traffic, due to the development of large packages.

There is major uncertainty about One. It could either merge with another Austrian operator, which would be good news for the market, or acquired by an international player like KPN/E-Plus, France Telecom, Orascom which could take an aggressive approach.

Overall, in Austria, the pressure on prices is likely to remain high in the fixed-line market, due in particular to head-on competition between mobile and fixed-line operators. We expect ARPU to fall for several years.

Some operators fear that Telekom Austria will use convergence to win back market share in mobile, although the risk is limited given the extent of fixed-mobile substitution.

Switzerland: stability, except in the case of M&A activity?

For mobile, we expect ARPU, which remains far higher than the European average, to continue to fall, as a result of the decline in termination rates. But Swisscom Mobile's market share is constant and large.

The fixed broadband market will soon see the introduction of unbundling. However, we expect the impact to be limited, as Swisscom's unbundling rates will be regulated only on an ex-post basis (as opposed to ex-ante regulation in European Union countries). The broadband market is largely dominated by Swisscom and the cable operator Cablecom. Thus, only Sunrise is likely to seize the opportunity of unbundling.

The uncertainty in the Swiss market stems from the possible change in the shareholding structures of Swisscom's challengers: Cablecom is owned by a private equity consortium, as is Sunrise (via TDC).

Table 39: Number of players and HHI index in the various markets

France	Fixed	Mobile	Convergent
France Telecom (%)	47	43	44
SFR (%)	3	38	22
Bouygues Telecom (%)	0	20	11
NeufCegetel (%)	17	0	7
Iliad (%)	18	0	8
Telecom Italia (%)	6	0	3
Deutsche Telekom (%)	5	0	2
Cable (%)	5	0	2
Other (%)	(1)	0	0
Number of players	**7**	**3**	**8**
HHI	**2,897**	**3,621**	**2,732**

Spain	Fixed	Mobile	Convergent
Telefonica (%)	56	47	51
Vodafone (%)	0	35	20
France Telecom (%)	9	18	14
TeliaSonera (%)	0	0	0
Deutsche Telekom (%)	5	0	2
Auna & Ono (%)	21	0	9
Tele2 (%)	4	0	2
Other (%)	4	0	2
Number of players	**6**	**4**	**8**
HHI	**3,713**	**3,741**	**3,269**

UK	Fixed	Mobile	Convergent
BT (%)	24	0	11
Vodafone (%)	0	28	16
Telefonica (%)	0	26	15
France Telecom (%)	8	23	17
Deutsche Telekom (%)	0	18	10
H3G (%)	0	5	3
Carphone Warehouse (%)	18	0	8
Tiscali (%)	11	0	5
Virgin Media (%)	24	0	10
BSkyB (%)	2	0	1
Pipex (%)	3	0	1
Other (%)	9	0	4
Number of players	**10**	**5**	**12**
HHI	**1,774**	**2,332**	**1,176**

Italy	Fixed	Mobile	Convergent
Telecom Italia (%)	66	43	53
Vodafone (%)	0	36	20
Wind (%)	9	14	12
H3G (%)	0	7	4
Tiscali (%)	5	0	2
Fastweb (%)	12	0	5
Other (%)	8	0	3
Number of players	**5**	**4**	**7**
HHI	**4,653**	**3,391**	**3,419**

Germany	Fixed	Mobile	Convergent
Deutsche Telekom (%)	48	35	41
Vodafone (%)	12	36	26
KPN (%)	0	13	8
Telefonica (%)	0	15	9
United Internet (%)	15	0	7
Freenet (%)	7	0	3
Telecom Italia (%)	14	0	6
Cable & Fiber (%)	3	0	1
Number of players	**7**	**4**	**8**
HHI	**2,959**	**2,966**	**2,558**

Table continued on next page

The Netherlands	Fixed	Mobile	Convergent
KPN(%)	43	43	43
Vodafone (%)	0	27	16
Deutsche Telekom (%)	0	20	12
France Telecom (%)	11	9	10
Versatel (%)	4	0	2
UPC (%)	16	0	7
Essent (%)	15	0	6
Other cable (%)	7	0	3
Other (%)	4	0	2
Number of players	**7**	**4**	**9**
HHI	**2,468**	**3,114**	**2,425**

Belgium	Fixed	Mobile	Convergent
Belgacom (%)	53	49	51
France Telecom (%)	1	35	21
KPN (%)	0	16	9
Telenet (%)	32	0	14
Versatel (%)	5	0	2
Scarlet (%)	7	0	3
Other (%)	2	0	1
Number of players	**6**	**3**	**7**
HHI	**3,894**	**3,898**	**3,193**

Switzerland	Fixed	Mobile	Convergent
Swisscom (%)	44	63	55
France Telecom (%)	0	19	11
Sunrise (%)	14	18	16
Cablecom (%)	35	0	15
Tele2 (%)	7	0	3
Number of players	**4**	**3**	**5**
HHI	**3,414**	**4,654**	**3,627**

Austria	Fixed	Mobile	Convergent
Telekom Austria (%)	43	46	45
Deutsche Telekom (%)	0	31	18
One (%)	0	17	10
Tele2 (%)	9	1	4
Hutchison 3G (%)	0	5	3
UPC (%)	33	0	14
eTel (%)	2	0	1
Other (%)	13	0	6

Source: Exane BNP Paribas, Arthur D. Little estimate

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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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Neuf Cegetel

Investment banking	Distributor	Liquidity provider	Corporate links	Analyst's personal interest	Equity stake US Law	Equity stake French Law	Disclosure to company	Additional material conflicts
NO	YES	NO	NO	NO	NO	NO	NO	NO

Source: Exane

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Source: BNP Paribas

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La recherche Exane est aussi disponible sur le site web (www.exanebnpparibas-actions.com) ainsi que sur Bloomberg (EXAA), First Call et Multex.