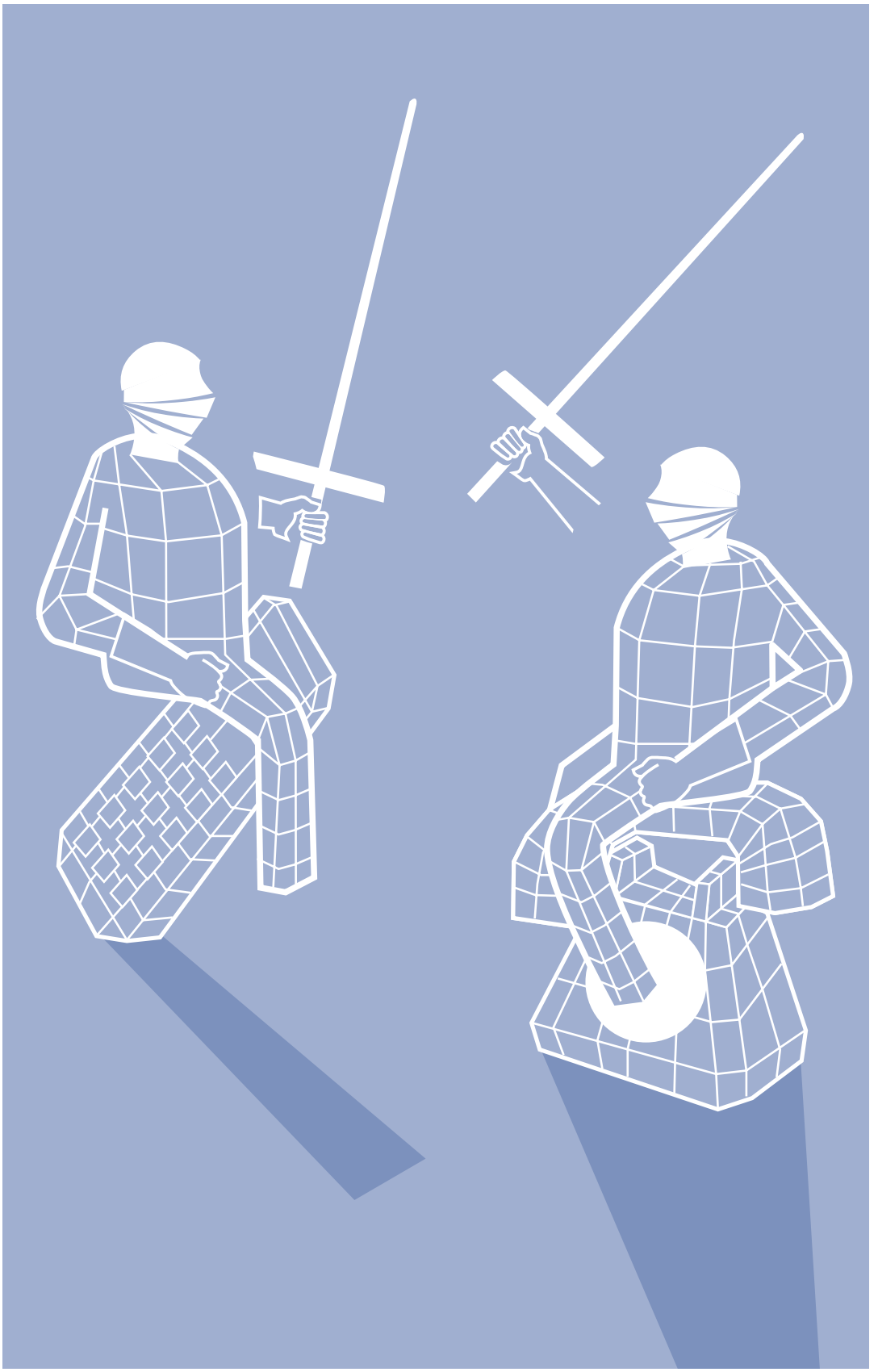


Mobile Telephony in Europe: The Leaders Hit Back

Bruno Duarte, Jean-Luc Cyrot, Jesus Portal and Karim Taga

While European mobile operators' hangover from the towering debt of 3G[1] is coming to an end, the competitive landscape is changing once again. This is one of the conclusions suggested by this year's edition of Arthur D. Little's annual survey of mobile operators, an industry whose leaders are claiming their turf and gaining ground once more. Duarte, Cyrot, Portal and Taga explore the state of the industry in Europe and take a closer look at developments on the horizon.

Arthur D. Little's Yearly Study on European Mobile Telephony

Each year Arthur D. Little carries out an in-depth analysis of the challenges and opportunities facing European mobile operators. This year's study was conducted in collaboration with the leading French broker, Exane-BNP Paribas. The analysis by Exane and Arthur D. Little is backed by more than 50 face-to-face interviews with mobile operators, equipment vendors and service providers. The previous surveys - "Slowly but Surely" (2001) and "Back on the Road... but who's Got the Map?" (2002) - emphasised Arthur D. Little's expectations of a slow development of mobile multimedia services and a quick recovery of mobile operators from the internet/telecom "crisis". This year's edition hints at many growth opportunities for mobile operators and a revival of the competitive playing field.

Mobile Operators – Ready to Boost Growth

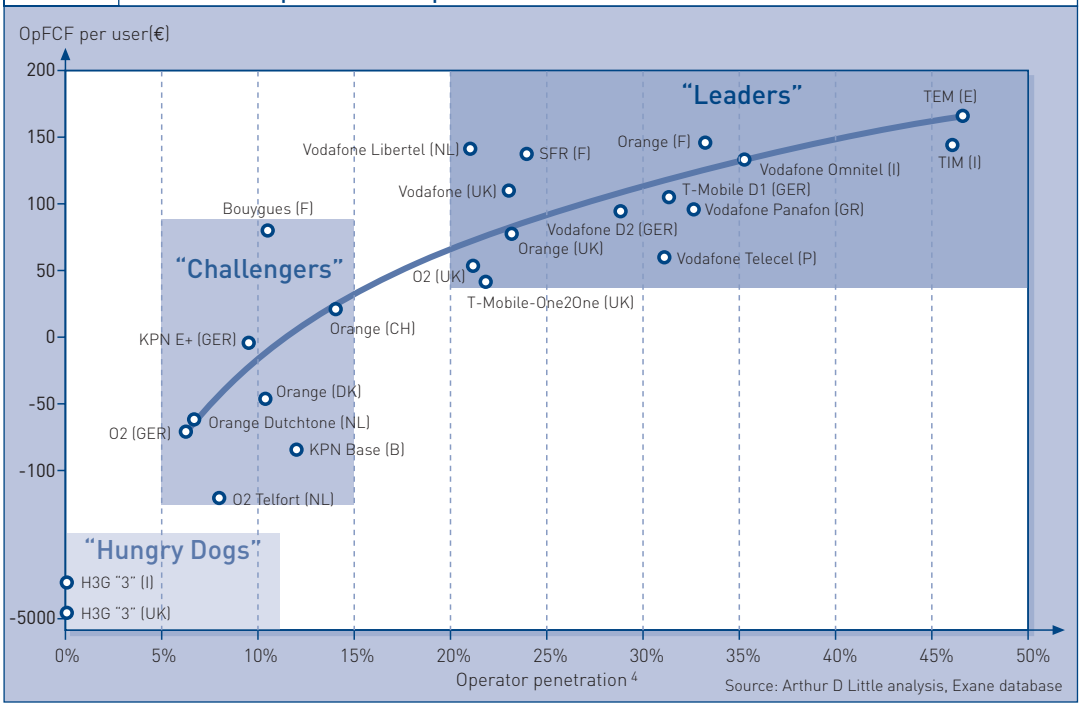
A central point for the study was the question of the fundamentals behind European mobile operators' performance. The team from Arthur D. Little wanted to know in-depth how the various operators fared in their respective countries – no matter if they were incumbents or new entrants, and no matter if they were independent or belonged to a bigger group. One of the main findings was that European mobile operators' profitability is overwhelmingly driven by their local size. Thus, operators can be classed into three segments, in each of which operators exhibit homogeneous behaviour and financial performance:

- **Leaders:** typically one of the two largest players in their domestic market, with a subscriber base greater than 20 percent of the respective country's population. They benefit from a high operating free cash flow[2], typically greater than €80 per user.

- **Challengers**: typically late entrants who are still significantly smaller than the leaders. Their main motivation should be growth and few of them were cash flow positive in 2003.

- **"Hungry dogs"**, i.e. new entrants to 3G. They are greenfield operators who started their operations in 2003. After the withdrawal of several 3G licence holders, this segment now only consists of Hutchison subsidiaries in Europe (UK, Italy, Austria, Sweden, Denmark and Ireland).

Exhibit 1 **Operating Free Cash Flow per User vs. Operators' Penetration [3] (2003) – Selected European Mobile Operators**

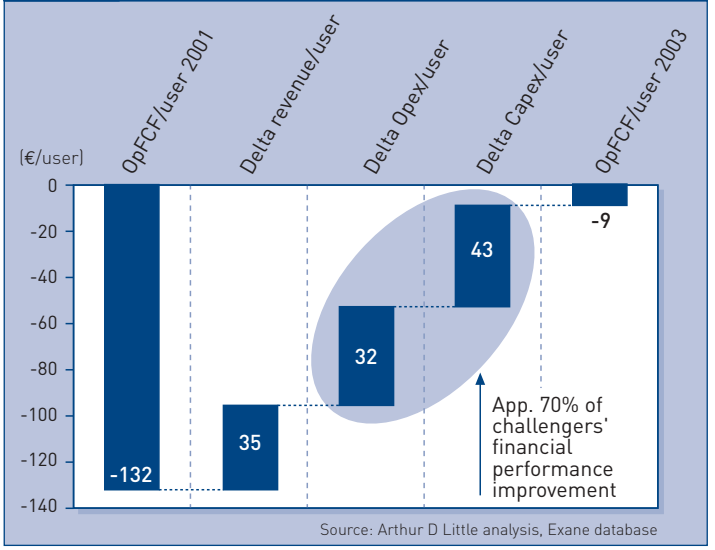


[1] 3G: Third generation broadband mobile system – includes phones and data access devices operating on Universal Mobile Telephone Service (UMTS) frequencies, including W-CDMA, as opposed to 2G (or GSM) the second generation mobile system.
[2] Operating free cash flows: earnings before interest, tax, depreciation and amortisation minus capital expenditures.
[3] Operator's country penetration: operator's number of mobile subscribers divided by the country's population.
[4] Below 10 percent p.a. on average between 2001 and 2003.

It may appear counter-intuitive, but our research led to the conclusion that, today, being part of a pan-European group such as Vodafone has little impact on an operator's performance. The most significant variable to explain an operator's performance and behaviour is the domestic size of the local operational entities, as measured by the operator's penetration in the country.

The last two or three years were characterised by a relative competitive status quo. In most European countries, market shares were fairly stable, with challengers only able to make limited inroads into the leaders' competitive positions. It is therefore all the more noteworthy that, despite fairly limited growth of their client base[4], challengers were able to drastically improve their financial performance. As illustrated in Exhibit 2, challengers have grown their operating free cash flows from €132/user to €9/user. This has been, to a large extent, due to the optimisation of their operating and capital expenditures, which accounted for almost 70 percent of the financial performance improvement (see Exhibit 2).

Exhibit 2 **Breakdown of Challengers'[5] Change in Operating Free Cash Flow per User between 2001 and 2003**



[5]Sample of challengers: Bouygtel (France), KPN/Base (Belgium), KPN/Eplus (Germany), mmO2 (Germany), mmO2 (Netherlands), Orange (Denmark), Orange (Netherlands), Orange (Switzerland).

In such a high fixed-cost business as mobile telephony, operators may be viable (i.e. operating free cash flow positive) only once they reach critical size. Thanks to their drastic improvements in operational performance, challengers have lowered this viability to approximately 5 percent of a country's population. Today, "hungry dogs" remain way below this figure and will therefore need to aggressively acquire new customers in the future.

In 2000, at the peak of the telecom bubble, European operators' net debt was equivalent to more than 25 years of free cash flows. It is now down to five years.

As anticipated in our last study[6], debt is no longer an issue for mobile operators. In 2000, at the peak of the internet/telecom bubble, European operators' net debt was equivalent to more than 25 years of free cash flows. It is now down to five years, which is low for a business with such recurring cash flows. By 2005, operators should have generated in excess of 60 billion euros of cash – more than 10 percent of their market capitalisation.

In 2004 and 2005, we believe that mobile operators will be able to foster revenue growth again. A growth in usage (voice and data), combined with — and driven by — skilful price management should significantly prompt revenue growth for all operators.

Voice Usage: The Marketing Machine Revs up

Voice traffic on mobile networks will continue to rise. Operators should be able to boost mobile voice usage as:

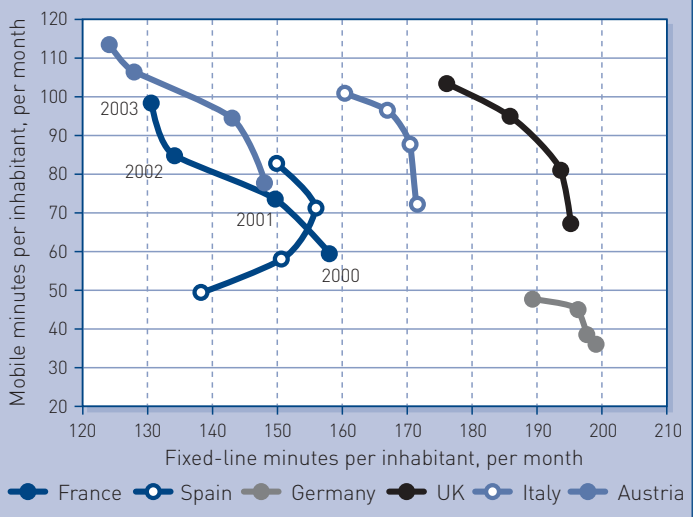
1. Fixed-to-mobile substitution keeps gaining ground;
2. Operators have set up a powerful marketing machine to increase their clients' consumption;
3. Reaction from fixed-line operators will be necessarily slow.

1. Fixed-to-mobile substitution keeps gaining ground

Between 2001 and 2003, mobile minute volumes rose 15 percent p.a. in the five major European countries. This growth took place mainly at the expense of fixed traffic. In 2003, we estimate that growth in mobile traffic corresponded to an equivalent decline in fixed-line traffic.

[6] "Back on the road... but who's got the map?", Arthur D. Little – Exane report (November 2002).

Exhibit 3 **Change in Minutes of Voice Traffic per Inhabitant, Fixed-Line vs. Mobile (2000-2004)**



Source: Arthur D Little analysis, Exane database

We expect mobile traffic to continue to cannibalise fixed-line traffic over the next few years. The scope for fixed-mobile substitution remains significant as mobile operators have attracted only 34 percent of total traffic (slightly under 20 percent in Germany, slightly less than 40 percent in the UK, Italy and Spain, and a little more than 40 percent in France). In other words, the usage per inhabitant in minutes is still twice as high on fixed lines compared to that on mobile (about 160 minutes per month per inhabitant on fixed lines vs. 80 minutes per inhabitant on mobile lines in 2003). At the same time the number of people equipped with mobiles continues to grow. The trend has remained steady, albeit at a slower pace, whereas fixed-line growth is negative. This continues to prompt a network effect favourable to usage. The more mobile subscribers there are, the more people will opt for mobiles to place calls: people find it more practical to call their correspondents' mobiles because they have a better chance of reaching them. Across Europe, it is cheaper to call a mobile phone from another mobile than from a fixed line.

2. Operators have set up a powerful marketing machine to increase their clients' consumption

In order to foster the cannibalisation of fixed-line traffic, mobile operators are looking for ways to stimulate mobile usage by making it more user-friendly. Two factors should make a positive contribution to the market's development over the next few years: handset replacement and new user-friendly services.

The new handsets are a major improvement over old handsets in several ways: batteries last longer, reducing the periods during which mobile users cannot make calls and freeing them from the worry of a dead battery. New handsets benefit from functions with more intuitive usability, particularly larger memory, enabling users to store more names and telephone numbers. This should work, as in the past operators like Orange and Vodafone in Europe or SK Telecom in South Korea have demonstrated that high-end handsets generate higher revenues per user, both on voice and data.

Operators are also inventing services that make life easier and aim to increase mobile usage. Just two examples of new services offered by TIM and Vodafone in Italy in 2003 demonstrate this objective:

- Pay-for-me: a collect call which, for example, allows young people to call their parents, who will pay for the call.

- SMS alerts either to warn people that the person they have failed to reach has turned on their handset again or to let people know of missed calls while the handset was off.

From the raft of instruments at the disposal of mobile operators to increase customer usage, the main one, in our view, is pricing. It spurs customer loyalty and gradually increases consumption within the framework of a win-win deal with the operator. The goal is to encourage customers to ever-higher usage for an apparently marginal extra amount.

New customers, comprising an increasing proportion of young people, enter the world of mobile phones via prepaid cards. The crucial first step for the operator is to encourage these prepaid customers to migrate to contracts, thereby regularising their consumption, increasing customer loyalty and thus the customer's value for the operator. Once migration to a contract has occurred, the customer is enticed to continuously upgrade his or her contract by low call rates on additional minutes.

At most European operators this migration has been underway since 2002 - and it has not yet come to an end. Contract penetration remains weak (under 40 percent of the population in all major European countries), although it continues to grow very steadily. European operators are driving the trend via highly attractive price plans and handset subsidies for contracts.

Operators heavily subsidise customer migration from prepaid to contract – this is a profitable investment.

Operators often heavily subsidise customer migration from prepaid to contract (for example, with discounts on mobile handsets and months of free subscription). Nevertheless, this is a profitable investment:

- First, the net present value of a migrated customer increases as the revenue is higher and the lifetime of a contract tends to be typically twice the lifetime of a prepaid.

- Second, migration is the point of departure from which the customer can be persuaded to move up the virtuous package ladder.

Italy remains an exception. The almost total absence of post-paid offers - due to dissuasive tax conditions - constitutes a structural obstacle on the Italian mobile market. Despite the introduction of a plethora of ingenious incentives for prepaid customers to consume more, Italian operators appear less able to increase usage than their counterparts that have packages in their armoury.

Once customers have switched to post-paid, operators' pricing structures entice them to ever-higher consumption. The price for the additional minutes from one package compared to the package on the next lower level is

less than €0.10 after tax. This is 50 percent lower than the average mobile minute price in Europe. It is interesting to note the striking homogeneity of those attractive marginal prices across Europe.

Operators have thus developed a powerful marketing machine which should help them drive usage in the near future.

3. Reaction of fixed-line operators: necessarily slow

At Arthur D. Little we expect a higher proportion of fixed minutes to be offered within bundles including broadband internet access (ADSL) and unlimited consumption of voice minutes.

A major uncertainty regarding the potential of further fixed-to-mobile substitution in the medium term is related to the reaction of fixed-line operators and internet service providers. These players, which enjoy much lower marginal costs, could retaliate in the face of mobile operators' lower prices, and thus sharply reduce the price incentives introduced by the latter.

This has already started to happen. We expect a higher proportion of fixed minutes to be offered within bundles including broadband internet access (ADSL) and unlimited consumption of voice minutes. This fixed-line trend is prompted by:

- Competitive pressure on incumbent operators, which have been attacked by alternative operators via preselection, and increasingly by unbundling and ADSL. These techniques enable challengers to propose voice over IP services at very low prices;

- More prosaically, the development of broadband internet access, taking huge volumes of narrowband internet traffic (several tens of billions of minutes p.a.) from the fixed-line networks and thereby liberating huge capacity then available for packages with almost unlimited minutes.

Nevertheless, we believe that voice traffic will continue to migrate towards mobiles. The large or unlimited packages of the incumbent fixed-line operators will be relatively less attractive for customers than those of mobile operators. This problem for the fixed-line operators will be linked to the following factors:

1. Regulatory constraints: given the potentially dangerous impact of these offers on alternative operators using preselection (they cannot offer unlimited packages as they pay interconnection fees per minute to the incumbent operators), it will be difficult for regulators to accept the principle. It is noteworthy that with unbundling, the alternative operators' business model is improving, as they are saving 50 percent of the interconnection cost per minute. Therefore, regulators are likely to ease their position as unbundling expands. However, this will take time;

2. Incumbent operators may be wise not to move too quickly into unlimited packages in order to minimise cannibalisation of their existing revenues. Migration to unlimited fixed-line offers must be slow for the impact to be positive for the operator;

3. The appeal of fixed-line offers for customers is declining while that of mobile contracts is increasing. A large mobile package includes not only calls to fixed-line but also on-net mobile calls and a certain number of calls to other mobile networks, while fixed-line packages do not include calls to mobiles, given the substantial cost differential. Moreover, unlimited bundles which would only include calls to fixed-line are becoming less universal as the number of households without fixed-line phones increases;

4. Most of the major fixed-line operators have mobile subsidiaries, so the overall impact of fixed-mobile migration is not necessarily negative for all of the groups. Therefore, it may not be in their interests to prevent fixed-mobile substitution.

Arthur D. Little takes a prudent stance on the contribution of mobile data services to operators' revenues. It is easier for operators to sell attractive new handsets than to develop usage of mobile multimedia services and to increase data ARPU.

Data Services: Still Small but Pockets for Growth Exist

We take a prudent stance on the contribution of mobile data services to operators' revenues. It is easier for operators to sell attractive new handsets than to develop usage of mobile multimedia services and to increase data ARPU.

We expect average monthly data revenue per user to grow from €4 in 2003 to less than €6 in 2005. SMS (short text

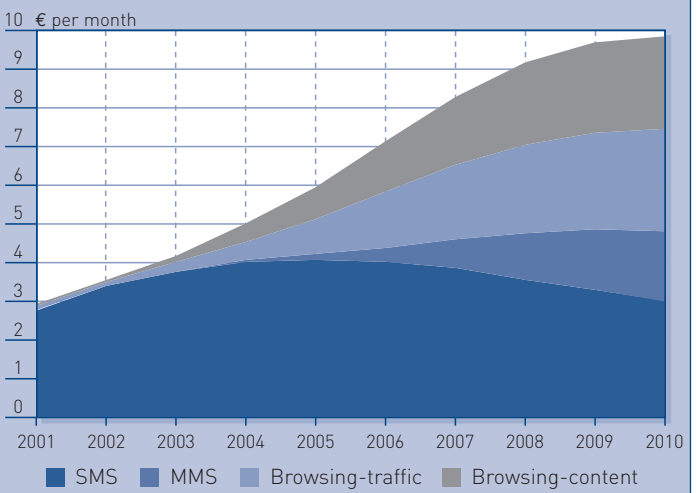
messages) should still represent the bulk of operators' data revenues until 2006. Other data revenues fall into two categories:

- MMS (multimedia messaging services, notably for sending photos) and other types of person-to-person message;

- Browsing, i.e. access to content, which can be divided into traffic revenues corresponding to the transport of data on the network and content revenues for customer payments for browsed content.

Regarding these emerging data services, the penetration of new handsets with colour screens will encourage usage of several browsing services, such as the download of ringtones, logos, or games. These services will make a substantial contribution to data ARPU, even though a significant portion will be paid back to content providers. Our estimates regarding MMS are more cautious, notably concerning the pace of development, as the current pricing remains too high.

Exhibit 4 **Average Monthly Data Revenue per User – Contribution of SMS, MMS and Browsing**



Our expectations compare with a generally more optimistic vision at operators, some of which are still officially declaring that data will amount to 25 percent of their revenues by 2005.

3G Commercial Roll-out Starts in 2004: Opportunity or Threat?

Over the past few months, the roll-out of 3G networks has been the focus of mobile operators. This is particularly the case for major operators such as Vodafone and Orange, as they want to move back into the spotlight in 2004 after being sidelined by "small" operators in 2003.

3G may enable new applications and provide faster connections, but most importantly it will significantly raise the capacity of mobile. It comes with new frequencies. The spectrum available to each operator increases by 70 percent on average.

The credibility of a commercial 3G launch in 2004 was recently strengthened, as operators have been much firmer regarding their 3G commercial launch schedules. Orange, Vodafone and most others appear to agree that 3G dual-mode handsets should be available from September 2004 onwards for the mass market.

3G may enable new applications and provide faster connections, but most importantly it will significantly raise the capacity of mobile. It comes with new frequencies. The spectrum available to each operator increases by 70 percent on average. Moreover the 3G standard ensures a more efficient spectrum use compared to GSM. Overall, we estimated that existing operators will raise their network capacity by two to four times when rolling out their new 3G networks. However, this will not be without substantial risk on the customer experience and/or operators' revenues sides, stemming from:

- Quality: While GSM quality is now well established, that of 3G is far from assured. Certain technical issues, such as the 2G/3G handover, still need to be resolved.

- Handsets: For another two years, 3G handsets will be of lower quality than existing handsets in terms of basic requirements such as size, weight, battery life and, particularly, price[7]. As operators aim at mass marketing 3G handsets, they run the risk of disappointing their customers as well as burdening themselves with higher subsidies.

[7] In 2004, the extra cost to an operator of a 3G handset is expected to be €300 compared to existing multimedia handsets.

One of the key issues currently facing operators is how fast they should migrate towards 3G. The migration will be expensive, especially for pioneer operators, owing to the high price of 3G handsets. We estimate the potential impact on the EBITDA margin of a major operator could reach two points once the migration peaks in 2006.

The recent experience in Austria shows that it is still too soon for the leading operators to aggressively launch 3G. Austria, a very competitive market, is the only country in Europe that had five active 3G operators by the end of 2003. The incumbent GSM operator, mobilkom Austria, was one of the first European operators to launch 3G services in April 2003, followed a few weeks later by a "hungry dog" Hutchison subsidiary. Three lessons can be drawn from this example:

The recent experience in Austria shows that it is still too soon for the leading operators to aggressively launch 3G.

- Handsets are still very disappointing in terms of quality and features;
- Videophony works well, but so far has had limited commercial impact. Moreover, the impact of other 3G-specific services (video multimedia content) has also been limited, notably because of the exclusive nature of content deals;
- Eight months after the 3G launch, the market has not taken off. The 3G operators had just 18,000 customers at the end of 2003, 16,000 of whom were with H3G, the Hutchison subsidiary.

Due to the above-mentioned problems, T-Mobile, One and tele.ring followed in December 2003 with a "soft" launch of their 3G services, mainly to comply with the regulatory requirements. The licence conditions required minimum population coverage of 25 percent by the end of 2003.

H3G focuses and differentiates itself via content, claiming to be a true "multimedia company" and heavily promoting videotelephony, whereas the other four competitors are absent from the media with regards to 3G services, offering neither promotions nor specific packages with UMTS handsets nor bundled innovative tariff schemes. For leaders and challengers alike, 3G was the most

unspectacular service launch ever in Austria. This behaviour clearly indicates that mobile operators believe that the potential to increase ARPU is still in voice and value-added services (in particular SMS), and are therefore spending up to 100 percent of their promotion budgets on 2 and 2,5 G basic services.

The deployment of the 3G network will help the leaders make up for their disadvantage in terms of capacity over the medium term, and give them the full means to push fixed-mobile substitution.

The Leaders Strike Back

Will 3G change the balance of power between leaders and challengers? From 2004, we anticipate that leaders should stabilise their positions and perhaps gradually gain ground.

2003 saw challengers like Bouygues Telecom in France and mmO2 Germany win market share both in terms of subscribers and revenue, thanks to contract subscriber market share gains and higher revenues per user. This is mainly attributable to their strong position in large packages.

With a smaller client base, they benefit from greater network capacity available compared to the leaders. They leveraged this capacity by marketing large package offers that leaders were reluctant to replicate due to their capacity limitations.

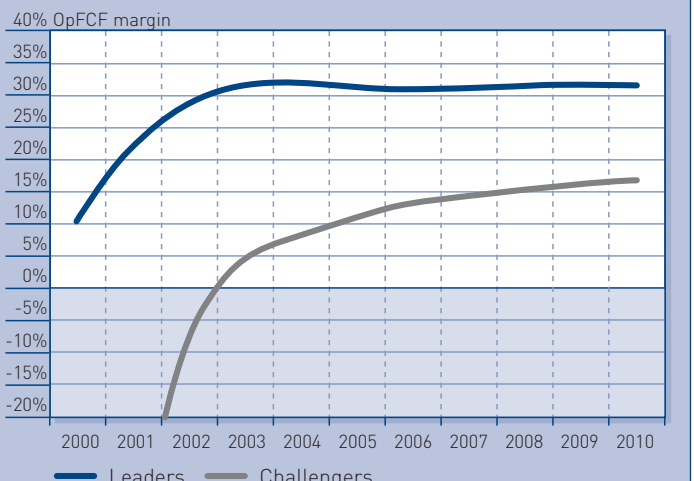
Challengers will continue in this direction. However, leaders are expected to follow suit and rapidly erode the competitive advantage so far enjoyed by the challengers. The deployment of the 3G network will help the leaders make up for their disadvantage in terms of capacity over the medium term, and give them the full means to push fixed-mobile substitution. Several leaders (O2 UK, Orange France, SFR, Vodafone Germany) have not waited for 3G to become reality in order to position themselves on large packages. Astute yield management practices enable them to cut the marginal price of voice minutes. Given their capacity constraints, the leaders' offers will not be as attractive as those of their challengers, but they will probably come close.

3G makes challengers uncomfortable, as it confronts them with a financial and operational dilemma.

1. 3G deployment implies rolling out a second mobile network. Although this does not entail deployment throughout an entire country[8], a minimum network investment is required before generating any revenues. For a challenger, such capital expenditures can only be spread over a smaller base of customers, thus leading to higher capex as a percentage of revenues than that of leaders. Moreover, challengers are less "motivated" by rolling out a new 3G network, as they still benefit from plentiful capacity on their existing networks.

2. Moreover, 3G deployment will mean higher operating expenditures attributable to operating and integrating the two networks (existing and 3G). This will include fixed costs, which weigh more on challengers, meaning that their EBITDA margin will remain lower.

Exhibit 5 **OpFCF Margin Forecasts for European Operators: Large vs. Small**



Source: Arthur D Little, Exane estimates

[8] Other technologies such as EDGE could be used to cover low-density areas at a reasonable cost compared to 3G.

3. Finally, as mentioned above, equipping customers will imply higher handset subsidies, thus higher subscriber acquisition and retention costs. For challengers with lower EBITDA and operating free cash flow margins, these additional costs will be a heavier burden.

In the long run, challengers are expected to suffer from somewhat more limited financial leeway than the leaders, with cash flow margins approximately half the ones of leaders (see Exhibit 5). The rather modest financial and human means of challengers can also handicap them from an operational point of view:

Some challengers are tempted to wait before switching to 3G. In our opinion, there is no "ideal solution". Each operator must decide on the best timing based on its financial, technical and human resources as well as the competitive environment.

- Fine-tuning the product: operators which have actively worked on fine-tuning 3G services have said that 3G is technically complex to operate. Unlike GSM, 3G has not yet been entirely standardised. Therefore important efforts to make the equipment and handsets of the various manufacturers compatible are still necessary;

- It is hard for challengers to negotiate handsets at a good price due to their lack of volume when they are not part of an international mobile group.

Some challengers are tempted to wait before switching to 3G. In our opinion, there is no "ideal solution". Each operator must decide on the best timing based on its financial, technical and human resources as well as the competitive environment.

The argument for a wait-and-see stance is as follows:

- Alternative technologies (called EDGE) could be a good stopgap measure. A challenger whose network is not saturated could thus be able to offer data rates almost as fast as those that 3G promises to deliver in the short term;

- By putting off 3G, operators can avoid the cost of fine-tuning 3G technology, thus getting around the operational handicap. They would also benefit from cheaper network equipment as prices will have dropped in the meantime;

- The same logic applies to handset prices, resulting in savings on subsidies.

The transition from analogue to digital (GSM) in the mid-90s showed that mobile operators who adopt a wait-and-see stance in the midst of major technological advances put their medium-term competitiveness at risk.

For example, tele.ring[9] and Bouygues Telecom are the only operators in their respective countries (Austria and France) that will not launch a massive 3G roll-out in 2004.

Nevertheless, as the mobile phone market is driven by supply, we believe that demand for 3G services (or for the improvement in services made possible by 3G) will emerge, prompted by the leaders, and that ultimately this will force all operators to adopt 3G. Against this backdrop, for a challenger, a "step-by-step" move towards 3G would be risky. The transition from analogue to digital (GSM) in the mid-90s showed that mobile operators who adopt a wait-and-see stance in the midst of major technological advances put their medium-term competitiveness at risk. The convergence of mobile operators' market share in the UK[10] is partly attributed to the fact that the two historical leaders, British Telecom Cellnet (now the O_2 brand) and Vodafone, feared to cannibalise their large analogue customer base. Their hesitation in promoting digital mobile telephony for several years left the door open to the challengers, Orange and One-2-One (now the T-Mobile brand), which aggressively promoted GSM.

[9] Further than meeting regulatory coverage requirements.
[10] A unique case in Europe where all four mobile operators have similar customer base sizes.

Insights for the Executive – How Leaders Hit Back

The competitive landscape for European mobile operators is changing rapidly. One of Arthur D. Little's main findings was that the single most important factor for any operator's performance was its penetration: the simple ratio between its actual customer base and the number of inhabitants in a country. Thus we came to the conclusion that operators may basically be clustered into three groups: "hungry dogs", challengers and leaders, with the latter having been able to defend their turf against new entrants during the last couple of years.

Another of the main findings concerning the usage of mobile and fixed-line telephony is the fact that, in Europe, fixed-line telephony continues to be progressively replaced by mobile telephony. This is due to the fact that the number of mobile users is continuously growing, which in turn makes it cheaper to place calls within the mobile networks compared to calls to fixed-line numbers. Another force that will probably strengthen this trend is the launch of new handsets and new user-friendly services during the coming years. In combination with the very successful luring of young customers, this should make for profitable growth in the next couple of years. The segment of young people very keen on having mobile devices but not furnished with the necessary cash is a particularly attractive one. They usually start out with prepaid cards so that costs are under control, and this segment proves to be particularly attractive once operators manage to lure them into fully fledged contracts.

At the same time fixed-line operators will be slow to react. The gradual introduction of broadband across Europe releases massive capacities on fixed-line networks which they could use for new bundled offers to keep users from migrating. But, so far, fixed-line operators have been slow to react. This is partly due to regulatory necessities, and partly to the fact that some fixed-line operators also run big mobile operators and feel less motivated to shift their fixed-line business model.

Data services, however, which have been the media darling for the last couple of years, will probably develop at a

much slower rate than expected. We will probably see the decline of SMS services after 2006, while browsing services should take off as the new generation of handsets gains more ground in the markets. Another technology that should alter the landscape will be the long-awaited launch of 3G services from September 2004 onwards. However, producers of handsets and operators alike will have to overcome some technical hurdles.

It is probable that the leaders will use 3G to defend their turf even further, as they have the financial clout to massively market their services at attractive prices. At the same time challengers will probably find it very difficult to invest heavily in network infrastructure and customer retention without hampering their financial performance. Here, the size of the customer base does come into perspective once again. But there is no "ideal solution". Each operator must decide on the best timing based on its financial, technical and human resources as well as the competitive environment.

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