# Change Within the Mobile Communications Market
## An initial assessment of the structural and organisational repercussions of 3G

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### Introduction

Over the last year or so the mobile telecommunications industry has undergone a complete sea change; the initial euphoria surrounding the German and UK licensing process, where widely optimistic claims about the array of possible services and uptake were made, has been replaced by widespread anxiety and pessimism. This anxiety and pessimism is driven by the large debts that companies have incurred to enter the market, doubts as to the validity of claims that 3G will usher in a whole new era of service development and the increasing belief that subscribers will not migrate in the required numbers to the new technology.

What has caused this sea change in opinion? The first factor that must be taken into account is the enormous financial investment that 3G represents. To date, the 3G licensing process across the European Union (EU) has raised more than €110bn for Member State governments. Successful licensees have been obliged to increase their borrowings, and at one stage the licence costs alone accounted for a third of BT's and KPN's total debts and nearly all of Telefonica's (*The Economist*, 2001: 71). However, to the licence costs must be added the other costs that the successful bidder will incur, namely those arising from the construction of the network as well as the development of the necessary services to attract subscribers. *The Economist* (2001: 71) estimates that roughly the same amount will be required for network construction as was spent on the licences.

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Secondly, questions have also been raised as to the viability of 3G services. As part of the bidding process for the licence all the operators enthusiastically discussed the range and nature of the services that they intended to offer if successful. These services combine voice with video and data, are available over a variety of devices and, broadly speaking, fall into the categories of information, communication, productivity and entertainment related. At present, however, the exact nature of the services to be offered over 3G networks remains open to speculation, as no operator has yet begun to offer services with the limited exception of NTT DoCoMo (Japan) and Manx Telecom (Isle of Man). On several occasions, companies have announced their intention to begin trials, only subsequently to delay them. Furthermore, the development of the requisite technology for 3G has not progressed as anticipated. Vodafone has warned that the range of services to be offered by its 3G networks will be limited and too slow for entertainment services such as live video or music whilst others have suggested that 3G will merely be a stepping stone on the road to 4G technologies (ROBERTS, 2001a: 23 & 2001b: 1).

The huge financial cost of securing the licences, coupled with technological delays has given rise to uncertainty that has been transferred outwards from the mobile sector by the interwoven nature of the telecommunications industry. Not only do many PTOs (public telephone operators) like Deutsche Telekom and France Telecom also operate large mobile networks, but a large number of the successful bidders for 3G licences in the EU are joint ventures. The uncertainty has been manifested in four ways. Firstly, share prices have declined. For instance, the share price of Sonera, the Finnish mobile group with four EU 3G licences has fallen from a March 2000 peak of €97 to €3.30 on Oct 1 2001. The fall in Sonera's share price is not all that unusual given that companies ranging from Lucent to France Telecom, Nokia and Vodafone have all experienced declines of more than 50% since July 2000 (CURWEN, 2001b).

Secondly, senior executives have departed as they have been blamed for excessively exposing their companies to the vagaries of 3G. The price of an institutionally acceptable debt reducing rights issue by BT was widely seen as being the departure of Sir Iain Vallance, and Kaj-Erik Relander resigned as Sonera chief executive as concerns over the company's future mounted. Thirdly, the debt ratings of the major European telecommunications companies have been downgraded by the likes of Standard & Poor's as borrowings have increased and future prospects have become less rosy. The financial position of many telecommunications companies has declined, with some companies such as KPN and Sonera being rated just above the

lowest investment grade. Any further decline in the rating will result in the large financial institutions selling their holdings, as below this level they will not hold the debt.

Fourthly, telecommunication companies have announced, and have begun to implement, far-reaching restructuring plans. BT spun off its mobile subsidiary, mmO2 (formerly BT Wireless) in late 2001, and has sold its hitherto core Yell subsidiary whilst France Telecom has floated a small stake in Orange, its global mobile subsidiary. It is in this last area, of reorganisation and restructuring, that attention in this paper will be focused. The underlying premise of the paper is that the financial difficulties of companies, primarily arising from the cost of participating in 3G, is driving the reorganisation and restructuring of the telecommunications industry. The lack of any 'killer application', and doubts over the ability of the services to live up to initial expectations, ensures that the role of services here is to exacerbate the problems faced by 3G license winners by not offering the prospect that service revenues will be sufficient to service the level of debts incurred. Moreover, services will only provide revenues in the future yet the problems faced by companies are imminent. Thus, companies have no choice but to resort to organisational solutions to remedy the financial problems that they face.

Although examples are drawn from across the telecommunications industry, they are here largely drawn from the smaller companies, as these are the ones that have most acutely felt the financial and organisational pressures emanating from 3G. The smaller telecommunications companies also feature prominently among those rumoured to be involved in industry consolidation, through either the sale of their mobile operations to another company or by their merger with another PTO. In addition, the financial and organisational problems of the smaller companies have been transferred to the larger companies through the web of cross-holdings that bind the industry together, as well as by altering how the industry is viewed by analysts, investors, banks and so forth. The organisational and market repercussions of 3G are addressed in the following main section that is divided into three parts. In the first part infrastructure sharing between 3G license winners is dealt with, whilst in the second mergers and acquisition activity is examined. The third part focuses on the organisational form of 3G license winners and network scale. Conclusions are then drawn in the final main section.

## Organisational and market repercussions

### *Infrastructure sharing*

Infrastructure sharing involves two or more mobile operators using all or some of the same infrastructure to deliver their 3G services, and has been seen by many as a way to reduce their financial burdens. However, although infrastructure sharing has been widely commented on as a way for operators to reduce the substantial investment required to build their 3G networks, only in three countries – Sweden, UK and Germany – have companies indicated their willingness to cooperate and share infrastructure if permitted by the regulatory authorities.

In Sweden two infrastructure sharing joint ventures have been established. The first joint venture is between Telia and Tele2 (formerly Netcom AB), whilst the second is between Europolitan Vodafone, Hi3G Access and Orange Sverige. Two explanations can be offered for the willingness of these companies to collaborate with one another. After failing in its 3G application to gain a licence, Telia formed its joint venture with Tele2 to effect its entry into the marketplace. In contrast, the other three companies viewed the joint venture as a way of reducing the cost of building their 3G networks. It was envisaged by Europolitan and Hi3G that the joint building and maintenance of 70% of their network would save them both around 30% of their infrastructure spending (GEORGE, 2001a: 34). Although the later inclusion of Orange Sverige into their joint venture will offer the potential for further savings, these are likely to be small as the joint venture excludes Stockholm, Gothenburg and Malmo where the companies are required to build their own separate networks.

The second market where infrastructure sharing has been announced is Germany. In July 2001 BT Wireless and T-Mobile announced that they would share one another's infrastructure within Germany and the UK. Within Germany this infrastructure sharing is limited to passive network components like sites, masts and power supplies (BENOIT & MALKANI, 2001b: 27). Roaming agreements would also be established in both countries in areas of low population density, thereby resulting in one party becoming a virtual operator in parts of the country. Cost reduction appears to the principal motive, with BT stating that it estimates capital expenditure savings of €2bn over the next ten years (BENOIT & MALKANI, 2001a). Furthermore, BT also expects that its population coverage will be built out faster so that it will cover half, rather than a quarter, of the German population by 2003.

However, analysts have argued that the scope for immediate cost savings within Germany is limited because of the regulatory regime. Viag Interkom (the German operation of mmO2) is required to meet its licence obligation regarding population coverage with its own infrastructure. Thus, any savings from roaming agreements with T-Mobile will come after this has occurred. In addition, larger savings would come from sharing the 'active' parts of the network, such as base stations and controlling / switching equipment (BENOIT & MALKANI, 2001b: 27). When the relevant technology becomes available, the scope for savings will be further expanded to the extent that they outweigh those from the passive parts of the network.

Whilst infrastructure sharing is attractive to many operators, it has not been universally welcomed. Many countries prohibited infrastructure sharing in the licences on the grounds that it is anti-competitive (*The Economist*, 2001: 72). The sharing of infrastructure will encourage companies to collude with one another, and any cost savings that arise from the sharing will not be passed on to end users. Those companies not wanting to participate in infrastructure sharing have been critical, not least because they fear being placed at a competitive disadvantage. Furthermore, some of the gains from competition, such as service innovation, may not be as readily forthcoming if infrastructure competition is widespread.

Regulatory opinion as to the attractiveness of infrastructure sharing is divided. Fearing collusion between operators, the EU has been guarded in its comments and has only recently welcomed infrastructure sharing if customers do not suffer (Dombey, 2001a, 2001b & 2001c), whereas the German regulator, RegTP, has agreed to infrastructure sharing providing certain conditions are met (RegTP, 2001). Although RegTP did not alter coverage targets and other aspects of the licence, the clarification emphasises how operators may share infrastructure and establish roaming agreements to achieve these targets.

***Mergers and acquisitions***

Categorically identifying merger and acquisition (M&A) activity that is the result of the 3G licensing process is fraught with difficulties, primarily because M&A activities can originate from such a wide range of factors and because 3G has exacerbated many trends / issues already present within the telecommunications industry. Having said this, it is possible to identify several instances of M&A activity where 3G played a key, if not determining, role.

The first of these instances is the series of events that led to Hutchison Whampoa re-entering the UK market as Hutchison 3G Holdings UK Ltd. In the UK 3G auction process, Telesystems International Wireless (TIW) paid £4.387bn for the fifth and largest licence that was reserved for new entrants. Subsequent to the completion of the auction, TIW formed a joint venture with Hutchison Whampoa whereby a mobile virtual network operator (MVNO) would be formed and owned 9.9% and 90.1% respectively by TIW and Hutchison Whampoa. TIW would construct the network and make capacity available to the MVNO. At the same time, Hutchison Whampoa agreed to support a credit line taken out by TIW that would fund the network's construction. However, the two companies subsequently re-organised their relationship with the effective result being that TIW exited the UK. In July 2000 the MVNO and TIW were merged together and shares in the resulting entity sold to both NTT DoCoMo (20%) and KPN Mobile (15%). Hutchison Whampoa held the remaining 65%, though TIW was granted the option to acquire 6.5% of the company by November 2000. TIW did not take up this option. The most likely explanation for this is that expansion plans elsewhere, as well as the continued capital requirements of Dolphin Telecom, its European subsidiary, ensured that TIW could not afford the investment.

Telenor, the Norwegian PTO, brings together two potential sets of mergers and acqusitions activity, one centred around BT and the other on the Nordic regional market. In late 2000 and early 2001 Telenor withdrew from three joint ventures with BT: Viag Interkom (Germany), Esat (Ireland) and Telenordia (Sweden). In the case of the former two joint ventures, Telenor exercised options that led to BT acquiring its stake for a combined total of NOK 30.8bn (€3.85bn / £2.36bn). Telenordia was divided between BT and Telenor, with BT receiving the business operations, and Telenor the mobile operations.

This substantial transfer of resources from BT to Telenor contributed to, and exacerbated, the financial problems of BT as it came on top of larger than anticipated 3G licence payments in the UK and Germany, as well as the August 2000 purchase of E.ON's 45% stake in Viag Interkom for €6.65bn. This limited the ability of BT to strengthen its holdings in AirTel and Japan Telecom / J-Phone. In late 2000, Vodafone acquired an additional 52.1% of Airtel from a variety of shareholders thereby bringing its total stake to 73.8%. This significantly reduced the influence that BT could exert over AirTel, as the company switched from being one of the largest minority shareholders to effectively become a passive investor in a company controlled by Vodafone. Similarly, from December 2000 onwards, Vodafone

acquired shares in Japan Telecom to complement its existing shareholding in the Japan Phone Group (which is the operating subsidiary of Japan Telecom) from AT&T, West Japan Rail Company and Central Japan Rail Company. This increased Vodafone's stake to 25% compared to BT's 20%.

BT was unable to respond as it lacked the financial resources to acquire additional shares to bolster its position. Although both companies expressed a desire to work with one another the presence of two telecommunications companies was bound to be problematic. Vodafone exploited its superior financial position vis-à-vis BT by buying for cash the latter's holdings in AirTel, Japan Telecom and Japan Phone Group for £4.8bn in May 2001. Not only did this free resources for BT to use elsewhere, on debt reduction for example, but it also enabled Vodafone to become the sole telecommunications company in these joint ventures. The sale of these assets exited BT from markets that it had repeatedly stated were strategically important, and when combined with the sale of other assets ensured that when mmO2 was spun off its operational scope was limited to just a handful of European markets.

Recently there has been much discussion as to whether a Nordic telecommunications company will emerge through one of several mergers. These rumours focus on the merger of the PTOs from Denmark, Finland, Norway and Sweden and the expansion of the resulting company into the remaining Nordic markets. It has been suggested that Telia has held merger talks with both Tele Danmark and Sonera, but that it will merge with only one of these two companies (STENEBERG, 2001). This comes after its very public failed 1999 merger with Telenor of Norway and subsequent expansion into that market through the purchase of NetCom ASA (GEORGE, CRISCIONE & MacCARTHY, 2001: 33). Although Telenor is reported to have held talks with SBC Communications about buying its 46.2% stake in Tele Danmark (GEORGE & MacCARTHY, 2001: 31), and that the sale of assets enhanced its financial position, it would appear that the strategic priorities of Telenor no longer lie in merging with one of its fellow Nordic PTOs. Indeed, the acquisition of additional shares in Pannon GSM for €1002m suggests that the ambitions of Telenor lie elsewhere in Europe. This deal reduced the ability of Telenor to participate in any Nordic consolidation from a position of financial strength.

As a consequence, the formation of any Nordic telecommunications is likely to involve the merger of Telia with either Tele Danmark or Sonera. Merging with either Sonera or Tele Danmark will present quite different challenges and opportunities to Telia. A merger with Tele Danmark would

provide Telia with a presence in Denmark to add to its existing operations in Sweden, Norway and a newly awarded 3G licence in Finland. It would also reinforce its position as the largest Nordic telecommunications company. It is, however, by no means certain that Telia and Tele Danmark will be able to agree on merger terms. Moreover, Tele Danmark's largest shareholder, SBC Communications may be unwilling to accept the shares that Telia has intimated it is wanting to use to fund any acquisition (BROWNE-HUMES, 2001: 28).

A merger with Sonera would be advantageous in three ways for Telia. Firstly, it would be cheaper than a merger with Tele Danmark. Secondly, the Finnish government, which owns 53% of Sonera, is likely to accept equity, as this would allow them to benefit from any future recovery in telecommunication share prices. Thirdly, a merger with Sonera would greatly expand Telia's presence in the European 3G market as the Finnish company holds licenses in Finland, Germany, Italy and Spain. Sonera did successfully bid for a Norwegian 3G licence but returned it after its partner, Enitel, withdrew to focus on other markets. Sonera concluded that building out the network alone was too expensive, not least because the failure to acquire a Swedish 3G licence limited the opportunities for scale economies across Scandinavia (GEORGE, 2001B; SONERA, 2001).

The handing back of the Norwegian licence vividly demonstrated the weakened financial position of Sonera. Since mid 2001 Sonera has sought to rectify this position; through the sale of assets as well as a December 2001 rights issue it has managed to reduce its debt burden by more than half to €2.7bn (SONERA, 2002). However, it has failed to address the root cause of its financial difficulties, namely, its four 3G licences that it remains committed to. Until it does Sonera will remain financially vulnerable and will not participate in any Nordic consolidation, as the dowry it brings to the table are the financial uncertainties and liabilities of its 3G licences and not a series of established and significant investments across Europe. Although it would now appear that the merger proposals have collapsed, the same significant obstacles remain if the merger was ever to be revived.

***Joint ventures, wholly owned subsidiaries and network scale***

Taking the 55 licences awarded to date across the EU as our basis, several characteristics of the organisational form used to bid for the licence can be identified. It is clear from the licences so far awarded that the organisational forms used fall into one of four categories – wholly owned

subsidiaries, companies with a majority shareholder, joint ventures with two or more telecommunications present and joint ventures. Although one or two of the wholly owned subsidiaries are new entrants into the marketplace, for example, Hutchison 3G Austria, the majority are in fact subsidiaries of incumbent 2G operators. The UK in particular demonstrates this, as the four incumbent 2G operators, which are wholly owned by their respective parent companies, each received a 3G licence. The fifth licence is operated by the only joint venture, Hutchison 3G UK Holdings Ltd.

The remainder of the successful licence bidders are collaborative. The pros and cons of joint ventures are well known; joint ventures allow risk to be borne by more than one company and allow companies to benefit from the competences and assets of other companies. However, associated with joint ventures are control and trust problems that often lead to their breakdown. Companies may disagree over strategy, or use the close contact with other companies to learn new competences before launching themselves in competition. As some of the licences have been awarded to companies that have a majority shareholder they have avoided many, if not all, of the trust and control problems associated with joint ventures whilst at the same time sharing the risk inherent to the investment with others. Examples of majority shareholders are Vodafone (Omintel, Europolitan, Telecel and Airtel) and Hutchison Whampoa (Hutchison 3G Holdings UK Ltd and Hi3G).

KPN Mobile initially acquired shares in E-Plus in December 1999, that is, before the 3G licensing process began. This acquisition considerably added to KPN's debt burden, a debt burden that was significantly exacerbated by participation in the 3G licensing process in Germany. In late 2001 E-Plus accounted for €13.3bn out of KPN's total debt load of €21.9bn (Total Telecom, 2001). As KPN's debt increased, and the company struggled to bring it under control, both its share price and credit rating declined and speculation mounted that KPN would need to 'do something drastic' to reverse the situation it found itself in. No single drastic action on the scale of a demerging of the mobile arm has been undertaken. Instead, a series of actions have been undertaken that collectively have reduced KPN's debt to €16.5bn in February 2002 (CRAMB, 2002: 30).

Since late 2001 KPN has sold assets, such as its holdings in Pannon, Eircom and Telkomsel, as it refocuses on its core operations and has used the raised funds to pay down debt. The sale of 10% of KPNQwest to Qwest not only freed funds for further debt reduction, but also enabled KPN to deconsolidate a further €430m from its balance sheet (KPN, 2001). In December 2001 KPN completed a €5bn rights issue. Included within this

was a contribution of €1.37bn from the Dutch government that maintained its stake at 34.7% (BICKERTON, 2001B: 33).

It has also been speculated that KPN will sell E-Plus, but the company has denied this suggestion and reaffirmed its commitment to E-Plus (BENOIT, 2001: 28; Total Telecom, 2001). This may, of course, be nothing more than posturing to strengthen its bargaining position. KPN did receive at least one offer for E-Plus, which was described as being too low by the company's CEO (BICKERTON, 2001a: 30). In February 2002 BellSouth exercised its option to swap its 22.5% in E-Plus for shares in KPN (CRAMB, 2002: 30). Through the unravelling of the relationship between KPN and BellSouth, not only has the debt of KPN increased by €930m to €16.5bn but the repayment schedule on some of the debt has been accelerated. The accelerated debt repayment, as well as the overhang of 235m shares that BellSouth has publicly stated it wishes to sell to affect its retreat from Europe, ensured that when the deal was announced KPN shares slipped 4.25% (CRAMB, 2002: 30; GOLDSTEIN, 2001). By consolidating its control over E-Plus, KPN is now in the position of being able to do something drastic. KPN could sell E-Plus, though with the present climate it is hard to see who would be a willing buyer. A stock based merger would resolve the E-Plus problem, though KPN would have to wait until the market recovers to maximise its financial return. However, the pressing nature of the debt burden ensures that KPN does not have the necessary leeway to wait for this to occur. KPN will, therefore, opt for the outright sale approach. Although such a deal will quickly reduce the debt burden faced by KPN, it will do so at the expense of maximising the sum raised by the disposal.

**Table 1: Joint ventures among EU 3G licence winners with more than one telecommunications company present**

| Country | Joint venture | Owners |
|---|---|---|
| Austria | Connect | 17.5% Orange, 15% TDC |
| France | Vivendi / SFR | 44% Vivendi Universal, 15% Vodafone, 26% mmO2, 15% SBC Communications |
| Germany | Group 3G | 42.8% Sonera, 57.2% Telefonica Moviles |
| Italy | IPSE 2000 | 12.5% Sonera, 45.9% Telefonica Moviles |
| | Omnitel | 77% Vodafone, 23% Verizon Communications |
| Spain | Retevision Movil | 3.71% Telecom Italia Mobile, 22.6% Telecom Italia |
| | Xfera | 27.5% Vivendi Universal, 15% Sonera |
| UK | Hutchison 3G Holdings Ltd | 65% Hutchison Whampoa, 20% NTT DoCoMo, 15% KPN Mobile |

*Source: http://www.TotalTele.com; various annual reports.*

The 3G joint ventures that bring together two telecommunications companies are shown above in table 1. The table draws attention to the paradoxical nature of the relationship between Sonera and Telefonica Moviles. In two markets, Germany and Italy, Sonera and Telefonica Moviles are partners in 3G ventures. However, Sonera is a competitor to Telefonica Movies in its home market through its 17% holding in Xfera. In other words, Sonera and Telefonica Moviles are both collaborators as well as competitors. Until now, both companies have been able to reconcile the competitive and collaborative nature of their relationship, with no rumours emerging as to the strained nature of their relationship. The comparative financial weakness of Sonera may, however, change the nature of its relationship with Telefonica Moviles. The sale of its stake in either IPSE 2000 or Group 3G whilst retaining its stake in Xfera is likely to strain its relationship with Telefonica Moviles. The inevitable consequence of a strained relationship will be the dissolution of the joint ventures with the stronger partner, Telefonica Moviles, or expanding company, taking charge of the ventures. Conversely, the sale of Xfera whilst retaining the other two 3G investments would strengthen its relationship with Telefonica Moviles.

CHAN-OLMSTEAD & JAMIESON (2001) have recently described alliances formation in the telecommunications industry in terms of scale and scope. As scope is not relevant here, as all the investments are within the same sub-sector of the industry, what does the ownership structure of the successful licence bidders tell us about scale? In particular, have operators used the market entry opportunity that the licensing process represents to build for themselves a pan-regional network of investments across the EU. From table 2 over we can see that the scale of operators varies considerably. On the one hand there is Orange and Vodafone, which have invested across the EU with the apparent intention of creating a regional network of networks. Not only would this allow for roaming traffic to be internalised, but it would also enable a seamless service to be offered as well. The desire of both of these companies to introduce a seamless European service is demonstrated in the gradual re-branding of their national subsidiaries so that the same corporate image is presented across all of their markets. For instance, Vodafone has undertaken a re-branding exercise across Europe with the weaker brand names being replaced by 'Vodafone' and the stronger brands such as Europolitan in Sweden being changed to Vodafone Europolitan.

Interestingly neither Vodafone nor Orange have used the difficulties faced by the smaller telecommunications companies to expand the scale of their mobile operations across Europe. This is surprising given that the

pressing problems of the smaller companies, combined with declining asset values offers the opportunity for acquisitions to be made that fill in gaps in their respective networks. Instead Vodafone has taken the opportunity presented by the financial difficulties of BT to strengthen its position within what it views as a strategically important market, namely Spain, by acquiring control of Airtel. This highlights the recent trend in the telecommunications industry of joint ventures that split control between several companies to unravel as companies seek to take control of their investments.

**Table 2: Who owns stakes in 3G licences within the EU (*) (as of Feb 2002)?**

| Country | Orange | Vodafone | Hutchison Whampoa | KPN | Sonera | $mmO_2$ | T-Mobile | Telefonica Moviles | TIM |
|---|---|---|---|---|---|---|---|---|---|
| Austria | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Belgium | ✓ | | | ✓ | | | | | |
| Denmark | ✓ | | ✓ | | | | | | |
| Finland | | | | | ✓ | | | | |
| France | ✓ | ✓ | | | | | | | |
| Germany | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Greece | | ✓ | | | | | | | ✓ |
| Italy | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ |
| Neths | ✓ | ✓ | | ✓ | | ✓ | ✓ | | |
| Portugal | ✓ | ✓ | | | | | | | |
| Spain | | ✓ | | | ✓ | | | ✓ | ✓ |
| Sweden | ✓ | ✓ | ✓ | | | | | | |
| UK | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | |
| Total: | 10 | 9 | 5 | 4 | 4 | 4 | 4 | 4 | 4 |

(*) Luxembourg and Ireland have not yet awarded 3G licences.

Vodafone is furthest along the path of gaining control of its mobile investments in the five key EU markets (France, Germany, Italy, Spain and the UK). Vodafone is the majority or sole shareholder in its German, Italian, UK and Spanish mobile businesses. The exception is France where Vodafone is a minority shareholder in SFR, and appears unable or unwilling to increase its shareholding for fear of antagonising Vivendi with whom it collaborates in Vizzavi. In contrast, Orange is the majority or sole shareholder in its UK, Spanish and French mobile businesses. In the two remaining markets, Orange has a 26.6% stake in New Wind (Italy) and 28.5% stake in MobilCom (Germany). Recent reports suggest that the relationship between Orange and MobilCom is far from harmonious, with the source of tension being the rate at which MobilCom is to roll out its 3G network across Germany (BENOIT, 2002: 29). Not only have doubts been cast on the ability of MobilCom to meet its forecasts in a crowded and competitive

market, but whether its management is wise to invest considerable sums in a market where consolidation may occur at some future point.

On the other hand, there are the remaining multiple 3G licence owners like $mmO_2$, T-Mobile and Sonera that have been successful in acquiring a few licences across the EU. However, regardless of whether they are large or small players within the telecommunications industry, they have at best gained only three licences in the largest five EU markets. As a consequence, the ability of these companies to offer pan-EU services that cover all of the major markets is severely limited. Because geographical coverage is a central aspect of business service provision, and is particularly lucrative, this lack of coverage in the key EU markets is likely to detrimentally affect $mmO_2$ etc. Corporate customers, as well as some residential customers, may leave the smaller operators in favour of these that can provide pan-EU networks.

In the search for scale, a merger between one or more of the smaller operators is not unimaginable. Not only would increased scale bolster the position of operators regarding corporate customers who want pan-EU service providers, but it would enable them to capture both ends of roaming traffic as well. Increased scale may also help operators negotiate better deals with equipment manufacturers. However, which of the smaller operators are likely to merge? Any combination of $mmO_2$, Hutchison Whampoa, KPN, Sonera and T-Mobile would involve investment overlap, and would therefore lead to some form of divestment. Whether any of these companies merge will be determined by their respective financial strength or weakness, the degree of overlap of their networks and the extent to which they are prepared to accept a reduced price for the overlapping assets. As many companies bought at the top of the market, their willingness to accept the lower values that presently prevail will largely shape whether or not they will partake in industry consolidation. Companies like KPN and Sonera need to resolve the financial pressures that they face, and have participated in industry consolidation and restructuring more by the need to reduce their debts than to shape any long term and sustainable strategy. The management of KPN for one has been more concerned with the need to reduce its debt burden, than reshaping its investment portfolio in a way that either maximises the amount raised or does so in a way that is strategically sustainable in the long-term. Although the debt burden of KPN has been reduced its investments increasingly lack strategic coherence and the problem of E-Plus remains unresolved.

Differences in financial strength, network overlap and the prices that they are prepared to accept ensure that any merger will be complex and prone to failure, especially if two of the weaker companies seek to merge. For example, in the case of a merger between $mmO_2$ and Sonera the degree of overlap would be limited to just the German market (Viag Interkom and Group 3G respectively). Any merger would require the divestment of one of these two companies; the sale of struggling Viag would not command a high price and would weaken any claims that the merged company could make to being present in all of the key EU markets. A sale would also relieve the merged company of one of its key assets: customers. Group 3G is a new entrant, and presently does not have any customers. Sonera could hand over its share in Group 3G to Telefonica Moviles, or sell it to a third party, but the price fetched is likely to be small. Such a move is also likely to antagonise Telefonica Moviles, who would be a partner of the merged company in Italy and a competitor in Spain. One possible resolution to the difficulties with Telefonica Moviles would be a three-way merger between its European operations, $mmO_2$ and Sonera. Whilst the resulting company would have a presence in all of the key European markets, such a merger would be unprecedented, difficult to structure and subject to such intense scrutiny that only the most determined management would be able to see it through to completion. Whether the management of $mmO_2$, Sonera and Telefonica Moviles is capable of doing this in today's climate is unknown.

## Conclusions

As we have demonstrated above, the advent of 3G has wrought changes in the structure and organisation of the telecommunications industry. The immediate aftermath of the licensing process saw the debt of telecommunications companies rise dramatically and their debt ratings fall, as the uncertainty surrounding 3G increased. A wide variety of commentators expressed their concern as to the underlying technology of 3G and the validity of market and service predictions made during the licensing process. Although these concerns cast serious doubt on 3G in their own right, they are more important because they have set in train a series of events that will have long term structural and organisational affects on the telecommunications industry.

The long term structural and organisational affects of 3G fall into three broad areas. Firstly, to mitigate the cost of building national networks some of the successful bidders have agreed to share infrastructure with one

another. Until now the 'norm' within the mobile telecommunications has been that licence holders each build their own network, but the uncertainty associated with 3G is increasingly forcing companies to think again about whether it is necessary to own a network that covers all of the market.

Whilst the sharing of network infrastructure between companies allows them to reduce the cost of fulfilling their licence conditions, it also raises questions as to the nature of competition within mobile telecommunications markets. Presumably, when regulators offered four or five licences they thought that this number was necessary for a competitive market, and that this market would be characterised by infrastructure competition. What is now emerging is a mobile market with different characteristics from that initially envisaged, for whilst service competition remains the same with five or six companies in the market they are at times utilising the same infrastructure. This raises questions as to whether the new market will be as competitive as thought; will the presence of shared infrastructure lead to collusion between companies, or will service competition be unaffected by co-operation in the provision of the underlying infrastructure?

Secondly, companies have begun to restructure themselves as they struggle to come to terms with their new, higher, levels of debt. Part of this restructuring is, of course, demonstrated in their newfound willingness to enter into network sharing collaborative relationships with others in the marketplace. However, the restructuring has gone further than this with the most drastic example of restructuring being the decision of BT to voluntarily split itself into a UK focused fixed network company on the one hand (Future BT) and a European focused wireless company on the other ($mmO_2$). Whether BT would have adopted its divestment strategy without the effect of 3G is unknown. Without 3G the overall debt burden of BT would have been considerably less, with the consequence that it would not have faced the same pressure to divest assets worldwide and would have had access to financial resources to counter the expansionary moves of Vodafone in Spain and Japan. However, prior to 3G, BT had begun to think publicly about its organisational form and how it could be changed to alleviate some of the mainly financial pressures facing the company. In early 2000 it began the process that culminated in the divestment of $mmO_2$ when it re-organised itself into five divisions and senior executives openly commented that this would increase transparency and aid the floatation or sale of divisions if required. The role of 3G, therefore, is one of exacerbating the pressures facing BT and increasing the urgency with which it looked at, and then implemented, the radical structural solution of separating the fixed from wireless and effected a retreat from markets around the world.

Thirdly, the telecommunications industry, within the European Union if not elsewhere, may be on the verge of consolidating around a smaller number of players that importantly operate on a greater scale than has hitherto been the case. Such consolidation would not be out of step with that going on in other parts of the telecommunications industry; for example, the European Internet Service Provider (ISP) market is consolidating around five companies (CURWEN, 2001a). However, who will be the five or so surviving companies? Given their size and present scale both Orange and Vodafone will be among the surviving companies. However, identifying the other surviving companies is somewhat more difficult. In the short term Sonera, KPN and $mmO_2$ all face significant, possibly insurmountable, problems that they must address and which may result in their independence being surrendered. Thus, their role in consolidation is more likely to be as the acquired than the acquiring company. Of the other companies, Hutchison Whampoa could play a role in consolidation but this is unlikely given its reputation as a financial investor and its reluctance to threaten its own balance sheet. Financial burdens may also prevent T-Mobile from participating in any consolidation. When combined with the seemingly never ending decline in the price of telecommunications stocks, this is likely to mean that consolidation will be delayed as companies preserve their capital and the stronger companies hold back from beginning the consolidation process in the hope that prices will drop further. This does not mean that the consolidation process will not happen, but that it may be precipitous to talk about the consolidation process as being imminent.

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