OFFICE OF COMMUNICATIONS

Mobile citizens, mobile consumers

Adapting regulation for a mobile, wireless world

Consultation

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Contents

Section 1

Executive summary

1.1 In fulfilling its duties as the regulator of converging communications industries, Ofcom periodically takes stock of the strategic role of regulation in the particular sectors we regulate. We believe that now is the right time to carry out an assessment of the UK mobile sector.[1] The purpose of this Assessment is to identify whether and how regulation needs to adapt to a changing market.

1.2 Our principal statutory duties are "(a) to further the interests of citizens in relation to communications matters; and (b) to further the interests of consumers in relevant markets, where appropriate by promoting competition".[2] These two obligations, as well as our duty to encourage innovation, are at the heart of this Assessment.

1.3 Our goal is for the mobile sector is to ensure that the sector contributes fully to the UK economy and society at large. In practice, this means that individual and business consumers have a range of choices offered by competing providers and that choosing (and switching) between providers is easy, quick and safe from scams. For citizens, it means widespread availability of those services needed to participate meaningfully in society, and clear and practical responses by regulators to the changing demands of digital citizenship, in areas like privacy, identity and content. For industry, it means being able to compete and innovate in the context of a clear regulatory framework supported by effective enforcement to protect consumers, where appropriate.

1.4 This goal is realised in the market, through the actions of customers and providers, not the regulator – but regulation has an important role to play in creating the conditions for success.

1.5 This document sets out, and invites comments on, our initial views on the performance of the mobile sector and how it might change in future. We look at the growth in the use of mobile services, and how that has affected the interests of citizens and consumers. We analyse market trends and developments, as a way of framing how the mobile sector could evolve in the future. Finally, we draw together the current trends and possible future scenarios to ask: what are the implications for regulation, and the industry, if we are to realise the full potential of the mobile sector for citizens and consumers?

Mobile has already delivered huge benefits to citizens, consumers and society as a whole

1.6 The mobile industry has changed significantly in recent years, in ways that have benefited us individually and contributed to UK society – reflecting rapid growth and technological advances underpinned, in part, regulation:

[1] Ofcom published guidelines setting out the terms of reference for the Mobile Sector Assessment (referred to as the 'Assessment') in February 2008. For the purpose of this Assessment, we take a broad view of what is 'mobile', including all services delivered over an electronic communications network that are capable of being used while moving from place to place. 'Wireless' means, in this context, other services or technologies that use radiocommunications but that may not necessarily provide full mobility. For brevity, the term 'mobile sector' is used broadly to describe that part of the communications industries involved in mobile or wireless services.
[2] Communications Act 2003, section 3.

- mobile has become nearly ubiquitous. 84 per cent of people aged 8 or over use, or have access to, mobile services;[3]
- mobile has become a critical input for business, with mobile communications now a vital element in an increasingly services-based economy;
- the mobile sector is now larger by revenue than the fixed and broadband sectors combined;
- with five mobile network operators, as well as several large 'virtual' operators, the UK market is often cited as one of the most competitive in the world;[4] and
- the market continues to change. For example, demand for mobile broadband services has grown dramatically since late 2007.

Even though the sector continues to evolve rapidly, it is a challenging place for new entrants

1.7 In past years, the mobile sector has become more important; in future the sector looks set to become more complex. The sector continues to evolve rapidly with the potential for fundamental changes across a complex value chain. More spectrum is becoming available (including the digital dividend).[5] Technology continues to change quickly. And now a new wave of data-based services, including mobile broadband, promises to bring together two of the most significant features of modern communications: the flexibility of the internet and ease and immediacy of mobility. Although there is a lot that we do not yet know about how events will unfold, we are optimistic about the potential benefits that these changes will bring for UK citizens and consumers.

1.8 Competition relies on new challenges for its vitality. While the UK enjoys a higher level of competition than is evident in other markets in Europe, the mobile sector is particularly challenging for new entrants – the barriers to entry are high. There are obstacles in terms of spectrum, technical standards and infrastructure that remain formidable in the eyes of many prospective entrants (large and small). Removing or minimising those barriers (for example, by releasing spectrum) wherever we can will remain an important objective for Ofcom.

1.9 At the same time, the mobile sector is an increasingly integral part of a broader communications market. The distinction between fixed and mobile networks, previously clear, is starting to blur. In an international marketplace, events here are affected by events elsewhere – both within Europe and, increasingly, in developing economies with whom we are interdependent.

[3] In a number of places in our Assessment, we refer to the fact that many children have mobiles, or can access them. Decisions as to whether children should be permitted to use mobile services are for parents, not Ofcom. Following the publication of the Stewart Report in 2000 the Department of Health recommended that, in line with a precautionary approach, the widespread use of mobile phones by children (under the age of 16) should be discouraged for non-essential calls.
[4] A mobile virtual network operator (or "MVNO") is a firm that buys wholesale network services and sells them to retail customers. MVNOs are discussed more in section 3 at paragraphs 3.57 and 3.59 and 3.91 to 3.93.
[5] The 'digital dividend' is the spectrum freed up for use by digital switchover (that is, the move to digital television).

Not all citizens and consumers have benefited from mobile services in the same way

1.10 Most of us report ourselves satisfied with our mobile service (and we are more likely to be satisfied with our mobile service than with our fixed or broadband service). However, a significant minority are dissatisfied and the number of complaints received by Ofcom and other agencies, in particular about bills and cases of mis-selling, appears to be rising. Given the scale of the industry, relatively small percentages can under-emphasise the real difficulties experienced by millions of us with our mobile service.

1.11 For many, the quantity of minutes, texts and in some cases data we receive in typical service 'bundles' has dramatically increased. However, the benefits of this trend are unevenly distributed, with contract customers appearing to have fared better than those who rely on pay-as-you-go services.

1.12 Coverage of mobile networks is generally good, although there are still areas of the UK which are not served by some or all of the operators. People living in those areas, and businesses seeking to serve them, may be disadvantaged by lack of access to mobile voice and data services. For 3G network coverage there is still a noticeable difference between city and countryside, with some parts of (each of) Scotland, Wales and Northern Ireland, and some regions of England, having poorer coverage than the UK average.

1.13 There are also groups of people who are excluded from mobile services for other reasons. For example, older people, and disabled people, each have disproportionately low levels of mobile ownership. Those without access to credit or a bank account may not be able to obtain the most favourable prices or packages. As mobile becomes a more important way to communicate, these issues become more significant.

The continued success of the mobile sector will require regulation to change as industry changes

1.14 Our vision is for a UK mobile and wireless sector that serves the needs of those who live and work in the UK by offering them:

- a wide choice of competing providers of mobile and wireless *networks* which we are able to be used reliably while commuting, travelling, at home or in the office,
- easy and reliable mechanisms to allow consumers to switch between competing network and service providers;
- a wide choice of good value and affordable mobile and wireless *services* (voice and data) - including mobile internet access that is, to the extent technically feasible, as open and flexible as today's fixed internet;
- a diverse range of high-quality content and, where appropriate, protection from harmful content;
- coverage across as much of the UK as is economically feasible (and, potentially, going further where that is socially desirable); and
- protection from unfair practices and scams, including those infringing citizens' interests in protecting their personal information, identity or location.

1.15 These outcomes are most likely in a market environment where citizens and consumers benefit from competition, and industry has the ability and incentive to innovate, with the opportunity to earn fair returns on investment.

1.16 Our goal is to set regulation so as to maximise the likelihood that these outcomes will be delivered by competition as markets evolve. Often, this involves responding to an identified market failure (and being mindful of the risks of regulatory failure). In doing so, we are guided by our regulatory principles, including a bias against intervention – balanced by a willingness to intervene firmly, promptly and effectively, when required.[6]

1.17 Today's trends may lead the UK mobile sector to follow a number of different paths. In particular, fixed-mobile substitution, increased data use and new applications and technology are all potential drivers for significant market change. In this Assessment, we have considered these trends individually and then in combination to develop a number of illustrative scenarios to describe possible future market outcomes. These scenarios are designed to help frame views about what might happen in future.

We see a need for fresh strategic thinking on issues such as call termination and mobile broadband

1.18 This assessment is not intended to be a blueprint for increasing the scope of regulation of the mobile sector. Indeed, we are looking for opportunities to de-regulate where possible. Our strategy is built on recognising the value to citizens and consumers of competition at the deepest level of infrastructure where that competition will be effective and sustainable. In mobile markets, that has meant competition between end-to-end networks. We are also looking to adapt regulation to remove unnecessary regulatory obstacles to innovation, where they exist, and to enable the market to function efficiently.

1.19 We see scope for further de-regulation as competition advances. In particular, it will further the interests of citizens and consumers to continue our existing programme of spectrum release, and to consider whether and how quickly to de-regulate fixed services in the face of competition from mobile services. We intend to pursue both.[7]

1.20 At the same time, some elements of mobile services have remained regulated despite the presence of retail competition. In these cases, we intend to consider whether there exists a better, less intrusive, way to achieve good outcomes.

1.21 A particularly important question is how, if at all, the mobile termination rate regime should change after the current charge control ends in 2011. Now is the right time to engage in a strategic debate about the future of that regime. The growing debate about the possible changes to the structure of mobile termination (such as 'bill and keep' arrangements) deserves careful consideration.[8]

1.22 In other areas, we want to understand the extent to which market conditions will deliver specific outcomes that are in the interests of citizens and consumers – for example, an open and thriving mobile broadband environment with scope for

[6] Ofcom has adopted a set of regulatory principles, which are set out at Ofcom's website at www.ofcom.org.uk/about/sdrp

[7] Ofcom's programme of spectrum release is discussed further in section 3 in paragraphs 3.110 to 3.115. We have recently launched our market review of fixed narrowband services (that is, fixed voice services) which will review regulation in this area.

[8] 'Bill and keep' and other variations of mobile call termination arrangements are discussed further in section 8 in paragraph 8.43.

innovation across different parts of the mobile value chain. Where competition will secure these goals, the question of regulation does not arise. Where the market seems unlikely to deliver those outcomes, the question then needs to be asked: what role, if any, might regulation play?

1.23 Sometimes, regulation may have the unintended consequence of holding back innovation (a good reason to be vigilant in rolling back regulation wherever we can). We intend to be active in searching for ways to adapt regulation to a world in which mobile, wireless and fixed networks may inter-operate, and compete, in more complex ways. In preparing for a converged world, clarity of purpose and technology-neutrality will be vital.

Asking questions, before proposing regulatory change

1.24 At this stage, we are not setting out any specific proposals for regulatory change. Instead, as with the Strategic Review of Telecommunications, we are asking a number of questions, the answers to which are important in shaping our approach to changing regulation in a changing market.[9]

1.25 We have taken this approach deliberately, and with a view to enabling an open and candid debate about the future of the sector, the role of regulation and the ways in which we can fulfil our duty to further the interests of citizens and consumers.

After engagement and debate, moving from questions to proposals

1.26 We regard this consultation as a step to increased engagement with stakeholders affected by events in the mobile sector, and to help us ensure that regulation evolves and does not trail market developments.

1.27 We are particularly interested to engage with interested members of the public, and with consumer representatives, as well as those with a commercial interest in these issues. We have also set up a blog to enable discussion of these issues among stakeholders, and to help us to understand these issues better, from a range of perspectives. The blog is accessible via http://comment.ofcom.org.uk/mobileblog/

1.28 We will also conduct further research into some of the areas that may represent cause for concern, such as the potential exclusion of certain groups of citizens and consumers from mobile services, and the detailed causes for recent complaint levels. We will also carry out further analysis of the options with regards to mobile termination rates and participate in the European debate on this issue.

1.29 After we have had chance to hear views from the consultation and gathered further evidence, we will set out the specific steps we propose, and if necessary, a timetable, as we move to conclude our Assessment.

Consultation questions

As well as inviting feedback on the analysis and questions noted elsewhere in this document, we are asking stakeholders for feedback on the four primary questions of our Assessment:

[9] Details of Ofcom's Strategic Review of Telecommunications (including the questions posed, which are set out initially in the Phase 1 consultation document) can be found at http://www.ofcom.org.uk/static/telecoms_review/index.htm .

Question 1.1: What are the implications of market change for mobile and wireless services?

Question 1.2: How are citizens and consumers affected by developments in the mobile sector?

Question 1.3: What are the purposes of mobile regulation, and where should its focus lie?

Question 1.4: What is the scope for deregulation, competition and innovation in the mobile sector?

Section 2

Why is Ofcom undertaking this Assessment?

Summary

2.1 This section 2 explains why Ofcom is undertaking the Mobile Sector Assessment, and the purpose and structure of this document.

Between two 'revolutions', we see a good time to take stock

2.2 The ability to reach into our pocket, push a button and speak to anyone we want, anywhere in the world, is now so ubiquitous and so fundamental to the way we keep in touch that we often take it for granted. Mobile telecommunications has not simply changed the way we make telephone calls; it has enabled new ways of communicating that affect our way of life – at home, in our families, between friends and at work. Whether it is a text announcing the birth of a new baby, the ability to answer business email in a spare moment from wherever we are, a 999 call from isolated hikers, teenagers entering a quiz or as an integral component in soap-opera plots, mobile telecoms is part of who we are in modern Britain.

2.3 As a result, the UK telecommunications market has changed immensely since mobile services were first launched in the UK:

- most of us, including most children, now have or can access at least one mobile phone;
- we use mobile phones to send as many text messages as we make phone calls;
- mobile services are a vital input to business, with the way we work increasingly reliant on connectivity on the move;
- we now spend half our total telecommunications budget on mobile services;
- mobile calls look set to outnumber fixed calls in the UK within the next 12 to 18 months; and
- the mobile sector now earns more revenue than the fixed, corporate data and broadband sectors combined. At the same time, it is the fastest-growing of these sectors.

2.4 We are now on the cusp of a second mobile revolution. In 2008, data services and the ability to access the internet on the move look set to become as widely available as the ability to make phone calls or send texts. We can already see that:

- more of us are using mobile data services, like mobile broadband and internet access;
- networks continue to evolve with the arrival of 3G technology (and beyond).

- mobile devices offer more capabilities and more varied services than at any other time – and this trend is set to continue;

- in some cases, the distinction between fixed and mobile services has already started to blur, which will have important implications for regulation; and

- services like mobile TV are emerging, blurring distinctions between telecoms and broadcasting.

2.5 This pivotal period – when we have already 'gone mobile' to a great extent, but the second wave of mobile data and internet services has yet to fully emerge – is a good time to take stock of the role of regulation.

2.6 Our approach to regulation of telecommunications begins by asking what the market will deliver, and only then considering what role, if any, regulation needs to play.[10] Our long-standing strategy is to promote competition at the deepest level of infrastructure where that competition is likely to be effective and sustainable.[11] For mobile telecommunications, that has meant competition between networks. Mobile telecommunications has never been a monopoly in the UK. Once competition was established, the market has been driven by customers' needs, with technical and commercial innovation spurred by competition. Competition has been a success for UK citizens and consumers.

2.7 Therefore, this Assessment begins by considering: how is the market functioning? What is it doing well? What is it not doing well? And how might that picture change in future?

2.8 Despite the pivotal role played by competition, regulation affects the mobile sector in a number of ways:[12]

- spectrum licensing has shaped competitive conditions in the market by determining how many networks have been built and, previously, the technology they use. In the past, spectrum licences have also set minimum coverage limits to ensure that a large number of citizens and consumers were able to receive service within a specified time;

- regulation dealing with competition has focused on interconnection, setting the terms on which services that enable users on different networks to exchange calls and messages are supplied. Sometimes these are set commercially; where necessary (i.e. when referred to us as a dispute), they are set by Ofcom;

- mobile networks and services are also governed by general rules applying to telecommunications, for example, in relation to telephone numbers and consumers' right to keep their number when they change networks. Some of these rules protect consumers by regulating some aspects of sales and marketing of services; and

[10] Ofcom has adopted a set of regulatory principles, which are set out at Ofcom's website at www.ofcom.org.uk/about/sdrp

[11] This strategic principle was adopted in our previous review, the Strategic Review of Telecommunications. On 22 September 2005, Ofcom issued the *Final Statements on the Strategic Review of Telecommunications and undertakings in lieu of a reference under the Enterprise Act 2002* (available at http://www.ofcom.org.uk/consult/condocs/statement_tsr/statement.pdf).

[12] This is not intended to be an exhaustive list. Further details about the regulation most relevant to this Assessment is set out in section 6.

- on some specific issues, such as international roaming, regulation has been applied to limit prices across Europe.

Purpose of this document

2.9 This consultation document sets out our initial views on the questions we asked in our Guidelines in February this year. We are asking for feedback on our views, and to hear from others about these issues. Although we have considered a lot of material so far, we remain open-minded. As more evidence comes to light, our views, expressed in this document, may change.

2.10 Unlike a policy consultation, we are not putting forward any detailed regulatory proposals at this stage. Instead we are identifying policy and public interest issues that we think are likely to be the critical questions in the future.

2.11 We expect that any detailed regulatory changes will need to be given the scrutiny of a further more detailed consultation. The main role of this phase of our Mobile Sector Assessment is to help to map out the road ahead.

2.12 Some areas of policy (for example, in relation to data protection and privacy, the regulation of premium-rate services and so on) are shared with, or sit with, other agencies. This Assessment deliberately approaches the question of what is in the interests of citizens and consumers in the UK in an open way, with a view to prompting debate, rather than excluding questions that might be primarily issues that others will take forward, rather than Ofcom.

Structure of this document

2.13 This document is organised into the following sections:

- Following the summary and this introduction, **section 3** of this document looks at the development of the mobile market;
- **Section 4** looks at how the position of consumers has changed over time;
- **Section 5** considers how our interests as citizens are affected by changes in the mobile sector;
- **Section 6** summarises the key regulation of the mobile sector;
- **Section 7** lays out some scenarios for the development of the mobile sector; and
- **Section 8** looks at the possible implications of the analysis for future approaches to regulation of the mobile sector and discusses next steps in this Assessment.

Section 3

Today's UK mobile markets

Summary

3.1 This section sets out our views about the UK mobile market as it is today.

3.2 First, we describe the rapid growth and extensive take-up of mobile services in the UK, and how it has changed the overall telecoms landscape.

3.3 Second, we consider some of the commercial changes underpinning this shift. Spend per capita is continuing to rise, fuelled in part by growth in users with two or more devices. Voice continues to be the main source of revenue, although text messaging has grown remarkably – 36 per cent, by volume, in the last year alone. In recent years, for contract customers there is 'more for more', as contracts lengthen and bundles have grown larger. By contrast, for pre-pay customers there is 'same for the same', with prices roughly flat. Over the same period, expenditure on mobile services by businesses has also grown.

3.4 Third, we take a closer look at competition in the sector. Operating within a global marketplace, the UK mobile operators rely on the activities of a complex value chain in order to deliver services. In the retail market, the largest players have, at times, offered a similar range of services, handsets, pricing structures and contract terms. In many cases, innovations have been quickly copied. For customers, this may mean that all mobile suppliers appear to be close substitutes, competing intensely on price. Questions remain about the scope for entry by firms with alternative business models – which in the longer term could trigger market changes that potentially lead to greater choice or a better service to consumers.

3.5 Fourth, we ask whether new mobile broadband and mobile data services signal further change in the market. While the voice market is growing more slowly than in previous years, data services show strong – even explosive – growth. However, considerable uncertainty about the sustainability of this trend remains. Proponents of mobile broadband argue that it can bring the freedom of the internet to the mobile environment for a mass market. It is too early to tell whether those predictions are right. However, there is growing evidence that fixed-mobile convergence (in a number of different forms) is emerging from hype to commercial reality.

Setting the scene: we have 'gone mobile'

3.6 This section begins by setting out some of the basic data demonstrating the extent to which the use of mobile services has grown both in absolute terms, and as a proportion of total telecommunications activity in the UK.

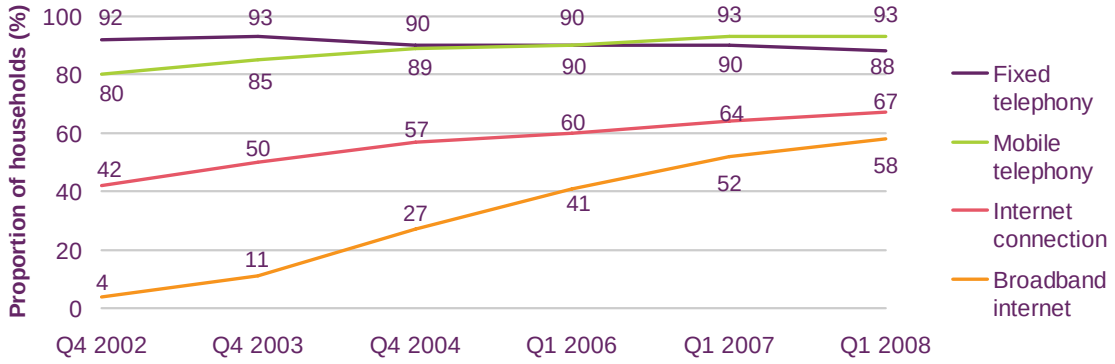
Mobile is the most popular telecom technology in the UK

3.7 Mobile is now the most pervasive telecoms technology among households as shown in Figure 1, with more households using a mobile phone (93 per cent) than any other telecom services, including fixed line (88 per cent). Reflecting this trend, one in eight

UK households relies solely on mobile services for their voice communication needs.[13]

3.8 A number of factors could affect this trend in either direction in future. For example, faster broadband services over mobile (e.g. using dongles) could prompt a similar move to abandon the fixed lines required for ADSL or cable broadband. Alternatively, as discussed in section 7 (scenarios), in-home technology (such as femtocells) may reverse this trend, cementing reliance on a fixed line as a core element in providing mobile as well as fixed services.

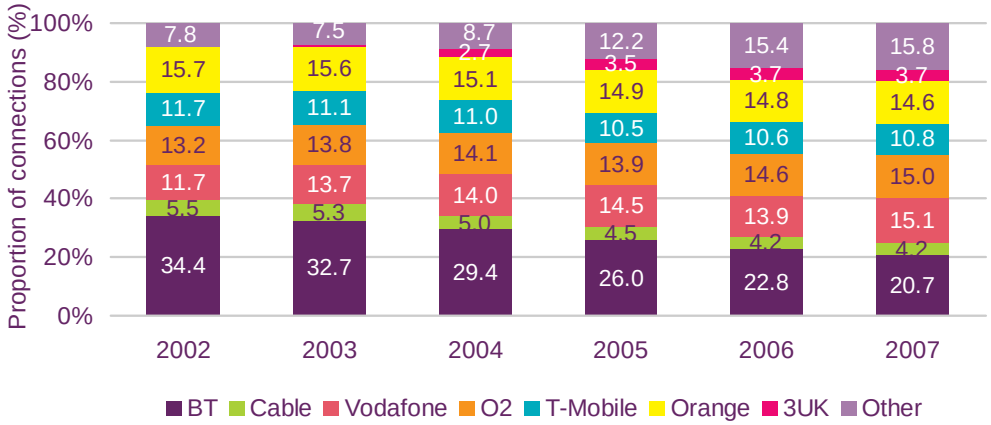
Figure 1: Household penetration of key telecoms technologies



Source: Ofcom

3.9 As a result of growth in mobile connections, four of the top five communications providers in the UK by number of connections are mobile operators.[14]

Figure 2: Share of total UK fixed and mobile telecoms connections



Source: Ofcom / operators
Note: Includes estimates where Ofcom does not receive data from operators
Other includes subscribers of other fixed service providers offering services using carrier pre-selection (CPS), wholesale line rental (WLR) and local loop unbundling (LLU). Mobile virtual network operator (MVNO) and other mobile service providers are also included in the same section.

[13] 11 per cent of all UK households are 'mobile only': Ofcom's Communications Market Report 2008, p298. Less than one percent of households report themselves as being without any telecom service.
[14] Connections provided by fixed and mobile operators have important differences as well as similarities. Whether consumers regard these services as substitutes is unclear, and will be considered in Ofcom's upcoming Fixed Narrowband Market Review (which commenced in 2008).

Half the money we spend on telecoms is spent on mobile services

3.10 Mobile services account for 51 per cent of average UK household expenditure on telecoms.

3.11 Household spend on mobile services has remained broadly stable over the past few years, with the main changes occurring as expenditure on fixed voice services has fallen. As with other trends, it is not necessarily clear whether this will continue in the future – for example, as discussed in paragraph 3.26 below, many contract customers are receiving more inclusive minutes in mobile tariff plans, with complex effects on total overall expenditure. If users start to adopt better value price plans e.g. due to an economic downturn, it could put pressure on revenues. This trend may accelerate if, for example, rising energy and food prices were to force some households to look for ways to cut costs.

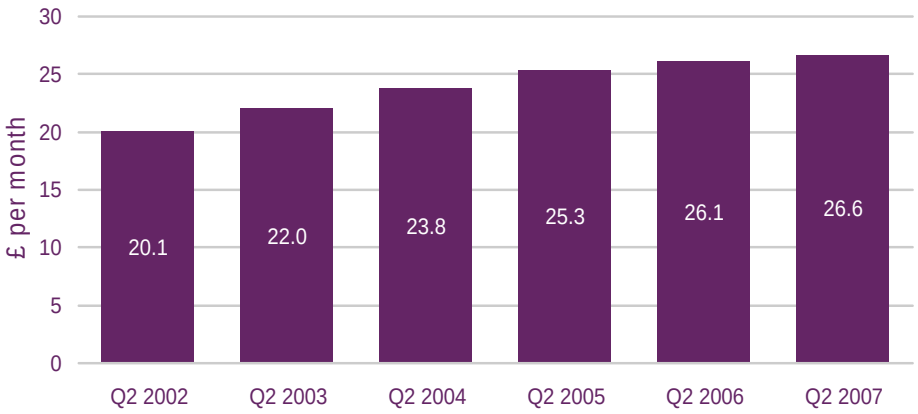
Figure 3: Household spend on communications services (in 2007 prices)

Source: Ofcom / operators
Note: Figures have been adjusted to take account of inflation

We're spending more per head on mobile services, not less

3.12 On average, the amount that UK consumers pay for mobile services has been rising – a trend that has continued every year since 2002. We have derived this measure by dividing total industry service revenue by our estimates of the number of active mobile customers (46m in mid-2007). The average total revenue per mobile user has increased from £20 per month in 2002 to over £26 in 2007.

Figure 4: Average monthly retail revenue per mobile user 2002-07 (nominal values)

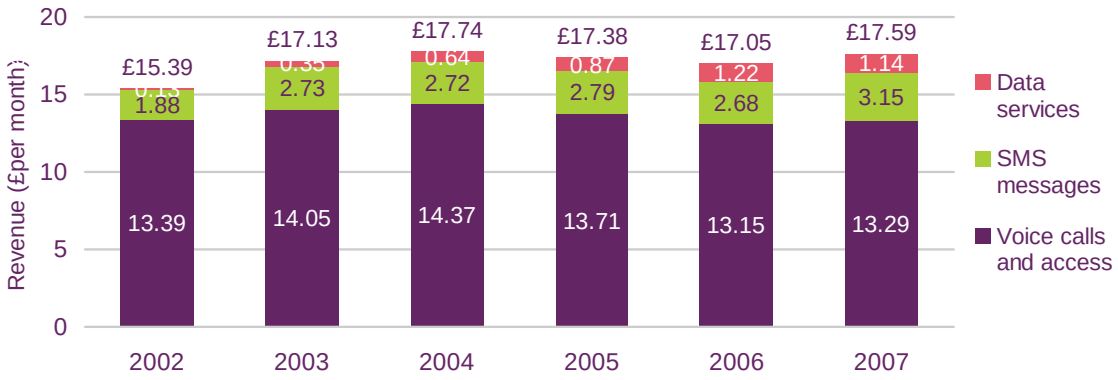


Source: Ofcom
Note: Figures are nominal. Revenue per subscriber is calculated by dividing total industry service revenue by the number of UK-wide users – distinct from ARPU which is typically calculated per active connection.

3.13 By contrast, revenue per mobile connection (widely reported by industry as 'ARPU') has remained relatively flat since 2003.[15]

3.14 Increasingly, users have more than one device, fragmenting their expenditure among multiple mobile connections. Ofcom research in July 2008 found 11 per cent of adult mobile users use more than one SIM. Over a third of mobile users with more than one subscription claim they do so in order to separate work and personal calls.[16]

Figure 5: Average monthly retail revenue per mobile connection 2002-07



Source: Ofcom / operators
Note: Figures are nominal. Includes estimates where Ofcom does not receive data from operators

Second (and third) connections are growing faster than new users are joining

3.15 In earlier phases of the market's development, growth was fuelled by new users taking their first mobile services. More recently, fewer customers are first-time users and existing customers are using second (and further) devices. This trend can be

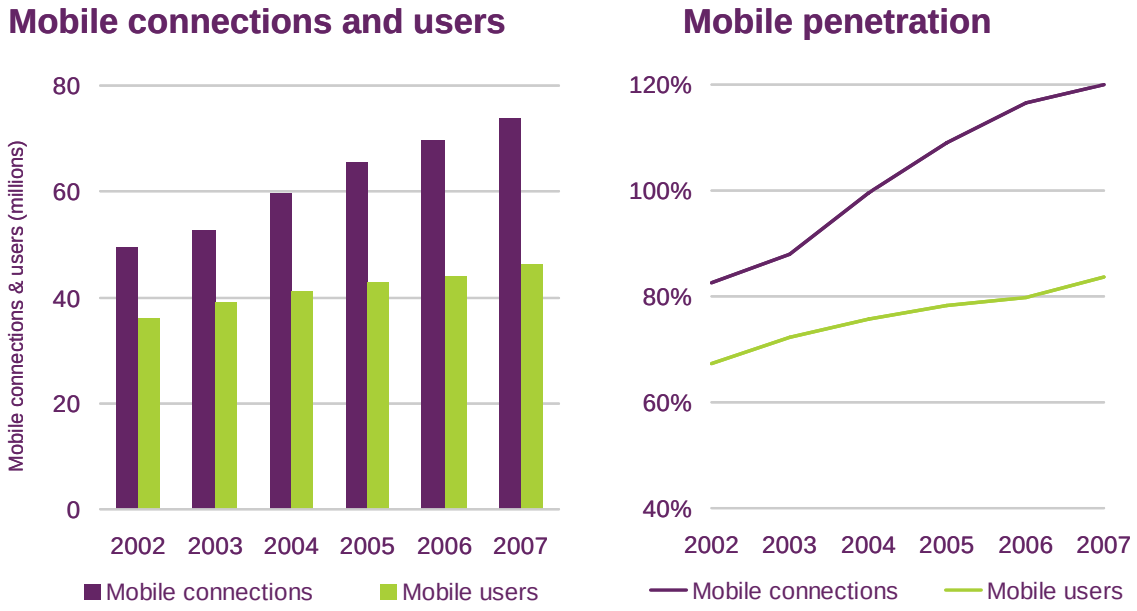
[15] Note that although ARPU means, literally, 'average revenue per user', industry measures of ARPU divide total revenue by the number of active connections.
[16] Ofcom's Communications Market Report 2008, p338. Much of the rest of the gap between connections and users is accounted for by inactive/barely active SIMs (most operators define 'active' as 'used within the last three months', meaning that a proportion of accounts that will never again be used as are still 'active').

seen in the widening gap between the number of active connections and actual users.

3.16 This growth means that there are now as many as three devices for every two users in the UK.[17] At the end of 2007, UK mobile subscriptions exceeded 73.5m, and we estimate there were approximately 46m people aged eight and over who were 'active users' of mobile (comprising 84 per cent of the population in that age group).[18] As a proportion of that group, the penetration rate for mobile connections was 120 per cent.[19]

3.17 By contrast, Figure 6 shows that in 2002, the level of participation was below 70 per cent, although the overall penetration was just above 80 per cent. This is notionally equivalent to a second device being held by one in seven users.

Figure 6: Mobile connections and penetration 2002-07



Source: Ofcom
Note: Penetration based on population 8+

Within mobile, voice dominates revenue

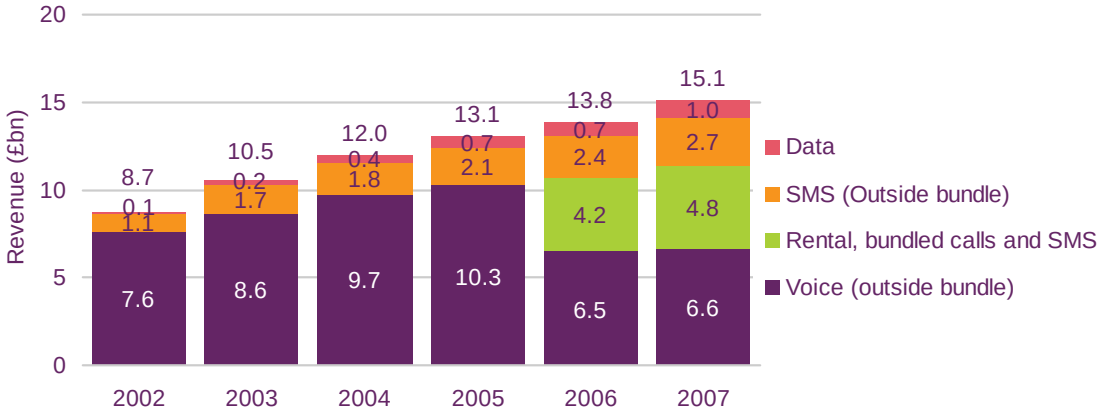
3.18 Today, most of the mobile industry's income comes from voice calls and monthly access charges (primarily used to make and receive voice calls). Figure 7 shows that revenue from rental and bundled offerings (inclusion of a fixed number of voice calls and SMS) rose by 15 per cent in 2007 to £4.8bn but revenue from voice outside the rental and bundle increased by £0.1bn (or two per cent).

3.19 More recently, data traffic has started to grow quickly, although from a very low base. The highest growth in revenue across all mobile services in 2007 came from non-

[17] This is likely to overstate the true position to some extent. The UK Communications Market Report 2008 conducts a reconciliation of the number of users and the number of devices (at Figure 5.63 on page 335). Citing research by Enders Analysis, the CMR08 notes that some of the 'extra' devices may be inactive or barely active SIMs, leaving 9.4m "genuine second SIMs", which roughly matches with the 11 per cent of users who report themselves to have two or more devices.
[18] The uptake of mobile services amongst 16+ is 85%.
[19] Ofcom research at http://www.ofcom.org.uk/research/cm/cmr08/telecoms/telecoms.pdf

voice services (outside the bundle) with revenue from non-SMS data services increasing by 33 per cent to 6.5 per cent of total revenue in 2007, compared to three per cent in 2002. Data services still have many features of an application in the early phases of market adoption (for example, rapid growth and uncertainty about future demand). In section 7 of this document (scenarios) we consider possible future developments for data volumes and the implications these may lead to.

Figure 7: Estimated mobile retail revenue by service



Source: Ofcom / operators
Note: The split between revenue from rental, bundled calls and SMS and voice revenue (outside bundle) is only available for 2006 and 2007. Pre 2006 revenue from rental, bundled calls and SMS revenue is included in voice (outside bundle) figures.

Total mobile call volumes are rising[20]

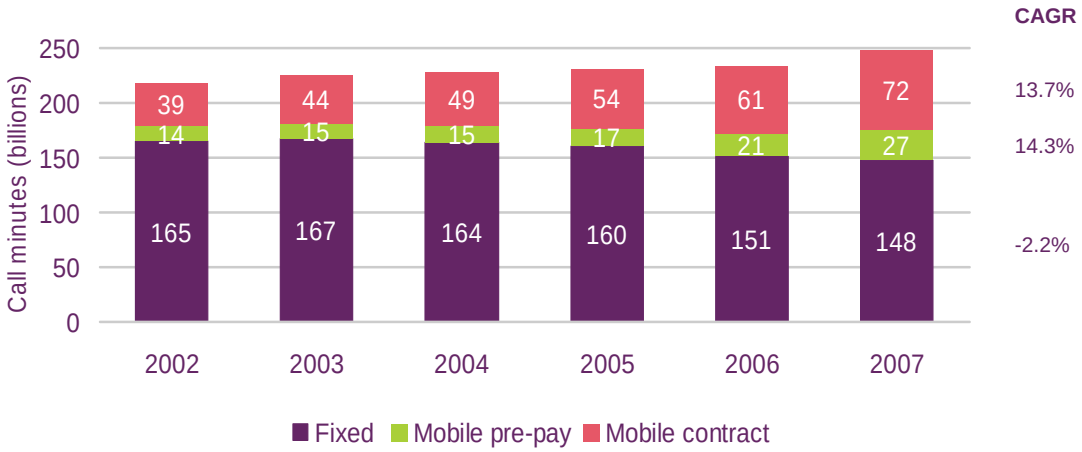
3.20 The number of voice calls made on mobile devices is growing at an accelerating rate, with 40 per cent of all voice calls (corresponding to nearly 100 billion minutes) being made over mobile in 2007 as shown in Figure 8. As discussed further in paragraph 3.26 below, this growth may reflect a number of factors such as the inclusion of more bundled minutes in tariff plans.

3.21 Customers on monthly contracts make more calls on average than pre-pay customers. Despite accounting for just over one-third of total connections, 73 per cent of mobile calls are made by customers on a monthly contract. Given the current trend to offer more voice minutes (or unlimited calls) to contract customers, we expect this trend to continue, and perhaps accelerate.

3.22 At 2006-7 growth rates, there will be more mobile calls than fixed calls made in the UK in 2010.

[20] For simplicity of expression, this analysis equates 'minutes' with 'calls', which may be an over-simplification in some contexts or for some customer segments (since call lengths may vary considerably between fixed and mobile or between pre-pay and contract).

Figure 8: Fixed and mobile call volumes

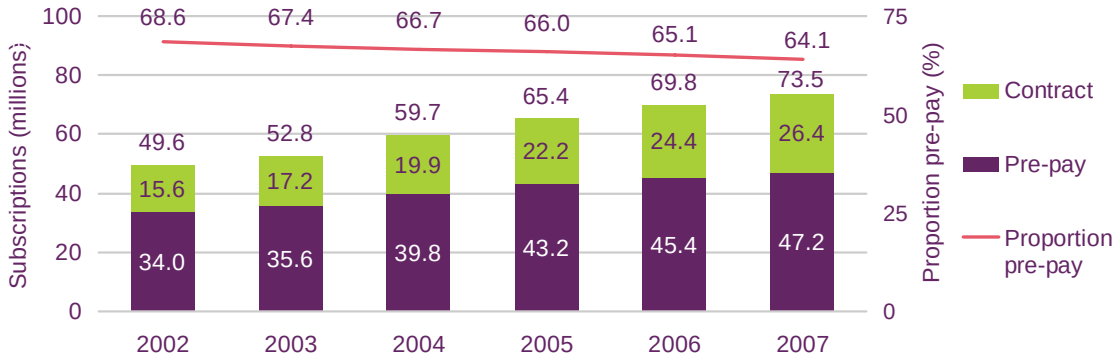


Source: Ofcom / operators
Note: Includes estimates where Ofcom does not receive data from operators

Most people are on pre-pay but a growing proportion are moving to contract subscriptions

3.23 The introduction of pre-pay mobile phones in 1996 was one of the key drivers of mass market take up of mobile phones, particularly among the young.[21] Prior to 1996, penetration was one tenth (12 per cent - that is, 12 connections per 100 population) of today's level (over 120 per cent).[22] Today, two thirds (64 per cent) of all mobile connections are pre-pay, although this share has declined since 2002 as mobile operators encourage pre-pay users to migrate onto attractively priced contract plans.

Figure 9: Pre-pay and contract mobile subscriptions



Source: Ofcom / operators
Notes: Based on network operator reported figures; likely to overstate activity in reference quarter; includes estimates where Ofcom does not receive data from the operators

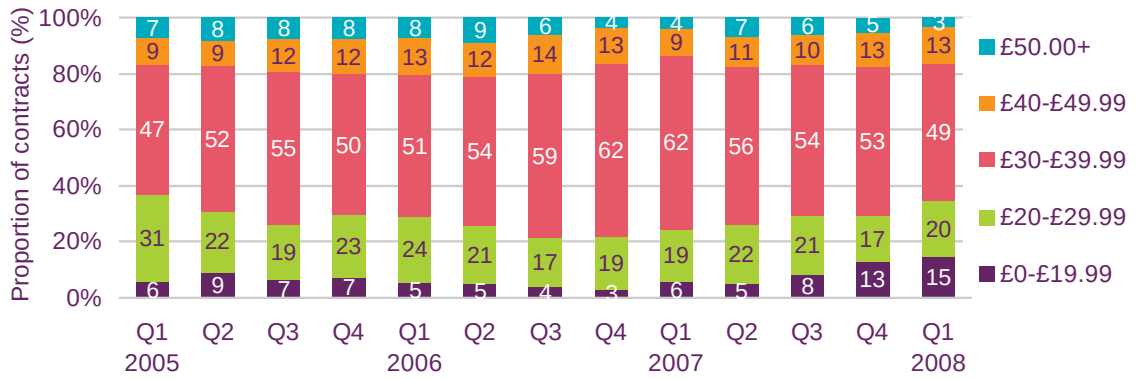
3.24 Operators have achieved some success in encouraging pre-pay users to switch to contract plans by offering more inclusive minutes and texts with free or low-priced handsets. Figure 10 below shows the proportion of new contracts being taken by customers, split into bands according to the monthly charge for each. A recent trend has been a rise in the proportion of customers entering a contract with a monthly charge in the lowest price band (less than £20). This has tripled (from five per cent to 15 per cent) in the last 12 months (since Q2 2007). SIM-only monthly contract plans

[21] The first pre-pay service was launched in 1996 by Vodafone.
Source: http://www.vodafone.ie/aboutus/vfirl/history/
[22] There were 6.8 million subscribers at the end of 1996. Source: Ofcom

are one recent example of the ways that operators are encouraging pre-pay users to switch to bundled tariff plans without tying themselves into a more expensive long term contract.

3.25 At the other end of the scale, the proportion of mobile contracts costing over £50 a month has also more than halved, perhaps as the growth in numbers of inclusive minutes at lower prices has made these higher-priced contracts unnecessary to some consumers.

Figure 10: Monthly line rental for new mobile monthly contracts

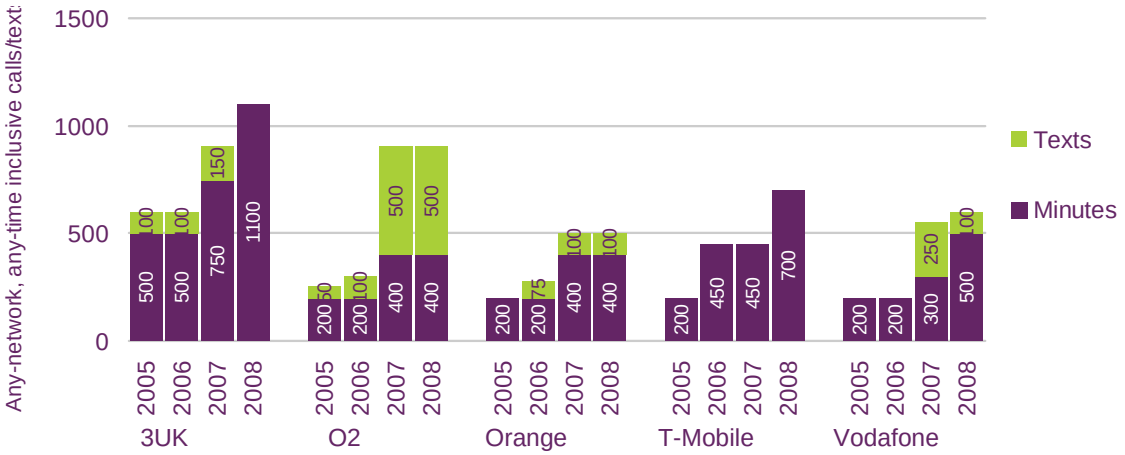


Source: GFK retail data
Note: Based on new contracts with handsets, covers 94 per cent of sales. Excludes upgrades.

For contract customers, bundles are getting bigger

3.26 As Figure 11 indicates, there has been a marked increase in the number of minutes available within standard £30 contracts from all five mobile network operators over the past three years.

Figure 11: Anytime, any network allowance within £30 mobile contracts

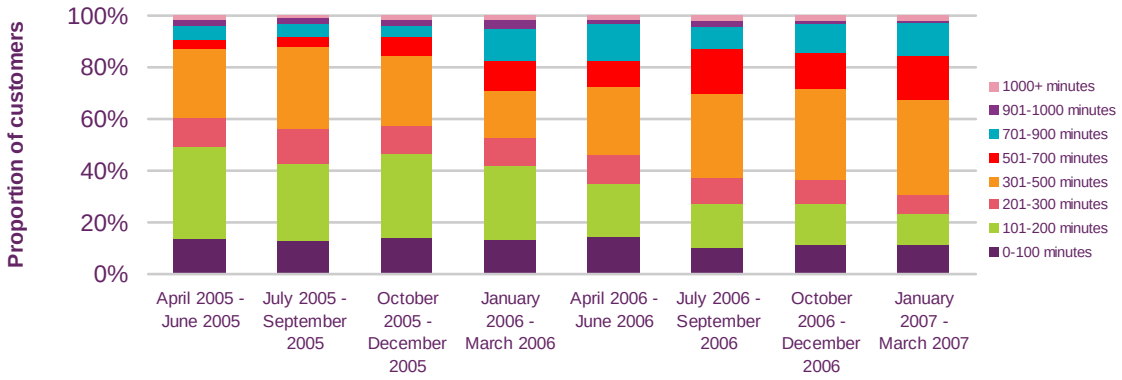


Source: Ofcom / tariff data from Pure Pricing
Notes: Standard tariff selected which offers highest number of anytime, any network minutes for £30 or less on an 18-month or 12-month contract; excludes tariffs only available online or direct; excludes specific promotions; excludes SIM-only deals; some variation between 2006 and 2007 is caused by greater availability of 18-month contracts; this table is indicative of inclusive any time, any network minutes only (and texts when they are additional to the maximum number of minutes) and should not be used to compare overall pricing as many additional factors are excluded, such as handset, on-net calls, off-peak calls, data bundles and metered pricing

3.27 Figure 12 breaks down the monthly allocation of minutes (that is, the bundle size) being taken by customers entering monthly contracts over time. This reveals a similar trend to Figure 11, although rather than tracking a single operator's bundle at a single

price, it shows how, across the board, a greater proportion of consumers are taking a contract with more minutes than they would have in previous years.

Figure 12: Monthly bundle size for new mobile monthly contracts



Source: GFK
Note: Based on new contracts with handsets, covers 94 per cent of sales

3.28 This trend has led to what might be termed 'super-sizing' of bundles. For example, in 2005, less than half of customers received 300 minutes or more per month; by 2007 it was two-thirds (average *actual* usage in 2007 is around 234 minutes per month for contract customers). From 2005 to the present day, a growing proportion of consumers have elected to purchase relatively large bundles. At the same time, many have entered contracts with longer fixed terms than were typical in previous years.

Contracts are getting longer

3.29 Over the last couple of years, mobile contract lengths have increased in duration, as shown in Figure 13. This trend has been industry-wide and once a longer contract was introduced into the market by one player, it was then rapidly deployed by all. A timeline showing the introduction of 18 month contract lengths is shown in Figure 14.

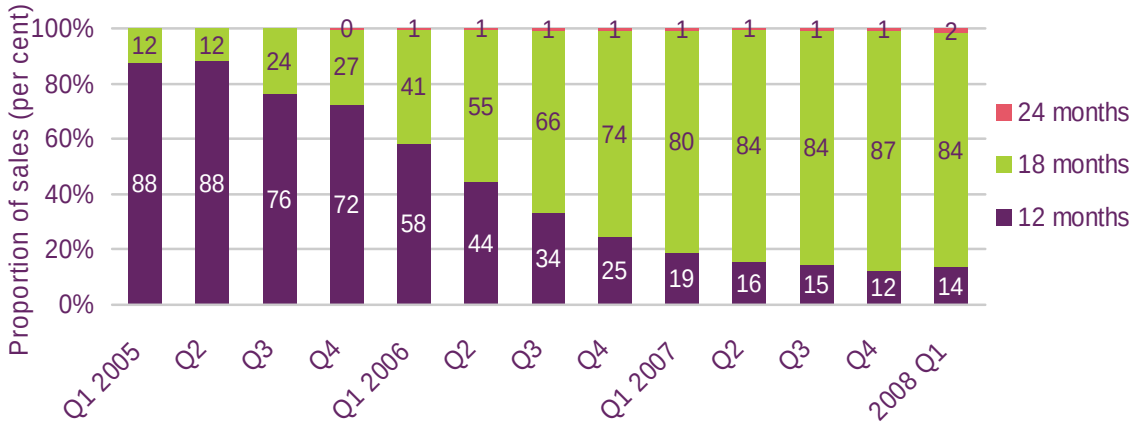
3.30 In the context of a market where consumers have a choice of provider (and a choice whether or not to enter a contract or to pre-pay), the terms of retail contracts are not subject to sectoral regulation.[23] That means that the length of contract, and the trade-off with other factors such as the monthly access charge, up-front payments, handset subsidies and charges for out-of-bundle services provided during the contract are a matter for the market, provided that consumers have all the information they need to make a properly informed choice.

3.31 That said, the use of longer-term contracts may have some detrimental effects on the market. In particular, when customers are tied in to the same supplier for longer periods, the supplier may not have to compete as hard – either to win new customers to replace those who leave, or in offering better terms to retain those who are considering switching.

[23] As with other consumer contracts, mobile contracts are subject to general consumer law – for example, the Unfair Terms in Consumer Contracts Regulations – discussed further in section 6 (Regulation).

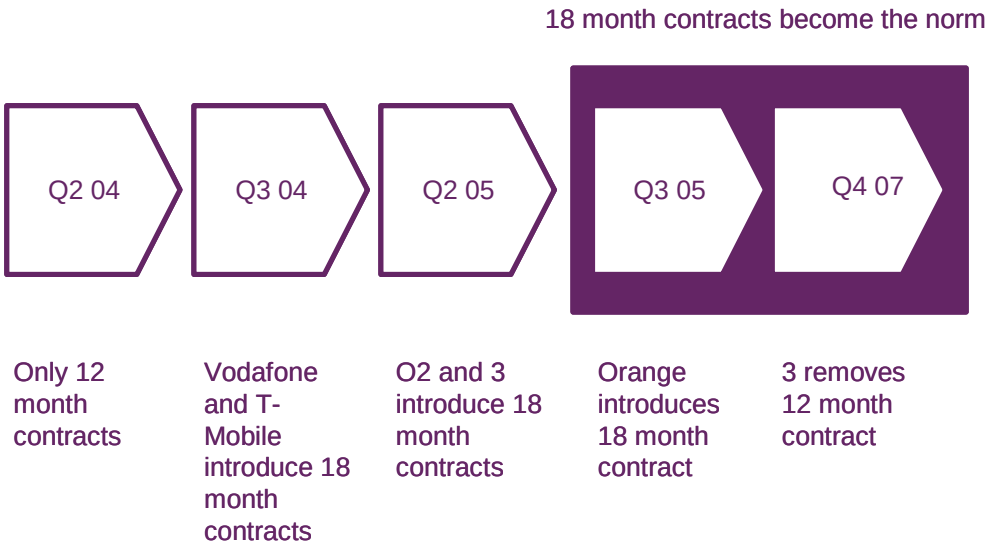
3.32 This trend may also be contributing to the recent increase in consumer complaints. For example, when trying to release themselves from longer contracts consumers can face early termination charges.[24]

Figure 13: Length of new mobile contract connections



Source: GFK
Note: Based on new contracts with handsets, covers 94 per cent of sales

Figure 14: Timeline of the introduction of longer duration price plans



Source: Ofcom
Note: Pricing plan data from Pure Pricing

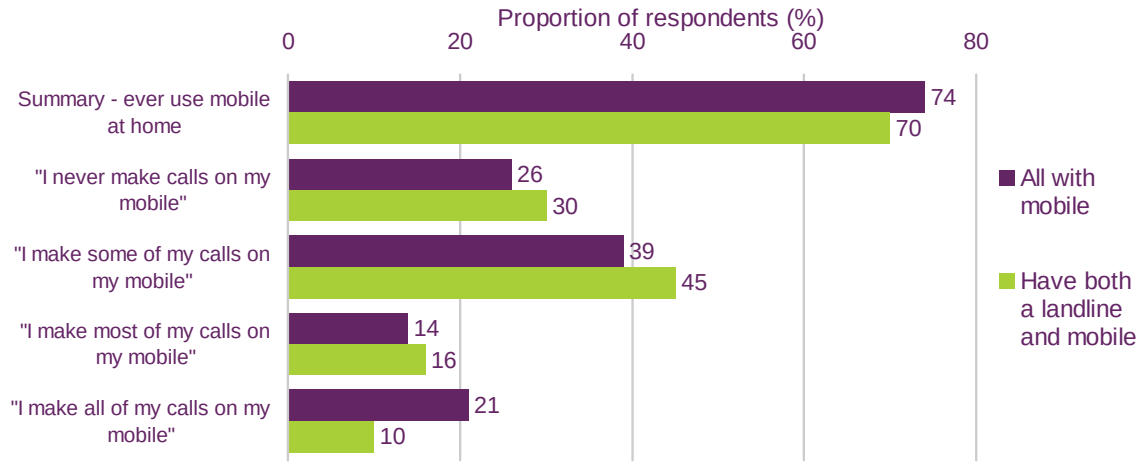
'More for more' drives fixed to mobile substitution

3.33 With bigger bundles and longer contracts, many customers have found themselves able to make more calls for a fixed monthly price for a longer period. This is consistent with the overall rise in the number of calls made using mobile phones, which has increased steadily since 2005 (as shown in Figure 8). The availability of these large bundles, which increasingly apply to any-time, any-network calls, has encouraged greater use of mobile phones in new contexts – for example, in the home.

[24] Ofcom intends to publish a statement on additional charges, including early termination charges in autumn 2008.

3.34 Even though fixed-line operators are increasingly offering 'unlimited' tariffs, Figure 15 shows that over one-quarter (26 per cent) of those users who have a fixed and mobile connection at home claim to use a mobile to make most (16 per cent) or all (10 per cent) of their calls at home.

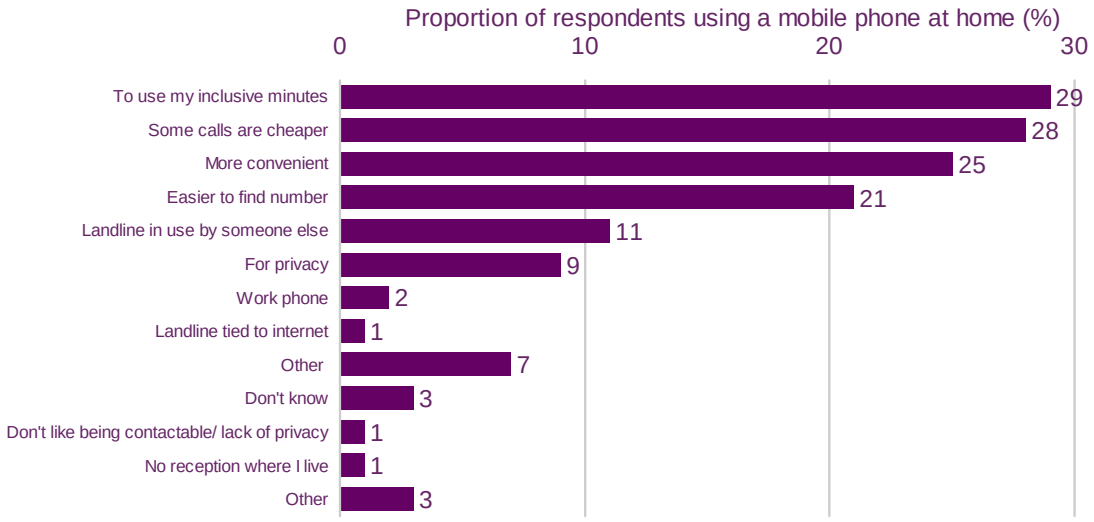
Figure 15: Frequency of using a mobile phone in the home



Source: Ofcom research, February / March 2008
Base: All who use a mobile phone

3.35 As Figure 16 shows, the most common reason users give for making calls at home using a mobile is to use up the minutes included in their tariff plan. Almost as many users claim they are able to make some calls cheaper using a mobile than a fixed line. With the majority of current bundled tariff plans including 'anytime, any network' minutes it is likely that users are taking advantage of mobile to mobile calls being less expensive than fixed-to-mobile calls. A second significant set of reasons consumers report for using their mobile service whilst at home relate to the convenience, ease of use and privacy of mobile communications.

Figure 16: Reasons for using mobile phone while at home



Source: Ofcom research, February / March 2008
Base: All who use a mobile phone at home
Note: Multiple responses permitted

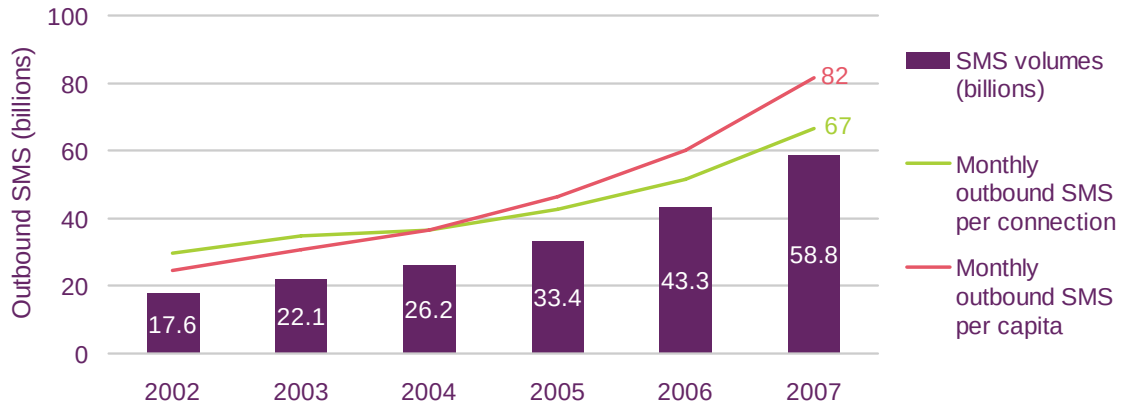
SMS usage is soaring

3.36 We are also using our mobile phones to send text messages – a service that has little direct equivalent in fixed services.[25] The volume of outgoing text messages grew by 36 per cent in 2007 (Figure 17), twice the growth rate of voice minutes (Figure 8).

3.37 In 2007, an average of 67 text messages per month were sent from every UK mobile connection; this compares with an average of 29 text messages sent per mobile connection in France and 20 in Germany in 2007.[26]

3.38 As with voice minutes, the inclusion in bundles of more text messages (or even unlimited texts on some tariff plans such as T-Mobile's *Combi* plans at £30 and above) may be contributing to this growth. However, as shown in Figure 7, out-of-bundle text messaging grew by 11 per cent in 2007 (more than out-of-bundle calls), suggesting that this is not the only factor.

Figure 17: Outbound SMS volumes



Source: Ofcom / operators
Note: Includes estimates where Ofcom does not receive data from operators and excludes H3G; figures have been restated from the 2007 Communications Market Report to reflect more accurate data

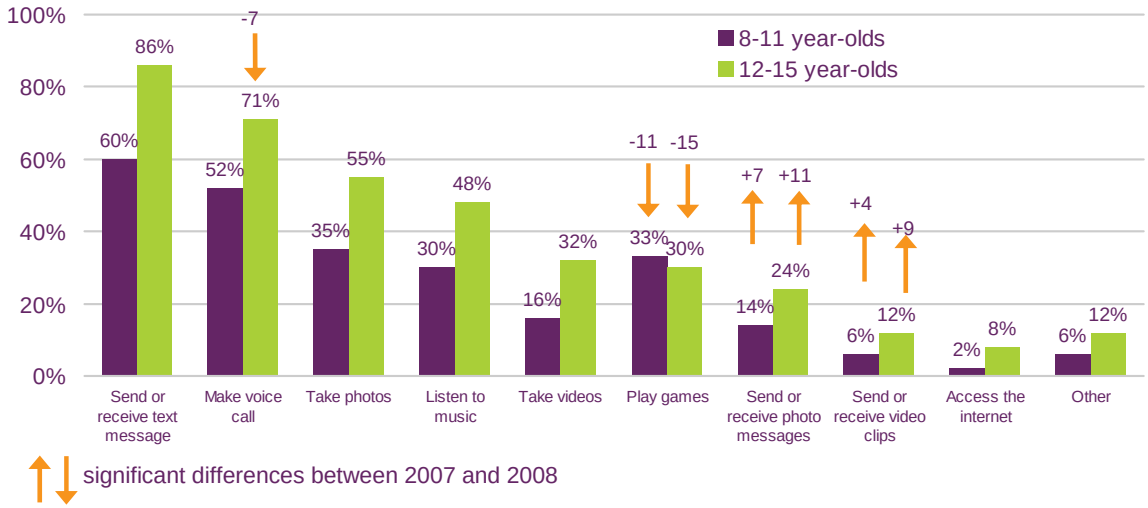
For children, texting is more important than making calls

3.39 Take-up of text messaging has been pronounced among one particular group of mobile consumers: children. The trend of increasing SMS volumes seems set to continue, with children more likely to send a text than make a voice call (Figure 18). A seven per cent decline in the regular use of voice calls suggests that older children are increasingly relying on text as the main way to communicate on their mobile. While part of this may be the additional features of text messaging compared to voice communications (the ability to send one-to-many text messages, and the privacy compared to voice calls which may be overheard), pricing is also likely to be a factor.

3.40 The fixed price of a text message (compared to a voice call which varies with duration) may also help children (or in some cases, their parents) to control the amount spent using a mobile and help prevent 'bill shock' where a user receives an unexpectedly high bill.

[25] Fixed SMS services are available, although take-up has been limited compared with mobile SMS.
[26] Source: Ofcom research / national regulators

Figure 18: Children's use of mobile phones



Source: Ofcom research, fieldwork carried out by Saville Rossiter-Base in April to May 2008
Base: Children aged 8-15 with their own mobile phone (213 aged 8-11, 347 aged 12-15). NB Base too small for 5-7 year olds.
Note: Yellow arrows indicate statistically significant differences from Q2 2007.

Business use is growing, but at a slower rate than for residential mobile

3.41 The use of mobile as a business tool has been a core selling point since the first launch of mobile service in the UK. As well as take-up by individual consumers, businesses have adopted mobile telecommunications as a vital tool for keeping in touch within firms and between firms.

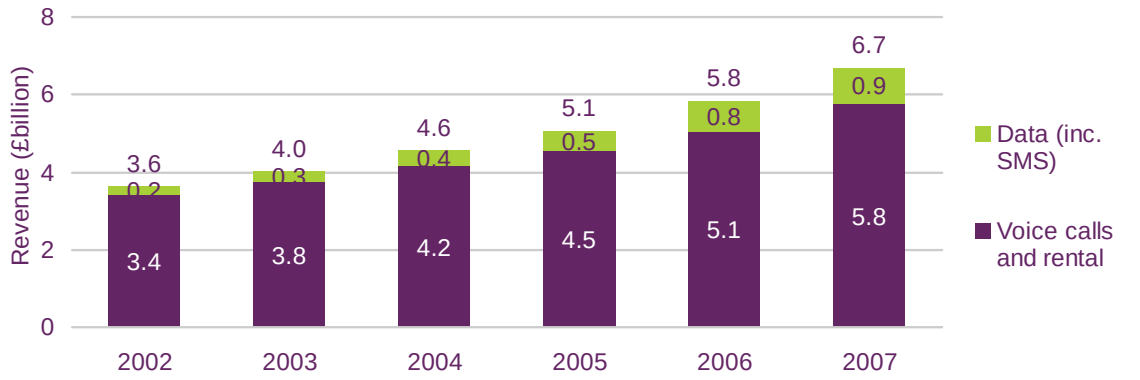
3.42 Voice calls continue to account for the greatest proportion of revenue from business users of mobile services, although revenue from data services (including SMS) is increasing at a faster rate. As in the overall mobile market, more inclusive minutes have led to increasing use of mobile voice by business users – although the rate of increase has not been as marked. Growth in data revenue (including SMS) was partly a result of increasing take-up of devices such as PDAs and BlackBerrys by business users, although growth in 2007 was much lower than the 44 per cent reported in 2006.

3.43 However, as businesses become more reliant on mobiles to function efficiently and take advantage of newer technologies such as push email or mobile internet, they may be particularly vulnerable to 'not spots'. Not spots describe gaps in coverage and lead to familiar issues such as dropped calls. On the established 2G network surveys have indicated steady improvements in coverage, although the remaining gaps that exist are a source of real frustration for those affected. As well as hearing directly from stakeholders, a number of our Advisory Committees (for example, the Committees for Wales and for Scotland) have consistently raised with us the fact that improvements have not reached all areas.[27] It is widely recognised that the 3G network is less extensive, particularly outside urban areas. Although 'not spots' in 3G coverage may not lead to calls being cut off, as the call is passed back to a 2G network, it does lead to dropped high speed internet connections and data transfers.

[27] Ofcom has established separate advisory committees ("Committees") for the nations on the whole breadth of its communications responsibilities in Scotland, Wales, Northern Ireland and for the English regions. These Committees have been established under section 20(1) of the Communications Act 2003. Further information about the Committees and links to information about each of them can be found at: http://www.ofcom.org.uk/about/csg/adv_cmmt_nations/

3.44 Some companies are particularly vulnerable to poor coverage, for example, mobile workforces operating in areas where 3G has yet to roll out extensively. Additionally there may be a larger risk to the overall reputation of doing business in the United Kingdom as experiences from overseas visitors are carried home and compared to their domestic coverage.

Figure 19: Breakdown of business mobile revenue



Source: Ofcom / operators

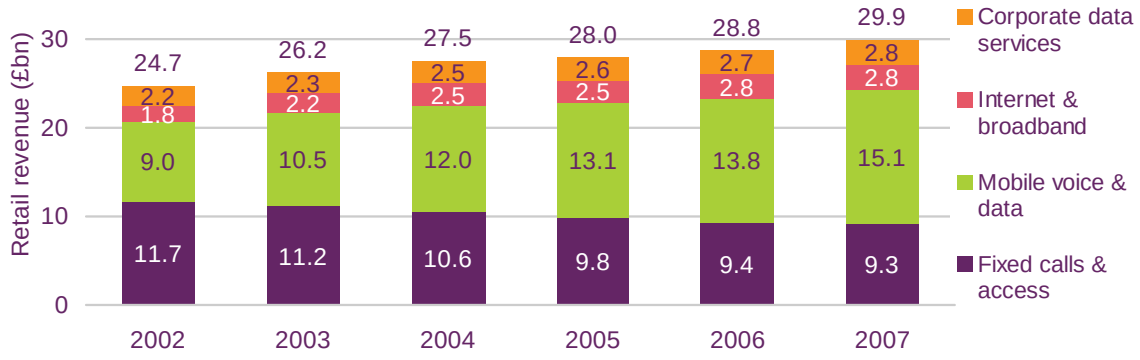
Mobile services are underpinned by a large, complex, integrated industry

3.45 This section begins by describing the phenomenal growth of the mobile communications industry in the UK and elsewhere in Europe. It then goes on to describe the mobile value chain and takes a closer look at competition within the UK mobile sector. This section concludes by identifying some of the major changes that have occurred in the value chain in the recent past.

The mobile industry has grown at home and abroad

3.46 Mobile communications' share of total retail telecoms revenue became larger than fixed in 2004 (as set out in Figure 20). By 2007, total retail revenue from mobile telecommunications was greater than the combined revenues of the fixed telecommunication (residential and corporate) and broadband sectors, and more than half of total retail telecoms revenue.

Figure 20: UK telecoms retail revenue

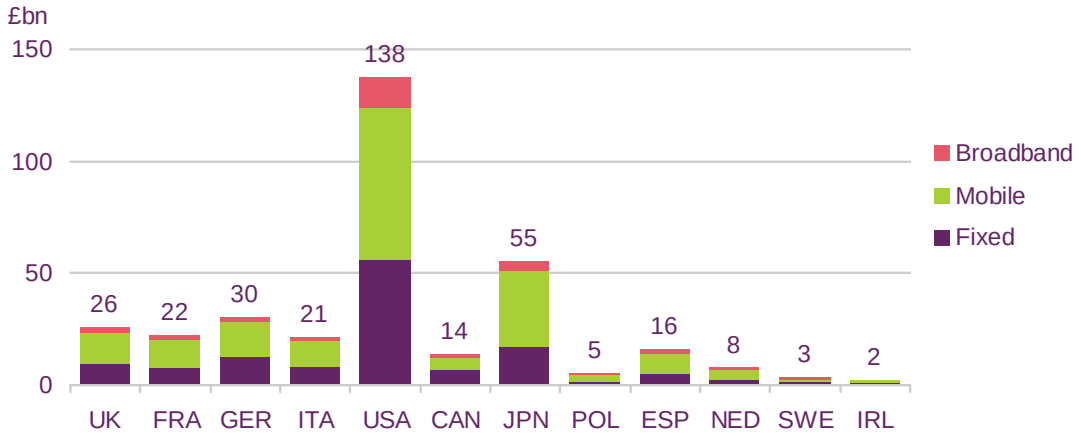


Source: Ofcom / operators

3.47 The growth of the UK mobile sector is mirrored in other developed countries. Among the countries analysed in Figure 21, mobile is larger, by revenue, that the combined fixed and broadband sectors in all countries except Canada and Sweden.[28]

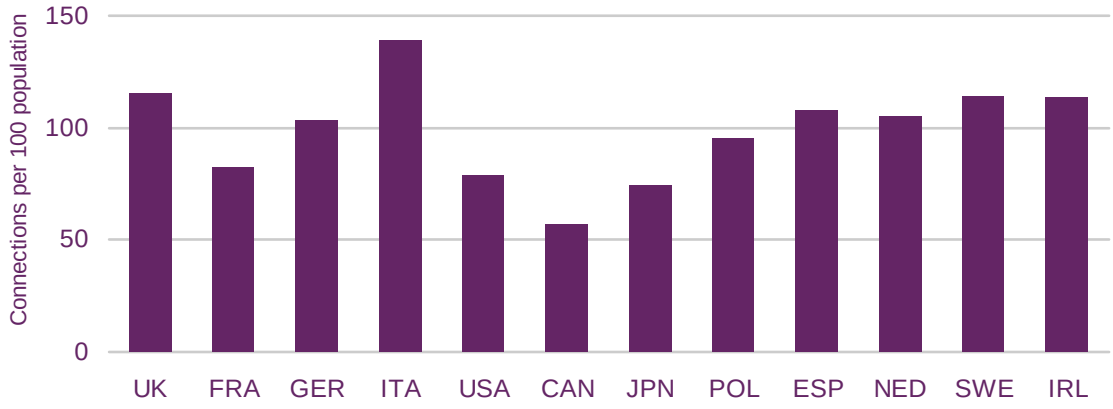
3.48 Within Europe, with the exception of France, many of the other EU member states also have mobile penetration rate of greater than 100 per cent (as shown in Figure 22), demonstrating the popularity that mobile services enjoy over much of Europe. The overall European mobile penetration rate (as of 2007) is 100.7 per cent.[29]

Figure 21: Telecoms revenue by sector, 2006



Source: IDATE / industry data / CRTC / Ofcom

Figure 22: Take up of mobile services, 2006



Source: IDATE / industry data / CRTC / Ofcom

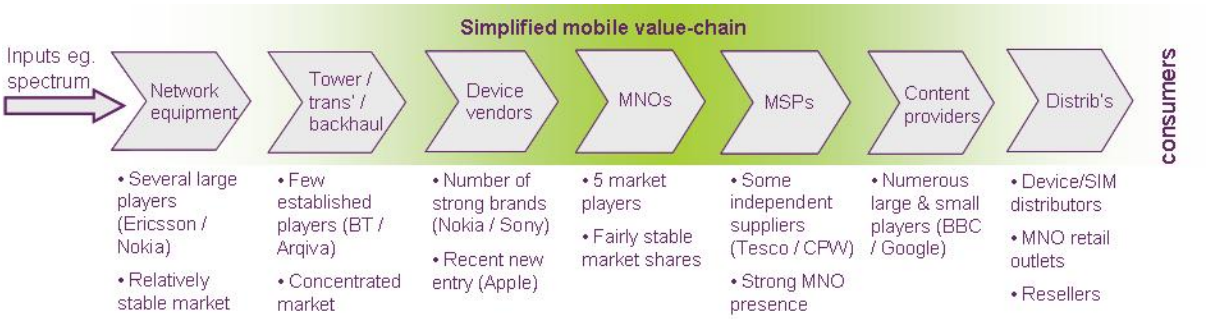
Mobile services rely on a complex value chain with mobile operators at the centre

3.49 In the UK, attention in the mobile sector focuses on the activities of five mobile network operators. However, they are one part of a wider complex set of activities, which are in some cases integrated with the business operating a network, and in

[28] In Canada this reflects lower penetration of mobile services than in comparable countries (e.g. the US) – the tele-geography of a large country with a widely distributed population in some provinces may play a role. In Sweden higher spend on high-speed broadband connections, relatively low-cost mobile and take-up of fixed-line voice services made up the main differences.
[29] Analysys Mason Country Market Data Report, August 2008

others involve a wide range of third-party suppliers. In Figure 23 we provide an overview of the different elements in the mobile value chain.

Figure 23: Simplified mobile value chain



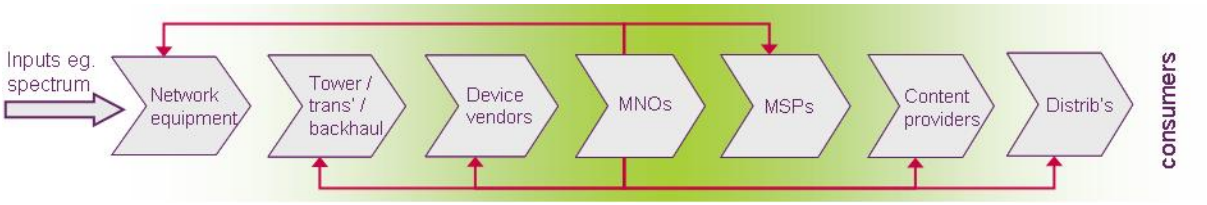
Source: Ofcom / Analysys Mason

3.50 As well as being economically significant in their own right, the mobile network operators have a strong influence on, and are influenced by, other parts of the value chain. MNO relationships with other value chain elements are shown in Figure 24. MNOs interface with other participants in the value chain when they, for example:

- choose network equipment and device vendors, including deciding on the technical features supported in the equipment they purchase. MNOs typically restrict access to their network to the devices that they alone authorise;
- select network sites to house their equipment including potential sharing arrangements with other MNOs;
- partner with selected content providers (and, if they wish, block other forms of content or services);
- establish a distribution channel including potential alliances with existing retail distributors; and
- provide retail services directly to consumers or provide wholesale network services to other MNOs.

3.51 This involvement of the MNOs in many parts of the mobile value chain is one reason for our particular focus on their activities in our Assessment and more generally.

Figure 24: MNO relationships across the value chain



Source: Ofcom / Analysys Mason

3.52 As part of this Assessment, we commissioned Analysys Mason to survey the UK mobile sector. (A full copy of this report is available in Annex 9). In Figure 25 we summarise their description of the UK mobile value chain.

Figure 25: Value chain description

Value chain element	Description
Network Equipment Vendors (NEV)	These firms provide the equipment that comprises the mobile radio network. There are a small number of large international players in this market, with product offerings following internationally standardised specifications. Each vendor can individually decide on features to support in its product line beyond a critical set required for interoperability.
Tower and backhaul providers (TBP)	These firms provide sites for network equipment and connectivity used to link the different parts of the network. While individual sites may be negotiated individually with site owners, large-scale provision of network sites features a few large players who provide locations for use by mobile networks and other wireless players. The backhaul provision industry contains two types of players – providers of leased lines and providers of fixed microwave links. Leased lines are generally provided by existing fixed telecommunication operators while microwave links are provided by the NEVs.
Mobile network operators (MNO)	These are the licensees of mobile spectrum and the operators of the networks.
Mobile service providers (MSP)	These firms enter into contracts with customers for the provision of mobile electronic communications services. This includes the MNOs themselves and the mobile virtual network operators (MVNOs).
Device vendors (DV)	These firms provide mobile devices (handsets, data dongles etc.) that customers need to access mobile services. This segment features a few large international players with products complying with internationally standardised specifications. As in the case of the NEVs, each vendor can individually decide on features to support in its product line beyond a critical set required for interoperability. However, the flexibility provided to device vendors in supporting different features is more restrictive compared to that of the NEVs. In many cases, these firms may be NEVs as well eg. Nokia manufactures both mobile devices and network equipment.
Content Providers	This includes players which generate and aggregate content which can be delivered over mobile networks. The variety of available content provides the opportunity for multiple players to exist in this segment of the value chain.
Distributors	This comprises those players who provide the customer-facing retail function and includes the direct and online sales channels of the MNOs and MVNOs as well as the independent retailers and resellers. While independent distributors were the primary delivery channel in the initial years of the mobile communications industry, recent developments have seen an increase in the MNOs providing their own distribution networks via self branded retail outlets.

Source: Ofcom / Analysys Mason

The scope for entry at different levels of the value chain

3.53 This section briefly describes the scope for market entry at different levels of the value chain.

3.54 Substantial R&D and manufacturing setup costs together with falling equipment prices (see Annex 9) limit entry as a **network equipment vendor**. However, the development of new technologies provides opportunities for entry into niche segments of the market for firms that have essential intellectual property in this area. Even in such cases, successful establishment as an equipment vendor generally requires the support of an established player or a network operator interested in commercialising the technology.

3.55 Entry as a **provider of network sites** requires the identification of sites that are not currently in use and of potential use to network operators. Given the established nature of incumbent networks, the number of unused quality site locations is expected to be small and therefore securing sites for new entrant use may be difficult. However, increasing network sharing by the mobile operators may lead to the elimination of overlapping site locations which in turn could free up some sites.

3.56 Entry as a network **backhaul provider** is potentially more likely if new providers bring to market new technologies to address the increasing backhaul requirements of the mobile network operators (for example, as data traffic grows). The provision of backhaul services to mobile network operators has historically been considered within the context of competition issues in the leased line market (with BT being required to offer radio base-station backhaul services as part of its regulatory obligations).[30]

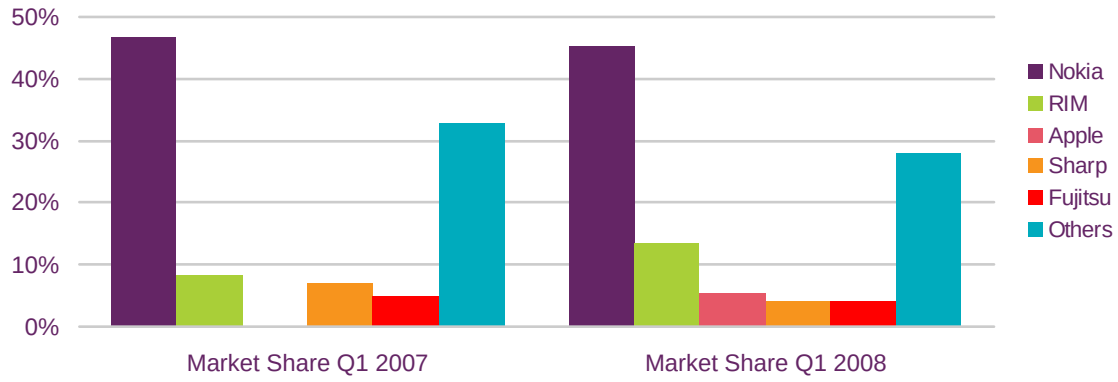
3.57 The high initial capital expenditure required to build a mobile network, combined with the requirement to secure suitable spectrum, inhibits market entry as a new mobile **network operator** (MNO). In addition, what is sometimes described as a saturated marketplace with major international network operators already present makes entry less commercially attractive. However, the release of new spectrum which can be used for new technologies may provide entry opportunities for new players as well as new opportunities for existing ones.

3.58 The ability to enter the UK market successfully as a mobile **service provider** (MSP) (or MVNO) depends on securing access to a mobile network from a network operator (these arrangements are not regulated in the UK). In addition to gaining network access, the entrant must also establish distribution channels and incur considerable expenditure on branding and marketing.

3.59 The largest MVNOs typically bring to market a strong pre-existing brand (e.g. Virgin), and, potentially, a significant retail distribution channel (e.g. Tesco). However, the MVNO market also provides opportunities in principle for entry using novel business models. For example, Blyk has sought to develop an advertising-funded business model targeted exclusively at young consumers.

3.60 There are considerable barriers to entry as a consumer **device vendor** due to the substantial R&D, manufacturing and brand development costs involved. Moreover, the device market features a small number of major suppliers, making it a tough market to enter for new players. One widely-cited new entrant is Apple's iPhone, which quickly attracted wide press, industry and customer attention – and is considered to have influenced the development of handsets by a number of others, including well-established players.[31] As shown in Figure 26, Apple has attained a market share of five per cent in the worldwide smartphone market in less than a year.

Figure 26: Worldwide smartphone market share



Source: Gartner

[30] These rules are currently being reviewed in our Business Connectivity Market Review – see http://www.ofcom.org.uk/consult/condocs/bcmr_tisbo/

[31] See Apple iPhone 3G: Faster … cheaper … slimmer margins, Enders Analysis, 12 June 2008

3.61 Entry as a **content** or **application provider** may have the lowest barriers to entry – but is an area where there is still considerable uncertainty about consumer take-up and likely focus for future services. Given the increasing use of data services, opportunities exist for market entrants with novel services and access to user-desired content (witness, for example, the success of ring-tones as an early content offer). However, the provision of such services often requires the agreement of the network provider expected to carry the service and the availability of handsets to provide the expected user experience. Some operators are expressing interest in enabling third-party access by, for example, offering open application programming interfaces (APIs). It remains unclear whether the mobile broadband environment will open new opportunities for the delivery of innovative content and applications.

3.62 This segment has also been affected by the iPhone and the 'App Store', an online facility that enables iPhone users to download (sometimes for free) a wide variety of applications created by Apple or third-party developers. The iPhone/App Store combination clearly demonstrates the inter-relationship within the overall mobile value chain: innovation in handsets can lead to changes in the competitive dynamics in the service provider market and the creation of an open platform for third-party suppliers may increase opportunities for innovation in the application/content market. It remains to be seen whether this model spreads to other mobile service platforms (as some expect).[32]

3.63 The capital expenditure required to establish a **distribution network** at a time when mobile operators are increasingly moving towards using own distribution channels may make commercial entry unattractive. The presence of multiple online resellers together with the online channels of the MNOs makes entry as an online retailer unattractive as well.

3.64 Figure 27 provides illustrative examples of some recent developments at different segments of the mobile value chain.

[32] See Apple's press release at http://www.apple.com/pr/library/2007/06/11iphone.html

Figure 27: Value chain entrants

Value Chain Element	Entrant	Comment
Network Equipment Vendor	IPAccess Huawei	Femtocell manufacturer Established player in parallel fixed line business
Tower or Backhaul Provider	Geo	Backhaul historically provided by BT (SMP)
Mobile Network Operator	Cable and Wireless	GSM guard band operator using low power spectrum
Mobile Service Provider	Lebara Blyk	MVNOs with niche target consumer segments and business models
Device Vendor	Apple	Established player in computer industry
Content Provider	Facebook	Social networking success story in internet industry
Distributor	e2Save	New entrant in reselling market Absorption of "The Link" by O2

Source: Ofcom

UK operators are part of wider international market

3.65 The UK mobile market shares some important features with other mobile markets in similar countries across the world. Mobile take-up has grown strongly worldwide, with international technical standards (like GSM) playing a critical role in ensuring worldwide adoption.[33] While there are important differences between markets, it is striking that the main features of service offering – such as the structure of pre and post-pay contracts, the offering of SMS alongside voice services – vary little from one market to the next.[34]

3.66 Figure 28 provides an overview of the five UK MNOs. The UK is the only European market where all the major multi-national European MNOs are present, and in the UK there is no single player who is a clear long-term leader in market share. The European footprint of the UK MNOs is shown in Figure 29. It can be seen that all the UK MNOs are part of larger groups operating in a number of European countries.

3.67 In most European countries (and in many other countries throughout the world) the incumbent fixed line operator is one of the main players in mobile telecommunications. The UK is the only major European market where the incumbent fixed line operator does not have a mobile network.

[33] See GSM Association article on worldwide takeup of GSM technology at http://www.gsmworld.com/news/statistics/pdf/gsma_stats_q4_07.pdf

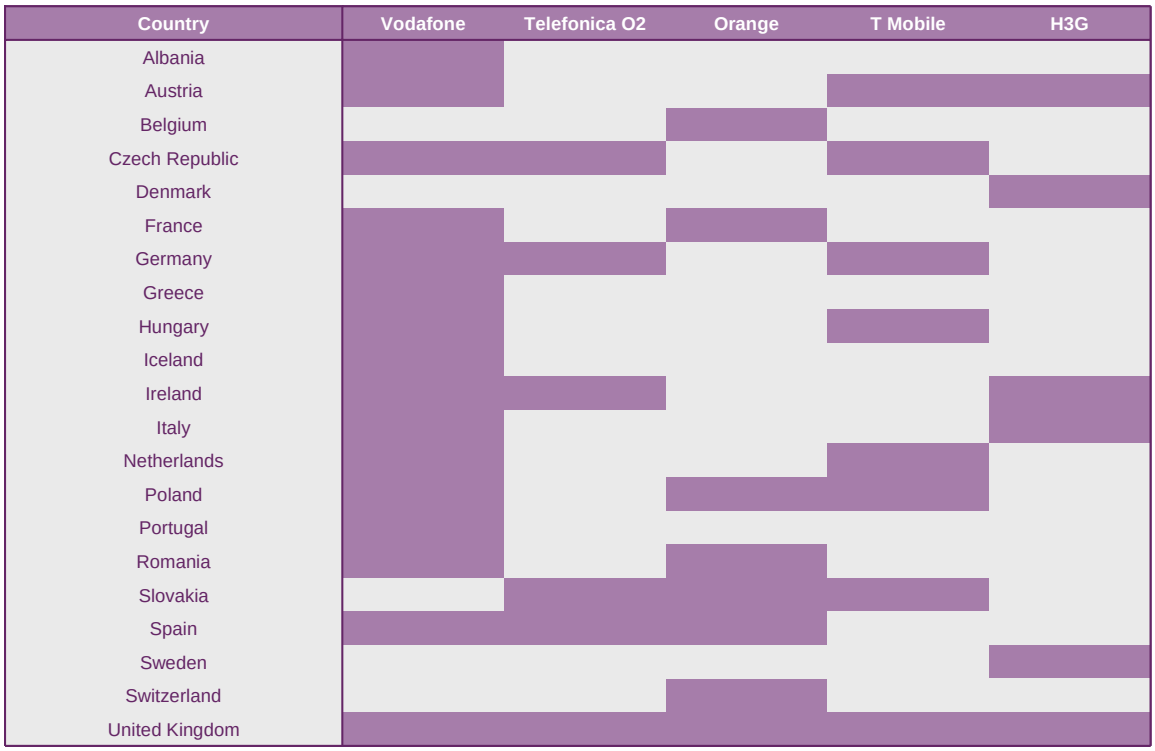
[34] In the interests of brevity, this observation generalises a complex area of international comparison among mobile markets that is outside the primary scope of this Assessment. Those interested in more detail on these issues might want to look at Ofcom's International Communications Market Report (the 2007 edition is available on line at http://www.ofcom.org.uk/research/cm/icmr07/telecoms.pdf; the 2008 edition is likely to be published around November).

Figure 28: UK MNO snapshot

	Vodafone	O2	Orange	T-Mobile	H3G
Subscriptions (millions)	16.5	20	15.7	17.3	4
Retail revenue (billion)	4.1	4.1	3.2	2.7	1.1
Parent company	Vodafone Plc	Telefonica	France Telecom	Deutsche Telekom	Hutchison Whampoa
3G Coverage (%)	Greater than 80	Greater than 80	Greater than 80	Greater than 80	Greater than 80
Fixed Broadband Provided	Yes	Yes	Yes	No	No

Source: Analysys Research and Ofcom estimates where operator data is not reported
Note:
3G coverage denotes population, as opposed to geographic, coverage
O2 subscriber and revenue figures include Tesco Mobile
T-Mobile subscriber and revenue figures include Virgin Mobile
Coverage data from Ofcom

Figure 29: European footprints of UK MNOs



Source: Ofcom
http://www.telefonica.es/acercadetelefonica/eng/
http://www.orange.com/en_EN/group/global_footprint/index.html
http://www.three.com/
http://ghs-internet.telekom.de/dtag/cms/content/TMOI/en/343728
http://www.vodafone.com/start/about_vodafone/where_we_are.html
Note:
Only European countries where UK MNOs operate have been shown
Data includes subsidiary companies and some affiliates

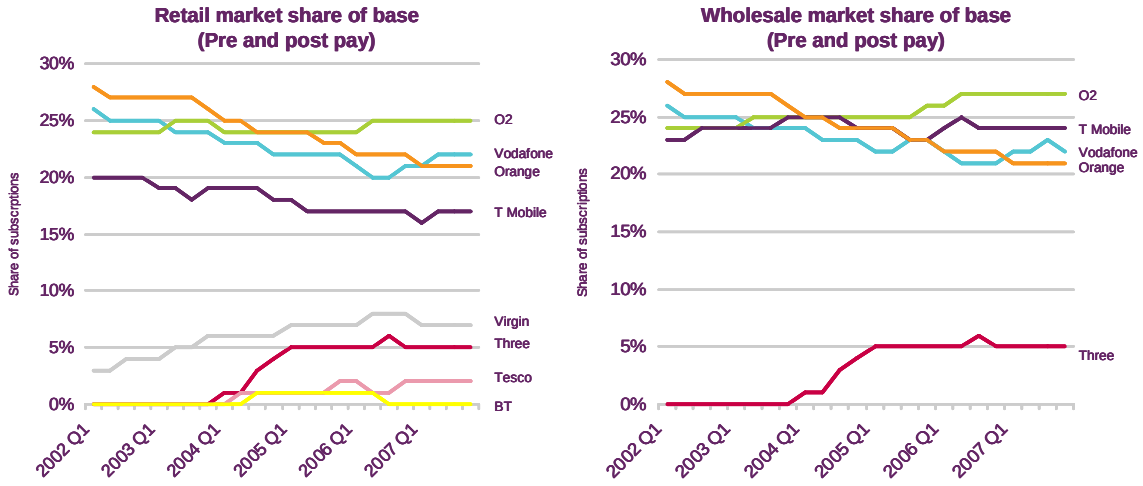
‘End-to-end’ competition is a defining feature of the mobile market

3.68 In the UK as with other markets around the world, a critical distinction between mobile markets and other telecoms markets (such as fixed telephony) has been the presence of end-to-end competition between networks. UK mobile operators have historically controlled all elements of the network (and, generally, marketing and retailing) when providing their services.[35] Interconnection has been required between networks to enable two-way termination of calls and messages, but, in general, networks are not required to offer access to, for example, MVNOs (although some have elected to do so commercially).[36]

3.69 Many commentators regard the UK market as among the most competitive in the world.[37] Retail market shares of the MSPs (that is, the mobile operators and MVNOs) have remained relatively stable over the past several years as seen in Figure 30. One feature of retail market share has been the gap between the four established network operators (all of whom have had more than 15 per cent) and the fifth network operator and MVNOs (none of whom has ever risen above ten per cent). Of course, this picture could change, perhaps considerably, in the future.

3.70 Figure 30 also shows the wholesale market shares – that is, the breakdown of market shares according to the underlying network used to supply services to customers, regardless of who sold the service and who the billing service provider is. Market shares have also been relatively stable on this measure over the past few years.

Figure 30: Retail and wholesale market shares by subscriptions

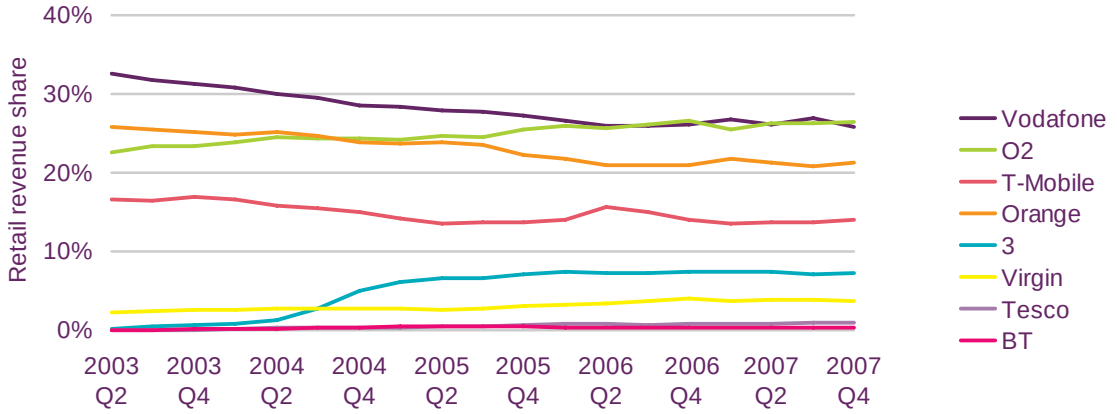


Source: Ofcom / operators

3.71 Figure 31 shows how revenue share of the major retail players has changed over time.

[35] In the early days of mobile Cellnet (today O2) and Vodafone sold wholesale services to retail service providers as a condition in the licences granted in 1993 and 1994. This requirement was subsequently withdrawn.
[36] There are some exceptions to this general principle (in relation to arrangements for national roaming during H3G’s roll-out) which are discussed further in Section 8.
[37] See telecommunications note from Investec Securities on 16 April 2008 and UK Trade and Investment article at http://www.ukinvest.gov.uk/Brochure/10447/en-GB.html

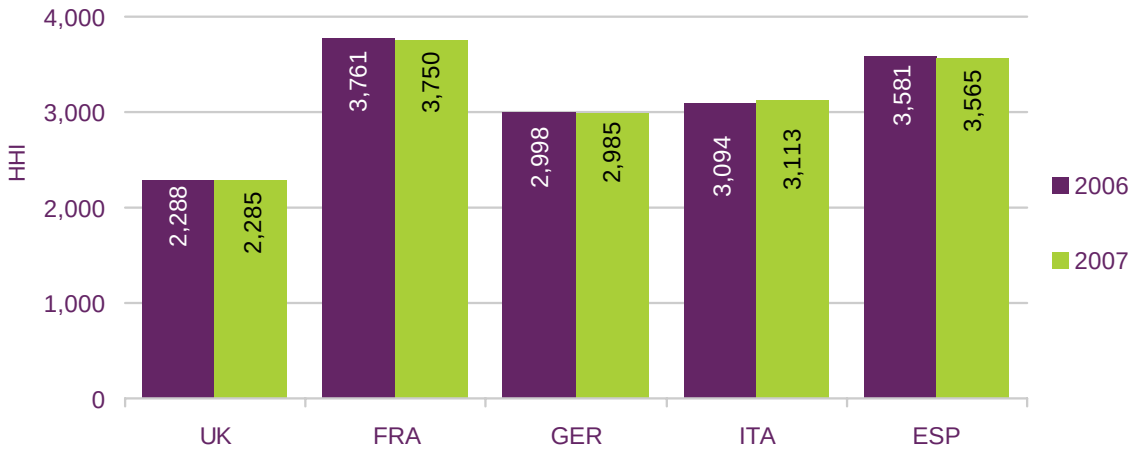
Figure 31: Estimated retail market share by revenue



Source: Ofcom / operators
Note: Includes estimates where Ofcom does not receive data from operators. Independent Service Provider revenue is included in the 'host' mobile operator figure (excluding Virgin, Tesco and BT).

3.72 On a more formal measure of market concentration, the Herfindahl-Hirschmann Index (HHI), the UK market has a lower index than some international comparators but remains (by the OFT's definition as described below) a "highly concentrated" market. However, given the fixed costs incurred during market entry it may be difficult for the market to get below this threshold. Comparison of the UK HHI with mobile markets in similar-sized countries in Europe reveals the UK market to have the lowest HHI for 2006 and 2007. This reflects two features of the UK market - the greater number of players, and the relatively similar distribution among those players compared to other peer markets.

Figure 32: HHI Index for the mobile industry (2006 & 2007)



Source: IDATE /national regulators /OECD /Ofcom research /Informa
Note: The subscriber figures used to calculate the mobile HHI Index are based on wholesale subscriptions only.

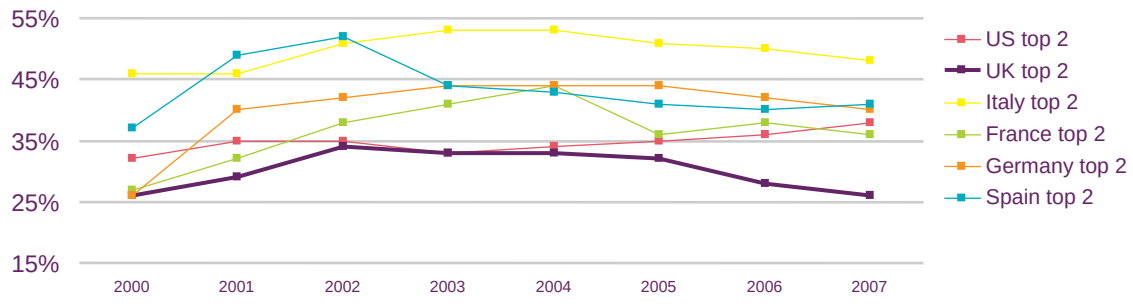
Herfindahl-Hirschman Index of market concentration

The Herfindahl-Hirschman Index (HHI) is a measure of the size of firms in relation to the size of the industry as a whole and is an indicator of the level of competition in a market. The HHI is defined as the sum of the squares of the market shares of each individual firm. As such, it can range from 0 (for a market with a large number of firms with equal market share) to 10,000 for a monopoly.

A lower HHI generally indicates a more competitive market. In the UK the Office of Fair Trading (OFT) is likely to regard a market with an HHI in excess of 1,800 as highly concentrated and a market with an HHI in excess of 1,000 as concentrated. However, it is important to note that this is only the first stage in a competition assessment: some markets may be competitive with very few firms (and hence a high HHI), while competition problems may occur in markets with a low HHI.

3.73 A comparison of the UK EBITDA margins of the 'top 2' players in the UK and other European countries and the US shows that, on this measure, the UK has had the lowest margins consistently for the last eight years.[38] The national EBITDA margin represented here is the average of the EBITDA margins of the top two MNOs in each geographic market.[39]

Figure 33: EBITDA margin comparison



Source: Ofcom

MNOs retain most value in the value chain

3.74 Despite the presence of MVNOs competing for market share at the retail level, it is clear that the centre of gravity of the mobile value chain remains firmly with MNOs and their wholly-owned retail MSP businesses. An analysis of the flow of funds in the mobile value chain is shown in Annex 9.

3.75 It is important to note that the flow of funds approach does not attempt to assess the exact profitability of every single player or group of players in the value chain but rather calculates the 'retained value' for the main participants. This is the share of revenues retained by a market participant after paying for or sharing the revenues with other participants.

3.76 Although an estimate in some areas, it suggests that:

[38] 'Top 2' players have the two highest EBITDA margins in each country considered

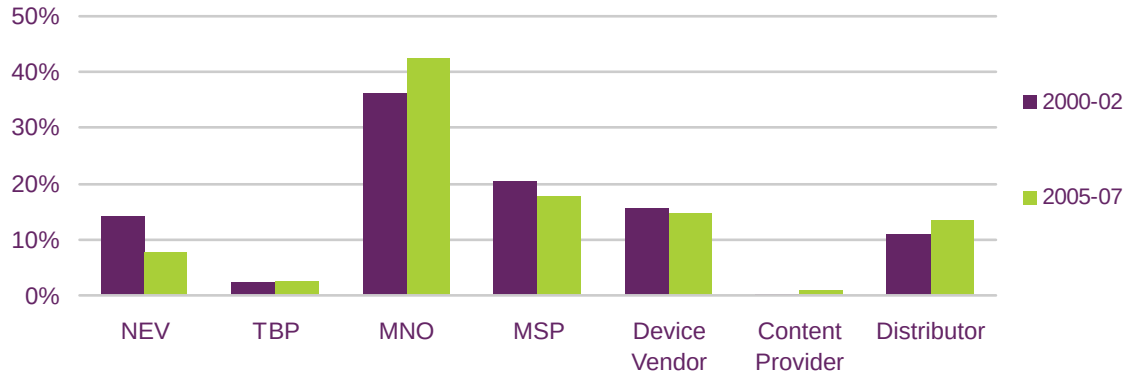
[39] This is obviously, in some senses, an arbitrary measure, but enables a comparison to be made across markets with different numbers of players. It is indicative only and we do not consider it to be an exhaustive measure of relative operating profitability.

- the revenue share of the network equipment providers has seen the steepest drop;[40] and

- network operators, distributors and content providers have all increased their share over the same period.

3.77 Network operators comprise the largest single segment by retained revenue across all the players in the value chain, and this picture has remained stable over a long time (i.e. since 2000). When considered alongside the fact that the five UK operators themselves are also very large service providers, the share of funds flowing through the value chain retained by the operators is evidently large. This has an impact in all of their dealings with other players, including those who are, or who could be, prospective entrants into core MNO/MSP markets.

Figure 34: Retained revenue across value chain



Source: Analysys Mason

3.78 On the other hand, the analysis also reveals that the content providers have experienced the greatest percentage increase in their revenues over the period considered. This may indicate that the value generation in the value chain is starting to shift from the equipment provider to the provider of content that uses that equipment. However, the total share of retained revenue of the content providers remains small.

The mobile market shows some signs of maturing

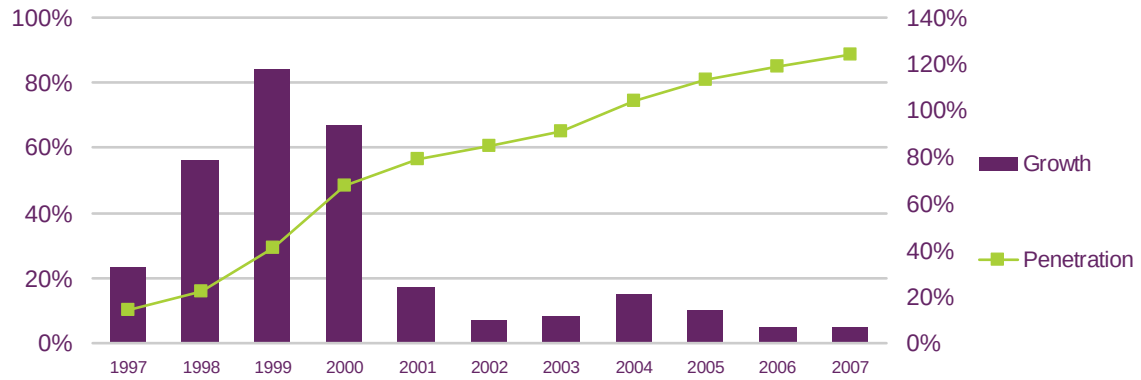
3.79 There are some signs that the UK mobile markets is maturing. Market maturity may act as a spur to innovation as companies seek to escape falling margins by creating new markets. It may also create fresh pressures to find ways to ease competitive intensity - for example, by pursuing mergers that lessen competition.

3.80 As mobile penetration increases, inevitably, growth rates have begun to slow. Figure 35 sets out the evidence of the speed at which the UK mobile sector may be maturing. Classically, market development during the product life-cycle demonstrates an early adopter, late adopter distribution of growth with a steep rise in the middle stages of service introduction (in this case, around the millennium period) followed by an extended period of much reduced growth. The slight increase in the growth rate in 2004 occurred shortly after the entry of H3G in the market with a new service

[40] This is broadly consistent with the costs of equipment falling over time, and the very different trading conditions for equipment vendors in 2000 and 2007. The telecoms market was also affected by the 'telecoms crash' in late 2001/2002 (See IDATE news number 259 titled 'Mobile telecom equipment markets – Handsets, Middleware Platforms and Network Equipment: What prospects?')

offering. After 2004 when penetration rates exceeded 100 per cent, much of the growth has been due to users having multiple subscriptions.

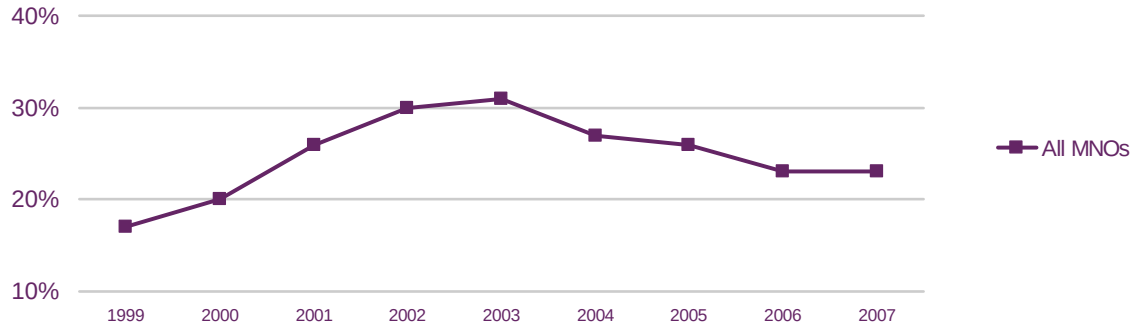
Figure 35: Growth and penetration of UK mobile connections



Source: Analysys Mason

3.81 Figure 36 shows the average aggregated EBITDA margins of the UK mobile operators. The aggregated EBITDA margin of the mobile operators peaked in 2003.

Figure 36: Average EBITDA margin of MNOs



Source: Ofcom
Note: Estimates have been used where figures are not reported

MNOs co-operate in technical and other areas

3.82 The dynamics of competition in the mobile sector are also complicated by the way in which the operators often co-operate in order to deliver mobile services.

3.83 This co-operation takes place in a number of strategically important areas of activity. As an example, the commercialisation of a new product feature generally involves its standardisation, the selection of a partner to develop the customer proposition, establishment of a marketing channel and potential selection of a content provider. While the number and type of activities will depend on the nature of a particular proposal, all of them may involve co-operation between multiple players in the value chain.

3.84 Given the importance of the MNO function in the revenue share across the value chain, the level of co-operation that exists among the players in this segment is of particular interest. Co-operation among mobile operators extends across many areas:

- in order to ensure interoperability and a seamless customer experience, network operators promote the development of technical standards. They may initiate studies in standards fora and industry and academic research institutions in order to address future customer requirements or solve current technical problems. As an example, all the MNOs participate in the global telecommunications standardisation agencies which decide the 2G and 3G standards;

- joint trials of new technologies in order to verify field performance and business viability and ensure inter-operability in cases where the technology is likely to be provided by multiple vendors;

- network asset sharing to reduce capital and operational expenditure and extend coverage to areas where single MNO coverage may not be economically viable. Conformance with local environmental regulations also encourages sharing of some elements of the network; and

- reciprocal charging agreements to simplify customer offers and reduce costs in the case of roaming. This has been particularly popular in the case of MNOs which operate in multiple countries.

3.85 Co-operation among the MNOs and across the value chain can provide multiple benefits to the industry and consumers:

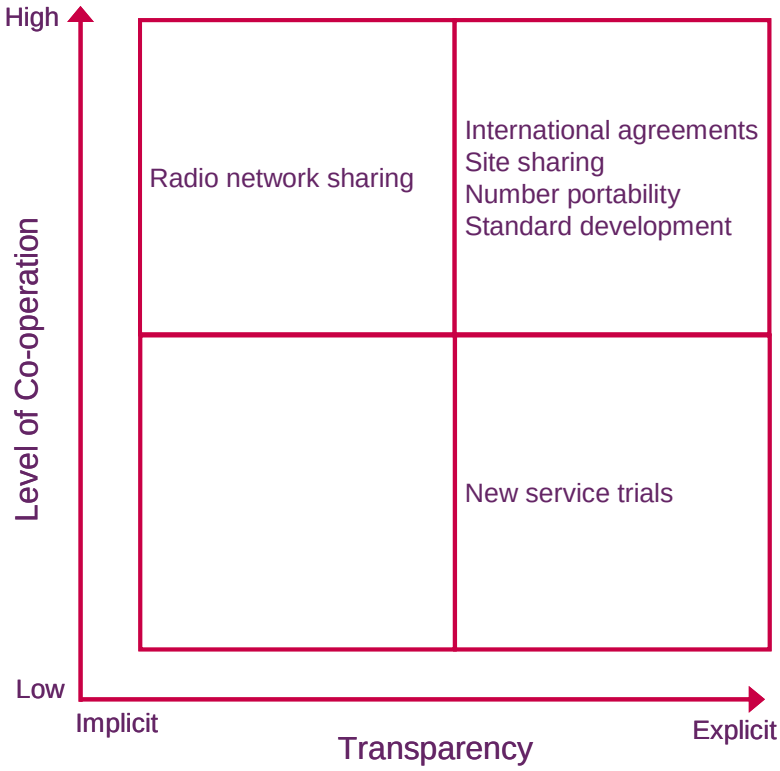
- It has led to the development of common standards and permitted the benefit of scale economies in product development and manufacturing on a global scale. Common standards also foster the creation of a developer community which provides different elements of the dominant design or creates the applications that run on products conforming to the standard.

- It can provide a channel for new innovations to come to the market. As an example, co-operation between a new device vendor or a content provider and one or more MNOs can lead to quicker introduction of new services. Co-operation between multiple MNOs can help ensure that any new service attains the customer base necessary for profitability.

- It can lead to the availability of services in areas where there may not be an economic incentive for a single MNO to provide service. This may be true in thinly populated geographies where a single MNO may not be able to provide service profitably but joint investments between multiple MNOs may be economically viable.

3.86 However, there are risks to competition and to innovation associated with these activities, and co-operation between competitors will always be a subject of particular interest to national competition authorities and regulators. The level of co-operation in each of these different activities and its transparency is specific to the nature of each activity. Co-operation on technical issues tends to be explicit as are the ones which are necessitated and encouraged by external agencies. Any co-operation in operational matters (shared outsourcing, for example) is, by its nature, more implicit - and may be fully visible only to the co-operating parties.

Figure 37: MNO Co-operation



Source: Ofcom

RAN-sharing and other future events may change the nature of the market

3.87 A tangible form of the shift towards increased co-operation in the UK has been the moves by two pairs of operators to share some elements of their access networks:

- on 18 December 2007, H3G and T-Mobile announced their intention to share their radio access networks;[41] and
- on 19 February 2008, Vodafone and Orange announced their intention to engage in access network sharing, involving passive network elements in the first phase of deployment.[42]

3.88 Given the structure of a 3G network as shown in Figure 38, there are several options for infrastructure sharing:

- spectrum sharing;[43]
- sharing network sites, masts and antennas;

[41] See 3's press release at http://www.three.co.uk/news/h3gnews/pressnewsview.omp?collcid=1019745742912&cid=1197535991381

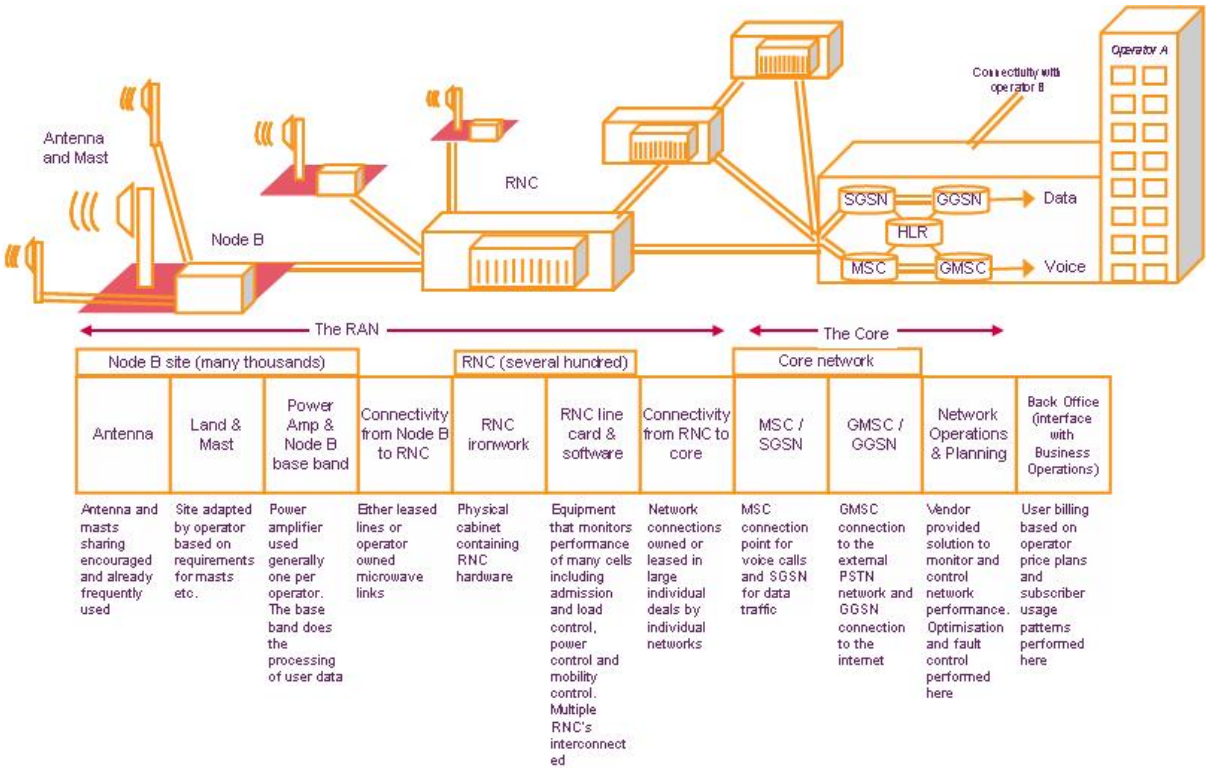
[42] See Orange's press release at http://pressoffice.orange.co.uk/Content/Detail.asp?ReleaseID=759&NewsAreaID=2

[43] Spectrum sharing is the sharing of radio frequencies for wireless communications. Though not, strictly speaking, 'infrastructure sharing', it is included here for the sake of completeness.

- sharing the connectivity elements within the radio access network (RAN) (e.g. using leased lines or high capacity microwave links);
- sharing the connectivity elements within the core network, and between the RAN and the core;
- sharing Node Bs between the MNOs while the radio network controller (RNC) functionality remains logically separate (but co-located) – with or without sharing backhaul;
- sharing RNCs;
- sharing the complete RAN - with or without sharing backhaul;
- sharing the gateway core elements like the mobile switching centre (MSC) and the serving GPRS support node (SGSN), in addition to all elements in the RAN; and
- wholesale supply of services, where a single entity owns the network (core and access) and provides wholesale connections to the service providers requiring access.

3.89 Any practical implementation of RAN sharing is likely to involve utilising one or more of these options depending on the sharing agreements between the MNOs entering into such an arrangement.

Figure 38: 3G Radio Access Network (RAN) and Core Network (CN)



Source: Ofcom

3.90 The effects of RAN-sharing may be felt across the value chain:

- In a competitive equipment market, RAN sharing allows equipment vendors to offer new products targeted at network operators who want to share network infrastructure.[44] The extension of infrastructure sharing to 2G technologies in the near future is likely to provide further opportunities as MNOs upgrade or extend existing networks.

- Site providers may see an impact as MNOs reduce their site requirements in all but areas with the greatest traffic – in an area of the value chain undergoing significant change already.[45]

MVNOs have played a role in market development but with a few exceptions remain niche players

3.91 The most popular variant of network 'sharing' (in the widest sense) in the UK has been the purchase of wholesale access by MVNOs. The UK mobile communications market has seen the entry of multiple MVNOs such as Virgin Mobile and Tesco Mobile over the last decade. Currently, MVNOs' aggregate market share remains less than 15 per cent (Figure 39). Figure 40 shows the market shares of three UK MVNOs – Virgin and Tesco which are MVNO businesses with strong retail brands, and BT's mobile business.

Figure 39: Aggregate MVNO market share as a percentage of subscriptions

Source: Ofcom

3.92 Following the success of the initial MVNOs, a number of other companies launched similar services. Fierce competition and market maturity have meant that these new entrants have had limited success, while some have been forced to exit the market. Some of the new entrants have also suffered due to the absence of a strong retail brand. The experience of Danish incumbent TDC, which entered the UK MVNO market in partnership with easyGroup, is a particular instance of an investor in a UK MVNO that was forced to retreat from the UK market due perhaps in part to competitive pressures.[46]

3.93 In September 2007 Blyk, a MVNO founded by a former Nokia executive, launched an advertisement-funded invitation-only mobile service targeted at 16-24 year old customers.[47] Success in continental Europe prompted Lebara, headquartered in

[44] See Nokia's press release on the launch of multi-operator radio access network product at http://press.nokia.com/PR/200105/822167_5.html
[45] See information on the NGW/Arqiva merger at http://www.competition-commission.org.uk/Inquiries/ref2007/macquarie/
[46] See TDC's press release at http://tdc.com/publish.php?id=8260
[47] http://www.blyk.co.uk/

London and already operating in multiple European markets, to enter the UK market with special offers aimed at immigrant communities.[48]

Figure 40: Selected UK MVNOs

	Virgin	Tesco	BT
Market Share (%)	6.0	2.1	0.4
Host MNO	T-Mobile	O2	Vodafone
Launched	Nov 99	June 03	Nov 03

Source: Ofcom

Few new network operators have entered the market

3.94 The 1781.7/1880 MHz (ex-GSM/DECT guard band) licence auction held in early 2006 raised the potential for the entry of multiple new players in the mobile communications market, using relatively small amount of spectrum with specific conditions (shared access to the same frequencies, low power). These frequencies enable the provision of mobile communications using low power devices and are thus likely to be most useful for indoor applications. The twelve licence holders following those this auction are shown in Figure 41. These services are now coming to market, using the spectrum that they acquired as part of the auction.

Figure 41: UK GSM guard band licence auction winners

BT	**Cable & Wireless**	**Colt Telecom**
Cyberpress Ltd	**FMS Solutions Ltd**	**Mapesbury Communications Ltd**
O2	**Opal Telecom**	**Teleware**
PLDT	**Shyam Telecom**	**Spring Mobil AB***

Source: Ofcom
*Note: * Traded to OnePhone UK Ltd*

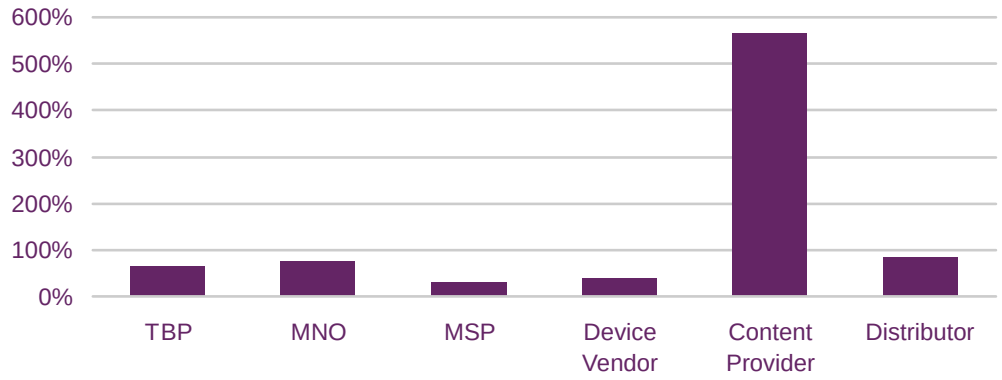
3.95 As an example of the type of services made possible by the release of new spectrum, Cable and Wireless have recently launched a converged mobile network for enterprises in the UK by combining their fixed network and GSM guard band licences with a national roaming agreement with Orange.[49] Unlike unlicensed mobile access (UMA) products (like BT Fusion) [50], this service uses conventional GSM handsets which route calls via the fixed broadband network while the user is indoors, and hands the call over to the cellular network when the user is outdoors.

[48] http://www.lebara-mobile.co.uk/en/index.php
[49] See more information on C&W's offering at http://fmc.my-cw-portal.com/fmc/fmc.html and Orange's announcement at http://pressoffice.orange.co.uk/Content/Detail.asp?ReleaseID=761&NewsAreaID=2
[50] http://www.bt.com/btfusion

Content and application providers are growing fast, but from a small base

3.96 As Figure 42 shows, the part of the value chain that has seen the greatest revenue growth is in content provision. While there remains considerable uncertainty, the uptake of 3G services, availability of advanced handsets and the increasing use of the mobile phone for data services all have the potential to fuel the demand for more content on mobile platforms. While revenue growth in this segment has been strong in percentage terms, the total content market is still very small compared to other elements of the value chain.

Figure 42: Revenue increase across value chain (2000 to 2002 and 2005 to 2007)[51]



Source: Analysys Mason

3.97 If the mobile market is moving towards growing data and internet-based services, content (and application) vendors are likely to have a very significant role to play in its future development. An important ingredient in the provision of these services is easily available, fast, ubiquitous mobile broadband. In 2008, the first signs of mobile broadband as an effective option for consumers were visible.

More changes are on the way

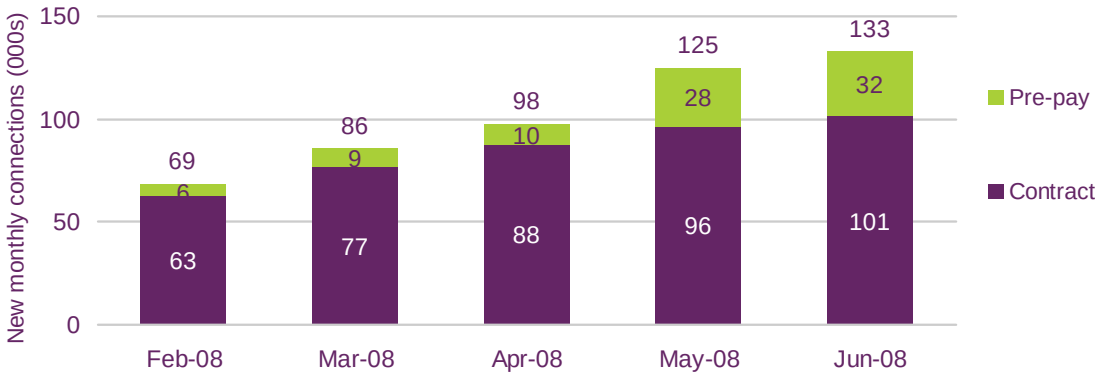
3.98 This section describes some recent developments in the UK mobile communications industry.

Growth of mobile broadband

3.99 Although voice revenues predominate, operators are increasingly focused on driving usage and revenue growth from non-SMS based data applications. More recent focus has been on mobile broadband over data-cards and USB dongles that provide internet connectivity for laptops using higher speed 3G services. This is in addition to already available data services on mobile handsets. Recent sales data indicate there has been rapid take-up of mobile broadband dongles.

[51] See also Figure 34 shown in Section 3.

Figure 43: New mobile broadband connections



Source: GFK retail data (includes only consumer channels)

3.100 Although it is early in the market's development, the promise of mobile broadband is hard to ignore – promising the freedom and ease of use of the public internet with the ubiquity, portability and popularity of mobile devices. It also carries the prospect of increasing the scope for competition between mobile and fixed broadband providers, thereby benefiting consumers.[52]

3.101 Evidence about the rapid take-up of mobile broadband services is striking. For example, by July 2008, nearly one quarter (23 per cent) of people who access the internet away from home or work said that they did so using a USB dongle or datacard – almost as many as did so using their mobile phone (31 per cent).[53] As well as contracts for mobile broadband services, a pay-as-go-market appears to be emerging.[54] If these patterns of take-up become widely established, mobile broadband services could well become a significant influence in the wider picture of the UK broadband market.

3.102 Most important, in terms of benefits for UK consumers, is the prospect that mobile broadband might prove as effective a catalyst for innovation and market development as fixed broadband was in its own context. It is too early to judge this question and currently there remains considerable uncertainty about the role mobile broadband will play.

3.103 The development of a true mobile broadband 'ecosystem' may also change the underlying relationships between different parts of the mobile value chain, in ways that are difficult to predict. The development of fixed broadband services has created tremendous value for consumers and for suppliers of content and applications, enabling an explosion in the use of an always-on connection to the internet as a medium for delivery of an immense variety of content and services.

3.104 Of course, there are also important qualifiers to this promise, and mobile broadband may not fulfil its potential. For example, capacity and traffic management issues are very differently handled on mobile and fixed networks, given the need to manage the risk of harmful interference and manage networks to deliver services to users on the move. Providers will also need to be careful in their management of customers'

[52] Ofcom has recently reviewed the regulation applying to wholesale broadband access markets, concluding in May 2008. Those interested can find our final decision and statement at www.ofcom.org.uk/consult/condocs/wbamr07/statement/statement.pdf
[53] UK Communications Market Report 2008 ('CMR08'), at Figure 2.8 (the full report is available at http://www.ofcom.org.uk/research/cm/cmr08/).
[54] Communications Market Report 2008, page 71.

expectations, particularly given the widespread frustration felt by many customers over (fixed) broadband migration and speeds already.[55] In some cases, charges imposed by operators for international roaming and usage in excess of package limits have led to so-called 'bill shock' whereby mobile broadband consumers receive unexpectedly high bills. This may also affect consumers' perceptions of mobile broadband services.

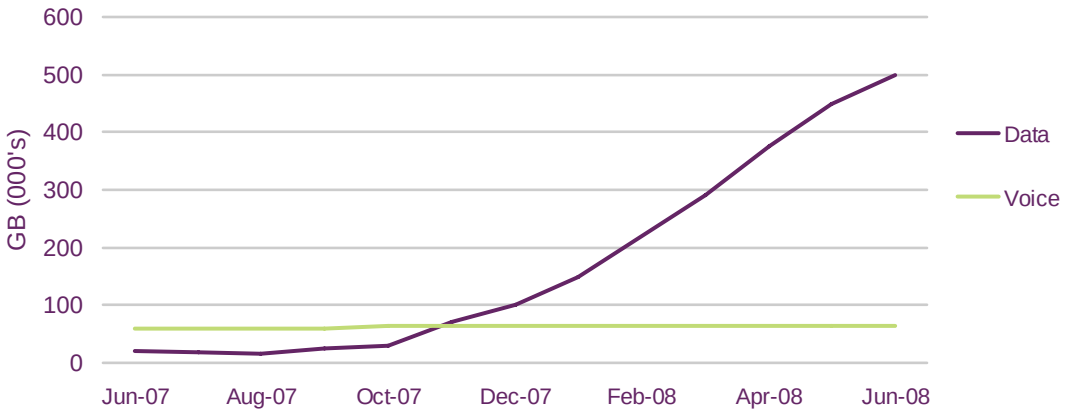
Data usage can drive network efficiencies but also lead to additional costs

3.105 One important feature of a shift to data services is that the steady increase in the uptake of mobile broadband services can, in the longer term, permit MNOs to realise economies of scale when providing data services. Over time, this may in turn lead to lower prices, enabling a 'virtuous circle' of falling costs.

3.106 In the short term, however, it is possible that there may be significant capacity constraints on the growth of mobile broadband, although so far consumer concern about this issue (at the time of this assessment) has been muted. As can be seen in Figure 44, at least one operator's publicly released traffic figures suggest that growth in data traffic may quickly outstrip the capacity needed for voice services. Of course, uncertainties about demand and the patterns of user behaviour mean that, in our view, this issue is too early to call.

3.107 Rapid growth in data services is likely to require investment to expand network capacity, both on the radio access side (via new technologies, more sites and extra spectrum) and on the backhaul network. Given the substantial expenditure that MNOs currently undertake for leased line based backhaul, upgrades to cheaper backhaul products or even self-supplied backhaul products may become more plausible.[56]

Figure 44: Monthly network traffic volume on the H3G network[57]



Source: H3G

[55] Ofcom set a general condition regulating migration between fixed broadband services on 13 December 2006 (http://www.ofcom.org.uk/consult/condocs/migration/statement/statement.pdf). Ofcom's code of practice for internet service providers (ISP) to ensure clarity of broadband speeds to consumers at http://www.ofcom.org.uk/media/news/2008/06/nr_20080605

[56] See Analysys Mason report in Annex 9

[57] Presentation by Kevin Russell, CEO, H3G http://www.westminsterforumprojects.co.uk/mediaforum/slides/krussell.pdf

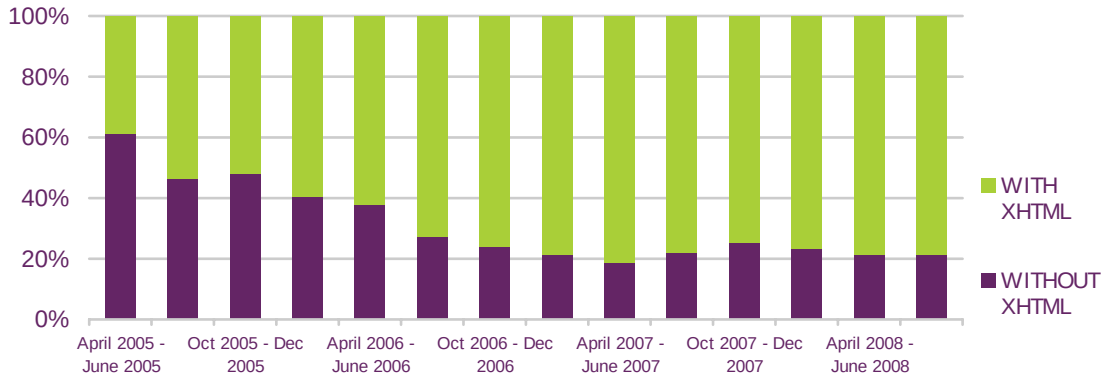
Smartphones have become increasingly popular

3.108 Selling new types of mobile services requires, by definition, devices capable of delivering the functions that users value. For more advanced mobile data services, 'smartphones' are increasingly an element of the overall service package that consumers are taking.

3.109 Usage of non-message data services is strongly dependant on the capabilities of the mobile handset (e.g. screen size, connection speed, user interface) as well as the type of browser software installed. Historically, mobile handsets were equipped with only Wireless Markup Language (WML) browsers, which were only capable of accessing customised Wireless Application Protocol (WAP) websites.

3.110 The development of 3G networks and the data services they enable has led to the availability of Extensible Hypertext Markup Language (XHTML) compatible browsers in mobile handsets. These browsers are capable of accessing a significant proportion of content from the open internet and are not restricted to websites customised for mobile devices. Figure 45 shows that the proportion of mobile handsets sold that have XHTML capability has seen steady increase over the last couple of years.

Figure 45: Proportion of XHTML-enabled mobile phones



Source: GFK
Note: Based on all contracts with handsets, covers 92 per cent of sales

New spectrum for mobile services is coming to market

3.111 Growth in mobile services increases demand for suitable spectrum to meet customer demand. As more spectrum becomes available, it is likely to have a profound impact on the options for market entry or development of new and existing platforms available to all players. Spectrum issues will therefore remain critical to the development of competition in mobile markets. Conversely, of the uses likely to generate value from more efficient allocation of spectrum, public mobile services may be the most significant.[58]

3.112 Ofcom has for some time been pursuing a spectrum strategy focused on replacing previous 'command and control' mechanisms of spectrum allocation with market-based mechanisms, and liberalising rules on spectrum usage where possible.[59]

[58] See, for example, the analysis of value generated by use of spectrum in the UK by sector in the *UK Communications Market Report 2008*, at Figure 2.55 drawing on work done by Europe Economics in March 2006 (full report available at http://www.ofcom.org.uk/research/cm/cmr08/)
[59] Spectrum Framework Review http://www.ofcom.org.uk/consult/condocs/sfr/sfr2/sfr.pdf

3.113 Key elements of this strategy include:

- prompt release of spectrum that is available for new users, to create opportunities for entry and innovation, and secure more efficient use of spectrum;
- the liberalisation of spectrum bands already in use, to enable for efficient use to be made. Ofcom has already liberalised a number of licences and is planning (subject to European legal requirements and careful consideration of the effects on competition) to liberalise the 900 MHz and 1800 MHz brands presently used for GSM;
- introducing spectrum trading; and
- extending pricing to spectrum that has been awarded in the past (other than by auction) to ensure users are aware of the opportunity costs.

3.114 Early in 2008, we reviewed our progress in implementing this strategic framework, re-affirming our intention to have at least half the spectrum available in the 0 -3 GHz range (most well-suited for mobile services) allocated using market mechanisms by 2010.[60]

3.115 We are also pursuing a policy of making available spectrum that is unused or underused. The 2.6GHz band is particularly significant in this regard for mobile services as (a) it is significantly underused; (b) it has been designated for harmonised mobile use across the EU; and (c) by virtue of the bandwidth available it offers scope for new entry and for the development of new technologies and services. Ofcom decided in April 2008 to auction spectrum in the 2.6GHz band as soon as possible.[61]

3.116 Finally, the move from analogue to digital television will lead to the release of a significant amount of low frequency spectrum which can also be used for mobile services – the 'digital dividend'.[62]

3.117 Figure 46 and Figure 47 provide an overview of the spectrum currently used and potentially available for mobile services.

[60] The progress report is available at http://www.ofcom.org.uk/radiocomms/sfr/sfrprogress. See also the UK Communications Market Report 2008, Figure 2.54. (The full report is available at http://www.ofcom.org.uk/research/cm/cmr08/)
[61] See our statement of 4 April 2008 available at http://www.ofcom.org.uk/consult/condocs/2ghzrules/statementim/
[62] http://www.ofcom.org.uk/radiocomms/ddr/

Figure 46: Spectrum already in use for mobile telecommunications

Spectrum Band	Current Use
2.1 GHz 1920 MHz to 1980 MHz 2110 MHz to 2170 MHz	3G mobile services (Orange, O2, Vodafone, H3G & T-Mobile)
1.8 GHz 1710 MHz to 1781.5 MHz 1805 MHz to 1876.5 MHz	2G mobile services (Orange, O2, Vodafone, & T-Mobile)
GSM guard band 1781.7 MHz to 1785 MHz 1876.7 MHz to 1880 MHz	Mobile services
900 MHz 880 MHz to 915 MHz 925 MHz to 960 MHz	2G mobile services (O2, Vodafone)

Source: Ofcom
Note: Only 3G paired spectrum bands are shown. Unpaired 3G spectrum is 1900 MHz to 1920 MHz.

Figure 47: Spectrum potentially available for mobile telecoms (selected bands)

Spectrum Band	Available Bandwidth	Current Use	Timing of availability
2.6 GHz	205 MHz 2500 to 2690 MHz 2010 to 2025 MHz	Vacant (Temporary or minor use only)	Now
Digital Dividend	128 MHz and 16 MHz interleaved 550 to 630 MHz 790 to 854 MHz	Mainly TV broadcasting	From late 2012
3.4 – 3.6 GHz	Not decided (Up to 160 MHz)	Mainly defence	Not decided, but could be near future
2 GHz MSS	1980 to 2010 MHz 2170 to 2200 MHz	Vacant (Temporary or minor use only)	Possibly 2009
Other bands may also become available in the future, for example in the 2.7 to 3.1 GHz band which is the subject of a current study			

Source: Ofcom

Note: A number of other spectrum bands have licences that are already available on a fully tradable, application and technology neutral basis. Any of these have the potential to be used for mobile telecommunications.

Markets and technology continue to change

3.118 At the same time, new forms of mobile technology are being developed that may have a significant effect on the range of services on offer in UK mobile markets. Here we briefly discuss two of the most significant technologies, Worldwide Interoperability for Microwave Access (WiMAX) and Long Term Evolution (LTE), both designed to provide high speed data services based on an internet protocol (IP[63]) based architecture to support better, faster and more varied mobile applications.

[63] IP is the protocol used to route traffic on the internet

3.119 WIMAX is a technology that is standardised by the Institute of Electrical and Electronic Engineers (IEEE) in the US.[64] The technology has multiple variants – a static version suitable for fixed wireless access and wireless backhaul applications and a version with full mobility support. Commercial rollout of WiMAX has already been announced in a number of countries, for example in the United States by Sprint. In the UK, WiMAX is currently being trialled by multiple service providers and several stakeholders have come forward as potential new entrants using WiMAX and the 2.6GHz band to provide mobile broadband services. The key features of the technology include:

- peak uplink/downlink data-rates that are much faster than existing 3G technologies;
- optimised for packet-data traffic; and
- multiple bandwidth deployment.

3.120 LTE, a technology currently being standardised in the 3G standardisation forum Third Generation Partnership Project (3GPP), is intended to provide a seamless upgrade to 4G services beyond today's 3G and GSM applications.[65] Industry views vary on the issue but a majority of commentators expect LTE to be commercially available in approximately two years. The key features of this standard include:

- peak uplink/downlink data-rates that are much faster than existing 3G technologies;
- low service latency;
- optimised for packet-based traffic;
- multiple bandwidth deployment from 1.25 MHz to 20 MHz with the ability to deploy adjacent to Wideband Code Division Multiple Access (WCDMA); and
- ability to reuse existing network sites.

3.121 While significant commercial deployment of LTE is unlikely before 2010, it may well be a technology of choice for a range of existing MNOs internationally. Some MNOs that currently have different legacy systems in operation (both CDMA/EV-DO and GSM/UMTS) have reported plans to align their future network strategies around LTE.[66]

Femtocells are a new technology that may lead to networks becoming neither fully fixed nor fully mobile

3.122 As well as large-scale technological developments like WiMAX and LTE, smaller-scale consumer technologies are also beginning to be deployed. These bring the promise of more efficient use of network elements between fixed and mobile networks, as well as new competitive options for new and existing players. One example of this type of innovation is the femtocell.

[64] The IEEE is an international organisation developing multiple electronic and electrical standards. Further information can be found at http://www.ieee.org/web/aboutus/home/index.html
[65] 3GPP is an organisation founded by the collaboration of many national standards organisations. Further details can be found at http://www.3gpp.org/
[66] See Verizon Wireless' press release at http://investor.verizon.com/news/view.aspx?NewsID=872

3.123 A femtocell is a miniature, low power base station intended to improve 2G or 3G indoor coverage. When the user is in their home, all calls are routed via the user's home broadband connection to the core network of the operator supplying services. When the user is away from home, calls are routed like a normal mobile call. The user's mobile network retains control of the call or data transmission at all times but a different route is chosen for the user's data depending on the user's location.

3.124 In addition to improving indoor coverage for the owner of the femtocell, they may have other benefits e.g. to:

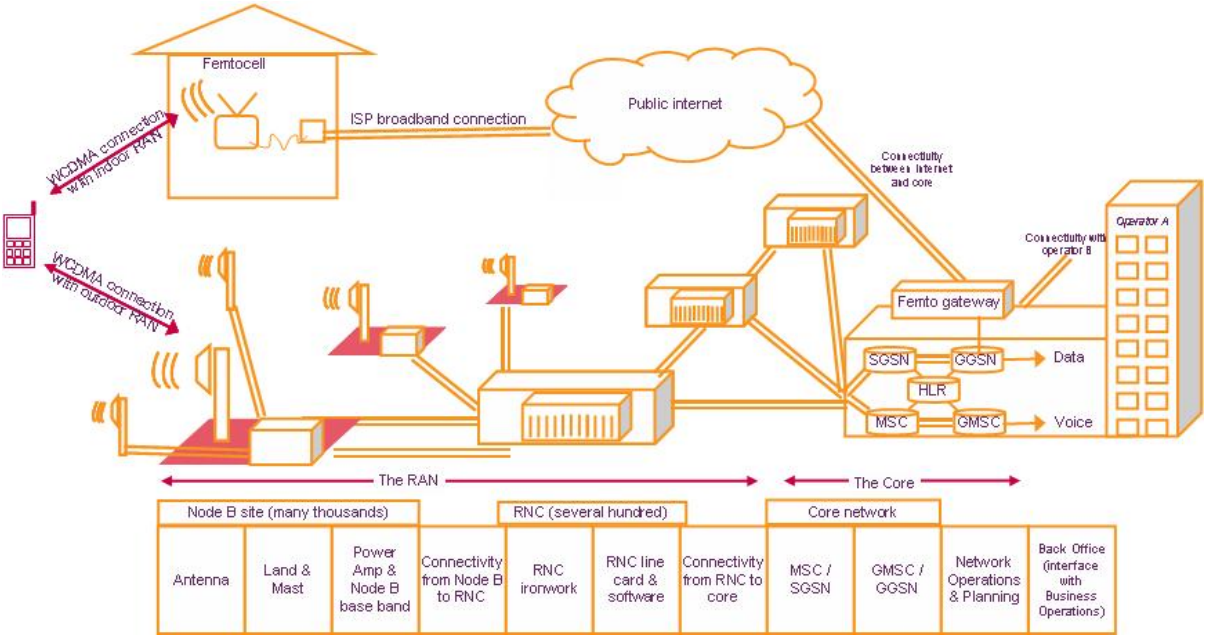
- enable MNOs to charge different prices for calls made while indoors and those made while outdoors. This can be used to enable efficient 'home zone' pricing more precisely than currently possible;
- enable the user to use a single handset to make calls via the cellular network or his home broadband connection; and
- enable MNOs to offload traffic from their cellular networks. This spare capacity can then be potentially used to introduce other services. This may also reduce the need to invest in capacity expansion of the macro-cellular network which is a substantial expenditure for an MNO with large geographic coverage.[67]

3.125 Proponents of femtocells claim that femtocells may also enable MNOs to reduce backhaul expenditure.[68] Backhaul based on leased lines is a significant recurring expenditure for any MNO and this can be reduced if a significant proportion of users' data is routed via home broadband connections. MNOs which also operate fixed broadband services are likely to have an advantage in being able to cost effectively route mobile network traffic across their fixed networks.

[67] Picocells and Femtocells: Will indoor base stations transform the telecom industry? Analysys Mason Research, March 2007

[68] See paper from femtocell vendor Picochip at http://www.picochip.com/downloads/WiMAX_World_Vienna_WiMAX_Backhaul_The_Economics_May_2006.pdf and Analysys Mason study on femtocells at http://www.analysysmason.com/About-Us/News/Insight/Femtocells-will-they-shape-future-mobile-and-fixed-operator-partnerships/

Figure 48: Operation of a femtocell



Source: Ofcom

3.126 As with any nascent technology, the impact of femtocells on future market events could turn out to be profoundly important, irrelevant or important in unpredictable ways. At this point, they form part of a vanguard of a long-promised technology that has the potential to enable new forms of competition across communications networks: fixed-mobile convergence.

Fixed mobile convergence is an increasingly likely feature

3.127 Fixed mobile convergence has long been talked about, but it is only now that we see signs of it becoming a potential reality.

3.128 The launch of converged mobile service offerings like BT Fusion, C&W's new corporate services and Orange Unique provides some early signs of commercial attempts to exploit convergence of fixed and mobile services.

3.129 Traditionally fixed and mobile operators have always maintained separate networks and routed their calls via their own infrastructure. Mobile operators have utilised the services of fixed operators to provide backhaul connections (that is, leased lines to connect base stations to their core networks), but access networks have been separate. Access technologies have also been restricted to those permitted in the operating licence i.e. 2G phones have used spectrum limited to the use of GSM, while 3G phones have used spectrum limited to the use of 3G, although most 3G phones can switch between 2G and 3G spectrum.

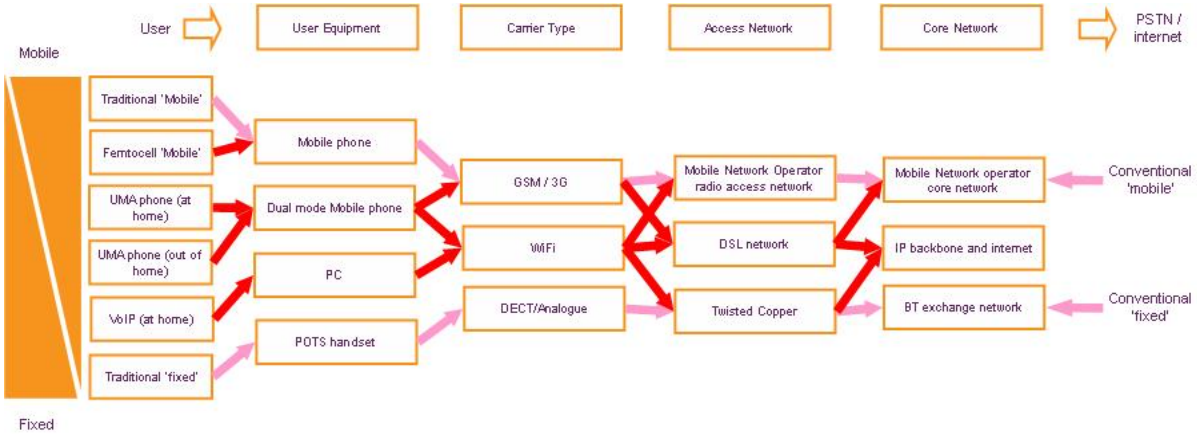
3.130 UMA handsets provided the first instance of licence exempt equipment being used to route mobile calls.[69] Calls were routed using a WiFi connection which eventually connected to the core network of the MNO.

[69] BT Fusion and Orange Unique (http://www.orange.co.uk/unique/) are examples of UMA services launched in the UK.

3.131 Femtocells, described above, provide an additional element in call routing and make use of the fixed broadband connection of the user to route calls. The fixed broadband connection of multiple users is connected to a network traffic router which interfaces with the core network of the MNO providing the femtocell equipment.

3.132 The availability of these devices fundamentally alters the way voice calls are routed in a telecommunication network. Figure 49 illustrates some of the many ways that voice calls could be made in the future.

Figure 49: Different ways of future call routing



Source: Ofcom
Note: Dual mode handsets are defined as GSM/3G and WiFi capable
Traditional fixed services using ISDN technology have not been considered
Cable users may have a hybrid of fibre and copper connections in their access network

3.133 Fixed-mobile convergence is not a one-sided process: as well as changes in mobile networks, fixed networks are continuing to develop and incorporate innovations. An example is the possibility of providing very high bandwidth transmission capacity in next generation access networks. The long-term development of next-generation mobile networks may well be, as many predict, the emergence of networks that are IP at the core and 'agnostic' about access.[70] The future development of fixed-mobile convergence and scenarios for its development (and the implications that may raise for regulation) are discussed further in sections 7 and 8.

Consultation questions

3.134 We welcome feedback on any aspect of the market analysis presented in this section. We are also interested in stakeholders' views on the following questions:

Question 3.1: What do you think are the features of a well-functioning mobile market? What evidence do you see that those features are present in the UK market?

Question 3.2: What measures are most appropriate to assess whether the mobile sector is performing well for citizens and consumers?

Question 3.3: How will market dynamics change as a result of trends such as availability of new spectrum, mobile broadband and new ways of delivering voice services?

[70] See Ofcom's 2005 consultation on next generation networks (NGN) at http://www.ofcom.org.uk/consult/condocs/ngn/ngn.pdf

Section 4

Consumers

Summary

4.1 This section sets out our initial views on how UK consumers have fared as the mobile market has changed.

4.2 First we ask: are consumers satisfied? Most UK consumers report themselves happy with their mobile service – but a material minority is not.

4.3 Second, we examine consumer confidence in the market – for example: do consumers feel capable of using their mobile phones? Do they feel able to choose a provider and switch with confidence? Mobile literacy has been increasing, and a large proportion of consumers have switched provider, using a range of information sources. However, some people report that complex services and pricing make it harder for them to assess the options available to them.

4.4 Next we consider whether consumers are getting better value for money as the market has grown. Our preliminary analysis suggests a mixed picture, with contract customers generally receiving more (or in some cases paying less) but prices for pre-pay customers staying roughly the same.

4.5 Finally, despite high overall customer satisfaction we ask why complaint levels appear to be rising. We do not yet have a view about a single cause for this trend, and we suspect it reflects a number of factors. Looking at complaints data, consumers are concerned about a range of issues, including customer service issues, bills, mis-selling and phone-paid services.[71]

4.6 The mobile industry has largely been successful at addressing consumers' needs, but the market is not easy for some consumers to navigate. Some consumers still have experiences that are unacceptable, however small a proportion of the whole market they are. We have been addressing these issues, for example, in our mobile mis-selling consultation in April 2008, and they will remain a further focus of attention.

As overall bills fall, we spend more on mobile than on fixed and broadband combined

4.7 To recap from section 3, mobile has become very important for UK consumers:

- we estimate there were 46m people (unique users or individual subscribers) aged eight and over using mobile services by mid-2007, who comprise 84 per cent of that age group;
- in 2007, 40 per cent of all telephone calls were originated from mobile phones; and

[71] Premium rate goods and services that we can buy by charging the cost to our phone bills and pre-pay phone accounts. Typical services include; helplines, competitions, mobile ringtone and logo downloads, news and sports alerts, interactive, directory enquiries. http://www.phonepayplus.org.uk/consumers/faq/default.asp#phone%20paid%20services

- in 2007 mobile accounted for 51 per cent of UK household spend on telecoms services – more than the expenditure on fixed and broadband services combined.

4.8 As demonstrated in Figure 50, mobile spend overtook fixed voice spend in 2003.

Figure 50: Average household expenditure on telecom service

Source: Ofcom/operators/ONS
Notes: Includes estimates where Ofcom does not receive data from operators; adjusted to Retail Price Index; includes VAT.

Mobile consumers are mostly happy with the service they receive

4.9 Our research suggests that 94 per cent of UK consumers are satisfied with their mobile service. This figure is higher than the comparable measure for either fixed or broadband services, as shown in Figure 51. Reported satisfaction with value-for-money in mobile services is 86 per cent - again, higher than fixed or broadband. Eighty seven per cent also report they are satisfied with the coverage and radio reception they receive (a point not measured for fixed services and broadband).

4.10 This picture has improved over time, and appears relatively stable. Overall satisfaction with mobile services has been growing steadily, by one percentage point a year over the last four years. Mobile performs well on all measures of satisfaction relative to fixed and broadband with one significant exception: consumers consistently rate the reliability of fixed telecommunications services (93 per cent) more highly than mobile services (88 per cent).

Figure 51: Consumer overall satisfaction and Value for Money (VFM) rating for mobile phone services

Source: Ofcom research
Base: All adults aged 15+ in the UK/Aged 16+ in Northern Ireland with a fixed line, mobile service or broadband at home who expressed an opinion on overall satisfaction and value for money. Mobile (Q2 2005, 1791) (Q2 2006, 1862) (Q2 2007, 1273) (Q1 2008, 4727).

4.11 Of the six per cent who did not form part of the 94 per cent of satisfied users, three per cent of those surveyed in 2008 reported being dissatisfied (or very dissatisfied) with their mobile service (with the remaining two per cent reporting indifference). Although small in percentage terms, this could represent over 1.3m people, as set out in the estimates in Figure 52.

Figure 52: Estimated number of potential consumers who are dissatisfied with their mobile service

Category	Number of Consumers
Very dis-satisfied	ca. 450,000
Dis-satisfied	ca. 900,000

Source: Ofcom estimate (percentages rounded) based on the total number of mobile users reporting themselves dissatisfied or very dis-satisfied in our 2008 research.

4.12 High levels of satisfaction were reported across demographic groups, with only minor variations by age and income. For example, consumers in the £11.5k-£17.4k income band gave higher overall ratings than higher income groups. Younger customers are slightly more likely to be satisfied than those over 65.[72]

Most consumers use their mobile phones and exercise choice with confidence

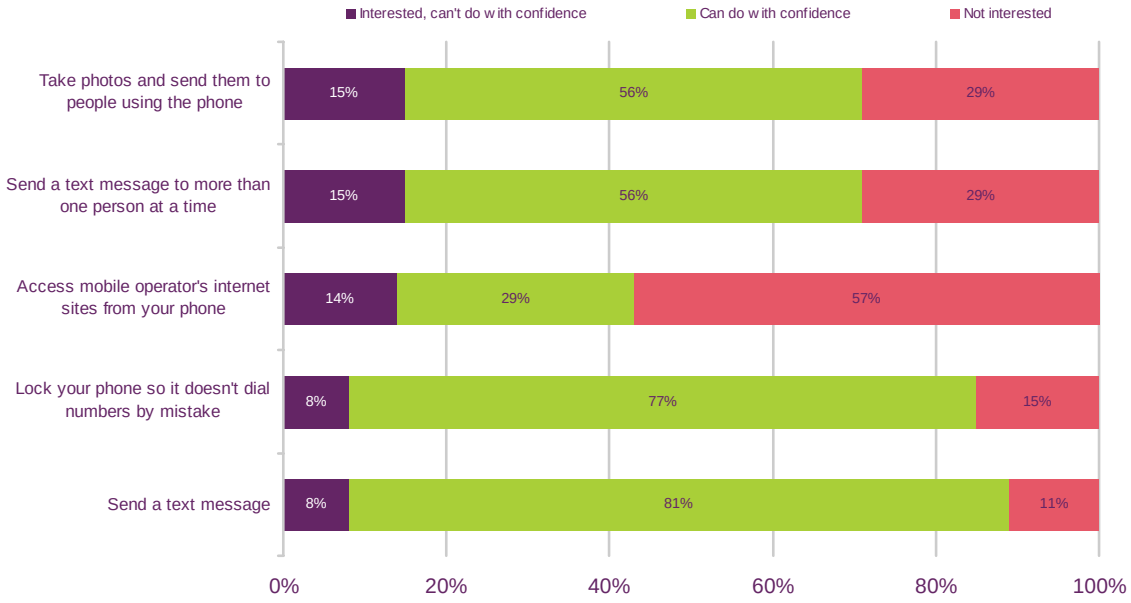
Mobile literacy is generally good

4.13 In general, consumers have confidence in their ability to perform a range of tasks on their mobiles as shown in Figure 53. For example, most of them have no problem with basic functions, such as sending text messages and locking a phone.

[72] Ofcom 2008, *Communications tracking survey*

4.14 Only a relatively small proportion of users reported that they did not feel confident to perform tasks they would like to perform. The most common cases of such 'frustrated consumer interest' were taking and sending photos, and sending text messages to multiple recipients. Of these, 15 per cent of people registering an interest in either of the respective functions felt uncomfortable about performing them.

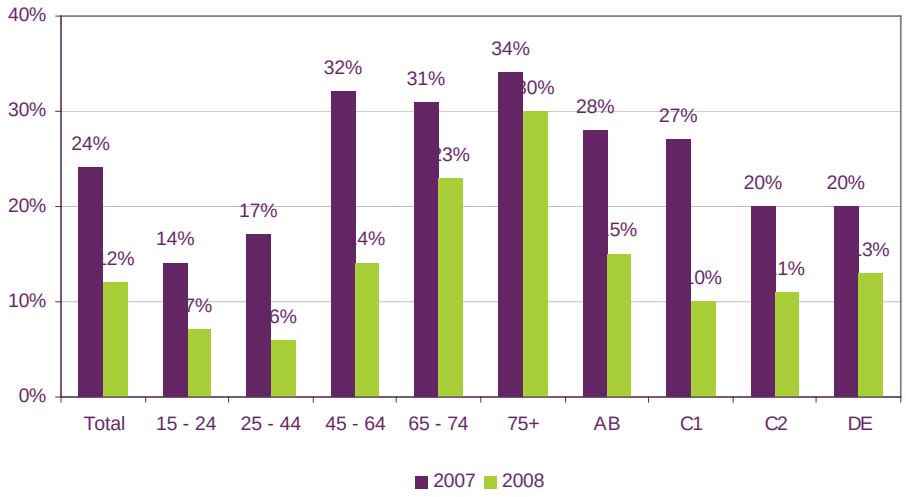
Figure 53: Interest and confidence in mobile phone functionality



Source: Ofcom research, fieldwork carried out by Saville Rossiter-Base in October to December 2007
Base: Adults aged 16+ with a mobile phone (2481)
M4A-E – Please look at the options shown on this card. I'm going to read out some different types of things you can do with some kinds of mobile phone, and for each one I'd like you to say which options on the card applies to you.

4.15 Consumers are also becoming more capable with their mobiles over time: the proportion of them who say that they are experiencing difficulties using mobile phone services has decreased significantly in the past year (Figure 54). This may reflect devices becoming easier to use, consumers becoming more adept, or both.

Figure 54: Percentage of consumers experiencing difficulties using mobile services by age and socio-economic groups in 2007 and 2008



Source: Ofcom communications tracking survey
Base: All adults 15+ (Q2 2007, 1497) (Q2 2008, 2109)

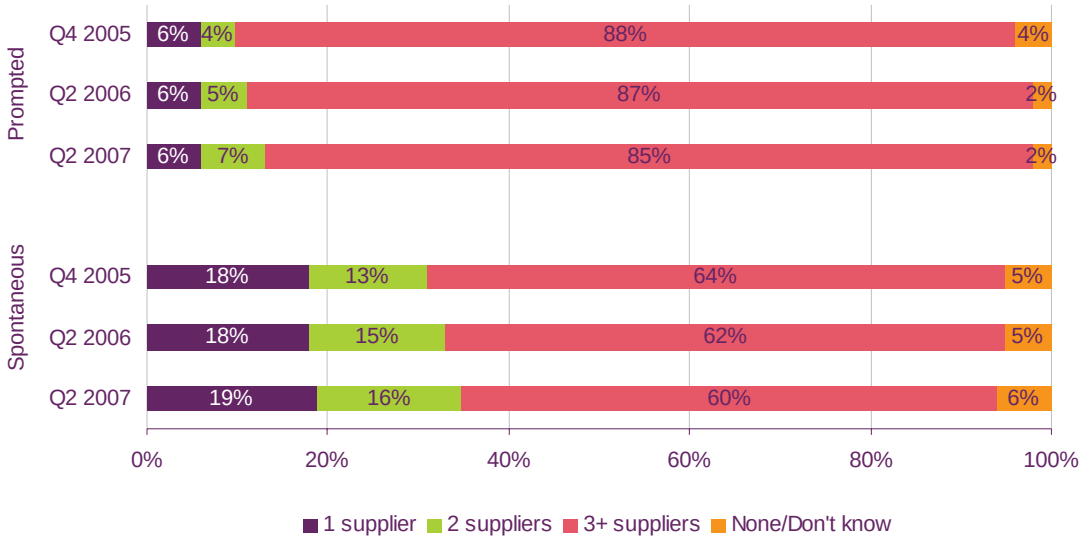
4.16 At the same time our research on the consumer experience in the mobile market showed, that in 2007, a proportion of consumers showed less interest in market developments, switching provider or negotiating a better deal than in previous years.[73] The reasons for this are unclear, and it is uncertain whether this has any impact on the take-up of new, higher specification devices (although given other indicators of take-up, such as the growth in smartphone use, this seems unlikely).[74]

4.17 As discussed in Ofcom's Media Literacy Audit published in May 2008, age and socio-economic group continues to play a role in people's engagement with media (mobile service, internet, fixed line or television).[75] Those with the most interest and confidence across media functions are 16 to 44s or AB socio-economic groupings. Those who have least interest are over-65s, DEs, and those with no children in the household.

Awareness of different mobile operators is high

4.18 Alongside increasing mobile literacy, consumer awareness of UK mobile suppliers (Figure 55) remains high and awareness is higher than the levels reported for either fixed-line or broadband suppliers. However, while consumers awareness of one or two suppliers has grown between 2005 and 2007, recognition of three plus suppliers has fallen.

Figure 55: Spontaneous and prompted awareness of mobile suppliers

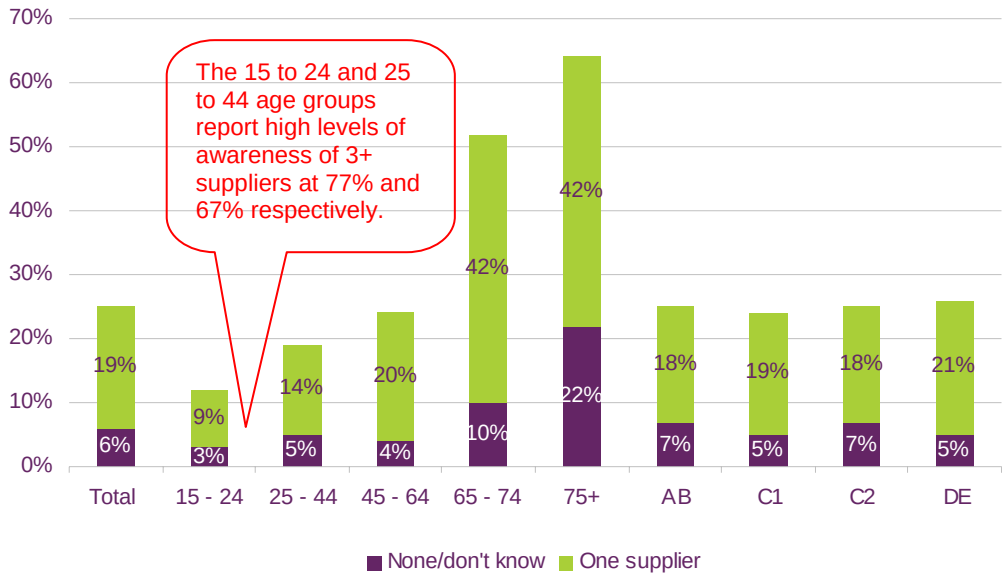


Source: Ofcom communications tracking survey
Base: All adults 15+ with a mobile (Q4 2005, 1700) (Q2 2006, 1696) (Q2 2007, 1301)

[73] The shift towards 'inactive' participation was specifically among older consumers, with younger consumers who spend more on their mobile phone bills more likely to be participating. This could be attributed to the maturity and competitiveness of the market (Ofcom 2007, *Consumer Experience Report*).
[74] Research suggests there is potentially a knowledge gap in consumers' understanding of new technologies offered on mobile phones and the awareness of 3G benefits and features. (Ofcom 2006, *Consumer engagement with Digital Communications Services;* Ofcom 2006, *Consumer engagement with Digital Communications Services*; Ofcom 2007, *Ease of use issues with domestic electronic communications equipment; and* Ofcom 2008, *Switched On, Ofcom Consumer Panel)*.
[75] Ofcom 2008, *Media Literacy Audit: Report on UK adults' media literacy'*

4.19 Without prompting, nearly one in five consumers could only recall the name of one mobile supplier (or could not name any) and as shown in Figure 56, older consumers are more likely to be aware of only one mobile supplier.

Figure 56: Spontaneous awareness of mobile suppliers by age and socio-economic group



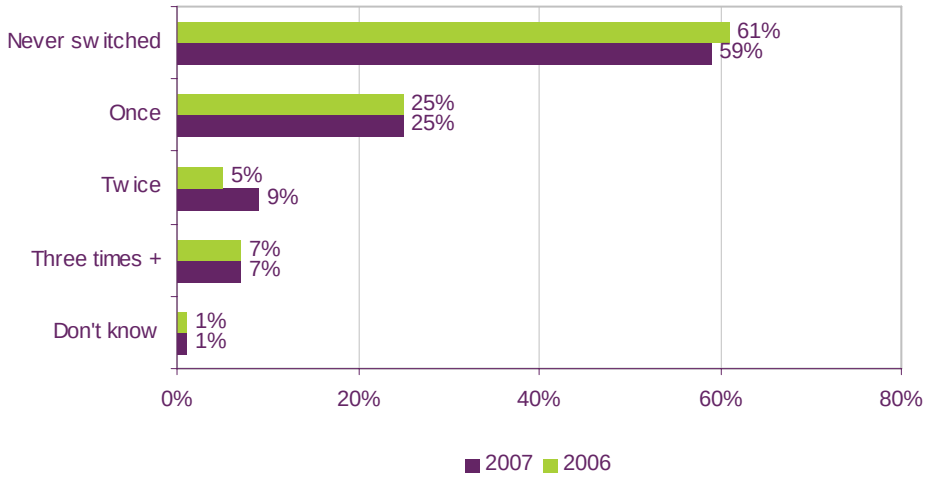
Source: Ofcom communications tracking survey
Base: All adults 15+ with a mobile (Q2 2007, 1301)

Consumers are increasingly confident in switching

4.20 Confidence and awareness of consumers is reflected in actual behaviour with over 40 per cent of UK consumers having switched supplier at some point (Figure 57).[76] When deciding which operator to sign up with, consumers use a number of information sources, most commonly trusted personal sources, followed by websites and supplier sources.[77]

[76] Reported switching statistics show that mobile phone consumers are more likely to have ever switched than fixed line or broadband consumers, (Ofcom 2007, *Consumer Experience Report*). Consumers who reported 'ever switching' remained at 40% in our 2008 research also (Communications Market Report 2007, page 343).
[77] Ofcom 2007, *Consumer Experience Report*

Figure 57: Number of times consumers have switched mobile network supplier



Source: Ofcom communications tracking survey
Base: All adults 15+ with a mobile Q2 2007 (1273) and Q2 2006 (1883)

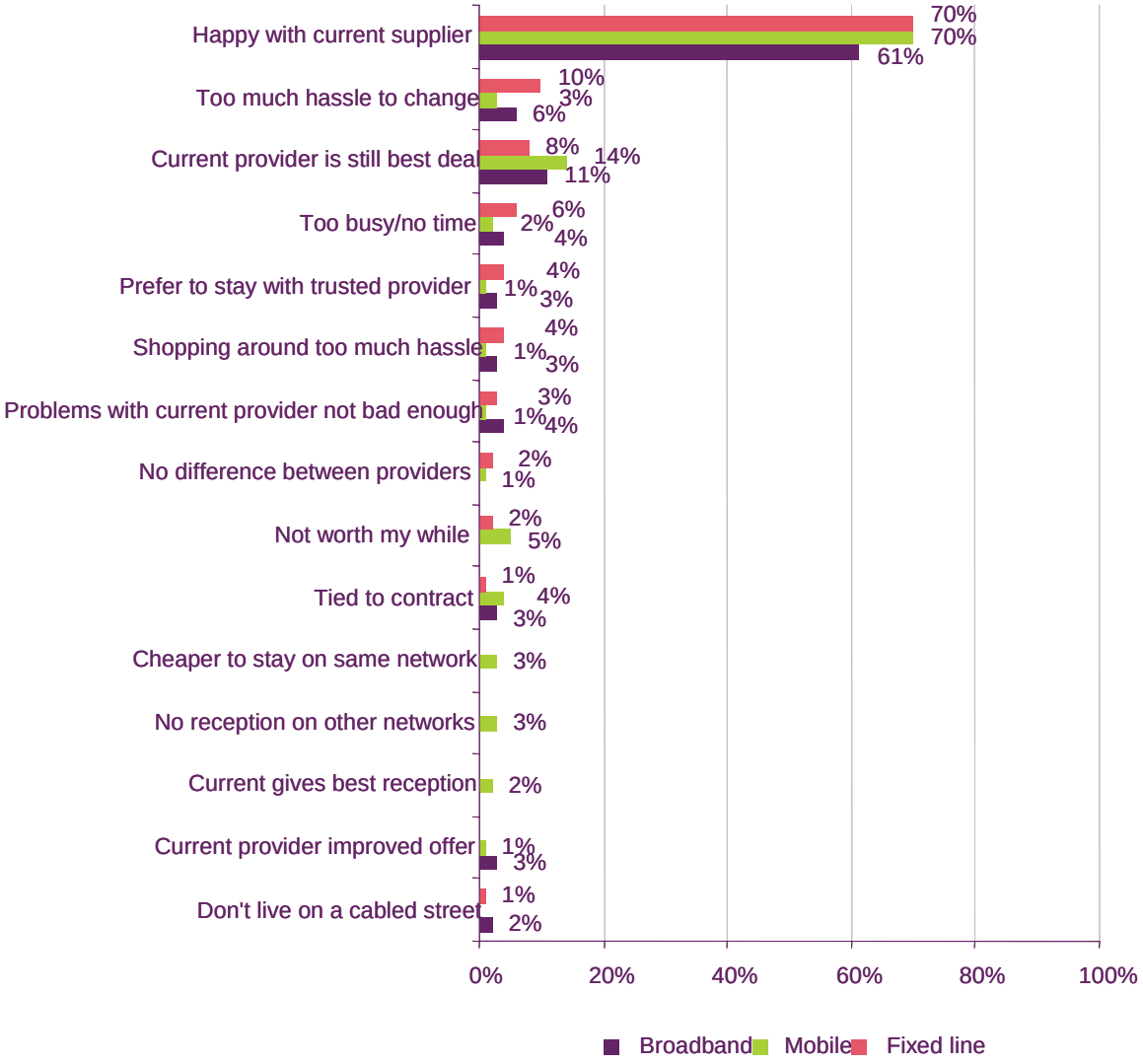
4.21 Switching is lower in Northern Ireland, rural areas and in UK regions, possibly reflecting the lower level of coverage from multiple service providers in much of those areas (see Figure 68 and Figure 69 in Section 5).

4.22 In addition, despite good awareness and actual switching occurring, a significant minority of consumers (one in four of those who have never switched) think it would be difficult to switch and this group is therefore subject to a greater degree of inertia.[78]

4.23 Figure 58 below outlines the reasons provided by consumers for not switching mobile suppliers. The main reason for not switching is positive (i.e. happy to stay with the current supplier). However, 'hassle', the perception of how worthwhile it was to switch, contract tie-in and reception remain the biggest barriers.[79]

[78] While consumer opinion on ease of switching mobile suppliers among those who have switched remains high, 27 per cent of consumers who have never switched believe it would be fairly/very difficult or they don't know, (Ofcom 2007, *Consumer Experience Report*).
[79] Ofcom is working closely with industry through UK Porting (www.ukporting.org.uk) to improve the consumer experience with regards to number portability.

Figure 58: Reasons for not switching suppliers



Source: Ofcom decision making survey 2007
Base: All decision makers who considered switching in the past but didn't (fixed-line 897) (mobile 1044) (broadband 337)

More complex pricing may make it harder for some consumers to make informed choices

4.24 Price comparisons for complex services like mobile can be difficult for some consumers, with lifetime costs and in-bundle and out-of-bundle elements complicating the picture. Although overall levels of consumer confidence in switching are rising, there is also evidence that some consumers are finding the task of choosing a mobile service more difficult. For example, in 2007, we saw:

- a decrease in the proportion of consumers who considered it easy to make *price* comparisons between mobile suppliers;[80] and
- a decrease in the proportion of consumers who find it very easy to make comparisons of service *quality*.[81]

[80] In 2007, consumers reporting it 'very easy' to make cost comparisons decreased from 21% to 15% and those reporting that they 'don't know' how easy or difficult it is rose from 14% to 19%. (Ofcom 2007, *Consumer Experience Report, page 103)*

4.25 Choices about aspects of service, including price are, of course, a healthy sign of a well-functioning market. Nor are varied (or even complex) prices necessarily a sign of a problem – for example, there are important efficiencies that can be lost if providers are not able to take opportunities to offer prices that vary between different groups of customers with different requirements or willingness to pay for particular features. The critical question is whether there is anything about the balance between simplicity and complexity that suggests the market is not functioning properly in offering those choices.

4.26 As well as making it more difficult for individual consumers, overly complex tariffs can make it more difficult to assess the overall impact on consumers of changes in prices over time. We discuss below the evidence that tariffs are becoming more complex, and how this might be affecting consumers.

4.27 Most mobile service providers frequently adjust their pricing. For example, since 2001, we have observed 16 major changes to pre-pay tariffs where new pricing mechanisms were introduced and at least 26 minor changes to individual pre-pay tariffs (for example for a particular call type).

4.28 Given this rate of change, and the growth in complexity noted below, the role played by information available to consumers to make informed choices becomes increasingly important.

4.29 Ofcom research in 2006 found that contract mobile customers have a tendency to under-estimate usage and spend, often due to a lack of awareness of when their existing tariff limits have been exceeded, this may lead to consumers being on sub-optimal tariffs. On the other hand, pre-pay consumers tend to estimate spend more accurately, as they decide in advance how much they wish to spend over a given time period.[82]

4.30 The ability of consumers to make well-informed decisions affects providers as well as users, suggesting that there are commercial pressures for providers to respond to these concerns by simplifying packages and making pricing decisions easier for their customers. For example, service providers may be worse-off if users choose the 'wrong' package and then temper their own usage to avoid out-of-bundle prices that would not have applied with the 'right' package.

4.31 It is not clear why, given these factors, many consumers feel tariffs are complex and consumer concerns are rising. We intend to do further work in this area, including analysis and consumer research during the next phase of our Assessment.

4.32 In our current work programme, we are reviewing the existing regulatory requirements on communications service providers to provide certain information and whether they should be extended to other services, including mobile.[83]

4.33 The following sub-section considers evidence about growing complexity and possible sources of customer confusion.

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[81] In 2007, consumers reporting it 'very easy' to make quality of service comparisons decreased from 17% to 11% and those reporting that they 'don't know' how easy or difficult it is rose from 17% to 22%. (Ofcom 2007, *Consumer Experience Report, page 105).*

[82] Ofcom 2006, *Consumer Experience Research*, Annex 5 'Consumer Estimates of Usage Patterns'

[83] The issue of comparable information on quality of service is being considered as part of Ofcom's review of 'quality of service' information – see Ofcom's phase 1 consultation at http://www.ofcom.org.uk/consult/condocs/qos08/qos08.pdf

Mobile operators' complex pricing arrangements contain elements that many consumers perceive as hidden charges

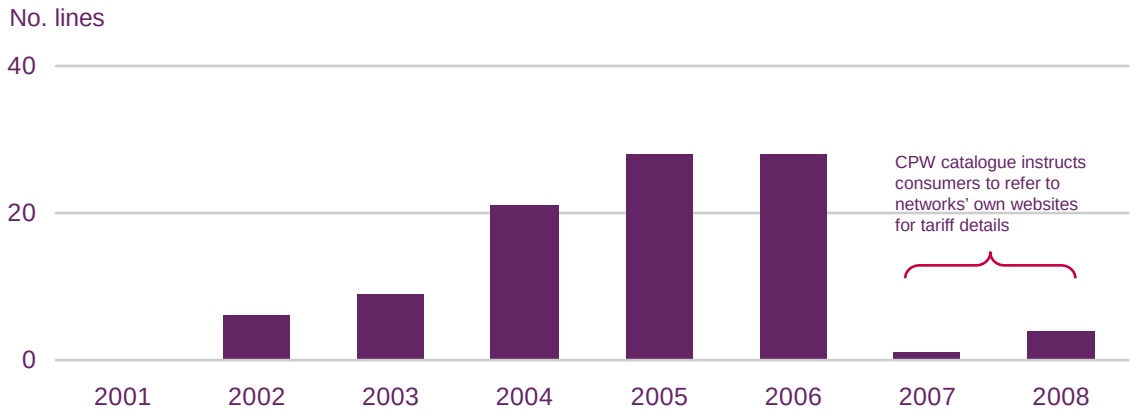
4.34 There are many elements to the pricing of mobile services. Some do not vary among suppliers (for example, cross-network voice minutes, SMS and gigabytes of data are common to all major providers) but some differences remain, particularly in the case of data services and pre-pay contracts.

4.35 In addition to charges for providing different telecommunication services, network operators also charge for a number of additional features that are broadly similar across the networks. A comparison of the five UK network operators reveals that:

- all levy additional charges for non-direct debit monthly payment for post pay customers;
- none include all non-geographic numbers in the call allowances available to post pay customers. However, some include access to some non-geographic numbers in the call allowances provided to customers;
- all provide additional insurance protection to their customers;
- all employ rounding of monthly bills;
- all charge for a paper version of itemised billing (although this is free online);
- none allow rollover of unused call and SMS allowances; and
- all levy a minimum call charge.

4.36 A simple proxy to illustrate the growing complexity of pre-pay tariffs is to count the number of lines of small print that The Carphone Warehouse (Carphone Warehouse) included on its pre-pay tariff pages. As shown in Figure 59, from 2000 to 2006, this grew from zero to over 30. By 2007, Carphone Warehouse stopped including full details of pricing and other information; from this point on customers are instead referred to the websites of the relevant service provider.

Figure 59: Lines of 'small print' on CPW's pre-pay tariff catalogue pages



Source: Carphone Warehouse monthly retail pricing catalogue

4.37 Even when customers are referred to a service provider's website, our informal research suggests that it is not always possible to obtain full pricing information and

in certain instances to access that information without incurring some fee.[84] Separate from this Assessment, we are currently investigating compliance with rules covering the provision of information relating to non-geographic numbers and with the requirement to publish clear and up to date price and tariff information on providers' websites.[85]

4.38 Consumers may not necessarily be aware of these charges or may not have fully considered them at the point of agreement, or they may be aware of some of them but not others. The issue of additional charges, including charges for non-direct debit payments and charges for itemised billing is being considered as part of our Review of Additional Charges.[86]

Real cost of a basket of mobile services has fallen 9% per year

4.39 For the last six years, we have measured the real cost of mobile services using a basket based on the average for the year for usage of UK fixed (geographic) calls and line rental, on-net, off-net and messaging.

4.40 Based on this basket, the average real cost of mobile services has fallen at an average annual rate of nine per cent between 2002 and 2007 with the largest yearly fall of 15 per cent between 2006 and 2007 to £17.93.

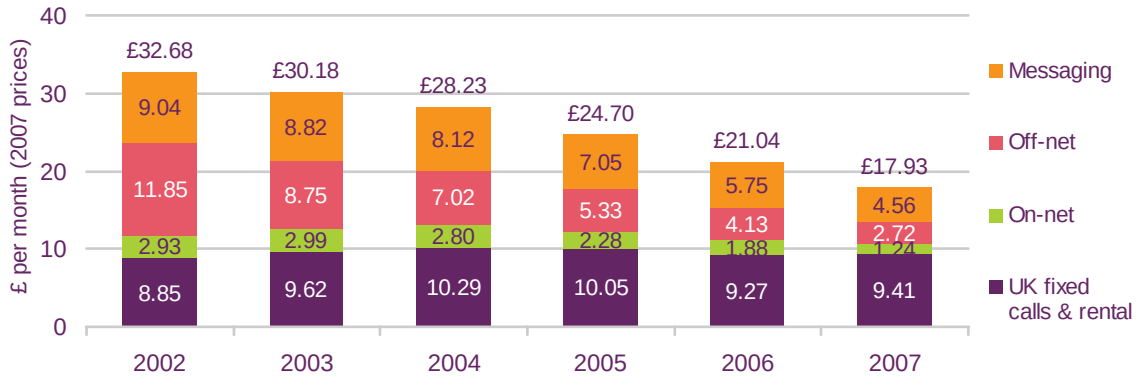
4.41 This declining real cost based on average annual usage figures for 2007 differs from the bundled price of these services because the bundled price includes allowances that consumers may not fully use. The effect of consumers increasing substitution of their inclusive mobile minutes for fixed minutes is to reduce the real cost of mobile services.

[84] For example, in at least one case the relevant website had a number to call for information that itself cost up to 25p.

[85] CW/00980/03/08, *Second own-initiative enforcement programme: compliance with General Condition 14.2 ("GC 14.2")*. The investigation is examining communications providers' compliance with GC 14 and GC 10. GC 14.2 requires all originating communications providers who bill domestic and small business customers for non-geographic calls (e.g. premium rate services (PRS) and number translation services (NTS)) to establish, maintain and comply with a Code of Practice for the provision of information relating to PRS and a Code of Practice for NTS calls and for those two Codes to be consistent with the guidelines set out at Annex 1 (PRS) and Annex 2 (NTS) to GC 14. In addition, GC 10.2 and GC 10.3 requires communications providers to publish pricing and tariff information in the form described above. Full details of the investigation are available at http://www.ofcom.org.uk/bulletins/comp_bull_index/comp_bull_ocases/open_all/cw_980/.

[86] http://www.ofcom.org.uk/consult/condocs/addcharges/

Figure 60: Real cost of a basket of mobile services



Source: Ofcom / operators
Note: Includes VAT; excludes non-geographic voice calls; figures have been restated from the 2007 Communications Market Report to reflect more accurate data

4.42 Trends in value-for-money for customers taking monthly contracts are explored in section 3, where we noted that bundles are getting bigger and contracts are getting longer.

4.43 The next section discusses whether the same conclusion of better value over time also holds for customers who buy pre-pay services. Our analysis suggests that value for money may not have improved for these users to the same extent.

Prices for pre-pay services have remained roughly flat

4.44 As noted in section 3, most mobile subscriptions in the UK are for pre-pay services. During our Assessment, we have gathered retail pricing information for all of the major providers covering the period from 2001 to 2008.[87] We have used this information to understand how prices of pre-pay services have changed during 2001 to 2008 in three ways:

- we have considered how 'headline' prices (that are advertised to customers) have changed;
- as noted above, we have used an informal measure – the number of lines of small print in the catalogue used by a major retailer – to illustrate the growth in complexity of packages and offers; and
- we have calculated the prices that would have been paid by a user under various 'user profiles', to provide a sense of price movement under a variety of usage patterns.

4.45 The overall picture, taking into account all three methods, is discussed in more detail below.

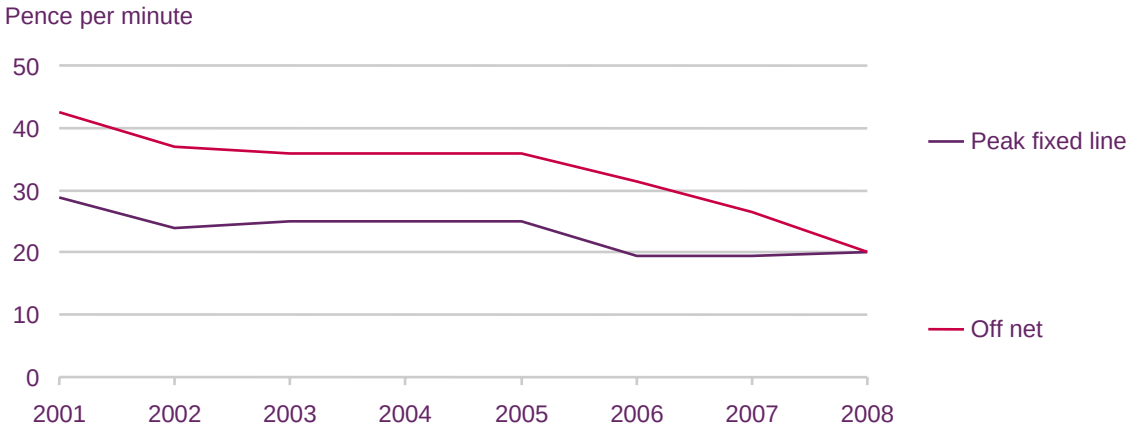
Headline prices fell but less visible charges became more important

4.46 Using information from in-store brochures we have been able to track the evolution of prepay pricing since 2001 for a number of major providers, as set out in Figure 61.

[87] We photocopied the pricing pages of eight years of monthly retail catalogues used in-store by a major retailer, Carphone Warehouse. We are grateful to Carphone Warehouse for their co-operation.

4.47 Since 2001, the average of headline prices for pre-pay calls has fallen. For some call types, such as calls to other mobile networks ('off-net calls') prices have halved over this period.

Figure 61: Comparison of average headline call rates (selected call types only)



Source: Ofcom. Data from CPW in-store brochures, June/July each year. Peak tariff used when multiple tariff offered. Price calculated by averaging leading tariffs from Vodafone, O2, Orange, T-Mobile and Virgin.[88] No weighting used. All prices are nominal.

4.48 At the same time, other charges that are less visible to consumers have risen - including call set up fees, or charges to call customer services.

4.49 In 2001, most of these charges related to high tariffs for infrequent calls, such as calls to directory enquiries (costing above 60p per minute in some cases). By 2008 these charges also include prices that may be more difficult for consumers to measure or consider directly, such as minimum call costs (either a set price, or a set period of time, used each time a call is made).

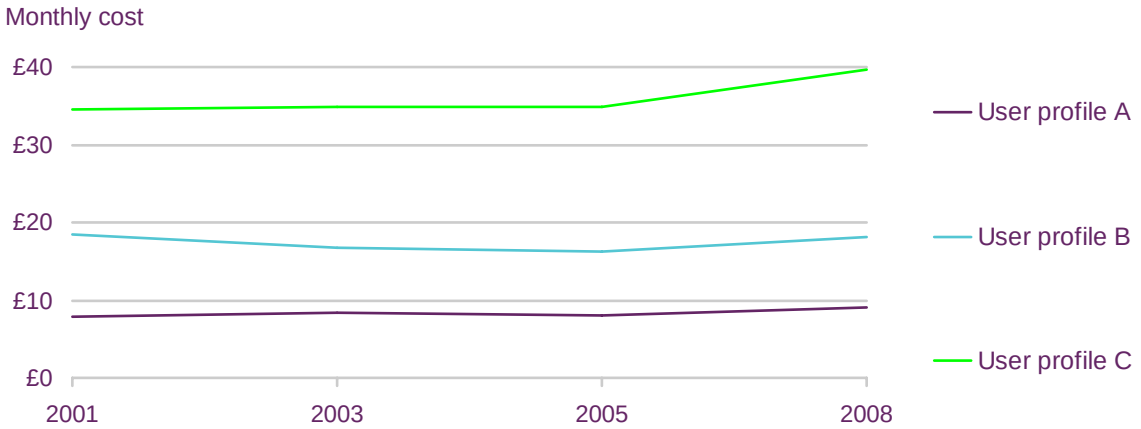
User profiles provide an alternative way to consider consumer charges

4.50 To explore what these trends might mean for individual users, we calculated predicted costs incurred for three pre-pay user profiles (covering light, mid and high user profiles – notionally informed by the potential usage patterns for a retired person, a late adopter and a teenager). These profiles are set out in more detail in Annex 5.

4.51 In each case, we calculated the costs incurred using the tariffs of each of the major providers. In calculating the costs, we have applied both the changes in headline rates and changes in the less visible charges, for example call set-up costs impacting calls with a short duration.

[88] H3G entered the market in 2003 and so were excluded from these calculations because there was not a full time-sequence of data covering 2001 to 2008.

Figure 62: Monthly spend per month for three user profiles assuming constant usage



Source: Ofcom. Data from CPW in-store brochures. Full details of the user profiles are set out in Annex 5
Price calculated by averaging tariffs from Vodafone, O2, Orange, T-Mobile and Virgin. No weighting used. All prices are nominal.

4.52 The predicted pre-pay charges for each user profile has remained stable or, slightly increased over the last seven years, in nominal terms. For the customers concerned, a significant fall in the advertised headline prices has not translated into cheaper services.

4.53 These results contrast with, for example, our own assessment (in the Communications Market Report 2008) that the average cost per minute for pre-pay services has fallen (calculated on an industry-wide basis, dividing total revenue by total minutes). We intend to consider the question of pre-pay pricing further in the next phase of our Assessment. We also welcome stakeholder views on this issue.

Lower income users continue to prefer the cost control offered by pre-pay

4.54 Mobile phones are still considered a luxury by some people: 24 per cent of adults in socio-economic grouping DE do not have a mobile phone, in comparison with 15 per cent of the total population.[89] This appears to indicate that those in the less affluent parts of society are less likely to own a mobile phone than those parts which are better off.

4.55 Not surprisingly, therefore, Ofcom research in 2007 found that a vast majority of consumers earning less than £15k were on pre-pay services. Pre-pay was viewed by respondents as an ideal payment method and take-up was widespread as a result. Consumers in this group tended to avoid mobile contracts due to difficulties experienced in the past (such as call costs and missed payments) and some had tried contracts but had reverted back to the pre-pay method.[90] Above all, pre-pay subscriptions were valued for the ability they gave consumers to have flexibility and exercise control over their spending.

4.56 Pre-paying also provides flexibility in terms of tariff and provider choice, as pre-pay consumers are able to move to other offers by their current provider or switch provider without needing to, for example, weigh-up contract commitments or pay early termination charges.

[89] Ofcom 2008, *Media Literacy Audit*
[90] Ofcom 2007, *Consumer Experience Report*

4.57 Operators have also introduced SIM-only deals, which allow consumers to bypass the added costs of a handset up-grade. Many such contracts allow consumers to leave on 30 days' notice. With the current economic climate increasing pressure on consumers spending habits, patterns of take-up of pre-pay and SIM-only services may change over time.

An increasing number of services and complex pricing can lead to 'bill shock'

4.58 There are also increasingly varied ways to spend money using mobile phones aside from the more traditional voice and text based services. A number of additional offers are available on mobiles, ranging from downloadable games, to ring-tones, to music videos. These services are available in two main ways – by one-off payment, or via subscription service. There has been widespread reporting of problems with these services in the press, with stories of users, in particular children, receiving very large mobile bills.[91]

4.59 This phenomenon is known as 'bill-shock', which refers to the potential for customers to unwittingly build up large bills (or, in the case of pre-pay customers, to discover their credit used up more quickly than anticipated). Other potential areas for bill-shock include data charges, international roaming charges, and when the two combine, international data roaming charges.

4.60 Customer problems with bill-shock are often widely reported in the national press which raises consumer awareness of potential problems no matter how likely or not, they are to occur.[92] In the extreme, people may voluntarily avoid using mobile services to prevent unwanted charges. Although there is little direct evidence, it seems more likely to be a factor in relation to, say, international roaming (particularly for data services) than domestic services. Separately from this Assessment, we are currently looking at the issues around 'bill shock' in order to understand better some of the concerns raised and to determine whether regulatory intervention is necessary.

Despite high overall satisfaction levels, the numbers of consumer complaints are rising, indicating that a growing number of individuals have negative experiences

4.61 Despite the overall high satisfaction levels reported by consumers, complaints to Ofcom and other organisations about mobile services are rising. In 2006, there was a significant increase in complaints to Ofcom about mis-selling and slamming related to mobile services involving the use of mobile phone retailers either acting, or purporting to act, on behalf of mobile network operators.

4.62 Most mis-selling complaints relate to general mis-selling such as misleading/inaccurate information being provided to the consumer, especially about tariffs, coverage, features of the service, the switching process or contract duration.

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[91] For example, *The Times*, 'Ringtone websites' hidden charges 'exploiting' children' 13 July 2008, at http://www.timesonline.co.uk/tol/money/consumer_affairs/article4322724.ece. In relation to premium-rate content services, such as reverse-billed SMS services, regulation and enforcement by PhonepayPlus is one important element in reducing the harm to consumers from scams that exploit these payment mechanisms. PhonepayPlus is the co-regulatory body for Premium Rate Services (PRS). Ofcom has responsibility for regulating these services, however, PhonepayPlus (formerly ICSTIS) acts as the agency which carries out the day-to-day regulation of the PRS market on Ofcom's behalf.

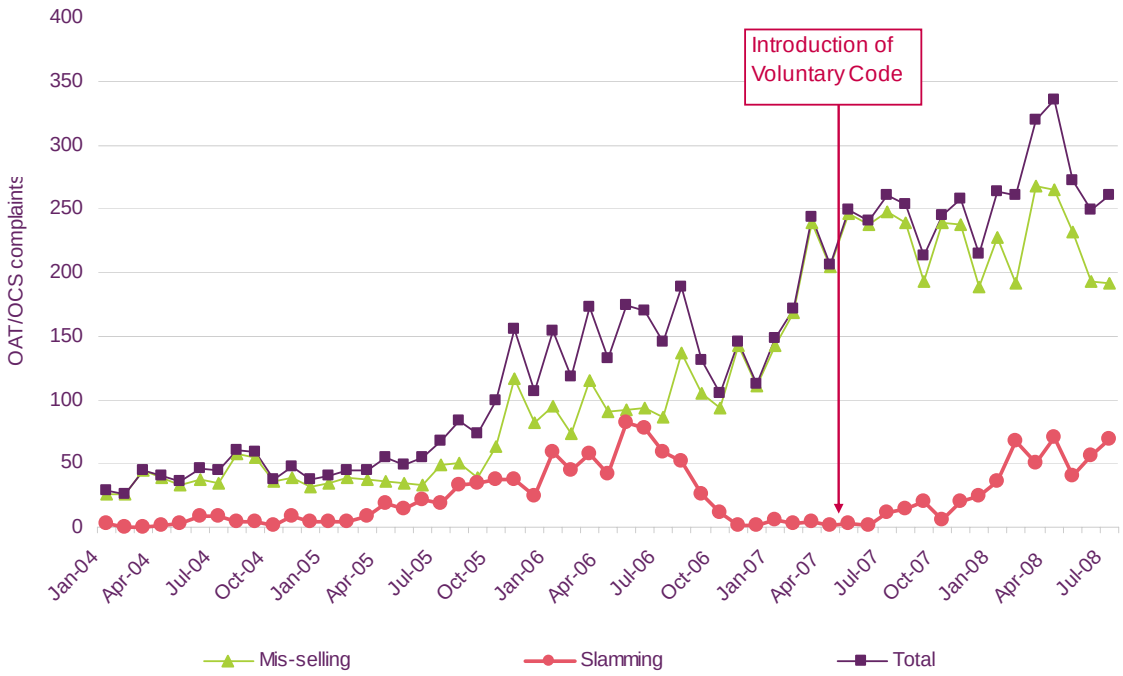
[92] For example, *The Times*, 'My £1,500 mobile data bill', 26 June 2008, at http://www.timesonline.co.uk/tol/travel/business/article4219555.ece

4.63 Another specific area of complaint has been mobile cashback schemes. Cashback schemes involve consumers being offered an incentive by a retailer (who is not the mobile service provider) to enter into a contract – hence they will receive 'cash back' some way into the term commitment of the contract.

4.64 The rise of mis-selling, slamming and cashback complaints is shown in Figure 63 and Figure 64. This led to a number of actions by Ofcom, including in 2006 the launching of enforcement action (an 'own-initiative' enquiry into a number of suppliers) which resulted in a number of steps taken to mitigate the issue and then involvement by Ofcom and all of the major suppliers in discussions about how this issue might be addressed. This led to the agreement of an industry code of practice in July 2007 and our consultation on mobile mis-selling in March 2008 (described further in section 6).[93]

4.65 Complaints to Ofcom about cashbacks have recently fallen sharply (Figure 64). However, complaints about general mis-selling have not fallen to a similar extent (Figure 63).

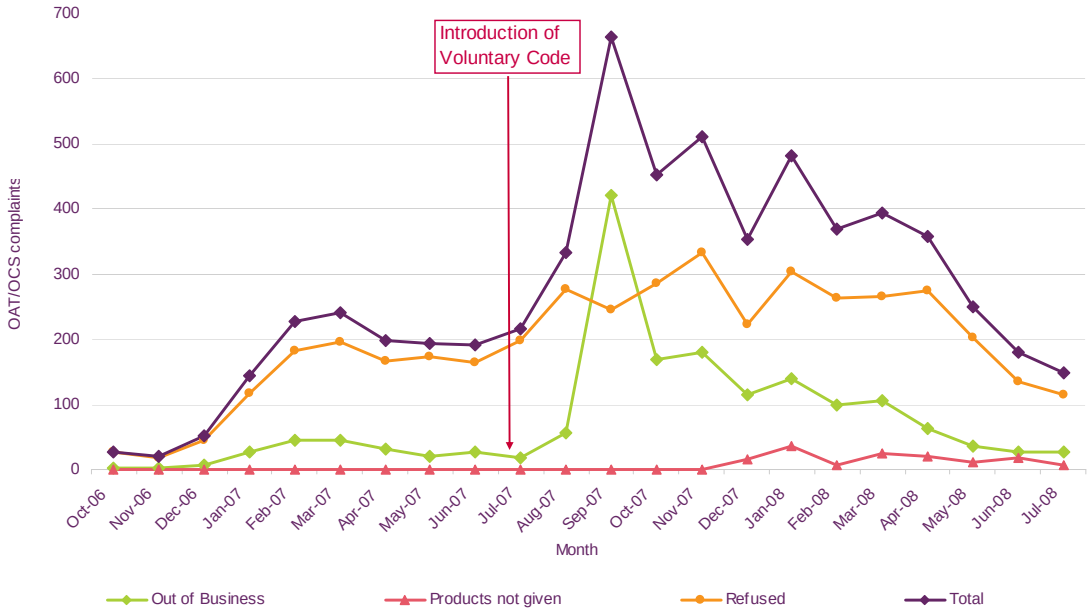
Figure 63: Mis-selling and slamming complaints from January 2004 – July 2008



Source: Ofcom

[93] http://www.ofcom.org.uk/consult/condocs/mobmisselling/

Figure 64: Cashback complaints from October 2006 – July 2008



Source: Ofcom

Lower income groups and minorities are more likely to be exposed

4.66 Over the period 2006/7 and 2007/8 Citizens Advice reported similarly large rises in the number of reported mobile 'problems' that Citizens Advice Bureaux in England and Wales dealt with.[94] The main mobile 'problems' raised by consumers at CAB tend to derive from those who are:

- from low income households and/or the unemployed;
- from ethnic minorities, some of whom may have poor or no understanding of English; and
- complaining about independent retailers.

The experience of individual consumers should not be lost in the averages

4.67 CAB provided Ofcom with a number of examples of complaints received by its Bureaus, which include the following:

- One complainant was cold called in early April 2008 by an MNO offering them a pre-pay mobile service costing no more than £25 per month. They advised the salesperson they were not interested and were told that as long as they did not register the SIM-card they would not be billed. When the SIM-card arrived the complainant decided not to register it, but soon after received a bill for £37. They contacted the MNO but were told that the 14 day cooling off period had expired. The complainant responded that there was no mention of a 14 day cooling off period by the salesperson originally or in the letter received with the SIM-card. They then received a second bill for £65 in May. After the complainant invested

[94] CAB records consumer complaints as 'problems'. It is possible that individual consumers may log more than one problem.

time and money contacting the MNO to resolve the matter, it was eventually agreed in writing by the MNO that the complainant did not owe any money and received a voucher and an apology. However, a month later, the complainant received a letter from a debt collection agency for the outstanding balance.

- Another complainant reported that they were required to provide the evidence of bills and payments entitling them to cashback by email only, even though they did not have access to a computer. This restrictive criterion for claiming cashback was not mentioned at point of sale.

- Another complainant, with a poor level of understanding English, explained how they were assigned a sales representative that spoke their native language and was subsequently mis-informed and pressurised into accepting more than one mobile contract on the basis that any additional contract would be part of a free promotional gift and that they would not be required to pay for it.

4.68 It is important to recognise that there may be a number of different factors that could lead to the growing complaint numbers, in addition to changes in the underlying services. For example, rising complaints may reflect increasing consumer awareness or changes to the way cases are recorded. This may be the case for the CAB data. We provide this data with further explanations in Annex 6.

4.69 Our observations and those of the CAB are supported by the data collected by organisations such as Consumer Direct and co-regulatory body PhonepayPlus, which can be found in Annex 6 to this document.

Often sources of concern are matters not directly regulated, highlighting the importance of industry co-operation and mobile literacy

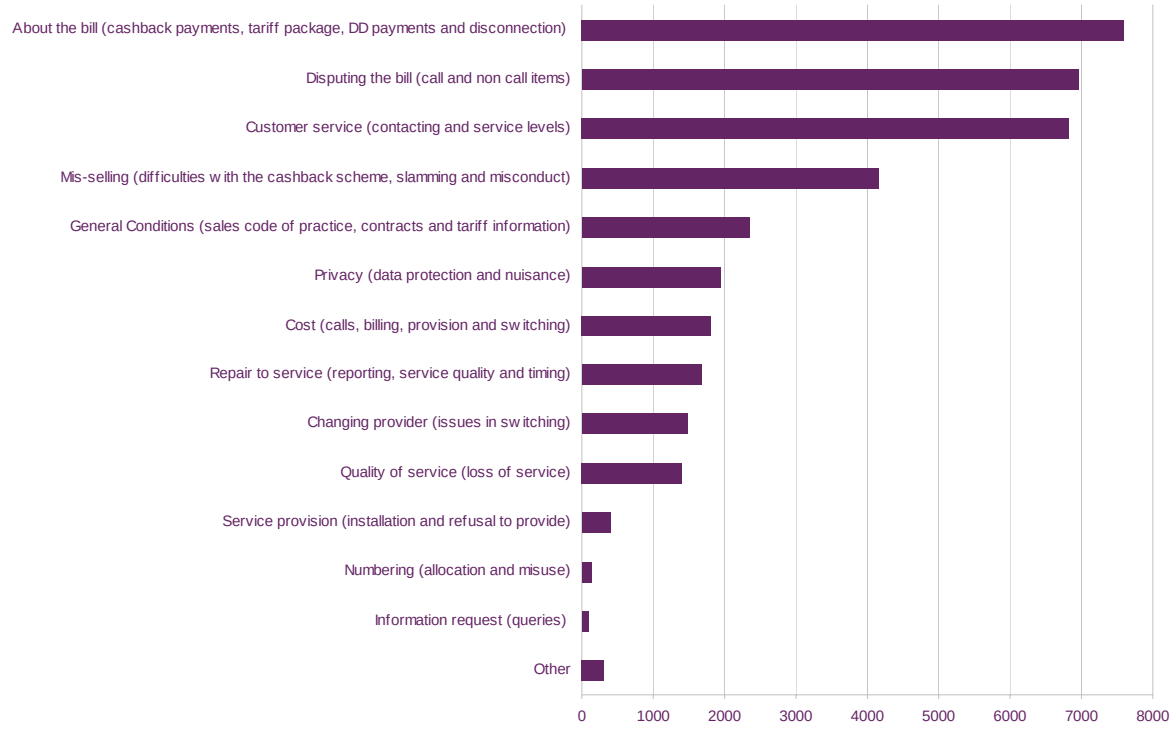
4.70 The majority of complaints from consumers have focused on areas of the service that are not directly regulated. Most complaints to Ofcom's Advisory Team are about:

- bill payments – cashback payments, direct debits, disconnections;

- customer services; and

- bill disputes – call and non call items.

Figure 65: Total complaints about mobile services reported to Ofcom's Advisory Team (OAT) between January 2007 and June 2008



Source: Ofcom

4.71 As services develop and use of the mobile internet grows there are additional security concerns that could prove significant in the future and may act as a source of inertia in uptake of next generation mobile devices (as well as creating an important set of concerns for specific citizen groups e.g. minors).[95]

4.72 For example, while remaining low level the 'SMiShing' threat has been the subject of concern in the recent past as a potential threat to consumers. SMIShing is 'phishing'[96] by SMS.[97] Mobile users receive a text trying to get the user to visit a website on the PC and that site in turn infects the PC; evolving malware specifically targeting the operating systems on mobile devices.

[95] Analyst and industry views on how serious these issues are varies, as evidenced by the following: *McAfee Mobile Security Report 2008*, at http://www.mcafee.com/us/research/mobile_security_report_2008.html contrasted with *Gartner Identifies Five Most Over-Hyped IT Security Threats*, at http://www.gartner.com/press_releases/asset_128743_11.html

[96] Phishing involves an email or pop-up message claiming to be from a business or organisation that a consumer may legitimately deal with, for example, an internet service provider, bank or online payment service. The message may ask them to 'update', 'validate', or 'confirm' their account information. The messages direct consumers to a website that looks just like the legitimate organisation's site. However, it is a bogus site that exists simply to deceive consumers into revealing their personal information so the operators of these websites can use their identity. http://www.consumerdirect.gov.uk/watch_out/scams/phishing/

[97] For example, the SMS 'dating scam' that was run in August 2006 in Iceland and Australia, (http://www.ocba.sa.gov.au/assets/medicomms/mrelease_hightech_scams.pdf).

4.73 As mobile becomes ever more-widely used in communications it will become even more important to educate consumers about the possible risks that they face in using the medium.[98]

Consumer issues will remain high on our agenda

4.74 Consumer issues will remain high on our agenda – notwithstanding many of the other more positive trends we have observed. Billing issues, high quality handling of complaints and customer service remain issues of focus.

4.75 Inevitably, rising complaints attract regulatory concern. As described above, in the case of cashback schemes, a code of practice adopted by industry has shown positive signs with complaints falling. However, the mis-selling problem persists. These varied experiences suggest that there is no a single 'one-size-fits-all' approach to these issues.

4.76 As mentioned above, co-regulatory body PhonepayPlus has also seen increasing complaints about mobile phone-paid services, with complaints about mobile now far outweighing fixed services. With the further proliferation of mobile content and transaction services, it seems likely that this trend will continue. PhonepayPlus is currently consulting in relation to subscription and joining fee based services (e.g. ringtones, wallpaper and music downloads); 51 per cent of all mobile complaints made to them relate to these services.[99]

4.77 Later this year, Ofcom will publish a consultation document that looks at the regulation of Premium Rate Services (PRS) more broadly in the context of changes in the PRS sector which assesses the need to improve the regulatory framework.

4.78 Ofcom is currently looking at the provision of customer service information in the fixed voice, mobile and broadband markets in our consultation on quality of service information.[100] We are also consulting on how to improve provider's complaints handling in our Review of Alternative Dispute Resolution and Complaints Handling Procedures.[101]

4.79 We expect to work further with industry to seek to ensure that consumer information is improved and negative experiences and unacceptable practices are minimised. We intend to conduct further research on these issues in the next phase of our Assessment.

Consultation questions

We would welcome feedback on any aspect of the analysis in this section. We are also interested in stakeholders' views on the questions:

Question 4.1: What is your experience, as an individual consumer or an organisation that uses mobile services?

[98] On 15 February 2008, the OFT sent out thousands of fake scam text messages to 18-24 year-old mobile phone users to raise awareness about scams. Press Release, http://www.oft.gov.uk/news/press/2008/21-08

[99] *Mobile phone-paid services and their marketing, A PhonepayPlus Review and Consultation document*, 17 July 2008 at http://www.phonepayplus.org.uk/pdfs_news/Mobile_White_Paper.pdf

[100] Ofcom, *Review of quality of service information*, 17 July 2008, at http://www.ofcom.org.uk/consult/condocs/qos08/qos08.pdf

[101] Ofcom, *Review of alternative dispute resolution and dispute handling procedures*, 10 July 2008, at http://www.ofcom.org.uk/consult/condocs/alt_dis_res/condoc.pdf

Question 4.2: How should regulators and policy-makers respond to signs of rising consumer concern?

Question 4.3: What are the important factors to consider in striking a balance between protecting mobile consumers and enabling markets to work flexibly? Have we got this balance right in today's mobile market?

Section 5

Citizens

Summary

5.1 This section sets out our initial views on how the mobile sector affects the interests of citizens in the UK. As citizens people are concerned not with their own personal interest, but with those issues which are important to them individually as members of society or which have wider benefits for society as a whole.[102]

5.2 First we explain why we believe mobile issues are important in terms of citizen interest. We discuss the consequences of not owning a mobile phone and ask how citizen opportunities, and concerns, about mobiles are evolving.

5.3 Secondly, we look at the difficulties some people have when accessing mobile services, whether because of where they live, affordability or issues about usability. The number of people who report themselves involuntarily excluded from mobile phone ownership in the UK is small, around one per cent of the total population. We intend to explore in more detail, why people are involuntarily excluded from mobile phone ownership in more detail in the next phase of this Assessment.

5.4 Thirdly, we ask how the current trends of mobile may affect citizens in the future.

5.5 We think that mobile phones already bring many positive benefits for citizens, and will continue to benefit us as citizens in the future. As mobile use has grown however, concerns such as inequalities in people's ability to access and use mobile services have also grown in significance.

5.6 Future changes, such as wide-spread take-up of location-based services (which are already available to early adopters) and increasing integration of personal data kept in mobile devices with internet-based services, look set to heighten concerns around privacy and personal security. Regulators and policy-makers have a responsibility to move to adapt regulation in response to these changes.

Why mobile has a 'citizen dimension'

5.7 Ofcom has a principal duty to further the interests of citizens.[103]

5.8 As noted in section 3, 84 per cent of UK citizens (8 years or older) use mobile devices today, with the overall total number of active accounts in use being over 120 per cent of the total population.[104]

5.9 Mobile phones are not used simply as devices to sustain economic activity; they are used to support all forms of interactions between people. Now and in the future, the use of mobile services enables social, political, educational and cultural activities, in

[102] Those interested in more detail about Ofcom's approach to citizen issues might want to see the recent paper, "Citizens, Communications and Convergence", available at http://www.ofcom.org.uk/consult/condocs/citizens/discussionpaper.pdf.
[103] Communications Act 2003, section 3.
[104] Many people choose to have more than one mobile subscription, or pay-as-you-go SIM card, for a variety of reasons, including: to take advantage of price promotions, or to save money when dialling the same network; for emergencies, e.g. keeping a spare mobile phone in a car; and as a result of being provided with a mobile phone for work.

ways that enhance but also go beyond our activities purely as consumers: to sustain friendships, contact within families, and, for example, contact among those organising for political or social causes.

5.10 As well as the benefits mobile services bring to individual citizens, the availability of mobile services is important to us collectively at times of national disaster, emergency or, for example, terrorist attack.[105]

5.11 Access to mobile services is not necessarily universal, and some people find it harder than others for a variety of reasons to use mobile services. In the eyes of some commentators, not having access to a mobile phone can be a substantial disadvantage. For example, research by the Joseph Rowntree Foundation published in June 2008 suggests that owning at least a pre-pay mobile phone is a prerequisite to being able to adequately participate in society.[106]

Mobile ownership presents a number of citizen opportunities and benefits

5.12 In this section we consider some of the possible impacts of mobile services on citizens' interests.

5.13 Given the growth in messaging and, more recently, data services, the impact of mobile services on citizens' interests is not limited to telephony. We expect mobile devices to become lighter and cheaper, and to have more functions in the future. From the integration of increasingly sophisticated cameras, to satellite navigation technology and software, mobile devices serve many purposes beyond making calls.

5.14 At the same time, citizens without mobile devices may find themselves marginalised in an increasingly mobile-focused society. It is relevant to ask how those without mobile services (or who do not have access to the full range of mobile services) may be affected - and how this is likely to change in the future.

5.15 It is also important to consider that exclusion might occur for individuals or groups of individuals, but also to areas of the country, where particular services or opportunities might not be made available.

Opportunities to use public services

5.16 Mobile devices may become more widely used to access public services. For example, mobile devices would make an ideal platform to provide real-time, location-based updates on local information, ranging from traffic congestion to community events (and in some cases, this is already occurring). While some of the issues raised by these services are primarily for the commercial sector (and the development of such services is likely to proceed first from commercial sources), it may also have an impact on public services.[107] Mobile delivery may be a cheaper

[105] For an illustrative example of this, please see the following newspaper report published following the attempted bombing of London on 21 July 2005, http://www.guardian.co.uk/media/2005/jul/21/newmedia.uknews

[106] Minimum income standard adopted in *A minimum income standard for Britain*¸ Joseph Rowntree Foundation, June 2008 [106] http://www.jrf.org.uk/bookshop/eBooks/2226-income-poverty-standards.pdf

[107] The use of communications services to make government service more accessible, particularly by using the internet, is now well established, and indicates one reason why we think that there is good cause to expect that, for example, mobile broadband may be able to play a role in making public services more widely available.

way of delivering some services – particularly if, for example, it removes the need to handle cash, especially for small transactions.[108]

5.17 The growing sophistication of mobile devices allows for their increasing use for financial transactions. The creation of a 'digital handbag' or 'digital wallet', with electronic or transactional services integrated into a single digital device, is one example although there are a number of different ways that payment and portability might be combined.[109] This technology, already developed, is getting closer to being a commercial reality for the mass market.[110] For example, bank cards and micro-payment mechanisms such as an Oyster card may be incorporated into a mobile device. If this proves to be the start of a wider move to use mobiles as a popular medium for payment, there may be a number of long-term citizen concerns about the hidden impact on those who do not have a mobile device.

5.18 As an illustrative example, the cost of a Zone 1 single fare paper ticket on the London Underground network is £2.50 more than paying by electronic ticket (Oyster card).[111] Should mobile phones be used for this type of transaction then the inability to pay for transport services (or access online banking, shopping, etc) via mobile, may mean that the best-value option is excluded as companies seek to reduce their costs by offering incentives to mobile users.

5.19 The main risk we see here arises not from offering the *option* of using mobile as a platform to access or receive public services, but from making it the *only* way to pay. This may be appropriate for some services or applications, but in thinking about these issues, it is important to keep in mind that, currently, around 16 per cent of the population does not have a mobile phone.

Democratic opportunities

5.20 'E-democracy' can take many forms, and can be hosted on the internet, as well as mobile platforms. It is possible that there may be a role for mobile devices in democratic processes - for example, as a tool in voter registration, or to alert voters about nearby polling stations using location information. Mobile services will also, inevitably, be used as an element of the communications between political candidates and parties, and the electorate.[112] Central Government, in the form of the (now defunct) Department for Constitutional Affairs and more recently the Ministry of Justice have responsibility for electoral modernisation and increasing democratic engagement. Since 2006 a number of pilots have taken place exploring various methods for modernising voting, including mobile voting.[113]

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[108] For example the City of Westminster is rolling out a scheme to replace traditional coin parking meters with a cashless.scheme. Motorists will be able to pay via credit card or their mobile phone. http://www.westminster.gov.uk/councilgovernmentanddemocracy/councils/pressoffice/news/pr-4126.cfm

[109] One example of how a digital wallet might operate is here http://www.plusminus.ru/call.html

[110] On 28 November 2007, Transport for London announced a partnership trial, with TranSys and O2, of a mobile handset incorporating Oyster technology, http://www.tfl.gov.uk/corporate/media/newscentre/archive/6592.aspx

[111] Prices accurate as at the time of writing (August 2008), and published to take effect from 2 January 2008. http://www.tfl.gov.uk/tickets/oysteronline/2732.aspx

[112] In August 2008, the presumptive Democratic Party US Presidential nominee, Senator Barack Obama, announced his choice of Vice-Presidential running mate, Senator Joe Biden, to supporters by text message as well as by email – see http://www.nytimes.com/2008/08/13/opinion/13graff.html.

[113] Information about these pilots can be found at http://www.dca.gov.uk/elections/process.htm and (footnote = http://www.justice.gov.uk/whatwedo/electoralmodernisation.htm)

5.21 The prospect of a society where access to democratic participation is materially easier for those with mobile handsets (or handsets with particular function) carries obvious risks of disenfranchising non-mobile citizens. Conversely, making it easier to find ways to vote using a mobile handset (or even vote directly) may enfranchise particular groups – for example, younger voters, who are relatively more likely to use mobile services, or house-bound citizens who might find such arrangements more secure and effective than the current postal system. In this situation, access to and the usability of mobile voting systems could become an important issue.

Health opportunities

5.22 An increasing number of GP's surgeries are now adopting technologies which enable users to receive text message reminders in order to reduce the number of missed appointments. These types of services can also send out important health messages such as invitations to receive flu jabs or attend asthma clinics. Increasingly these services are using patients' own medical records in order to specifically target health campaigns, such as stopping smoking or fighting obesity, more effectively.[114]

5.23 Future developments in the healthcare sector, as indicated in our report "Tomorrow's wireless world", may include the use of in-body networks, on-body monitors and smart drug dispensing to help health professionals to diagnose and monitor at-risk patients in their own home. [115] All of these devices rely on being able to send information across a mobile or wireless network.

5.24 As noted later in this chapter, those who are poorer, older or disabled are less likely to own a mobile phone – and these groups, for different reasons, often have relatively greater need to access health services than the general population. As more health services are promoted and delivered via mobile communications, not owning a mobile phone or having access to a mobile network could affect the ability of, for example, public health initiatives to be fully effective - in the extreme, with the risk of those most in need of medical support missing out.

Social opportunities

5.25 Web-based social networking has enjoyed a striking rise in popularity.[116] These networks allow communications that would previously have been conducted face-to-face, or over the phone, to take place in other ways. As online social networking sites grow and diversify their services, they are increasingly looking towards mobile as a way to offer access to their users. Many mobile operators are integrating mobile access within their packages, for example offering convenient access to social networking sites such as Facebook, Bebo and Myspace, (and related services like Twitter) as part of their tariff bundles.[117] The ability to integrate such services with location information provides a new sort of immediacy: the prospect of services that integrate 'social proximity' ("who are my friends?") with physical proximity ("are any of my friends nearby?"). The social impact of these services could be significant.

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[114] See, for example, this announcement about the success of a text-message anti-smoking campaign in Barking and Dagenham: http://www.bdpct.nhs.uk/news.aspx?id=2204

[115] http://www.ofcom.org.uk/research/technology/overview/randd0708/randd0708.pdf

[116] Our research in 2007 showed that 22% of UK adults have set up their own page or profile on a social networking site, but that this rises to 54% of adults aged 16-24, http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/socialnetworking

[117] For example, http://www.vodafone.com/start/media_relations/news/local_press_releases/uk_press_releases/2007/unlimited_internet.html

5.26 Given that not everyone has a mobile, there is the risk of a digital divide among citizens. One part of society, the mobile-savvy, could prefer to conduct the majority of their interaction via mobile and social networking, placing limits on their opportunities to interact with non-mobile users. The other part of society, non-mobile users, may continue interacting in a more traditional way, but with less interaction with mobile users than previously. As among groups of consumers, the fact that some people use mobile phones or social networking and some people don't, may not be particularly significant. However, for us as citizens, the fact that some people don't interact with other people, as a result of their access to technology, may be significant.

As mobile use changes, non-economic concerns of mobile users have become more important

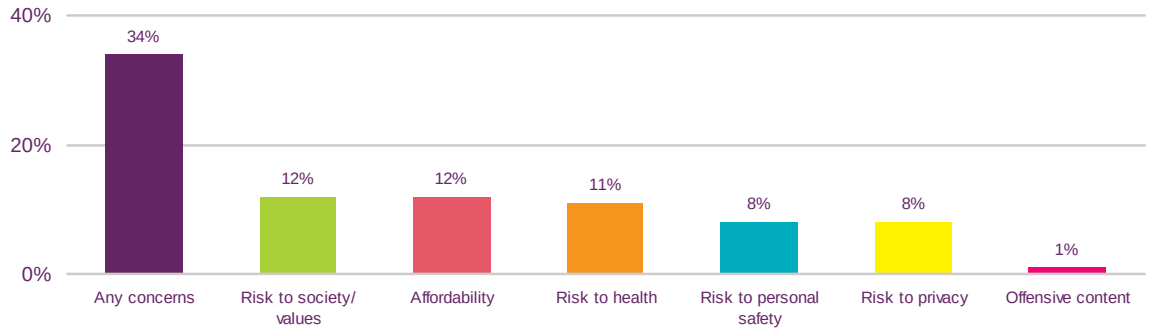
5.27 The increasing sophistication of mobile devices and changes to the mobile market, provides greater opportunities for mobile users but also the potential for tension and anxiety for some citizens.

5.28 Research undertaken during our 2008 Media Literacy Audit identified a number of concerns among mobile users.[118] The unprompted responses were grouped into the following themes:

- risk to society/ values - relating to responses such as misuse of camera phones, 'happy slapping', children having phones at a young age and paedophiles contacting children;
- affordability - relating to responses such as cost of calls generally and cost of calls when abroad;
- risk to health - relating to responses such as health concerns from using handsets and from masts;
- risk to personal safety - relating to responses such as being a target for stealing mobile phones;
- risk to privacy - relating to responses such as intrusion into other people's space, a public space and the proliferation of junk and spam text messages; and
- offensive content – including access to inappropriate content by minors.

[118] http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/ml_adult08/aannex.pdf

Figure 66: Concerns about mobile phones



Source: Ofcom research, fieldwork carried out by Saville Rossiter-Base in October to December 2007
Can you tell me if you have any concerns about mobile phones?
Base: All adults aged 16+ (206 aged 16-19, 207 aged 20-24, 473 aged 25-34, 661 aged 35-44, 489 aged 45-54, 341 aged 55-64, 356 aged 65-74, 167 aged 75+)

5.29 Over one-third of respondents had at least one concern related to mobiles.

5.30 Community concerns surrounding health risks, affordability and risk to personal safety have been reported by people in poll data for a number of years.[119] Risks to personal safety are often reported in the context of street crime.[120]

5.31 Concerns surrounding society/values and the risk to privacy are more recent developments. This may reflect growing awareness and anxiety about take-up of mobile services by children. These responses relate to issues that are, broadly speaking, beyond Ofcom's remit. Issues regarding privacy and mobile phones raise some questions for governments and, for example, the Information Commissioner's Office.[121]

5.32 The data shows that the level of concern is roughly similar with the exception being in the 'offensive content' category which is currently not as significant a worry as the other areas – reflecting, possibly, the still-emerging nature of access to content on mobile devices and self-regulatory efforts to address these issues.[122]

Some people choose not to have a mobile phone while others have difficulty accessing mobile services

5.33 We estimate that roughly 7.4m people do not use or have access to a mobile phone.[123]

5.34 Of these 7.4m people, our survey suggests that two-thirds have *chosen* not to have one. (Figure 69 below shows the reasons given for not owning a mobile).

[119] For further details on mobile phones and public health please see - http://www.ofcom.org.uk/consumeradvice/mobile/health/
[120] The Home Office reported that in 2007, that in 50 per cent of robberies a mobile phone and in one-third of robberies only a mobile phone is the only item taken (http://www.homeoffice.gov.uk/crime-victims/reducing-crime/robbery). Already in September 2003, Metropolitan Police undertook a campaign to encourage mobile users to keep their phones out of sight in busy public places to increase their safety (http://www.met.police.uk/campaigns/safer_streets/index.htm)
[121] The website of the Information Commissioner's Office can be found under http://www.ico.gov.uk
[122] The mobile industry has also adopted a self-regulatory regime, the Independent Mobile Classification Body (IMCB), http://www.imcb.org.uk
[123] This corresponds to 16% of people over the age of 8, or 15% of adults (16+).

5.35 Of those who don't have a mobile, only eight per cent - or slightly below 600,000 people - appear not have a mobile for involuntary reasons.[124] Although this is small percentage (around one per cent of the total population), the impact of exclusion on this group may be significant, particularly if the market is failing to address the needs of some of the most vulnerable citizens. (Interestingly, the absolute proportion of the population who cite themselves as involuntarily excluded (one per cent) is roughly the same as those who live outside mobile coverage areas – although even those who live outside those areas may be mobile users if, for example, they commute for work and use a mobile for work).

5.36 We intend to explore question of involuntary exclusion from the mobile market more in the next phase of our Assessment.

Figure 67: Non-ownership of mobile phones

Source: Ofcom communications tracking survey Q3 and Q4 2007
Can you tell me if you intend to get digital television/internet access/mobile phone at home in the next year or so?/ And can you tell me why that is?
Base: All adults aged 16+ who do not have mobile phone at home (n=517)

5.37 Based on our understanding of today's market, we have no concerns about the exclusion of those who, not facing any obstacles of affordability, ability or expertise, elect not to have a mobile device by choice. In a free society, the adoption of mobile telecommunications or any other form of communications is a matter of choice, not compulsion. With any technology, there are some citizens who elect to 'opt out'. Their reasons are as varied as the individuals involved, but some choose not to engage with new technology, while others do not have a desire or need to be easily contactable all the time.

5.38 At the same time, it is also relevant to at least understand how and why people are exercising that choice; for example, attitudes to new technologies may vary between different sections of society.[125] Policy-makers need to be aware how many choose not to have services, so that they do not inadvertently craft policies based on an implicit assumption that everyone uses that service.

Rational cost calculations may drive the choice not to have a mobile phone

5.39 Individual circumstances dictate the amount of disposable income available to spend on household and consumer items, such as mobile phones. Research from the Office for National Statistics places UK gross disposable average income at £1,150 per month.[126] How income is used by individuals is of course a subjective exercise,

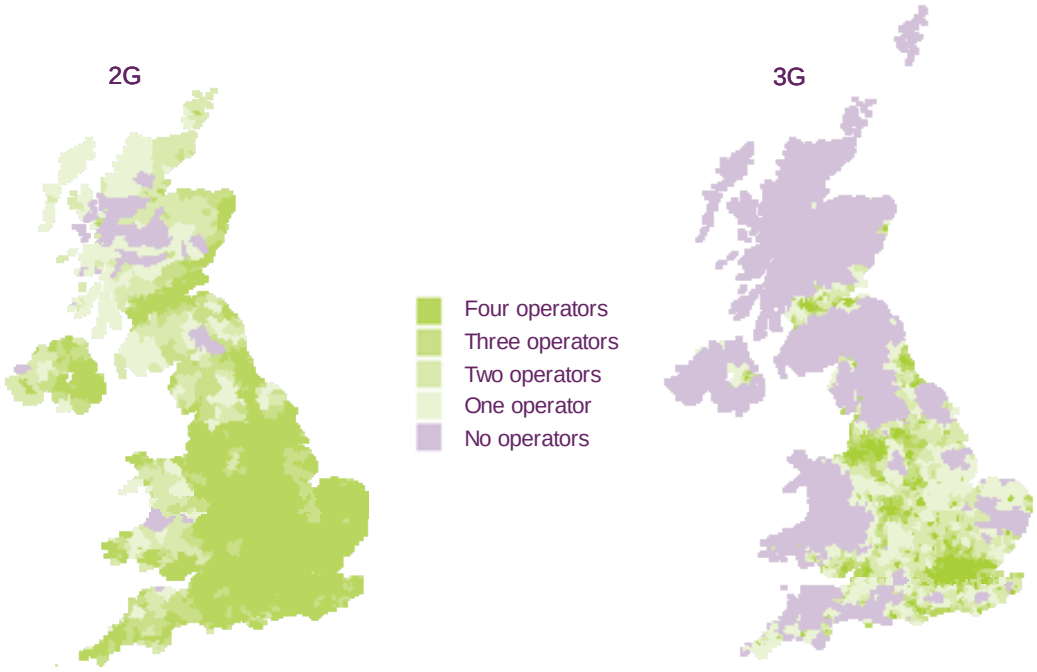
[124] These calculations are approximations only and gloss over a number of complexities – for example, assuming that the survey data, where respondents were 16+, can be extrapolated to population data based on 8+. But we consider that it is sufficient to provide a rough estimate of the scale of involuntary exclusion from the mobile market.
[125] As an illustrative example of this, *The Independent* newspaper recently profiled a range of people who proactively opted out of mobile - http://www.independent.co.uk/life-style/gadgets-and-tech/features/no-signal-the-mobile-phone-refuseniks-834233.html
[126] Gross disposable household income, known as household income, represents the amount of money available to individuals less taxes, National Insurance and pension contributions, property

however some citizens need to make careful rational cost calculations when choosing their telecommunications services. This may include choosing between a fixed and a mobile service – an issue that we intend to explore further in the up-coming Fixed Narrowband Market Review.

Some people still do not have access to mobile networks

Most nations and regions are less well served than London and the Northwest

Figure 68: Map of 2G and 3G mobile phone geographic coverage in the UK



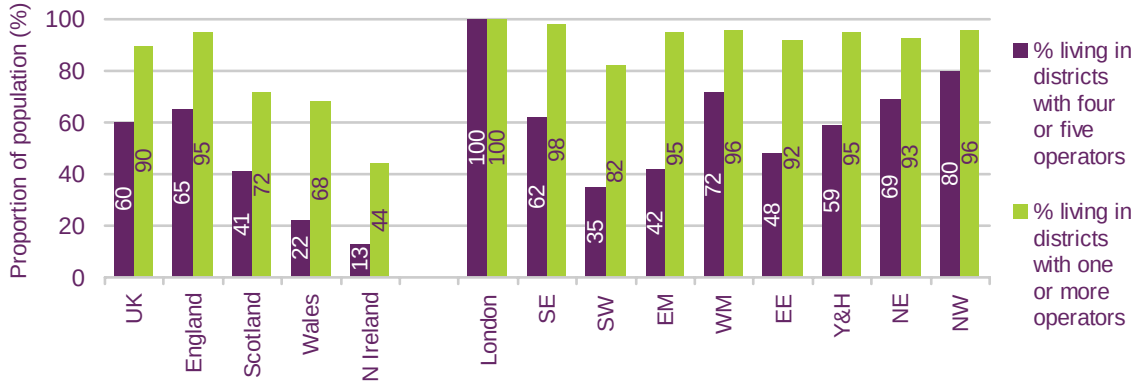
Source: Ofcom / GSM Association / Europa Technologies Q1 2008-08-07
Note: Map shows the number of 2G and 3G operators with at least 75 per cent coverage area

5.40 Mobile network coverage is generally good in the UK, although there are still areas of the UK which are not served by some or all of the operators. People living in those areas may be restricted in using mobile voice and data services.

5.41 Coverage of 2G networks is far more extensive than 3G networks, as shown on the maps in Figure 68.

costs (e.g. mortgage interest) and other interest paid (e.g. bank loans).
http://www.statistics.gov.uk/CCI/nugget.asp?ID=1552&Pos=1&ColRank=2&Rank=1000

Figure 69: 3G mobile phone population coverage



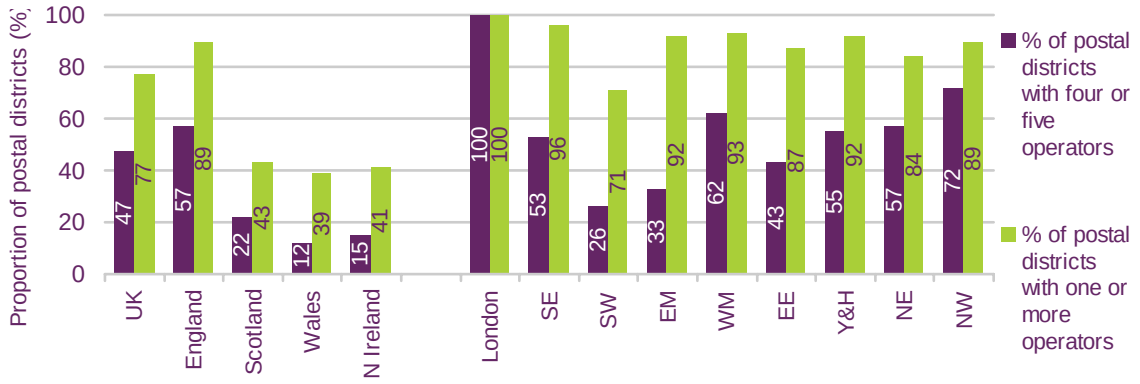
Source: GSM Association / Europa Technologies; Q1 2008
Note: Figures show the percentage of population within postcode districts where at least one or four or five operators had at least 75 per cent 3G area coverage

5.42 Figure 69 shows how the level of 3G coverage varies from the overall UK average. A We have considered 3G in more detail as this is the most prominent new technology – and 3G coverage is a critical issue for the growth of new services, like mobile broadband, that are particularly the subject of this long-term Assessment of the sector. All five UK 3G networks reach at least 80 per cent of the UK population (which is a requirement of the 3G spectrum licences).[127]

5.43 Unsurprisingly, coverage focuses on areas with high population density. London and the North West (Manchester and Liverpool conurbations) have greater levels of coverage, as the majority of people in these areas live in highly concentrated urban areas. Scotland, Wales and Northern Ireland have less coverage when compared with the UK average, and in particular when compared with London and the Northwest of England.

5.44 Figure 70 shows that the distribution is similar, if measured by geographic coverage.

Figure 70: 3G mobile phone geographic coverage



Source: GSM Association / Europa Technologies; Q1 2008
Note: Figures show the percentage postcode districts where at least one or four or five operators had at least 75 per cent 3G area coverage

[127] We recently determined that all five operators have reached this minimum coverage level (see our press release of 2 May 2008 at, http://www.ofcom.org.uk/media/news/2008/05/nr_20080502a). Further assessment will be undertaken to make sure all the MNOs maintain their obligations in the future.

5.45 Providing coverage in areas of mountainous and hilly terrain can incur higher costs for operators than in other areas. If population densities in these challenging environments are low (and as a result there is a low demand to make and receive calls) it may not be commercially viable for operators to extend coverage to these areas.

5.46 Those people living or working in areas which are not served at all by the mobile networks must rely on fixed telephony at their main premises (if available). For businesses, particularly SMEs, the need to operate and market both fixed and mobile contact details may result in increased costs and inefficient communication with their customers and suppliers.

5.47 While not always resulting in total exclusion from mobile services; intermittent or unreliable coverage may lead to 'partial' exclusion. This may also occur when people travel through areas with a lack of coverage. For example, the ability to establish or maintain a mobile call may result in reduced productivity for mobile workers, and may result in lost business. For citizens, lack of reliable coverage may affect quality of life, particularly for those who rely on mobile connectivity for peace of mind, such as children and their parents, and the elderly. Lack of access to emergency services is also, obviously, a source of potential concern.

5.48 Quantifying the impact of partial exclusion resulting from gaps in mobile coverage is problematic due to the complexity of quantifying un-met demand and the resulting loss to citizens and consumers.

5.49 In the UK, Universal Service Obligations (USO) ensures that basic fixed line services are available at an affordable price to all citizens. Presently, there is no similar obligation placed upon mobile operators. It is possible that technological improvements may see geographic disparities erode over time. Although it is too early to comment on any recent improvements, rollout of new networks and technologies such as RAN-sharing, LTE, or WiMAX may see the levels of coverage change. Alternatively, the way we think about universal access and universal service may evolve, becoming more technology-neutral over time.

5.50 These issues are discussed further in section 8.

Cost, coverage and lack of knowledge of the benefits are the key reasons that citizens are involuntarily excluded from mobile services

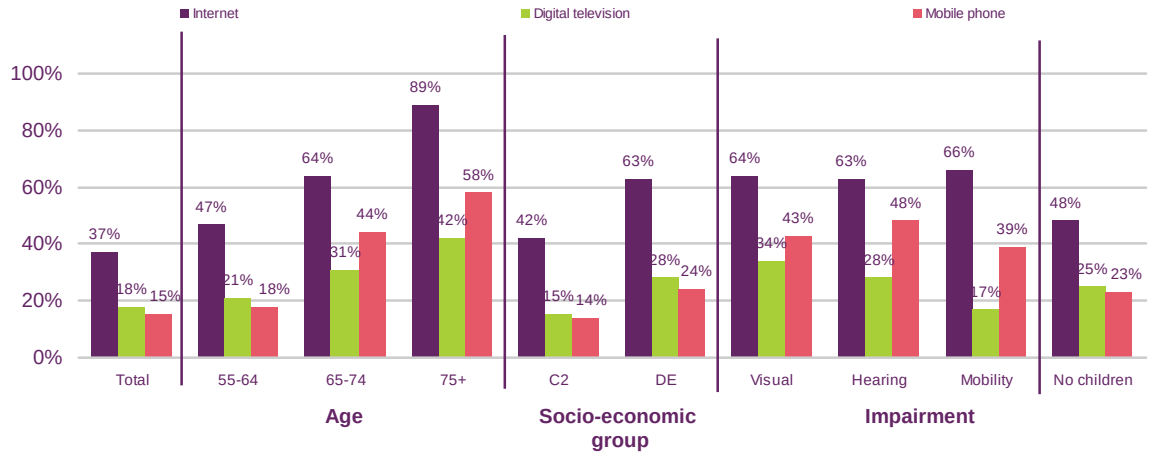
5.51 Most people believe they receive good value-for-money from the mobile sector (as discussed in section 4), but the affordability of mobile services in UK remains a concern for certain groups of people.[128] These issues are further considered below.

Older and disabled people are less likely to have a mobile phone than the rest of the population

5.52 Both older and disabled people have lower levels of mobile ownership than the UK population as a whole.

[128] Ofcom 2006, *Consumer engagement with Digital Communications Services* p.40 and Ofcom 2008 *Media Literacy Audit* p.78

Figure 71: Levels of non-ownership among older and disabled people compared with other core groups, and other services:



Source: Ofcom research, field work carried out by Saville Rossiter – Base in October to December 2007
Base: All adults 16+ (2905)
T1 / TN1 / M1 _ Various

5.53 Figure 71 shows the levels of mobile non-ownership that exists for older and disabled people.[129] The total level of non-ownership of mobile found among the general population in the Media Literacy survey is 15 per cent.[130]

5.54 Those people in the 55-64 age group display a similar level of take-up with only 18 per cent not owning a mobile. However, in the 65-74 and 75+ age groups there is a marked change, with a significant number, if not a majority of people *not* owning a mobile. As well as take-up, usage is also lower; as noted in our 2008 Communications Market Report, only 7 per cent of users aged over 65 make a mobile call every day (compared with half of all adults), 5 per cent send a text daily (compared to 48 per cent of all adults) and nearly nine in ten older users have pre-pay services, not a contract.[131]

5.55 Disabled users are also less likely to use mobile services. This is particularly striking when considering those who are impaired in their physical mobility. One of the benefits of mobile phones is convenience – calls can be made on demand and devices are easily accessible. Mobile should therefore be capable of playing a positive role in the lives of UK citizens who are disabled, yet non-ownership is higher among this group of people than in the UK as a whole.

5.56 Research by the consumer group "Which?" has shown that there are a number of mobile devices designed to be easy to use, and accessible to a range of different users (such as elderly and disabled people), although sometimes there may be an extra price associated with purchasing specialist phones.[132] Some specialist organisations such as the Royal National Institute for Deaf People (RNID) and the Royal National Institute for Blind People (RNIB) provide user information and fact

[129] There will, of course be some overlap between these groups as well as between elderly and disabled and those on lowe incomes.
[130] Note that more recent analysis suggests that for the total of the UK population, at the end of 2007, that number was actually 16 per cent.
[131] UK Communications Market Report 2008 at paragraph 1.4.1 (the report is available in full at: http://www.ofcom.org.uk/research/cm/cmr08/).
[132] Published May 2008 in print and on http://www.which.co.uk/

sheets offering advice when buying and selecting mobile phones.[133] The RNID also provide free mobile textphone software capable of operating real-time character-by-character text for making calls via a text relay services, but this is only available for outgoing calls and does not support calls to emergency services.[134]

5.57 People with visual and hearing impairments found the RNIB and RNID helpful sources of information for advice on mobile handsets, services and specialist equipment/devices.[135]

5.58 People with visual impairment indicated that improvements could be made in terms of streamlining the pre-pay top-up service and the training of customer service staff in speech software. They were generally aware of several networks and supplier offers, however for those who used talking software their choice of handsets, and therefore network, was limited (as not all handsets are compatible).[136]

5.59 People with hearing difficulties found the mainstream appeal of the mobile, its SMS focus and access to other non-voice functions often outweighed the potential barriers to usage.[137]

5.60 Overall, it is unclear why these groups don't have higher levels of mobile ownership. As with other forms of exclusion, further research of this issue and engagement with stakeholders will be undertaken in the next phase of our Assessment.

Looking forward, mobile services brings new possibilities, but also new risks

Access to safety of life services

5.61 Fixed networks have historically been a robust way to communicate even when other systems, such as power systems supplying homes, are not working. Of course, mobile networks are already used to deliver a significant proportion of 999 calls made in the UK. It is undoubtedly true that the ability to use mobile services has enabled emergency services to respond faster and more accurately to 999 calls (for example, in remote areas where there is good network coverage) than could have been possible using only fixed services.

[133] http://www.rnid.org.uk/information_resources/factsheets/equipment/factsheets_leaflets/mobile_phones_information_for_deaf_and_hard_of_hearing_people.htm and http://www.rnib.org.uk/xpedio/groups/public/documents/publicwebsite/public_mobphonesfactsheet.hcsp

[134] A service based on an ongoing agreement between the RNID, BT and Ofcom - http://www.typetalk.org.

[135] These list specialist equipment and also a comparison of more mainstream equipment available in the marketplace. Much of the equipment, especially for those with visual impairments, is designed to meet only the basic needs of voice / text communication and the more advanced functions appearing in mainstream products have not yet been fully adapted for models which would be used by those with visual or hearing impairments. (Ofcom 2007, *Consumer Experience Report* has a specialist report on those with hearing impairment).

[136] While respondents recognised the value of larger screen sizes and buttons (for those with mild/moderate impairment), they were concerned with the size of the phone relative to mainstream devices. For further detail please refer to http://www.ofcom.org.uk/research/tv/reports/visual/. This report is based on a qualitative research programme conducted between 25 February and 5 April 2008 consisting of 40 two hour interviews.

[137] For example, inferior/inconsistent sound quality, problems with compatibility of specialist equipment and concerns about the cost of equipment to improve the user experience (e.g. Bluetooth).

5.62 However, growing use of mobile services and the growth in 'mobile-only' households could, in future, affect overall performance of 999 services, particularly given limits to mobile network coverage and a lack of roaming for emergency calls.

5.63 Separately, there are also issues about whether there is a wider social value in setting parameters for the quality and robustness for example to minimise the loss of service in the event of disaster. More than at any other time, we turn to communications networks for critical information in the event of a terrorist attack, or a natural disaster. In the US, following Hurricane Katrina, this concern has led the Federal Communications Committee (FCC) to require cellular (mobile) operators to have backup power facilities at all cell sites, to prevent short-term mobile blackouts.[138]

5.64 Developments in mobile, and the networks used, may lead to improvements being made to safety of life services. For example, increasing use of technologies that allow mobile users to be located even more precisely than today's 'triangulation' methods may be further integrated in 999 access. (Callers to emergency services are already able to be located to an extent by the mobile networks triangulating their location, saving valuable time and providing useful information when emergency calls are made). In future, these services may be able to access more accurate information, such as GPS data.

5.65 This issue is discussed in more detail in section 8.

Security and privacy concerns are growing

5.66 The risk to privacy that mobile phones may bring is an area of growing concern for some citizens. A device that is carried by the individual, and that contains much information that is highly personalised, carries an inherent ability to compromise our privacy if it falls into the hands of others, or if the data on it is used without our permission. Recent issues concerning the loss of information by public organisations has brought the issue of data security to the fore.[139] As mobiles become more sophisticated, incorporating payment functions and containing personal data, the types of information they store is becoming more sensitive, and the necessity of keeping that information secure is increasing.

5.67 The introduction of location based services on mobile phones, such as GPS and satellite navigation technology, means that organisations have the capabilities to locate users. The use and security of this information is likely to be an important topic for consideration.

5.68 Citizens' awareness of the access that is given to personal data (identity and location – despite positive consent to that through click based 'opt-in') through mobile devices is relatively low and their concerns about identity theft and loss of personal details is rising.[140] For example:

[138] The requirement to have an energy back-up power source applies to both fixed and mobile operators. The FCC's order can be found under http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-107A1.pdf, recent online reports state that some cellular (mobile) operators have appealed against this order (e.g. see http://www.msnbc.msn.com/id/23523577/).

[139] For example, http://news.bbc.co.uk/1/hi/uk_politics/7103828.stm.

[140] See, for example, this report from POST an office of both Houses of Parliament, charged with providing independent analysis of public policy issues that have a basis in science and technology, http://www.parliament.uk/post/pn183.pdf.

- Ofcom research highlighted citizens' increasing concern regarding identity theft, with a 15 per cent increase between 2005 and 2007.[141] This appears to influence some consumer's behaviour regarding the internet, with around one-fifth stating they would never enter their mobile phone number, debit card details or home phone number when registering on a website.[142]

- A report published by the Ofcom Consumer Panel in March 2008 identified a number of specific privacy concerns which included the threat of spam, collection and storage of personal data.[143]

5.69 While these concerns have been raised more in relation to the internet as a platform, as internet access is a service also provided via mobile phones, it may be necessary to consider their impact on mobile consumers. Respondents also felt that the mobile phone would increasingly be exploited by marketers, with a sense of being "under siege".[144]

5.70 The 'digital handbag' noted above brings a number of potential consumer benefits. However, alongside these benefits of device convergence come some understandable risks. The integration of transactional services, alongside other electronic services (key access to cars and the home) brings risks not previously associated with mobiles, for example, "how do I get into my house, if I've lost my phone?" The full scale of device convergence is uncertain – this is therefore one of those areas where rapid developments can spring surprises. This is an area where the appropriate authorities, including Ofcom, will need to be alert to the possibilities of rapid change.

Consultation questions

We would welcome feedback on any aspect of the market analysis in this section.

We are also interested in stakeholders' views on these questions:

Question 5.1: How does the use of mobile services affect our participation as citizens in society?

Question 5.2: What factors should we take into account in thinking about access and inclusion issues in mobile markets?

Question 5.3: What factors should we take into account in thinking about new services, and how those services may affect issues like protection of children, privacy and security?

Question 5.4: Have you been affected by issues about coverage or 'not spots'? How has it affected you?

[141] Page 66 Media Literacy Report 2008, last paragraph. This figure may be subject to upward bias due to its sampling time.
[142] Page 63 Media Literacy Report 2008, last paragraph.
[143] Page 31 "Switched On", Ofcom Consumer Panel March 2008, available at http://www.ofcomconsumerpanel.org.uk/information/documents/Switchedon.pdf).
[144] Page 31 "Switched On", Ofcom Consumer Panel March 2008, available at http://www.ofcomconsumerpanel.org.uk/information/documents/Switchedon.pdf).

Section 6

Regulation

Summary

6.1 This section sets out a brief overview of the most significant forms of regulation in place that affect the mobile sector.

6.2 Our aim in including this material is to provide a common understanding of the current regulatory landscape, particularly for those stakeholders who are less familiar with the regulatory regime. We discuss in section 8 some of the implications of the market changes for future regulation.

The purpose of regulation is to deliver our statutory duties and international obligations

6.3 Ofcom's principal duty as the sectoral regulator is to:

> "further the interests of citizens in relation to communications matters; and to further the interests of consumers in relevant markets, where appropriate by promoting competition."

6.4 With respect to the mobile sector, regulation has focused on the need to promote competition, protect and empower consumers, and improve efficient use of spectrum. This section surveys the most significant regulatory interventions that Ofcom has undertaken in relation to the sector, either because we have decided to do so, or because those interventions have been required by, for example, the European Commission.

6.5 Ofcom's role as a regulator is governed by those powers and duties conferred on us by Parliament and set out in various laws. The most significant Acts that relate to Ofcom's work are:

- Communications Act 2003. This Act gives effect to much of the regulatory framework for electronic communications that has been established by the European Commission across the European Union (which is set out in four principal directives);[145]
- Wireless Telegraphy Act 2006. This Act, which consolidated a number of earlier pieces of legislation, sets out the regime for licensing the right to use spectrum, and empowers Ofcom to take action to prevent unlicensed use of spectrum;
- Competition Act 1998. This Act has far-reaching effects across the UK economy, setting out the UK's basic competition law. Ofcom is one of a number of concurrent regulators empowered to enforce competition law. Ofcom, as a concurrent regulator of the communications sector, also has powers to apply and enforce Articles 81 and 82 of the EC Treaty in competition matters where they may affect trade between Member states; and

[145] Directive 2002/19/EC, Directive 2002/20/EC, Directive 2002/21/EC, Directive 2002/22/EC and Directive 2002/58/EC. See also the Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC.

- Enterprise Act 2002. Like the Competition Act, this Act forms part of the UK's competition law regime, providing the mechanism for Ofcom (and other regulators) to refer matters to the Competition Commission. It also provides the framework for Ofcom (and other regulators) to enforce various UK laws to protect consumers, and for the assessment of mergers and acquisitions.

6.6 Most of our regulation focuses on the following areas:

Competition – Ofcom has two distinct roles with respect to competition:

The first is as the **sectoral regulator** for the communications sector, acting in accordance with the powers and duties set out in the Communications Act. Relevantly, this includes the duty to promote competition when exercising our sectoral powers. When acting as a sectoral regulator, Ofcom aims to ensure competition is encouraged where possible, and where competition does not work effectively, imposes rules that address market failure (including, where needed, regulating prices to cost-oriented rates).

The second is as a **national competition authority (NCA)**, empowered to enforce competition law in the sectors we regulate. Our powers and duties when acting as an NCA are very similar to those of the OFT and other concurrent regulators. Acting as an NCA, Ofcom conducts investigations and is empowered to take action against agreements that are contrary to competition law and against abuses of a dominant position.

Consumer – Similar to our role in relation to competition, Ofcom has two sets of powers and duties in relation to consumer law:

The first is as the sectoral regulator, imposing rules that apply to communications markets specifically, and taking action to enforce those rules. An example (from outside the mobile sector) are rules in relation to the selling of fixed-line telecommunications services to prevent slamming and mis-selling.

The second is as a national regulatory agency listed under the Enterprise Act as an enforcer of UK consumer law. Ofcom uses these powers to take action in relation to conduct that fails to comply with UK consumer law, which applies to all sectors.

Content – Ofcom is the UK's regulator of broadcast content, setting and giving effect to standards with respect to the material people see on TV and hear on radio. In mobile, our responsibilities as content regulator include our examination of the current self and co-regulatory regime, governing the provision of content, e.g. video, photos, gaming and audio on mobile phones.

Spectrum – One of Ofcom's most significant responsibilities (in terms of overall impact on the UK economy) is our role as the UK's spectrum regulator. Ofcom has adopted a strategic spectrum framework which commits us to using market-based mechanisms as far as possible to replace previous 'command-and-control' spectrum management principles. Given that mobile services depend by their nature on the use of radio spectrum, this role is obviously relevant to the sector.

6.7 Ofcom is accountable to Parliament in the Select Committee process, with senior officials appearing before elected representatives to take questions and provide information about our actions.[146] Our actions are also subject to appeal (with many of our statutory powers subject to review on appeal by the Competition Appeal Tribunal) and, as with all those exercising public authority, to judicial review.[147]

6.8 The mobile sector is subject to regulation from a range of sources, not just Ofcom. Examples of these are:

- the European Commission which has the ability to make decisions that are binding on all member states;
- the regime regulating mergers, administered by the OFT and the Competition Commission; and
- the self-regulatory regime for advertising, administered by the Advertising Standards Authority.

6.9 Certain issues in the mobile sector are addressed by self- or co-regulation. 'Self-regulation' is when the relevant industry comes together to set a code of conduct or guidelines, designed to mitigate the need for formal regulatory intervention. In other words, there is no formal oversight or participation of the regulator or government and, in particular, there is no *ex ante,* legal backstop in a self-regulatory scheme to act as the ultimate guarantor of enforcement. 'Co-regulation', by contrast, involves both industry and the government (or the regulator) administering and enforcing a solution to a greater or lesser extent, depending on the particular design of a scheme and what it is trying to achieve.

Competition regulation: dealing with market power and market failure

6.10 Under the Communications Act, we have the power to impose rules on communications providers with significant market power (SMP) in particular markets, and rules on all providers as general conditions.[148] We also determine disputes between providers of electronic communications networks and services.[149] Furthermore, we are also accountable to the EU, which has a number of responsibilities regarding competition in mobile at the European level.

6.11 Ofcom's accountability to the EU includes the regulation of mobile numbering and portability, international roaming and mobile termination rates.

[146] For illustrative purposes, Ofcom representatives attended a Joint Select Committee comprised of the Culture, Media and Sport Committee and the Business and Enterprise Committee on 22 April 2008 to discuss the Ofcom Annual Plan, http://www.parliament.uk/parliamentary_committees/berr/becpn30.cfm.
[147] For more information, see the Competition Appeal Tribunal's website at, http://www.catribunal.org.uk
[148] Section 45 of the Communications Act sets out Ofcom's powers to impose general conditions and significant market power conditions.
[149] Ofcom's dispute resolution powers are set out in sections 185 to 191 of the Communications Act. A detailed discussion of their operation can be found in Ofcom's Draft Enforcement Guidelines at, http://www.ofcom.org.uk/consult/condocs/enforcement/

Mobile numbering and portability

6.12 As part of our general responsibilities in relation to telephone numbering, Ofcom has designated the following ranges of numbers for use in connection with mobile services in the National Telephone Numbering Plan (the 'Numbering Plan'):[150]

071XX XXX XXX to 075XX XXX XXX

077XX XXX XXX to 079XX XXX XXX

6.13 Limiting mobile numbers to these ranges helps to increase consumer transparency about the type (and associated cost) of the service they are calling. Ofcom continues to analyse the effects of our current numbering policy, and consider potential future changes.

6.14 What constitutes a 'mobile service' in this context is set out in the Numbering Plan:

> "'Mobile Service' means a service consisting in the conveyance of Signals, by means of an Electronic Communications Network, where every Signal that is conveyed thereby has been, or is to be, conveyed through the agency of Wireless Telegraphy to or from Apparatus designed or adapted to be capable of being used while in motion."[151]

6.15 This definition is relatively wide, in that it may include not only mobile-to-mobile communications (such as mobile telephone calls and SMS) but also services that are offered to consumers using mobile devices (such as mobile multimedia services).

6.16 Many consumers value their mobile number, and would incur effort and expense if required to change their number when changing mobile provider. Therefore, Ofcom has sought to promote competition by setting rules for mobile number portability. Number portability enables consumers to retain their telephone number(s) when they change provider. Historically, although number portability has been possible, the amount of time taken for consumers to port their number as well as the need to contact the existing provider for approval to port have acted as a disincentive to make use of the facility.

6.17 In 2006, we considered that enhancements were needed to improve the ease of use, reliability and convenience of that system for consumers, thereby promoting competition in the UK telecommunications industry.[152]

6.18 Following a consultation in July 2007, we introduced modifications to General Condition 18 in November 2007, designed to modify the number porting process.[153] In summary those modifications led to:

- Fixed and mobile operators being required to establish a common database to allow direct routing of calls to fixed and mobile ported numbers, thereby removing customers' reliance on their previous providers' networks and ensuring customers are not vulnerable to such providers' commercial or technical failure. Direct routing of calls to mobile numbers will be introduced on 1 September 2009.

[150] The Numbering Plan is published on Ofcom's website http://www.ofcom.org.uk/telecoms/ioi/numbers/
[151] http://www.ofcom.org.uk/telecoms/ioi/numbers/numplan170608.pdf
[152] "Review of General condition 18 – Number portability" published by Ofcom November 2006
[153] http://www.ofcom.org.uk/consult/condocs/gc18review/numberportability.pdf

- Mobile porting lead times being reduced to a maximum period of two working days from 31 March 2008, the process of porting mobile numbers becoming recipient led from 1 September 2009 and the lead time to port becoming near-instant (two hours or less) by the same date. This was to ensure that there is an incentive on new providers to promote porting and make the porting experience for consumers quick and convenient.

6.19 Ofcom's decision to impose these modifications is currently the subject of an appeal to the Competition Appeal Tribunal (CAT).[154]

International roaming

6.20 The ability for mobile handsets sold in one country to work in different countries using networks other than the original supplier's home network (international roaming) has been a technical capability for most handsets for some time. However, the costs for consumers of international roaming have historically been very high, relative to the price of the same services within the UK.

6.21 In June 2007 the Council of the European Union and European Parliament adopted EU mobile roaming regulation that sets maximum price limits for wholesale and retail roaming charges.[155] This Regulation also requires each operator to provide its customers with basic personalised pricing information (via SMS) when entering a new Member State.

6.22 The European Commission is obliged to monitor the functioning of the Regulation. As part of this monitoring it launched a public consultation, which closed on 2 July 2008. The Commission will report to the Council and European Parliament with any recommendations by December 2008. At this point decisions will be made whether to extend the scope (to cover SMS and mobile data services) or whether to extend the current end date of 30 June 2010.

6.23 Extending the regulations to cover SMS and mobile data services would be likely to bring consumer benefit by increasing pricing transparency and reducing the potential for bill-shock. At the same time, it could also increase the risks of possible regulatory failures (for example, by generating unintended consequences), particularly if that regulation is not carefully tailored and targeted.

Mobile termination rates

6.24 In order for customers of different networks to be able to call each other, telecommunications networks, including mobile networks, need to be connected to each other. One long-standing role of telecommunications regulators across the world has been to help ensure adequate interconnection of telecommunications networks. Without regulation, large networks might seek to refuse interconnection to small networks, and thereby undermine competition – since small networks could not offer an attractive service to new customers. This reflects the feature of communications networks that the more people you can reach and be reached by on a network, the more valuable its service is likely to be to you.

[154] Further information on this appeal can be found on the CAT's website under "Current Cases", at www.catribunal.org.uk.
[155] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:171:0032:0040:EN:PDF

6.25 In practice, network operators conclude interconnection agreements, setting out the terms and conditions on which they will interconnect – with Ofcom resolving disputes concerning those agreements if either party asks it to do so.

6.26 One of the services that is provided between network operators is call termination – that is, the completion of a call to a customer of another network. Mobile voice call termination is the service necessary for a network operator to connect a caller with the intended mobile recipient of a call on a different network. Under current interconnection practices, the network of the customer making the call pays an amount (known as the wholesale mobile call termination rate) to the network of the customer being called.[156]

6.27 When considering the competitive characteristics of call termination, most regulators across the world have concluded that, without regulation, each operator is able to set a charge for connecting calls to its own customers without any competitive constraint (that is, in terms of the EU framework, the operator in question has significant market power with respect to termination). Given this, operators will rationally set the charge as high as possible. Therefore, many regulators including Ofcom have regulated termination rates, typically setting them to cost-oriented rates.

6.28 Ofcom's most recent set of decisions about wholesale mobile voice call termination by the five main UK mobile network operators was made in March 2007.

6.29 In the UK, common with other regulators in other EU Member States, we concluded that there are separate markets for wholesale mobile termination on each of the mobile networks and that each mobile network operator has SMP in the provision of mobile termination on each of their own networks. Consequently, we have imposed charge controls on each operator and these run for four years from 2007 to 2011.[157]

6.30 Ofcom's decision to set conditions and impose charge controls in March 2007 has subsequently been appealed to the Competition Appeal Tribunal by BT and H3G. On 18 March 2008, the Tribunal referred various "price matters" to the Competition Commission for resolution. A judgment by the Competition Appeal Tribunal (in Ofcom's favour) about the remaining "non-price matters" in the case (related to questions of market power and the appropriateness and proportionality of the regulatory conditions) was issued on 20 May 2008. That judgment is now before the Court of Appeal, having been appealed by H3G on 17 June 2008.

6.31 Wholesale and retail charging mechanisms are related because interconnection prices affect the structure as well as the level of the interconnecting operator's costs, impacting on the cost recovery and the retail prices of the services provided to retail customers. The future trajectory of the regime for mobile call termination is a critical issue facing Ofcom, the industry and consumers; these issues are discussed further in section 8.

Consumer regulation: setting clear rules for market conduct

6.32 Ofcom's principal duty makes clear our responsibility to further the interests of consumers. As well as taking actions to ensure that markets work effectively by promoting competition, clear standards of market conduct in the form of rules protecting consumers are also needed. The mobile sector is subject to general

[156] This charge is referred to as a wholesale charge because it is charged and paid between network operators, rather than by retail customers.
[157] http://www.ofcom.org.uk/consult/condocs/mobile_call_term/statement/statement.pdf

consumer law, but given the complexity of modern telecommunications services, those rules sometimes need to be sector-specific in their detail.

6.33 Ofcom's approach to the setting of rules for consumer protection has been to act only where specific market failures have been identified, in keeping with our regulatory principles. Until the last couple of years there has been a limited amount of mobile regulation specifically directed at consumer protection, although more general (non-mobile specific) consumer protection conditions have been imposed. (And noting that all Ofcom's work on competition, spectrum and other issues in mobile has ultimately been undertaken to further the *interests* of citizens and consumers).

6.34 More recently, as noted in section 4, Ofcom has observed a material increase in the evidence of consumer concern about a number of issues, prompting us to consider further intervention where there is a clear case for doing so. The most significant recent example has been our investigation of concerns about mis-selling of mobile telecommunications services and 'cash-back' offers.

Mobile mis-selling

6.35 Misleading sales and marketing behaviour can undermine consumer confidence in markets and cause individuals harm. During 2006 we received numerous complaints regarding mobile 'cash-back' schemes both directly to Ofcom but also from local Trading Standards services. The complaints typically alleged that consumers were promised, but did not receive, cash from independent retailers that had been offered to them as an incentive to consumers to take up particular mobile phone packages.

6.36 Following these complaints, in September 2006, we opened an enquiry into the practices of some service providers in order to assess whether enforcement action was appropriate. As a result, a number of providers made voluntary undertakings to Ofcom – for example to revise sales and marketing practices, and to adopt minimum business standards prohibiting various and potentially unfair terms from being included in the cash back terms and conditions used by retailers signing up customers on their behalf. On this basis, we closed the enquiry, although we continued to monitor complaints.

6.37 In early 2007, however, complaints were still rising.[158] As a result of the growing concern, we worked with the mobile industry to agree a self-regulatory voluntary code of practice, aimed at stamping out misleading sales and marketing practices.[159] The voluntary code was adopted by all the major providers on 31 July 2007.

6.38 At the time we were clear that, unless the Code resulted in a significant and rapid reduction in the volume of complaints, we would consider the case for regulation to address the problem. By October 2007 there had been no significant reduction in the level of complaints, especially regarding 'cashback' schemes, and so we started to look at the case for further action. We consulted in March 2008 with a number of proposals designed to strengthen and protect the position of consumers. [160] The new General Condition as it was then proposed would (among other things) require MNOs:

- not to engage in dishonest, misleading or deceptive conduct;

[158] Complaints to Ofcom regarding mis-selling rose from 154 a month in January 2006, to 235 a month by March 2007.
[159] http://www.ofcom.org.uk/telecoms/ioi/mbp/cop.pdf
[160] http://www.ofcom.org.uk/consult/condocs/mobmisselling/mobmisselling.pdf

- to improve the quality of information provided to consumers when buying a product;
- to ensure that the consumer is aware they are entering into a contract;
- to ensure that the terms and conditions of all sales incentives offered by their retailers are not unduly restrictive; and
- to carry out a number of checks on the veracity of their retail companies, and its directors.

6.39 In the consultation we noted that, by proposing a new General Condition, we were primarily seeking to improve the consumer experience of mobile customers. On 29 April 2008, the consultation closed, and Ofcom intends to publish its conclusions from the consultation shortly.

Additional charges

6.40 Under UK consumer law, consumers are protected from terms in consumer contracts that are unfair (and such terms are unenforceable).[161] This prohibition is set out in general terms in law. The OFT (and other regulators) provide guidance about their views about what is, and is not, an unfair term to businesses dealing with consumers.[162]

6.41 Recently, consumer concern has grown around a number of issues raising questions of possible or alleged unfairness of some terms often found in consumer contracts for telecommunications. Although not limited to mobile services, some of these issues are particularly relevant to, or have an impact on, consumer contracts for mobile services. For example, in part because mobile contracts often include the provision of a subsidised handset funded by a relatively long-term commitment by the customer (typically 18 months or more), the issue of early termination charges is of particular significance for mobile customers and their suppliers.

6.42 Early termination charges fall under so called 'additional charges', i.e. additional amounts of money, over and above the headline prices consumers expect to pay. Another example are the charges for itemised bills. In February 2008, we launched a consultation considering these types of charges. We expect to publish a statement announcing our findings in Autumn 2008.[163]

Broadband speeds

6.43 We recently agreed a voluntary Code of Practice with fixed line ISPs, which is designed to ensure that consumers receive better information about the likely data transmission speeds they can expect to obtain from their broadband service.[164]

6.44 We are now considering whether similar measures are appropriate in the mobile broadband sector. We are also looking into the problem of 'bill-shock' experienced by

[161] http://www.opsi.gov.uk/si/si1999/19992083.htm
[162] Information on what is an unfair term in a consumer contract can be found on the OFT's website at http://www.oft.gov.uk/advice_and_resources/resource_base/legal/unfair-terms/, general guidance on unfair contract terms is available on the same website at http://www.oft.gov.uk/advice_and_resources/resource_base/legal/unfair-terms/guidance.
[163] http://www.ofcom.org.uk/consult/condocs/addcharges/addcharges.pdf
[164] http://www.ofcom.org.uk/telecoms/ioi/copbb/copbb

consumers using mobile broadband services, e.g. as a result of charges for international roaming or usage in excess of package limits.

Mobile content is currently largely self-regulated

6.45 The availability of rich content on mobiles (internet, video, mobile TV) is relatively new. With the advent of 3G phones and dongles/data cards, enabling web surfing and a variety of interactive and TV applications, a new area for potential consumer and citizen harm, in particular for children, is emerging.

6.46 There have been no specific regulations regarding mobile content to date, although in line with all television services, mobile television services require licences under the Broadcasting Act 1996 (Television Licensable Content Service (TLCS) licences). Instead, there has been a move towards self or co-regulation.

6.47 The most prominent examples of content self-regulation within the mobile sector are the Independent Mobile Classification Board (IMCB) and the Code of Practice for the sales and marketing of subscriptions to mobile networks.

6.48 The IMCB has set a 'Classification Framework' for commercial mobile picture-based content. It is the responsibility of content providers to use the framework and self-classify their own content as 18-rated where appropriate. If content is 18-rated its access will be restricted by the mobile operators until customers have verified their age as 18 or over.

6.49 In January 2004, the Mobile Broadband Group published its Code of Practice, which sought to provide protection against minors being able to access inappropriate content on mobile devices. Following on from this Code, we recently concluded a review of the code as requested by The Children's Charities' Coalition for Internet Safety (CHIS) and the Home Office.

6.50 In our review we found the Code to be effective in restricting young people's access to inappropriate content and a good example of industry self-regulation. We felt that the Code was understood and readily adopted by all concerned. In operating the Code the mobile operators have established a process whereby an initial breach of the Code by a commercial content provider results in a warning (yellow card) and any subsequent breach of the Code can result in a sanction (red card). The yellow/red card scheme is viewed both by mobile operators and the content suppliers as a highly effective compliance mechanism.[165]

6.51 As part of this review we recommended that the Mobile Broadband Group consider including in an updated version of it's code that:

- mobile operators should make more effort to ensure information supplied by retailers, customer services and websites is easy to understand and accessible;
- the industry should consider forwarding enforcement data to the IMCB for publication on their website;
- the IMCB should publish annual reports and minutes of Board meetings; and
- a voluntary opt-in system is established allowing only 'child-friendly' content to be accessed by phones used by younger children.

[165] The full review can be found at, http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/

Spectrum regulation has focused in recent years on introducing market mechanisms and enforcing existing licence conditions

6.52 Traditionally, spectrum licences have been linked to the use and provision of specific technologies. In recent years the UK has increasingly adopted a service and technology-neutral approach to spectrum regulation. As such, the approach has been to reduce the reliance on specifying usage as, for example, 'mobile', preferring instead to maximise the potential usage of spectrum bands by removing service and technology restrictions and introducing spectrum trading. The benefit to consumers is that this approach allows market forces to determine the appropriate service and technology to use in a particular spectrum band and allows those uses to change over time, creating flexibility, enabling innovation in spectrum use and reducing any impact on downstream competition of spectrum licence obligations.

GSM directive

6.53 The GSM directive, introduced in June 1986, helped to shape the current spectrum environment for mobile operators. The directive mandated the use of 890 to 915 MHz and 935 to 960 MHz exclusively for the use of GSM services, in order to encourage the growth of mobile services across Europe. Currently, debate is ongoing at the European level considering possible changes to the GSM directive that may lead to the liberalisation in new and existing spectrum assignments.

3G licence conditions

6.54 As part of the award of 3G licences to T-Mobile, Orange, Vodafone, H3G and O2 in 2000, a number of licence conditions were included.[166] Similar to the GSM directive, these licences mandate the type of equipment that can be operated in the spectrum, in this case limiting operators to use of UMTS equipment. Another significant obligation was the requirement to rollout their networks to enable the provision of telecommunication services to an area where at least 80 per cent of the population of the UK live by 31 December 2007.

6.55 In February 2008, Ofcom undertook an assessment to discover the level of compliance with the 3G licence roll-out conditions.[167] The assessment showed that four of the five license owners had complied, but O2 only covered 75.69 per cent of the population. This was a shortfall equivalent to approximately 2.5m people. Consequently, we issued O2 with a notice under the Wireless Telegraphy Act proposing that if O2 had not met the rollout obligation by the end of June 2008, then we would shorten the term of its 3G licence by four months. In May 2008, we were able to announce that O2 had met its roll-out obligations, but that further assessment would be undertaken to make sure all the MNOs maintain their obligations in the future.[168]

Releasing spectrum for new uses

6.56 A critical part of our spectrum strategy is the release of spectrum for new uses. For example, the Digital Dividend Review (DDR) statement, published in December 2007, considers how to award the spectrum released as a result of switching from

[166] At the time, the licences were awarded to T-Mobile's and O2's predecessor organisations, one2one and BT3G respectively.
[167] http://www.ofcom.org.uk/media/news/2008/02/nr_20080227
[168] http://www.ofcom.org.uk/media/news/2008/05/nr_20080502a

analogue terrestrial television to digital terrestrial television ('digital switchover').[169] Further consultation documents have recently been published on the detailed design of the digital dividend awards that could have an impact on any operators wishing to deploy mobile services in this spectrum.[170]

6.57 Our proposed approach with the DDR and the separate auction of the 2.6 GHz spectrum band will be to supply the market with relatively large portions of spectrum suitable for a variety of new uses (including, potentially, for the provision of mobile services). The potential benefits for the UK mobile market include the prospect of:

- existing MNOs purchasing new spectrum to expand their networks or the range of services available, such as mobile TV, mobile broadband, or other data-rich services; and
- the opportunity for new entrants into the mobile market, potentially using new technologies such as WIMAX.

6.58 We have already released 5.958 GHz of spectrum through a series of spectrum awards:

- 1785 to 1805 MHz in Northern Ireland
- 1781.7 to 1785 MHz/ 1876.7 – 1880 MHz (GSM/ DECT guard bands)
- 1452 to 1492 MHz (L-Band)
- 10 GHz, 28 GHz, 32 GHz and 40 GHz

6.59 As discussed earlier, Ofcom has moved away from the 'command and control' approach to spectrum management to provide a greater role for market forces in determining how spectrum is used. Our technology-neutral approach allows for market-led outcomes to promote innovation and competition.

Liberalising existing spectrum allocated for mobile use

6.60 Part of our process to introduce market mechanisms into spectrum use is to remove the service and technology restrictions in existing licences, instead focusing on minimum the technical licence conditions required to avoid harmful interference, comply with international obligations and ensure efficient use of the spectrum. A number of existing licences have already been liberalised.

6.61 In November 2007, we published a consultation proposing liberalisation of the 2G spectrum bands (900 MHz and 1800 MHz) to allow for alternative uses and technologies.[171] We also proposed that some of the 900 MHz spectrum currently held by O2 and Vodafone should be released by them and re-awarded by us on a technology neutral basis. We also consulted on liberalisation of the 2.1 GHz (currently 3G) band.

6.62 Liberalisation is likely to lead to significant benefits for citizens and consumers in terms of the provision of mobile broadband services. In particular, liberalisation of the 900 MHz spectrum is likely to help improve the quality of 3G networks, with better

[169] http://www.ofcom.org.uk/consult/condocs/ddr/statement/
[170] http://www.ofcom.org.uk/radiocomms/ddr/
[171] http://www.ofcom.org.uk/consult/condocs/liberalisation/liberalisation.pdf

indoor coverage and more extensive coverage in rural areas. We are currently looking at this issue in detail (but outside the scope of this Assessment).

6.63 We see a continued need for an active programme of work, informed by our strategic framework for spectrum, to ensure that we are doing all that we can to make spectrum available for a variety of uses. The future need for this programme is further discussed in section 8.

Mobile phones on aircraft

1.2 Following a three month consultation, in August 2008 we issued draft regulations to allow passengers to use their mobile phone on an aircraft.[172] Under the regulations, airlines will be able to offer their customers access to onboard mobile services providing they meet certain technical criteria and are not operational under 3000 metres.

1.3 This proposal is in line with the European Commission Decision on harmonised conditions of spectrum use for the operation of mobile communication services on aircraft (MCA services) in the Community.[173] Although we have authorised the use of mobile communication services on aircraft, issues relating to the user equipments' safety and air worthiness rests with the Civil Aviation Authority (CAA) and the European Aviation Safety Agency (EASA). Provided safety and air safety requirements are met, it will then be up to airlines to decide if and when they will offer these services to their passengers.

Summary: Regulation to date

6.64 Figure 72 summarises mobile regulation in the UK today, grouped into content, consumer, competition and spectrum.

[172] http://www.ofcom.org.uk/consult/condocs/mca08/mca.pdf
[173] Available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:098:0019:0023:EN:PDF

Figure 72: Current snapshot of mobile regulation split by group

Source: Ofcom

6.65 We consider in section 8 how the balance of regulatory activity may change in the future, given the market trends discussed in sections 3, 4 and 5 - and potential for further change in the market in future.

6.66 The question of how markets may evolve in future is the focus of section 7, which considers four scenarios that may illustrate possible market developments.

Section 7

Scenarios

Summary

7.1 In our guidelines published in February 2008, we highlighted our intention to consider the possible scenarios for the development of mobile and wireless networks over the next five years and beyond, and to examine what these trends might mean for services, products and competition.

7.2 This section summarises the outcome of that work, which we have conducted with input from Analysys Mason, an external consultancy.

7.3 We welcome views from stakeholders about likely future market developments, and whether these scenarios can be further improved as a mechanism for thinking about the different ways market events may unfold, and what those events might imply for citizens and consumers.

Scenarios, not predictions

7.4 There is a lot about how mobile markets may evolve that is uncertain. Our approach has been to create a range of structured scenarios, based on what we do know now. By doing this, we can develop a sense of the range of likely possibilities.

7.5 We have considered four possible scenarios for the development of the market over the next five years and beyond. The scenarios have been developed by thinking about how the relationships between various parts of the mobile value chain work, how these might change under different market conditions and what implications this would have for the market and for our regulatory policies.

7.6 These scenarios are not predictions, nor should they be considered as mutually exclusive or totally exhaustive. The scenarios should be taken together as a single piece of work providing a range of possible market outcomes. The purpose of this work is to illustrate the degree of uncertainty that exists about how the UK mobile market *might* develop and the possible regulatory issues that could arise as a result.

7.7 No particular scenario is expected to be the winner at the expense of any other. In fact, all scenarios might, to a greater or lesser extent, co-exist in the future.

7.8 We have adopted this approach to highlight potential areas where our regulatory policy might need amending or refinement, and to get feedback from stakeholders on how this might be best achieved. We do not think that these scenarios are suitable for commercial strategic planning or thinking about how, for example, operators or the sector may fare financially in future or to use them to predict how other mobile related policy decisions may be made.

Approach

7.9 We commissioned Analysys Mason to survey market trends and, based on that work, to pose a range of possible scenarios.[174] As well as their own research into these issues, Analysys conducted interviews with a large number of industry stakeholders, from across the mobile value chain, in order to build up an aggregated picture of different perspectives on potential market developments.

7.10 Based on the work undertaken by Analysys, we have then developed a simplified set of four scenarios to assist discussion, placing increased emphasis on certain elements within each scenario and extrapolating current trends.

7.11 As with all of the analysis in this document, this represents our initial views during the first phase of our Assessment, not a concluded view. We welcome stakeholder feedback on whether this approach is useful, what we should learn from it (and what it does not tell us) and how it might be improved.

Scenarios

7.12 Each section below describes a single scenario. The four market scenarios described are:

- Scenario 1 – '*steady as she goes*' – no major changes in current market dynamics;
- Scenario 2 – '*Mobile voice wins*' – technological developments lead to innovative pricing for mobile voice services and rapid fixed to mobile substitution;
- Scenario 3 – '*Internet on your mobile*' – mobile data becomes a mass consumer market service; and
- Scenario 4 – '*SIMs everywhere*' – cheap technology and data carriage drives mobile service innovation.

7.13 Each scenario has been presented in the same way:

- we set out a brief description of the scenario;
- we identify a number of assumed trends (drawing on the work in sections 3, 4 and 5) that underpin the scenario or make it more likely that it will be influential;
- we identify potential market outcomes that flow logically from the trends identified; and
- we briefly touch on some of the implications arising from the scenario. Implications are discussed in more detail (for the trends and scenarios in an aggregated way) in section 8.

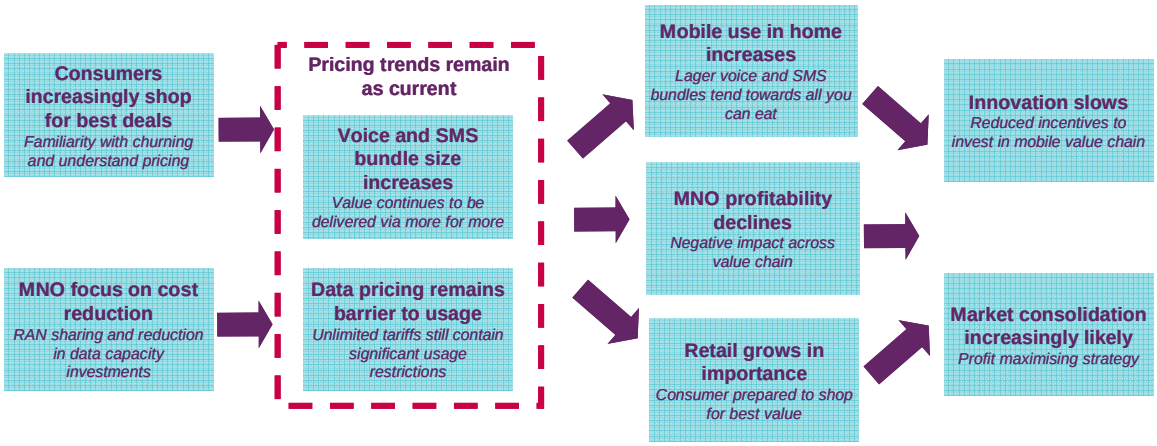
[174] The report included as Annex 9 is the result of the work undertaken by Analysys Mason. The thoughts, views and questions raised in this report do not therefore necessarily represent or reflect the views of Ofcom.

Scenario 1 – 'steady as she goes'

7.14 This scenario considers a future in which the market does not deviate significantly from its current trajectory, as described in section 3, 'Today's UK mobile markets'. As well as being a possible outcome, it also provides a baseline against which to compare other scenarios described below.

7.15 Under this scenario, mobile voice services continue to be the major source of revenue for mobile operators, and the size of voice and SMS bundles continue to increase, reflecting the tit-for-tat nature of consumer acquisition offers. Demand for mobile data services continues to increase, but slows from current 'early adopter' rates, as mobile data access remain limited by retail terms (such as usage limits) and continue to be above prices for data access over a fixed network.

Figure 73: Dynamics of 'steady as she goes' scenario



Source: Ofcom / Analysys Mason

Key trends

7.16 **Super-size bundles increase**: Wide-spread familiarity with mobile tariff bundles and increased consumer awareness of how to get the best-deal for mobile voice calls puts increasing pressure on MNOs to increase the value of their retail deals. The availability of 'super-size' bundles (described in paragraphs 3.28) continues, with these tariff plans increasing in size and apparent value. Lower monthly rental charges lead to ever greater numbers of mobile users taking up these 'super-size' plans.

7.17 **Mobile data remains 'early adopter' usage only**: Despite the prevalence of flat-rate data packages, mobile data accessed either directly on a handset or via a 3G dongle, fails to become a main stream application.

7.18 **MNOs focus on cost reduction**: MNOs continue to focus on cost reduction in a highly contested retail voice market. Investment in the provision of data is limited, limiting their ability to develop and support data usage on a mass scale.

Market outcomes

7.19 **Mobile usage in home increases**: As in-bundle voice minutes increase, consumers use more minutes 'in-home' in order to use up the minutes they have already paid for. This behaviour and its contribution to increased substitution between fixed and mobile voice services as has been already seen in section 3 of this consultation document.

7.20 **Retailing grows in importance, relative to other activities:** As bundles sizes increase and consumer knowledge grows, consumers become ever more prepared to shop around for the best deal. Price comparison sites aid transparency and retailers are increasingly prepared to add extras (e.g. cash-backs).

7.21 **MNO profitability under pressure**: MNOs find it increasingly difficult to grow revenues and control acquisition costs and this places profitability under pressure. Larger inclusive allowances help consumers fix their monthly spend, limiting the ability for MNOs to grow ARPU. The increased emphasis on differentiating at the retailer level increases both subscriber acquisition and retention costs.

7.22 **Innovation rates lessen**: Declining profit margins ripple across the value chain, while investment heavy innovation is unattractive, as all players focus on core areas of profitability.

7.23 **Possible market consolidation:** Given increasing focus on core profitability and cost control, consolidation (to capture scale benefits) becomes more likely. The UK market may therefore come to more closely resemble other markets with fewer network operators in terms of competitive intensity and degree of innovation.

Regulatory implications

Potential competition issues

7.24 This scenario describes a situation where MNO profitability comes under increasing pressure. In response MNOs look to reduce costs and potentially extend RAN sharing agreements into full consolidation with a consequent reduction in the number of MNOs active within the market. Such consolidation may take several forms, for example a reduction in the number of players limited to particular parts of the value chain, or direct consolidation among vertically integrated operators.

Citizen and Consumer issues

7.25 It is possible that competition in headline retail rates might lead to an increase the use of ‘hidden’ charges (e.g. voice-mail/itemised billing etc), as operators seek to compensate for headline reductions. This could lead to some consumers being disadvantaged, if competition does not address this issue, e.g. by operators competing to build trust.

7.26 Similarly there may be increased incentives to mis-sell mobile services to consumers to maintain revenue and market share under this scenario.

7.27 There are indications that pricing trends towards ‘super-size’ tariff plans could disproportionately benefit higher-end users on more expensive, typically above £30 per month monthly contracts. Lower spend consumers, particularly those on pre-pay tariffs (which tend not to have inclusive bundles) have relatively less pronounced price changes over the same period

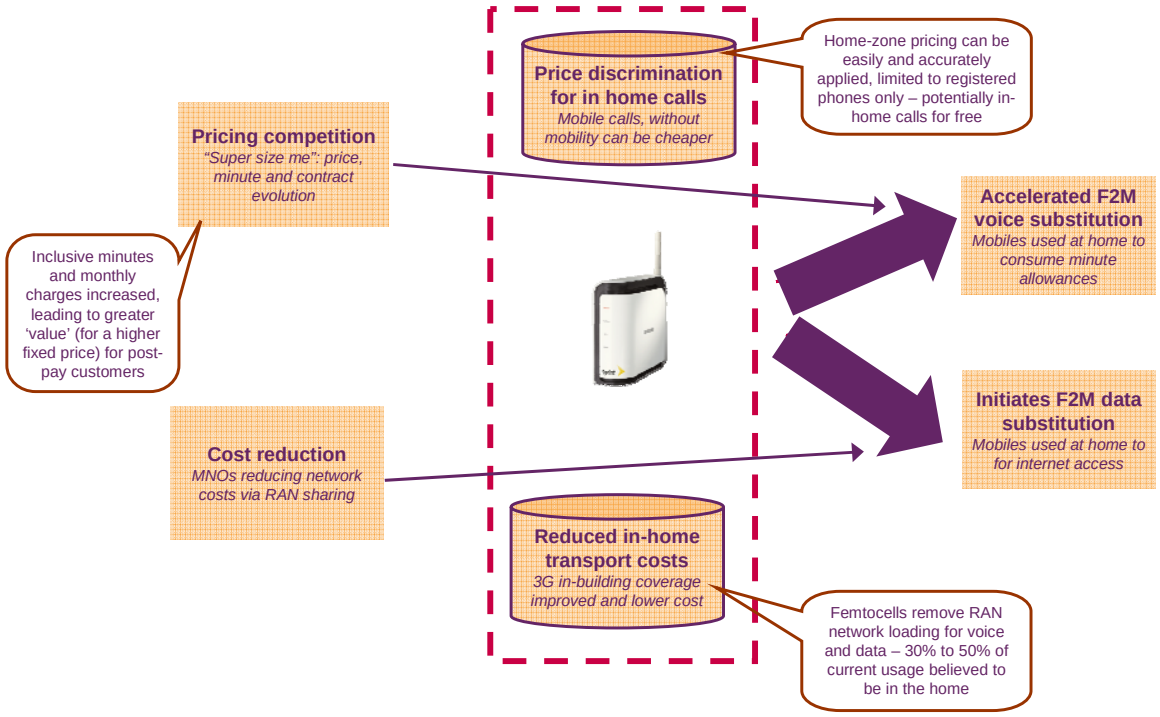
Spectrum implications

7.28 Falling industry profitability and the possibility of market consolidation suggests that, under this scenario, market entry by a new 2G or 3G based infrastructure player would be unlikely. However this may have alternative benefits as the cost of market entry falls to other spectrum users, for example mobile TV.

Scenario 2 – 'mobile voice wins'

7.29 This scenario considers the possibility for an increase in mobile use in the home, facilitated through technological developments which enable MNOs to differentiate between usage in-home and out-of-home. In this scenario, mobile services increasingly displace fixed services as the main form of telephony provision inside and outside the home or business premises.

Figure 74: Dynamics of 'mobile voice wins' scenario



Source: Ofcom / Analysys Mason

Key trends

7.30 **'Super-size' bundles:** As described under the previous scenario, 'super size' pricing plans have become increasingly available. It might be expected that continued uptake of such bundles allow for an increase in mobile phone usage in the home. The use of mobile phones in the home, as a substitute to fixed phones, appears to be established.[175]

7.31 **Focus on cost reduction:** At the same time MNOs have increased their focus on costs. Recently announced radio access network sharing agreements between T-Mobile and H3G, and Vodafone and Orange form the starting point for more extensive cross-operator arrangements to save costs.

7.32 **Technological developments:** Operators are able to exploit technological innovations that enable better targeting of in-home and truly mobile services. Femtocells, described in Section 3, are an example of a technology which might lead to significant benefits for MNOs under this scenario.

[175] Based on conversations with industry, estimates have been given that between 30 per cent to 50 per cent of mobile usage is in the home.

Market outcomes

7.33 **Home-zone pricing:** In-home technologies (e.g. femtocells) and commercial trends facilitate operators targeting in-home usage more accurately and at lower costs than conventional delivery. When consumers are at home and therefore not placing a value on the mobility aspect of a mobile phone (static mobile), prices can be lower (reflecting lower costs), while out of home and mobility is valued, prices can reflect this value (in-motion mobile).

7.34 This is a subtle but significant change from today's 'super-size' pricing plans where all types of calls, either static mobile, or in-motion mobile are priced the same despite the value they offer to consumers being different. As a result, this scenario suggests that the operators will price discriminate on the basis of in-home or out of home, leading to smaller 'in motion' bundles but all you can eat, static mobile bundles.

7.35 **Fixed to mobile substitution:** Calls over mobiles while in the home are seen as low-cost or 'free' and fixed to mobile substitution trends accelerate rapidly, with the fixed line being used primarily for broadband connectivity/pay TV and supplying connectivity (for example, for a femtocell). As familiarity with using a mobile at home increases and in-home mobile data pricing moves to 'all you can eat' access, the use of data services over mobile grows. (This trend is explored further in scenario 3 below).

Potential implications and regulatory questions

Potential competition issues

Prospects for fixed de-regulation

7.36 To the extent that fixed and mobile services compete head-to-head, this raises important implications for the regulation of fixed services (much of which is predicated on the distinction between fixed and mobile).

Termination rates

7.37 Similarly, the termination rate regime, which sets different arrangements for fixed and mobile call termination, based on the different competitive characteristics of the fixed and mobile wholesale termination markets, may need to evolve in this scenario. For example, would terminating a call over a fixed broadband backhaul connection to an in-home femtocell be considered fixed or mobile voice call termination?

Impact on MVNOs

7.38 Gaining access to existing allocated spectrum may become increasingly important if MVNOs are able to offer competing products. Without access to such spectrum MVNOs may be unable to offer femtocell-type solutions and therefore offer similar home-zone pricing offered by MNO's. This may put MVNOs at a competitive disadvantage, compared to the current situation, where access to spectrum is not a barrier to matching the services of their wholesale suppliers.

Impact on bundling across products

7.39 The opportunity for MNOs to bundle services increases in this scenario. In-home mobile, full mobile (out-of-home) and broadband 'triple play' packages might become commonplace. Bundling can have a variety of positive and negative impacts for

consumers and, based on past experience, is an area that may give rise to regulatory or competition law concerns. Bundling may also be on the agenda as part of a competitive response by fixed providers combining fixed voice services with, for example, pay TV and broadband.

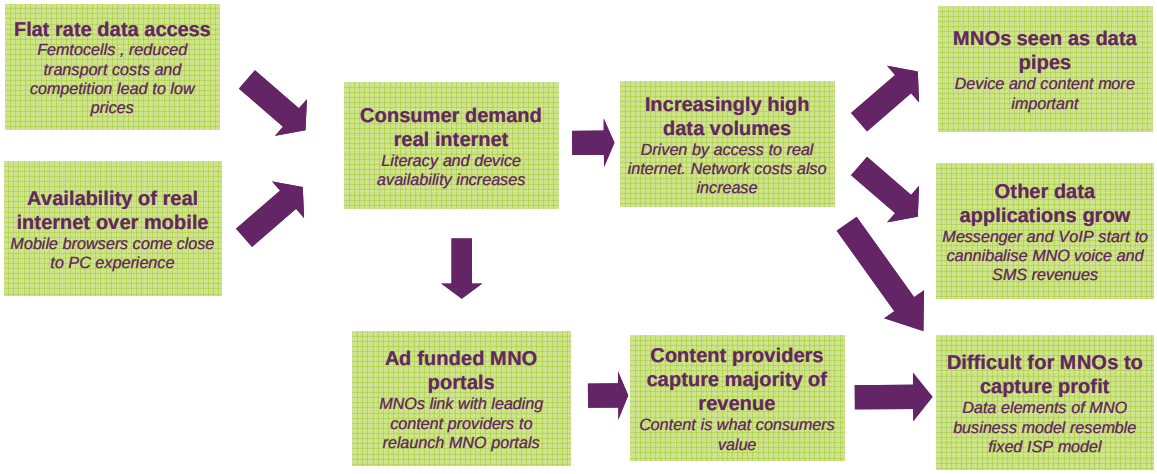
Impact on VoIP and WiFi networks

7.40 Current alternatives to mobile voice calls, such as VoIP and WiFi providers (some with innovative business models) may be less able to compete with MNOs offering home-zone pricing services that leverage their existing customer base and scale.

Scenario 3 – 'internet on your mobile'

7.41 This scenario envisages a future where many more consumers access the internet over a mobile device more often, leading to ever increasing data volumes. Although content providers and handset manufacturers see benefits, MNOs face the risk of becoming 'data pipes' – and, in a way analogous to fixed broadband providers previously, find it difficult to extract profit from the growth in data. This is due to network investments required to handle increased data volumes and that consumers value the content they are browsing, rather then the pipe or portal which is carrying the content. Furthermore, consumer's increasing familiarity with data applications increase the risk that non-SMS based messaging (e.g. MSN) and VoIP applications grow, cannibalising the MNOs traditional core revenue sources.

Figure 75: Dynamics of 'internet on your mobile' scenario



Source: Ofcom / Analysys Mason

Key trends:

7.42 **Affordable data access**: A reduction in data transport costs from the growth in data traffic and the efficiencies it brings, and increased retail competition, leads MNOs to make more and cheaper flat-rate data tariffs available. Consumers reject walled gardens and constraints on access to the public internet (although MNOs may be able to leverage their position into a highly congested portal market to some extent). In this scenario, operators manage to avoid the issues of network congestion and find ways to deliver a data experience comparable to today's fixed broadband networks at a comparable price.

Market outcomes:

7.43 **Mobile portals relaunched:** Consumer demand for the internet over mobile devices could imply that, for example:

- MNOs see a significant increase in data volumes carried over their networks; and
- content tie-ins and alliances become more important, as operators seek alternative ways to derive profit from internet access. For example, content with strong brands, such as Facebook, may be free but generate advertising revenue.

7.44 As ad-funded MNO portals grow, consumers see portals as a free way to access quality content. As it is content which is valued rather then the portal, it becomes increasingly difficult for MNOs to retain the advertising revenue generated, and instead the revenue passes to the content providers who are responsible for the content that is valued by consumers. From an operator's perspective, this limits the portal's profitability.

7.45 While data volumes are increasing on MNO's networks, absolute network costs are also increasing. With much of the revenue gained through the MNOs portals passing through to content providers, and with consumers using their mobile device as a means of accessing the public internet, MNOs find it increasingly difficult to generate a profit from this service.

7.46 Access to content is the primary driver behind consumer uptake of mobile data services, and the MNO's business model starts to have some similarities to that of a fixed ISP in the late 2000s. In addition, it is possible that the availability of data applications grows, with consumers downloading applications such as instant message and VoIP applications which begin to cannibalise MNOs SMS and voice services.

Regulatory implications

Potential competition issues

Mobile termination rates

7.47 In addition to some of the points made in relation to the previous scenario, there are some further questions this scenario might pose for the termination rate regime. For example, mobile termination rates are currently calculated with reference to the costs that a mobile network incurs when terminating a voice call. This includes the cost of routing calls across the radio access network. An increase in mobile data traffic and/or an increase in calls not carried across the RAN (and delivered using, for example, fixed broadband connections paid for by consumers) may impact the amount for fixed costs allocated to voice calls, and in turn increase the risk of regulatory uncertainty in calculating cost-oriented termination rates.

7.48 In addition, widespread use of mobile internet access may enable competition for the delivery of calls from, for example, mobile VoIP services, as well as for outbound calls. This could raise the possibility of a market-based constraint on termination rates, enabling de-regulation.

Citizen and consumer issues

7.49 More wide-spread use of personal mobile devices to access the internet raises a number of consumer protection issues. In particular children may have more ready available access to harmful or offensive content when accessing the internet via a mobile device versus accessing via a PC connected via a fixed line.

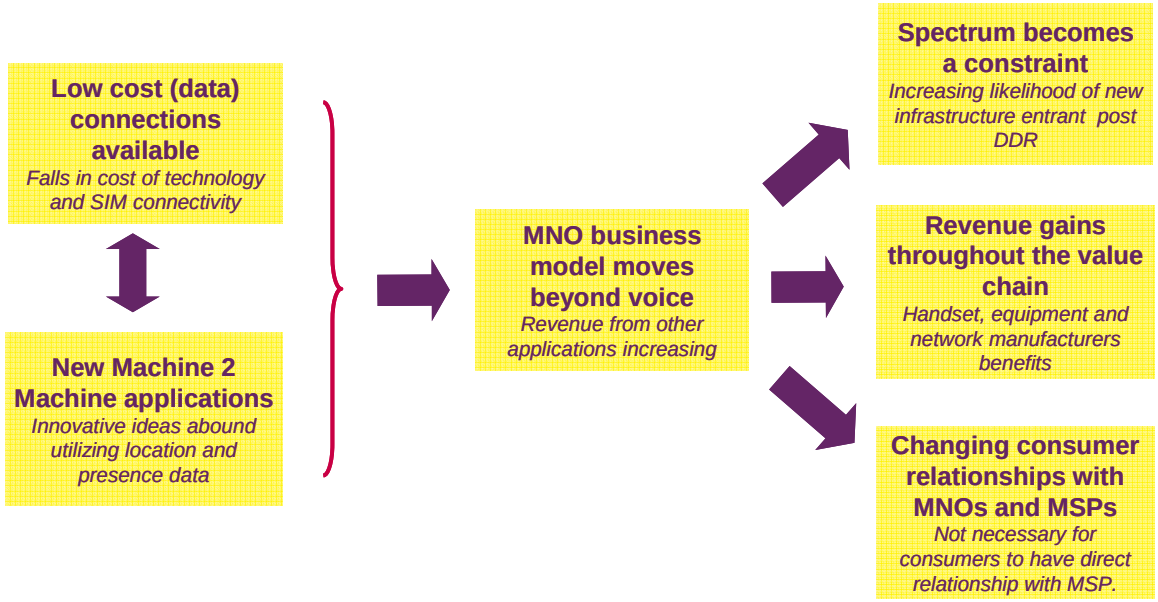
7.50 The level of privacy and the security of personal data held on a mobile device also differ from that on devices more typically used to access the internet from a fixed location.

7.51 While the ability for consumers to access the internet over their mobile device increases under this scenario, the conditions of access may not be the same for all consumers. The best deals for access may require contractual commitments; young, elderly or credit conscious consumers may be unable to access these services, or have to pay more to do so.

Scenario 4 – ' SIMS everywhere'

7.52 This scenario considers a future where mobile technology becomes more widely used for applications that move beyond the direct provision of personal communications. Reductions in the cost of data technology and intellectual property rights stimulate increased application and hardware innovation. This stimulates the development of new innovative data applications, and increases the possibility of machine-to-machine applications. This allows mobile operators to extend their current business model beyond the voice, SMS and data products provided today.

Figure 76: Dynamics of 'SIMs everywhere' scenario



Source: Ofcom / Analysys Mason

Key trends

7.53 **Reduced price of data connections:** An increase in the volume of data carried, combined with per Mb cost reductions lead to relatively low cost data connections and technologies (e.g. SIMs) being available. This stimulates broad innovation by a range of data application players. As with the previous scenario, this assumes that

operators find ways of addressing issues of network congestion driven by rising data traffic.

7.54 **New innovation:** A multitude of players from a wide range of industries look to enter the market by developing new and innovative services for consumers. MNOs recognise the opportunity for new revenue streams and actively seek to develop their business model to take advantage of the possibility for increased innovation.

Market outcomes

7.55 **Potential for new wholesale arrangements:** The advent of wholesale data arrangements would stimulate the emergence of new and innovative SIM-based data services, including the possibility for machine-to-machine communications. In this scenario SIMs become more 'everyday' and are employed in a range of products to deliver new/innovative services across a range of industries.

7.56 **Machine to machine innovations:** The potential for innovation in new data applications is significant. In discussions with Analysys Mason, a number of industry players mentioned their view that new applications based on SIMs embedded within devices have an important role to play in the future development of the mobile market.

7.57 A fairly recent example of a service which combines application elements with access to a mobile device is the Tom-Tom traffic service, which uses access to a mobile device via a mobile network to deliver various services, for example traffic congestion information and updated driving conditions.

7.58 **Revenue opportunities:** The expansion of data services available in this scenario allows MNOs to exploit new revenue streams, potentially far beyond the models described in the other scenarios. Increased service innovations are likely to provide significant gains throughout the mobile value chain, as new services are provided to consumers. Under this scenario all participants may grow revenue, as an increasing number of applications are developed.

7.59 **Spectrum:** It is possible that the increase in new services and growing demand for data transfer leads to an increased demand for spectrum, over and above what is currently available. Under this scenario, spectrum is a constraint on the development of new services.

Regulatory implications

Potential competition issues

Wholesale access and interoperability

7.60 One striking feature of this scenario is that the interactions between users of the mobile data network much more closely resemble those on the wider public (fixed) internet. This raises the prospect that some of the other features of this environment might move in a similar direction, raising the prospect for possible de-regulation.

7.61 At the same time, this scenario assumes that commercially viable agreements for wholesale access are able to be reached with mobile operators (or service providers) to enable a new generation of services to be made available to consumers.

7.62 In principle, those arrangements should be able to be struck under competitive conditions, but it may be that this does not occur or does not occur to a sufficient extent to enable the cycle of innovation described above. This could lead to calls for, for example, regulated access to either mobile platforms in general (e.g. Fair Reasonable and Non-Discriminatory access requirements) or ensuring that at least one or more mobile platforms adhere to open technical standards (e.g. by using spectrum authorisations to require this).

7.63 One possible issue that could constrain this scenario might be wrangling over technical standards, causing consumers or application developers to hold back, waiting for clarity to emerge. This could increase calls on Ofcom to get more involved in questions around technical standards.

Possibility for SIM 'portability'

7.64 An increase in the prevalence of SIMs in multiple devices used to deliver a range of services to consumers raises questions about service portability. For example, consumers in the US are able to download electronic books using Amazon's Kindle devices via a mobile network. The consumer has no direct relationship with the mobile network providing connectivity for this service; instead having a relationship direct with Amazon.

7.65 This is an example of the type of innovative services considered under this scenario. In this example as there is no direct relationship between the end-user and the mobile operator, where a disagreement, commercial or otherwise, between the MNO and the service provider arises, the consumer may lose service.

7.66 A possible solution to this would be for a process for 'service portability' (i.e. portability of the SIM card) from one content provider to another network provider. Under this framework a content provider would 'own' the SIM and be able to approach a number of mobile network operators to provide connectivity services.

Citizen and consumer issues

7.67 Under this scenario consumer data, for example consumer location information, may become required to provide a number of innovative services. For example, to anticipate traffic congestion a provider may purchase 'anonymised' location data from an MNO, in order to assess congestion within a particular area.

7.68 This raises a number of data protection issues regarding the way that information is held, used and provided to third parties.

Spectrum implications

7.69 The potential increase in data traffic described under this scenario leads to the possibility for increased spectrum requirements. In addition, there is also a possibility that a new infrastructure player enters the market if the increase in data applications and SIMs in various devices becomes a reality.

Questions for consultation

We would welcome feedback on any aspect of the analysis in this section. We are also interested in stakeholders' views on these questions:

Question 7.1: What do you see as the most influential trends and features of mobile and wireless markets in future?

Question 7.2: What new policy and regulatory challenges could the trends highlighted in this section bring? Which policy and regulatory challenges could they address?

Section 8

Implications

Summary

8.1 This section 8 discusses the range of possible implications that the trends and scenarios outlined earlier raise for regulation.

8.2 First, we briefly re-visit the four primary questions we posed in February 2008, drawing on the analysis in this document.

8.3 Second, we identify three potential core purposes that could guide Ofcom's work in mobile and wireless markets:

a) to promote competition (including by encouraging efficient investment and promoting innovation);

b) to protect consumers; and

c) to adapt regulation as market conditions change.

8.4 Next, we invite views on the future of mobile termination rate regime after 2011. Will technological or commercial change enable a simpler or less interventionist approach? If Ofcom sets rates, how should it do so? How do the shift to next-generation fixed networks and the prospects for fixed-mobile convergence affect these questions? We invite a wide-ranging debate, exploring all options.

8.5 We identify two areas of work, the release of further spectrum and possible de-regulation of fixed networks, that are outside the scope of this Assessment but underway in Ofcom and that have strong interdependencies with developments in mobile and wireless markets. We also note that the role of competition and regulation in international roaming markets remains a source of active discussion across Europe.

8.6 We also consider some areas where it is far from clear that regulation has a role, but that may affect outcomes for citizens and consumers and so merit debate. Will competition be sufficient to ensure that mobile broadband fulfils its potential to benefit citizens and consumers? How will network operators, applications providers and customers strike a balance between network management and 'open access' (in its many forms)? How will these issues play out in a more complex marketplace? There are many uncertainties, and we invite stakeholders to share their perspectives on these issues. We are open-minded, although cautious about the risks of a role for regulation.

8.7 In a more complex market, the task of consumer protection may become more difficult. The role of regulation is likely to be twofold: to intervene to set standards for market conduct where the case for a market failure is clear, and to enforce regulatory rules effectively. Self-regulation has worked in some areas (such as mobile content), providing a basis for exploring options other than direct regulation – but always balanced by a willingness to act where required. We also ask: Will markets alone address issues such as 'not spots' or exclusion of particular groups of citizens?

8.8 Finally, we discuss some further implications of fixed-mobile convergence. Will universal service provision remain solely a matter for the fixed network? How might the use of telephone numbers change in a world where fixed and mobile services are less distinct?

Understanding the mobile market

8.9 In February 2008, we said that the Mobile Sector Assessment would ask four primary questions:[176]

- What are the implications of market change for mobile and wireless services?
- How are citizens and consumers affected by developments in the mobile sector?
- What are the purposes of mobile regulations and where should its focus lie?
- What is the scope for deregulation, competition and innovation in the mobile sector?

8.10 The first phase of the Assessment (i.e. this consultation) has focused primarily, but not exclusively, on the first three questions. As a result we are able to suggest possible answers to those three questions and what those might imply for the fourth question, about how regulation ought to evolve.

What are the implications of market change for mobile and wireless services?

8.11 We noted in section 2 that we are at a point midway between two major transitions in the use of mobile and wireless services. The first, which has in large part already occurred, is citizens and consumers 'going mobile' when making calls and sending messages. The second, which is just beginning, brings together the convenience of mobility and the flexibility of the internet. We see these two shifts as the fundamental drivers of future market change.

8.12 Since services were first launched, successive waves of commercial and technological innovation have led to profound changes in the UK mobile sector. Commercial innovations include pay-as-you-go services; technological innovations include the development of SMS, mobile data services and more recently, mobile broadband. Competition has been an essential element in the successful growth of the industry and, consequently, the benefits that have flowed to consumers.

8.13 The scenarios illustrate the considerable uncertainty about future market developments, but it is clear that just as the mobile market has become more *important* over the past few years, it is now set also to become more *complex*:

- we are increasingly using mobile services at home. In part, this reflects factors such as wider take-up of larger bundles of mobile call minutes than previously provided to customers;
- as consumer technology improves, the use of mobile data services is growing – with mobile broadband now beginning to reach a mass market. Existing access options like dongles and stand-alone use of services like WiFi might be supplemented with other access technologies and, in the future, through more extensive use of equipment like picocells and femtocells;

[176] http://www.ofcom.org.uk/research/telecoms/msa/msa.pdf

- network operators plan major investments in the coming years – in the case of large existing mobile operators, investments in 3G and, perhaps, LTE; in the case of other players, a wide range of possible networks, potentially employing a number of different technologies;

- developments such as Google's Android operating system or WiMAX are potential sources of increased competition and wider consumer choice;

- the capability to offer new services like mobile VoIP is becoming more widely available, both at the network level through next-generation networks, and at the service provider level (e.g. Skype);

- application developers, who have faced the challenge of a fragmented device market, are increasingly finding ways to offer applications to users on platforms that provide more open and robust access to the mass market; and

- amongst users, there is an endless appetite for new and varied content – including, increasingly, the content we create ourselves and share with each other (for example in social networks) as well as conventional content we 'consume'.

8.14 These changes may affect the inevitable tension that exists between the need for investment, innovation, and competition. Operators planning new investments take into account the balance between risk and reward they face. Some risks are inherent to a competitive market (for example, the risk that new players and/or technologies (e.g. VoIP) will disrupt business models). Other forms of risk, such as regulatory risk, may be capable of being reduced or at least minimised by clear signals about the principles that will guide future regulatory decision-making).

8.15 If mobile becomes a mass-market platform for broadband internet access for more users and for a wider range of applications, there could be implications for the capacity of existing networks and demand for spectrum. Competition has been and will, we think, remain a critical driver of investment and innovation in these markets. However, different forms of competition (between networks as opposed to between application providers, for example) may raise very different issues, and affect each other - raising, potentially, issues like 'net neutrality' on mobile platforms.

8.16 We want to understand better the likely effect of these developments on consumer choice and competition, and how they interact with one another. Where trade-offs arise, what weight should we give to different factors and how should we resolve this tension? These are important questions, and we hope to use this Assessment to take stock of how we should approach them, in the context of our duties to citizens and consumers.

How are citizens and consumers affected by developments in the mobile sector?

8.17 The evidence of the popularity of mobile telephony and mobile messaging speaks for itself. As a result of commercial trends in both pre- and post-pay markets, price is being reduced as a barrier to direct substitution for line access (for example, by the option to pay-as-you-go) and for calls (for many, as a result of larger bundles for a monthly access fee). Consumers have responded by using their mobiles more – including in their own homes.

8.18 As a result, mobile is now used by all, or nearly all, of us, rather than being a premium option chosen by some. This has provided greater flexibility and choice in the way we access telecommunications. A primary initial finding of the first phase of this Assessment is to recognise those benefits, which have accrued over many years to many citizens and consumers.

8.19 Our preliminary work has identified a number of specific issues affecting us as citizens or consumers that may warrant further attention:

- a small proportion of consumers report themselves excluded from the market involuntarily (that is, for reasons other than their own choice). Our next phase of work will consider why this is the case, and whether this should be an area of concern;

- people in some areas – 'not spots' – have limited service or choice. Building on long-standing engagement with our Advisory Committees (who have consistently raised this issue with us), we wish to hear from stakeholders affected by this issue, with a view to understanding how and why these 'not-spots' persist.[177]

8.20 Increasingly, we expect mobile users will be able to access new types of services – for example, more location-based services and services using information about social networks. Consumers are likely to supply sensitive information about themselves to their suppliers and third parties. Law and regulation designed to protect the rights of 'digital citizenship' may need to adapt to remain relevant.

8.21 Reported customer satisfaction with mobile phones has remained high over a number of years. But we are concerned about signs that some indicators of poor customer service and other consumer dissatisfaction appear to be rising – and it may be that the increasing complexity of this market may accentuate some of these issues. While we want to understand the reasons for this in greater detail, we see this primarily as a challenge to industry, to improve the customer experience and address the underlying causes of this trend.

What are the purposes of mobile regulation and where should its focus lie?

8.22 Ofcom has adopted as one of our regulatory principles a bias against intervention – balanced by a willingness to intervene firmly and promptly when required. We are therefore very cautious about any suggestion that regulation should expand its reach into areas of the communications sector that are, on most measures, performing well.

8.23 While much has changed in mobile and wireless markets, and may change in future, the primary role of regulation in those markets will remain constant: to further the interests of citizens and consumers, where appropriate by promoting competition.

8.24 In practice, the development of end-to-end competition has meant less need for regulation of mobile networks than fixed networks. Ensuring that, to the maximum extent feasible, effective competition drives innovation and investment in mobile and wireless markets is consistent with our principal duties.

8.25 Pursuing that outcome helps ensure that regulation can continue to be used sparingly and only to achieve clearly articulated public purposes that markets, by

[177] More information about the Committees is available at http://www.ofcom.org.uk/about/csg/adv_cmmt_nations/ .

themselves, cannot or will fail to deliver. However, we see some possibility that there may be a shift in the emphasis of regulation:

- Regulation has so far often focused on competition issues (particularly regulating termination rates) and spectrum. Given the market trends set out in this document, we see a possibility that consumer and content issues will grow in significance.

- To date the focus of social policies such as universal service has been on the fixed network. We may need to reconsider this approach, particularly if the trend continues for mobile usage to displace fixed usage. For example: can or should mobile technology play a role in the delivery of universal service?

8.26 This does not imply that regulation in those areas must or should expand. However, the trends highlighted in this document suggest some likely pressure-points. These might indicate growing pressures for more robust regulation over the medium to long term if, for example:

- consumer anxieties and complaints were to increase, and providers were to fail to respond to the challenge of improving customer experience;[178]

- players seeking to adopt new business models and launch new services were unable to secure interconnection or services such as mobile number portability;[179] and

- paths to innovation for applications or content were blocked by unfair, unreasonable or disproportionate action, or proprietary technical standards.[180]

8.27 Taking our statutory duties as a starting point, we see three core purposes of Ofcom's work in mobile markets:

- To maximise the role and intensity of **competition**. This means actively promoting, rather than simply protecting, competition – the distinction is discussed further in paragraph 8.31 below. Promoting competition includes encouraging efficient investment in infrastructure – with the opportunity to earn fair returns – and promoting innovation.

- To set, and enforce, clear rules for **consumer protection**. This needs to take into account the development of an increasing range of complex and content-rich services.

- To **adapt** regulation as the market changes. Regulation should not prevent innovation (indeed, our aim is to promote and encourage innovation). In particular, we should roll-back regulation where appropriate – for example, as and when fixed-mobile convergence occurs.

8.28 In pursuing these core purposes, our objective is to ensure that the mobile sector fulfils its potential to contribute to the development of the UK communications market, for the benefit of UK citizens and consumers. At a time when the mobile market has already become very important to UK consumers, but is showing signs of becoming,

[178] As discussed earlier in section 4 at paragraph 4.55.
[179] As discussed earlier in section 3 at paragraph 3.53.
[180] As discussed earlier in section 3 at paragraph 3.83.

over time, more complex, then that task may become more difficult. Our analysis suggests that, on the basis of the evidence that we see today, the mobile sector has the potential to play an even more significant role in future, raising important questions:

- Will consumer services be increasingly, or even pre-dominantly, supplied over mobile (or wireless) networks?
- How can we maximise the promise of mobile broadband? Can mobile broadband services become as ubiquitous and available as fixed services? Will the mobile internet be as open, and hence as effective as a platform for innovation and delivery of a wide variety of services, as the fixed internet has become – and be able to support, for example, services like instant messaging and mobile VoIP? Will mobile broadband services become easy to use across Europe and across the world, without concern for national boundaries?
- How should we promote competition in a market which may have a more complex mix of players, who have very different technologies, strategies and business models – and who may range from the very large to the very small?
- How can we ensure that any regulatory obstacles to convergence are removed, and that we are doing all we can to de-regulate as competition advances?

8.29 During the next phase of the Assessment, we are asking ourselves and stakeholders:

- Are these the right core purposes for Ofcom to adopt?
- What strategic principles should we adopt to give effect to these purposes?

8.30 The remainder of this section poses a series of further questions that highlight our current thinking on the questions posed in paragraph 8.28 and the issues that might arise, given the likelihood of further market change. We have divided these issues up broadly into questions about: promoting competition; protecting consumers; and adapting regulation as markets change. Inevitably, many of the issues touch on more than one of these areas.

Promoting competition

8.31 ‘Promoting competition’ is a substantive obligation placed on Ofcom as part of our principal statutory duty to further the interests of consumers. It is also one of the core elements of the European framework for regulating communications. The Framework Directive notes that national regulator’s duty in promoting competition includes, at least:

- ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality;
- ensuring that there is no distortion or restriction of competition in the electronic communications sector;
- encouraging efficient investment in infrastructure and promoting innovation; and

- encouraging efficient use and ensuring the effective management of radio frequencies and numbers.[181]

8.32 In addition, promoting competition also implies an ongoing effort to do two things:

- to foster competition between existing players (for example, by ensuring that switching is fast and straightforward for consumers); and

- to remove, or at least reduce, barriers to market entry, including enabling market entry by new players on a level playing-field.

8.33 The first area, where we see a clear need for further policy work, is the future of mobile termination rate regime after 2011.

8.34 The second area, which is already a focus and is likely to remain so, is the need to give full effect to the existing obligations on operators to permit interconnection of their networks and provide services such as number portability.

8.35 We also identify two important areas of work where we see scope for de-regulation. The first is in relation to our ongoing programme of spectrum release and liberalisation, as we continue to implement our strategic framework for spectrum. The second is the scope to de-regulate the fixed sector as evidence of competition between fixed and mobile networks becomes clearer. Both these fall outside the scope of this Assessment but form part of Ofcom's future work programme.

8.36 Next, we consider whether there needs to be a further consideration of the long-term policy approach to international roaming, an issue that remains high on the agenda of consumers and regulators.

8.37 Finally, we turn to a number of issues where there is considerable uncertainty about the need for regulatory intervention. These are issues that may arise given the trends we see or scenarios posed in section 7, but which raise questions about future regulation that are far more speculative:

- Could there be a role for regulation to encourage adoption of 'open standards' to help foster innovation – for example mobile 'net neutrality' or open standards as spectrum licence requirements like the US regulator has done?

- Would it ever be appropriate to regulate wholesale access to mobile networks?

How might the mobile termination rate regime need to evolve and what are the alternatives?

8.38 As described in section 6, we have imposed a ceiling on the price that each of the five UK mobile network operators can charge other fixed or mobile operators for terminating calls to their customers. Those charge controls, set in March 2007, end in March 2011.

8.39 The current regime has led to significant reductions in termination charges. These have declined from around 16ppm in early 1998 (or 21ppm in today's prices) to

[181] This list reflects the wording of Article 8(2) of the Framework Directive, which provides that Ofcom (as the responsible national regulator) "shall promote competition in the provision of electronic communications networks, electronic communications services and associated services and facilities by *inter alia*: …"

around 9ppm in early 2004 (or 11ppm in today's prices) to the current level of around 6ppm and will remain around 6ppm in early 2011 (or around 5.5ppm in today's prices).[182]

8.40 There is currently a debate underway within Europe about the future of this regime. Much of this debate focuses on the European Commission's proposals for guidelines relating to the method used to set cost-oriented rates by national regulatory agencies, including Ofcom.[183] Some other European regulators are currently looking at, or intend to examine the issue of the most appropriate wholesale pricing regime, either directly and through a dialogue in the European Regulator's Group. Researchers have also contributed to this debate raising questions about whether the current system - based on calling party pays (CPP) - provides the greatest benefits to consumers.[184]

8.41 We believe that the regime has performed well to date in promoting competition and benefiting consumers. However, as we have seen from the scenarios, under all visions of the mobile future, there will be increasing pressure on the mobile termination rate regime after 2011 arising from:

- **Convergence.** There is increasing scope for technology to enable fixed and mobile networks to share some access, backhaul or core elements. One example of this type of technology is a femtocell, which enables a mobile access network to use a broadband service as backhaul. These technologies are likely to change much more quickly than the regulatory price-setting process; there is a risk that rapid changes in the way in which fixed and mobile networks operate may lead to unintended or distortionary effects of regulation, or worse, create obstacles to innovation;

- **Competition.** Particularly given the emerging availability of spectrum as a result of digital switchover and further spectrum auctions, we see the possibility of more (and more diverse) players in the market. If that occurs, deriving cost-based termination charges may be more difficult. For example, regulated prices are sometimes sensitive to chosen estimates of future demand. Making these calculations with more or more varied players becomes inherently more uncertain, increasing the risks of regulatory failure; and

- **Regulatory burden.** Broadly speaking, each time we have set a regulated charge control for mobile services, the reduction in per-minute prices has been less than previously, as prices have converged on costs. At the same time, the time and effort involved in determining a regulated charge remains roughly constant, including the highly contested formal regulatory process and, potentially, litigation. Although the scale of the industry means that the benefits of getting termination prices right are significant, eventually this raises the question of whether there is an alternative approach that can achieve the same or better outcomes for consumers, more efficiently.

[182] These charges are for 2G termination for 1998 and 2004, while the later periods are blended for both 2G and 3G termination.
[183] See, for example, the European Commission's consultation about these issues at http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/termination_rates/termination.pdf
[184] See, for example, Littlechild, S.C. (2006) "Mobile termination charges: calling party pays versus receiving party pays." *Telecommunications Policy*, 30(5-6): 242-277.

8.42 We are interested in views on whether the current market review process and the structure of mobile termination regulation can be improved in any way. For example, can we achieve the same or increased benefits to consumers in a less resource-intensive way (including for industry)? Will technological or commercial changes reduce or remove the need for regulation of termination rates? If regulation is needed, can the process used to set prices be simplified or improved?

8.43 A number of alternative approaches to dealing with call termination have been suggested or already exist around the world, which we note for the purposes of discussion only:[185]

- The costs to be recovered from termination services might be narrowed, and/or the increment of traffic used to calculate 'incremental' costs might be narrowed (essentially the approach being discussed by the European Commission). This would be a change in the way that costs are currently shared between the caller and the recipient mobile customer, by shifting recovery of fixed and common costs away from the caller to the receiving party. The rationale and implications of such a change would need careful consideration, taking account of the benefits of lower termination charges, but also other likely effects. For example, there may be implications for competition, both among mobile operators and between fixed and mobile networks. Also, the change in the pattern of cost recovery between the calling and receiving parties may lead to changes in retail tariffs, which may benefit some consumers but disadvantage others;

- Mobile termination charges could be unregulated. Any consideration of this approach would need to account for the risk that, given regulation of fixed network operators (including BT's current 'any-to-any connectivity' obligation and charge control of its fixed termination charges) – simply removing existing mobile termination charge controls without making other changes to the wider regulatory regime could result in increases in termination rates by all mobile operators. Care would also need to be taken to account for the fact that, if mobile termination (only) were left unregulated (while fixed termination remained regulated) it could also lead to wasteful arbitrage opportunities and distortionary effects on competition between fixed and mobile networks;

- There could be no regulation of the prices of termination on any communications network. In some cases, current arrangements for two-way exchange of traffic between communications networks are set commercially without regulatory intervention.[186] Full deregulation of termination could involve not only removing price controls on fixed and mobile operators, but also, perhaps, removing BT's any-to-any connectivity obligation – allowing rates to be set under fully commercial conditions. Considerations relevant to this approach include the risks that it could lead to higher termination rates or even to so-called 'connectivity breakdown' (whereby each network will become a closed network). If this occurred, it could have extremely negative consequences for consumers. A further important concern that would need to be taken into account would whether and how consumers would be protected from the consequences of negotiations breaking down (in the worst case, operators might cancel

[185] The approaches here are not an exhaustive list of alternatives. As noted above we are open to other possible approaches not included here, subject to consideration of the complex factors that would need to be weighed up in adopting any specific policy.
[186] The public internet is an example of a network that is not regulated but that achieves widespread connectivity on a commercial basis.

interconnection arrangements in a showdown over pricing – which would cause significant consumer detriment); and

- The termination rate could be set on a reciprocal basis between fixed and mobile networks (sometimes referred to as 'fixed-mobile symmetry'). This would mean that a single termination rate, presumably the fixed termination rate, would be paid to any provider of any network who terminated a call to their own customer, regardless of the technology used to deliver the call. This is similar to the reciprocal compensation arrangements applying in the US between mobile operators and local Bell operating companies.[187] Within this framework there could also be true 'bill and keep' arrangements struck between operators or required by regulation. In such a regime the termination charge would be zero. In this case, the recovery of costs incurred in termination would be entirely shifted away from the caller to the receiving mobile customer. Operators could elect to recover the costs of terminating calls from their own customers in the form of either a 'per minute' charge to receive calls, or via their monthly access charge, or both.

  As for other approaches, the rationale and implications for competition and consumers would need careful consideration. There may be effects on competition between fixed and mobile operators, given their different service characteristics and cost structures, and on competition among mobile networks. The different pattern of cost recovery as between calling and receiving parties could lead to significant changes in the nature and structure of retail prices. Such changes could have potentially important implications for usage and penetration and the consumer experience more generally, from which some consumers may benefit (e.g. through reductions in prices for calling mobile phones), but others could be disadvantaged compared to the current regime (e.g. as the pattern of recovery of termination costs is shifted to receiving mobile customers; and if the removal of termination charges stimulates unwanted or nuisance calls).

8.44 Analysis of the pressures on the current regime for mobile termination and the pros and cons of different regimes after 2011 will raise many important issues for competition and consumers. We believe that it is appropriate and timely to start this debate now.

8.45 The extent of convergence will also play a role, since any analysis of options for mobile call termination may also need to consider ongoing changes affecting fixed services, particularly the shift to next-generation networks. Any change to the interconnection regime in one part of the sector may have implications elsewhere and reform is likely to be best considered in light of all of the issues in the round (including questions about transitional issues).

[187] This is a simplification – the US regime is complex. Those interested should consider the FCC's 2001 document, *In the Matter of developing a Unified Intercarrier Compensation Regime*, CC Docket 01-92, adopted on 19 April 2001 and released 27 April 2001 (available at the FCC's website at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-01-132A1.pdf). The FCC's website also has information about ongoing reform of the US intercarrier compensation regime – see for example http://www.fcc.gov/wcb/ppd/IntercarrierCompensation/). We also found J. Scott Marcus' paper "Call Termination Fees: The U.S. in global perspective" (presented at the 4th ZEW Conference on the Economics of Information and Communication Technologies, Mannheim, Germany, July 2004) to be a helpful distillation, written explicitly to help those outside the US understand those arrangements. That paper is available at: ftp://ftp.zew.de/pub/zew-docs/div/IKT04/Paper_Marcus_Parallel_Session.pdf.

Promoting competition by ensuring access to interconnection and MNP

8.46 Currently, prospective new entrants to mobile markets sometimes experience difficulties in establishing interconnection and related services such as access to the number portability regime. Clearly, competition may not work as effectively if prospective new entrants cannot secure the services they need to enable them to compete. Left unchecked, this situation could harm the interests of consumers.

8.47 Although short-term questions of enforcement fall outside the scope of this Assessment, we are likely to see a continued need for regulatory attention to overcome any delays in prompt fulfilment of the clear rules in place for the negotiation of interconnection and provision of number portability between eligible providers.

De-regulation and release of spectrum will remain a critical area of policy work

8.48 We noted in section 3 the role played by spectrum availability as a trigger for market change in mobile and wireless markets. One clear implication is the importance of the role played by spectrum in mobile and wireless markets and, therefore, the value of Ofcom's well-established strategic framework for spectrum issues.

8.49 Our spectrum policy programme is outside the scope of this Assessment. But it includes the work that we have done, and are continuing to do, to:

- release spectrum for new uses, including through market mechanisms (such as auctions); and
- relax the rules in place on the use of already allocated spectrum rights, wherever it is appropriate to do so.

How could developments in mobile markets affect the fixed regulatory regime?

8.50 We have, in section 3, described how the use of mobile voice services has grown, and the use of fixed voice services has shrunk, over a number of years.

8.51 These data are not a conclusive basis for determining that mobile and fixed services are directly competing in a single defined market (as that term is understood in competition policy). However, we think that it supports the view that now is the right time to review the fixed narrowband market – that is, the market for fixed voice services. We have commenced two related reviews, covering the retail and wholesale markets.[188] Those reviews will consider whether the regulation that has been applied to BT (and Kingston) previously continues to be relevant, given the competition conditions in those markets.

8.52 Those reviews will consider whether BT still has significant market power in relevant markets defined in that review, by applying established principles of competition policy. A critical question will be the extent to which BT faces competition from, for example, the services of other fixed line operators (such as Virgin Media, the cable company) and from other sources – including mobile services.

[188] The wholesale and retail Fixed Narrowband Market Reviews were identified in Ofcom's Annual Plan for 2008/09 (see also the full work programme available at: http://www.ofcom.org.uk/about/accoun/reports_plans/annual_plan0809/projects/comp/).

8.53 Although not, strictly speaking, a question of regulation relating to the mobile sector, it may represent one of the most significant long-term de-regulatory impacts of the changes occurring in mobile and wireless markets. Given the significant benefits that competition can bring over regulation, the prize for consumers – in terms of innovation and competition – of any de-regulation could be large.

How might approaches to international roaming evolve in future?

8.54 Within Europe, persistent high international roaming charges for voice and SMS (and, more recently, high international roaming charges for data services) have been a conspicuous source of friction between consumers, mobile operators and regulators. It is also an issue where competition appears to have little impact and where consumers feel that they can find themselves paying prices of which they are often unaware (until they get home).

8.55 We have on a number of occasions expressed our concerns about roaming prices. Ofcom and the European Regulators Group (ERG), of which Ofcom is a member, informed the European Commission that the 2002 regulatory framework for electronic communications did not provide regulators with suitable tools to address the issue, and urged the Commission to propose a solution, in co-operation with ERG. This led to Regulation (EC) No 717/2007 on roaming within the EU.[189] We have welcomed the positive impact for UK consumers flowing from the European institutions' intervention to set caps on the amount that may be charged for voice roaming services directly in legislation.

1.4 The Regulation imposes obligations on voice roaming tariffs at both the retail and wholesale level to protect the interests of roaming customers. The Regulation also imposes obligations on the transparency of voice, message and data roaming rates to customers in order to improve consumer awareness. Given the apparently high prices for SMS and data roaming services, the EC is currently considering whether to introduce further regulatory remedies for these services.

8.56 There is an additional question as to whether competition at the retail level proves sufficient to constrain roaming prices in the future. National regulatory authorities and the Commission are currently monitoring market events, to see whether prices fall from their current regulated levels, indicating that competition is working effectively.

8.57 If roaming prices prove to be an enduring problem, then Ofcom will need to consider whether, through the promotion of competition, we can help ensure that market forces, not regulation, determine prices for international roaming.

8.58 One option would be to create a mechanism for more effective consumer choice in roaming. One example of this type of approach might be to allow carrier pre-selection for roaming on mobile phones. Currently, a roaming user is restricted to using roaming services offered by mobile network operators in the roaming destination that have a roaming agreement with the user's 'home' network.[190]

8.59 Any regulatory response to enable consumer choice would need to address both wholesale and retail roaming issues, and may well require a co-ordinated response

[189] Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on Roaming on Public Mobile Telephone Networks within the Community and amending Directive 2002/21/EC.

[190] The GSM Memorandum of Understanding (MoU) provides the general basis for the establishment of international roaming, and the Standard International Roaming Agreement (STIRA) defines the principles of bilateral roaming agreements between different operators.

between European regulatory institutions. Nevertheless, with growing numbers of people using a growing number of ever more diverse devices across national boundaries, the question is unlikely to decline in significance.

Will competition be sufficient to ensure that the mobile broadband 'ecosystem' has the potential to be as vibrant and open as the wider public internet?

8.60 The best and most robust spur to innovation is, in our view, competition. That said, we have a statutory duty to have regard to the desirability of encouraging innovation in UK markets.[191] Mobile broadband faces considerable uncertainty about take-up and whether it will prove a stable medium for broadband services. At the time we are issuing this first consultation in our Assessment, the early signs are promising that it may bring significant benefits to citizens and consumers, just as the development of fixed broadband has done, and continues to do.

8.61 One feature of today's internet is the ability of providers to offer a seemingly endless range of content or applications to users, and the emergence of a diverse 'ecosystem' of services and forms of content. That environment has grown richer and more complex over time. Many of these applications (such as blogs and social networking) were not predicted (nor predictable) prior to their development and launch. Many rely for their effectiveness on the openness of networks using the Internet Protocol.

8.62 Therefore, it is reasonable to ask whether (if mobile broadband does prove to be a stable and sustainable way of offering broadband services): will the mobile broadband 'ecosystem' have the same opportunities and openness we see on today's fixed internet?

What role does openness and access to spectrum play in fostering innovation?

8.63 Innovation in technology markets often benefits from the provision of open standards and open platforms.[192]

8.64 One important resource that is a requirement for participation in mobile and wireless markets is access to spectrum. We think that our well-established strategic vision for spectrum - including technology neutrality, enabling of spectrum trading and an ongoing programme of spectrum liberalisation – will increase the amount of spectrum available for use and could play an important role in encouraging innovation. But if it were to be the case that lack of access to spectrum were to become a major obstacle to new, innovative spectrum uses, then there are some ways in which regulation could help reduce any impact on innovation and competition.

8.65 Regulators around the world have considered a number of different approaches to help ensure that spectrum does not become a bottleneck to downstream innovation and competition. For example, equipment using spectrum can be made available for without the need for a licence (for example, WiFi equipment). Another approach is to allocate a significant portion of spectrum (sufficient to build, for example, a national

[191] Communications Act, section 3(4)(d).

[192] There is no single definition of 'openness' is this context. Many commentators ascribe this relationship between openness and innovation to the need to overcome the difficulties in establishing a new platform, and the role that openness plays in inviting others to innovate in ways that contribute to its success (see, for example, Chesbrough, H. *Open Platform Innovation: Creating Value from Internal and External Innovation* (Intel Technology Journal, 18 August 2003 (available at ftp://download.intel.com/technology/itj/2003/volume07issue03/art01_open/vol7iss3_art01.pdf

mobile platform) to a particular licensee but impose licence conditions requiring that the platform adhere to standards of open access.

8.66 This 'open access' reserve approach was adopted recently by the FCC in the recent US auction spectrum of spectrum freed as a result of digital switch-over in the US. The FCC, responding to a proposal by a coalition of public interest groups, attached open-access requirements to a single block (the C-block, comprising 22 MHz) of the 700 MHz wireless band, sufficient to support at least one major new platform.[193] The Commission reasoned that:

> Rapid deployment and ubiquitous availability of broadband services across the country are among the Commission's most critical policy objectives ... Wireless service is becoming an increasingly important platform for broadband access.[194]

8.67 In reaching its decision, the FCC cited practices by network operators such as filtering of web-content, and limits on the services and functions available to users of mobile broadband services (restrictions it noted were not a feature of the fixed internet or (fixed) wireless networks).[195] It also expressed concern that mobile network operators appeared to have required equipment manufacturers to limit Wi-Fi and other capabilities in mobile devices.[196]

8.68 Without making a final finding about the state of competition, the FCC's requirements ensure that, within the reserved spectrum, any platform using C-block spectrum will give users the ability to attach any device and any application to that part of the band (but does not require the licensee to resell wireless bandwidth).[197]

8.69 Given that the UK does not face the same sort of issues with respect to interoperability as the US, we do not see a clear need for this sort of step here.

8.70 Another way to manage this issue would be to impose access regulation on the platforms using the spectrum, whether in spectrum licenses or using competition regulation (discussed further below).

8.71 Here in the UK, we have already consulted on a proposal *not* to include these sorts of obligations in licenses for the spectrum that we intend to award following our Digital Dividend Review.[198] Part of the reason for our view is that there is not sufficient evidence of a problem regarding innovation that would merit intervention going this far. Another important reason for our view is the very significant costs that

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[193] The FCC undertook this action following a proposal filed by the Ad Hoc Public Interest Spectrum Coalition ('PISC', consisting of the Consumer Federation of America, Consumers Union, Free Press, Media Access Project, New America Foundation and Public Knowledge). The PISC filing is available at http://www.publicknowledge.org/pdf/pisc-oa700mhz-exparte-20070405.pdf or via the FCC website.
[194] FCC's 700 MHz *Second Report and Order* ("FCC 07-132"), at paragraph 196 and 197. For the full decision, see http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-132A1.pdf.
[195] 'Although wireless broadband services have great promise, we have become increasingly concerned that certain practices … may constrain consumer access to wireless broadband networks and limit the services and functionalities provided to consumers by these networks'. FCC 07-132 at paragraph 198; the Commission goes on to discuss those practices noted in the text above. Note that in US regulatory terminology, a 'wireless service provider' means a cellular (i.e. mobile) service provider and therefore the 'wireless broadband networks' referred to above are, in UK terms, mobile networks.
[196] FCC 07-132 at paragraph 199.
[197] FCC 07-132. The Commission's comments on competition are at paragraph 201; the requirements themselves are spelt out in paragraph 206.
[198] http://www.ofcom.org.uk/consult/condocs/ddr/ddrmain.pdf

any such regulation could impose on the relevant licensee. Having consulted, we are not seeking to re-open this issue.

8.72 However, we would welcome the views of stakeholders on the wider question of whether conditions of competition are likely to be sufficient to ensure that there is a fair balance between access providers' needs to manage their networks and the value to citizens and consumers of an open mobile internet.

What role might 'net neutrality' play in mobile markets?

8.73 'Net neutrality' is a term coined as part of a debate whether there should be a principle of non-discrimination regarding different forms of internet traffic carried across networks, including mobile networks. There are different definitions of net neutrality but for the purposes of this discussion, we use it to describe any situation where an electronic communications network provider does not:

- prioritise one application, or one application provider's traffic over another;
- deliberately degrade any application, or application provider's traffic;
- charge any application provider for providing a higher quality of service; or
- deliberately block any one application or application provider's traffic.[199]

8.74 This issue has come into increasing focus, not only in North America but also here in Europe. The issue is whether communications providers should be free to block or manage the delivery of particular services or applications over their network, or whether they should be free to differentiate in the provision of services or applications over their networks either by charging content providers or consumers, or both, to deliver those particular services to an acceptable quality. Sometimes this is characterised as pitting the interests of those who supply access to the internet against the interests of those who supply applications or content, although this risks simplifying a complex issue.

8.75 If mobile broadband becomes more fully established, or if smartphones become a critical way many people access internet-based services, then it is likely that services offered by third-party suppliers over the internet will become alternatives to the services offered by the mobile operators themselves. Today many mobile network operators do not allow the use of services such as instant messaging or VoIP – applications that could compete directly with the packages that they offer to their subscribers.

8.76 In a competitive market, we expect that the degree of 'net neutrality' (if any) is to be determined by consumer choice and therefore does not require regulation. As long as consumers have a choice of access supplier, and consumers are able to switch operators, then unpopular blocking of services or content should be unprofitable. As a result, we have previously seen no case for intervening in relation to fixed internet access.

[199] Many different definitions exist, drawing on these themes. See for example the declaration of the Trans-Atlantic Consumer Dialogue which defines 'net neutrality' as a state in which users have the freedom to access the content, services, applications, and devices of their choice: full text at http://www.publicknowledge.org/pdf/tacd-nn-resolution-200803.pdf.

8.77 An important corollary is that consumers should be aware of any restrictions that are placed on their service both at the point of sale and during the term of the contract. Therefore, to the extent any intervention is called for, it may be focused on making the restrictions transparent to consumers, rather than regulating access.

8.78 Clearly any benefits that might be gained from requiring 'net neutrality' on mobile platforms would need to be weighed carefully against the costs that this would impose – particularly any potential lessening of incentives to innovate on the part of the platform operators themselves. There may be other ways of addressing concerns about blocking – for example, restrictions imposed to hinder competition, that are not subject to competitive pressures, may warrant action either under our regulatory powers under the Communications Act or under competition law.

Under what circumstances, if ever, would it make sense to consider access regulation?

8.79 As we have seen in section 3, retail market entry by MVNOs purchasing wholesale access has been a relative success in the UK. However, wholesale access is a less significant feature in mobile markets than in some other markets (such as fixed broadband) where access to wholesale network access is required to be provided on regulated terms.

8.80 Access regulation is an intrusive form of regulation, and as a matter of regulatory policy, is only warranted where competition is not working and there are no alternatives that might impose fewer costs and have fewer unintended consequences. It can also affect investment and, indirectly, incentives to innovation. Therefore, we would be cautious in even considering the case for such regulation. However, if, for whatever reason, competition between mobile networks was ineffective, or undermined in some way, then a similar obligation might be appropriate to promote competition between new service providers seeking to enter the market and the incumbents.

8.81 The presence of five mobile network operators – in contrast to BT's dominance of the fixed network – has allowed competition to replace any need for regulated access to mobile networks.[200] Currently, operators are required to negotiate with those seeking access but are, ultimately, free to refuse to supply access to MVNOs if they wish to do so.[201]

8.82 While further entry, for example of an MVNO with wholesale access to an existing mobile network, might lead to some increase in competition, it is unclear that the resulting benefit would be enough to justify the costs and difficulties associated with regulated access (including the likely risk of, for example, protracted regulatory disputes). On the other hand, an entrant with a new technology and its own network which enabled consumers to enjoy a much more effective or much cheaper form of mobile communication could have a large impact on competition, and directly on consumers. If access to existing networks were a constraint to entry of this kind, the benefits could arguably be much greater. But we would still have to consider the

[200] In 2001, Oftel decided that BT Cellnet and Vodafone AirTouch had "market influence" under a previous regulatory regime. As a result, BT Cellnet and Vodafone AirTouch were required to allow service providers to access their networks on non-discriminatory terms. For the 2001 determinations, see http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/midet0401.htm; for removal of these obligations: http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/2002/mide0402.htm

[201] There is a general obligation to negotiate with respect to interconnection, set out in General Condition 1.1 of the 'General Conditions of Entitlement' that apply to all communications providers in the UK.

costs of mandating access – such as the potential for unintended consequences on, for example, existing operators' incentives to invest.

8.83 A further issue is that, if RAN-sharing were to become a more widespread feature of the market, with (say) three or even fewer access networks operating, it could change the conditions of competition, perhaps profoundly. At the same time, some have privately expressed the view that it is inefficient to have multiple mobile networks in the UK. If we believed this were true (which, to be clear, on the evidence we have seen, we do not), then this could raise the question of whether we could or should seek to promote competition between service providers rather than between networks.

8.84 When H3G entered the UK market in 2003 it negotiated a national roaming agreement with one of the existing providers that allowed H3G's customers to use 2G services outside H3G's own network footprint. One feature that enabled the commercial agreement for national roaming to be struck was a regulatory obligation to supply roaming, contained in the licences of two of the existing operators. At the time, this was seen as providing a 3G new entrant with certainty that it would be able to offer commercial voice and data services to its customers as it rolled out its 3G network (a level of certainty which existing operators already had by virtue of being 2G network operators).[202]

8.85 This allowed H3G to launch services with national coverage before having to roll out fully its 3G network. Subsequently, H3G has expanded its network, reducing reliance on national roaming and, according to recent announcements, will reach 98 per cent of the population using its own network.[203]

8.86 Other new network operators, who wish to build new mobile networks, possibly using different technologies, are likely to wish to secure national roaming. Unlike in the past, the role played by national roaming services may vary a great deal between different types of new entrant. Not all new entrants may want to replicate the business model and services that existing mobile network operators provide. In principle, a more varied set of strategies might make commercial agreement on national roaming more likely, reducing any need to consider whether regulation is needed.

8.87 There is evidence that, today, at least some parties seeking to buy national roaming can get services under commercial conditions.[204] Of course, competition does not imply that all deals that can be done, are done. However, if there were compelling evidence that existing networks were not under competitive pressure to pursue those opportunities, we might consider whether to promote competition by ensuring that new entrants have the ability to strike reasonable roaming deals in the future. Given the significant benefit to citizens and consumers of network competition as far as it is feasible, and the costs regulation imposes, the case for intervention would need to be clear for such regulation to be considered.

[202] See, for example, the discussion at paragraph 2.9 in Oftel's consultation document on these issues, issued during the transition to the new regulatory regime under the Communications Act 2003 (http://www.ofcom.org.uk/static/archive/oftel/publications/eu_directives/2003/eu_roam/roam0503.pdf)

[203] http://www.three.co.uk/news/h3gnews/pressnewsview.omp?collcid=1019745742912&cid=1197535991381

[204] See, for example the recent deal announced between Cable & Wireless plc and Orange, noted in section 3.

How should Ofcom ensure consumers are protected?

8.88 As well as promoting competition, we seek to ensure that consumers are protected from various unfair or unacceptable forms of market conduct. Consumer protection and promoting competition are complementary activities: competition benefits when consumers feel that they can make choices with confidence – and competition itself is one of the most powerful drivers to ensure consumers are treated well by their suppliers. Consumer protection also includes restrictions on unacceptable content provided over mobile phones.

8.89 Given the rate of change in the sector, consumer protection needs to be flexible enough to allow for the evolution of content and services, and provide clear principles that give providers and consumers a clear sense of how Ofcom will decide whether regulation is the right response to specific issues.

8.90 In considering the implications for consumer protection, we raise a number of issues:

- first, we ask whether there ought to be a wider debate about the possible implications for privacy and personal security of a world where location-based services become widely available – a question that goes beyond Ofcom's remit but that we pose to assist other agencies, and Government, and interested stakeholders;
- next, we consider whether we should seek to provide consumers with more information and tools to exercise effective choice in the mobile market;
- we then consider whether, given the issues raised in our analysis about 'not-spots' and lifeline access, there is a role for Ofcom (whether by imposing regulation or by facilitating commercial processes) to help extend coverage outside urban areas and ensure the widest possible access to 999 services;
- we also note our intention to consider in more detail in the next phase of our work the question of those groups who are involuntarily excluded from the mobile market; and
- finally, we ask whether there ought to be a wider debate about mobile content issues. Here there is considerable uncertainty, and many of the issues relating to mobile content fit into a wider set of questions about internet content more generally.

Will privacy and security issues become more important as services become more personal and more complex?

8.91 We discuss at paragraph 5.62 the issues related to privacy and security. As a growing number of people increasingly store personal information on their mobiles, the control and security of that data will become ever more important. (These issues are not primarily for Ofcom – for example, some fall within the remit of the Information Commissioner; others are issues for Government).

8.92 A particular concern about privacy and security issues relates to those users who are vulnerable for some reason – for example, children. There are obvious benefits to parents from the ability to communicate with their children (and, in future perhaps, to locate them) but there are just as obviously risks with the security of those services and their ability to be misused. While much media attention understandably focuses on the risks to personal security, these are not the only concerns – for example,

children can also be exposed to commercial exploitation (with new variants of spam or advertising).

8.93 We therefore see risks to the interests of citizens and consumers if regulation and consumer protection rules in relation to personal information fall too far behind technological change.

Should we seek to influence the quality or quantity of information available to consumers?

8.94 Good quality information serves both a consumer protection purpose, and is essential to effective competition. As discussed in section 4 we have already consulted on some elements of making better information available to consumers in the context of additional charges. However, there are a number of additional areas where better information might be required to be provided, providing that intervention is proportionate.

8.95 Cost comparison websites exist, but as we discussed in section 4 the full calculation that a consumer makes in assessing a mobile service package may be complex.[205] It can include not only the 'obvious' elements such as the headline price plan, the mobile handset and any incentive being offered (e.g. cashback) but also at the cost of charges for items such as voicemail, ex-bundle minutes, data or texts, or itemised billing. Consumers do not always have a simple way of being able to compare all of the relevant elements across all of the operators in order to make a fully informed choice.

8.96 In some cases, markets can address these issues – for example, some suppliers can choose to offer simpler pricing that addresses consumers concerns directly. In other cases, regulation has played a role in ensuring a minimum level of information is available to consumers to enable them to make comparisons.

8.97 A specific example of an area where this concern might arise is in relation to mobile broadband. It is not in consumers' interests to have the concerns about headline speeds that have arisen in the fixed network extend to mobile broadband if that can be avoided.[206] Although measures of mobile broadband performance may be more difficult (since it may vary depending on the user's location) there may be benefits in mobile broadband operators providing more information to consumers about what they can expect from their service. We are currently considering this issue further.[207]

8.98 Of course, requirements to provide information impose costs that are ultimately borne by consumers, so the trade-off involved necessarily requires an assessment of whether consumers are likely to benefit (by avoiding poor choices) by a greater amount than those costs.[208]

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[205] Although currently no price comparison calculators accredited by Ofcom offer mobile voice comparisons.

[206] Fixed broadband ISPs have recently agreed to provide estimates of maximum line speed to make it clearer to consumers what quality of service they are likely to get when they sign up to a particular provider.

[207] http://www.ofcom.org.uk/media/news/2008/06/nr_20080605

[208] Fixed line operators are already obliged to publish quality of service information. This information is published on the independent website www.topcomm.org.uk. As set out in section 4, we are currently reviewing these obligations and considering whether any potential future requirements should be extended to other communications services such as mobile. Our review considers the impact this

Are markets likely to address issues such as persistent 'not spots' or emergency access?

8.99 As we saw in section 5, all the mobile operators have fulfilled the minimum coverage obligations that they are required to deliver as part of their 3G licence obligations. However, there are still areas of the country, in particular areas in Scotland, Wales and Northern Ireland and rural parts of England, where there is either poor coverage or coverage by only a few operators (or only a single operator). This problem is particularly acute for 3G coverage.

8.100 As we saw in section 3, some of the remaining coverage not-spots may be addressed by network sharing agreements, so any decisions about whether regulation might be appropriate should be taken only after the prospects for commercial deployment are clearer. However, it may be that national roaming (where operators pay for the use of another operators' network) might provide a mechanism to share costs to make the coverage of these areas economically viable.

8.101 A related issue is the question of 'emergency roaming'. Currently between UK networks, handsets do not work on other networks at all – including for emergency (999) calls. Handsets brought from overseas (i.e. that are using international roaming) can, by contrast, roam onto any network and make an emergency (or other calls) anywhere there is any mobile coverage. This leaves the situation where a UK consumer needing emergency access may have worse access to the UK's 999 services than an international visitor in a remote area, even though the technical means to provide that access exists.

8.102 It may be that this issue will be resolved under commercial conditions. However, given the technical feasibility of 999 roaming (which we understand occurs in other European countries), if no progress is made on commercial resolution over a long period, the question of whether to address this using regulation might need to be considered.

How might access requirements for particular groups need to evolve?

8.103 We saw in section 5 that disabled and older people have a lower penetration of mobile services than other users. We also saw that a small number of people report themselves as being excluded from the market as a result of factors other than their own choice.

8.104 We intend to consider in more detail the question of exclusion in the next phase of our Assessment.

Can we expect the self-regulatory approach to mobile content to continue to be successful?

8.105 As a platform neutral regulator, we regulate communications services, such as television services, regardless of the technology through which they are delivered. This includes, for example, linear television services delivered over IP or mobile networks (mobile TV). Mobile TV is subject to the same regulatory regime as other forms of linear TV, and is therefore covered by Ofcom codes. However, Ofcom is not responsible for the regulation of internet content accessed via mobiles, which in the UK is subject to the general law and self-regulatory regimes.

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information has on consumer decision making and effective competition, and the likely cost to industry.

8.106 In mobile markets, self-regulatory mechanisms are exist that aim to protect consumers, and particularly children, against harmful and offensive content. For example, the UK mobile industry has been worked over the past few years to develop age verification systems and today mobile phone users cannot have access to 18-rated content in still pictures, video and audiovisual material, and mobile games unless they can prove their age. Recently, we published a review of the UK code of practice for the self-regulation of new forms of content on mobiles, noting that the mobile industry had made significant investment in the development and implementation of content controls and has taken significant steps to enforce compliance, over and above the requirements set out in the Code.[209]

8.107 We think that this is an appropriate approach to the regulation of mobile internet content. As mobile web browsing increases and as children 's use of mobiles to access internet content grows, industry, consumers and regulators should continue to work together to improve and strengthen these mechanisms. In this context, it is worth noting the Mobile Broadband Group recently published a review of its Code of Practice for the regulation of new forms of content on mobiles.[210]

8.108 However, as new software tools become available, there is a risk that options open to parents and carers might not keep pace with technology. This is why it is important that alongside industry initiatives, emphasis is also placed on the need to educate users so that they can make effective use of such technologies.

How should regulation adapt to respond to convergence?

8.109 Finally, we need to consider other areas of regulation that may require further work to ensure that, as the communications market evolves, regulation does not unnecessarily impede the development of the market.

How might universal service and universal access need to adapt?

What role might mobile play in universal service delivery in future?

8.110 Current universal service regulation guarantees all citizens the provision of a fixed line service as part of a universal service obligation (USO) imposed on a single provider – in the UK, BT.[211]

8.111 Given that the underlying costs of providing mobile services have fallen in recent years, and the inherent desirability of creating regulation that is technology neutral, the question arises: will there come a point where we need to consider whether mobile could or should play a role in the provision of universal services?

8.112 For example:

- Could mobile compete with fixed to offer the most cost-effective way to provide subsidised access to unprofitable areas or unprofitable customers?
- Could mobile services be as good, or even better, in terms of meeting the needs of low users, who are entitled to specific prices and services?

[209] http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/
[210] http://www.mobilebroadbandgroup.com/press.htm
[211] Excluding the Hull area, where the universal service provider is Kingston Communications plc

- If services offered under a USO were expanded, would it be in the interests of consumers to ensure that the technology chosen to deliver it was selected on the basis on efficiency, and could be either fixed, or mobile – or a combination of both?

- Given that there are multiple providers, on whom would the obligation fall? If it was to be a single provider, how would that provider be selected?

8.113 Universal service is an evolving concept, which needs to adapt as technologies and society's preferences change. The rise of mobile usage might have implications on the provision of universal service going forward, and these are some questions which we think merit further consideration. The European Commission will initiate a debate on the future of USO later this autumn, and we are looking forward to engaging with affected stakeholders and to contribute to this debate.

Should Ofcom be concerned about affordability?

8.114 As we saw in section 3 mobile operators are providing packages that appear to be serving high-end users relatively well. The situation is less clear with low-end customers and particularly unclear with respect to some pre-pay customers.

8.115 It is not clear that affordability per se is a significant obstacle to take-up for anything other than a small proportion of consumers. However, this could change in future. For example, some argue that changes to the mobile termination regime (or falls in termination rates under the existing termination regime) could disproportionately impact cheaper and pre-pay services, which could increase in price. This may raise affordability concerns, prompting a debate about whether some form of mobile low-user package might be necessary in such circumstances.[212]

How might telephone numbering issues be affected by convergence?

8.116 Apart from the fact of mobility, to many consumers one visible difference between mobile and fixed services is that mobile and fixed numbers are different. Fixed (geographic) numbers may provide information about *where* a call is to be routed (e.g. geographic numbers with an area code). Mobile numbers, by definition, do not – but conversely provide more precise information about *who* is likely to receive a call made to that number.

8.117 Telephone numbers have historically played a number of different roles, and the use of telephone numbers for mobile services has evolved in the context of numbering arrangements that were developed in the context of fixed services (and using initially geographic numbers). In the future, there are questions that may arise that change this context:

- Will the distinctions between fixed and mobile numbers become less significant in the eyes of consumers, if, for example, fixed geographic numbers become more widely used for nomadic VoIP services that may be provided to different locations?

[212] Under the fixed universal service obligations, BT is obliged to a low-user package (sometimes called a 'social telephony product'). This offer is limited to those who are in receipt of certain Government benefits

- Will there be some consumers, and some contexts, where calls delivered to a location might be assigned to individuals and routed to personal devices rather than a 'household' device?

- Conversely, will there be some consumers (for example, businesses) where routing a call to a location is more useful than specifying a person – even if the majority of calls have migrated to mobile or personal devices?

- Will the network used to deliver the call or the service being provided in connection with the number remain the only way to distinguish between these different uses of telephone numbers?

8.118 At the same time, telephone numbers may become increasingly affected by the way that routing and addressing is undertaken in other contexts. For example, in next-generation networks, it may be the case that telephone calls are routed using IP addresses that are translated into telephone numbers for the ease of users, in the same way that IP addresses are converted into domain names for ease of reference today. Similarly, there are already voice telephony services that use on-line user names or email addresses to rout services, including services that are interconnected with the public switched telephone network (e.g. Skype). If this integration continues, then the use of telephone numbers may become more flexible (even discretionary) for users.

8.119 There may be considerable benefits to consumers in being able to access services more flexibly – and that flexibility might well outstrip what was envisaged when the current telephone number system was designed.[213] Given the history of telephone numbers and the investment made by residential and business users in ensuring that others know their number, any changes are likely to occur gradually rather than in a 'Big Bang' – but as with other aspects of mobile services, even this is uncertain.

8.120 If fixed and mobile networks become less distinct, then this is likely to raise a number of implications for the treatment of telephone numbers:

- The definition of 'Mobile Service' in the National Telephone Numbering Plan, already the subject of debate within industry, may need revision – along with, potentially, the current distinctions between fixed geographic and non-geographic numbers;

- Consumers' perceptions of the distinctions between fixed and mobile numbers may have an impact on competition between what are (in today's terms) fixed and mobile networks but are competing directly to provide the same or similar services to consumers;[214] and

- The question of number portability between fixed and mobile platforms (which is not currently permitted under the existing rules on number portability) might become more important.

[213] This is not limited to mobile services – for example, fixed next-generation networks may offer users their full suite of services at a location that might change depending on where the user is at the time.
[214] As noted previously, we are not making any findings in this consultation with respect to the question of whether fixed and mobile networks compete directly at the moment. Those questions will be central to Ofcom's Fixed Narrowband Market Reviews.

Moving from questions to proposals

8.121 Following the publishing of this consultation, we intend to hear from stakeholders affected by events in the mobile sector.

8.122 We are planning:

- a dialogue with all stakeholders;
- a programme of further research, for example, into the underlying causes of the consumer and citizen issues identified in this Assessment; and
- further analysis of the options with regards to mobile termination rates and participation in the EU level debate on this issue.

A dialogue with stakeholders

8.123 Over the next months we will be hearing from and meeting with stakeholders, as well as inviting written submissions to this consultation.

8.124 We have set up a moderated blog that allows interested individuals and organisations to contribute to the debate about the future of mobile services, consumer and citizen issues and the role of regulation in a less formal manner. We also intend to use the blog to, for example, provide updates on our dialogue with stakeholders and pass on for debate views of others, to prompt debate. We may include a summation of views expressed on the blog in our subsequent consultation.

8.125 The blog is open from 28 August 2008 and can be accessed via http://comment.ofcom.org.uk/mobileblog/.

8.126 We will also seek engagement with various industry, government organisations and consumer bodies through a series of conferences and individual interactions.

8.127 We are planning further public engagement with stakeholders. Plans will be available on our website and via the blog.

Further research including into citizen and consumer issues

8.128 We intend to conduct further research into a number of the consumer and citizen issues raised in this consultation to arrive at a clearer picture of their causes. This will provide us with clearer evidence of potential areas of concern.

8.129 Our research will focus on the causes and impact of exclusion from mobile services over time, looking into:

- how mobile services impact consumers' lives and how this has changed over time;
- how the impact of mobile services, both in terms of benefits and concerns, is distributed among various groups of the population; and
- what drives this distribution.

Next steps

8.130 As a result of this consultation and our further research we aim to arrive at proposals for answering the final question of our initial scope for this assessment: What is the scope for deregulation, competition and innovation in the mobile sector?

8.131 We will publish these proposals in a further consultation, which we expect to publish in the first half of 2009.

Consultation questions

We would welcome feedback on any aspect of the market analysis in this section. We are also interested in stakeholders' views on these questions:

Promoting competition

Question 8.1: Should Ofcom do more to promote competition in mobile and wireless markets?

Question 8.2: Ofcom's strategy in telecommunications is to promote competition at the deepest level of infrastructure that is effective and sustainable. How might this strategy be applied, given future developments in the mobile sector? Under what circumstances, if ever, would it make sense to consider access regulation for mobile platforms?

Question 8.3: What role can competition play in ensuring that future development of the mobile internet provides an open and flexible environment for a wide range of services? Should Ofcom explore open access requirements to ensure opportunities for innovation? What role might 'net neutrality' play in the mobile sector?

Setting clear rules for consumer protection

Question 8.4: What role might competition play in addressing questions about transparency of prices, services and contractual conditions offered to consumers of mobile and wireless services? What role should regulation play in addressing these questions?

Question 8.5: What is the best way to promote content standards and ensure privacy protection for increasingly complex content and transaction services? How will privacy issues fare in a world where services are more personal and more complex?

Adapting regulation to converging markets

Question 8.6: Will the mobile termination rate regime need to evolve or change more fundamentally? What is the best approach to adopt?

Question 8.7: If competition does not reduce international roaming charges sufficiently, how should regulators respond, if at all?

Question 8.8: How might universal service and universal access need to adapt in a world where we increasingly rely on mobile services? What role might mobile play in universal access delivery in future?

Question 8.9: Can markets and commercial agreements address issues such as 'not spots' and emergency access? If not, what role might be played by a regulator to address these issues?

Question 8.10: How might access for particular groups (such as the elderly and disabled users) need to evolve in future? What role can competition play in addressing these questions?

Our proposed way forward

Question 8.11: Do you have any comments regarding our proposed way forward and the objectives of the next phase of this Assessment?

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made by 5pm on 6 November 2006.

A1.2 Ofcom strongly prefers to receive responses using the online web form at http://www.ofcom.org.uk/consult/condocs/msa08/howtorespond/form, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.

A1.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email mobile@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

A1.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Emma Taylor
Floor 4 (Competition Group)

Ofcom

Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3706

A1.5 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A1.7 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please feel free to contact:

David Stewart (Project Director) via email at david.stewart@ofcom.org.uk or by phone on 020 7783 4173 or

Katja Benyon (Project Manager) via email at katja.benyon@ofcom.org.uk or by phone on 020 7981 3286.

Confidentiality

A1.8 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

A1.9 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.10 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at http://www.ofcom.org.uk/about/accoun/disclaimer/

Next steps

A1.11 Following the end of the consultation period, Ofcom intends to a further consultation in the first half of 2009.

A1.12 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: http://www.ofcom.org.uk/static/subscribe/select_list.htm

Ofcom's consultation processes

A1.13 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A1.14 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or email us at consult@ofcom.org.uk . We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.

A1.15 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Vicki Nash, Director Scotland, who is Ofcom's consultation champion:

Vicki Nash
Ofcom
Sutherland House
149 St. Vincent Street
Glasgow G2 5NW

Tel: 0141 229 7401
Fax: 0141 229 7433

Email vicki.nash@ofcom.org.uk

Annex 2

Ofcom's consultation principles

A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A2.3 We will be clear about who we are consulting, why, on what questions and for how long.

A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5 We will consult for up to ten weeks depending on the potential impact of our proposals.

A2.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A2.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A2.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Consultation response cover sheet

A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.

A3.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.

A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

A3.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at www.ofcom.org.uk/consult/.

A3.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

What do you want Ofcom to keep confidential?

Nothing	☐	Name/contact details/job title	☐
Whole response	☐	Organisation	☐
Part of the response	☐	If there is no separate annex, which parts?	

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response. It can be published in full on Ofcom's website, unless otherwise specified on this cover sheet, and I authorise Ofcom to make use of the information in this response to meet its legal requirements. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here. ☐

Name Signed (if hard copy)

Annex 4

Consultation questions

A4.1 Section 1 - Executive summary

Question 1.1: What are the implications of market change for mobile and wireless services?

Question 1.2: How are citizens and consumers affected by developments in the mobile sector?

Question 1.3: What are the purposes of mobile regulation, and where should its focus lie?

Question 1.4: What is the scope for deregulation, competition and innovation in the mobile sector?

A4.2 Section 2 – Why is Ofcom undertaking this Assessment?

We have not included any questions for this section.

A4.3 Section 3 – Today's UK mobile markets

Question 3.1: What do you think are the features of a well-functioning mobile market? What evidence do you see that those features are present in the UK market?

Question 3.2: What measures are most appropriate to assess whether the mobile sector is performing well for citizens and consumers?

Question 3.3: How will market dynamics change as a result of trends such as availability of new spectrum, mobile broadband and new ways of delivering voice services?

A4.4 Section 4 – Consumers

Question 4.1: What is your experience, as an individual consumer or an organisation that uses mobile services?

Question 4.2: How should regulators and policy-makers respond to signs of rising consumer concern?

Question 4.3: What are the important factors to consider in striking a balance between protecting mobile consumers and enabling markets to work flexibly? Have we got this balance right in today's mobile market?

A4.5 Section 5 - Citizens

Question 5.1: How does the use of mobile services affect our participation as citizens in society?

Question 5.2: What factors should we take into account in thinking about access and inclusion issues in mobile markets?

Question 5.3: What factors should we take into account in thinking about new services, and how those services may affect issues like protection of children, privacy and security?

Question 5.4: Have you been affected by issues about coverage or 'not spots'? How has it affected you?

A4.6 Section 6 - Regulation

We have not included any questions for this section.

A4.7 Section 7 - Scenarios

Question 7.1: What do you see as the most influential trends and features of mobile and wireless markets in future?

Question 7.2: What new policy and regulatory challenges could the trends identified in this section bring? Which policy and regulatory challenges could they address?

A4.8 Section 8 – Implications

Promoting competition

Question 8.1: Should Ofcom do more to promote competition in mobile and wireless markets?

Question 8.2: Ofcom's strategy in telecommunications is to promote competition at the deepest level of infrastructure that is effective and sustainable. How might this strategy be applied, given future developments in the mobile sector? Under what circumstances, if ever, would it make sense to consider access regulation for mobile platforms?

Question 8.3: What role can competition play in ensuring that future development of the mobile internet provides an open and flexible environment for a wide range of services? Should Ofcom explore open access requirements to ensure opportunities for innovation? What role might 'net neutrality' play in the mobile sector?

Setting clear rules for consumer protection

Question 8.4: What role might competition play in addressing questions about transparency of prices, services and contractual conditions offered to consumers of mobile and wireless services? What role should regulation play in addressing these questions?

Question 8.5: What is the best way to promote content standards and ensure privacy protection for increasingly complex content and transaction services? How will privacy issues fare in a world where services are more personal and more complex?

Adapting regulation to converging markets

Question 8.6: Will the mobile termination rate regime need to evolve or change more fundamentally? What is the best approach to adopt?

Question 8.7: If competition does not reduce international roaming charges sufficiently, how should regulators respond, if at all?

Question 8.8: How might universal service and universal access need to adapt in a world where we increasingly rely on mobile services? What role might mobile play in universal access delivery in future?

Question 8.9: Can markets and commercial agreements address issues such as 'not spots' and emergency access?If not, what role might be played by a regulator to address these issues?

Question 8.10: How might access for particular groups (such as the elderly and disabled users) need to evolve in future? What role can competition play in addressing these questions?

Our proposed way forward

Question 8.11: Do you have any comments regarding our proposed way forward and the objectives of the next phase of this Assessment?

Annex 5

Mobile pre-pay user profiles

A5.1 In section 4, Figure 62 we showed our estimate monthly spend per month for three pre-pay user profiles assuming constant usage, based on operators' average tariffs over the period considered.

A5.2 This Annex 5 describes the three user profiles used for these calculation.

A5.3 It is important to note that while the three constructed profiles serve to illustrate the central pricing experience for those notional individuals over time, the profiles do not capture all potential dimensions (e.g. international calls) to the calling activities for those individuals. In addition, the three usage profiles cannot describe the entire pre-pay experience for all user types.

User profile A: Mobile pre-pay profile for a light-weight user of mobile services

A5.4 The light-weight user of mobile services is assumed to make a total of 30 minutes of outbound national calls per month, of which 50 per cent of those calls are made at peak times and 50 per cent at off-peak times, and these calls are divided in the following way:

i) Calls to fixed: 20 minutes per month (one call at 4 minutes, four calls at 1.5 minutes per call and 20 calls at 30 seconds per call);

ii) Calls to mobile: 10 minutes per month with:

on-net – 3 minutes (one call at 1 minute and 4 calls at 30 seconds per call); and

off-net – 7 minutes (one call at 1.5 minutes, three calls at 1 minute and 4 calls at 30 seconds per call, 2 calls at 15 seconds).

It is also assumed that the light-weight user:

(a) sends no text messages (SMS); and

(b) retrieves three voicemails per month, each of which lasts 30 seconds.

User profile B: Mobile pre-pay profile for a mid-weight user of mobile services

A5.5 The mid-weight user of mobile services is assumed to make a total of 60 minutes of outbound national calls per month, of which 70 per cent of those calls are made at peak times and 30 per cent are made at off-peak times, and these calls are divided in the following way:

i) Calls to fixed - 30 minutes per month (four calls at 4 minutes, four calls at 1.5 minutes per call and sixteen calls at 30 seconds per call);

ii) Calls to mobile - 30 minutes per month with:

on-net – 15 minutes (two calls at 4 minutes, two calls at 1.5 minutes per call and eight calls at 30 seconds per call; and

off-net – 15 minutes (two calls at 4 minutes, two calls at 1.5 minutes per call and eight calls at 30 seconds per call).

It is also assumed that the mid-weight user:

(a) sends 20 text messages (SMS) per month, of with 50 per cent are sent on-net and 50 per cent off-net, and

(b) retrieves 10 voicemails per month, each of which lasts 30 seconds.

Mobile pre-pay profile for a heavy-weight user of mobile services

A5.6 The heavy-weight user of mobile services is assumed to make a total of 100 minutes of outbound national calls per month, of which 30 per cent of those calls are made at peak times and 70 per cent are made at off-peak times, and these calls are divided in the following way:

i) Calls to fixed – 30 minutes (one call at 5 minutes, five calls at 2 minutes, six calls at 45 seconds per call, 15 calls at 30 seconds and 12 calls at 15 seconds per call); and

ii) Calls to mobile – 70 minutes per month with:

on-net – 50 minutes (one call at 10 minutes, five calls at 5 minutes, three calls at 1.5 minutes, 15 calls at 30 seconds, 12 calls at 15 seconds); and

off-net – 20 minutes (one call at 5 minutes, three calls at 2 minutes, 10 calls at 30 seconds and 24 calls at 10 seconds per call).

It is also assumed that the heavy weight user:

(a) sends 120 text messages (SMS) per month, of which 70 per cent are sent on-net and thirty per cent off-net; and

(b) retrieves eight voicemails per month, one of which lasts 2 minutes, one lasts 1.5 minutes and six others last 45 seconds.

Annex 6

Mobile related complaints

A6.1 This Annex 6 provides further information about the evolution of consumer complaints about mobile services.

A6.2 In Chapter 4 we noted that there has been a significant increase in reported complaints to Ofcom, PhonepayPlus, Consumer Direct and Citizens Advice Bureaux in England and Wales.

A6.3 Set out below are the high level statistics that relate to those complaints.

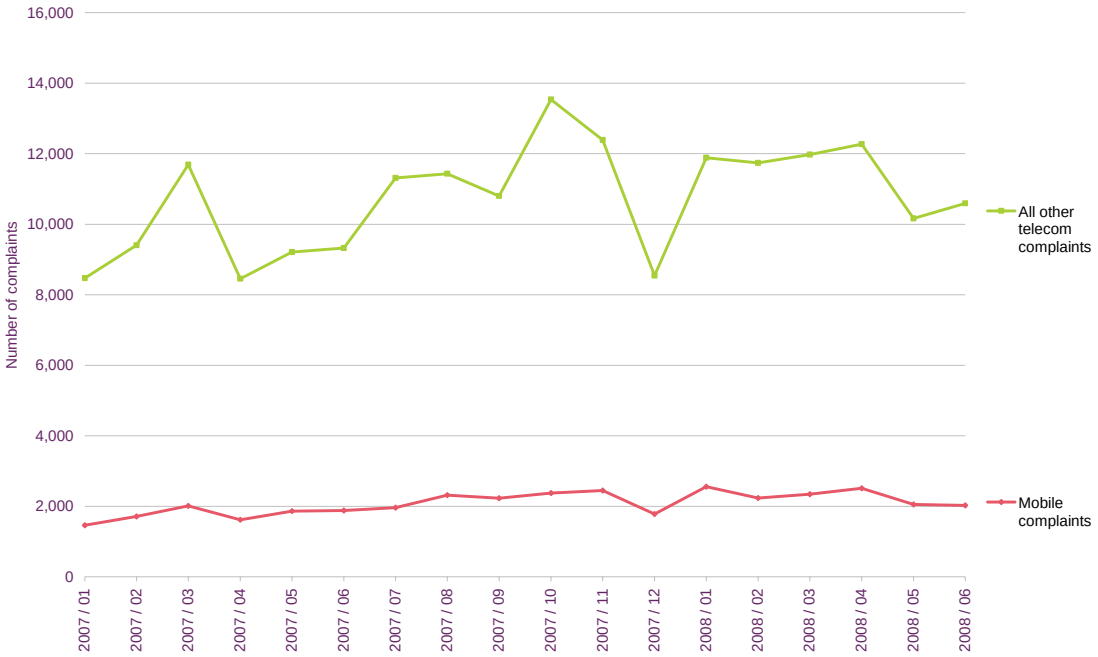
Complaints made to Ofcom

A6.4 Figure A1 below shows the total number of complaints received by Ofcom's Advisory Team (OAT) about mobile services since January 2007 (the composition of that total is given at Figure 65 in section 4) against all other telecoms complaints received by OAT in the same period.

A6.5 There were approximately 24,000 complaints in total made to OAT about mobile services in 2007, which represented 0.03% of the total subscriber base that year.

A6.6 The trend in mobile service complaints in 2007 was upwards, although the rate of growth was less pronounced than for all other telecoms (fixed and broadband). And, while the upward trend for the first six months of 2007 for complaints about both mobile and all other telecoms was reversed in the first six months of 2008, the rate of fall in complaints in 2008 was greater for all other telecoms than it was for mobile services.

Figure A1: Total mobile complaints reported to Ofcom's Advisory Team (OAT) and all other telecoms complaints (fixed line and broadband) between January 2007 and June 2008



Source: Ofcom OAT complaints data

Complaints made to PhonepayPlus

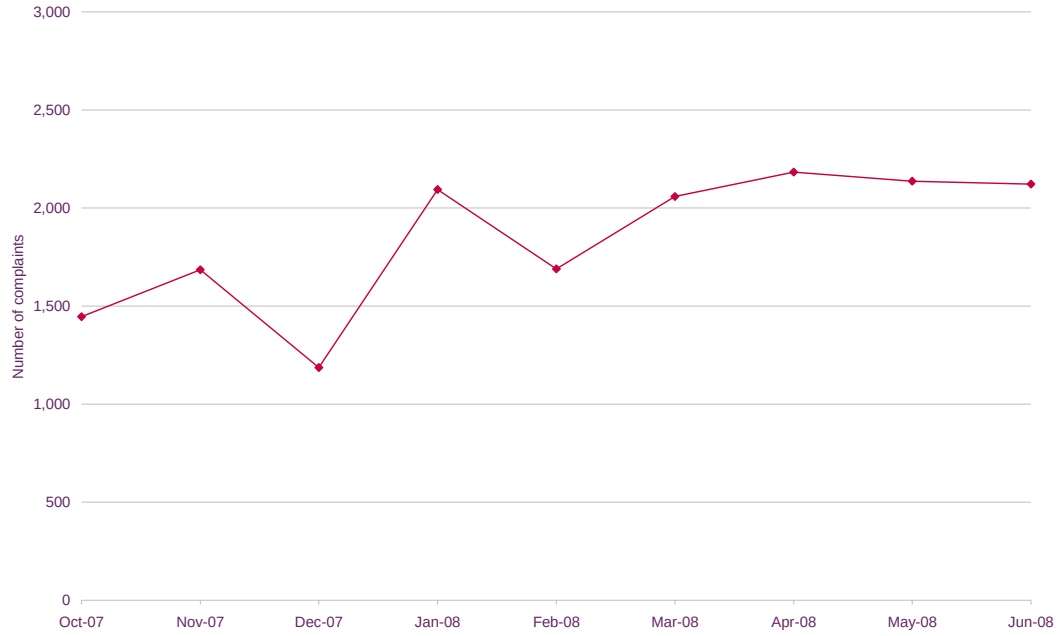
A6.7 Mobile services form the largest single segment of the UK phone-paid market, with consumers having spent £464m on mobile phone-paid services in 2007/8. This represents 46 per cent of the total phone-paid market in which 18m UK consumers have pparticipated.

A6.8 With the development of the market, PhonepayPlus has seen a 108 per cent increase in mobile related complaints in 2007/8 and which totalled more than 8,000 in 2007/8.

A6.9 The upward trend in mobile related complaints to PhonepayPlus has continued into 2008 and although the rate of increase in complaints has slowed, PhonepayPlus still received more than 8,000 complaints since April. Furthermore, the number of individual complaints made to PhonepayPlus about each service provided has increased from an average of between 5 and 10 in April 2007 to as many as 270 complaints in mid July 2008.

A6.10 Figure A2 below graphs the complaints received by PhonepayPlus about mobile paid-for services over the past nine months. This has been produced by PhonepayPlus on an adjusted 'like-for-like' basis to reflect the 4 February 2008 changes to the criteria used by them for recording consumer complaints. While that change enables PhonepayPlus to better capture information about consumer harm the change has served to increase the number of complaints recorded.

Figure A2: PhonepayPlus complaints data from October 2007 to June 2008



Source: PhonepayPlus

A6.11 The rise in the number of mobile complaints received by PhonepayPlus can be seen in part as a consequence of the development of markets where service providers explore the sale of new services through new channels e.g. promotional SMS messages and subscription services. Where this is the case, issues that often arise relate to the level of consumer experience and understanding of the new services and in particular the level and quality of information provided and relayed to them at the time of the sale. Where customer confusion arises, this also provides the potential for them to be exploited.

A6.12 PhonepayPlus is currently consulting in relation to subscription and joining fee-based services (e.g. ringtones, wallpaper and music downloads) given that 51% of all mobile complaints made to them relate to these forms of selling. [215]

Complaints made to Consumer Direct

A6.13 Table A3 below sets out the total number of mobile related complaints received by Consumer Direct in 2006 and 2007. Mobile services come second only behind second hand cars as the sector that consumers most complain about. The combined complaints for mobile phone service and hardware categories indicate that in absolute terms, the mobile sector is the most complained about in the UK for the two consecutive years identified.

A6.14 The total number of mobile related complaints received by Consumer Direct grew 32% between 2006 and 2007. As a proportion of total subscriber base that total grew marginally from 0.06% of the base in 2006 to 0.07% of the base in 2007.

[215] *Mobile phone-paid services and their marketing, A PhonepayPlus Review and Consultation document*, 17 July 2008, at http://www.phonepayplus.org.uk/pdfs_news/Mobile_White_Paper.pdf

Table A3: Total Consumer Direct Complaints for 2006 and 2007 by reported category

Complaints types	Number of complaints 2006	Number of complaints 2007	% increase
1. Second hand cars purchased from independent	35392	41880	18%
2. Mobile Phones (service agreement)	**23338**	**34679**	**49%**
3. TVs	17337	19744	14%
4. Mobile Phones (Hardware)	**16338**	**17760**	**9%**
5. Personal Goods and Services (other)	13153	16976	29%
6. General building work (other)	15355	15598	2%
7. Car repairs and servicing from independent	13686	15253	11%
8. Upholstered furniture	13549	14024	4%
9. Internet Service Providers	9436	13536	43%
10. Second hand cars purchased from franchise	11957	13322	11%
Total Complaints	**695463**	**819815**	**18%**

Source: Consumer Direct 2008

A6.15 Based on the category codes for complaints used by Consumer Direct, we estimate that for the period January 2007 to October 2007 6,000 complaints may relate to mis-selling and cashback. For the period analysed by us to date, which reaches up to May 2008, mis-selling of mobile services continued to prove a significant issue for consumers. More generally, over the latter period, complaints relating to substandard service, misleading claims, claims against the trader, selling practices and terms and conditions of contract dominated.

Complaints made to Citizens Advice Bureaux

A6.16 Over the period 2006/7 and 2007/8 Citizens Advice reported similarly large rises in the number of reported mobile problems that they had dealt with in their Bureaux in England and Wales. In 2006-7 they dealt with almost 8,500 reported problems about mobile phones but in 2007-8 this figure had risen to more than 12,500.[216] The top five mobile phone issues that were reported to Bureaus in 2007-8 in rank order related to:

- complaints that had been made to mobile suppliers and redress;
- contract terms and conditions;
- contract cancellations and withdrawals;
- costs and billing; and
- selling methods and techniques.

[216] Citizens Advice revised the coding methods used to record problems that consumer reported to them and this change to logging practices has had the effect of increasing the total number of complaints. Although this change cannot explain the majority of the increase, it will explain some proportion.

Annex 7

Related Ofcom projects and initiatives

A7.1 This Annex lists some of the major ongoing mobile-related projects and initiatives within Ofcom and organisations linked to Ofcom (e.g. PhonepayPlus). Most have been mentioned in the main body of the document.

A7.2 We have grouped Ofcom's projects in line with our three areas of priority for mobile regulation:

- to promote competition;
- to protect consumers; and
- to adapt regulation as market conditions change.

A7.3 We are listing projects and initiatives in reverse chronological order, starting with the most recent ones, and ending with those already completed.

A7.4 We have not listed research reports that we publish periodically, such as the Communications Market Report and the Consumer Experience Report.

A7.5 The list of projects and publications included in this Annex is not meant to be exhaustive.

Promoting competition

Project or publication	Status
Business Connectivity Market Review - Review of the wholesale very high bandwidth traditional interface symmetric broadband origination markets http://www.ofcom.org.uk/consult/condocs/bcmr_tisbo/	Consultation published 10 July 2008 Closed 11 August 2008
Review of the wholesale broadband access markets - Final explanatory statement and notification www.ofcom.org.uk/consult/condocs/wbamr07/statement/statement.pdf	Final statement published 21 May 2008
Award of available spectrum: 2500-2690 MHz, 2010-2025 MHz http://www.ofcom.org.uk/consult/condocs/2ghzrules/statementim/statement/ *On 4 April 2008 Ofcom announced a decision to award spectrum in the 2.6 GHz and 2010 MHz bands. In that announcement we indicated that we expected the application date for the award to be in July 2008. On 9 June 2008 we published an update explaining that in light of legal challenges of our decision brought by T-Mobile and O2, we had decided that it would be inappropriate to set the application date for July or August 2008.*	Statement published 4 April 2008 Litigation ongoing

Project or publication	Status
That litigation is currently ongoing and we continue to press for it to be progressed as expeditiously as possible. In the meantime, we have decided that we will not call for applications in September or October 2008. http://www.ofcom.org.uk/radiocomms/spectrumawards/awardspending/award_2010/update060808/	
Application of spectrum liberalisation and trading to the mobile sector – Including implementation of the Radio Spectrum Committee Decision on 900 MHz and 1800 MHz http://www.ofcom.org.uk/consult/condocs/liberalisation/liberalisation.pdf	Consultation published 20 September 2007 Consultation closed 29 November 2007
Telephone number portability for consumers switching suppliers, http://www.ofcom.org.uk/consult/condocs/gc18review/statement/statement.pdf *Ofcom continues to work with industry on the implementation of these changes through UK Porting http://www.ukporting.org.uk* *UKPorting has been set up by Ofcom to facilitate the Mobile and Fixed telecommunications industry in implementing the changes to General Condition 18 set out in Ofcom's Concluding Statement on Telephone Number Portability published on November 29th 2007.*	Concluding statement published 29 November 2007
Digital Dividend Review http://www.ofcom.org.uk/radiocomms/ddr/ *The Digital Dividend Review (DDR) is the project releasing the spectrum freed up by digital switchover for new use.* *A recent update is available at: http://www.ofcom.org.uk/radiocomms/ddr/bandmngr/*	Three consultation documents published in June and July 2008 Closing dates between August and October 2008 Various publications since 2006
Draft Enforcement Guidelines - Ofcom's draft guidelines for the handling of competition complaints, and complaints and disputes concerning regulatory rules http://www.ofcom.org.uk/consult/condocs/enforcement/	2006
Spectrum Framework Review http://www.ofcom.org.uk/consult/condocs/sfr/sfr2/sfr.pdf	2004-2005

Protecting customers

Project or publication	Status
Regulation of Premium Rate Services (PRS)	Consultation expected Q4 08/09
Ofcom review of cross-product migrations	Consultation expected Autumn 2008
Notice of proposal to make the Wireless Telegraphy (Mobile Communication Services on Aircraft) (Exemption) Regulations 2008 http://www.ofcom.org.uk/consult/condocs/mca08/mca.pdf	Consultation published 28 July 2008 Closing date 29 August 2008
Review of quality of service information phase 1: Information on quality of customer service http://www.ofcom.org.uk/consult/condocs/qos08/qos08.pdf	Consultation published 17 July 2008 Closing date 8 October 2008
PhonepayPlus, Mobile phone-paid services and their marketing. A PhonepayPlus Review and Consultation document http://www.phonepayplus.org.uk/pdfs_news/Mobile_White_Paper.pdf *This document has been published by PhonepayPlus.* *PhonepayPlus (previously known as ICSTIS) regulates phone-paid services in the UK. Under the Communications Act 2003, Ofcom has responsibility for the regulation of premium rate services. In December 2007 it was confirmed that PhonepayPlus will act as the agency which carries out the day-to-day regulation of the PRS market on Ofcom's behalf. www.phonepayplus.org.uk*	White Paper published 17 July 2008 Closing date 11 September 2008
Review of Alternative Dispute resolution and Complaints Handling Procedures http://www.ofcom.org.uk/consult/condocs/alt_dis_res/condoc.pdf	Consultation published 10 July 2008 Closing date 4 October 2008 Statement expected Q4 08/09

Project or publication	Status
Voluntary industry code of practice: broadband speeds http://www.ofcom.org.uk/telecoms/ioi/copbb/copbb Agreed by the ISP community. Ofcom's news release can be found at: http://www.ofcom.org.uk/media/news/2008/06/nr_20080605	Voluntary industry code, version 1.0 published on 5 June 2008
Investigation into Phones 4U Group Limited regarding allegations of misconduct in the retail selling and marketing of telecommunications goods and services http://www.ofcom.org.uk/bulletins/comp_bull_index/comp_bull_ocases/open_all/cw_985/	Case opened 18 May 2008 Open
Media Literacy Audit - Report on UK adults' media literacy http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/ml_adult08	Research document published 16 May 2008
Extending Premium Rate Services Regulation to 087 Numbers http://www.ofcom.org.uk/consult/condocs/087prs/	Consultation published 2 May 2008 Consultation closed 16 June 2008
Protecting consumers from mis-selling of mobile telecommunications services http://www.ofcom.org.uk/consult/condocs/mobmisselling/	Industry Code of Practice for the sales and marketing of subscriptions to mobile networks (Voluntary) published on 31 July 2007. http://www.ofcom.org.uk/telecoms/ioi/mbp/cop.pdf Consultation published 18 March 2008 Closed 24 April 2008 Statement expected Autumn 2008

Project or publication	Status
Switched On - An exploration of Britain's tech savvy consumers http://www.ofcomconsumerpanel.org.uk/information/documents/Switchedon.pdf *This document has been published by the Ofcom Consumer Panel* *The Ofcom Consumer Panel was established under the Communications Act 2003 as the independent research and policy advisory body on consumer interests in telecommunications, broadcasting and spectrum markets (with the exception of content issues).* http://www.ofcomconsumerpanel.org.uk	Published in March 2008
Ofcom review of additional charges, http://www.ofcom.org.uk/consult/condocs/addcharges/	Consultation published 28 February 2008 Closed 8 May 2008 Statement expected Q4 08/09
Consumer engagement with Digital Communications Services http://www.ofcom.org.uk/research/cm/consumer_engagement/consumer_engagement.pdf	2006

Adapting regulation as market conditions change

Project	Status
Retail and Wholesale Narrowband Market Review	Commenced in 2008
Ongoing work programme on the Universal Service Obligation (USO). Review of options for future funding and provision of USO. Input to EC's 2008 review of USO scope	Commenced in 2008
Examining the variation in the availability of services across the UK and considering whether we can or should act to remove or overcome them, either directly or through a facilitation role	
UK code of practice for the self-regulation of new forms of content on mobiles http://www.ofcom.org.uk/advice/media_literacy/medlitpub/ukcode/	Review published on 11 August 2008

Project	Status
Citizens Consumers and Convergence, http://www.ofcom.org.uk/consult/condocs/citizens/	Consultation published 11 July 2008 Closing date 8 October 2008
Initial assessments of when to adopt self- or co-regulation http://www.ofcom.org.uk/consult/condocs/coregulation/	Consultation published 27 March 2008 Closed 6 June 2008
Mobile call termination http://www.ofcom.org.uk/consult/condocs/mobile_call_term/statement/statement.pdf	Statement published 27 March 2007

Annex 8

Glossary

2G Second generation of mobile telephony systems. Uses digital transmission to support voice, low-speed data communications, and short messaging services.

2.5G In mobile telephony, 2.5G protocols extend 2G systems to provide additional features such as packet-switched connections (GPRS) and higher-speed data communications.

3G Third generation of mobile systems. Provides high-speed data transmission and supports multimedia applications such as full-motion video, video-conferencing and internet access, alongside conventional voice services.

3.5G 3.5G refers to evolutionary upgrades to 3G services starting in 2005-2006 that provide significantly enhanced performance. High Speed Downlink Packet Access is expected to become the most popular 3.5G technology (see HSDPA).

3G LTE See LTE

3GPP Third Generation Partnership Project. The 3GPP was formed in December 1998 as a collaboration agreement bringing together a number of telecommunication standards bodies, referred to as Organizational Partners. The original aim of the 3GPP was to produce globally applicable technical specifications for third-generation mobile systems based on evolved GSM core networks and the radio access technology UTRA (Universal Terrestrial Radio Access).

Access network Electronic Communications Network which connects end-users to a service provider; running from the end-user's premise to a Local Access Node and supporting the provision of access based services. It is sometimes referred to as the local loop or last mile.

Additional charges Consumers are sometimes required to pay additional amounts of money ('additional charges'), over and above the headline prices they expect. For example, they may pay more in order to pay bills by cash or cheque, rather than by direct debit (through a 'non-direct debit' charge). Other examples include: paying an early termination charge to terminate a contract early, or paying extra to receive a fully itemised bill.

ADR Alternative Dispute Resolution.

ADSL Asymmetric Digital Subscriber Line. A digital technology that allows the use of a standard telephone line to provide high-speed data communications. Allows higher speeds in one direction (towards the customer) than the other.

Blog Short for weblog. A weblog is a journal (or newsletter) that is frequently updated and intended for general public consumption. Blogs generally represent the personality of the author or the website.

Broadband A service or connection generally defined as being 'always on' and providing a bandwidth greater than narrowband.

CAB Citizens Advice Bureaux. Citizens Advice is an independent charity and membership organisation with Bureaux across England, Wales and Northern Ireland. They provide

information and advice through face-to-face, telephone and email services and online at www.citizensadvice.org.uk.

Consumer Direct A telephone and online consumer advice service, supported by the Department for Business and Regulatory Reform. www.consumerdirect.gov.uk/.

CAGR Compound Annual Growth Rate. The average annual growth rate over a specified period of time. It is used to indicate the investment yield at the end of a specified period of time. The mathematical formula used to calculate CAGR = (present value/base value) (1/#of years) – 1

Communications Act Communications Act 2003, which came into force in July 2003.

Cashback A type of sales incentive where a retailer promises the payment of a certain amount of money to the customer when the customer takes out a mobile contract.

CPS Carrier Pre-selection. The facility offered to customers which allows them to opt for certain defined classes of call to be carried by an operator that has been selected in advance and has a contract with the customer. CPS does not require the customer to dial a routing prefix or use a dialler box.

Data packet In networking, the smallest unit of information transmitted as a discrete entity from one node on the network to another.

Digital switchover The process of switching over the current analogue television broadcasting system to digital, as well as ensuring that people have adapted or upgraded their televisions and recording equipment to receive digital TV.

Dongle A physical device, attached to a PC's USB port, which adds hardware capabilities.

Downlink speed Also downlink or download. Rate of data transmission from a network operator’s access node to a customer, typically measured in Megabits per second.

DSL Digital Subscriber Line. A family of technologies generally referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as 'twisted copper pairs') into highspeed digital lines, capable of supporting advanced services such as fast Internet access and video-on-demand. ADSL, HDSL (high data rate digital subscriber line) and VDSL (very high data rate digital subscriber line) are all variants of xDSL).

Enterprise Act Enterprise Act 2002, which, among other things contains consumer protection legislation. Ofcom is one of the designated enforcers of the Enterprise Act. More information on the Enterprise Act can be found on OFT's website www.oft.gov.uk.

General Condition Set of conditions applying to communication providers, imposing legal obligations on providers.

GPRS General Packet Radio Service, a packet data service provided over so-called 2.5G mobile networks.

GSM Global Standard for Mobile Telephony, the standard used for 2G mobile systems.

Headline connection speed The theoretical maximum data speed that can be achieved by a given broadband. A number of factors, such as the quality and length of the physical line from the exchange to the customer, mean that a given customer may not experience this headline speed in practice.

HSPA Jointly, downlink and uplink mobile broadband technologies are referred to as HSPA (High Speed Packet Access) services.

HSDPA High Speed Datalink Packet Access, an evolution of 3G mobile technology, often known as 3.5G, which offers higher data speeds.

Interconnection The linking of one Public Electronic Communications Network to another for the purpose of enabling the persons using one of them to be able (a) to communicate with users of the other one; (b) to make use of services provided by means of the other one (whether by the provider of that network or by another person).

International roaming A service offered by mobile operators that allows customers to use their phone abroad. The home operator has agreements with foreign operators that allows customers to make and receive calls, send and pick up text messages, and use some of the other mobile services (such as access to voicemail or topping-up credit on pre-pay phones). The exact services available and the charges for their use vary between operators.

Internet A global network of networks, using a common set of standards (e.g. the Internet Protocol), accessed by users with a computer via a service provider.

Internet-enabled mobile phone A mobile phone which allows its user to access the internet via in-built access technology such as GPRS or WCDMA.

IP (Internet Protocol) The packet data protocol used for routing and carriage of messages across the Internet and similar networks.

ISP Internet Service Provider. A company that provides access to the internet.

Leased Line A transmission facility which is leased by an end user from a public carrier, and which is dedicated to that user's traffic.

LLU (Local Loop Unbundling) LLU is the process where the incumbent operators (in the UK it is BT and Kingston Communications) make their local network (the lines that run from customers premises to the telephone exchange) available to other communications providers. The process requires the competitor to deploy its own equipment in the incumbent’s local exchange and to establish a backhaul connection between this equipment and its core network.

Local Loop The access network connection between the customer's premises and the local PSTN exchange, usually a loop comprised of two copper wires.

LTE (Long Term Evolution). Part of the development of 4G mobile systems that started with 2G and 3G networks. Aims to achieve an upgraded version of 3G services having up to 100 Mbps downlink speeds and 50 Mbps uplink speeds.

Mis-selling Covers a range of sales and marketing activities including the omission of relevant and/or provision of false or misleading information to consumers, applying unacceptable pressure on consumers to change supplier and in extreme cases slamming. Mis-selling can work against the interests of both consumers and competition and can undermine the confidence in the industry as a whole.

MMS Multimedia Messaging Service. The next generation of mobile messaging services, adding photos, pictures and audio to text messages.

Mobile Broadband Various types of wireless high-speed internet access through a portable modem, telephone or other device.

Mobile service providers MNOs and MNVOs

MNOs Mobile Network Operator (Vodafone, O2, Orange, TMobile, '3')

Mobile termination rate The 'per minute' fees that mobile phone companies charge other carriers to deliver incoming calls to users on their networks.

MP3 (MPEG-1 Audio Layer-3) A standard technology and format for compressing a sound sequence into a very small file (about one-twelfth the size of the original file) while preserving the original level of sound quality when it is played.

MP3 Player A device that is able to store and play back MP3 files.

MVNO Mobile Virtual Network Operator - an organisation which provides mobile telephony services to its customers, but does not have allocation of spectrum or its own wireless network (e.g. Virgin Mobile, Tesco Mobile, BT Mobile, Fresh, Blyk).

MSP Mobile Service Provider

OAT Ofcom Advisory Team - the team within Ofcom responsible for advising and dealing with complaints and enquiries from members of the public.

Ofcom Office of Communications - the regulator for the communications industries, created by the Communications Act.

OFT Office of Fair Trading - the consumer and competition authority of the UK. www.oft.gov.uk

Off-net call – mobile-to-mobile call from one mobile network and terminating on a different mobile network.

On-net call – mobile-to-mobile call from one mobile network and terminating on the same mobile network.

Narrowband A service or connection providing data speeds up to 128kbit/s, such as via an analogue telephone line, or via ISD.

PDA Personal Digital Assistant .

Peer-to-peer distribution The process of directly transferring information, services or products between users or devices that operate on the same hierarchical level.

Phone-paid services Premium rate goods and services that we can buy by charging the cost to our phone bills and pre-pay phone accounts.

PhonepayPlus (previously known as ICSTIS) regulates phone-paid services in the UK. Under the Communications Act 2003, Ofcom has responsibility for the regulation of premium rate services. In December 2007 it was confirmed that PhonepayPlus will act as the agency which carries out the day-to-day regulation of the PRS market on Ofcom's behalf. www.phonepayplus.org.uk

Service provider A provider of electronic communications services to third parties whether over its own network or otherwise.

SIM Subscriber Identity Module – a small smart card type device that has details of the mobile subscriber including public telephone number and the numbers required by the network to recognise and authenticate the subscriber.

SMS Short Messaging Service – facility to send text messages of up to 160 alphanumeric characters between compatible devices.

SIM-only a monthly mobile contract which is sold without a handset.

Slamming An extreme form of mis-selling, where customers find themselves with a service from a new provider, or new contract from their existing provider, without their knowledge and consent

SMP Significant Market Power – is a position held on a relevant market, by an operator for example, either individually or jointly with others, equivalent to dominance. That is a position of economic strength affording the entity in question the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.

Telecommunications, or 'Telecoms' Conveyance over distance of speech, music and other sounds, visual images or signals by electric, magnetic or electro-magnetic means.

Trading Standards The Trading Standards Service enforce the laws that govern goods and services bought, hired and sold, including Trade Descriptions Act 1968, The Consumer Protection Act 1986, The Consumer Credit Act 1974,Enforcement provisions under Part 8 of the Enterprise Act 2002.

UMTS Universal Mobile Telecommunications System. The 3G mobile technologies most commonly used in the UK and Europe.

Usage caps Monthly limits on the amount of data which broadband users can download, imposed by some ISPs.

USO Universal Service Obligation. This is a series of requirements, currently upon BT and Kingston Communications, to provide every household in the UK with access to a landline telephone.

VoIP Voice over Internet Protocol. A technology that allows users to send calls using Internet Protocol, using either the public Internet or private IP networks.

Voluntary Code Best practice guidelines/principles on sales and marketing which the mobile service providers introduced in July 2007.

WAP Wireless Application Protocol.

WiFi hotspot A public location which provides access to the internet using WiFi technology.

WiMAX A wireless MAN (metropolitan area network) technology, based on the 802.16 standard. Available for both fixed and mobile data applications.

Wireless LAN or WiFi (Wireless Fidelity) Short range wireless technologies using any type of 802.11 standard such as 802.11b or 802.11a. These technologies allow an over-the-air connection between a wireless client and a base station, or between two wireless clients.

WLR Wholesale Line Rental A regulatory instrument requiring the operator of local access lines to make this service available to competing providers at a wholesale price.

XHTML (EXtensible HTML) A markup language for Web pages from the W3C. XHTML combines HTML and XML into a single format (HTML 4.0 and XML 1.0).

Annex 9

Report by Analysys Mason

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