The International Communications Market 2008

5 Telecoms

Contents

5.1 Telecoms market developments

Figure 5.1 Key Indicators, 2007

	UK	France	Germany	Italy	USA	Canada	Japan
Telecoms service revenues	£26.9bn	£24.4bn	£30.4bn	£20.5bn	£133.0bn	£14.2bn	£50.4bn
Telecoms revenues per capita	£443	£382	£369	£353	£442	£432	£395
Fixed lines per 100 population	55.5	45.1	66.0	44.4	53.1	58.3	47.4
Monthly outbound fixed-line minutes per capita	203	138	171	122	223	182	78
Mobile connections per 100 population	121.0	86.9	117.9	154.4	85.3	61.6	78.9
Share of mobile post-pay connections	36%	66%	45%	10%	92%	78%	98%
3G connections per 100 population	20.6	9.2	10.6	41.4	14.0	0.9	65.4
Monthly outbound mobile minutes per capita	136	130	69	136	588*	261*	103
Broadband connections per 100 population	59.9	58.0	49.8	40.7	61.3	66.1	57.2
DSL as % of broadband connections	77.9	95.2	94.4	96.8	42.1	41.0	46.4

Source: IDATE / operators / national regulators
*Notes: Total service revenue excludes revenue from narrowband internet and corporate data services; * USA and Canada: mobile use includes both outbound and inbound calls; 3G includes W-CDMA and CDMA20000 1xEV-DO - It does not include CDMA2000*

5.1.1 Overview

The telecoms section of this report is split into three sections:

- **The year in telecoms** – this section provides an overall context and highlights the key trends in the telecoms market in 2007 and 2008.

- **The telecoms industry** – provides a 'top-down' approach by looking at the telecoms sector from the point of view of operators, and compares and contrasts trends in revenues and market structures across our comparator countries before looking specifically at fixed-line voice, broadband and mobile markets.

- **The telecoms user** – provides a 'bottom-up' approach from the point of view of consumers, and looks at the overall take-up of communications services before focusing specifically on consumers' experience of fixed-line voice, broadband and mobile phone use.

5.1.2 Introduction

It is difficult to overstate the importance of the telecoms sector in terms of its economic and social impact. The data above indicate that, in terms of revenue, the telecoms sector generates over £350 per head in each of the countries; around three times as much as television and radio combined.

IDATE estimates that global telecoms service revenues were over £800bn in 2007 (approximately equivalent to the GDP of Spain), with a further £174bn generated by telecoms equipment.[16]

And of course, these direct revenues are only part of the story; telecommunications are a key enabler for almost all industries in the world. As a 'multiplier' industry, investment in telecommunications delivers economic benefits in terms of productivity and employment far beyond the telecommunications industries.[17]

More difficult to quantify is the transformative social impact of developments in telecommunications; within the last decade the majority of people in all of our comparator countries have acquired a mobile phone and begun to use the internet, fundamentally changing the world in which we live.

It is in this context that we examine variations between market structures and the take-up and use of communications technologies across our comparator countries.

The two following sections do this by using data sourced from operators, national regulators and consumer surveys to compare and contrast the telecoms sectors across our comparator countries, first from an industry and then from a consumer perspective.

In this section, we look at how different consumer behaviour emerges from different industry structures, by focusing on five key trends in the telecoms market during the last year, and looking in particular at what drives variation across our comparator countries:

- **The implications of rising mobile use** – we use data from the last year to examine the relationship between use and revenue, the reasons why people are talking more on the phone than ever before, the drivers of and constraints to fixed-to-mobile substitution, and how mobile operators are targeting in-home use in order to maintain growth in the voice market.

- **Signs of slowing rates of broadband growth** – the pressure that fixed operators are under in voice markets is echoed in the broadband market, as narrowband migration nears completion, internet penetration approaches PC ownership levels, and competition emerges from the mobile broadband providers.

- **The development of next-generation access networks** - in the long term, high speed broadband is the great hope for fixed-line operators looking to develop new revenue streams; it promises to transform the ways in which we use communications, information and entertainment services. We look at developments in the last year and examine how different industry structures, socio-demographic contexts and regulatory regimes have combined to create different patterns of development.

- **The rise of mobile virtual network operators (MVNOs)** - in a year in which there has been a good deal of activity in many countries, we look at the different market contexts that have led to the emergence of different types of MVNOs. We explore

[16] IDATE, *DigiWorld Yearbook 2008, pp46-49*
[17] The European Mobile Industry Observatory quantifies the employment multiplier for the mobile industry as about 4.6 – with 590,000 European directly employed by the industry and "induced employment" of 2.7 million (GSMA, European Mobile Industry Observatory 2008, p20.)

how the launch of 'no-frills' MVNOs has created new competition in some countries at the low-use end of the market, and how new business models are being developed as highly specific MVNOs have launched, targeting the needs of niche segments.

- **The continuing growth of text messaging** - despite handset and network developments which enable more sophisticated types of communications such as instant messaging, the humble SMS had remarkable growth in many countries in 2007. We look at different levels of SMS use to explore how marketing initiatives, cultural preferences and the 'network effect' combine to create differing consumer behaviours.

5.1.3 The implications of rising mobile voice use

5.1.3.1 Mobile call volumes rising much faster than voice revenues

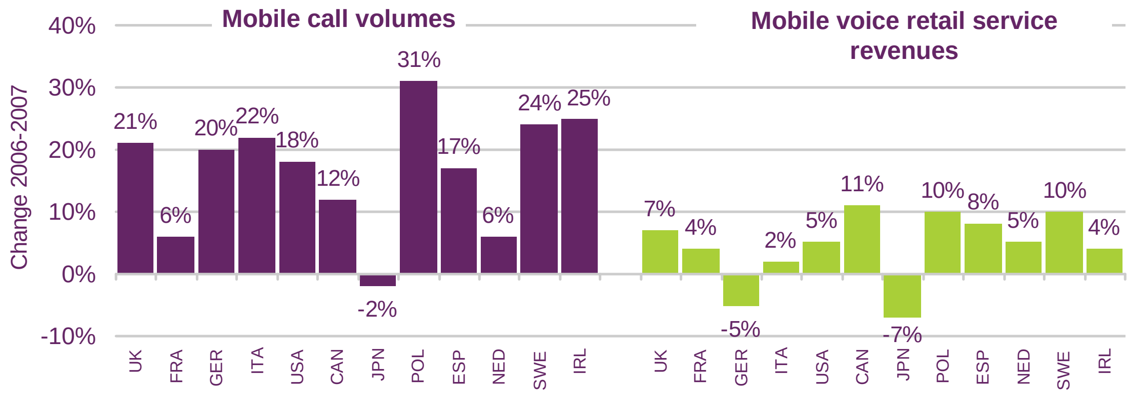
Mobile voice is now a mature market in all of our comparator countries. The number of mobile connections has exceeded the number of fixed connections in every country since 2006 (and in every European country since 2002). However, as Figure 5.2 shows, in most countries the market continues to grow in terms of call volumes and revenues (Figure 5.34 later in this report also shows that the number of mobile connections grew in every country during 2007).

Nevertheless, there is evidence of diminishing returns for operators as revenues fail to keep pace with increasing use. During 2007, mobile voice volumes grew by an average of nearly 17% across the 12 countries, with average revenues increasing by just 4.5%. The performance of the mobile market in Germany is most striking, with call volumes increasing by 20% during the year, but voice revenues falling by 5%, while in the UK the growth in mobile voice revenues was just one third of the growth in mobile call volumes.

In a mature market there are limited opportunities for growth through targeting new mobile users, so operators have had to look to drive higher use from existing mobile users by reducing prices or by increasing the number of minutes included within a monthly line rental fee. For example, in September 2007 the €60 a month *Relax* tariff from T-Mobile in Germany included 400 inclusive minutes, whereas in July 2008 a *Relax* tariff offered 1,000 minutes for the same monthly price.

The most mature market of all is Japan, where growth in mobile connections peaked before 2001 and mobile voice volumes overtook fixed-line voice volumes in 2005. It is also the only country in our analysis where mobile call volumes actually fell during 2007, as a result of the rise of other types of communication services available on mobile phones, including instant messaging and e-mail, and an increase in VoIP use on fixed lines.

Figure 5.2 Growth of mobile voice volumes and revenues 2006-2007



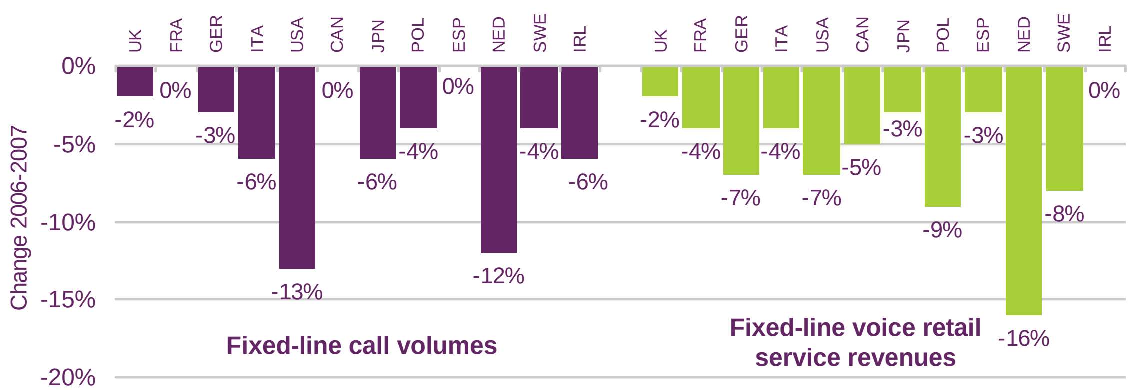
Source: IDATE / industry data / Ofcom
Note: Outbound call volumes for all countries except the US and Canada, where combined outbound and inbound call volumes are used

5.1.3.2 Growth in mobile puts pressure on fixed-line voice

As Figure 5.3 shows, fixed call volumes and fixed call revenues fell or remained the same in all 12 countries during 2007. Part of this reduction was due to the substitution of mobile for fixed calls, but there are also other pressures on fixed-line operators. The largest fall in call volumes was in the US, where national calls are rarely included in fixed-voice line rental tariffs and where the increasing use of Voice over Internet Protocol (VoIP) has combined with increasing use of mobile in substitution for traditional voice calls. The largest fall in service revenues was in the Netherlands, where the availability of 'naked DSL' (fixed-line broadband connection without the requirement for a voice service over the same line) has led to fewer fixed-line voice connections and been accompanied by falling voice pricing.

The countries where fixed-line call volumes have shown most resilience are those where fixed-line operators, perhaps in response to increasing 'buckets' of inclusive minutes with post-pay mobile connections, have moved to 'flat-rate' pricing models, with line rental fees typically including unlimited calls at off-peak times. For example, in the UK (where fixed-line call volumes fell by just 2% in 2007, despite a 21% rise in mobile call volumes), the incumbent offers unlimited national evening and weekend calls within its basic line rental (subject to committing to a 12-month automatically-renewing contract), while the German incumbent offers unlimited any-time national calls on a €30 tariff.

Figure 5.3 Decline of fixed-line voice during 2007



Source: IDATE / industry data / Ofcom
Note: Local and VoIP calls are excluded for the US and Canada

5.1.3.3 But overall, people in most countries are spending longer talking on the phone

The rise in inclusive minutes in mobile tariffs and 'flat-rate' fixed tariffs contributed to people spending more time talking on the phone in 2007 than in 2006 in all of our comparator countries except Japan and the Netherlands (which both have high levels of VoIP use). The highest overall increase between 2006 and 2007 was in the UK, where people spent on average 23 minutes more per month making mobile phone calls in 2007 than they did in 2006, but just five minutes less making calls on a fixed-line phone.

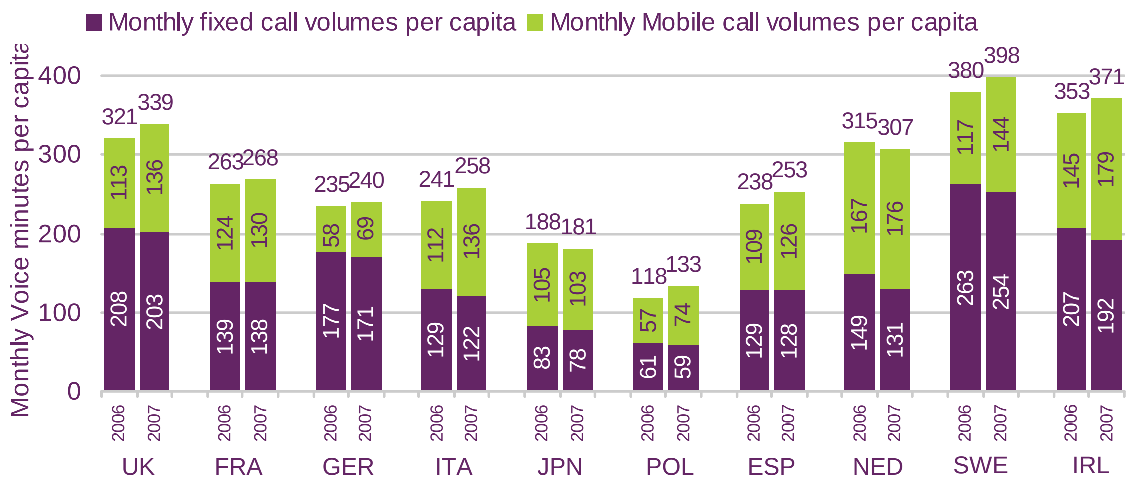
Figure 5.4 below also highlights large variations in the share of fixed and mobile minutes across the comparator countries. In 2007, 57% of voice minutes originated on mobile phones in Japan, 56% in Poland, 53% in Italy, but just 29% in Germany.

In Poland, and to a lesser extent in Italy, the high proportion of mobile calls is explained by the penetration of fixed lines being historically relatively low, and many households going straight to mobile. In Germany, the large proportion of fixed calls is explained by a greater differential between the price per minute of mobile and fixed calls (see Section 5.3.3.3). However, this gap is closing, through a combination of higher numbers of inclusive minutes within post-pay mobile contracts (it is only in the last two years that post-pay tariffs have started to typically offer inclusive minutes), and a range of pre-pay contracts which offer reduced prices per minute for larger top-ups.

Japan represents an interesting case study for other mobile markets such as the UK. Mobile voice volumes exceeded fixed volumes for the first time in 2005. However, the share of mobile has remained relatively stable; at 54% in 2005, 56% in 2006 and 57% in 2007. Operators still tend to use metered pricing for mobile voice calls, and in 2007 mobile volumes actually declined for the first time as consumers increasingly used completely 'flat-rate' applications such as email and instant messaging.

For fixed and mobile operators the rise of internet protocol-based applications such as VoIP and instant messaging are threatening the traditional pricing models which are based on per-minute charges. The response is to move more towards 'flat-rate' tariffs, and the consequence has been that people are spending more time talking on the phone than ever before – but there has not been a proportional rise in revenues.

Figure 5.4 Fixed and mobile call volumes per head , 2006 and 2007



Source: IDATE / industry data / Ofcom
Note: Local and VoIP calls are excluded for the US and Canada

5.1.3.4 Mobile-only households falling in some countries

There are large variations in the proportions of mobile-only households across our comparator countries. According to a survey commissioned by the European Commission, by the end of 2007 37% of Italian households had at least one mobile connection but no fixed connection (Figure 5.5). This compares to just 3% of households in Sweden, 9% in the Netherlands and 15% in the UK.[18]

Historical and socio-demographic factors provide much of the explanation for these variations. Relatively low take-up of fixed lines in Poland and Italy has resulted in many households going straight to mobile. Ofcom's research into mobile-only households in the UK finds that 19% of households in socio-economic group DE are mobile-only compared to just 4% of socio-economic group AB[19].The reasons for this are two-fold.

- Firstly, poorer households are more inclined to save expenditure by having only one type of phone line, and pre-pay mobile typically offers greater control over cost while the absence of a line rental fee brings down the overall cost for low users.
- Secondly, DE households are less likely to have a broadband connection, and a fixed phone line is a requirement for most DSL broadband connections (DSL is the dominant broadband platform in all the European countries in our analysis). Sweden and the Netherlands have both the highest take-up of DSL broadband and the highest wealth per head, and the lowest proportion of mobile-only households.

The number of mobile-only households increased sharply in most countries between 2005 and 2006, with an increase from 25% to 38% in Italy, from 18 to 24% in Ireland and from 14% to 18% in France. But, as Figure 5.5 illustrates, in some countries this trend slowed down or even reversed in 2007. Indeed, the proportion of households with a fixed line increased in France, Italy, Sweden and Ireland. It appears that fixed-to-mobile substitution, measured by the numbers of connections, is slowing down, largely due to the increasing penetration of DSL broadband.

Nevertheless, two recent developments in the market represent a potential challenge for fixed-line voice operators:

- the impact of a global economic downturn; significant numbers of consumers may reduce their household expenditure by forsaking their fixed line and relying solely on a mobile phone; and
- the rise of mobile broadband (discussed in Section 3.1.3 of this report) may remove the requirement for a fixed voice line, as required for most DSL broadband connections.

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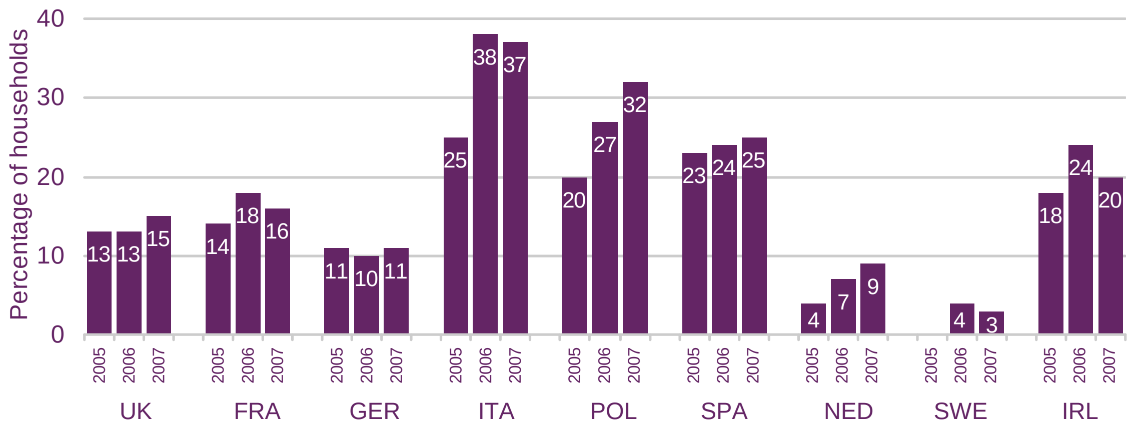
[18] Ofcom's own consumer research found 11% of UK households to be mobile-only in Q1 2008. See Ofcom's *The UK Communications Market Report 2008,* section 5.1.3. www.ofcom.or.uk/research/cmr/cmr08

[19] Further detail will be provided in the *Consumer Experience Report 2008*, published on 24 November 2008, www.ofcom.org.uk/research/tce/

Figure 5.5 Mobile-only households, 2005- 2007



Note: Proportion of households in each country which have a mobile connection but no fixed-line voice connection
Sources: European Commission, Special Eurobarometer, 249 (July 2006), based on fieldwork in December 2005-January 2006; European Commission, Special Eurobarometer, 274 (April 2007), based on fieldwork in November-December 2006; European Commission, Special Barometer 293 (June 2008), based on fieldwork in November-December 2007

5.1.3.5 The battle for share of in-home use

In 2007, overall call volumes were higher on fixed lines than on mobile for all of our comparator countries except Japan, Italy and Poland. Although mobile markets in all our comparator countries are mature, there is still the potential for more growth in the market if operators can target the calls made by consumers in their homes.

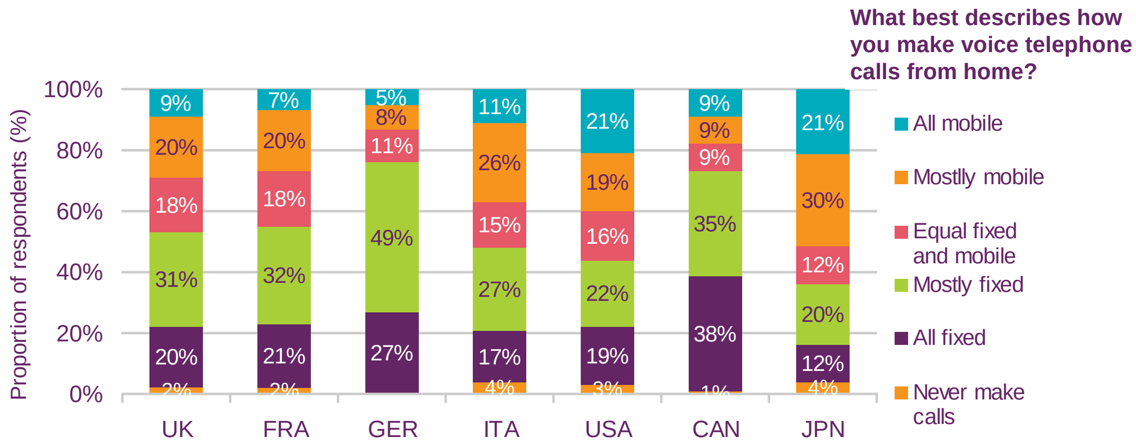
Our research indicates that there is large variation between countries in the extent to which consumers use mobiles in the home (Figure 5.6). In Japan, 51% of people claim either 'mostly' or 'always' to use a mobile in the home; just 13% of Germans and 18% of Canadians claimed that this was the case.

The increasing availability of dual-mode handsets, which offer access to both cellular and WiFi networks, and the emergence of 'femto' technology which enables the installation of a mini base station in a consumer's home (and backhaul via a fixed-line connection) mean that 'fixed-mobile convergence' (FMC) products will continue to be weapons in the battle for in-home use.

However, with the exception of Germany, where over two million mobile subscribers have taken up *Homezone* services (whereby users are charged a different rate for calls made in and outside the home), FMC services have been far less successful at driving fixed-to-mobile substitution than simple tariff structures which offer large numbers of inclusive calls for a fixed monthly fee. For example, our research in the UK found that over 70% of mobile users claimed to make mobile calls inside their home, with 29% of these claiming this was to "use up my allowance of minutes", and 28% claiming that it was because "some calls are cheaper".[20]

[20] Ofcom, *The UK Communications Market 2008*, pp294-295, www.ofcom.org.uk/research/cm/cmr08/

Figure 5.6 Use of mobiles in the home



Source: Ofcom Understanding International Communications Behaviour research, October 2008
Base: All adults aged 18+ who use the internet (UK 1001, France 1000, Germany 1002, Italy 1003, USA 1010, Canada 1000, Japan 1003)

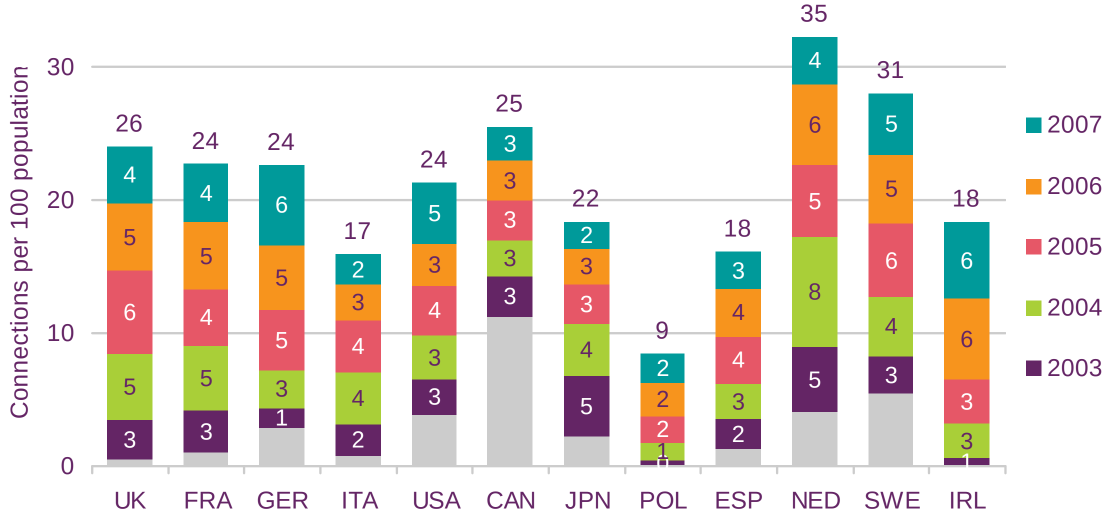
5.1.4 Broadband growth rates slowing in some countries

5.1.4.1 Signs of a slow-down in broadband take-up and revenues in some countries

In all countries covered by this report, most fixed-line operators have to some extent been able to offset declining voice revenues with broadband revenues. Indeed, in 2007 broadband was the fastest-growing sector in all of our 12 comparator countries with the exception of Sweden (where mobile revenues had higher growth). Across the 12 countries, by the end of 2007 broadband revenues accounted for 11% of all telecoms service revenue and 25% of fixed-line revenue (see Section 5.2.2 for more details).

However, there are signs that the pressures that fixed operators are experiencing in voice markets are echoed in broadband markets. Although growth in take-up of services remains strong, growth is slowing in some countries. In terms of take-up, among our 12 comparator countries only the US and Germany saw more net broadband additions in 2007 than in 2006 (Figure 5.7).

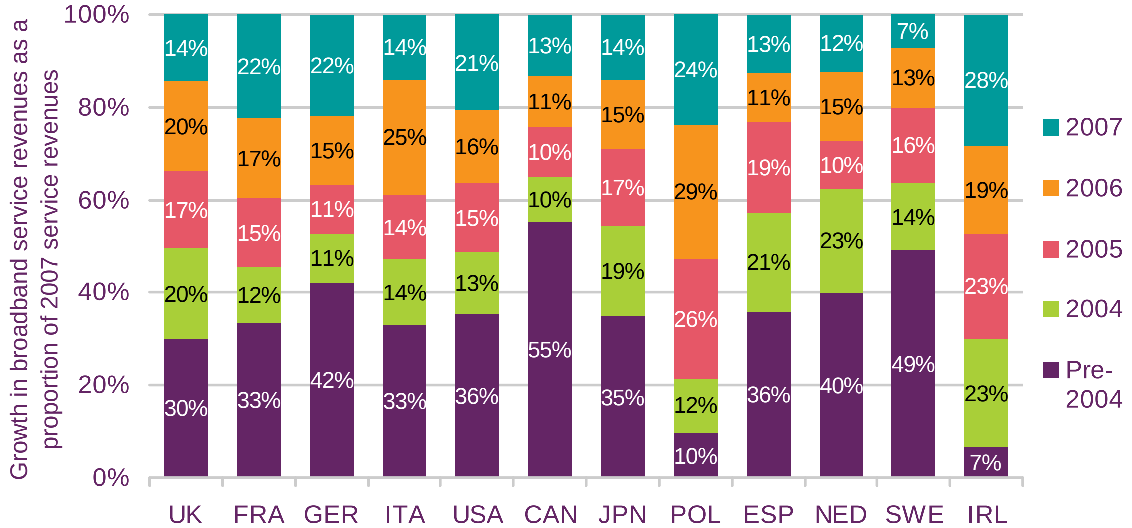
Figure 5.7 Growth in take-up of broadband services, 2003 to 2007



Source: IDATE / operators / national regulators

In terms of retail revenues, the picture is more complex; there is evidence of significant declines in growth rates in the UK and Italy between 2006 and 2007, but accelerated growth in France, Germany, the US and Ireland (Figure 5.8).

Figure 5.8 Growth in broadband service revenues as a proportion of 2007 revenues



Source: IDATE / operators / national regulators

5.1.4.2 Growth slows as broadband penetration approaches PC ownership

Three general trends threaten the continued growth of broadband revenues:

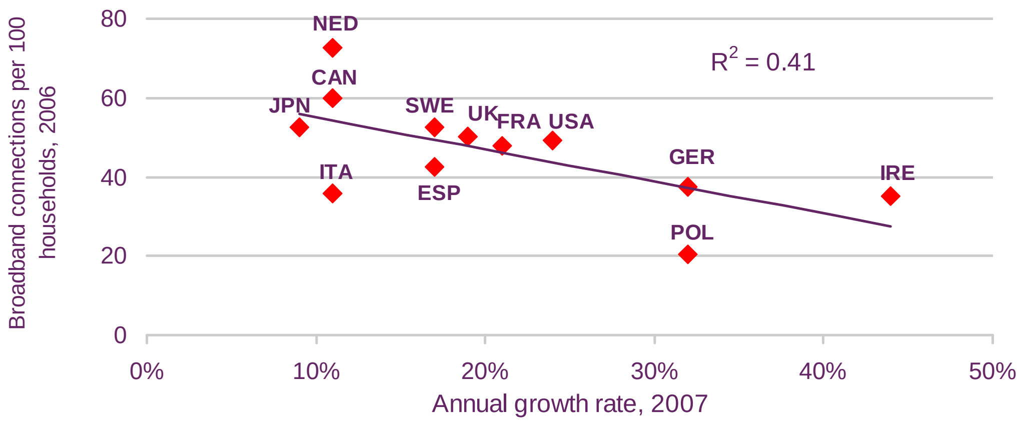
- slowing growth rates through market saturation as migration from narrowband completes and household internet take-up approaches household broadband take-up;
- new competition from mobile broadband; and

- increased pricing competition, particularly through the bundling of broadband with other services.

Unsurprisingly, there is a correlation between high levels of broadband take-up and slower growth rates (Figure 5.9). In mature broadband markets with high take-up such as such as the Netherlands, Canada and Japan, the growth rate was much slower in 2007 than in countries such as Ireland and Poland, which had much lower take-up. In countries with high broadband penetration, the migration from narrowband (dial-up) internet access is nearing completion; according to a European Commission survey, at the end of 2007 93% of internet connections in the Netherlands were via a broadband connection, 91% in France and 85% in the UK (see Section 5.3.5.2). By contrast, just 39% of internet connections in the Republic of Ireland were broadband.

However, although there is a general correlation between broadband penetration and growth rates, Poland, Spain and Italy, which have among the lowest broadband penetration of our comparator countries, all experienced slowing growth in 2007. This is in part due to much lower ownership of PCs in these countries. At the end of 2007, 46% of households in Spain had a PC, 48% in Italy and 52% in Poland; this compares to 90% of households in the Netherlands and 82% of households in Sweden.[21]

Figure 5.9 Broadband penetration and growth rates



Source: IDATE / operators / national regulators

5.1.4.3 Emergence of mobile broadband threatens fixed operators

Mobile broadband, whereby consumers can connect to the internet via a cellular network by plugging a USB modem (or ‘dongle’) into their PC, launched as a mass market consumer proposition in many of our comparator countries in 2007 and 2008, enabled by the upgrading of 3G networks to HSPA (further details are available in Section 3.1.3 of this report, where mobile broadband is discussed in more depth). In the UK, Italy, Germany and Spain the price of mobile broadband is comparable to fixed-line broadband, with 3GB of data per month at headline speeds of 3.6Mbit/s or 7.2Mbit/s typically available for under £20 per month (see Section 2.1.10 for details on the prices of mobile broadband).

The extent to which mobile broadband is being substituted for fixed-line broadband is unclear. Ofcom research in the UK in July found that around 68% of mobile broadband users also had a fixed-line connection, and this is in line with a claim by 3UK that around 30% of its

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[21] European Commission, *Special Barometer 293* (June 2008), based on fieldwork in November-December 2007

mobile broadband users used it as their only internet connection.[22] However, in other countries the impact of mobile broadband launches is almost certainly higher. While mobile broadband has gained market share in some countries, such as the UK and Sweden which already have high fixed-line broadband take-up, it has been even more successful in gaining share in countries where fixed-line broadband has lower penetration, and where many first-time broadband users have gone straight to mobile. This is the case in Italy, where 41% of households do not have a fixed-line voice connection, and in Ireland, where a majority of internet users at the end of 2007 were still connecting via dial-up (see Section 5.3.5.2). The bundling of mobile broadband with laptops also provides mobile operators with a way of targeting those households which do not currently have a PC (over 50% of households in Italy and Spain at the end of 2007, and around 36% of UK households).

While the number of fixed-line broadband connections has continued to rise in all of our comparator countries, fixed-line operators will note the example of Finland (outside the scope of this report), which in Q2 2008 was the first country in the world to see a decline in fixed-line broadband connections as consumers migrated to mobile broadband.

5.1.4.4 Downward pressure on pricing despite increases in broadband speeds

In all of the European countries covered in this report, the average revenue per broadband connection fell between 2006 and 2007 (see Figure 5.10). This is despite significant improvements in the headline speeds of connections delivered by investment in network upgrades to ADSL2+ or other higher speed technologies.

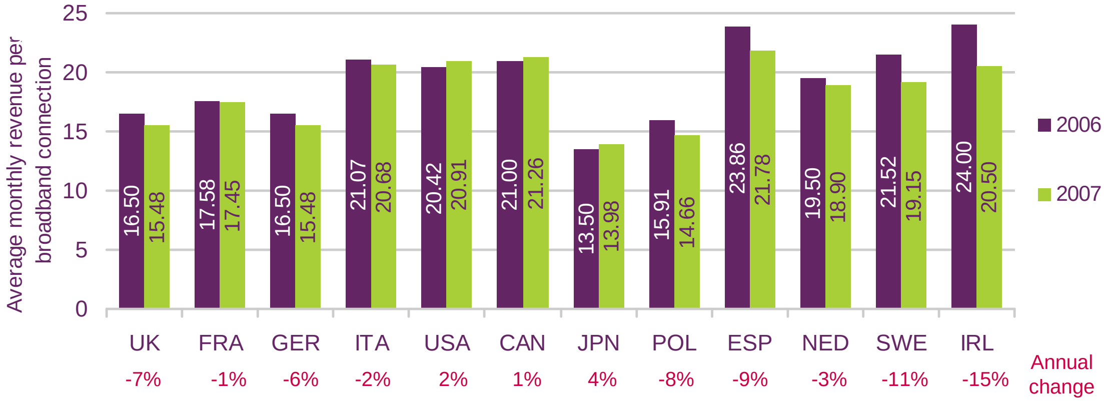
In most European countries, broadband roll-out has been accompanied by national regulators (and European Commission directives) mandating that incumbent operators offer access to alternative network operators, both by offering wholesale line rental, and by allowing alternative operators to install their own equipment within telephone exchanges and take over the line to the end-users' premises (local loop unbundling).

The result has been to create competition between suppliers: this has exerted downward pressure on pricing as operators battle for the market share they need to exploit economies of scale. This is evident in the rise of 'service bundling' in most European countries, where broadband is offered in association with another communications service such as fixed-voice ('doubleplay') or voice and television ('tripleplay'). In the UK, broadband is often offered 'free' with other services, and some leading suppliers do not even offer it on a single service basis: for example, BSkyB offers broadband only in association with satellite TV services, while TalkTalk offers it only in association with fixed-line voice. In Spain, over 80% of broadband connections are bought in combination with another service.

By contrast, average revenue per broadband connection has increased in the non-European countries covered by this report (the US, Canada and Japan). In part, this is due to the improved service offered by the roll-out of high speed fibre networks. However, it also indicates that in countries where broadband suppliers typically operate in local duopolies (as in the US and Canada, where the local cable operator typically competes with the incumbent telco operator for the supply of broadband services, or in Japan where fibre-to-the-home suppliers typically have sole access to households), operators are better positioned to maintain or increase prices by improving service quality, such as offering higher speed connections.

[22] Ofcom, *The UK Communications Market 2008*, p.302; www.ofcom.org.uk/research/cm/cmr08/*;* 3UK media briefing*, 8/12/2008*

Figure 5.10 Average monthly retail revenue per broadband connection, 2006 and 2007



Source: IDATE / industry data / Ofcom

5.1.5 Next-generation access broadband networks emerge

5.1.5.1 Operators and governments focus on the promise of super-fast broadband[23]

In order to deliver sustained broadband speeds in excess of 20Mbit/s over a copper fixed line it is usually necessary to replace sections of, or all of, the copper-wire access network between exchange and premises with an optical fibre connection capable of transporting data at high speeds without degradation. In addition to fibre via co-axial cable networks, fibre connections can broadly be categorised as follows:

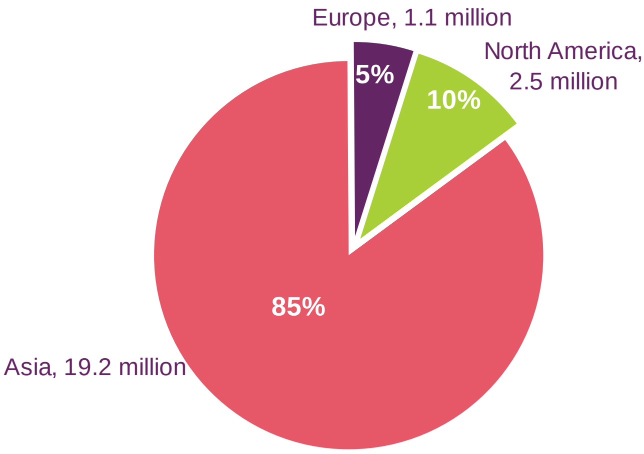
- fibre-to-the-home (FTTH), where a fibre connection is in place all the way from the exchange to the end-user;
- fibre-to-the-building (FTTB), where fibre is laid to the building with existing in-building copper wiring used for the final part of the delivery; and
- fibre-to-the-cabinet (FTTC), where a fibre connection is laid from the exchange to a local 'sub loop', with the final part of the delivery (typically less than 500m) over existing copper wire connections, usually using a technology known as VDSL.

The step-change in terms of available speeds means that for operators, fibre networks potentially offer new revenue streams by enabling new types of services, while for business and residential consumers, the (largely unproven) promise of next-generation access (NGA) is that it will transform the way in which we use communications, information and entertainment services. The scale of these promises, together with the scale of the costs involved in laying fibre networks, have led governments all round the world to pay a great deal of attention to NGA, not least because huge variations in the progress of NGA roll-out between countries and regions is perceived as having the potential to change relative national competitiveness. The 2008 Caio review in the UK is one example of a government-sponsored initiative to evaluate the barriers to investment in next generation broadband.[24]

[23] For a definition of super-fast broadband and for a detailed review of the context in the UK see Ofcom's consultation document *Delivering super-fast broadband in the UK* www.ofcom.org.uk/consult/condocs/nga_future_broadband (September 2009)
[24] Francesco Caio, *The Next Phase of Broadband UK: Action now for long term Competitiveness*, September 2008, www.berr.gov.uk/files/file47788.pdf

Figure 5.11illustrates that there is large regional variation in the take-up of super-fast broadband, with Asia a clear leader. By the end of 2007, there were 11.3 million FTTH/B subscribers in Japan, more than in any other country in the world, driven by the availability of service to over 85% of households. There is significant variation in the availability of fibre networks in Europe, with 20% of households in Germany having access to FTTC broadband at the end of 2007 and nearly 8% of households in Sweden having access to FTTB/FTTH. In contrast, there was virtually no NGA broadband available in the UK, Ireland or Spain at the end of 2007.

Figure 5.11 FTTH/B subscribers, by region, end 2007



Source: IDATE

5.1.5.2 National contexts determine types and timings of NGA roll-out

The reasons behind large variations in the timings and nature of fibre deployments between countries are complex. However, it is possible to identify four broad variables that contribute to decisions to invest in next-generation access: demographics, topography, the regulatory and political context, and consumer demand.

Demography, or the distribution of population, is a major determinant of the cost of deploying next-generation networks, which generally require large-scale civil engineering in order to lay cables. It follows that the cost per head is significantly lower in countries with high population density and a large proportion of people living in urban areas. Roll-out of fibre networks in Japan was eased because 32% of the population live on just 4.5% of the land mass. High population density in urban areas has driven relatively high availability in Sweden and the Netherlands. Housing patterns are also an important contributory factor to the cost of NGA deployments; in the UK around 85% of people live in single family houses, and about 95% in Ireland. In contrast, over 50% of the populations in Spain, Italy and Germany live in multiple dwelling units (MDUs), and can therefore potentially be served by fibre-to-the-building deployments rather than the more expensive fibre-to-the-home.

A second determinant of the cost and the type of NGA deployment is topography, both in terms of existing telecoms networks, and other aspects of the physical landscape. The following factors have all influenced NGA deployment:

- VDSL (very high rate DSL) is a technology which can be used to transmit data over existing copper wires, for example from the cabinet to the home. However, a characteristic of VDSL is that connection speeds degrade quickly with distance. The relatively short typical length of the ‘sub loop’ has made VDSL deployment feasible in Germany, but unfeasible, for example, in much of France, because of the longer length of the sub-loop. An additional factor favouring VDSL deployment in Germany is the large average cabinet size; this reduces civil engineering costs.

- The cost of upgrading cable networks to offer high-speed broadband can often be less than the cost of replacing a copper network. Virgin Media will offer the first widely available NGA network in the UK in 2009, as it upgrades two-thirds of its cable network to the EuroDOCSIS 3.0 standard, offering services of up to 50Mbit/s to 9 million premises.

- There is variation in the extent to which the deployment of NGA can reduce the cost base of operators. In the US, Verizon estimated that network problems are up to 80% less for its FTTH network than for its legacy voice and DSL services.

- In some cases, the sale of exchange premises can offset the cost of network investment, as has been the case in the Netherlands, where KPN has achieved windfall payments through the sale of exchange buildings.

- Civil engineering costs have been much lower for NGA deployments in Paris than in other cities in the world, because cables can be laid relatively easily through the sewer system. As a consequence, many Paris residents have a choice of FTTH supplier; alternative-network operator Free plans to make FTTC/B available to 90% of the city’s homes and businesses by 2009. In other countries, including the UK, the use of alternative routes (including sewers) is being considered, as operators seek ways to reduce the costs of deployment.

Regulatory approaches and government intervention have provided clear incentives for NGA investment in some countries, although, potentially, at the expense of future competition. The policy challenges presented by NGA are discussed in more detail in Section 1.4.3.1, but the following interventions have contributed to varying levels of investment across our comparator countries:

- The regulatory policy of ‘forbearance’ removes the obligation for fibre operators to offer wholesale access or to unbundle fibre loops, thereby incentivising operators to invest in NGA with the promise of monopoly returns. This has promoted widespread investment in FTTH in the US, predominantly by Verizon (which accounts for 66% of US FTTH subscribers). This policy is more suited to markets with competition between end-to-end infrastructure owners, as is the case in the US, where local duopolies typically exist between cable and telco operators.

- In Japan, the authorities initially pursued a light-touch approach to wholesale access pricing regulation, to stimulate the roll-out of fibre networks. With NGA roll-out having reached the majority of the population, a more interventionist stance has been taken, which has resulted in reduced wholesale access prices.

- In many countries, public funding has contributed to the roll-out of NGA networks. Local government-funded ‘munifibre’ schemes have contributed to the widespread roll-out of NGA in Sweden, while local deployments in the US and France are also often part-publicly funded.

- Governments and regulators also have a role to play in facilitating the civil engineering associated with NGA roll-out. In Japan, permitting overhead cabling has significantly reduced costs. As part of its strategy to achieve four million NGA broadband subscribers by 2012, in 2008 the French government passed a law for the modernisation of the economy (known as LME), with a range of requirements including the obligation for new-builds to have fibre optic wiring, and measures to facilitate operators' access to existing buildings and to duct infrastructure. The UK government-sponsored Caio review, published in September 2008, recommended some similar measures.

There are several commercial rationales for the deployment of high speed broadband services. Cable operators may seek relatively simple network upgrades, increasing broadband speeds to gain market share from DSL operators. In response, telecoms operators may seek to deploy fibre to defend their broadband customer bases.

However, in general, investment in super-fast broadband is based on the expectation of future demand rather than existing demand for high-speed services. Indeed, there is little evidence that large numbers of residential consumers are prepared to pay a premium for ultra high speed broadband. While high quality video sharing, 3D television, public services such as online healthcare, and peer-to-peer information sharing have all been touted as future services enabled by high speed fibre networks, the most obvious current commercial proposition is IPTV, with high-speed networks enabling multiple high-definition channels to be delivered. This has been a key driver of investment in the US, as telco operators have been able to move into competition with cable providers for the provision of television services (it is a feature of the US market that poor quality copper networks and lengthy local loops make TV over DSL unviable in many areas). By the end of 2007, nearly one million of Verizon's 1.5 million FTTH subscribers were taking HDTV services. Similarly, in Europe, triple-play offers incorporating HDTV have been central to the FTTH propositions of operators like Fastweb in Italy and Free in France. In contrast, however, IPTV is yet to take off in Japan; fewer than 250,000 of its 11.2 million FTTH subscribers take a TV service.

There may be fewer commercial opportunities for fibre operators in countries which already have high levels of digital television take-up and mature pay-TV markets. Such is the case in the UK, which has one of the highest levels of digital television penetration (86% at the end of 2007, compared to 66% in France and 32% in Germany); has a mature pay-TV market in the world (45% of UK household took pay-TV services at the end of 2007); and has HD services available over satellite and (to a lesser extent) cable platforms.

Figure 5.12 below details major developments related to NGA services in our key comparator countries during 2007 and 2008.

Figure 5.12 Major NGA developments, 2007 and 2008

Country	Major NGA developments
UK	**December 2007:** Cable operator Virgin Media announced that it was to upgrade two thirds of its cable network to the Euro DOCSIS 3.0 standard offering speeds of up to 50Mbit/s to 9 million households by 2008/9. **June 2008** : Incumbent BT announced plans to roll-out an NGA network to up to 10 million homes by 2012, predominantly based on fibre-to-the cabinet. **September 2008:** The government-sponsored Caio review emphasised that the private sector should play the principal role in investing in high-speed broadband, and detailed some practical recommendations to reduce cost by facilitating duct and pole access to install fibre cables. **September 2008**: Ofcom published a consultation document *Delivering super-fast broadband in the UK* in emphasising a competition-based approach with the market setting prices for wholesale products.
France	**March 2007:** France Telecom launched commercial FTTH services in areas of Paris, with an expanded roll-out in June. **April 2007:** Neuf Cegetel launched triple-play services including some HD channels over its FTTH service in areas of Paris. **September 2007**: Iliad becomes the third operator to offer FTTH services in Paris. **August 2008:** Law on modernising the economy (LME) introduces a range of measures designed to facilitate hitting a target of 4 million NGA broadband subscribers by 2012 including measures to reduce civil engineering costs by duct sharing, and requiring all new builds to have fibre optic wiring.
Germany	**April 2007:** Regulator BnetzA mandates access to the ducts between local exchanges and cabinets in incumbent Deutsche Telekom's VDSL network, but not to the cables themselves, meaning alt-nets need to install their own fibre if they are to provide VDSL services. **March 2008:** As part of announced plans to roll out a national VDSL network using Deutsche Telekom's cabinets, alt-net Arcor released details of a pilot in Thringa to be activated later in the year. **July 2008**: Alt-net Hausenet stated plans to roll out its own fibre network, with its first phase a limited FTTB trial in Hamburg. **July 2008**: Kabel Deutschland is upgrading sections of its cable network and claims that it has tested download speeds of up to 200Mbit/s during DOCSIS 3.0 trials in Hamburg.
Italy	**August 2007:** Alt-net Fastweb announced plans that it is to expand its fibre-optic footprint by 1.4 million households. **March 2008**: Telecom Italia's 3-year plan includes a target of offering FTTC to over 2 million households by 2010 (8% of population).
USA	**January 2008:** Three years after beginning its $23bn programme of rolling out FTTH to 19million households, Verizon reports 1.5 million subscribers. **June 2008**: A resolution is introduced into the House of Representatives calling for government policy on a new generation network offering universal availability of 100Mbit/s broadband by 2015.
Canada	**March 2007:** Bell announces $1.5bn investment in high speed internet access for residential and business customers, mainly focusing on DSL technologies for residential customers and optical ethernet services for larger business customers. **August 2008**: Bell announces that it will deploy FTTB for all new-build MDUs in Quebec-Windsor corridor.
Japan	**November 2007:** The government revised its ambitious target of 30 million FTTH/B subscribers by 2010 down to 20 million. **January 2008**: Leading FTTH operator NTT lowers rates for third parties to access its FTTH network for the first time since 2001. **September 2008**: The Ministry of Internal Affairs and Communications reported that for the first time the number of FTTH connections (13.1 million) exceeded the DSL connections (12.3 million).

Source: Ofcom

5.1.6 The rise of Mobile Virtual Network Operators (MVNOs)

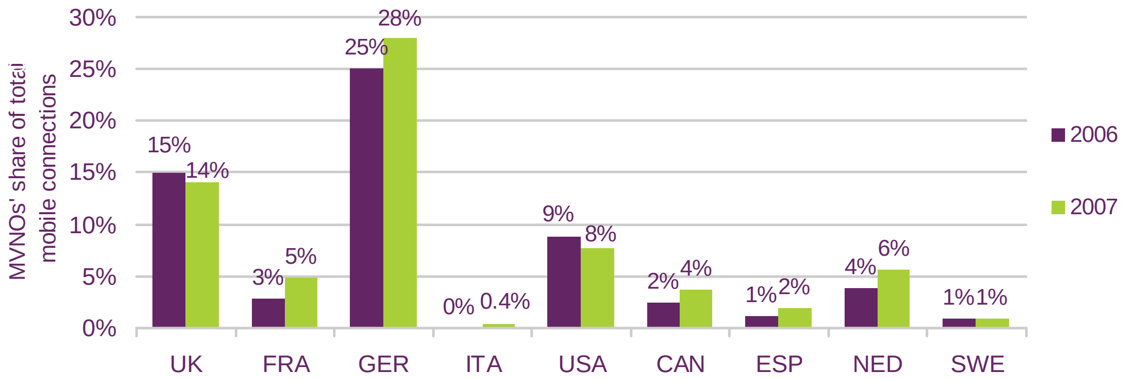
5.1.6.1 MVNOs offer new growth opportunities in mature markets

The last 18 months have seen significant changes in the structure of mobile markets across the world, as the consequence of the emergence of a raft of new mobile virtual network operators (MVNOs) and service providers.

In many respects, this trend can be viewed as indicative of a mature market seeking to expand into new areas; either to 'mop up' late adopters with low-margin offers targeted at the mass market, or to offer highly specific services targeted at clearly defined market segments with specific needs. Mobile network operators (MNOs) are able to generate additional revenues as sections of the market which they have been unable to target effectively are served by wholesale deals with MVNOs, while these MVNOs are able to direct their retail and marketing skills and assets into developing and selling mobile services without the need to invest in a mobile network.

However, the extent of MVNO activity varies significantly across our comparator countries, with MVNOs' share of connections falling slightly in some mature markets (the UK and the US), but increasing in most countries as a result of launches of new services (Figure 5.13)

Figure 5.13 MVNO share of total mobile connections, 2006 and 2007



Source: IDATE / Ofcom
Note: UK and Germany figures includes reseller subscriptions in addition to full MVNOs

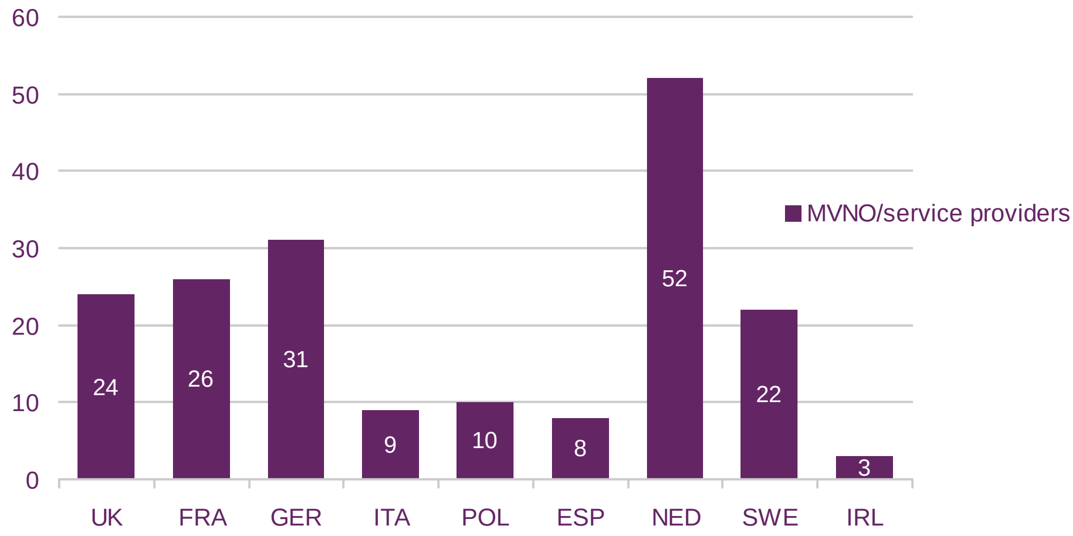
5.1.6.2 Wide variation in levels of MVNO activity across countries

Over the last 12 months the number of MVNOs and mobile service providers has increased in most of the key comparator countries. Mobile service providers are similar to MVNOs in that they purchase wholesale service from MNOs and re-sell them to end-users, but different in that they do not have their own switching infrastructure and therefore use the MNOs' own inter-connect agreements. Typically, they also use SIM cards provided by the MNO rather than their own.

However, in some mature markets, despite new entrants, the number of MVNOs and service providers has remained relatively static, as increased competition has led to consolidation among providers.

Historically, the Netherlands has had the highest number of MVNOs and service providers, targeting low-end and niche markets ranging from multi-cultural and ethnic groups to international business travellers (see Figure 5.14). The largest group of Dutch providers offers SIM-only offerings at the low-cost end of the market where price competition and churn are high. MVNO and service provider numbers continue to fluctuate; both through withdrawals and consolidation such as Tele2 Mobitel and Versatel, and as new providers continue to enter the market.

Figure 5.14 Numbers of MVNOs and service providers (estimated) in European countries, November 2008



Source: TelecomPaper.com

5.1.6.3 Regulatory pressure leads to growth of mass market MVNOs in Spain and Italy

The first MVNOs in Spain and Italy were launched in 2006 and 2007 following regulatory pressure on operators to open up their networks. Most of the 13 MVNO licence holders in Spain are fixed-line providers offering integrated mobile and fixed services, alongside pan-European brands such as Carphone Warehouse, Simyo and Carrefour. In Italy, high-profile retailers have been quick to build up market share since launching in Q4 2007; by mid-April 2008 the Italian communications regulator reported that MVNO subscriptions exceeded 500,000, led by UnoMobile (Carrefour) and CoopVoce (Co-op).

Drawing on the loyalty of their existing consumers, retailers such as supermarkets typify the low cost, value proposition adopted by the majority of the MVNOs that have launched in European markets. The retailer Carrefour has MVNO services in four countries and Tesco Mobile, with two million mobile subscribers using its service in the UK, launched in Ireland in November 2007. Other high-profile retail brands operating as MVNOs include Aldi (Germany), Co-op (Italy) and Asda and Ikea in the UK.

5.1.6.4 New MVNO business models emerge to serve niche markets

In markets with established MVNOs, particularly in northern Europe and the UK and, to a lesser extent, in Japan, there has been renewed impetus from virtual operators targeting particular niche markets and user requirements.

MVNOs offering low-cost international calls to consumers with family roots in other countries have grown quickly: Lebara (around 700,000 subscribers in seven countries by mid-2008), Lycatel Mobile and Ortel Mobile have launched services in multiple European markets, the latter being acquired by the Dutch incumbent operator KPN in April 2008.

In the UK, MVNO Blyk has grown rapidly; its innovative business model, targeting 16–24 year olds with the proposition of free calls and SMS in return for viewing advertisements, has delivered 200,000 users in the year since its launch in September 2007, and it plans to roll out in other countries.

Business-focused MVNOs, already popular in Japan, launched in the UK in 2007 - Gamma Telecom, on 3UK's network and IDT Mobil, in partnership with Orange - while Vodafone is reportedly considering wholesale data deals with navigation company TomTom and wireless web company Datawind.

Figure 5.15 Selection of multi-country MVNOs/service providers

MVNO	Type	Countries launched
Debitel	Retail	Denmark, Germany, France, Netherlands, Slovenia
Carphone Warehouse	Retail	Germany, France (joint venture with Virgin Mobile), UK
Carrefour	Retail	Belgium, France, Italy, Spain,
Debitel	Retail	Denmark, Germany, France, Netherlands, Slovenia
IDT Europe	Enterprise/International calls	Belgium, Denmark, Netherlands, UK
Lycatel	Ethnic	Belgium, Denmark, Norway, Sweden, Switzerland, UK
Lebara	Ethnic	Denmark, Netherlands, Norway, Spain, Sweden, Switzerland and the UK
Simyo	Low-cost	Belgium, Germany, Netherlands, Spain
Tesco	Retail	Ireland, UK
Virgin	MVNO/full service telco	Australia, Canada, France, UK, USA

Source: Ofcom

5.1.6.5 Some markets are better suited to MVNOs than others

Regulatory conditions and market dynamics have meant that in some markets MVNO market share has been relatively slow to develop, and has in a few cases resulted in high-profile failures.

In France, MVNO subscriber market share has been relatively slow to develop since the launch of the first MVNO, Transatel in 2002. Several new MVNOs have recently launched, targeting specific niche markets, but in 2007 there were some notable exits from the market including Debitel and TEN, bought out by SFR and France Telecom respectively. The US market has several high-profile large MVNOs such as Tracfone and Virgin Mobile, but also has had high-profile MVNO failures, with ESPN Mobile (2006) and Disney Mobile (2007) both discontinuing their services following poor take-up.

Despite claims from Japan Communications to be the world's first MVNO, the use of sub-brands by MNOs to target specific market segments has made Japan a challenging market for consumer MVNOs to enter. Existing providers have only been able to offer wholesale-type services, and MNOs did not generally permit MVNOs to offer proprietary devices. However, the recent launch of three high profile MVNOs suggests that they may play an increasingly important role in Japan's mobile sector; Japan Communication's 3G data-focused service (the 'world's first interconnected MVNO') launched in 2007, and 2008 saw the launch of Disney Mobile and the Internet Initiative Japan (IIJ) MVNO.

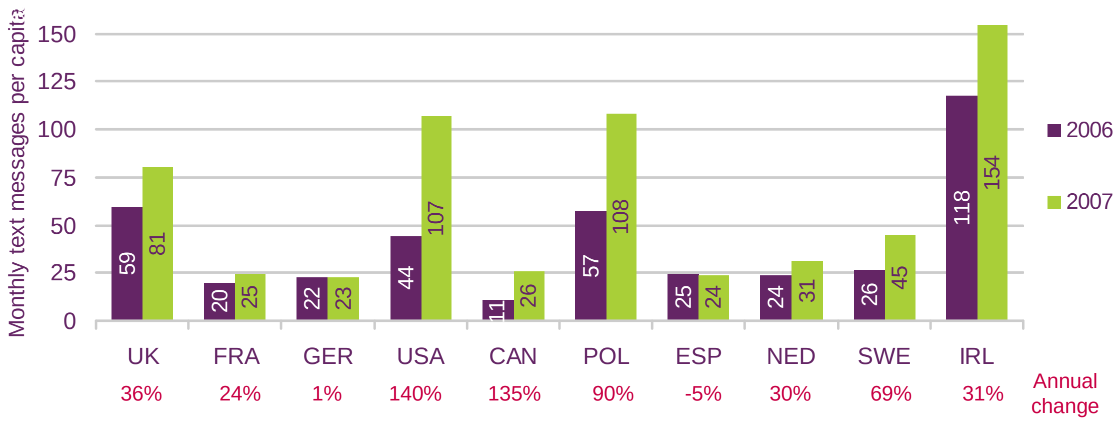
5.1.7 The continuing growth of text messaging

5.1.7.1 Big variations in the use of text messaging

The above sections have highlighted how different market structures have delivered different outcomes in respect to the relationship between fixed and mobile, types of broadband deployment and the characteristics of the mobile market. However, the very different levels of text messaging evident across our comparator countries are less easy to explain in terms of market structure, as are the very different growth rates (Figure 5.16). Text messaging services have been available in all countries with interconnection between all mobile operators for a decade, and have been available on virtually all handsets for at least five years. Moreover, from the operators' point of view, the costs of text messaging, and therefore the margins available, are largely the same in every country.

Therefore, we need to look beyond market structures to explore why there are such large variations in the use of text messaging: why people in the UK sent on average more than three times the number of text messages than their counterparts in France and Germany, and why the use of text messaging increased by over 70% in Sweden during 2007 while its use declined slightly in Spain (Figure 5.16).

Figure 5.16 Text messages per head, 2002 and 2007



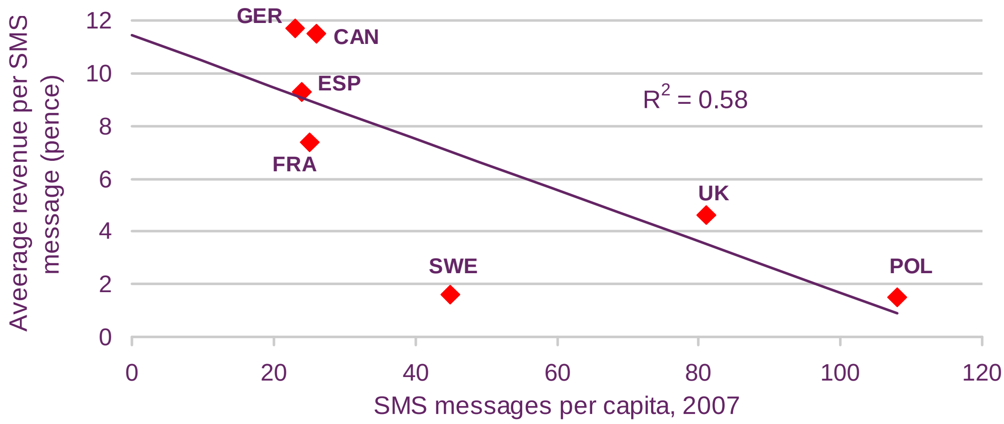
Source: IDATE / operators / national regulators
NOTE: USA data are not comparable as they include SMS and push-to-text

5.1.7.2 Pricing and marketing initiatives partly explain the variation…

Analysing the different levels of text messaging can provide some insight into how a combination of pricing and other marketing initiatives, cultural preferences and the 'network effect' can create different consumer behaviours.

Figure 5.17 below illustrates that there is some relationship between the use of text messaging and the average revenue per SMS (which can be used as a proxy for pricing). Among the countries for which data are available, the highest use per head is in Poland, where the revenue per SMS is lowest, and the lowest use is in Germany, where the revenue per SMS is highest. However, the correlation is far from perfect. Most notably, SMS messages cost around half as much in Sweden as in the UK, but Swedes on average send only around half the number of messages as UK consumers. The structure of UK tariffs may provide part of this explanation, with large numbers of SMS messages included in some tariffs (for example, Orange's *Dolphin* tariff) leading to effectively 'flat-rate' pricing, while other tariffs such as T-Mobile's *Flext* allow users to spend an inclusive allowance interchangeably on voice and SMS.

Figure 5.17 SMS messages per mobile connection and average revenue per SMS, 2007



Source: IDATE / industry data / Ofcom
Note: Data are not available for the US or Japan

5.1.7.3 … but cultural differences may also play a role in explaining variation between countries

Cultural differences are very difficult to quantify, but may contribute to the differing levels of use of text messaging between countries. In an analysis of how mobile phone use reflects national cultures, Carphone Warehouse surveyed 5,000 consumers in the UK, France, Germany, Spain and Sweden. It found that UK mobile users sent proportionally many more text messages than calls than did consumers in the other countries, and concluded: "This British use of the mobile phone in a way which reduces the need for human contact is a reoccurring feature in our findings, one could wonder whether this reflects the often noted British reserve, or if it in fact reflects the longer working hours in Britain, a quick text replacing the need for a lengthier call".[25]

The 'network effect' also drives volumes of text messaging. Individuals will send more text messages as the 'network' of those who send and receive text messages expands. This may explain the sudden increase in SMS use in Sweden during 2007. In contrast, text messaging has never reached critical mass in Japan, where people have instead used email functionality on their phones. While SMS contributes over two-thirds of total mobile data revenues in all of the European countries covered by this report, in Japan the contribution of SMS is negligible (see Section 5.2.4.5 for more details).

[25] The Carphone Warehouse, *The Mobile Life European Report 2007*, p16

5.2 The telecoms industry

5.2.1 Introduction

In this section we look at the major trends in the telecommunications markets in the 12 nations covered in this report from an industry perspective. After an overview of overall industry revenue, we will look at the industry on a sector-by-sector basis, addressing fixed-voice markets first, followed by the mobile sector and concluding with the broadband sector.

Most of the analysis covers the five years to 2007, although shorter periods are used where earlier data are not available. Some of the key findings in this section include:

- **The UK over took the US to become top in terms of telecoms spend per person** as average revenue per person increased from £420 in 2006 to £443 in 2007;

- Although **broadband revenues were the fastest growing element of telecoms revenue** in 2007, growing by an average of 36% a year in the previous five years (50% in the UK), broadband contributed only 11% of telecoms revenue in the same year (10% in the UK).

- **Over the five years to 2007 the total number of fixed lines in the nations covered by the report fell by 12% to 428 million**, although the number of lines did increase in Germany, Canada and the Republic of Ireland (in the UK it fell by 4%).

- **Fixed voice call minutes per capita declined in all tier one countries in 2007**, however, Canada was unique among them as it was the only nation where this happened for the first time;

- **In most countries the majority of voice calls still originate on fixed lines** - among the nations where separate outgoing call volumes data were available, an average of 46% of voice call minutes originated on mobile networks in 2007, up from 28% in 2002 (in the UK it increased from 24% to 40%).

- **There were more mobile connections than fixed lines in all of the comparator countries at the end of 2007**, and Poland and Italy had the highest proportion of telephony connections which were mobile at 80% and 78% respectively (69% in the UK).

- **During 2007 Poland overtook Japan to become the country where the highest proportion of total telephony revenues which were from mobile** (69% in 2007, up from 65% in 2006);

- **In 2007 the US overtook Japan to become the largest country in terms of mobile data revenues** (including SMS), with revenues of £12bn (up from £8bn in 2006);

- **Broadband connection growth averaged 37% a year between 2002 and 2007**, with highest average annual growth in the Republic of Ireland at 166% and lowest in Canada at 19% (63% in the UK).

- **In all of our comparator nations except the US and Canada the majority of broadband connections at the end of 2007 were DSL-based** - in the US and Canada most broadband connections are via cable (in the UK 78% were DSL-based at the end of 2007).

5.2.2 Telecoms revenues

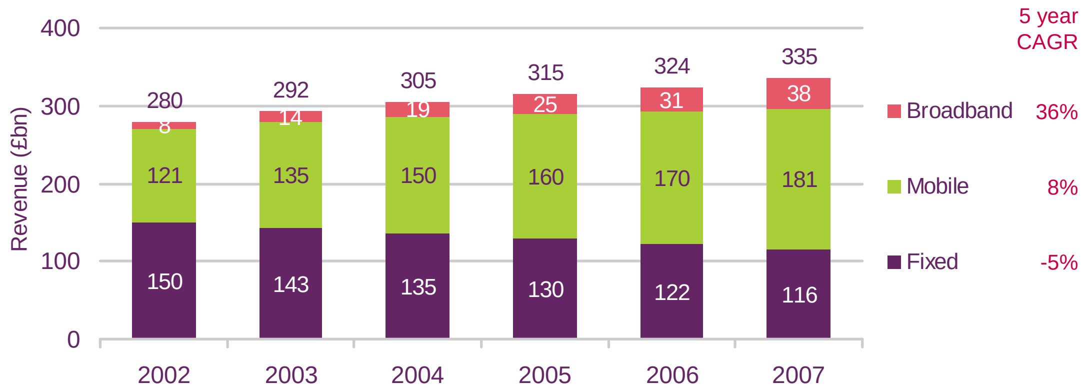
5.2.2.1 Broadband revenue growing fastest, but only contributes 11% of total revenue

Total telecoms revenue generated in the 12 countries covered in this report was £335bn in 2007, an increase of 3% on the £324bn figure for 2006 and 20% (£55bn) higher than the total for 2002 (Figure 5.18).

Mobile revenue made up the majority (54%) of telecoms revenues in 2007, an increase of one percentage point on 2006. Although broadband revenues were the fastest growing revenue element, increasing by 22% to £38bn during 2007, they made up only 11% of the total, while revenue from fixed-line services was £116bn (or 35% of total revenue), a 5% drop on the £122bn for 2006.

Broadband was also the fastest-growing sector in terms of revenue in the five years to 2007, with a compound average growth rate of 36% per year. Over the same period mobile revenues increased by an average of 8% annually, while fixed voice revenue fell by an average of 5% per year. Declining fixed voice revenues and growth in mobile telephony revenues are related to increasing mobile use in all of the comparator countries, while rapid growth in broadband revenue reflects increasing service take-up, driven both by migration from dial-up access and by new internet users.

Figure 5.18 Total telecoms service retail revenue, by sector: 2002 to 2007



Source: IDATE / industry data / Ofcom
Note: Excludes revenue from narrowband internet and corporate data services; covers only the 12 countries in the analysis; figures have been restated to reflect more accurate data

5.2.2.2 Poland has the highest proportion of telecoms spend which is from mobile

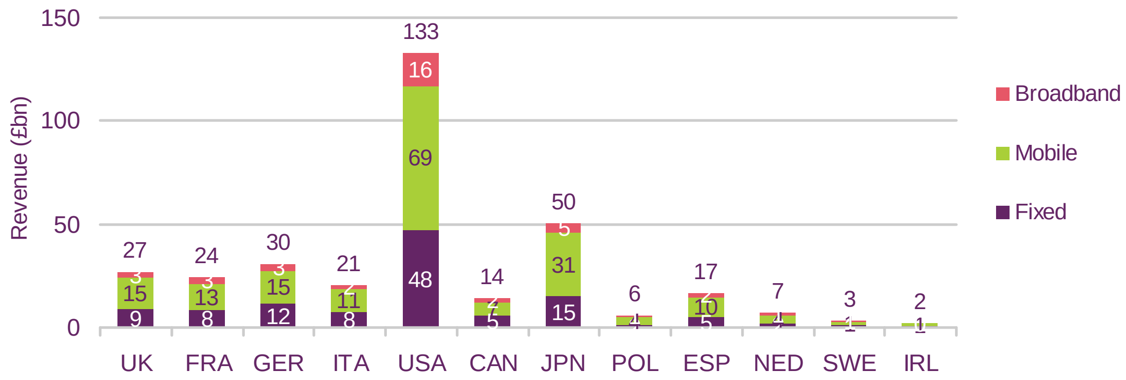
The US was by far the largest telecoms market of our comparator countries in terms of revenue in 2007, generating £133bn in retail telecoms revenues, or 40% of the total (Figure 5.19). The US population (over 300 million) accounts for 36% of the total population of the comparator countries.

As in 2006, Sweden and Canada were the only countries where combined revenues from fixed and broadband services were higher than those from mobile services in 2007. Sweden and the Republic of Ireland had the highest proportions of total revenues generated by fixed voice services (40% of the total in each country), while Sweden also had the highest proportion of revenues generated by broadband services (18% of the total), meaning that Sweden had the lowest proportion of total revenue generated by mobile services (42%). This was more than 20 percentage points lower than Poland (the highest, at 63%).

Poland had the joint lowest proportion of revenues from fixed voice services (along with the Netherlands, at 28%), while the Republic of Ireland had the lowest proportion of total revenues which was generated by broadband services (8%).

It should be noted when considering these figures that allocating revenue between fixed voice and broadband is often not straightforward because of the prevalence of service bundling in some countries. In our data we have relied on operators' and regulators' own figures.

Figure 5.19 Telecoms service retail revenue, by sector: 2007



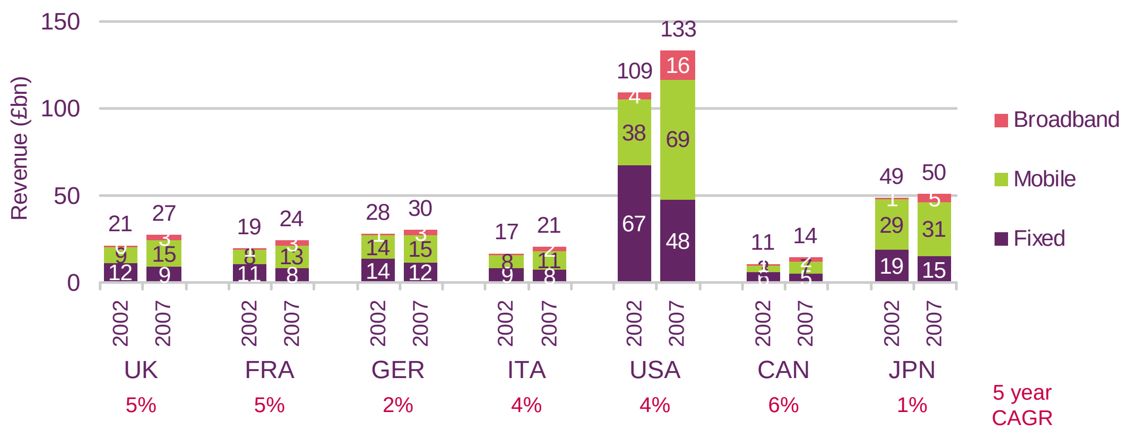
Source: IDATE / industry data / Ofcom
Note: Total service revenue excludes revenue from narrowband internet and corporate data services; the UK figure is not comparable to those published previously as it no longer contains an estimate of retail telephony revenues from non-regulated services.

5.2.2.3 Canada has the highest growth in telecoms revenue

Among the seven 'key comparator' nations covered in this report, the average annual growth in telecoms retail revenues was highest in Canada, at 6% in the five years to 2007 (Figure 5.20). Strong growth in mobile revenues in Canada (which increased by £3bn over the period) was the main driver behind this.

The fastest growth in broadband revenue over the same period was in the UK, where it averaged 50% per year (despite falling average costs per connection) as a result of increasing take-up. The fastest average decline in fixed voice revenues was in the US, where it averaged 7% a year, while the slowest rate of decline was in Italy, at 2% a year.

Figure 5.20 Telecoms service retail revenues, 2002 and 2007



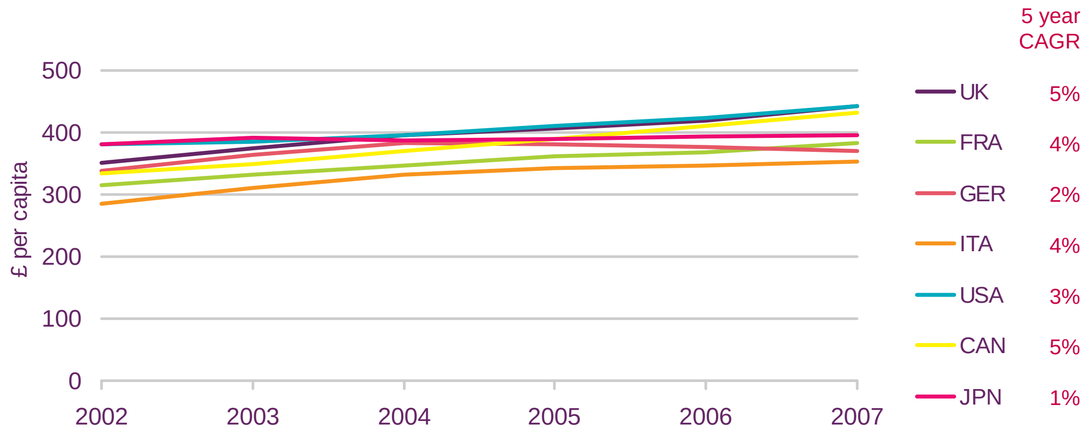
Source: IDATE / industry data / Ofcom
Note: Total service revenue excludes revenue from narrowband internet and corporate data services

5.2.2.4 Telecoms spend per head is highest in the UK and the US

In 2007 per-capita spend on telecoms services among our key comparator countries ranged from £353 in Italy to £443 in the UK, averaging just under £400 (or £33 a month). The UK overtook the US to become top in terms of per-capita telecoms spend as average spend per person increased from £420 in 2006. In the five years to 2007 the highest growth rates in per-capita telecoms spend were in the UK and Canada, where growth averaged 5% a year (Figure 5.21). The lowest growth was in Japan, where it increased by less than1% per year.

Germany and Japan were the only 'tier one' countries where there was evidence of falling per-capita spend on telecoms services in recent years: in Japan average spend fell in 2003 but increased in subsequent years, while in Germany, spend fell in each of the three years to 2007. This was primarily as a result of falling fixed call volumes, although there was some evidence of declining mobile revenues in 2007.

Figure 5.21 Total telecoms service revenue per head: 2002 to 2007



Source: IDATE / industry data / Ofcom
Note: Total telecoms service revenue excludes revenue from narrowband internet and corporate data services

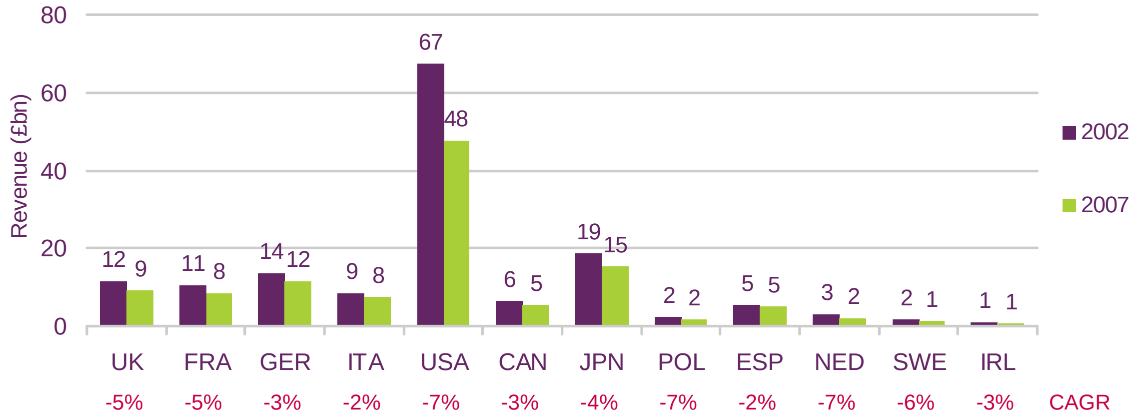
5.2.3 Fixed voice services

5.2.3.1 Fixed voice revenues fall by an average of 5% a year

Fixed voice revenues fell in all our comparator countries in the five years to 2007, with the steepest levels of decline being in the US, Poland and the Netherlands, where revenues declined by an average of 7% per year (Figure 5.22). The rate of fall in fixed-line revenues was lowest in Italy and Spain, where it declined by an average of 2% a year.

Across our 12 comparator countries fixed telephony revenues fell by an average 5% a year between 2002 and 2007. The main factor behind this decline was the increasing use of mobile telephony (as outlined in Section 5.2.4) and, in total, fixed-line voice revenues in the comparator countries fell by almost a quarter to £116 billion over the same period.

Figure 5.22 Fixed-line voice revenues: 2002 and 2007



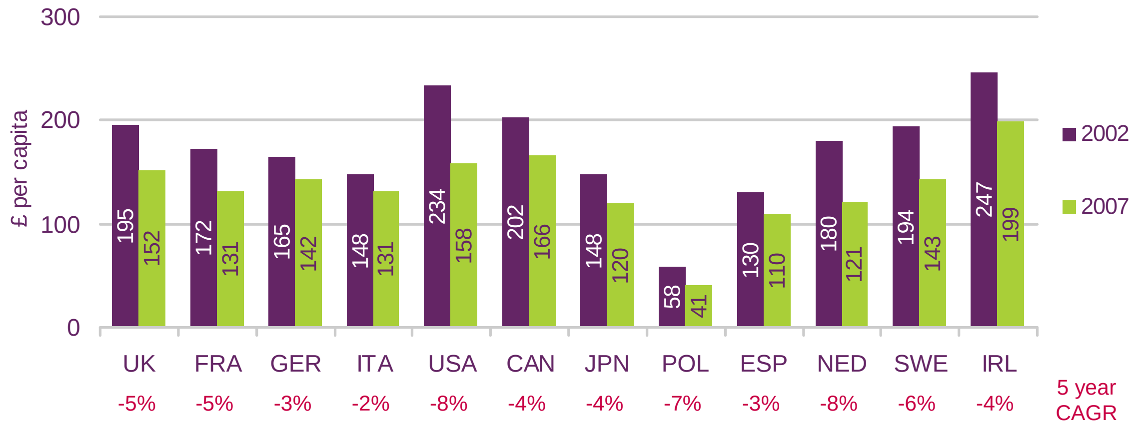
Source: IDATE / industry data / Ofcom
Note: Excludes revenue from narrowband internet and corporate data services

5.2.3.2 Per-capita fixed-line spend highest in Ireland

There were significant variations in average spend per head on fixed-line services in the 12 countries covered by this report. Fixed-line spend per head in 2007 ranged from £41 in Poland to £199 in the Republic of Ireland (Figure 5.23), averaging £138 a year across all of the nations covered.

Spend per head on fixed voice services fell in the five years to 2007 among all of our comparator countries. The fastest decline in spend was in the US and the Netherlands (where it fell by an average of 8% a year to £158 and £121 respectively in 2007). The slowest rate of decline was in Italy, where spend fell by an average of 2% a year to £131 per person in 2007.

Figure 5.23 Fixed-line voice revenue per head: 2002 and 2007



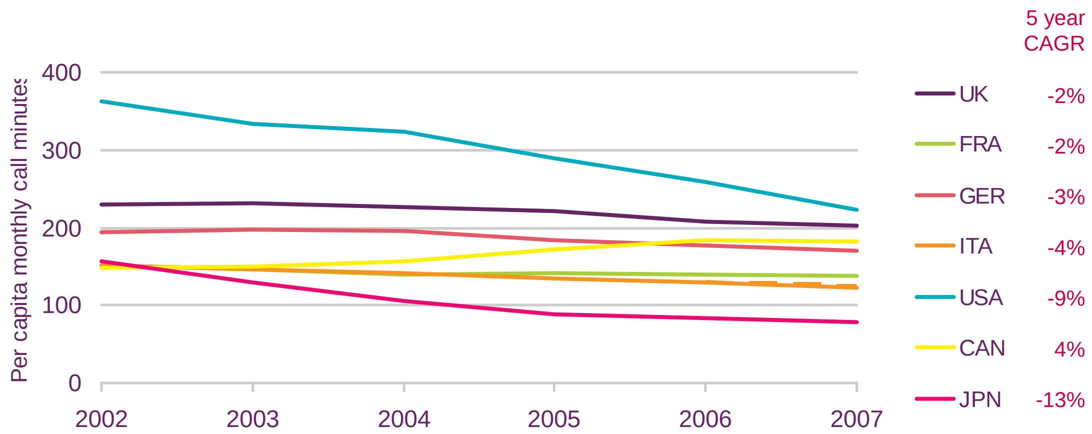
Source: IDATE / industry data / Ofcom
Note: Excludes revenue from narrowband internet and corporate data services

5.2.3.3 Average per-capita fixed call volumes highest in the US

The US had the highest average fixed voice call volumes per person (of the key comparator countries covered by this report) in 2007 and in each of the previous five years (Figure 5.24). In 2007 US residents made an average 223 minutes of voice calls (including local calls but excluding VoIP calls) per month, almost two-and-a-half hours more per person than the 78 minutes per month in Japan, where average fixed voice use was lowest. In Canada, 2007 was the first year in which average fixed voice calls per head had fallen.

Japan had the fastest decline in per-capita fixed voice volumes in the five years to 2007, with volumes falling on average by 13% a year. This steep fall is partly due to increasing use of mobiles, but falling mobile voice call volumes in 2007 also suggest that voice calls in general are being substituted by other forms of communication, such as email, instant messaging and VoIP (see Section 3.4.3.2).

Figure 5.24 Monthly fixed-line voice call minutes per head: 2002 to 2007



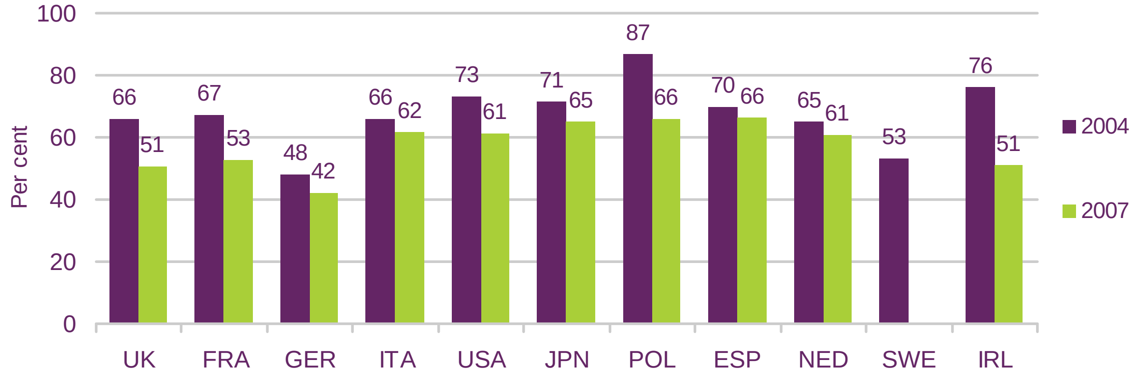
Source: IDATE / industry data / Ofcom
Note: Data for the UK and US excludes VoIP calls

5.2.3.4 Germany is the only nation where the incumbent's fixed call volume share is under 50%

There were marked differences in the proportions of fixed voice call volumes which originated on the incumbent operators' fixed network among the countries in this report, with the proportion being lowest in Germany at 42%. Conversely, the proportion of incumbent-originated fixed voice call minutes were highest in Poland and Spain in 2007, where almost two-thirds (66%) of fixed voice calls originated on Telekomunikacja Polska SA's and Telefonica's networks.

In all of the countries where historical data were available, the proportion of incumbent-originated voice call minutes fell between 2004 and 2007, suggesting that fixed-line competition has increased over the period. The introduction of wholesale products such as WLR (where an operator buys a wholesale access service, typically from the incumbent) or LLU-based services (where a provider takes over the line from the customers' premises to the local exchange, and uses its own equipment) - has contributed to the incumbent's declining retail market share in most of these countries.

Figure 5.25 Incumbent share of fixed voice call volumes: 2004 and 2007



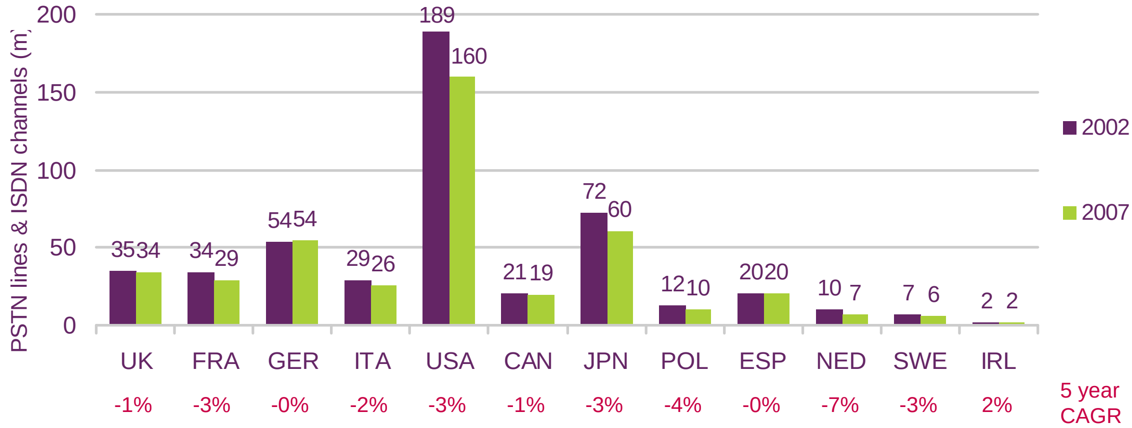
Source: IDATE / industry data / Ofcom

5.2.3.5 The rate of decline in the number of fixed lines is highest in the Netherlands

The number of fixed telephony lines declined in all of the countries in this report between 2002 and 2005,except the Republic of Ireland and Germany, although the average annual fall was less than one percentage point in Canada and Spain (Figure 5.26). The fastest rate of decline in the number of fixed lines was in the Netherlands, where the number of lines fell by an average of 7% a year, from 10 million in 2002 to seven million in 2007, partly as a result of the availability of 'naked DSL' which enables consumers to have a DSL broadband connection without the need for a voice line.

The average fall in the number of fixed lines (including ISDN channels) was 2% a year, and over the five years to 2007 the total number of fixed lines in our comparator countries fell by 58 million (12%) to 428 million.

Figure 5.26 Fixed exchange lines: 2002 and 2007



Source: IDATE / industry data / Ofcom

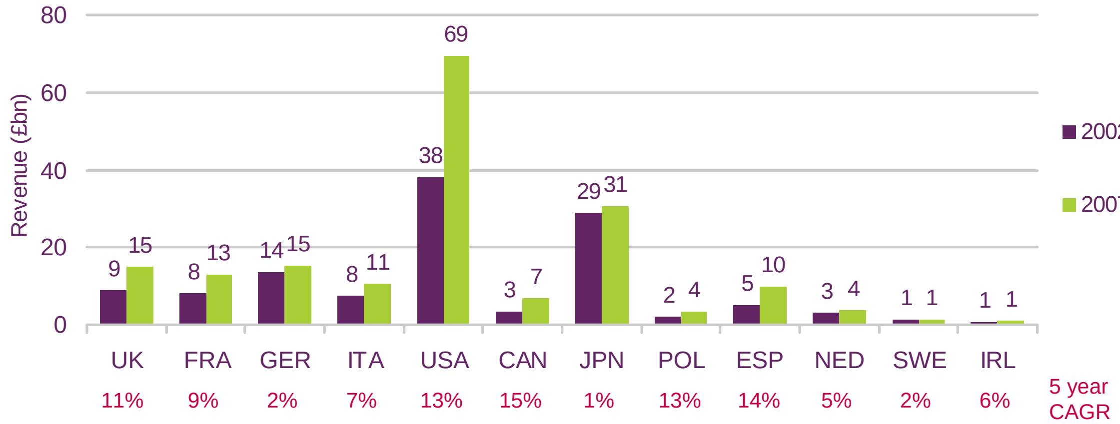
5.2.4 Mobile telephony services

5.2.4.1 Mobile revenue growth continues despite high take-up levels

Between 2002 and 2007 total mobile revenues increased by 49% (£59bn) to £181bn among the 12 countries covered in this report. The highest growth was in Canada, where revenues from mobile services increased by an average of 15% a year over the period as a result of increasing take-up and use. The slowest mobile revenue growth over the period was in Japan, where average mobile revenue growth has averaged just 1% per year.

Revenue growth in Japan has been inhibited by fierce competition among operators for subscribers and the introduction of mobile number portability. These factors have driven down prices, and average revenue per user fell by more than 24% in the five years to 2007. Despite the maturity of the market, mobile take-up in Japan (79 connections per 100 population) is also low in comparison to that in most of the comparator countries, in two-thirds of which there were more mobile connections than people at the end of 2007.

Figure 5.27 Mobile revenues: 2002 and 2007



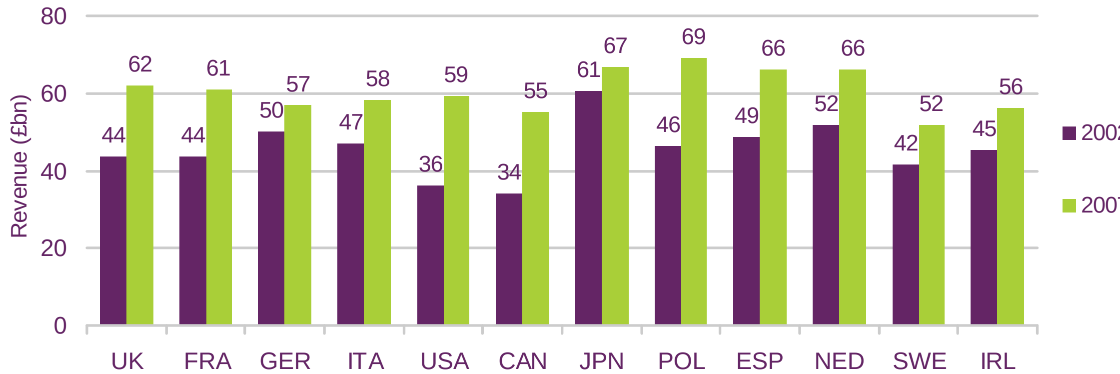
Source: IDATE / industry data / Ofcom

5.2.4.2 Mobile accounts for the majority of telephony revenues in most countries

In all of the countries covered in this report, revenues generated by mobile services were higher than those from fixed voice services in 2007 (Figure 5.28). The proportion of total telephony revenues contributed by mobile services ranged from 52% in Sweden to 69% in Poland in 2007, averaging 61% across our comparator countries, up from 45% in 2002. During 2007 Poland overtook Japan to become the country where the highest proportion of total telephony revenues which were from mobiles.

The largest growth in the proportion of telephony revenues contributed by mobile services in the five years to 2007 was in the US and Poland, where the proportions grew by 23 percentage points over the period to 59% and 69% respectively. The lowest growth was the six percentage point increase in Japan, where mobile revenues were lower in 2007 then they had been in 2003, for the reasons outlined previously in Section 5.2.3.3.

Figure 5.28 Mobile as a proportion of total fixed and mobile revenues: 2002 and 2007



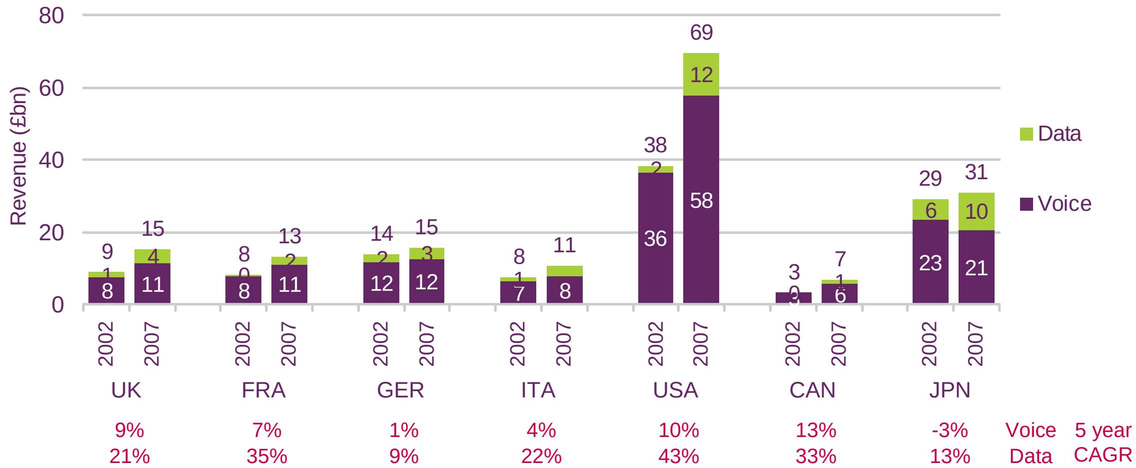
Source: IDATE / industry data / Ofcom

5.2.4.3 Mobile data revenues are growing five times faster than voice…

Mobile data revenue growth between 2002 and 2007 was higher than mobile voice revenue growth in all the key comparator countries covered in this report (Figure 5.29). This is unsurprising, because of increasing SMS use over the period, together with growth in other data services, enabled by faster mobile data speeds which have increased from the 144kbit/s of GPRS to HSDPA's 7.2Mbit/s (while CDMA's speeds have increased from 153kbit/s to 2.4Mbit/s and beyond using EVDO).

While total mobile voice revenues in the seven key comparator countries increased by 31% to £126bn over the five-year period, corresponding data revenues increased by 171% to £35bn. Average annual growth in data revenues ranged from 9% in Germany to 43% in the US, while the average yearly change in voice revenues was highest in Canada at 13% and lowest in Japan, where voice revenues fell by an average of 3% a year over the period. The US overtook Japan to become the largest country in terms of turnover mobile data services in 2007, with revenues (including SMS) increasing by 53% to £12bn.

Figure 5.29 Mobile revenue, by service type: 2002 and 2007



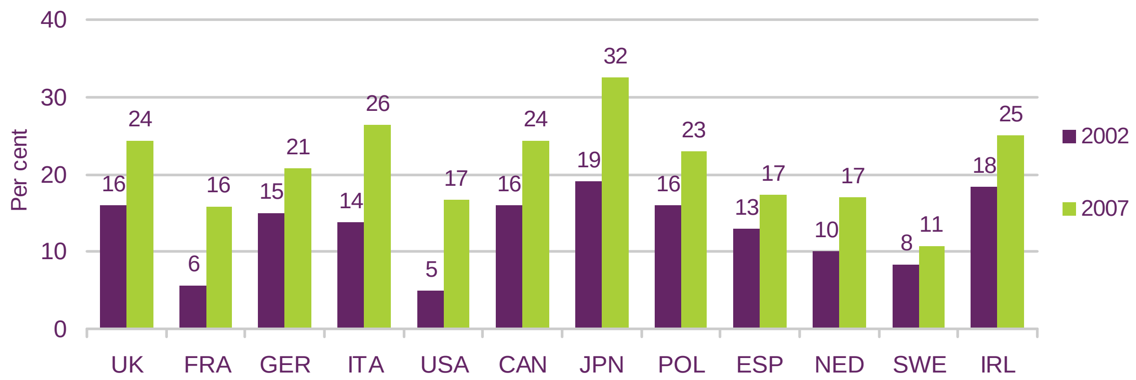
Source: IDATE / industry data / Ofcom

5.2.4.4 …but voice continues to contribute the majority of mobile revenue

As mobile data revenue has increased, so has the proportion of total mobile revenue that is generated by data services. The contribution of data revenue to total mobile revenue increased across all of our comparator countries between 2002 and 2007, with the highest proportional growth being in Japan and Italy (both particularly heavy users of mobile telephony services) where the increases were 13 percentage points, to 32% and 26% respectively (Figure 5.30).

Among the countries covered in this report the proportion of mobile revenues generated by data services was highest in Japan in 2007 (32%), lowest in Sweden (at 11%) and averaged 21% across all of the comparator countries. Section 3.4.3.2 shows that consumers in Japan are particularly high users of mobile email, but SMS messaging is not as popular with them as in the other nations.

Figure 5.30 Data as a proportion of total mobile service revenue: 2002 and 2007

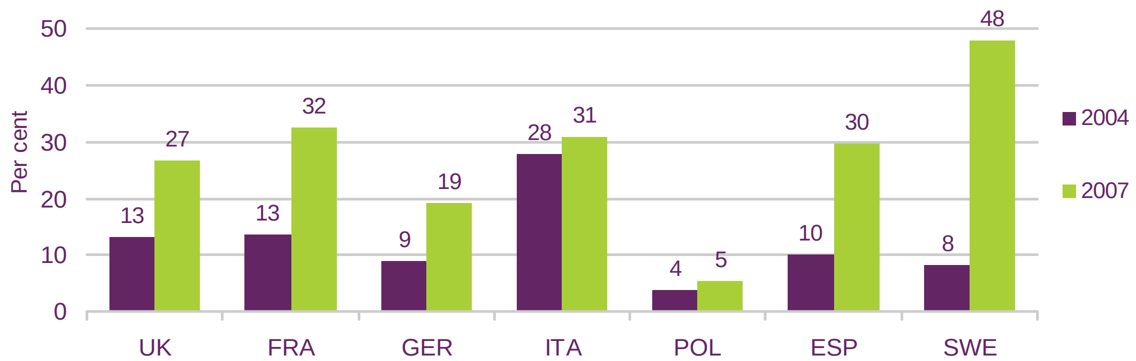


Source: IDATE / industry data / Ofcom

5.2.4.5 SMS continues to generate the majority of mobile data revenue

SMS messaging generated the majority of mobile data revenue in all of the countries for which data were available in 2007 (Figure 5.31). However, it looks unlikely that this pattern will continue, as in Sweden (where the proportion was highest in 2007) non-SMS data services contributed 48% of total mobile data revenue, up from 34% in 2006. Non-SMS data services' share of mobile data revenues was lowest in Poland (of the countries for which data were available for 2007) at just 5%. In all these nations the proportion of non-SMS data revenue increased in the three years to 2007, and the largest increase was in Sweden, at 40 percentage points.

Figure 5.31 Non-SMS data, as a proportion of total mobile data revenues: 2004 and 2007

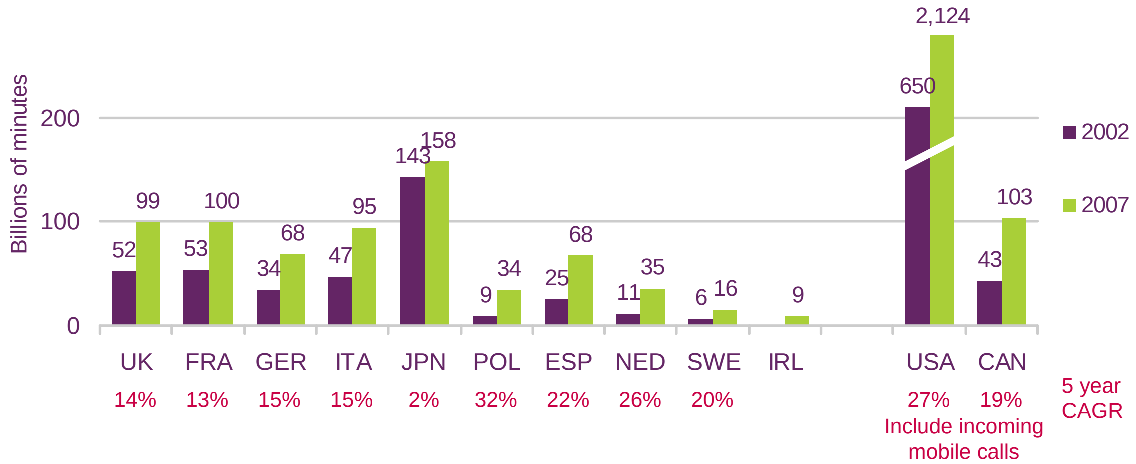


Source: IDATE / industry data / Ofcom

5.2.4.6 Mobile voice call volumes continue to increase across almost all countries…

Mobile voice call volumes increased in all the countries in this report in the five years to 2007 (Figure 5.32). This is as a result of growth in both the number of mobile connections and average calls per connection in all of our comparator countries. The fastest growth was in Poland, where mobile voice call volumes grew on average by 32% a year during the period, while the slowest volume growth was in Japan, where they increased by an average of just 2% a year. Japan was the only country in which mobile voice call volumes showed any sign of decline: in 2007 mobile-originated voice call minutes were 2% lower than they had been in 2006, partly as a result of increasing use of mobile data services.

Figure 5.32 Mobile voice call volumes: 2002 to 2007



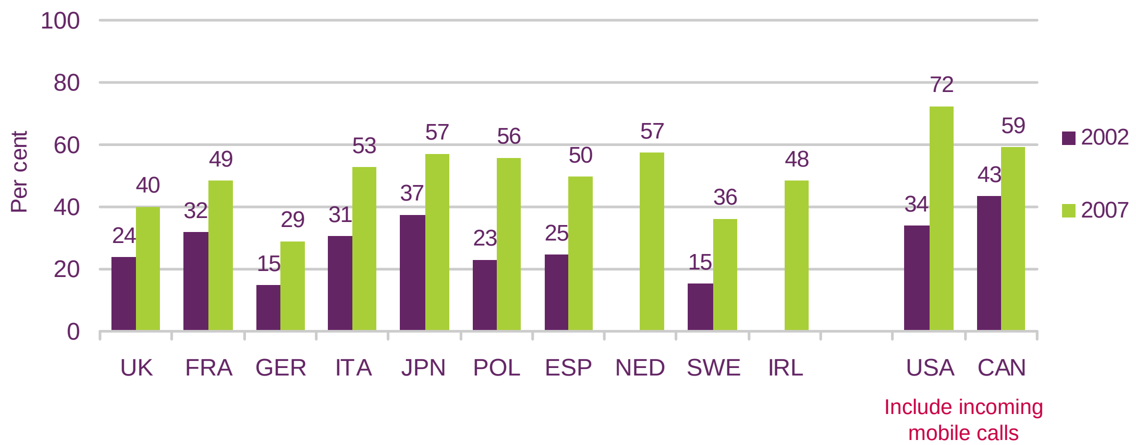
Source: IDATE / industry data / Ofcom
Note: USA and Canada also include incoming calls

5.2.4.7 …but in most countries the majority of voice calls still originate on fixed lines

The proportion of voice call volumes which originated on mobile networks ranged from 29% in Germany to 57% in Japan, among the countries for which separate outgoing fixed and mobile call volumes were available in 2007 (Figure 5.33). The lower proportion of mobile-originating voice calls in Germany is due to mobile telephony services being expensive in comparison with most countries, and the fact that until recently most mobile tariffs did not include an inclusive call allowance.

Among the nations where separate outgoing call volumes data were available, an average of 46% of voice calls originated on mobile networks in 2007, up from 42% in 2006 and 28% in 2002, as consumers increase the mobile calls they make, some of which are in substitution for those made over fixed lines.

Figure 5.33 Mobile voice call volumes as a proportion of total voice call volumes: 2002 and 2007



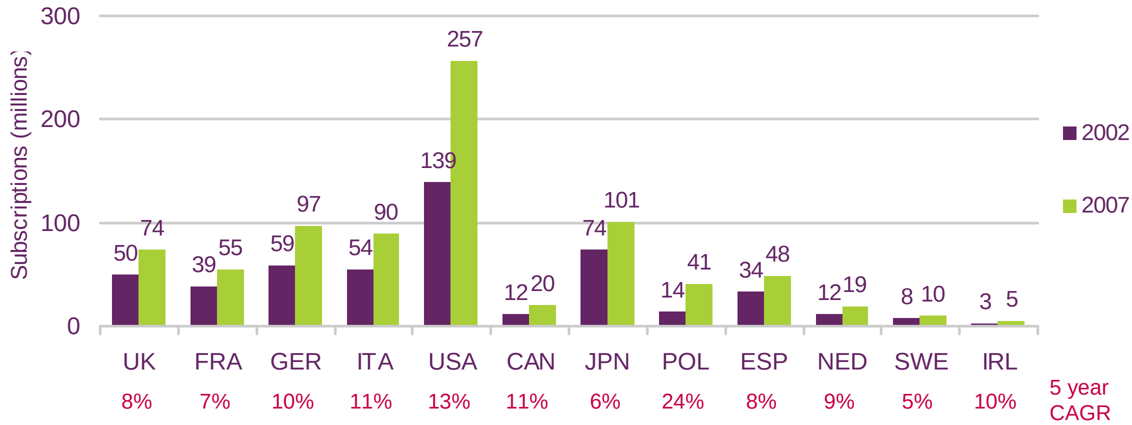
Source: IDATE / industry data / Ofcom

5.2.4.8 The number of mobile connections continues to grow, but growth rates vary

The total number of mobile subscriptions increased by 65% across the 12 countries covered by this report in the five years to 2007 (Figure 5.34). Average annual growth in the number of mobile subscriptions over the period was highest in Poland (at 24% a year) and lowest, at

5% a year, in Sweden (where mobile take-up was already at nearly 90% in 2002). The largest actual increase in mobile subscriptions over the period was in the US, where there were 118 million more mobile connections in 2007 than there had been five years earlier, and the rate of growth was the second highest, at an average of 13% a year.

Figure 5.34 Mobile connections: 2002 to 2007

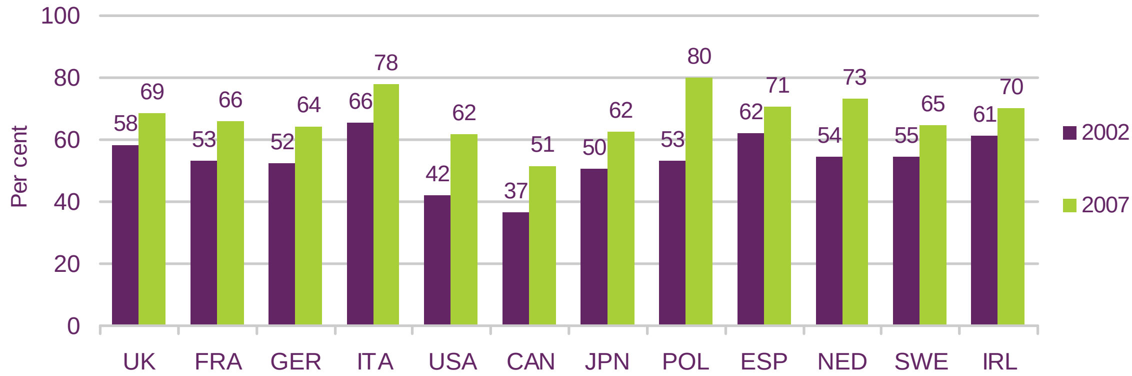


Source: IDATE / industry data / Ofcom

5.2.4.9 There are more mobile connections than fixed lines in all of the comparator countries

At the end of 2007 all of our comparator countries had more mobile subscriptions than fixed lines (Figure 5.35). Poland and Italy had the highest proportion of telephony connections which were mobile (at 80% and 78% respectively) while across all of the countries in the report the average was just under two-thirds (66%). The proportionally higher number of mobile connections in Poland is partly due to the fact that fixed-line availability extends to only about 80% of the population.

Figure 5.35 Mobile as a proportion of total telecoms connections: 2002 and 2007



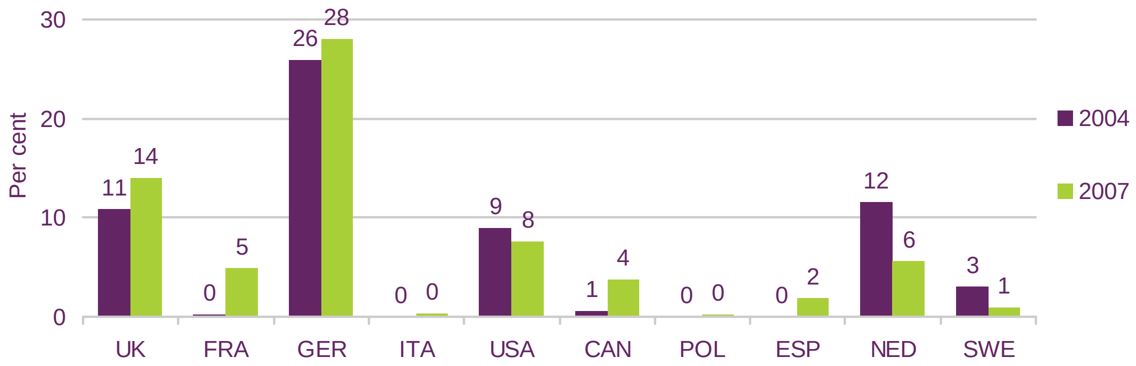
Source: IDATE / industry data / Ofcom

5.2.4.10 Proportion of MVNO users grows in France and Canada

Mobile Virtual Network Operators (MVNOs) provide mobile telephony services to retail or business customers by agreeing wholesale contracts to effectively use the infrastructure and radio frequency allocations of a mobile network operator. The introduction of services by MVNOs increases consumers' choice of providers, and therefore the level of competition in a market (Figure 5.36).

Growth in the proportion of MVNO connections in the three years to 2007 also varied among the nations; in France it increased by 5 percentage points due to the success of MVNOs such as Virgin Mobile, while in the Netherlands it fell by 6 percentage points as a result of network operators buying up MVNOs. In three of the countries for which historic data were available the proportion of mobile customers using MVNOs declined between 2004 and 2007.

Figure 5.36 MVNO share of total mobile connections, 2004 and 2007



Source: IDATE / industry data / Ofcom
Note: UK and Germany figures includes reseller's subscriptions in addition to full MVNOs

5.2.4.11 The UK and the US have the least concentrated mobile markets

The Herfindahl-Hirschman Index of market concentration, based on the relative market share of individual operators, can be used as an indicator of levels of competition in mobile markets across our comparator nations.

Herfindahl-Hirschman Index of market concentration

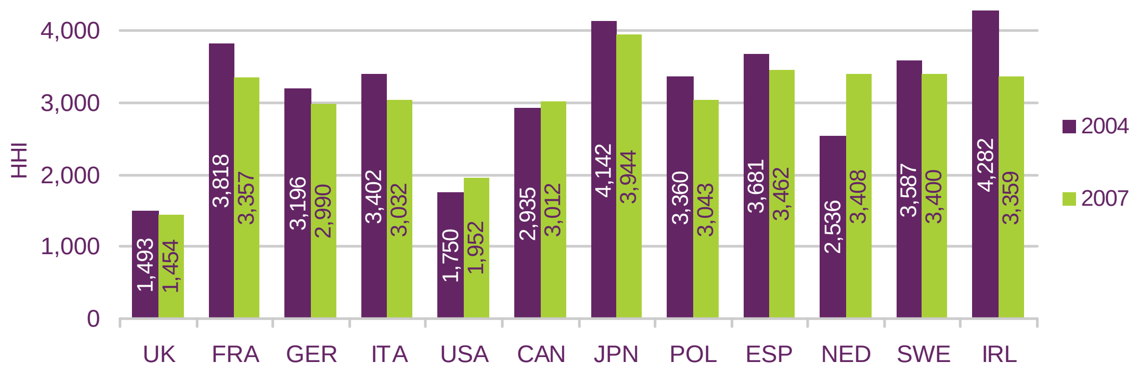
The Herfindahl-Hirschman Index (HHI) is a measure of the size of firms in relation to the size of the industry as a whole and is an indicator of the level of competition in a market. The HHI is defined as the sum of the squares of the market shares of each individual firm. As such, it can range from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

The HHI is a particularly useful metric for analysis of the mobile market, where the number of operators is constrained by the requirement to license spectrum.

Decreases in HHI generally indicate a loss of pricing power and an increase in competition, whereas increases imply the opposite. Our calculations of HHIs for the mobile market are based on the subscription shares of retail providers, and as such will reflect the effect of MVNOs and service providers on the retail market rather than the number of network providers

Among the comparator countries in this report, the UK had the least concentrated mobile market in terms of connections at the end of 2007, with an HHI of 1,454 (Figure 5.37). This is because there are five network operators in the UK (compared to three or four in all the other countries included in our analysis) as well as more than ten MVNOs and many more service providers.

Figure 5.37 Herfindahl-Herschman index of mobile subscription concentration: 2004 and 2007



Source: IDATE / industry data / Ofcom
Note: Figures for the UK have been updated from those published in the 2007 report, and are now comparable to those of the other comparator countries

The weighted average HHI value across all of the countries in this report was just over 2,700 at the end of 2007, while Japan had the most concentrated mobile market in terms of connections, with an HHI value of 3,944. This is as a result of NTT DoCoMo having a market share of around 50%. The HHI fell in all of the nations covered in the three years to 2007 except for the US, Canada and the Netherlands. In the Netherlands, a large increase in the degree of concentration in the market over the period was driven by a number of MVNOs being taken over by network operators.

Definition of 3G mobile technologies

3G technologies provide increased voice capacity and higher-speed mobile data access compared to 2G and support multimedia applications. The distinction between 2G, 2.5G and 3G is primarily based upon data speeds, resulting in some difference of opinion on the categorisation of various technologies.

We have defined the technologies below as 3G. Note that because of the slower data speeds we do not include CDMA2000 or EDGE as 3G.

W-CDMA (Wideband Code Division Multiple Access) is part of the UMTS family standardised by 3GPP. It is the most popular 3G technology in Europe and Japan (NTT DoCoMo's FOMA) while it is also becoming increasingly popular in the US. The maximum downstream speed is 384Kbit/s although actual speeds are around 200Kbit/s. It is a mass-market technology, with 75 million subscribers worldwide.

HSPA (High Speed Packet Access), often referred to as 3.5G, is an extension to the original W-CDMA standard providing significantly higher data rates. HSDPA (downlink) can provide theoretical maximum downlink speeds of 14.4Mbit/s. However, current implementations and devices support maximum speeds of 1.8Mbit/s, 3.6Mbit/s and 7.2Mbit/s while typical speeds range from 0.5 to 1.5Mbit/s. More than 220 networks worldwide support HSDPA today. HSUPA (uplink) supports maximum uplink speeds of 5.76Mbit/s (increased from 384Kbit/s available with HSDPA) and there are over 50 commercial HSUPA networks in operation. Initial deployments support up to 1.5Mbit/s. The investment required to develop HSPA networks consists mainly of relatively cheap software upgrades which will probably lead to a decrease in average cost per bit carried over mobile networks.

TD-CDMA (Time Division CDMA) is also part of the 3GPP UMTS family with limited adoption to date, mostly for fixed/nomadic wireless access. In the UK it is being used by UK

Broadband. It is suitable for use in unpaired spectrum bands and offers variable uplink/downlink data rate ratios (a feature particularly useful for asymmetric or broadcast services such as mobile TV). TDtv, the mobile TV standard developed by IPWireless, is based on this technology. Maximum downlink speeds of up to 12Mbit/s have been reported.

TD-SCDMA (Time Division Synchronised Code Division Multiple Access) is a 3G standard developed in China and is currently being commercially trialled in several cities in China.

CDMA2000 1xEV-DO (Evolution-Data Optimised) is an extension to CDMA2000 (similar to what HSDPA is for WCDMA) that can provide downlink speeds of up to 2.4Mbit/s (average 300-600Kbit/s). EV-DO Revision A will provide maximum downlink at 3.1Mbit/s and 1.8Mbit/s uplink (average 300-600Kbit/s both ways).

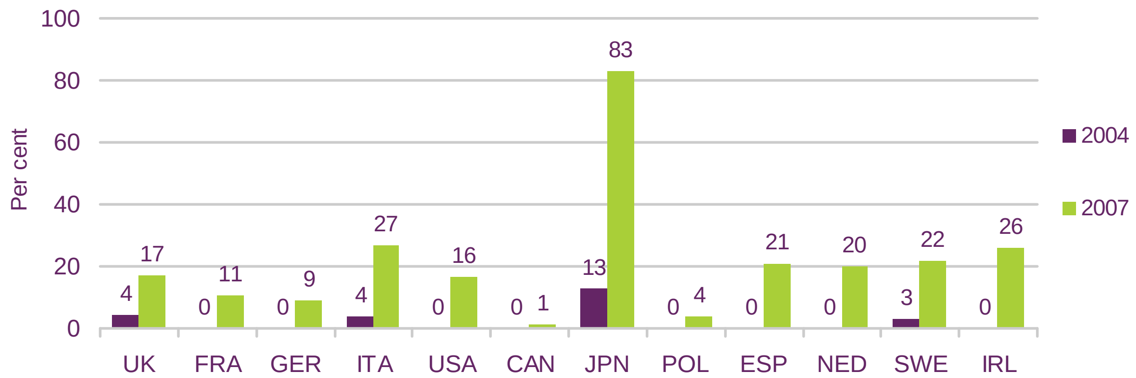
WiMAX (Worldwide Interoperability for Microwave Access) is a wireless MAN (metropolitan area network) technology, based on the 802.16 standard. Available for both fixed and mobile data applications, the technology was approved as a 3G standard by the International Telecommunications Union (ITU) in 2007.

5.2.4.12 Use of 3G mobiles highest in Japan

In all of our comparator countries the proportion of mobile users with a 3G subscription increased between 2004 and 2007 (Figure 5.38). Japan continued to have the highest proportion of mobile connections which were to 3G networks; at 83%, more than 50 percentage points higher than any other of the countries covered in this report. Italy had the second highest take-up of 3G among mobile connections, at 27%, while use of 3G was lowest in Canada at the end of 2007, where just 1% of mobile connections were using 3G networks.

Across all of the nations in the report, the average proportion of mobiles which were using 3G networks was just under a quarter (24%).

Figure 5.38 3G as a proportion of total mobile subscriptions: 2004 and 2007



Source: IDATE / industry data / Ofcom

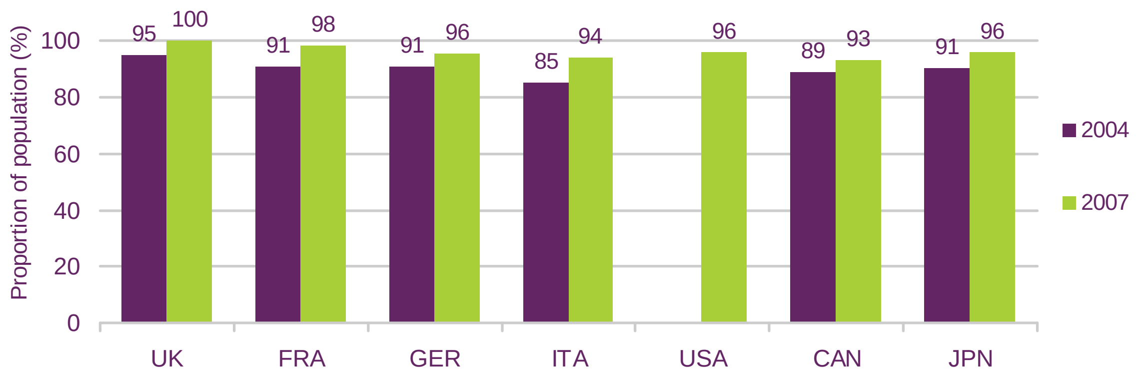
5.2.5 Broadband internet services

5.2.5.1 Availability of fixed broadband services high among most countries

Across all of the countries for which data were available, more than 90% of the population were able to receive broadband internet services by the end of 2007, when availability of broadband ranged from 93% in Canada to almost 100% in the UK (Figure 5.39). In all of the nations for which historic data were available the proportion of people living in areas where broadband was available grew in the three years to 2007 as the roll-out of services continued.

Although availability was high in all countries, a minority of people live in areas where they cannot get broadband. These are often remote areas, and in many cases it may be necessary to use wireless technologies such as satellite broadband or 3G over cellular networks in order for these consumers to receive service.

Figure 5.39 Availability of broadband services, 2004 and 2007



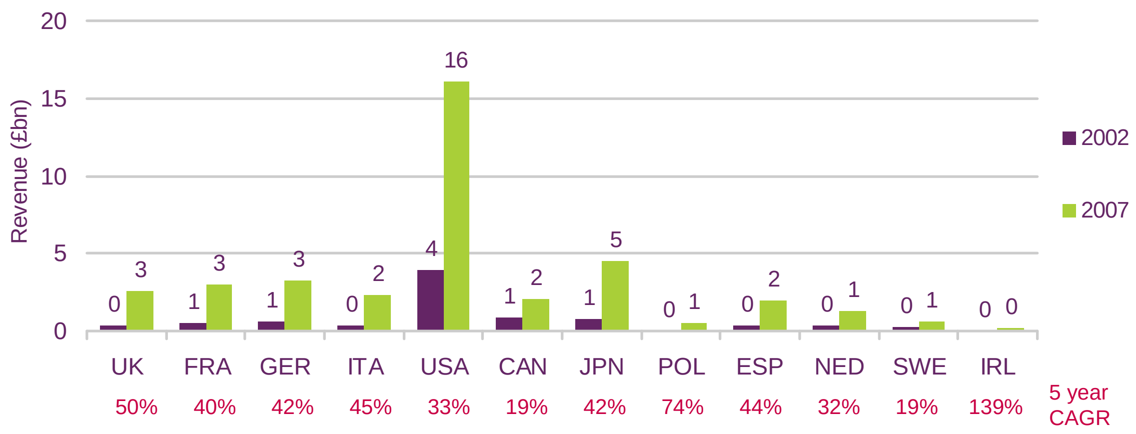
Source: IDATE / industry data / Ofcom

5.2.5.2 Annual broadband revenue growth averages 36% in the five years to 2007

Increasing take-up of broadband services resulted in strong broadband revenue growth in all of the countries covered in this report over the five years to 2007 (Figure 5.40). Average annual broadband revenue growth between 2002 and 2007 ranged from 19% in Canada and Sweden to 139% in the Republic of Ireland (where DSL services launched in 2002, so growth rates have been calculated from a small base).

Average broadband revenue growth was 36% per year across the countries covered in this report, slightly lower than the 37% growth in the number of connections identified in Section 5.2.5.5 below. This suggests that despite increases in service quality offered by the availability of higher speed connections, average prices have fallen.

Figure 5.40 Broadband revenues: 2002 and 2007

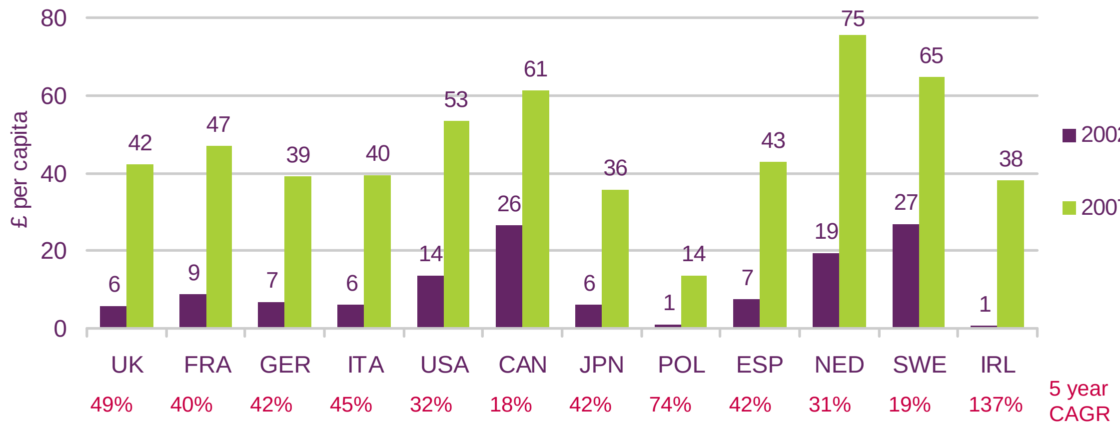


Source: IDATE / industry data / Ofcom

5.2.5.3 Average monthly broadband revenue per head was £3.79 in 2007

Per-capita broadband revenue increased across all of the countries in the five years to 2007 as a result of take-up growth (Figure 5.41). It was highest in the Netherlands in 2007 at £75, equivalent to £6.29 a month, and lowest in Poland at £14 (£1.15 a month) and across the countries in this report averaged £46 (£3.79 a month). Average per-capita revenue growth rates between 2002 and 2007 were similar to those for overall broadband revenues and averaged 35% across the comparator nations in this report.

Figure 5.41 Broadband revenue per head: 2002 and 2007

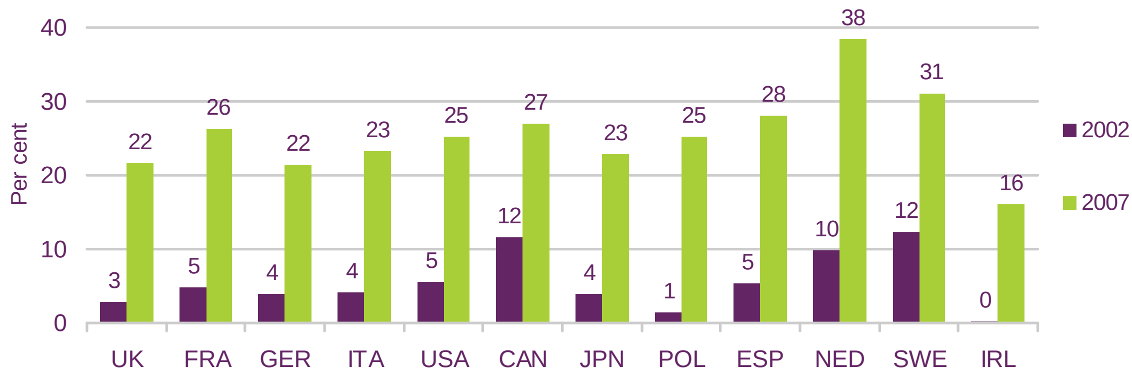


Source: IDATE / industry data / Ofcom

5.2.5.4 Broadband's contribution to total fixed revenues is highest in the Netherlands

In most of our comparator countries broadband services contributed between 20% and 30% of total broadband and fixed-line revenues in 2007 (Figure 5.42), the average being 25%. The exceptions were the Netherlands and Sweden (both higher, at 38% and 31% respectively) and the Republic of Ireland, which was much lower, at 16%, as a result of its relatively low broadband take-up and high fixed-voice revenue per line.

Figure 5.42 Broadband as a proportion of total fixed revenues: 2002 and 2007



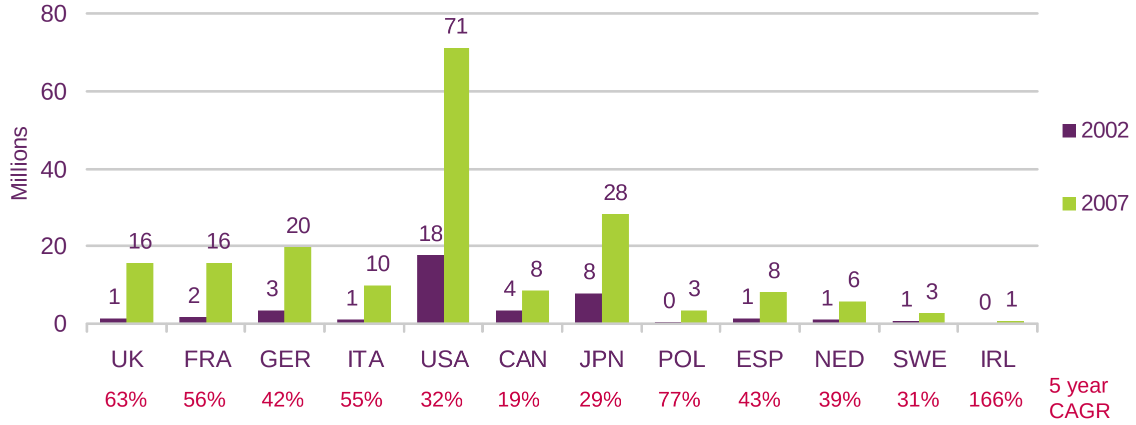
Source: IDATE / industry data / Ofcom

5.2.5.5 Broadband connection growth averaged 37% a year between 2002 and 2007

There was strong growth in the number of broadband connections in all the countries covered in this report in the three years to 2007 (Figure 5.43). The highest average growth rate was in the Republic of Ireland, where the number of connections increased by an average of 166% a year, albeit from a low starting point. Canada had the lowest rate of growth over the period, with connections increasing by an average of 19% a year. Among the comparator nations in this report, annual growth rates averaged 37%.

The US had the most broadband lines among our comparator countries at the end of 2007, although according to Point Topic, China overtook the US in Q3 2008 in terms of its total number of broadband connections (see Section 7.1 for more detail on the telecoms market in China).

Figure 5.43 Broadband connections: 2004 and 2007



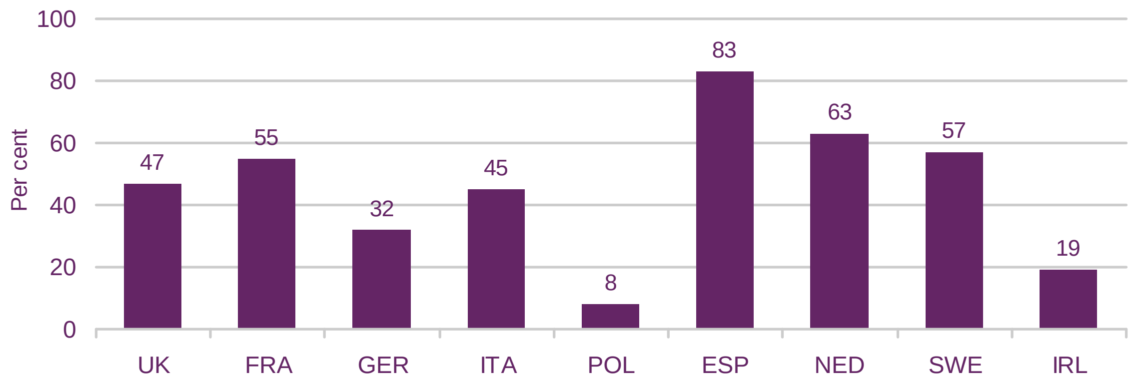
Source: IDATE / industry data / Ofcom

5.2.5.6 Spain has the highest proportion of broadband connections faster than 2Mbit/s

The proportion of broadband connections with a headline speed of above 2Mbit/s showed wide variation among our European comparator countries (data were not available for the US, Canada and Japan), ranging from just 8% in Poland to 83% in Spain (Figure 5.44). The high figure in Spain is partly due to the fact that broadband headline speeds in Spain are often far-removed from those actually received by consumers, an issue which Comisión del Mercado de las Telecomunicaciones (CMT), the telecoms regulator in Spain, is particularly active on. The weighted average across the EU countries in this report showed that just under half (48%) of connections had a headline speeds above 2Mbit/s, with the figure for the UK (47%) being slightly below this average.

It should be noted that these figures are for headline speeds only, and will be higher than the proportion of consumers actually receiving downstream broadband speeds above 2Mbit/s.

Figure 5.44 Proportion of broadband connections with a headline speed above 2Mbit/s: end 2007



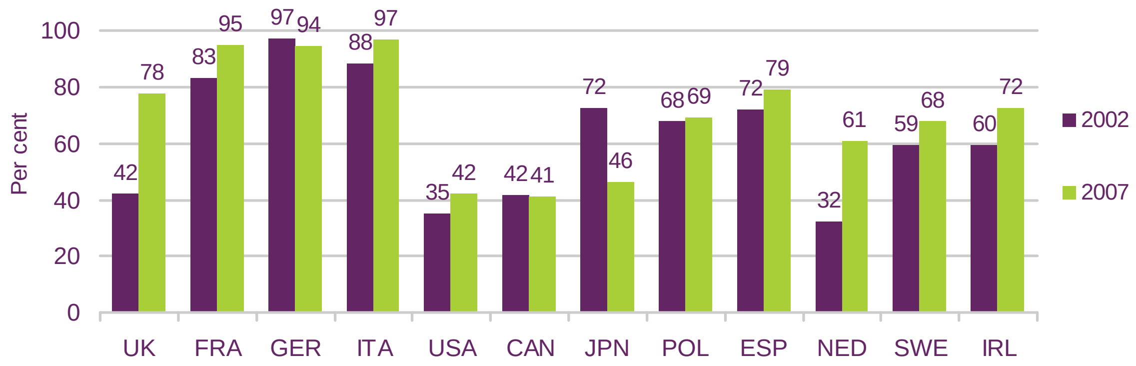
Source: IDATE

5.2.5.7 Most broadband connections are provided using DSL technology

DSL is the most prevalent broadband technology in most of the countries in this report, and by the end of 2007 the US and Canada (where long local loop lengths result in restricted ADSL performance for many customers and where there are extensive cable networks) and Japan (where many broadband connections are provided over fibre) were the only nations where the majority of broadband connections were not DSL-based (Figure 5.45). Technology news and opinion website The Register [26] reported in October 2008 that cable operator Comcast was on the verge of overtaking AT&T to become America's largest broadband provider in terms of connections.

The percentage of broadband connections which were provided using DSL varied from 41% in Canada and 42% in the US to 97% in Italy at the end of 2007. The average across all of the nations in this report was 61% – 8 percentage points higher than in 2002 as a result of DSL availability being higher than cable broadband and fibre-based service availability in most countries.

Figure 5.45 DSL as a proportion of all broadband connections: 2002 and 2007



Source: IDATE / industry data / Ofcom

5.2.5.8 Total market share of the top three broadband providers averaged 65% in 2007

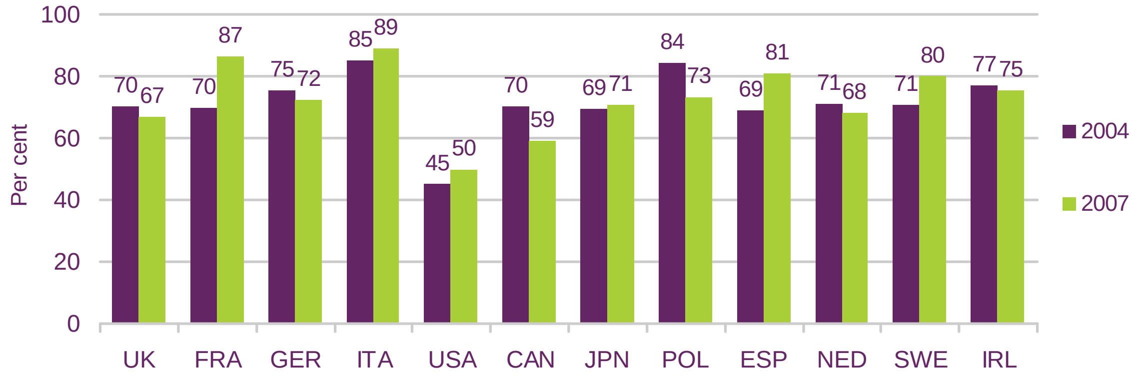
There is a mixed picture among the countries in this report in terms of levels of market concentration, as measured by the market share of the three largest broadband providers across all platforms (Figure 5.46). In half of the nations the share of the top three broadband providers rose in the five years to 2007, while in the other six countries it fell.

Overall, the average market share of the three largest broadband operators increased by 5 percentage points to 65% over the period. This is partly due to mergers and acquisitions in broadband markets, as operators look to gain the critical mass necessary to offset the capital expenditure required for investment in core network infrastructure, local loop unbundling and (in some countries) new access networks.

It should be mentioned that the figures for the US are slightly misleading as operators offer services on a regional basis. Therefore, regional sub-national markets may be highly concentrated, and many consumers may face a duopoly of an incumbent local exchange carrier (ILEC) and the local cable franchise.

[26] http://www.theregister.co.uk/2008/10/29/comcast_q3_earnings/

Figure 5.46 Retail subscription share of the top three broadband providers: 2004 and 2007



Source: IDATE / industry data / Ofcom

5.3 The telecoms user

5.3.1 Introduction

This section looks at trends in consumer use and availability of telecoms services in the 12 telecommunications markets, starting with an overview of the take-up of each service. This is then followed by an analysis of spend, use and availability of each individual service, starting with fixed-line, then mobile and finally broadband services. Some of the key points highlighted in this section include:

- Fixed-line voice penetration declined in most countries in 2007, irrespective of the level of take-up; the exceptions were Spain and the UK where take-up increased slightly.

- More mobile calls than fixed were made in Italy, Japan, Poland and the Netherlands during 2007, while just under half of all voice calls were made on a mobile in France, Spain and Ireland (40% in the UK).

- Mobile connections exceeded population in Poland for the first time in 2007, reaching 107%, joining seven other countries including the UK (121%) and Italy (154%).

- Average revenue per fixed line declined by 13% from 2002 to 2007 across the 12 countries in this report. Revenue fell fastest in Ireland (down 23%) and by 17% in the UK.

- High use of SMS in the UK brought average monthly revenue from SMS to £3.18 in 2007. This compares to £0.64 in Sweden, where SMS use per mobile connection was 70% lower.

- Average spend on non-SMS data services is highest in Japan (£8.48 per mobile connection per month), compared to just £0.09 per month in Poland. The highest spend across the European countries is in the UK, at £1.11.

5.3.2 Take-up of telecoms services

5.3.2.1 Take up of fixed-line voice continues to fall in most countries

Germany and Sweden had the highest fixed-line take-up of the 12 countries in this analysis, at over 60 lines per 100 population (Figure 5.47). Fixed-line use has been the main form of telephony for both residential and business users in these countries over a long period of time, due to its wide availability and affordable pricing. In contrast, less extensive availability (with a fixed-line voice network available to just 80% of the population) and relatively high prices in relation to low GDP have constrained take-up in Poland, with less than one in three of the population connected to a fixed line.

In most countries, irrespective of the level of take-up, fixed-line voice connections are in decline while mobile use increases. In Poland, despite having the lowest fixed-line take-up of any of the countries covered, connections fell by 7.5% in 2007 while in the US, a market with a relatively high fixed-line take-up, there was a 4.5% fall.

Increasing use of retail Voice over Internet Protocol (VoIP) services had a negative impact on fixed connections in some countries; in the Netherlands a decline of 1.4 million connections during 2007 was largely due to consumers switching to broadband services over naked DSL and cable.

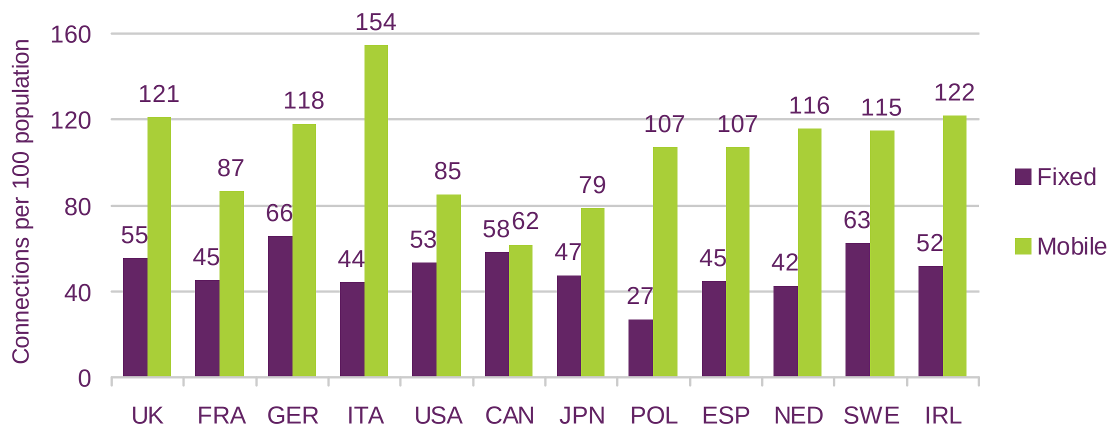
Spain and the UK are the only countries where fixed-line penetration increased in 2007, partially driven by rising demand for connections due to growth in the number of households, as the average number of people per household declines. Growth in the number of business lines has also contributed to a rise in the number of fixed lines in the UK.

5.3.2.2 More mobile connections than people in many countries

Mobile connections exceeded population in Poland for the first time in 2007 while Italy had the highest take-up of mobile services, at 157 connections per 100 population (Figure 5.47). High levels of mobile take-up are partly a result of multiple device ownership, but are also closely connected to the take-up and availability of pre-pay SIM cards. In six of the eight countries where mobile connections exceed the population, including Poland, Italy and the UK, pre-pay accounts for the majority of mobile connections. In Italy consumers often buy two or three pre-pay SIM cards from different operators and swap them in and out of their handset (SIM swapping) to take advantage of the different promotions and tariffs available.

Mobile take-up in Canada exceeded fixed-line for the first time in 2007, although, take-up was significantly lower than in the other countries in this analysis. In countries with the lowest number of mobile connections per 100 population (Canada, US, France and Japan) the majority of subscriptions are on post-pay and therefore multiple subscription ownership is less prevalent than in countries where pre-pay accounts for a larger proportion of subscriptions. In addition, there are a large number of mobile connections using CDMA handsets in Canada, Japan and the US, and this prevents SIM swapping as there is no SIM card present in the handset; the identity of the user is tied to the handset rather than to a SIM card.

Figure 5.47 Take- up of fixed and mobile services, 2007

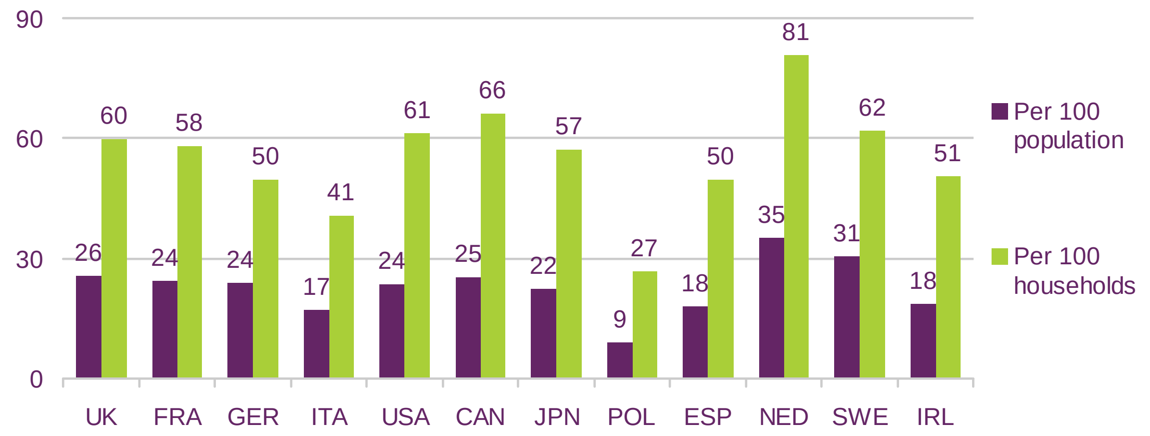


Source: IDATE / industry data / Ofcom

5.3.2.3 Wide variation in broadband take-up across European markets

Average broadband take-up per 100 households across the 12 countries covered in this analysis was 56 in 2007 (Figure 5.48), compared to 12 in 2002. There were significant differences between countries at the end of 2007: the Netherlands had the highest take-up, at 81 connections per 100 households, due to a combination of high GDP and a highly urbanised population, enabling broadband coverage to be deployed at relatively low cost (95% of households are passed by cable). By contrast, lack of fixed-line take-up and competition from mobile broadband have kept penetration of fixed broadband in Poland down to 27 connections per 100 household.

Figure 5.48 Take-up of broadband services, 2007



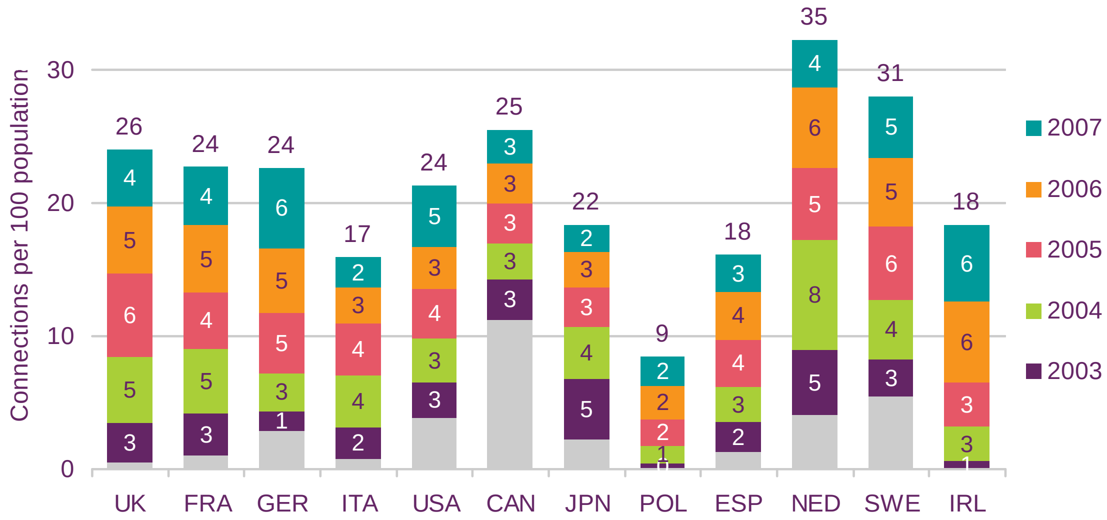
Source: IDATE / industry data / Ofcom
Note: For most countries separate data for residential and business broadband connections are not available and household take-up figures will include some business connections (although the corporate access market is excluded).

5.3.2.4 Broadband growth begins to slow in some less-penetrated markets

Annual growth in the number of fixed-line broadband connections per 100 population slowed during 2007 in half of our comparator countries (Figure 5.49). While slowing growth in the Netherlands can be explained by a market approaching saturation, growth also slowed in Spain, Italy and Poland, which have the lowest take-up of broadband, indicating that demand from potential users may be smaller than in other countries which have higher take-up. The reasons for low levels of demand vary between countries; above average household numbers and therefore less demand per population is partly responsible for lower take-up per population in Poland and Spain, while low GDP per capita in Poland and low PC take-up in Italy are also contributory factors. In addition, the high numbers of mobile-only households in Italy and Poland (see Section 5.1.3.4) indicate that many consumers are using a mobile broadband connection in place of fixed broadband.

In Ireland there was significant growth in take-up of broadband in 2007 (a 47% increase in connections), largely due to a national government initiative to encourage investment in extending broadband coverage and to greater competition from alternative operators, leading to a decline in prices.

Figure 5.49 Growth in take-up of broadband services, 2002 to 2007



Source: IDATE / industry data / Ofcom

5.3.3 Fixed-line voice services

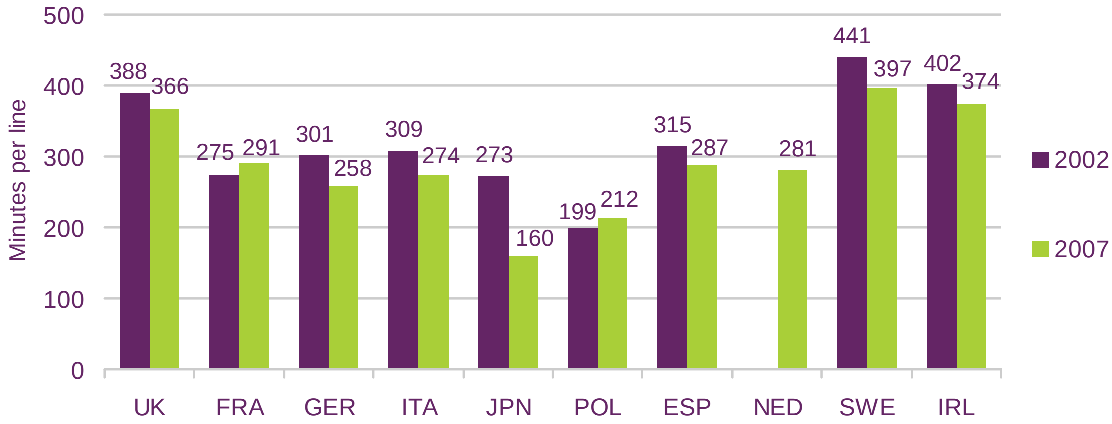
5.3.3.1 Average use per fixed line falls in all countries except France and Poland

Outbound call volumes per fixed line have fallen since 2002 across most countries, as users switch to making more calls on mobiles and, in some countries, via VoIP. Only France and Poland showed an increase in calls per line, as fixed-line connections fell at a faster rate than call volumes (Figure 5.50).

Sweden had the highest number of monthly outbound minutes per fixed line in 2007. The low cost of fixed-line calls and the high fixed-line take-up and GDP per capita mean that consumers in Sweden are less inclined to switch more of their voice calls to mobile, as the cost difference between fixed and mobile is less likely to play a part in influencing how they make calls.

Call volumes fell fastest in Japan between 2002 and 2007, down 41% to 160 minutes per month. The growth of VoIP use (which is covered in more depth in the convergence section within this report) is the main reason for this decline. Along with fixed to mobile substitution, VoIP is increasingly replacing traditional fixed-line use in some countries. According to the German regulator, the volume of VoIP traffic in Germany grew to 16 billion minutes, or approximately 10% of overall traffic, at the end of 2007 (German Federal Agency for Electricity, Gas and Telecommunications, Post and Railway *Annual Report 2007*).

Figure 5.50 Monthly outbound minutes per fixed line, 2002 and 2007

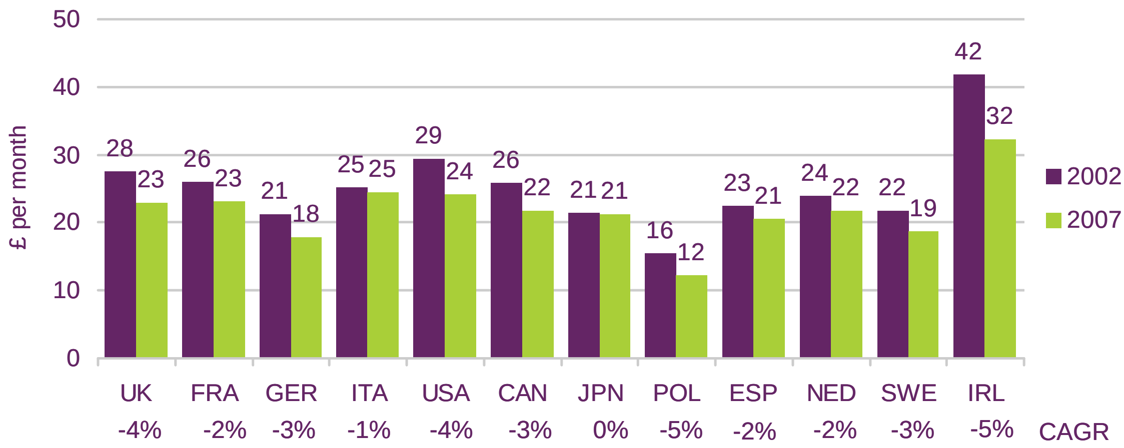


Source: IDATE / industry data / Ofcom

5.3.3.2 Average revenue per fixed line falls in all countries

Average revenue per fixed line declined on average by 13% from 2002 to 2007 across the 12 countries in this report. The trend towards 'flat rate' pricing, in which certain types of calls, or numbers of minutes, are included within the line rental prices, has resulted in average revenue per line falling faster than call volumes in half of the countries in this analysis. Revenue fell fastest in Ireland (down by 23%) as increased competition pushed down prices (Figure 5.51), although at £32 per month, average revenue per line remains the highest of any of the 12 countries.

Figure 5.51 Average monthly voice revenue per fixed line, 2002 and 2007



Source: IDATE / industry data / Ofcom

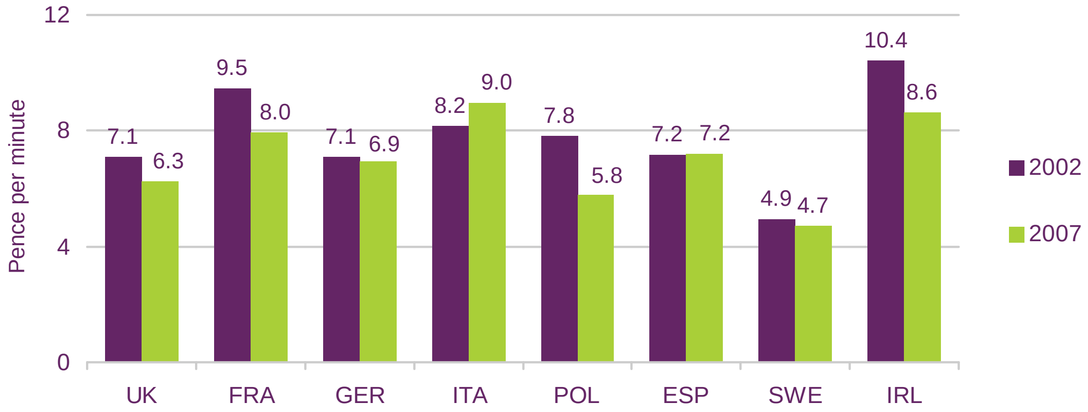
5.3.3.3 Revenue per minute falls fastest in Poland

An analysis of average revenue per fixed line call minute between 2002 and 2007 reveals that the biggest decline was in Poland, to 5.8 pence per minute, driven largely by regulatory cuts in interconnection charges paid to the incumbent and by a reduction in wholesale line rental, which has stimulated price competition within the market (Figure 5.52). Italy and Spain are the only markets where revenue rose over the period; although, after an 8% rise between 2002 and 2005, revenue per minute in Spain was back to 2002 levels by 2007.

The high take-up and use of fixed lines, combined with long-standing competition between the incumbent and alternative network operators, are the main reasons why Sweden had the lowest revenue per minute of any of the European markets (at 4.7p) in 2007. But in Ireland, competition within the fixed-line market has only recently been subject to competition (the incumbent holds a 70% share of total fixed-line revenue). Here, revenue per minute was highest among the European countries in this analysis in both 2002 and 2007.

The figures are calculated using fixed-line voice revenue and outbound call volume data, and are therefore a crude proxy for call costs in each country. The calculations do not take into account the average calling patterns between each country (for example, a larger proportion of higher-cost international calls) and with fixed-line services increasingly bundled with other services, revenue from other services such as broadband may be excluded or included within the revenue figures.

Figure 5.52 Average fixed-line revenue, per minute: 2002 and 2007



Source: IDATE / industry data / Ofcom

5.3.3.4 Voice over Internet Protocol (VoIP) use highest in France and the Netherlands

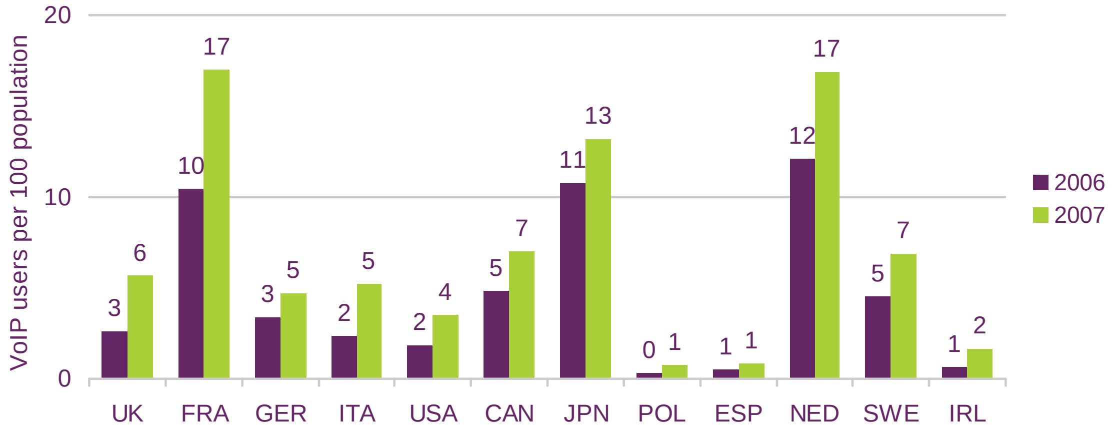
VoIP enables voice calls to be made over the internet, usually at a price that is considerably lower than for a call made through a public switched telephony network (PSTN).

Although information is available on the number of users making VoIP calls that terminate on a PSTN line or mobile network, it is not possible to measure the number of users who make PC-to-PC calls (Skype, Google or MSN VoIP services) as it is difficult to differentiate VoIP traffic from other data traffic over the internet.

Using this measure, France and the Netherlands had the highest proportions of VoIP users per 100 population at the end of 2007 (Figure 5.53). In France, this was due to the take-up of multi-play services such as Orange's 'Livebox', within which the consumer can use a single box to access broadband, WiFi services, and make VoIP calls to other fixed lines. In the Netherlands, VoIP was initially stimulated by the cable operators (38% of broadband subscribers). In 2006 incumbent operator KPN launched the *InternetPlusBellen* VoIP service but in 2007, unable to cope with high levels of demand for the service, it placed limits on the number of users.

The comparatively low use of VoIP in other European countries (ranging from just 1% take-up in Spain to 7% in Sweden) suggests that consumers are either unaware that such services exist, or that that there are fewer incentives for using VoIP. This may be as a result of the absence of naked DSL, which means users need a fixed-line subscription to access VoIP services, in addition to the low-price or 'flat-rate' calls available from PSTN providers. In the UK, for example, all tariffs from incumbent BT include unlimited off-peak calls to UK fixed lines.

Figure 5.53 Use of VoIP among internet users: 2007



Source: IDATE / industry data / Ofcom
PC-to-PC calls not included

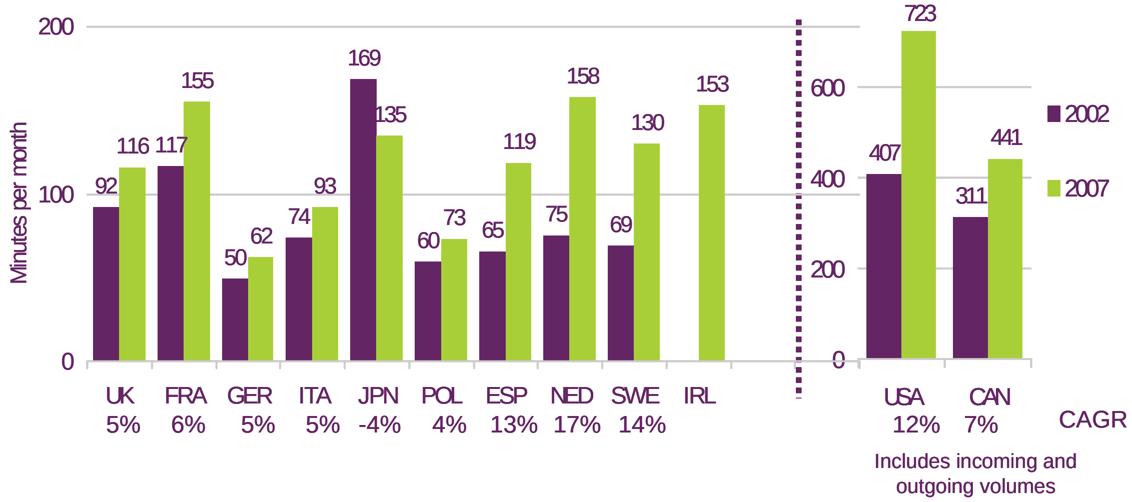
5.3.4 Mobile services

5.3.4.1 Large growth in minutes per connection in all countries except Japan

There are significant differences in the number of outgoing minutes per mobile subscription across the 12 countries in this analysis. The highest level per subscription in 2007 was in the Netherlands, doubling to 158 minutes over the five-year period as declining fixed-line connections, combined with an increase in the number of mobile-only households, drove growth in mobile use. In contrast, mobile use in Japan fell by 20% as consumers used alternative services to voice on their mobile, such as email and instant messaging. German subscribers use the least amount of minutes, perhaps because of the high cost of mobile services in relation to fixed-line costs.

The US and Canada are considered separately in this analysis as only combined figures on total outbound and inbound call minutes are available (this is due to their interconnect regimes, under which, unlike in other countries in this analysis, users are charged both for incoming and outgoing calls). Combined volumes per subscriber for both these countries increased substantially between 2002 and 2007, almost doubling in the US as a result of operators offering increasing ‘buckets’ of inclusive call minutes within basic line rental charges,.

Figure 5.54 Monthly outbound minutes per mobile subscription



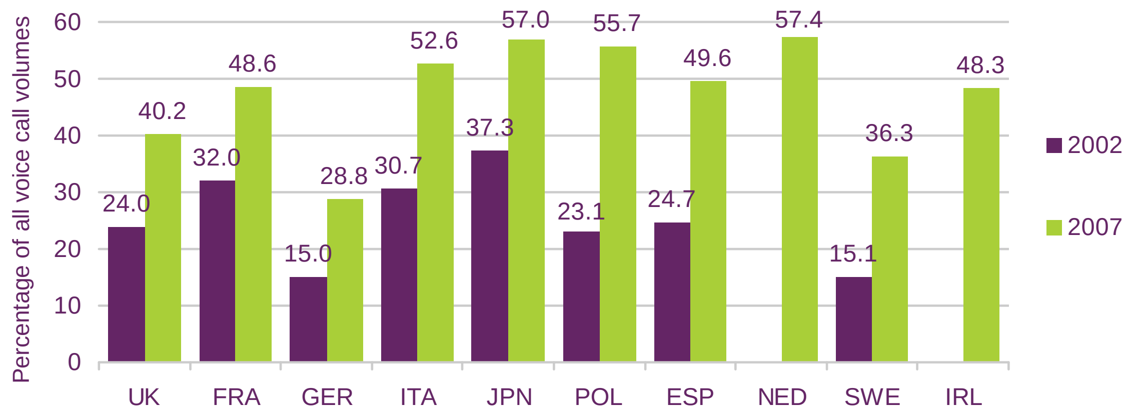
Source: IDATE / industry data / Ofcom

5.3.4.2 Mobile becoming main method of telephony in more countries

More mobile calls than fixed were made in Italy, Japan, Poland and the Netherlands during 2007 (Figure 5.55), while just under half of all voice calls were made on a mobile in France, Spain and Ireland. Increasing fixed-to-mobile substitution has eroded traditional fixed-line use in all the countries covered in this analysis, and in Italy and Poland, the relatively under-developed fixed line voice markets have been quickly overtaken by mobile. In Japan, which has mature fixed and mobile markets, the increasing use of IP phones connected to broadband-only connections has had the effect that, even though mobile call volumes have fallen, fixed-line call volumes have fallen at a much faster rate, and as a result, mobile's share of voice volumes has increased.

In Germany, France and Sweden, the proportion of calls made over mobile is lower, mainly due to higher fixed-line volumes than in most other countries in this analysis, rather than to lower than average mobile volumes.

Figure 5.55 Mobile as a proportion of all voice call volumes



Source: IDATE / industry data / Ofcom

5.3.4.3 Around 90% of Italian mobiles are pre-pay, compared to just 2% in Japan

There are large variations in the split between pre-pay and post-pay among the key comparator nations in this report (Figure 5.56). Around 90% of mobile connections in Italy were pre-pay at the end of 2007, while in contrast 98% of connections in Japan were post-pay, mainly due to strict laws on the identification required when purchasing a pre-pay phone. The proportion of post-pay subscribers grew in France and in the UK between 2002 and 2007, as operators focused on reducing churn and increasing average revenue per user, and encouraged pre-pay users to migrate to contract plans by broadening their product range to include lower-value monthly contracts and SIM-only tariffs such as T-Mobile UK's Solo 30 day SIM-only plans. In Germany pre-pay connections have increased due to the popularity of discounted prepaid brands such as Aldi and Tchibo.

The proportion of pre-pay subscribers remained relatively unchanged in the US from 2002 to 2007, growing in line with overall subscriptions despite the presence of high-profile pre-pay brands such as Virgin Mobile (which had over 5 million customers by the end of 2007).

Figure 5.56 Mobile subscriptions, by type: 2002 and 2007

Source: IDATE / industry data / Ofcom

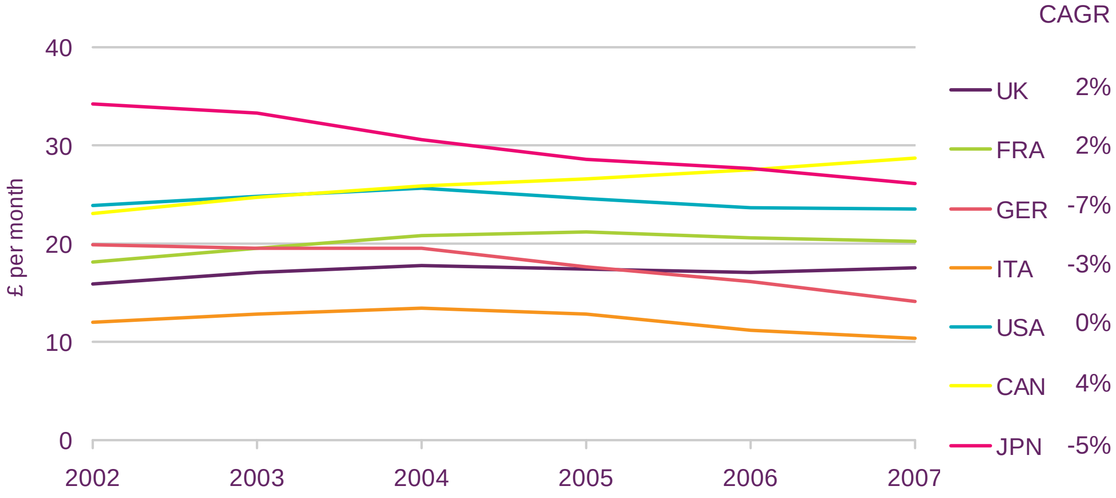
5.3.4.4 Average revenue per subscriber grows in Canada and the UK

Average revenue per mobile subscription between 2006 and 2007 fell in five of the main comparator nations covered in this report, by an average of 2%. Canada and the UK were the only countries where average revenue increased, driven by much higher use of both voice and data services.

In some European markets increased multiple SIM ownership has diluted the average revenue generated per subscription (lack of data makes it impossible to compare average revenue per user rather than per subscriber). Italy, with the highest number of mobile connections per head (1.54) has the lowest revenue per subscription, because users spread their spend over several subscriptions. In contrast, countries such as Canada, Japan and the US, dominated by post-pay contracts, have relatively low levels of multiple subscription ownership and therefore higher revenue per subscription.

The biggest fall in revenue has been in Japan, declining by 24% to £26.10 in 2007 (Figure 5.57). Increased competition on monthly price plans, stimulated by the introduction of number portability in 2006 and focus on discount call plans by Softbank Mobile (formally Vodafone KK), have led to voice revenue declining at a faster rate than rising revenues from data services.

Figure 5.57 Monthly mobile average revenue per subscription, 2002 to 2007



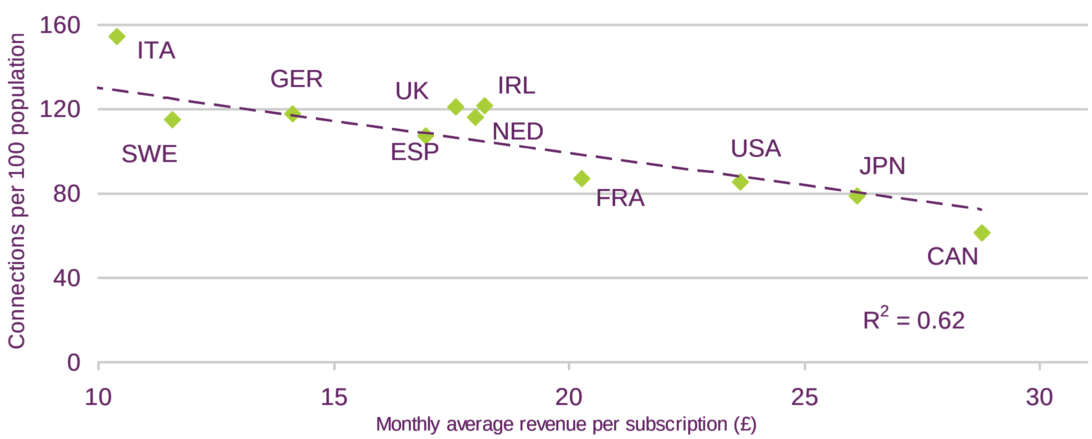
Source: IDATE / industry data / Ofcom

5.3.4.5 Revenue per subscription highest in post-pay markets

An analysis of the relationship between mobile take-up and average revenue per mobile subscription in 2007 shows a strong correlation. The absence of a significant pre-pay subscription base in France, the US, Japan and Canada has maintained higher revenue, as one subscription usually represents one user.

In contrast, the trend of owning more than one pre-pay subscription in Italy has diluted revenue and pushed take-up to new levels. Sweden is the only country with a high level of take-up based on a large proportion (55%) of post-pay users and low ARPU (Figure 5.58). This is due both to low call charges and to the fact that Swedish operators do not need to recoup the costs of subsidised handsets; consumers buy their handset separately from their mobile contract. This factor also needs to be taken into account when analysing ARPU in markets where pre-pay accounts for the majority of subscriptions; revenue per user in countries characterised by handset subsidies is over-stated, as the cost of the handset is included within the service revenue.

Figure 5.58 Mobile take-up and average monthly revenue per subscription: 2007



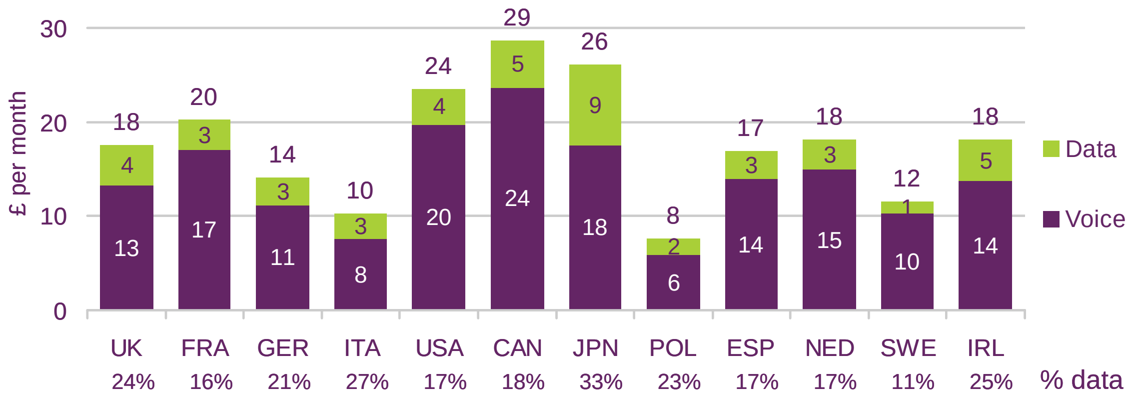
Source: IDATE / industry data / Ofcom

5.3.4.6 Spend on mobile data services significantly higher in Japan

There is a wide variation in the average voice and data revenue per subscription across the 12 countries (Figure 5.59), reflecting the extent to which each service is used. Nearly one-third of total revenue per subscription in Japan is spent on data services (£8.48 per month) compared to 11% in Sweden (£1.24).

In addition to text messaging, revenue is derived from data services such as picture messaging, email and internet browsing and other multimedia applications such as video streaming and mobile TV.

Figure 5.59 Monthly mobile voice and data revenue, per subscription: 2007



Source: IDATE / industry data / Ofcom

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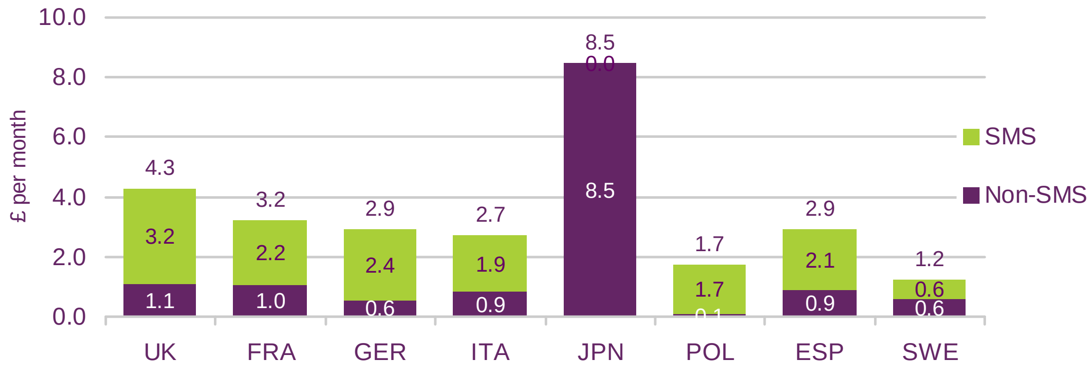
5.3.4.7 SMS spend highest in the UK

SMS accounts for the highest proportion of revenue data services in all the European countries in this analysis. High use of SMS in the UK resulted in average monthly revenue from SMS of £3.18 in 2007. This compares to £0.64 in Sweden, where SMS use per mobile connection was 70% lower (Figure 5.60).

In Japan, the high take-up of mobile internet services over 2G, such as i-mode, combined with the early roll-out of new technologies (3G was launched in Japan in 2001, but in 2003 onwards in other markets covered in this report) and the related availability of advanced services and handsets, has resulted in many Japanese consumers using their mobile phone as their primary way of accessing the internet. So in Japan non-SMS data revenues are high (£8.48 per mobile connection per month), while SMS has never taken off, as mobile users communicate via internet applications such as email and instant messaging.

In contrast, spend on non-SMS data services in European countries is as low as £0.09 per month in Poland; the highest is the UK at £1.11.

Figure 5.60 Monthly mobile SMS and non-SMS ARPU: 2007



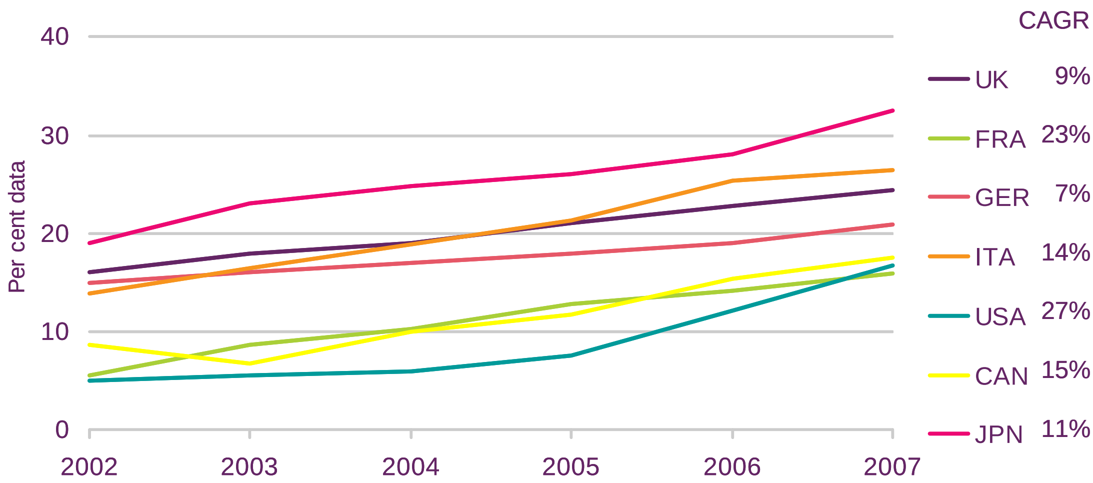
Source: IDATE / industry data / Ofcom

5.3.4.8 Mobile data revenue increases as proportion of total revenue

In 2007, mobile data revenue accounted for 21% of total mobile revenue across the seven key comparator countries, compared to 12% in 2002. The highest average growth rate over a five-year period was in the US, reflecting strong growth in mobile take-up and rapid adoption of SMS and advanced data services.

Nearly one-third of mobile revenue in Japan comes from data services, compared to 16% in France (Figure 5.61), where rollout of 3G coverage and services has been slower in comparison to Japan and the other large European markets.

Figure 5.61 Mobile data revenue, as a proportion of total mobile revenue: 2002 to 2007



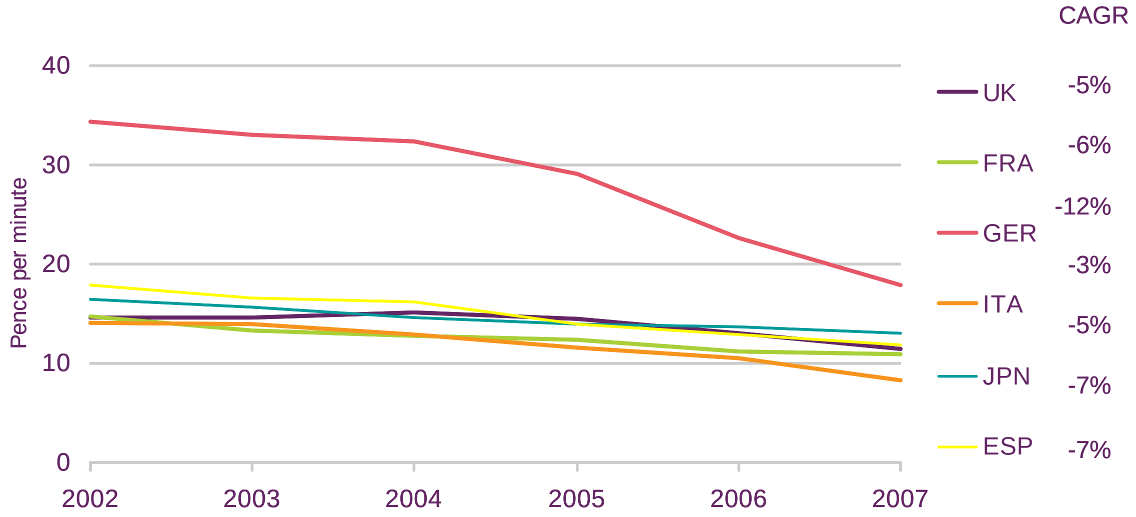
Source: IDATE / industry data / Ofcom

5.3.4.9 Revenue per outgoing call minute falls fastest in Germany

Average mobile revenue per outgoing voice minute, calculated from outgoing mobile call revenue and volume data, fell by an average 32% across our comparator countries between 2002 and 2007 (Figure 5.62). The largest decline was in Germany, falling by nearly half to 18p per minute due to the popularity of discount value brands and homezone tariffs; the latter enables mobile users to make calls at a lower price or at no cost if they are within the vicinity of their home and is intended to encourage fixed to mobile substitution within the home.

The lowest revenue per minute was in Italy at 8p in 2007, falling from 14p in 2002. As there are no handset subsidies in Italy, operators do not have to factor the repayment of handsets into their prices, resulting in lower prices per minute, and the arrival of several new low-cost MVNOs in 2007 has led to further price reductions.

Figure 5.62 Average mobile revenue per outgoing voice call minute, 2002 to 2007



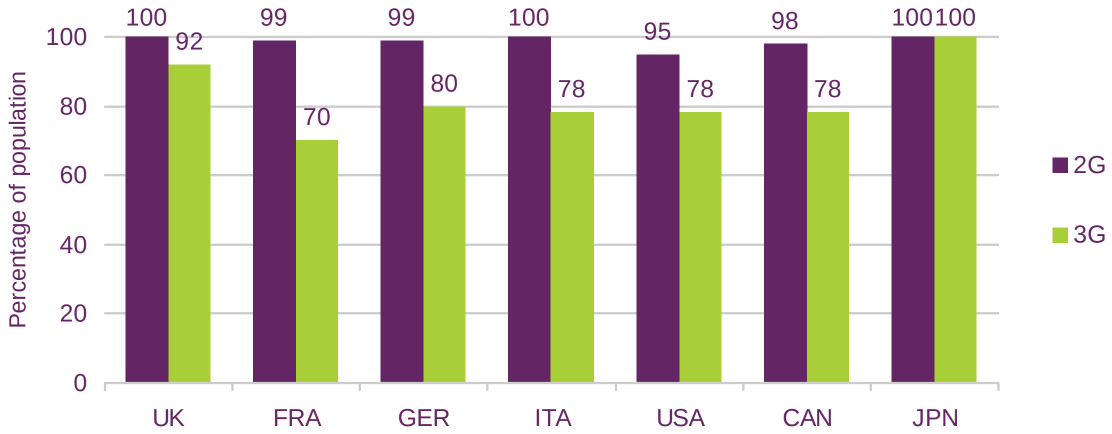
Source: IDATE / industry data / Ofcom

5.3.4.10 3G coverage population coverage highest in Japan

Japan deployed the first 3G service in 2001, several years before any other market, and this early launch, combined with its relatively dense population, meant that it was the only country in our analysis to have reached 100% penetration by 2007. At 92% (Figure 5.63), the UK had the highest level of 3G population coverage of any of the larger European markets, reflecting the regulatory requirements of the UK's 3G licences, a high level of demand from consumers, and competition between mobile operators to roll-out advanced mobile services.

The lowest level of 3G coverage was in France, reflecting the low population density and large land mass, combined with lower regulatory requirements for 3G coverage (70% at the end of 2007 compared to 80% in the UK). The high level of 2G coverage in comparison to 3G in all the countries in this analysis (with the exception of Japan) is consistent with 2G services being present in these markets for over ten years, together with the lower costs of 2G network deployment, which typically requires fewer base stations to serve a specific geographical area.

Figure 5.63 Mobile availability, by technology: 2007



Source: IDATE / industry data / Ofcom

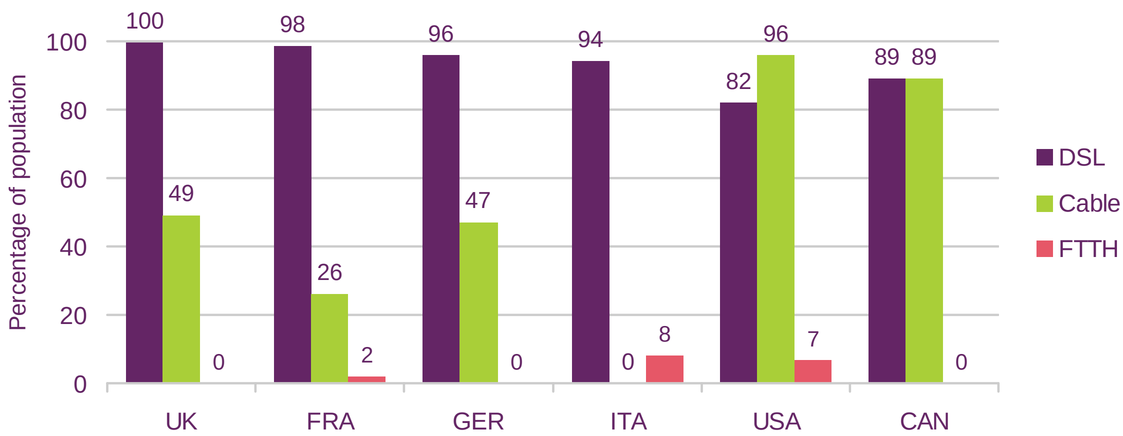
5.3.5 Internet and broadband

5.3.5.1 High availability of DSL broadband in major European countries

DSL broadband (delivered over ordinary copper-based phone lines) is available to over 90% the population in all of the larger European countries covered by this report, with availability highest in the UK, where nearly 100% of the population have access to DSL broadband.

Canada and the US are the only countries where cable availability matches or exceeds DSL coverage, due to the comparatively early roll-out of the platform from the 1940s onwards. But in Italy DSL has been the only broadband option, as no public cable network is in place, although fibre availability is growing. In Germany the incumbent operator Deutsche Telekom has opted for a fibre-to-the-curb (FTTC) network upgrade with VDSL in the local loop. Availability of next-generation access fibre networks was low in the UK in 2007, but Virgin Media is in the process of upgrading much of its cable network to offer speeds of up to 50Mbit/s to 9 million premises in 2009, while BT has announced plans to roll out fibre-based broadband to up to 10 million homes by 2012, predominantly based on fibre-to-the-cabinet (FTTC). More detail on the roll-out of next-generation access networks is provided in Section 5.1.5.

Figure 5.64 Broadband availability by platform: 2007



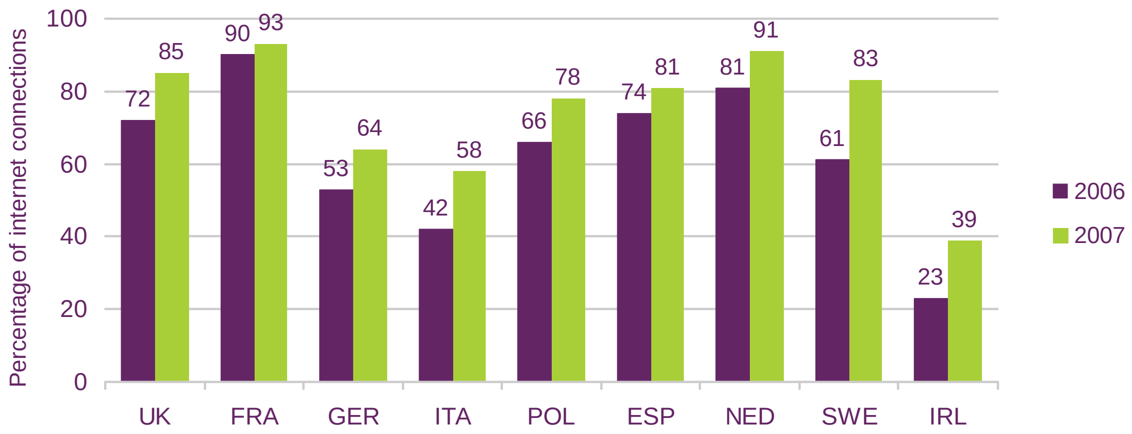
Source: IDATE / industry data / Ofcom

5.3.5.2 Speed of migration from broadband to narrowband varies across Europe

The European Commission's annual E-Communications Household Survey, undertaken towards the end of 2006 and 2007, shows that levels of broadband use vary widely among internet households in the EU countries covered in this report. Over 90% of internet users in France and the Netherlands used broadband in 2007, compared to 58% in Italy and less than 25% in Ireland.

Interestingly, the proportion of internet connections using broadband in Poland was higher than in both Italy and Germany, largely due to a significant and established base of broadband cable connections. It should be noted that due to the small sample sizes used in most of the countries covered in the research for the report, the figures should be treated as indicative only.

Figure 5.65 Proportion of home internet connections that are broadband: Q4 2007



Source: European Commission E-Communications Household Survey published April 2007 and June 2008, fieldwork conducted Q4 2006 and Q4 2007 by TNS Opinion and Social network
Note: Excludes connections classed 'other' and responses from consumers who were unsure of their connection type. Figures should be treated with caution due to small sample sizes in some countries.

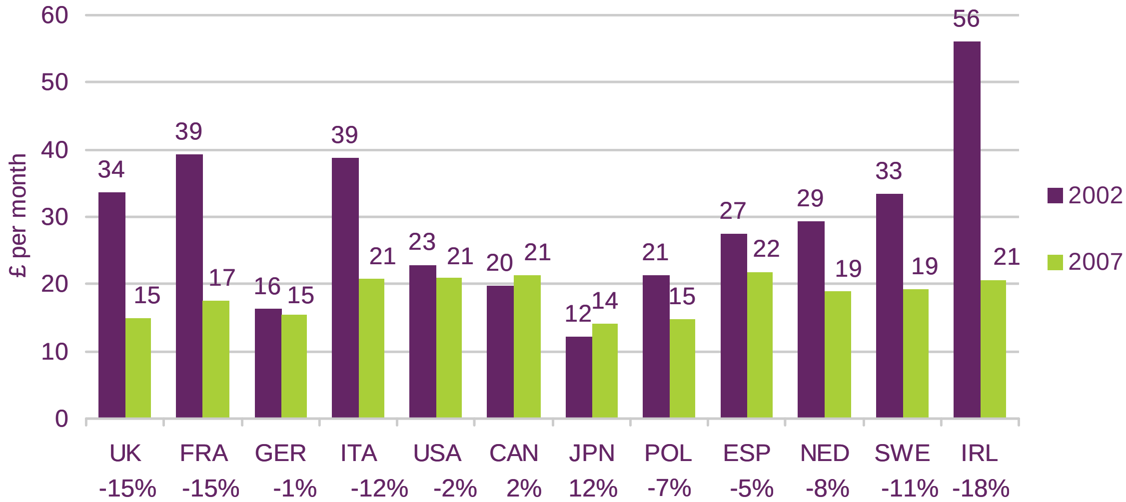
5.3.5.3 UK, Germany and Poland have the lowest revenue per broadband connection

Revenue per broadband connection fell in all our comparator countries except Japan, between 2002 and 2007. The largest percentage drop over the five-year period was 63% in Ireland, driven largely by increased competition, stimulated by the wholesale broadband providers. There is much less variation between the countries in 2007 than in 2002, because by then broadband had reached the mass market in all countries.

The low revenue per connection in the UK and Germany is the result of the downward pressure on pricing created by competition between platforms (cable and DSL) and competition between alternative network operators and the incumbent, both a result of relatively lightly-regulated wholesale line rental pricing, and the proliferation of local loop unbundling. Low revenue per connection in Poland is also partly driven by relatively low GDP per head.

Japan, which in 2002 had the lowest revenue per broadband connection, is the only country where revenue has increased. The main drivers behind this rise are the shift in users from DSL broadband to fibre, and the use of more advanced multimedia and entertainment services.

Figure 5.66 Average revenue per broadband connection: 2002 and 2007

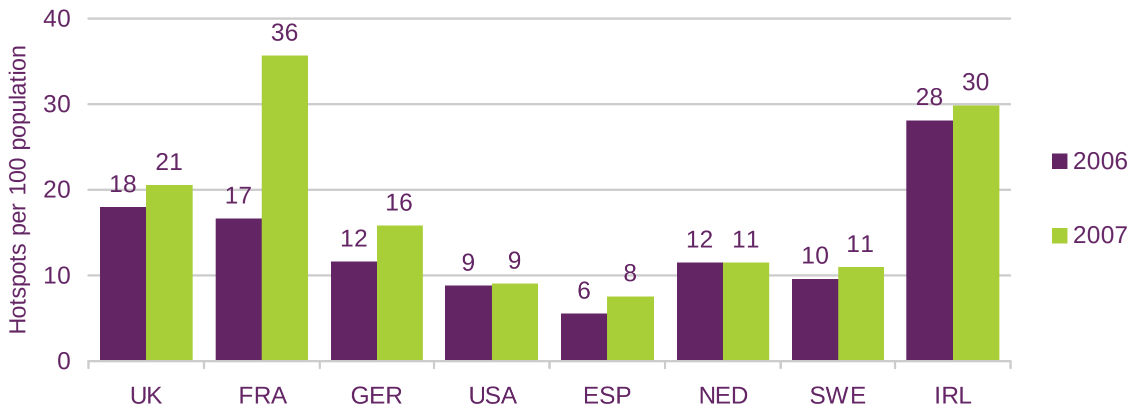


Source: IDATE / industry data / Ofcom

5.3.5.4 France doubles number of public WiFi hotspots

We can judge the level of public wireless (WiFi) hotspots in different countries by comparing the number of hotspots per 100,000 population. The average number of hotspots across the nations where data are available was 16 per 100,000 at the end of 2007. The number of hotspots has more than doubled in France since 2006. In addition to the launch of a free public WiFi network in Paris in July 2007 with an initial 400 hotspots, fixed-line operators have expanded the number of hotspots by enabling their own users to access the home WiFi gateways of other customers subscribing to the same broadband provider.

Figure 5.67 Public wireless hotspots per 100,000 population, 2002 and 2007



Source: IDATE / industry data / Ofcom