



International Communications Market Report 2011

6 Telecoms

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6.1 Telecoms key market developments

6.1.1 Overview

The telecoms section of this report looks at the fixed and mobile voice markets and those for fixed broadband and mobile data services among our 17 comparator countries. As such, the analysis excludes narrowband internet and corporate data services.

The section is split into three parts:

- **Key market developments** – provides an overall context and highlights key developments in international telecoms markets in 2009 and 2010, including changing revenues, investment in superfast networks and the growth of voice over IP (VoIP).
- **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 voice and data 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, mobile and broadband use.

6.1.2 Introduction

A strong case can be made that the deployment of telecoms networks has been the most significant single driver of social, cultural and economic change globally in the first decade of the 21st century. According to the United Nations’ International Telecommunication Union, around 30% of the world’s population (over 2 billion people) were internet users by the end of 2010, compared to just 6% at the end of 2000, and around 1.2 billion of these accessed the internet via mobile networks, using technologies which were barely nascent ten years previously.⁵² By the end of 2010 there were more than five billion mobile connections, a growth of 629 million in the year, and of the 1.28 billion mobile handsets sold during the year, 23% of them were smartphones – i.e. mobile phones specifically designed for the use of mobile internet services.⁵³

As basic telecoms services reach large sections of the world’s population, attention from industry and policy makers is increasingly focused on building the networks that are considered necessary to support the ‘internet of the future’. Investment in next generation fixed-line access networks is bringing ever-faster broadband speeds to consumers; by September 2011, 59% of UK homes were covered by a service offering at least ‘up to’ 30Mbit/s, while by October 2011 next-generation mobile networks using the long-term evolution (LTE) standard had been commercially launched by 35 operators in 23 countries around the world⁵⁴ (although not in the UK). There are many indications that the ‘internet of

⁵² International Telecommunication Union, Measuring the Information Society 2011, http://www.itu.int/ITU-D/ict/publications/idi/2011/Material/MIS_2011_without_annex_5.pdf

⁵³ Data from IDATE, *DigiWorld Yearbook 2011*

⁵⁴ Global mobile Suppliers Association, GSM/3G Market/ Technology Update, 12 October 2011

the future' is arriving very quickly: for example, Cisco estimates that global internet data traffic increased by 41% in 2010, with mobile internet data traffic increasing by 159%.⁵⁵

However, questions remain about how investments in building the infrastructure for the internet of the future will be funded. As the world becomes increasingly connected, the telecoms industry has struggled to convert increasing take-up and use of services into revenue growth. Global telecoms service revenues grew by just 2% in 2010 (to £864bn), with much of the growth being in developing markets such as China and Latin America. In Western Europe, North America and Japan revenues were largely flat as any bounceback from the economic downturn of the previous year was flattened by structural changes in saturated markets. In these mature telecoms markets fixed-line voice revenues have long been in decline - mainly from substitution for mobile, but also increasingly from voice over internet protocol (VoIP) telephony in some countries. Mobile revenues are coming under pressure as increasing data revenues struggle to offset the decline in voice revenues, and fixed broadband revenue growth is slowing as markets become saturated and the service becomes commoditised.

In this section we examine three of the key developments which are transforming the global telecoms market, both in terms of industry structures and consumer behaviour:

- First, we provide an overview of the changing relationship between fixed and mobile services, exploring variations in the relative use and take-up of mobile and fixed telecoms services across our comparator countries.
- We then compare and contrast the roll-out and take-up of next-generation fixed broadband services in different countries.
- We conclude the section by detailing the massive growth in data use on mobile networks, and how next-generation mobile networks herald a new phase of infrastructure development.

Figure 6.1 summarises key telecoms indicators across the 17 comparator countries included in this report.

⁵⁵ Cisco Systems' Visual Networking Index, http://www.cisco.com/en/US/netsol/ns827/networking_solutions_sub_solution.html

Figure 6.1 Key telecoms indicators, 2011

	UK	FRA	GER	ITA	USA	CAN	JPN	AUS
Telecoms service revenues (£bn)	27.2	31.8	35.5	23.7	188.2	20.9	79.0	16.0
Telecoms revenues per capita (£)	434	486	435	389	608	615	624	739
Fixed lines per 100 population	53.0	32.9	52.5	28.9	48.2	54.3	36.5	50.4
Monthly outbound fixed mins per capita	172	145	201	125	148	174	58	209
Mobile connections per 100 population	129.8	99.4	133.5	148.5	97.8	76.2	92.4	129.5
Share of mobile post-pay connections	46%	71%	45%	15%	77%	80%	99%	58%
3G connections per 100 population	50.3	34.4	26.0	56.6	46.8	23.1	85.8	72.4
Monthly outbound mobile mins per capita	170	132	103	172	603	318	98	287
Fixed broadband conn per 100 popn	31.3	32.6	32.9	21.1	26.6	31.9	26.9	25.7
DSL as a proportion of fixed bb conns	79%	93%	86%	96%	36%	40%	25%	80%
FTTx as a proportion of fixed bb conns	0.2%	1.6%	0.3%	2.6%	7.1%	-	-54.2%	-
Mobile broadband conns per 100 popn	7.7	4.2	5.3	10.0	27.6	2.7	7.7	19.5
VoIP subscriptions per 100 population	6.0	28.9	10.0	11.8	9.3	24.6	19.7	14.3

	ESP	NED	SWE	IRL	POL	BRA	RUS	IND	CHN
Telecoms service revenues (£bn)	20.0	8.5	4.3	2.2	5.9	34.2	18.6	12.1	65.9
Telecoms revenues per capita (£)	429	497	476	482	153	169	134	10	49
Fixed lines per 100 population	42.7	30.4	50.9	40.0	22.8	20.8	32.2	3.0	22.1
Monthly outbound fixed mins per capita	117	107	156	131	29	87	99	-	11
Mobile connections per 100 population	122.1	121.0	141.9	114.3	121.4	100.3	155.7	63.7	64.4
Share of mobile post-pay connections	65%	55%	64%	36%	49%	18%	5%	4%	33%
3G connections per 100 population	67.3	26.3	80.8	39.3	40.7	9.3	5.6	0.6	3.5
Monthly outbound mobile mins per capita	128	198	204	193	125	102	190	140	270
Fixed broadband conn per 100 popn	22.7	38.9	33.2	21.9	14.7	6.6	14.1	0.9	9.5
DSL as a proportion of fixed bb conns	79%	54%	54%	72%	46%	67%	39%	89%	75%
FTTx as a proportion of fixed bb conns	0.3%	3.1%	18%	0.9%	0.4%	0.0%	21%	0.0%	0.7%
Mobile broadband conns per 100 popn	7.2	4.2	32.2	12.3	9.0	-	-	-	-
VoIP subscriptions per 100 population	2.4	22.3	13.1	3.1	1.8	-	-	-	-

Source: IDATE / industry data / Ofcom

Notes: USA, CAN and CHN mobile use includes both outbound and inbound calls; 3G includes W-CDMA and CDMA2000 1xEV-DO but not CDMA2000; BRIC country revenues exclude fixed broadband

6.1.3 Mobile growth driven by substitution of fixed services

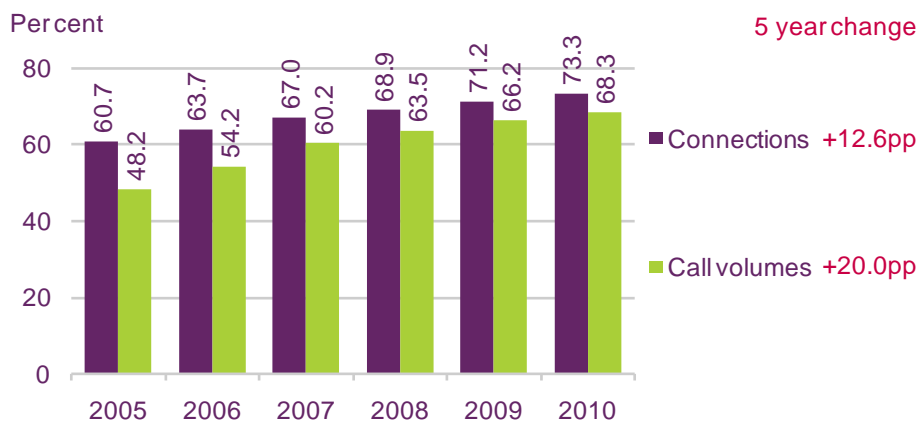
Fixed connections and call volumes fall in a mobile world

A characteristic of telecoms markets in recent years has been growth in the use of mobile services – for voice calls, messaging and data. Figure 6.2 indicates that, on average, across the 13 nations for which full time-series data were available, 68.3% of voice call minutes were made from mobile networks in 2010, up from 48.2% five years earlier in 2005 and 66.2% in 2009. Over the same period the proportion of voice connections that were mobile increased by 12.6 percentage points from 60.7% to 73.3%.

In some cases, increasing mobile use is complementary to that of fixed voice services; for example, where consumers benefit from the higher quality of service and/or lower prices offered by fixed-line services in the home, and use mobile services when out of the home. Mobile networks have provided telecoms services where there was no existing fixed network in some countries (for example, in large areas of the BRIC countries). And mobile telecoms services can also be substituted for fixed telecoms services. In this section of the report we

explore variations in the relative use and take-up of mobile and fixed telecoms services across our 17 comparator countries.

Figure 6.2 Mobile as a proportion of total connections and voice call volumes, 2005 to 2010



Source: IDATE / industry data / Ofcom

Note: Includes data for US, CAN and BRA, where mobile call volumes include an element of incoming calls

Fixed calls more resilient in some countries than others...

Figure 6.3 shows the percentage change in fixed and mobile voice call minutes among our comparator countries in 2010, and indicates that there were wide variations in call volume growth. The change in fixed voice call volumes ranged from a 15% fall in Poland to a 4% increase in China, whereas for mobile voice call volumes it ranged from a 1% fall in the US to a 93% increase in Brazil. Overall, total mobile voice call volumes among our comparator countries increased by 15% in 2010, while fixed voice call volumes fell by 7% during the year.

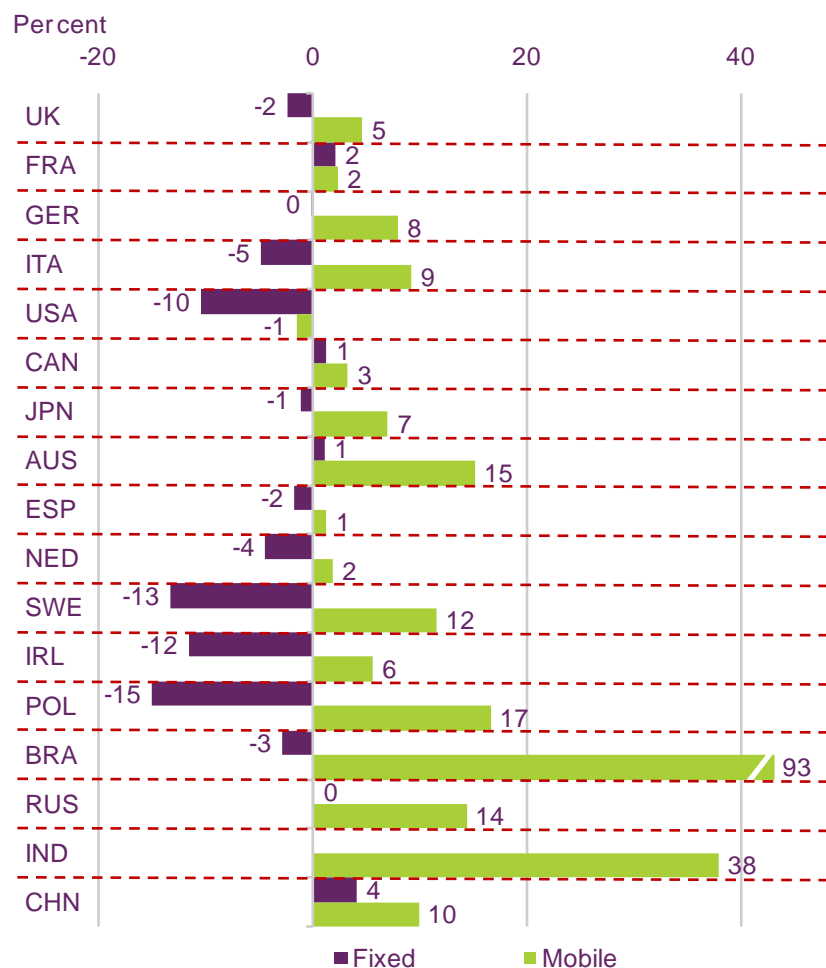
Among the Western European comparator countries, the only country where fixed voice call volumes increased in 2010 was France. The 2.1% increase in France in 2010 may be a result of the availability of 'naked DSL' (which means that DSL broadband can be provided without the requirement for a traditional fixed line). This has led to the widespread availability and take-up of low-cost bundled triple-play services, including a fixed broadband connection over which internet protocol television (IPTV) and VoIP-based fixed voice services are provided. In 2010 over half of fixed voice call volumes in France were made over VoIP.

The rate of decline of fixed voice call volumes in 2010 was also lower than the average fall of 1.8% across our Western European comparator countries in Germany, where fixed call volumes fell by 0.2%. Although take-up of mobile services in Germany was in line with the other countries, the average use per connection (which was 77 minutes a month in 2010) was lower, because fixed voice services in Germany are much cheaper than mobile services (see Figure 6.5 below and Section 2 for our comparative price benchmarking work). The largest declines in fixed voice call volumes among the Western European comparator countries in 2010 were in Sweden and Ireland, where they fell by 13.3% and 11.6% respectively. In both countries (along with Italy and the Netherlands) the average cost of a mobile voice call minute was less than that of a fixed voice call minute, while Ireland had the highest average use per mobile connection, at 169 minutes per month.

Section 6.3.5 contains an analysis of European Commission consumer research data regarding the proportion of homes that are mobile-only, i.e. those that no longer have a fixed

line, which shows that among the European countries covered in our report the proportion of homes that were mobile-only ranged from 2% in Sweden to 49% in Poland (in the UK it was 17%).

Figure 6.3 Change in fixed and mobile voice call volumes, 2010



Source: IDATE / industry data / Ofcom

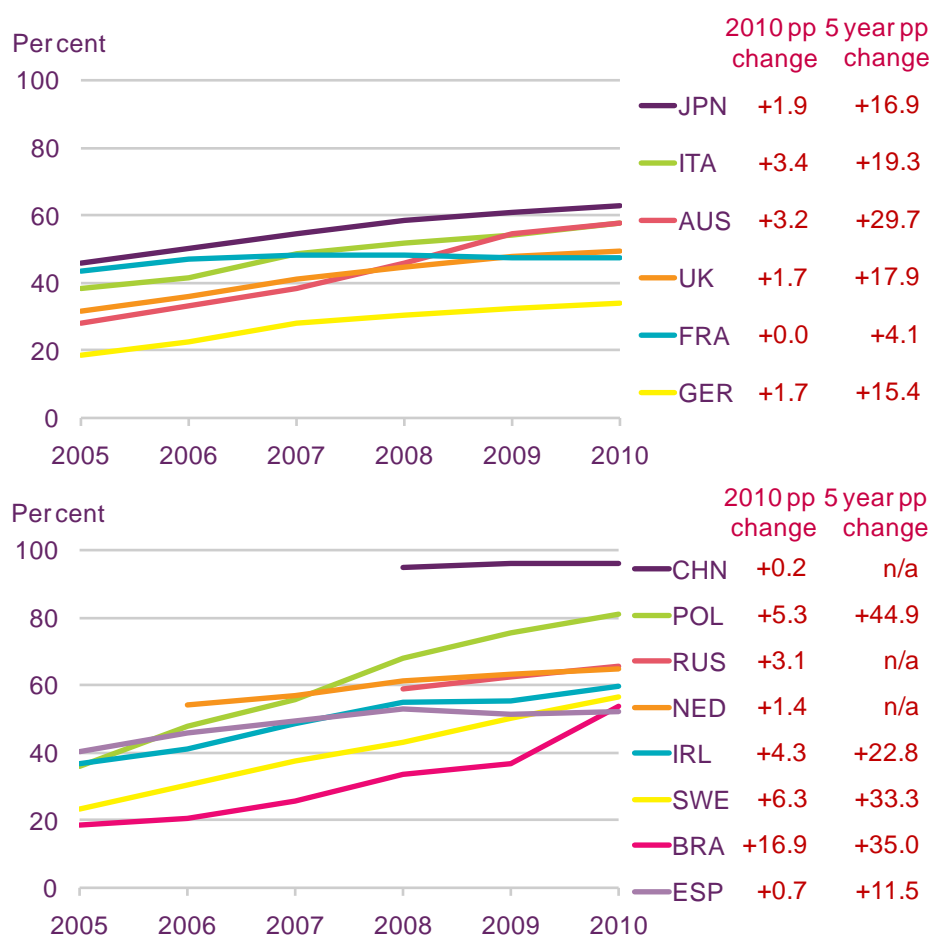
Note: USA, CAN and CHN includes incoming calls to mobiles; BRA, RUS and IND include fixed-to-mobile and off-net incoming calls

...but the proportion of calls that are mobile-originated continues to increase

In all of the comparator countries for which figures were available, there has been growth in the share of total call volumes originating on mobile networks. However, there is a great deal of variation between countries: 96.2% of call minutes in China (where the availability of fixed lines is low) were made from mobile networks in 2010, compared to 34.0% in Germany. Even within Western Europe there is significant variation: 65.0% of call minutes originated on mobile networks in the Netherlands in 2010, 31 percentage points more than in neighbouring Germany, and in the UK just under half of voice call minutes were mobile-originated in 2010.

Similarly, there are significant variations in the growth of mobile between countries (Figure 6.4). In France, mobile telephony's share of total voice minutes grew by just 4.1 percentage points between 2005 and 2010, whereas in Sweden it increased by 33.3 percentage points over the same period (in the UK the figure was 17.9 percentage points).

Figure 6.4 Proportion of voice calls originating on mobile networks



Source: IDATE / industry data / Ofcom

Note: Mobile data volume data for CHN includes incoming calls to mobiles, while that for BRA and RUS includes fixed-to-mobile and off-net incoming calls

Relative fixed and mobile voice prices are a key driver of levels of substitution

In order to compare relative fixed voice and mobile voice prices, we calculated the average cost of a mobile voice minute as a proportion of the average cost of a fixed voice call minute across our comparator countries, including access fees in the calculation (Figure 6.5). In this analysis a value of 100 shows that average prices are identical, while a value of less than 100 means that mobile calls are, on average, cheaper than fixed line calls in the country in question, and for values over 100 the opposite is true.

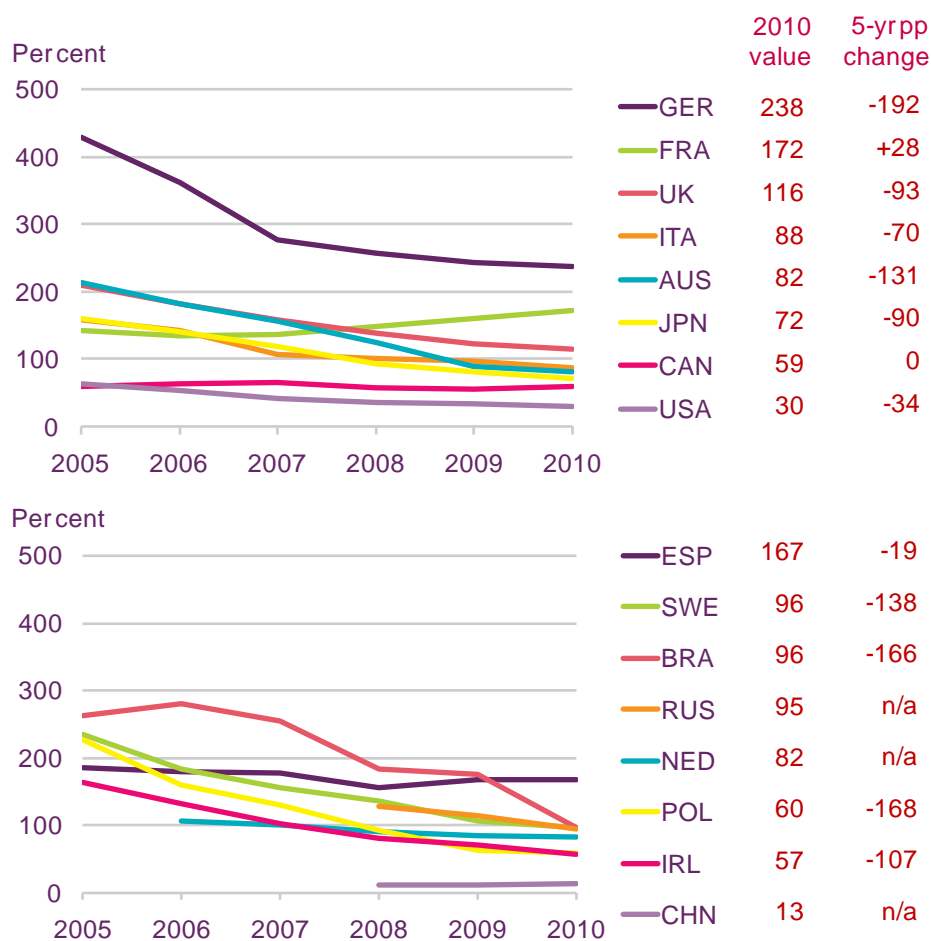
In 12 of the 16 countries for which we had data, the average per-minute cost of mobile voice call was lower than that of a fixed voice call in 2010 (this was the case in just two of our countries in 2005). The UK was one of the four comparator countries (along with France, Germany and Spain) where the ‘mobile premium’ (the difference between the cost of fixed and mobile voice services) was positive in 2010, with the average cost of a UK mobile voice minute being 16% more than that of a fixed voice minute⁵⁶. The lowest-cost mobile calls relative to fixed calls were in China, where the average cost of a mobile minute was just 13%

⁵⁶ Note that the cost per minute is calculated from operator-reported retail call volumes and retail voice revenues (including line rental); it provides an indication of, but is not the same as price – for example, for consumers with ‘unlimited’ calls within a voice package the incremental price of each call is zero.

of that of the average fixed minute, i.e. the 'mobile premium' was minus 87%. This is likely to be due to the economies of scale realised from the roll-out of national mobile networks in China, plus limited fixed infrastructure availability (in China, mobile use and take-up far outstrips that of fixed-line services), and low pricing of mobile calls in order to target the mass market.

France and Spain were the only countries where the 'mobile premium' increased in 2010. In France, the cost of mobile calls relative to fixed voice calls has been increasing since 2006, while in Spain this has been true since 2008. In both countries the average cost of mobile calls has been falling, meaning that the increase in the mobile premium is as a result of the rate of decline in fixed prices being greater than that of mobile calls. This may partly be a result of aggressive pricing by fixed network operators in response to falling fixed-line numbers, the decline in which has been particularly steep in France due to high levels of VoIP use.

Figure 6.5 Average cost of a mobile voice minute as a proportion of the cost of a fixed voice minute, 2005 to 2010



Source: IDATE / industry data / Ofcom

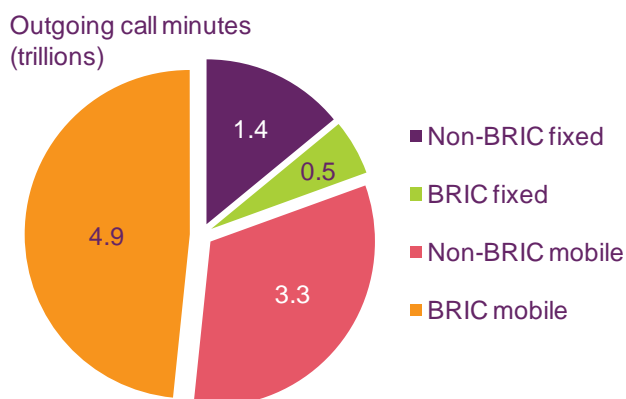
Note: US, CAN and CHN includes incoming calls to mobiles; BRA, RUS and IND include fixed-to-mobile and off-net incoming calls

Many consumers in BRIC countries have gone straight to mobile

The proportion of calls that originate on mobile networks is much higher in the less-developed BRIC countries than in our other comparator countries. In 2010 89.9% of total call volumes in Brazil, Russia and China (fixed-line call volume data was not available for India)

originated on mobile networks, more than 20 percentage points more than the 69.6% across our non-BRIC comparator nations. In fact, almost half (48%) of total voice call volumes in the comparator countries for which we had both fixed and mobile call volume data originated on mobile phones in the BRIC countries in 2010 (Figure 6.6).

Figure 6.6 Total voice call volumes, by network and country type



Source: IDATE / industry data / Ofcom

Note: BRIC country data excludes India

The difference between relative levels of fixed and mobile telephony use in the BRIC and non-BRIC countries can be explained by the maturity of the fixed-line markets in these countries when mobile services launched. In most non-BRIC countries landline services were widely available for many decades before the roll-out of mobile networks, and fixed telephony markets were relatively mature, with take-up of fixed voice services being widespread. When mobile services launched in these countries they were a more expensive alternative to making calls from a fixed-line phone, and it was only when pre-pay services launched that mobiles became a mass-market proposition. With increased take-up and falling prices (more generous call allowances were bundled with monthly line rental fees) mobile services became a viable substitution for landline calls.

This was not true in the BRIC countries, where fixed-line networks were not so developed, when mobile services launched, and often, landline services only became widely available in urban areas; they were not accessible to large proportions of the population living in rural areas. Accordingly, mobile telephony, rather than being a substitute for fixed telephony services, represented an alternative way for people to connect to the public switched telephony network (PSTN) and, more importantly, a lower-cost way for telephony providers to extend their network coverage; the investment required to roll out mobile base stations is significantly lower than that required to implement a fixed-line network from scratch.

Different drivers for fixed-mobile substitution of broadband services

As with voice call services, mobile broadband can be used either as a complement to fixed-line broadband or as a substitute for it. In order to assess different levels of take-up of fixed and mobile broadband services, we conducted consumer research in six of our comparator countries in October 2011. It should be noted that as the survey was carried out online, so the proportion reporting that they did not have a broadband connection at home will be lower than for a truly representative sample of the population in each country, and all other figures are likely to be higher.

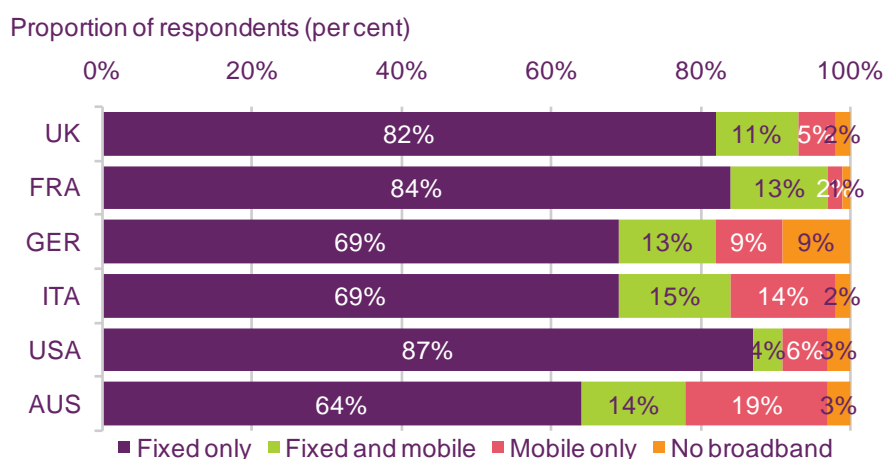
The lowest levels of mobile broadband take-up were in France (15% of respondents) and the US (10%). This may appear counter-intuitive, as both countries have also been

characterised by rapid decline in the number of fixed voice lines. However, the availability of ‘naked DSL’ in both countries (and high take-up of cable services in the US), mean that customers are able to take a fixed broadband service without having a fixed line, and there is less incentive to go ‘mobile-only’ for broadband, as the incremental cost of a fixed broadband connection is lower than elsewhere.

In France the widespread availability of cheap triple-play bundles of fixed voice, fixed broadband and pay-TV provides a further incentive for households to have a fixed broadband service, while in the US relatively expensive mobile broadband data charges are likely to be limiting the use of mobile broadband as a substitute for fixed broadband services. In the UK 82% of respondents lived in a household which had only a fixed broadband connection, the third highest proportion among those countries where the research took place (Figure 6.7).

Australia and Italy had the highest proportions of respondents relying entirely on mobile broadband for internet access, at 19% and 14% respectively. In Italy, this is likely to be driven by a high proportion of mobile-only households, which is a result of historically lower take-up of fixed voice lines than in the other large European countries. Australia was comparatively late to roll out fixed-line broadband networks, and this, combined with the early deployment of HSPA mobile networks and the fact that in some sparsely populated areas mobile is the cheapest way to provide broadband services, contributed to nearly one in five respondents having mobile broadband as their sole broadband connection.

Figure 6.7 Household penetration of fixed and mobile broadband



Source: Ofcom consumer research, October 2011

Base: All respondents, UK=1015, France=1014, Germany=1014, Italy=1045, USA=1002, Australia=1012

Q. Which of the following do you have in your home?

6.1.4 Growth in next-generation broadband services

Governments target a superfast future

With broadband now available to the large majority of consumers in most of our comparator countries, much of the focus among policy makers and industry has shifted to ensuring that networks are in place that will be sufficient for the ‘internet of the future’ in which the use of high-bandwidth services such as high-definition video become commonplace, multiple connected devices share a household’s broadband connection, and upload speeds become increasingly important for video communications, file sharing and ‘cloud-based’ storage.

Governments in many countries have introduced targets for the roll-out of superfast broadband, which in the UK and the rest of the European Union refers to a headline downstream speed of at least 30Mbit/s. Figure 6.8 indicates that most of our comparator countries have set targets related to the availability and/or take-up of next-generation services⁵⁷, while as part of its Digital Agenda initiative, the European Commission has set a target that all Member States' consumers should have access to 30Mbit/s downstream by 2020, with at least half of European households subscribing to 100Mbit/s services by the same year.

In all of the European countries covered in this report, the majority of broadband connections were ADSL at the end of 2010 (ADSL uses the copper wires initially laid for the telephone network to connect customers to their telephone exchange). Operator upgrades in recent years have increased the speeds available via ADSL, although the limitations of the technology mean that speeds of higher than 20Mbit/s downstream can rarely be delivered, and speeds much lower than this are typical, because speed decreases as the length of the line increases.

In order to provide superfast (next-generation) networks to consumers, it is necessary to lay fibre-optic cables, which are capable of transmitting data at high speeds with very little performance degradation, closer to consumers' homes. These 'next-generation' fixed network connections can broadly be categorised as follows:

- Fibre-to-the-home (FTTH) or fibre-to-the-premises (FTTP), where a fibre-optic cable is installed all the way from the telephone exchange to the consumer's premises. Copper wiring is often used inside the house building for the final part of the delivery.
- Fibre-to-the-cabinet (FTTC), where a cabinet is installed on the street with a fibre-optic cable laid from it to the exchange. A copper wire connects the cabinet to the consumer's premises: this portion is typically less than 500 metres and is known as a 'sub-loop'.
- Hybrid fibre/co-axial cable networks (HFC), via a DOCSIS 3.0 upgrade to an existing cable TV (CATV) system. From a network point of view, HFC is similar to FTTC in that it uses a street cabinet with fibre-optic cables on one side and co-axial copper wires on the consumer premises side. The technology used in HFC networks is often referred to as fibre-to-the-last amplifier (FTTLA).

⁵⁷ Exceptions include Brazil, Russia, India, China and Poland. Although all of these countries are seeing investment in fibre broadband networks (often in areas that have never had a copper telephone network), government targets focus more on expanding the coverage and take-up of any kind of broadband network (including mobile broadband). Brazil targets having 30 million fixed broadband connections by 2014, Russia targets 35 broadband lines per 100 population by 2015, India set a target of 10 million broadband connections by 2010, China targets availability of broadband to 45% of population by 2014; Poland targets 23% of its population taking broadband by 2013 (source: OECD, OECD Working Party on Communication Infrastructures and Services Policy 'National Broadband Plans', 15 June 2011, pp13-15).

Figure 6.8 Broadband targets in selected countries

Country	Target
UK	By 2015, to bring “superfast broadband” to all parts of the UK and to create the “best broadband network” in Europe. To provide everyone with at least 2Mbit/s and superfast broadband to be available to 90% of people.
FRA	By 2012, 100% of the population to have access to broadband. By 2025 100% of home to have access to very high speed broadband.
GER	By 2014, 75% of households will have download speeds of 50Mbit/s.
ITA	By 2012, all households to have access to the Internet at between 2 and 20Mbit/s.
USA	By 2020, at least 100 million homes should have affordable access to actual download speeds of at least 100Mbit/s and actual upload speeds of at least 50Mbit/s. Every household should have access to actual download speeds of 4Mbit/s and actual upload speeds of 1Mbit/s.
JPN	By 2015, fibre optic ‘highways’ will be completed enabling every household to access a superfast broadband service
AUS	By 2021, the National Broadband Network will cover 100% of premises - 93% of homes, schools and businesses at up to 100 Mbit/s over fibre, with the remainder at up to 12Mbit/s over next generation wireless and satellite.
ESP	By 2011, minimum speed of 1Mbit/s broadband access available to 100% of population. By 2015, 100Mbit/s broadband available to 50% of population.
IRE	October 2010: in areas where there was no broadband a mobile service (using HSPA), was required to be in place with a minimum download speed of 1.2Mbit/s and a minimum upload speed of 200kbit/s. Delivery of high speed broadband throughout Ireland is a key commitment under the Government’s NewERA programme and in June 2011 the government set up a Next Generational Broadband Taskforce
European Commission	Digital Agenda sets targets of basic broadband coverage for all EU citizens by 2013 and 30Mbit/s by 2020, with at least half European households subscribing 100Mbit/s.

Source: Source: Adapted from Table 21: ‘Broadband targets’ in OECD Working Party on Communication Infrastructures and Services Policy ‘National Broadband Plans’, 15 June 2011, pp13-14, <http://www.oecd.org/dataoecd/22/41/48459395.pdf>

NGA deployments gather pace as Europe catches up with Japan and US

In Japan the large-scale roll-out of FTTH and FTTP networks began in 1999, and by the end of 2010 93% the population had access to FTTH/B networks, typically offering speeds of ‘up to’ 100Mbit/s.

In our other comparator countries the roll-out of FTTH/P networks has been much slower to develop. In the UK, France, the US, Australia, Spain, the Netherlands and Ireland, at the end of 2010, the greatest proportion of superfast coverage was available from cable operators, where the upgrade of existing cable networks to the DOCSIS3.0 standard is inexpensive compared to the cost of laying new fibre networks. Speeds offered by the various implementations of DOCSIS 3.0 vary – in the UK, Australia, Spain and Ireland speeds of ‘up to’ 100Mbit/s are offered to many customers, whereas in the US the maximum speeds available are rarely more than ‘up to’ 25Mbit/s. This is less a factor of the technology and more an issue of competitive positioning by the operator concerned, and the range of spectrum available in the coaxial cable for broadband use.

In the UK and Germany, large-scale fibre-to-the-cabinet deployments have been made. In these countries the existing telecoms network infrastructure makes FTTC services more cost-effective to deploy to large areas of the country than FTTH/P services, not least because of the shorter lengths of fibre-optic cable that need to be laid. The relatively short sub-loops make it feasible to run VDSL⁵⁸ from the cabinet to the consumer's home, while, in Germany in particular, the large size of cabinets reduces civil engineering costs. Speeds available via FTTC services vary: in Germany, incumbent operator Deutsche Telekom offers services 'up to 50Mbit/s and in the UK BT offers speeds of 'up to' 40Mbit/s (although speeds for some consumers are lower, due to the length of the copper wire between the cabinet and the premises) and BT plans to launch services offering 'up to' 80Mbit/s in 2012. However, in the US the highest speeds offered by AT&T's FTTC service in November 2011 were 'up to' 24Mbit/s.

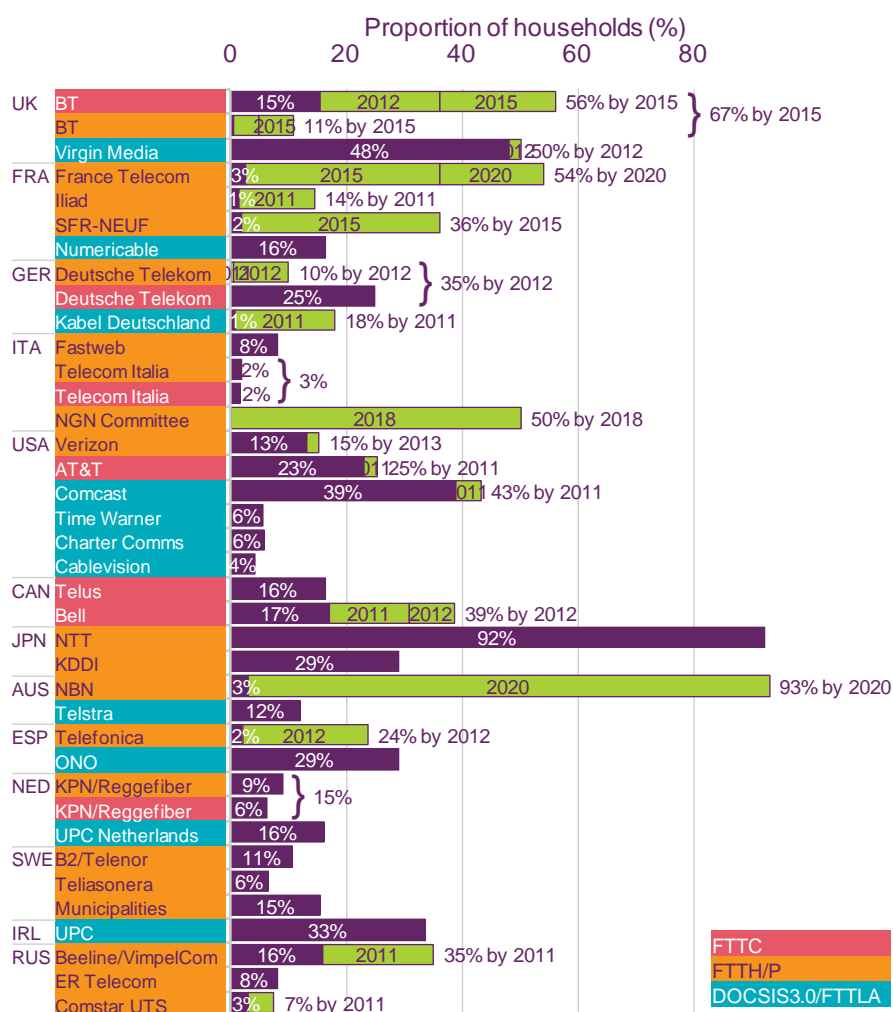
The per-capita cost of providing FTTH/P services is lower in countries where a large proportion of the population live in multiple-dwelling units (MDUs), and where the infrastructure or planning regulations allow for more cost-effective laying of fibre-optic cable. For example, in Japan, the costs for deploying fibre-to-the-home were relatively low because of the dense population (the large majority of which live in MDUs), and the deployment of cables overhead, as opposed to in the ground. Similar characteristics have limited the costs of deployment in cities in Russia, while Paris was one of the first cities in Europe to have widespread fibre deployment assisted by the low cost of laying cables, enabled by the unique characteristics of its sewer system. The high levels of availability of FTTH/P in Sweden are the result of deployment by local municipalities, under a government programme which makes funding available for them to build fibre networks to be run by independent operators.

Figure 6.9 details both current deployments and planned next-generation access (NGA) deployments. It shows that by the end of 2010 the coverage of superfast networks in the UK compared favourably to other countries in Europe, with 48% of the population passed by Virgin Media's cable network (offering speeds of 'up to' 50Mbit/s and 'up to' 100Mbit/s in some areas) and 15% being passed by BT's FTTC service. Throughout 2011, BT has continued to roll out its network – in September 2011 FTTC services were available to around 24% of the population, and around 59% of UK homes were covered by superfast services from either BT, Virgin Media or both.⁵⁹ The UK is likely to continue to be one of Europe's leaders in the availability of superfast broadband services in the next few years – BT's fibre services (a combination of FTTP and FTTC) are set to reach 40% of the population by 2012 and 67% of the population by 2015.

⁵⁸ VDSL is a variant of DSL which provides higher speeds than ADSL but it is effective only over shorter distances, due to higher signal degradation by distance

⁵⁹ This estimate assumes that around 15% of homes in exchange areas where FTTC is available will be unable to receive FTTC services. See <http://maps.ofcom.org.uk/broadband/downloads/ofcom-uk-broadband-speed-report-2011.pdf>

Figure 6.9 NGA coverage and planned deployments, end 2010



Source: Ofcom, based on operator announcements and third-party data including IDATE
 Notes: Includes announcements from the largest operators only; estimates have been used where there is lack of clarity on timelines; deployments are typically gradual and incremental – the year given marks the end of a planned deployment phase

Take-up still low in most countries

Figure 6.10 details the take-up of next-generation broadband services across our comparator countries. Some caution should be applied to these figures for two reasons. Firstly, while data on take-up of fibre-to-the-home services is available in all countries, data on take-up of FTTC and high-speed cable services is not always available (for example, in France we do not have data on how many consumers take high-speed services from service provider Numericable, and in the US we do not have data for any of the cable providers). Secondly, in some countries, consumers taking NGA services do not necessarily receive speeds which are ‘superfast’ – for example, while Verizon in the US offers a range of speeds over its high-quality FTTH network including ‘up to’ 150Mbit/s, many customers are on speeds of ‘up to’ 25Mbit/s or less (this is the result of Verizon charging a significant price premium for higher speed packages).⁶⁰

⁶⁰ In November 2012, Verizon’s fibre internet services (FiOS) started at \$49.99 a month for a 15Mbit/s service, rising to \$194.99 for a 150Mbit/s service, <http://www22.verizon.com/Residential/internet>

It is clear that there is significant variation in the take-up of superfast services across our comparator countries, and that in some nations, such as the UK, only a small proportion of consumers take superfast services even where they are available, while in Sweden, Russia and Japan more than a third of households covered by superfast services subscribe to them.

Two key factors appear to drive the take-up of superfast services as an alternative to basic services.

- The relative cost of superfast services compared to basic broadband services. Ofcom research among UK superfast broadband users, conducted in April 2011, found that 'value for money' was the key consideration in taking up superfast broadband services⁶¹. Virgin Media's 'up to' 50Mbit/s cable service (£25 per month in November 2011, excluding line rental) is nearly double the price of its basic 'up to' 10Mbit/s service (£13.50 per month), and only around 5% of Virgin Media's customer base took its 'up to' 50Mbit/s service by the end of June 2011⁶² (with an additional 21% taking the 'up to' 30Mbit/s service which is £18.50 a month). In contrast, in Sweden and Russia, fibre broadband is often the least expensive fixed broadband service in towns and cities where it is available.
- Secondly, in some countries fibre has had the highest take-up when it forms a 'triple-play bundle' with telephony and premium television services. IP-based television services are central to the fibre propositions of Verizon and AT&T in the US as they look to compete with cable companies – in June 2011, 83% of AT&T's FTTC customers also took a TV service, and 76% of Verizon's FTTH subscribers also took its FioS TV service. Similarly, in France, the majority of fibre subscribers purchase it within a triple-play package including IPTV. However, in Japan and Russia, IPTV penetration remains low, despite high take-up of FTTH/P services. The UK has very low take-up of IPTV services, although it is notable that the use of the internet for watching 'catch-up' television services is higher in the UK than in many other countries (see Figure 5.24 in the internet and web-based content section of this report).

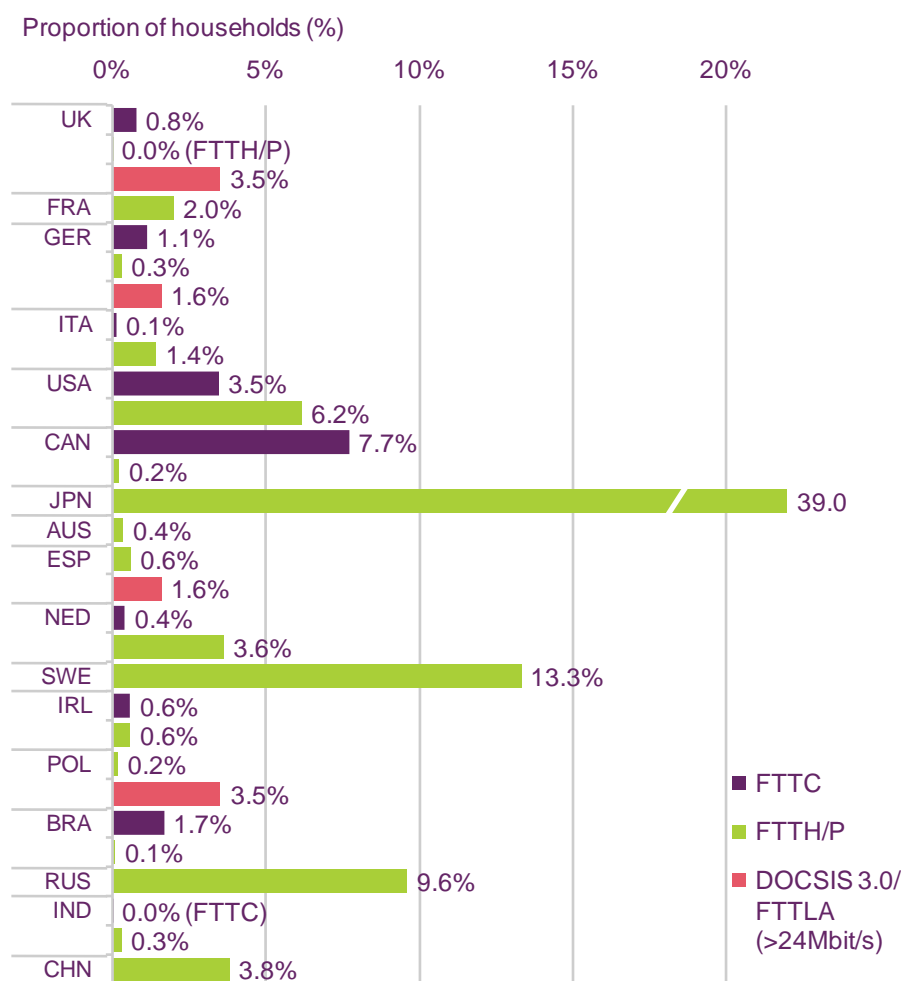
⁶¹ Ofcom, UK Communications market report 2011, pp251-252,

http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CMR_2011_FINAL.pdf

⁶² <http://phx.corporate->

[ir.net/External.File?item=UGFyZW50SUQ9Njc2NTd8Q2hpbGRJRD0tMXxUeXBIPtM=&t=1](http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9Njc2NTd8Q2hpbGRJRD0tMXxUeXBIPtM=&t=1)

Figure 6.10 Household take-up of superfast broadband, June 2011



Source: Ofcom, based on operator announcements and third-party data including Cullen International and IDATE

Notes: All FTTH/B and FTTC subscribers are included; DOCSIS3.0/FTTLA subscribers at speeds of more than 'up to' 24Mbit/s and higher are included; subscriber numbers for FTTC and DOCSIS3.0/FTTLA subscribers in some countries are not available.

6.1.5 Networks upgraded as mobile data use soars

Mobile users in UK and Japan use the most data

More than ever before, consumers are using a wide range of high-speed mobile devices to connect to the internet. According to telecoms vendor organisation, the GSA (Global mobile Suppliers' Association), there were 3,227 HSPA-enabled mobile devices available to purchase in August 2011, ranging from smartphones to mobile broadband dongles, SIM-enabled laptops, datacards, wireless routers and mobile hotspots; this number having risen 25% year on year.

The increasing take-up of powerful mobile devices, the availability of fast mobile networks and the ever-growing availability of internet applications and services (many of which are mobile-specific) means that consumers are downloading and uploading an increasing quantity of data. According to calculations published in Cisco Systems' Visual Networking

Index⁶³, monthly data traffic per mobile connection in the UK increased by 108% between December 2009 and December 2010 and was higher in December 2010 (268MB) than in all other comparator countries except Japan (349MB)⁶⁴. By comparison, France and Germany – two of Europe's largest telecoms markets – averaged 106MB and 139MB of data traffic per mobile connection per month; although they grew faster than the UK from 2009 to 2010: up 172% and 136% respectively (Figure 6.11).

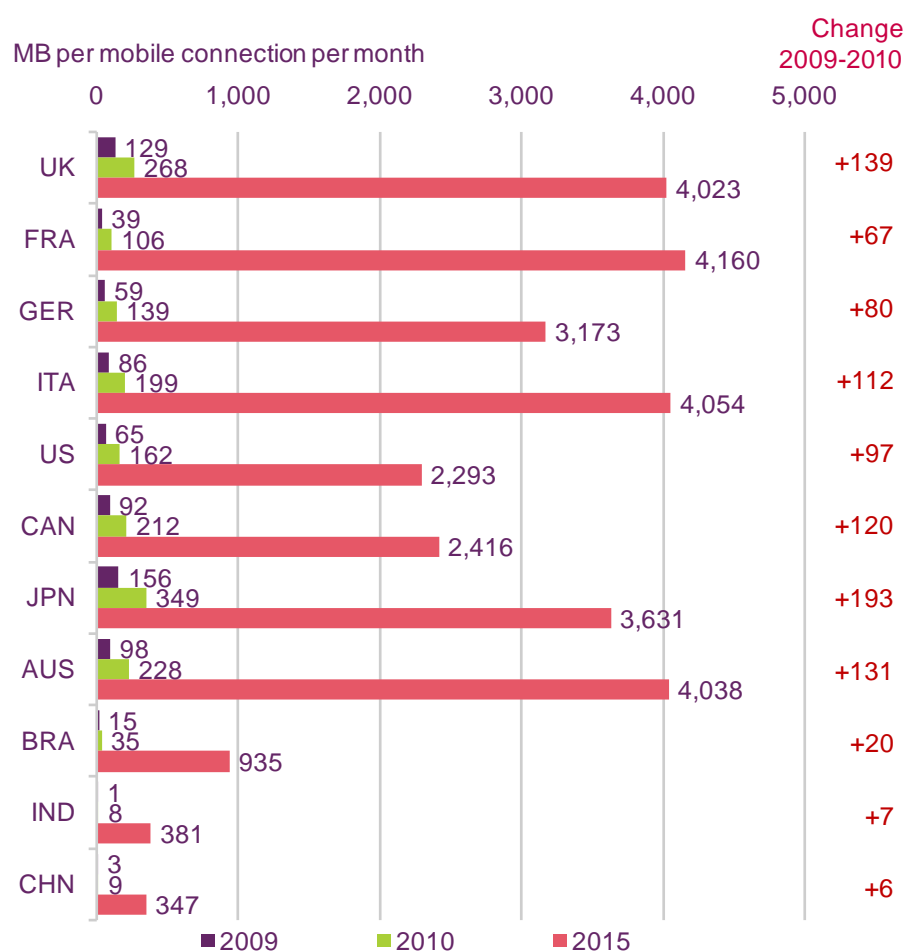
The majority of data use is from mobile broadband (dongles) connected to computers, although smartphone data use is growing rapidly: Vodafone reported that smartphones were responsible for 21% of all data traffic on its European networks in September 2011, compared with just 12% in March 2011⁶⁵. Cisco also forecast that total mobile data use will increase 21-fold by 2015 in the UK, with even higher growth rates in many other countries. The UK rate is equivalent to a compound annual growth rate (CAGR) of 84%, compared with 158% in India and 129% in China. However, mobile data use in India and China lags behind the UK considerably, so higher CAGRs can be expected in these emerging markets. Compared with the UK's 268MB per month per mobile connection in 2010, consumers in India and China consumed just 8MB and 9MB per person respectively.

⁶³ http://www.cisco.com/en/US/netsol/ns827/networking_solutions_sub_solution.html

⁶⁴ Average mobile data volumes reported by Cisco for the UK are higher than that reported by UK mobile operators. Data published in Ofcom's Infrastructure report found that average mobile data throughput per 3G connection was 240MB in March 2011. See <http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf>

⁶⁵ http://www.vodafone.com/content/dam/vodafone/investors/financial_results_feeds/half_year_30september2011/p_halfyear2011.pdf

Figure 6.11 Mobile data traffic per mobile connection: 2009, 2010 and 2015



Source: Cisco Systems' Visual Networking Index

Figures given are for December in each year stated. Precise figures are not available: the 2009 and 2010 figures are Cisco estimated actuals, and the 2015 figure is a Cisco forecast.

Mobile network operators are investing in upgrades to cater for data demand

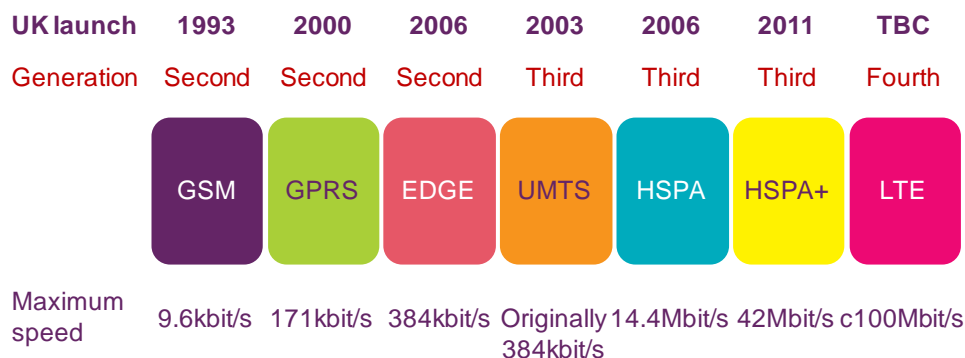
In order to keep up with the demand for mobile data services, operators need to invest in additional network capacity. Most operators in our comparator countries have now upgraded the radio access segment of their networks – the portion between the consumer's device and the base station - with HSPA technology, which offers download speeds theoretically more than 1,500 times faster than early second-generation (2G) GSM networks.

In some countries, including Sweden, Japan and the US, operators have deployed even faster networks, based on fourth-generation LTE technology, which can potentially deliver speeds of up to 100Mbit/s. However, this is the theoretical maximum speed that the technology is capable of, and is rarely achieved in practice. According to Ofcom's mobile broadband research, typical mobile data speeds in the UK were 1.5Mbit/s in Q4 2010⁶⁶; in contrast, according to Vodafone, its LTE customers in Germany are receiving actual speeds

⁶⁶ This finding was presented in Ofcom's Measuring Mobile Broadband in the UK report, published in May 2011. See http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2010/Mobile_BB_performance.pdf

of 6-12Mbit/s⁶⁷ in practice. Figure 6.12 illustrates the evolution of mobile technology in the UK since 1993.

Figure 6.12 Theoretical download speeds of mobile data technologies



Source: Ofcom

LTE networks offer faster downloads, less delay and greater efficiency

LTE networks offer a number of advantages both to consumers and to mobile network operators. For consumers, faster download speeds are required to deliver satisfactory performance for streaming high quality video content, while faster download and upload speeds make it quicker to receive and send large files. In addition to the benefits associated with faster overall speeds, LTE networks typically enable the transmission of data with lower delay (known as latency), meaning that internet connections are more responsive – for example, even a small web page will download much more quickly, while the experience of symmetric services like video telephony and online gaming are much improved.

For mobile network operators, LTE networks make more efficient use of radio spectrum, which will allow operators to carry more traffic for a given quantity of spectrum. This is highly important, given that radio spectrum is finite and telecoms operators have a licence to use only part of it. According to Ofcom’s research⁶⁸, LTE is 3.3 times as efficient for a given amount of spectrum, compared with standard 3G networks being used in 2011. The same research predicts that technical evolution will mean that by 2020, LTE networks will have become 5.5x as spectrally efficient as 3G networks in 2011.

The UK trails other countries in LTE deployment

In December 2009, Swedish operator Teliasonera announced the launch of the world’s first commercial mobile networks using the LTE standard, and by October 2011 LTE networks had launched in 21 countries worldwide, including six of our 17 comparator countries). In November 2011, two million subscribers currently use LTE services on 31 networks around the world, according to the GSA⁶⁹.

However, the evolution of mobile networks is happening at a different pace in different countries. With spectrum auctions not scheduled until the second half of 2012, LTE services are unlikely to launch in the UK, Italy, Ireland and Australia until 2013 or later, while the early

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http://www.vodafone.com/content/dam/vodafone/investors/financial_results_feeds/half_year_30september2011/p_halfyear2011.pdf

⁶⁸ <http://media.ofcom.org.uk/2011/05/12/4g-set-to-deliver-capacity-gains-of-more-than-200-over-3g/>

⁶⁹

http://www.vodafone.com/content/dam/vodafone/investors/financial_results_feeds/half_year_30september2011/p_halfyear2011.pdf

launch of high-speed LTE services in Sweden followed a 2.6GHz spectrum auction in 2008, and also comes in the context of high mobile broadband take-up.

Despite relatively high mobile data use in the UK, the launch of LTE services will be later than in many countries, as operators wait to purchase additional radio spectrum before rolling out LTE commercially, relying on HSPA until then. Ofcom has announced plans to auction spectrum at 800MHz and 2.6GHz (the former is 'digital dividend' spectrum made available by the switchover from analogue to digital television), which is likely to take place in the second half of 2012. In the meantime, operators are trialling LTE; Everything Everywhere announced in May 2011 that it would conduct a trial in Cornwall from September 2011 to early 2012, while in November 2011 O2 launched a nine-month trial in parts of London.⁷⁰

Due to the greater availability of spectrum and a general focus on mobile rather than fixed-line infrastructure, the BRIC countries are ahead of many other countries, including the UK, in rolling out LTE networks. As illustrated in Figure 6.13 below, China has been offering services on a limited scale since 2010 and Brazil is expected to follow suit in 2012. India has only recently launched 3G services, but LTE services are expected to launch in 2012. In Russia, the focus has been on the deployment of Wimax wireless broadband services (Wimax is an alternative technology standard to LTE for delivering high-speed mobile broadband services).

⁷⁰ <http://news.o2.co.uk/Press-Releases/O2-brings-superfast-4G-to-London-347.aspx>

Figure 6.13 Awards of UHF spectrum for likely LTE use

	Relevant spectrum awards	LTE launch	Comments
UK	No	No	Currently consulting on combined spectrum award. Proposed award is likely to be in the second half of 2012 with likely deployment of services starting 2013-2014.
FRA	No	No	Award for both bands expected early 2012
GER	Yes – 800MHz and 2.6GHz	Yes	Awarded May 2010. Commercial services launched late 2010.
ITA	Yes - 800MHz and 2.6GHz	No	Spectrum availability expected at the turn of 2012/2013
USA	Yes – 700MHz, 1700MHz and 2.1GHz	Yes	LTE services launched in all three bands in 2010
CAN		No	Launch expected 2012, with the auction of the 700MHz band late 2012.
JPN	Yes – 1500MHz	Yes	Launched December 2010.
AUS	No	No	700MHz and 2.6GHz auctions expected end 2012.
ESP	Yes – 800MHz and 2.6GHz	Expected late 2011	800MHz awarded July 2011.
NED	No	No	Awards in both bands expected early 2012.
SWE	Yes - 800MHz and 2.6GHz	Yes	World's first LTE deployment in 2009 after 2.6GHz award in 2008. Five operators now using this band. 800MHz awarded March 2011. Deployment of LTE Advanced expected in 2013.
IRL	No	No	Consultation launched on 800MHz band. Services expected after digital switchover in 2012. No plans for awarding 2.6GHz band.
POL	Yes – 2.6GHz	Yes	Part of the 2.6GHz band was awarded in 2009, which is already being used for LTE. No timetable for 800MHz.
BRA	No	No	2.6GHz spectrum award expected 2012.
RUS	Yes - 2.6GHz	No	2.6GHz band is being used for Wimax services.
IND	Yes – 800MHz and 2.3GHz	No	800MHz launch (2010) for UMTS only. 2.3GHz spectrum, awarded 2010, may be used for LTE, with services as early as the first half of 2012.
CHN		Yes	LTE services launched in 2010. Widescale deployment expected.

Source: Ofcom

Mobile data networks in Poland offer the fastest theoretical speeds

Figure 6.14 details the highest theoretical speeds commercially available in 13 countries in November 2011. It should be treated with caution, as in all countries there is a large gap between theoretical speeds and the actual speeds being delivered, and in many countries the speeds marketed are below the theoretical speeds (for example, Bell in Canada indicates⁷¹ average speeds of 12-25Mbit/s with peak speeds of 'up to' 75Mbit/s, and AT&T in the US simply claims LTE speeds will be 'up to ten times faster than 3G').⁷²

While the technology (LTE, HSPA, HSPA+) is a determinant of the theoretical speeds available, network topology, radio access network contention, other network technologies and consumer hardware, as well as the size of the radio spectrum bands used, are also relevant in determining speed. For example, in Poland the joint venture between operators CenterNet and Mobyland uses a 20MHz shared downlink and uplink band in the 1800MHz band (using the LTE Time Division Duplex, or TDD, standard) to offer theoretical speeds of 153Mbit/s⁷³, whereas Vodafone Germany uses two paired blocks of 5MHz in the 800MHz

⁷¹ <http://www.bce.ca/en/news/releases/bm/2011/09/14/76960.html?displayMode=print&>

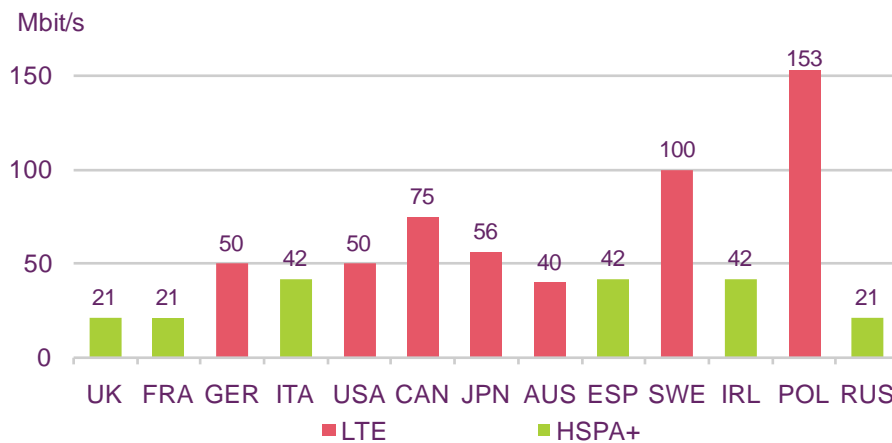
⁷² <http://www.att.com/network/>

⁷³ http://www.mobyland.com/pdfs/IP_MBL_and_Cent_07_09_2010_v7_en.pdf

band (using the Frequency Division, or FDD, standard) and offers theoretical maximum speeds of 50Mbit/s⁷⁴.

In Sweden, Teliasonera's LTE network uses a 20MHz downlink carrier to offer theoretical speeds of 100Mbit/s⁷⁵, while the LTE network deployed by MetroPCS in parts of the US uses 5MHz of spectrum, and has a lower theoretical maximum speed. As LTE networks are launched in more countries, the number of devices that can connect to LTE networks grows. By November 2011, according to the GSA, 161 devices capable of connecting to LTE networks were available. Most of these devices are also able to use HSPA networks, for when subscribers are not within range of an LTE base station.

Figure 6.14 Maximum theoretical download speeds available via mobile networks, by country: October 2011



Source: Ofcom, Global mobile Suppliers Association (GSA), Technology Update, 28 October 2011

⁷⁴ <http://www.mobilenewscwp.co.uk/2010/12/vodafone-germany-intros-lte-service-and-pricing/>

⁷⁵ <http://feed.ne.cision.com/wpyfs/00/00/00/00/00/13/28/1C/wkr0002.pdf>

6.2 The telecoms industry

6.2.1 Introduction

In this section we consider the major trends in telecommunications markets in the 17 nations covered by this report from an industry and operator perspective. In general, we have looked at trends over the five years to 2010, although we provide year-on-year analysis where trends have changed significantly over the period.

In the first part of this section we provide an overview of the industry as a whole, considering recent trends in revenue growth. We then look at each market individually and in more depth, starting with fixed voice, followed by mobile voice and data services and concluding with an overview of fixed-broadband services.

Some of the key points highlighted in this section include:

- **Total retail telecoms revenue generated in the 17 countries covered in this report was £594bn in 2010, 1.9% higher than in 2009.** This growth followed a 0.4% fall in total telecoms revenues in 2009 (page 242).
- **The BRIC countries had the highest average annual growth rate in telecoms revenues in the five years to 2010.** Growth was highest in Russia at 16.1%, followed by India (10.6%) Brazil (6.6%) and China at 5.4%, while in the UK it averaged 1.2% over the period (page 244).
- **Annual revenues from mobile services in the US, the largest mobile market among our comparator countries, passed £100m for the first time in 2010.** However, it was in India that growth in mobile revenues was highest, with growth hitting 18% during the year. In the UK mobile revenues were unchanged at £14.9bn in 2010 (page 255).
- **In 2010 data services generated 34% of total telecoms revenue among the non-BRIC countries in our report, up from 16% in 2005 and 30% in 2009.** Among these countries, the proportion of telecoms service revenue generated by data services ranged from 27% in the UK to 43% in Japan (page 245).
- **The UK was one of only three countries where fixed broadband revenues declined in 2010.** This 4.8% revenue fall in the UK was as a result of falling prices and increasing service bundling, and was despite increasing average connection speeds (page 32).
- **Fixed voice volumes declined in all of our comparator countries except France, Canada, Australia, Russia and China in 2010.** The fastest rates of increase in 2010 were in China (up 4.0%) as a result of strong economic growth during the year and in France (up 2.1%), while in the UK fixed voice call volumes fell by 2.4% to 129 billion minutes (page 251).
- **In 2010 the proportion of mobile connections that were pre-pay fell in all of our comparator countries except the US, Russia and India.** This is as a result of providers seeking to maximising revenues from their existing customer base by incentivising pre-pay customers to switch to higher-spend monthly contracts (page 267).

6.2.2 Overview

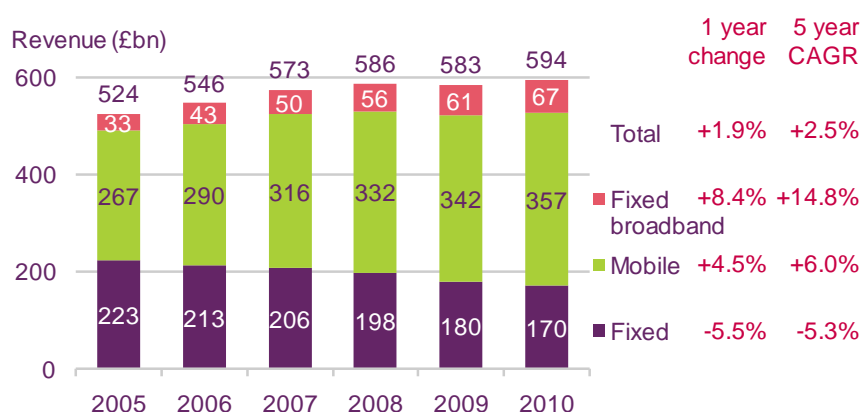
Telecoms revenues return to growth, following a decline in 2009

Total retail telecoms revenue generated in the 17 countries covered in this report amounted to £594bn in 2010, 1.9% higher than in 2009 and 13.4% higher than in 2005 (Figure 6.15). The growth in 2010 was as a result of a slowing in the rate of decline of fixed-line revenues and an improvement in global economic conditions, and followed a 0.4% fall in total revenues in 2009.

In the five years to 2010, fixed broadband services provided the fastest growing element of telecoms revenues, increasing by an average of 14.8% a year, from £33bn in 2005 to £67bn in 2010. Over the same period, revenues from mobile services grew by an average of 6.0% a year, while those from fixed-line voice services fell by an average of 5.3% a year, from £223bn in 2005 to £170bn in 2010.

Mobile telephony services continued to generate the majority of total telecoms revenue in 2010, accounting for 60% of the total (up from 59% in 2009 and by more than nine percentage points since 2005). Fixed-line voice share of total telecoms revenues fell to 29% in 2010, (compared to 31% in 2009 and 43% in 2005) while fixed broadband services continued to account for 11% of total revenue, one percentage point higher than in 2009 and five higher than in 2005.

Figure 6.15 Total comparator country retail telecoms revenue, by sector: 2005 to 2010



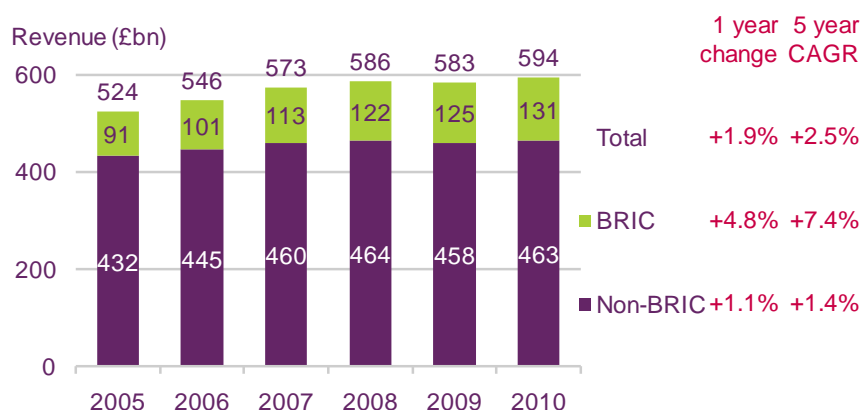
Source: IDATE / industry data / Ofcom

Note: Excludes revenue from narrowband internet and corporate data services and broadband revenues for BRA, RUS, IND and CHN; covers only the 17 countries in the analysis; figures have been restated to reflect more accurate data

Brazil, Russia, India and China are growing the fastest by total telecoms revenues

The decline in total telecoms revenues in 2009 was as a result of a 1.2% fall in revenues in the non-BRIC countries (revenues in the BRIC countries – Brazil, Russia, India and China - continued to grow, increasing by 2.2% during the year). In 2010 non-BRIC country telecoms revenues returned to growth, increasing by 1.1% during the year as many countries recovered to some extent from the economic downturn. In the BRIC countries, the rate of telecoms revenue growth more than doubled in 2010 to 4.8% (Figure 6.16).

Figure 6.16 Total comparator country retail telecoms revenue, by country type: 2005 to 2010



Source: IDATE / industry data / Ofcom

Note: Excludes revenue from narrowband internet and corporate data services and broadband revenues for BRA, RUS, IND and CHN; covers only the 17 countries in the analysis; figures have been restated to reflect more accurate data

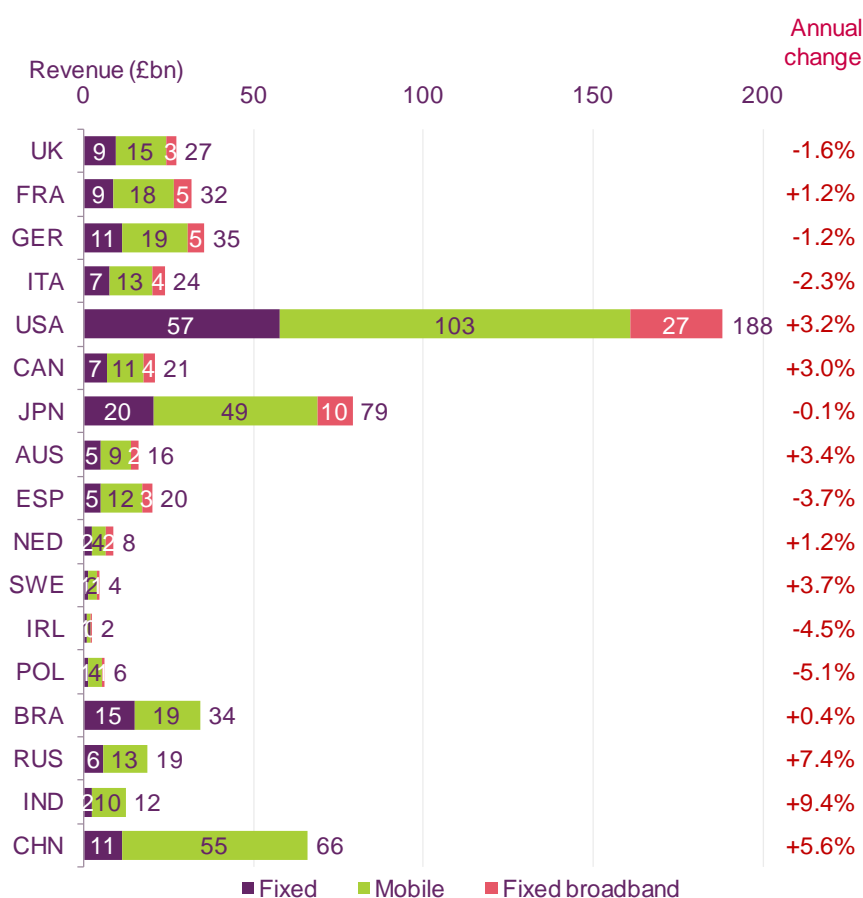
Mobile accounts for the majority of telecoms spend in all countries except Ireland

Ireland was unique among our comparator countries in that it was the only nation where revenues generated by mobile services were less than the combined revenues generated by fixed voice and broadband services. In 2010, mobile services generated 49% of total telecoms revenue in Ireland, with fixed voice accounting for 39% of all revenue (the highest among our comparator countries).

High take-up and use of mobiles in Poland (along with low fixed-line take-up) meant that it had both the highest proportion of total revenue generated by mobile services in 2010 (69%) and the lowest proportions generated by fixed voice (20%) and fixed broadband (10%) services. The Netherlands had the highest proportion of telecoms revenues generated by fixed broadband services in 2010, at 24%.

In terms of total revenue, the US continued to be the largest telecoms market covered in this analysis (and in the world as a whole) in 2010, generating £188bn of telecoms service revenues in 2010, a 3.2% increase on 2009 (Figure 6.17). Japan generated the second-highest telecoms revenues in 2010 at £79bn (down 0.1% on 2009) while in China, which had the third highest telecoms service revenue in 2010 at £66bn, revenues were 5.6% higher than in 2009). The UK had the seventh-largest telecoms market among our comparator countries in 2010, at £27bn higher than in Italy (£24bn) but lower than in Germany and France (£35bn and £32bn respectively).

Figure 6.17 Telecoms service retail revenue, by nation and by sector: 2010



Source: IDATE / industry data / Ofcom

Note: Total service revenue excludes revenue from narrowband internet and corporate data services and broadband revenues for BRA, RUS, IND and CHN

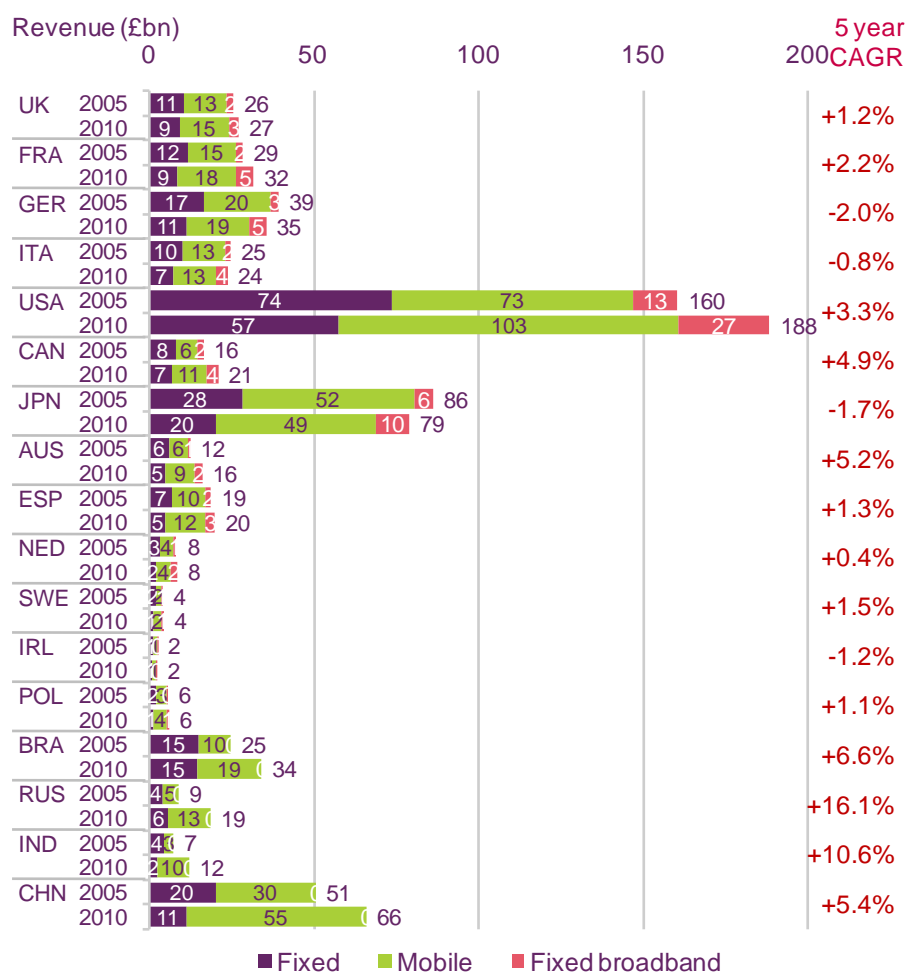
Russia had the highest growth in telecoms revenues in the five years to 2010

The BRIC countries had the highest average annual growth rate in telecoms revenues in the five years to 2010, with the rate being highest in Russia at 16.1%, followed by India (10.6%), Brazil (6.6%) and then China at 5.4% (Figure 6.18).

Among the non-BRIC comparator countries, revenue growth was highest in Australia (5.2%) and Canada (4.9%) over the same five-year period. In both countries mobile revenues contributed the greatest increase in revenues, while percentage growth rates were highest for fixed broadband revenues. Similarly, in the UK, a 2.8% average annual increase in mobile revenues was the largest element of a 1.2% average annual rise in total revenues, although the highest percentage growth rate over the period was in fixed broadband revenues, at 8.1%.

In four of our comparator countries total revenues from telecoms services fell between 2005 and 2010. These countries were Germany (down an average of 2.0% a year), Italy (down 0.8% a year), Japan (down 1.7%) and Ireland (down 1.2%). These falls were largely caused by declining fixed voice revenues (which fell in all of our comparator countries except Russia between 2005 and 2010, reflecting falling fixed-line use). However, in these countries mobile service revenues also fell over the period as a result of declining prices (they were the only comparator countries where this occurred).

Figure 6.18 Telecoms service retail revenues, by sector: 2005 and 2010



Source: IDATE / industry data / Ofcom

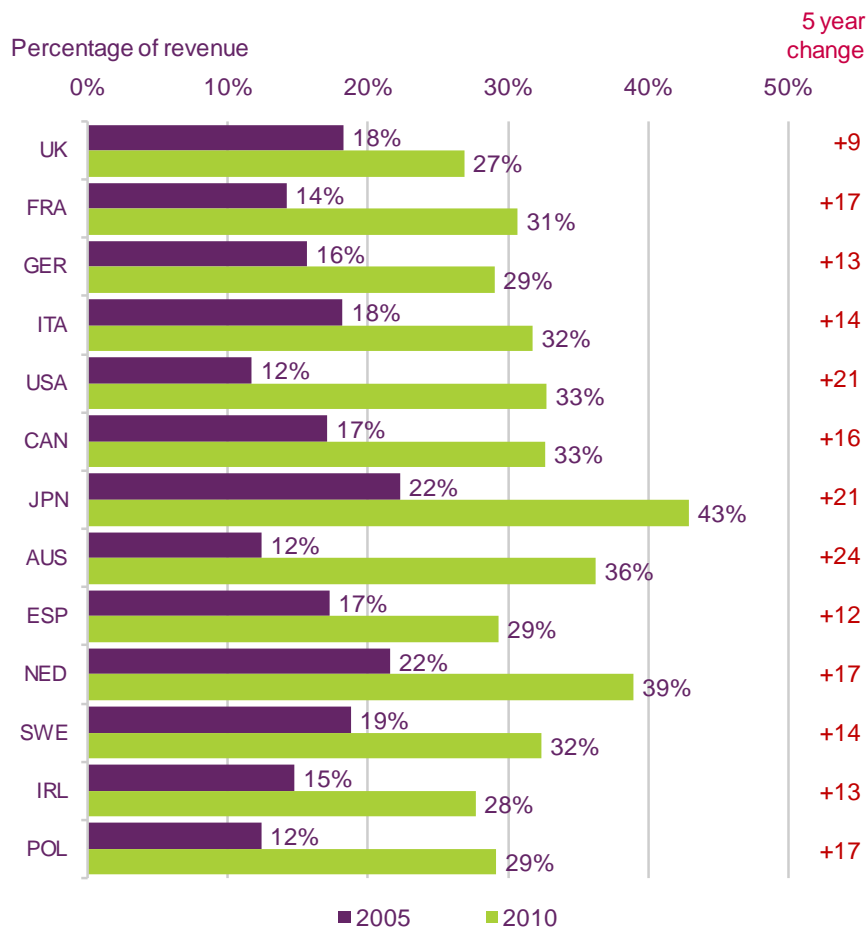
Note: Total service revenue excludes revenue from narrowband internet and corporate data services and broadband revenues for BRA, RUS, IND and CHN

Data services accounted for over a third of telecoms services revenues in 2010

There has been a gradual shift in the source of revenue for telecoms operators over the past few years, as revenues from voice services have declined and those from both fixed and mobile data services have increased. In 2010 data services generated 34% of total telecoms revenues among the non-BRIC countries in our report (we do not have fixed broadband revenue data for the BRIC countries), up from 16% in 2005 and 30% in 2009 (Figure 6.19). Among these countries, the proportion of telecoms service revenue generated by data services ranged from 27% in the UK to 43% in Japan, with the proportion from mobile data services ranging from 14% in France to 30% in Japan.

It should be noted that throughout this report, 'data service revenue' includes revenue from fixed broadband and mobile data services (including SMS and MMS messaging), but excludes revenue from narrowband internet and corporate data services (which are also excluded from our overall telecoms industry totals). Voice and data services are often sold together – for example, fixed broadband services are often sold in a 'bundle' with fixed voice services, and pay-monthly mobile services often include a bundle of both voice and data services – which can make it problematical to isolate revenues. We use operator allocations, but data revenues may be understated, as telephone rental is typically fully allocated to voice revenue, as are access charges for mobile phone contracts.

Figure 6.19 Data revenue as a proportion of total telecoms revenues: 2005 and 2010

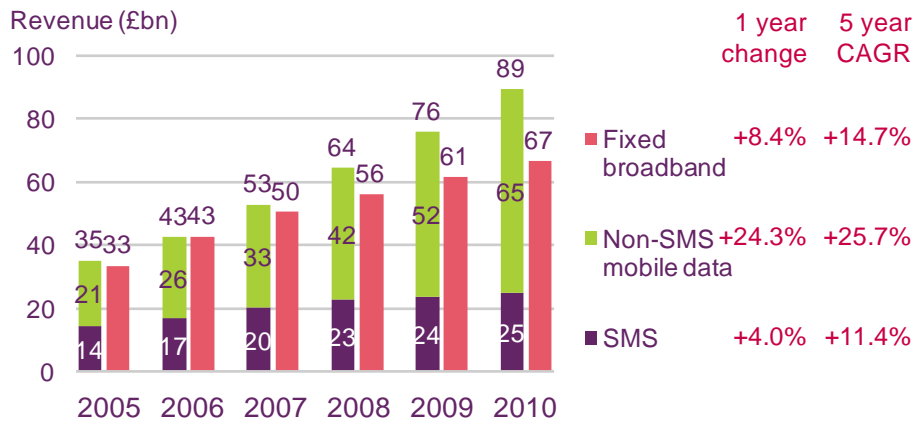


Source: IDATE / industry data / Ofcom
 Note: Analysis excludes the BRIC countries

Mobile data revenues growing twice as fast as those from fixed broadband

Figure 6.20 shows total mobile data and fixed broadband revenues from 2005 to 2010 in the 13 comparator countries for which fixed broadband revenue figures were available. This shows that mobile data revenues (£89bn) continued to be higher than those from fixed data services (£67bn) in 2010. Growth in mobile data revenues in 2010 (17.9%) was more than twice that of fixed broadband services (8.4%) in 2010, while on average over the previous five years the rates of growth were closer, at 14.8% for fixed broadband services and 20.6% for mobile data services.

Figure 6.20 Fixed broadband and mobile data revenues: 2005 to 2010

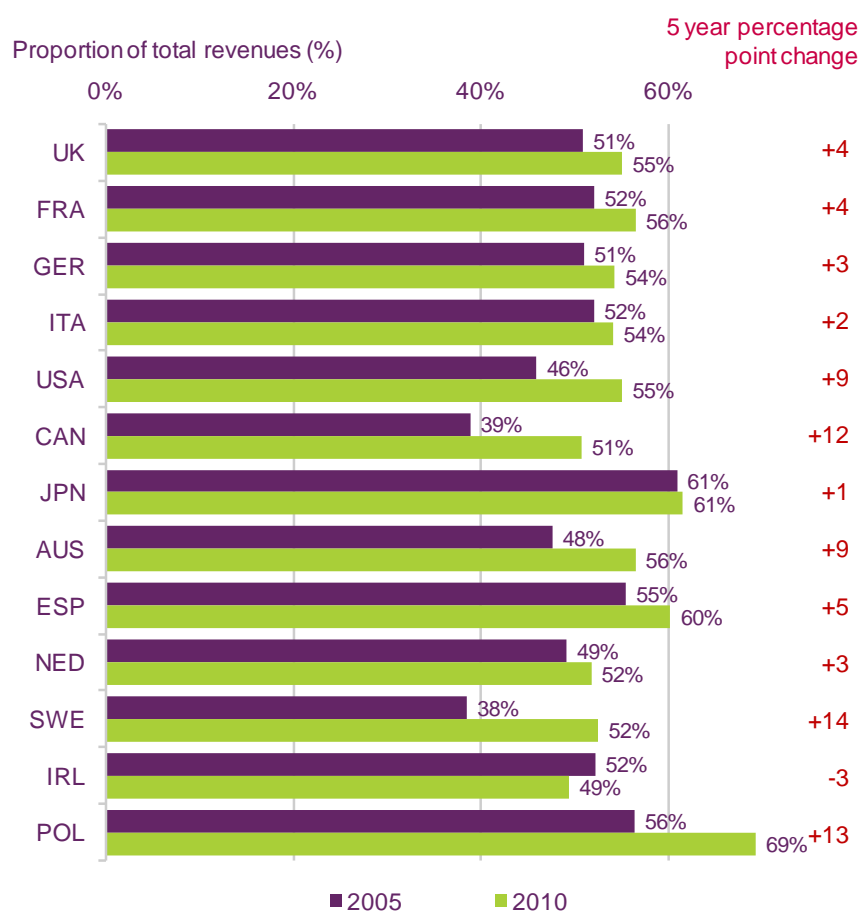


Source: IDATE / industry data / Ofcom
 Note: Analysis excludes the BRIC countries

Mobile accounts for 69% of total telecoms spend in Poland

Across the 13 comparator nations for which fixed broadband revenue data were available (which excludes the BRIC countries), mobile accounted for 56% of total telecoms revenues in 2010, compared to 51% in 2005 and 55% in 2009 (Figure 6.21). Ireland had the lowest proportion of revenue attributed to mobile in 2010, at 49%, while Japan had the lowest increase in mobile’s share of total telecoms revenues over the five years, at just one percentage point. Poland had the highest proportion of telecoms revenue from mobile services in 2010, at 69%, while mobile’s share of revenue had the largest increase in the five years to 2010 in Sweden, where it increased by 14 percentage points to 52% over the period. In the UK, mobile contributed 55% of total telecoms revenues in 2010, an increase of four percentage points on 2005.

Figure 6.21 Mobile as a proportion of total telecoms revenues, 2005 and 2010



Source: IDATE / industry data / Ofcom

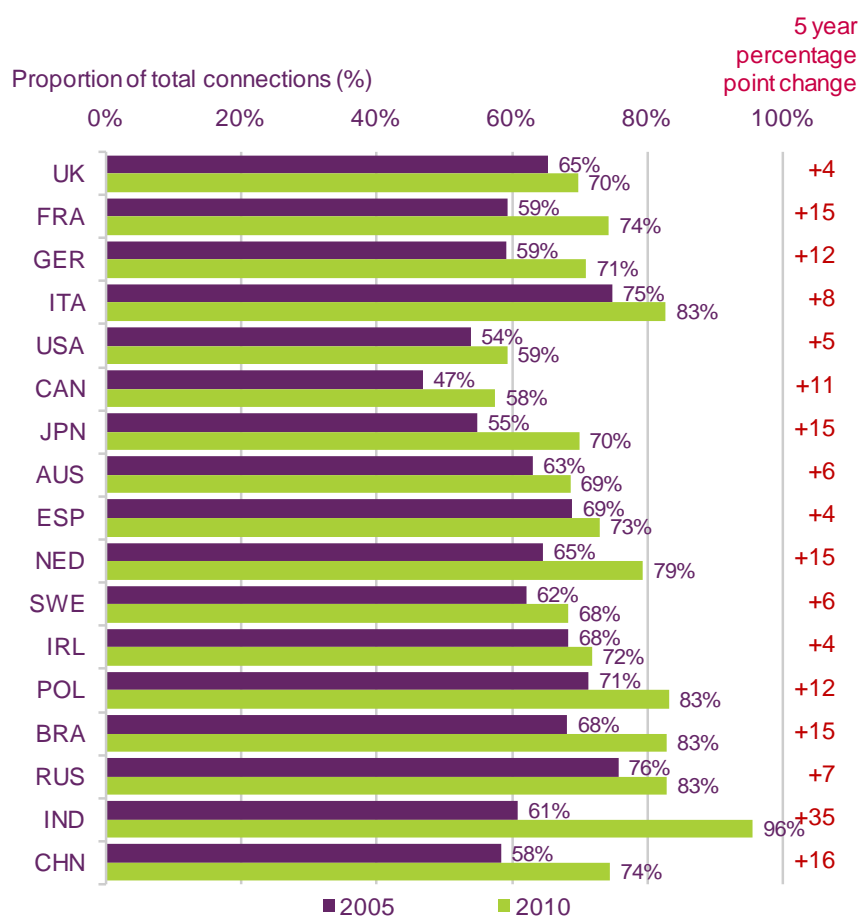
Note: Analysis excludes the BRIC countries

Mobile accounts for over 95% of voice connections in India

The proportion of voice telecoms connections that were mobile was highest in India (96%) at the end of 2010, while among the European comparator countries Italy, Russia and Poland had the highest proportions, at 83% (Figure 6.22). Several factors may be behind a high proportion of mobile connections relative to fixed, including low fixed-line availability, the comparatively high cost of fixed-line services and the prevalence of multiple mobile connections per person, often present in countries where pre-pay is the main way of purchasing mobile services.

On average, mobile accounted for 78% of total voice telecoms connections across our 17 comparator countries in 2010, up from 76% in 2009 and 61% in 2005. In the UK 70% of all voice telecoms connections were mobile in 2010, four percentage points higher than in 2005 and the fifth lowest proportion among our comparator countries after Canada (58%) the US (59%) Sweden (68%) and Australia (69%), where the majority of mobile connections are pay-monthly contracts.

Figure 6.22 Mobile as a proportion of total voice connections: 2005 and 2010



Source: IDATE / industry data / Ofcom

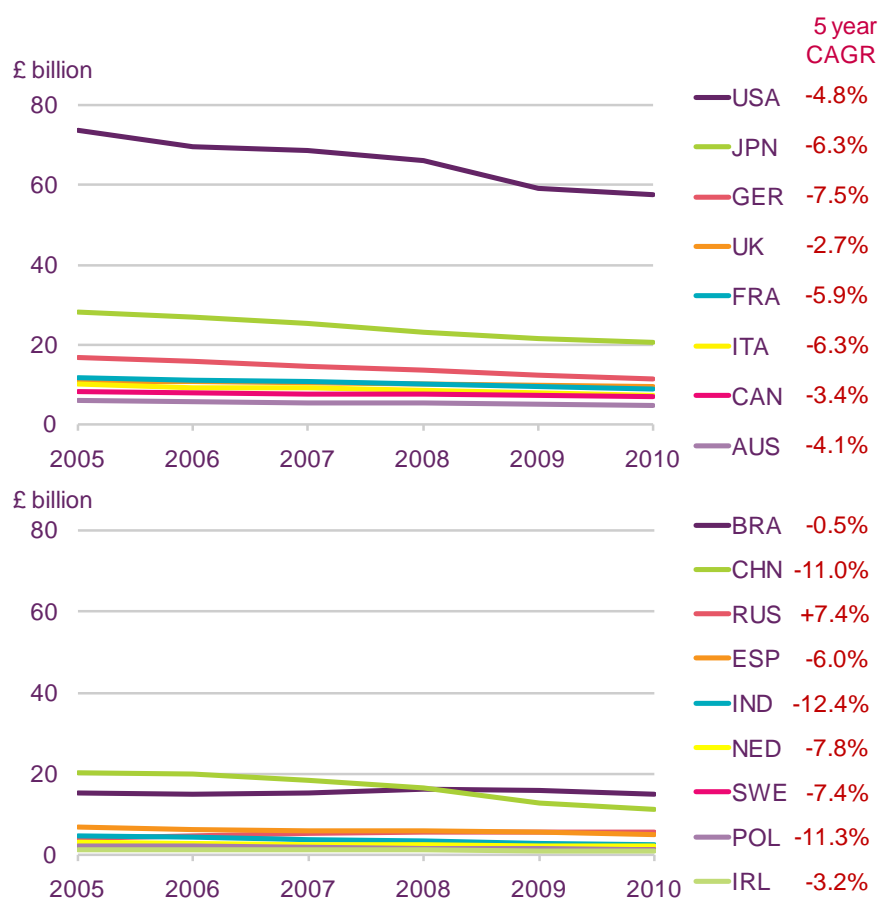
Note: Calculation excludes mobile broadband connections

6.2.3 Fixed voice services

Fixed voice revenues fell in every country except Russia and Sweden in 2010

Across all 17 comparator countries fixed voice telephony revenues fell by an average of 5.3% a year between 2005 and 2010, lower than the 8.9% fall in 2009, when the full effect of the global economic downturn was felt (Figure 6.23). Fixed voice revenues fell in all our comparator countries in 2010 with the exception of Russia, which was also the only comparator country where fixed-line revenues increased over the five-year period. The fastest average annual decline in fixed voice telephony revenues over the five years to 2010 was in India (12.4%), followed by Poland (11.3%), where levels of mobile use are high and increasing rapidly. In the US revenues fell by an average of almost 5% annually over the period, to £57bn in 2010.

Figure 6.23 Fixed-line voice retail revenues, 2005 and 2010



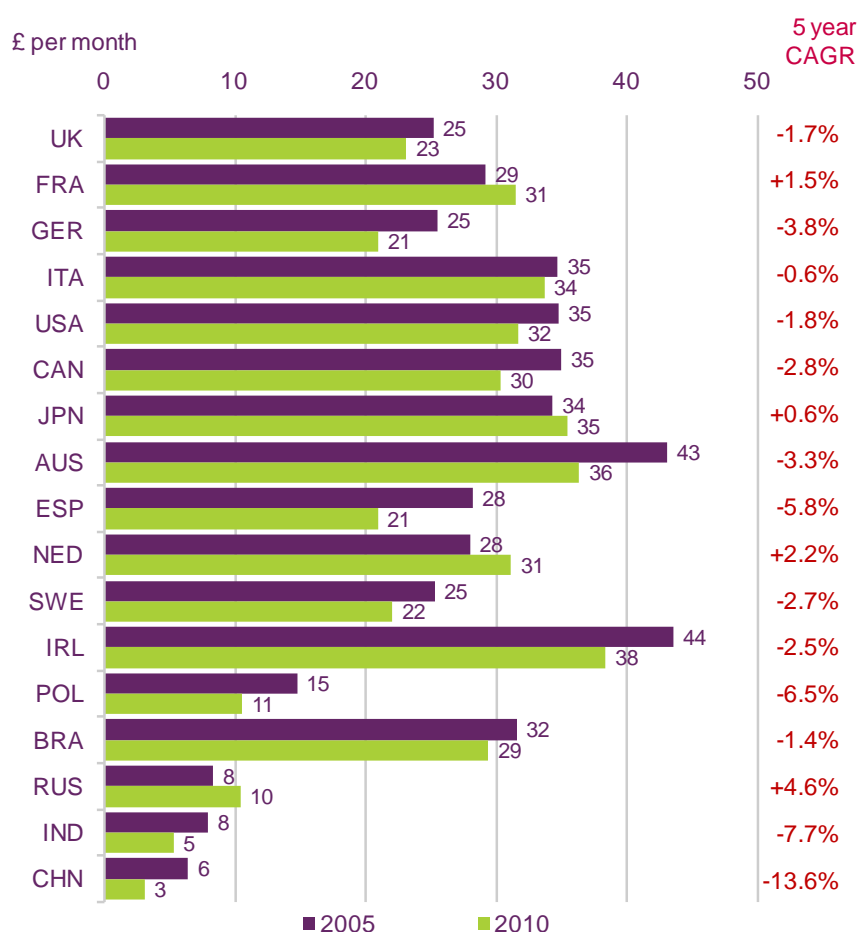
Source: IDATE / industry data / Ofcom

Average voice revenue per fixed line is lowest in China at £3 a month

Average voice revenue per fixed line fell in all but four of the countries covered in this analysis between 2005 and 2010, with the largest average annual declines being in China (13.6%) and India (7.7%), where the shift towards mobile voice telephony is likely to be the main contributory factor (Figure 6.24). The largest increase in revenue per line over the period was in Russia, where the increase averaged 4.6% a year to £10 per month in 2010, although most of this growth occurred prior to 2008 and average revenue per line has remained largely unchanged since then.

There were significant variations in the average monthly revenue per fixed voice line generated during 2010 among the 17 countries covered in this report. The highest revenue per line was in Ireland, at £38 per month, while it was just £3 per month in China. Average spend per fixed line in the UK was £23 in 2010, down an average of 1.7% a year since 2005. The average monthly revenue per line across the 17 countries was £17 in 2010, down from £22 in 2005, largely as a result of growth in the number of lines in the BRIC countries, where average revenue per line is low.

Figure 6.24 Average monthly revenue per fixed line, 2005 and 2010



Source: IDATE / industry data / Ofcom

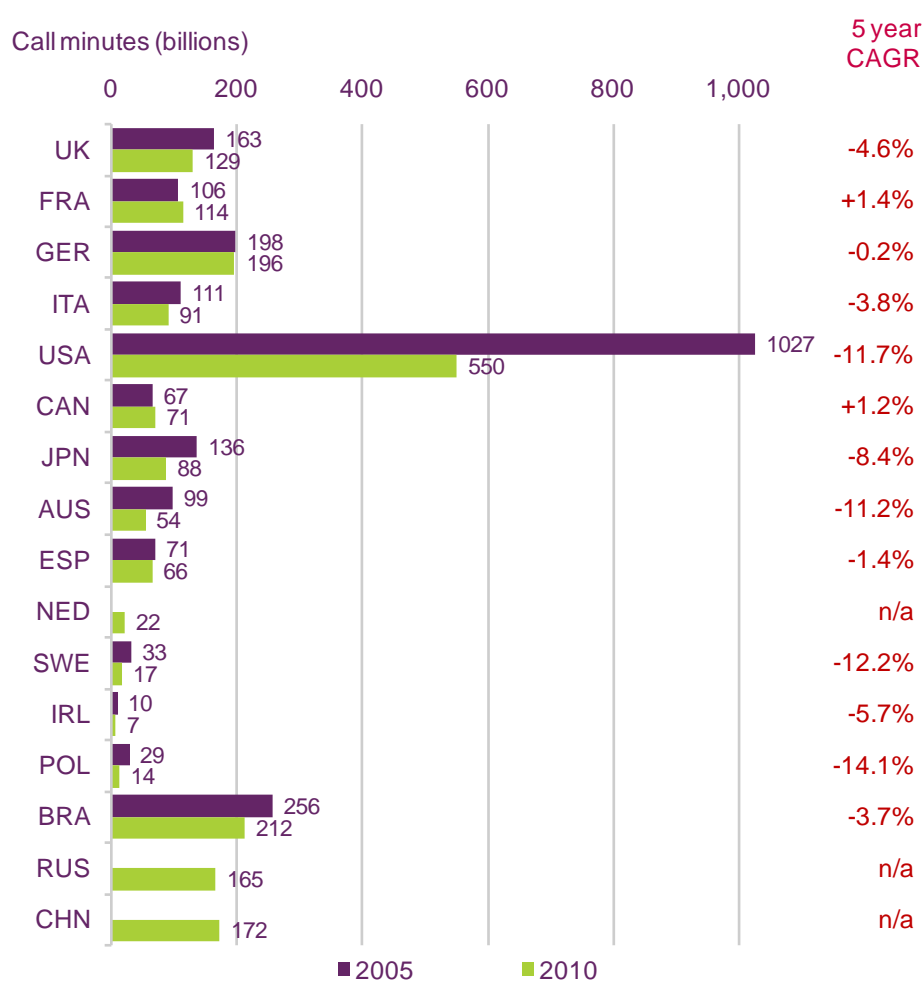
Fixed call volumes are declining in most comparator countries

Fixed voice volumes declined in all but five of the comparator countries for which data were available in 2010, those countries being France, Canada, Australia, Russia and China. The fastest rates of growth in 2010 were in China (up 4.0%) as a result of strong economic growth during the year, and in France (up 2.1%), as a result of the availability of cheap voice over IP (VoIP)-based fixed-line services.

Among the 11 comparator countries where fixed voice call volumes fell in 2010, the rate of decline ranged from 0.2% in Germany (where mobile services are relatively expensive) to 15.0% in Poland where there is low availability of fixed-line networks and high mobile use. Across all of the comparator countries for which data were available, fixed voice call volumes fell by an average of 3.8% in 2010, the rate of decline in the UK being less than average at 2.4%.

Looking at the longer-term trend, France and Canada were the only comparator countries for which data were available, where fixed voice call volumes increased in the five years to 2010, growing by an average of 1.4% and 1.2% respectively over the period (Figure 6.25). Again, Poland had the highest average annual rate of decline in fixed call volumes at 14.1%, while in the UK fixed voice call volumes fell by an average of 4.6% a year over the period.

Figure 6.25 Fixed-line voice call volumes: 2005 and 2010



Source: IDATE / industry data / Ofcom

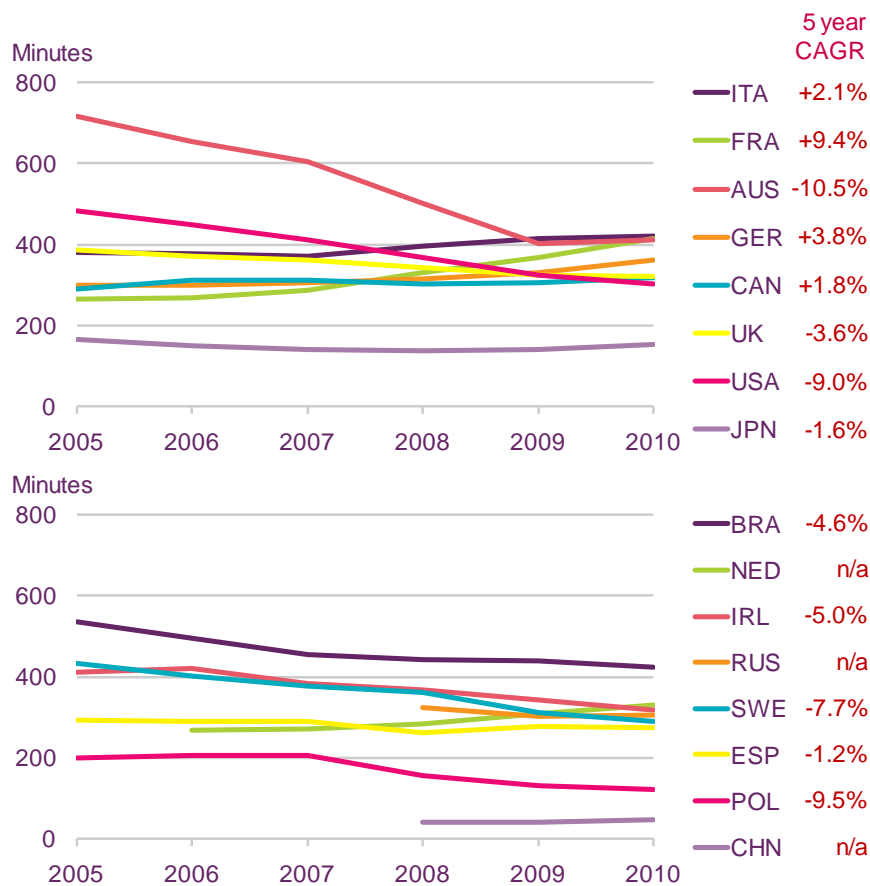
Note: Figures for US and CAN exclude local and VoIP calls and include incoming mobile calls

Call minutes per fixed line were highest in Brazil in 2010

The average number of monthly outgoing minutes per fixed line fell by 3.8% a year to 315 minutes a month in the five years to 2010, across the 13 comparator countries for which full time series data was available (Figure 6.26). Brazil had the highest number of call minutes per fixed line in 2010, at 422 minutes a month, almost nine times higher than that in China, where average use was lowest, at 47 minutes per month.

Average call volumes per fixed line in the UK fell to 322 minutes in 2010, an average annual decline of 3.6% over the five-year period. Italy, France, Germany and Canada were the only comparator countries for which full time series data were available where call volumes per line increased during the same five-year period, with the largest average annual rate of growth being in France, at 9.4% per year.

Figure 6.26 Monthly outbound minutes per fixed line: 2005 to 2010



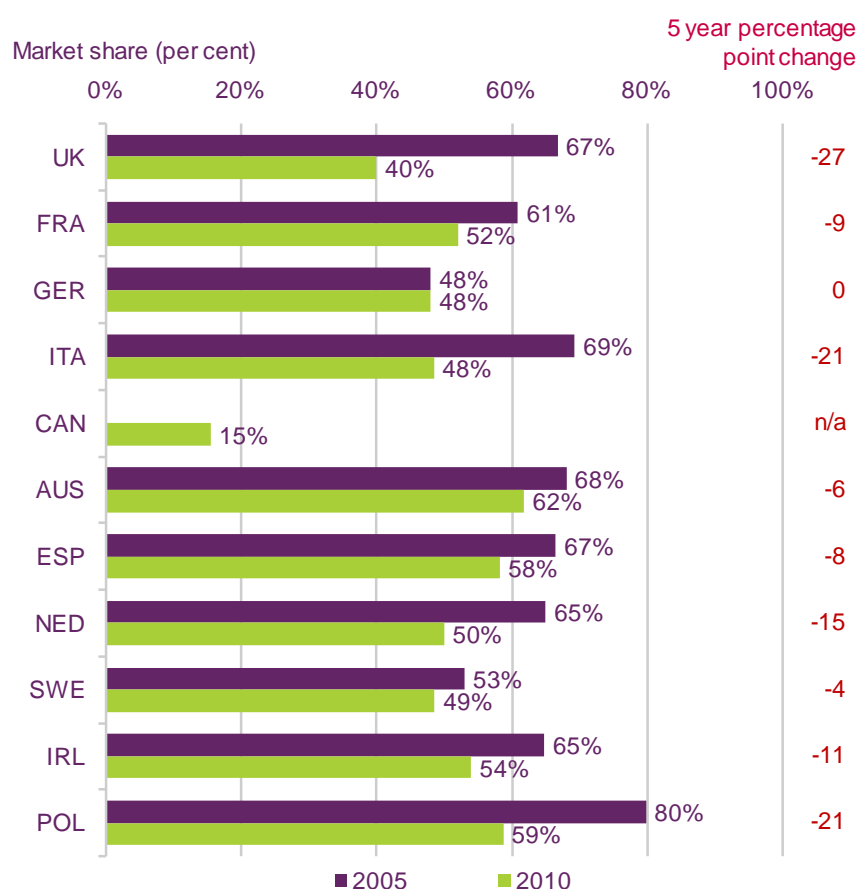
Source: IDATE / industry data / Ofcom

Note: Figures for US and CAN exclude local and VoIP calls and include incoming mobile calls

Germany is the only nation where the incumbent operator’s fixed call volume share has not fallen

Across all of the comparator countries for which figures were available, the incumbent operator’s share of fixed voice call volumes ranged from 15% in Canada (where the market is fragmented between regional players) to 62% in Australia in 2010 (Figure 6.27). In the UK, BT’s share of fixed voice call volumes was 40%, the second lowest share after Bell Canada’s, and 27 percentage points lower than it had been in 2005, the largest fall among our comparator countries. There were similar falls in the proportion of fixed call volumes which originated on the national incumbent operators’ networks in the five years to 2010 in all of the comparator countries for which figures were available, the only exception being in Germany, where Deutsche Telekom’s share was unchanged at 48%.

Figure 6.27 Incumbent operator's share of fixed voice call volumes: 2005 and 2010



Source: IDATE / industry data / Ofcom

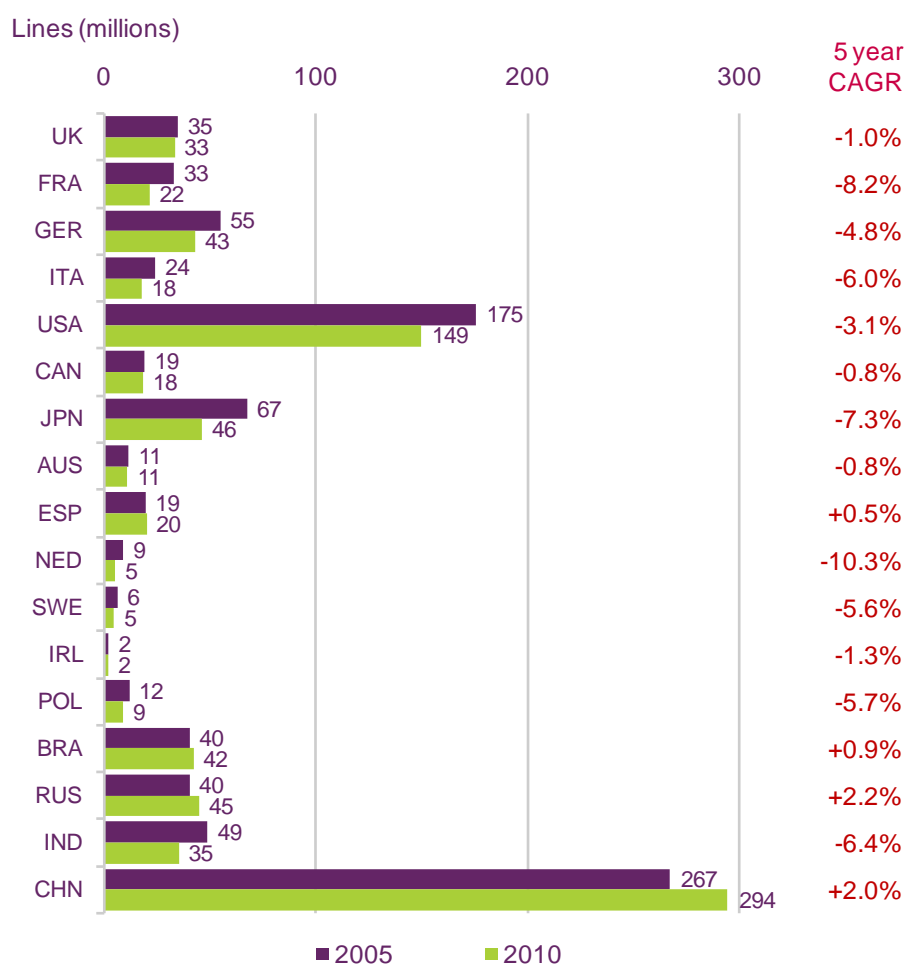
Note: Figures for CAN exclude local and VoIP calls and include incoming mobile calls

Take-up of VoIP drives decline in fixed exchange lines in the Netherlands, France and Japan

Between 2005 and 2010 the number of fixed exchange lines fell in all of our comparator countries except Russia, China, Brazil and Spain, where the number of lines increased by averages of 2.2%, 2.0%, 0.9% and 0.5% respectively per year over the period (Figure 6.28). Brazil was the only comparator country where the number of fixed exchange lines increased in 2010 (up by 1.4%), as the number of lines in Spain, Russia and China have declined over recent years.

The fastest average annual rate of decline in the number of fixed lines in the five years to 2010 was in the Netherlands, at 10.3%, followed by France and Japan, where the number of lines fell by an average of 8.2% and 7.3% a year respectively. Increasing take-up of VoIP services over broadband connections, where no fixed voice line connection is required (using either 'naked' DSL, cable or fibre), is likely to be a significant contributor to the rapid decline in these countries. In the UK the number of fixed lines fell by 1.0% a year, on average, over the period, to 33 million.

Figure 6.28 Fixed exchange lines: 2005 and 2010



Source: IDATE / industry data / Ofcom

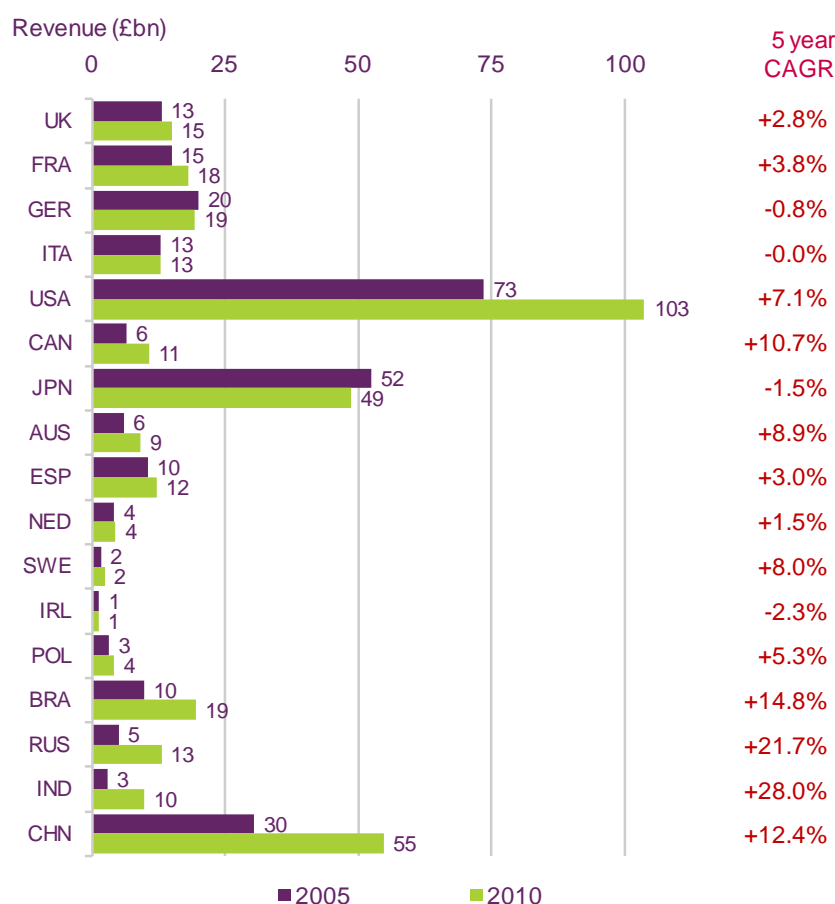
6.2.4 Mobile voice and data services

US mobile revenues passed £100m for the first time in 2010

Annual revenues from mobile services in the US, the largest mobile market among our comparator countries, passed £100m for the first time in 2010, growing by 4.8% during the year to £103m. However, it was in India that growth in mobile revenues was highest, with growth hitting 18.0% during the year (in the UK mobile revenues were unchanged at £14.9bn).

Average growth in mobile revenues was highest in the BRIC countries during the five years to 2010, with India experiencing the largest average annual increase, at 28.0% a year; from £3bn in 2005 to £10bn in 2010 (Figure 6.29). However, growth in the BRIC countries is slowing, and was, on average, 10.0% in 2010 compared to an average of 15.1% in the five years to 2010. Outside the BRIC countries average annual revenue growth in the five years to 2010 was strongest in Canada (10.7%) and Australia (8.9%), while in the UK revenue grew by an average of 2.8% a year. Ireland, Japan, Germany and Italy were the only countries in which mobile revenues declined over the five-year period, with the sharpest fall being in Ireland, where revenues dropped by an average of 2.3% a year over the period.

Figure 6.29 Mobile retail revenues, 2005 and 2010



Source: IDATE / industry data / Ofcom

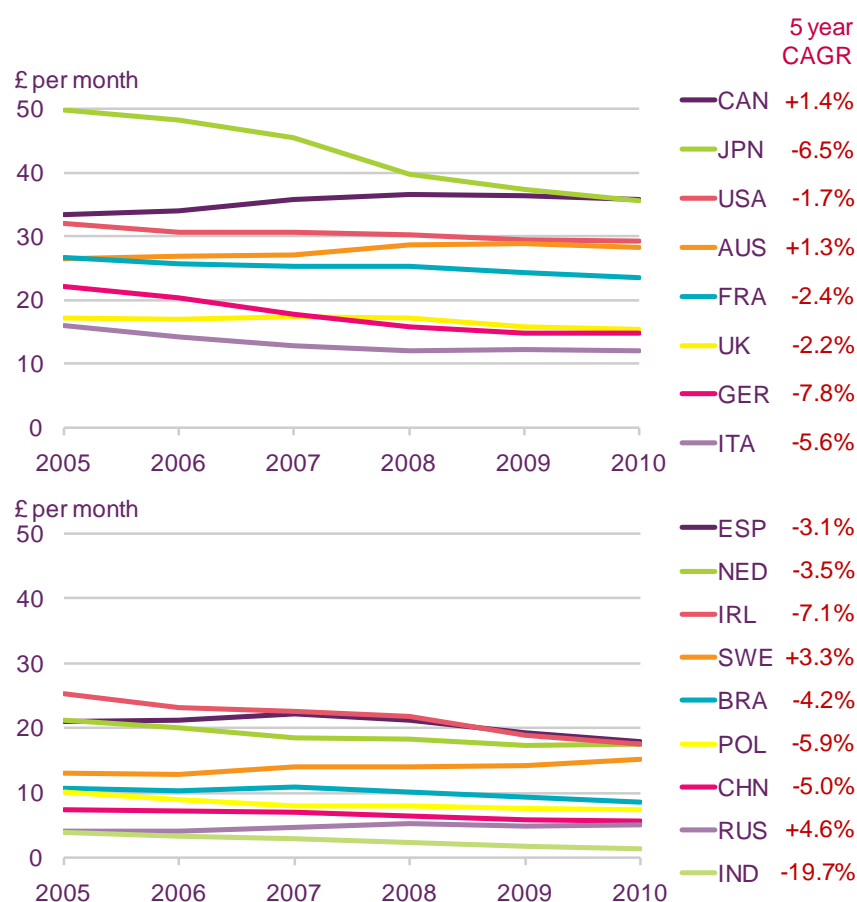
Note: USA and CAN include revenues from incoming calls

Revenue per mobile connection is highest in Canada and Japan, at £36 per month

In most comparator countries, average revenue per mobile connection declined in the five years to 2010, with the greatest average annual falls in being in India (19.7%) and Germany (7.8%) where spend has fallen as a result of falling prices, and is despite growing call volumes per connection (see Figure 6.35). Competition between mobile providers is the main factor behind falling prices in most comparator countries, and this has led to falling average spend, although the global economic downturn is likely to have also had a downward effect, as consumers have sought to reduce household spend.

The only comparator countries where average spend per connection increased in the five years to 2010 were Sweden, Russia, Canada and Australia. There were wide variations in revenue per mobile connection across our comparator countries, with average spend in 2010 ranging from just £1 per month in India to £36 a month in Canada and Japan (Figure 6.30). The main driver of variations in average mobile spend are differences in income levels (although although high levels of multiple connections per user will also reduce average spend). In the UK, average monthly spend fell by an average of 2.2% a year in the five years to 2010, to £15.

Figure 6.30 Average monthly revenue per mobile connection: 2005 to 2010



Source: IDATE / industry data / Ofcom

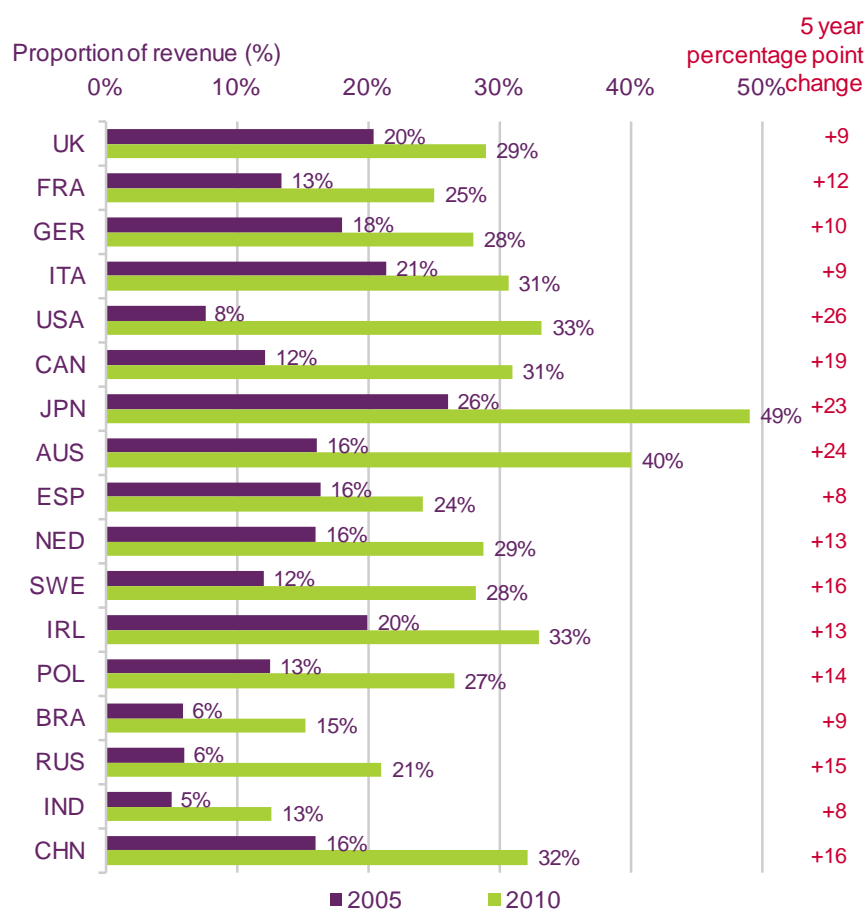
Note: USA and CAN include revenues from incoming calls

Data services generated almost a third of total mobile revenues in 2010

Data service revenues have become an increasingly important element of mobile revenues over recent years, as the use of mobile data services, including SMS messaging services, has increased while growth in mobile voice revenues has been limited, as a result of price competition between providers. Among our comparator countries, the average proportion of total mobile revenue that was generated by data services (including SMS messaging) more than doubled; from 15% to 32% in the five years to 2010 (Figure 6.31).

The proportion of mobile revenue generated by data services grew in all of our comparator countries in the five years to 2010, with the increase over the period ranging from eight percentage points in Spain and India to 26 percentage points in the US (in the UK the increase was eight percentage points). Japan had the highest proportion of mobile revenues generated by data services in 2010, at 49%, and it appears likely that mobile services will generate over half of total mobile revenue in Japan in 2011. Conversely, the lowest proportion of mobile revenue generated by data services was in India, where the availability of 3G services and take-up of internet-enabled handsets is low, at 13% (in the UK, data accounted for 29% of mobile revenue in 2010, slightly lower than the average).

Figure 6.31 Data as a proportion of total mobile service revenue: 2005 and 2010



Source: IDATE / industry data / Ofcom

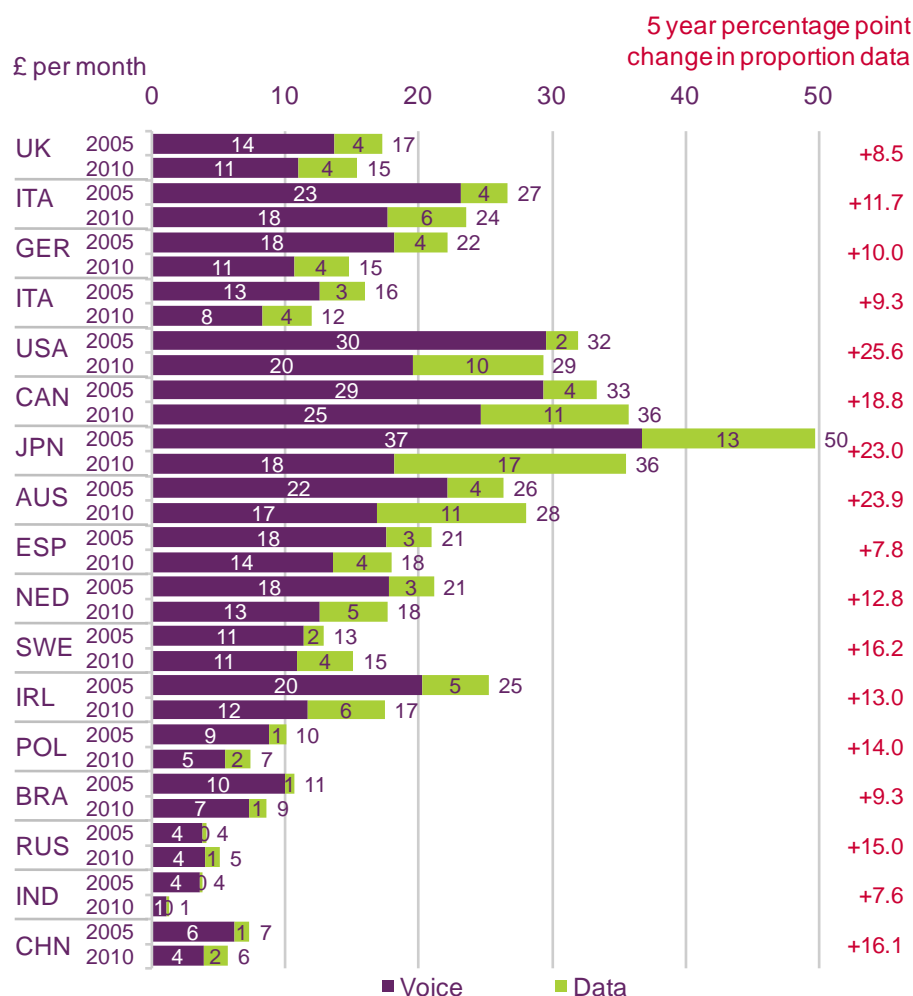
Note: USA and CAN include revenues from incoming calls

Mobile revenues per connection are falling in most comparator countries

Average revenue per mobile connection fell in all of our comparator countries except Sweden, Russia, Canada and Australia between 2005 and 2010, with the average annual increase among these countries ranging from 1.3% in Australia to 4.6% in Russia (Figure 6.32). The main reason behind falling average revenues per connection is declining prices, although average spend will be further reduced in countries with high levels of multiple connections per user (typically, those with high levels of pre-pay use, such as Italy).

In most comparator countries, falling average voice revenues per connection is being offset by increasing average data revenues per connection: in the five years to 2010 Russia (up by an average of 1.0% a year) was the only comparator country where average voice spend per connection grew, while over the same period average data revenue per connection increased in all of our comparator countries except India (where it fell by an average of 3.4% a year). In the UK, average mobile data revenue per connection increased by £1 a month to £4 in the five years to 2010, although this was offset by a £3 a month decline in spend on voice services, to £11, over the same period.

Figure 6.32 Average monthly voice and data revenue per mobile connection: 2005 and 2010



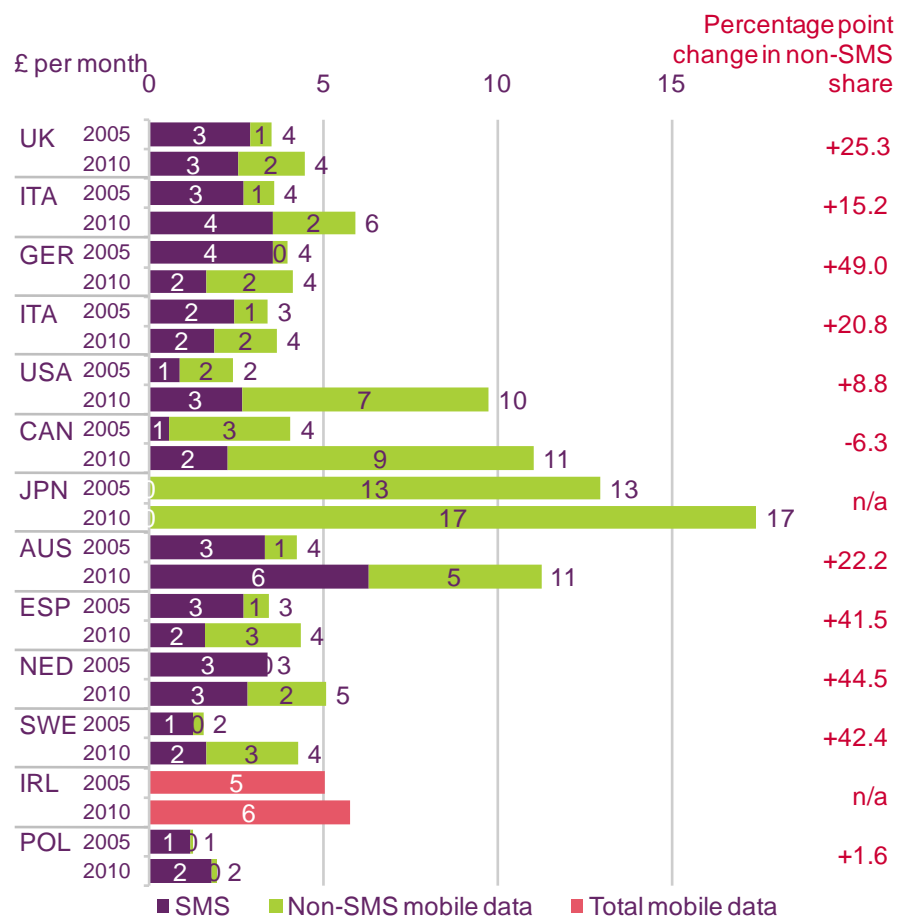
Source: IDATE / industry data / Ofcom
 Note: USA and CAN include revenues from incoming calls

Share of non-SMS data services has increased in all countries except Canada

While the proportion of total mobile revenues per connection that are generated by data services has been increasing in almost all of our comparator countries, the proportion of average data revenues generated by services other than SMS messaging also increased in all of our comparator countries (Figure 6.33). This is as a result of the increasing sophistication of mobile devices (many of which are now web-enabled) and growth in the take-up of mobile broadband services using either a mobile datacard or dongle.

The largest increase in the proportion of average mobile data revenues that are generated by services other than SMS was in Germany in the five years to 2010, at 49.0 percentage points, while in Canada this proportion fell by 6.3 percentage points to 20.3% (in the UK the increase over the same period was 25.3 percentage points). In six of our comparator countries (Germany, the US, Canada, Japan, Spain and Sweden) non-SMS data services accounted for the majority of average mobile data revenue per subscriber in 2010, while in the UK the figure was 43%. In Japan, SMS use is not widespread, and mobile users are much more likely to use email and instant messaging on their mobile handsets instead.

Figure 6.33 Average monthly SMS and non-SMS data revenue per mobile connection: 2005 and 2010



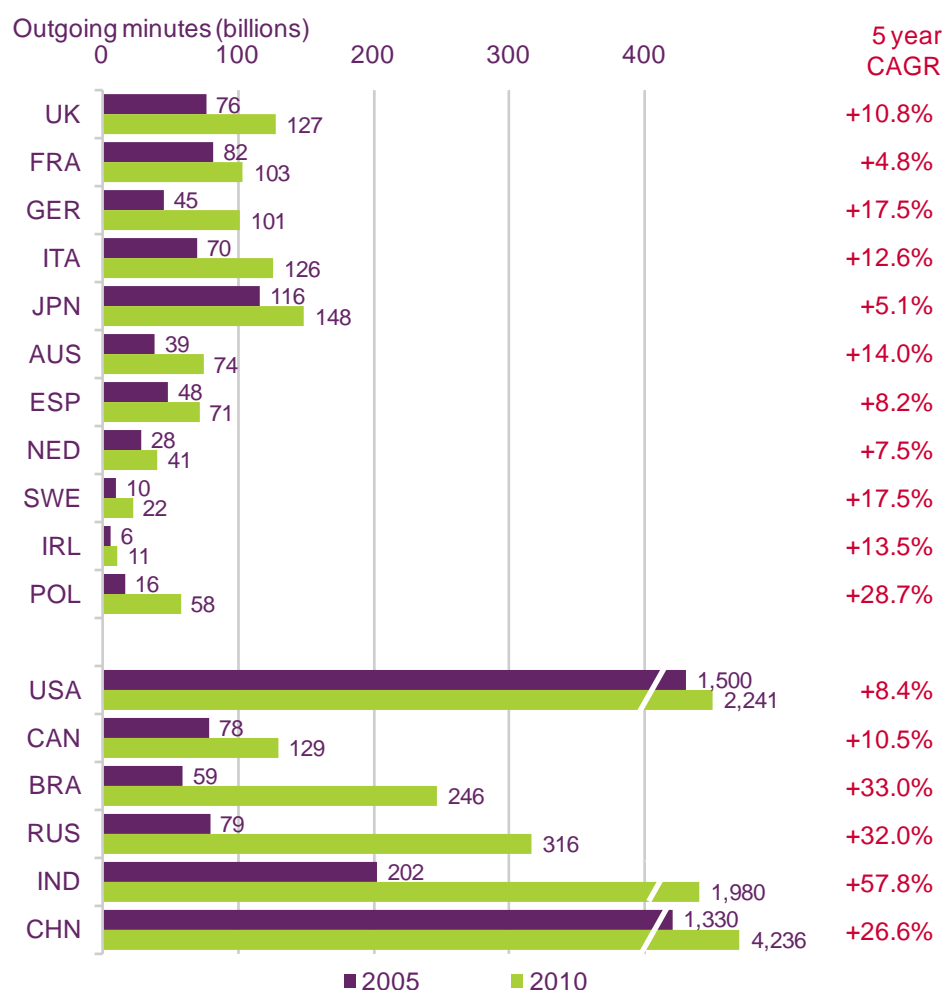
Source: IDATE / industry data / Ofcom

Mobile voice call volumes fell in the US in 2010

Mobile call volumes increased in all of our comparator countries in 2010 except the US, where total mobile call volumes (which, as in Canada and the BRIC countries, include incoming and outgoing calls) fell by 1.5%. Fixed voice call volumes also fell in the US in 2010, suggesting increasing use of other forms of communication such as VoIP, email and mobile messaging, including SMS (see Figure 6.36). Looking at the long-term trend, in the five years to 2010 mobile call volumes increased in all the comparator nations for which data were available, with the fastest growth being among the BRIC nations (average annual growth rates during the period were in excess 30% in Brazil, Russia and India) as shown in Figure 6.34.

Among the non-BRIC countries the average annual growth in mobile voice call volumes ranged from 4.8% a year in France (where fixed voice services are relatively cheap, due to the availability of VoIP-based services) to 28.7% in Poland, where there is limited fixed-line availability. In the UK, mobile voice call volumes increased by an average of 10.8% in the five years to 2010, around half the average rate of 21.7% across all of our comparator countries as a result of the UK's mobile market being comparatively mature.

Figure 6.34 Mobile voice call volumes: 2005 and 2010



Source: IDATE / industry data / Ofcom

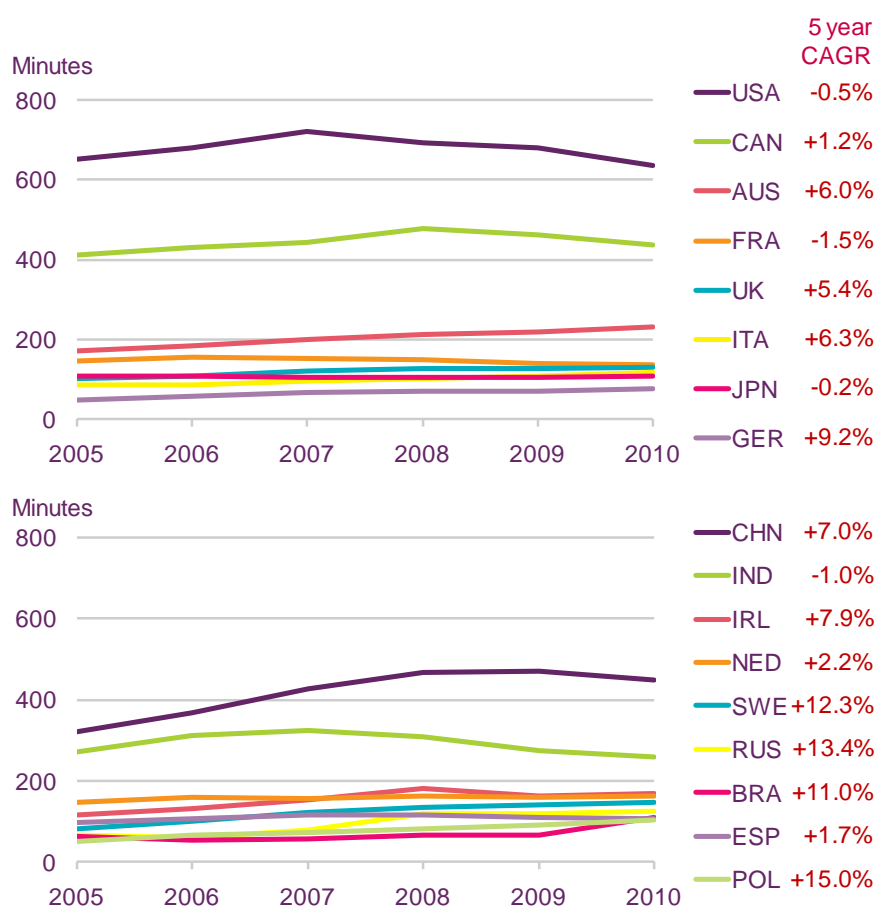
Note: USA, CAN and CHN include incoming calls; BRA, RUS and IND include fixed-to-mobile and off-net incoming calls

Mobile call volumes per connection fell in six comparator countries in 2010

Average call volumes per mobile connection fell in six of our comparator countries (the US, Canada, France, China, India and Spain) in 2010 (Figure 6.35). In those countries where take-up is relatively low, this is often because newer mobile subscribers are lower users of mobile services and therefore pull down average use per connection, while in countries where penetration is high it is because mobile users are dividing their use across more than one connection, and therefore average use per connection is lower. There were, on average, 131 minutes of monthly outgoing calls made for every mobile connection in the UK in 2010, 1.6% (two minutes) more than in 2009 as a result of a migration of pre-pay customers to monthly contracts (including SIM-only contracts) which offer inclusive call allowances.

In 2010, average monthly voice call minutes per mobile connection ranged from 78 minutes a month in Germany (where mobile service are comparatively expensive) to 232 minutes a month in Australia, among the countries for which separate outgoing call volume data were available. In fact, the US had the highest average use per month at 635 minutes, although this figure also includes incoming call minutes. The fastest rates of outgoing call volume growth, per connection, over the five years to 2010 were in Poland (up by an average of 15.0% a year) and Russia (with average growth of 13.4% a year).

Figure 6.35 Monthly outbound minutes per mobile connection: 2005 and 2010



Source: IDATE / industry data / Ofcom

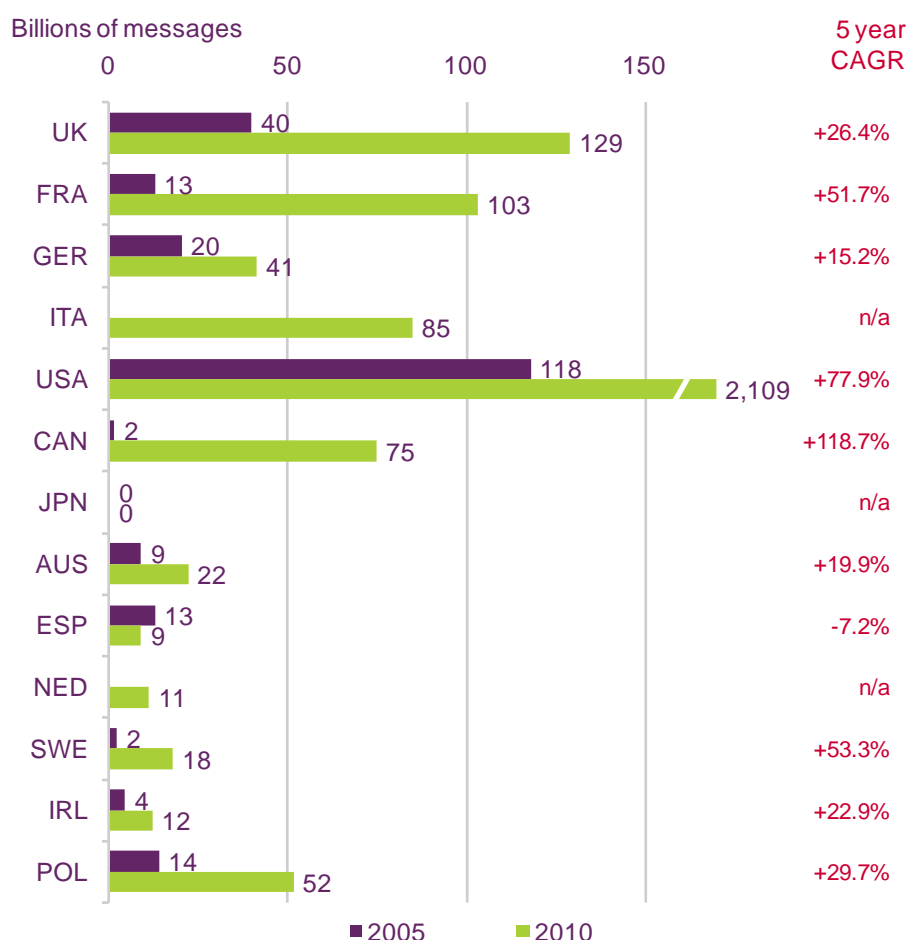
Note: USA, CAN and CHN include incoming calls; BRA, RUS and IND include fixed-to-mobile and off-net incoming calls

Mobile messaging volumes continue to increase in most comparator countries

Spain was the only country in which mobile messaging (SMS and MMS) volumes declined during the five years to 2010, falling from 13 billion in 2005 to 9 billion in 2010 (Figure 6.36). Average use of SMS is lower in Spain than in our other comparator countries as SMS is rarely included within pay-monthly tariffs in Spain, and messages are relatively expensive to send.

Among our other comparator countries, the fastest rate of SMS volume growth was in Canada, where SMS message volumes rose by an average of 118.7% a year over the period, due to a combination of rising take-up of mobile services and increased bundling of SMS messages in monthly contract tariffs. In the UK, the increased availability of tariffs with large or unlimited bundles of SMS contributed to an average annual rise of 26.4% in SMS volumes over the period. In 2010 the total volume of MMS messages more than doubled to 78 million, although MMS accounted for just 2.9% of total SMS and MMS messages across those countries for which volume data for both message types were available, up from 1.8% in 2009.

Figure 6.36 Mobile messaging volumes: 2005 and 2010



Source: IDATE / industry data / Ofcom

Note: Figures for the USA include push-to-text and are not directly comparable to those for the other comparator countries

Spain and Australia are the only countries where mobile messaging use per connection fell in 2010

The average monthly messages per mobile subscription increased in all of our comparator countries in 2010 except in Spain and Australia. As mentioned previously, SMS is a service which never gained the same momentum in Spain as it did in our other comparator countries (in 2010 an average of just 13 messages per connection per month were sent, compared to 236 across those comparator countries for which data were available), while in Australia 2010 was the first year in which average messaging use per connection fell (Figure 6.37).

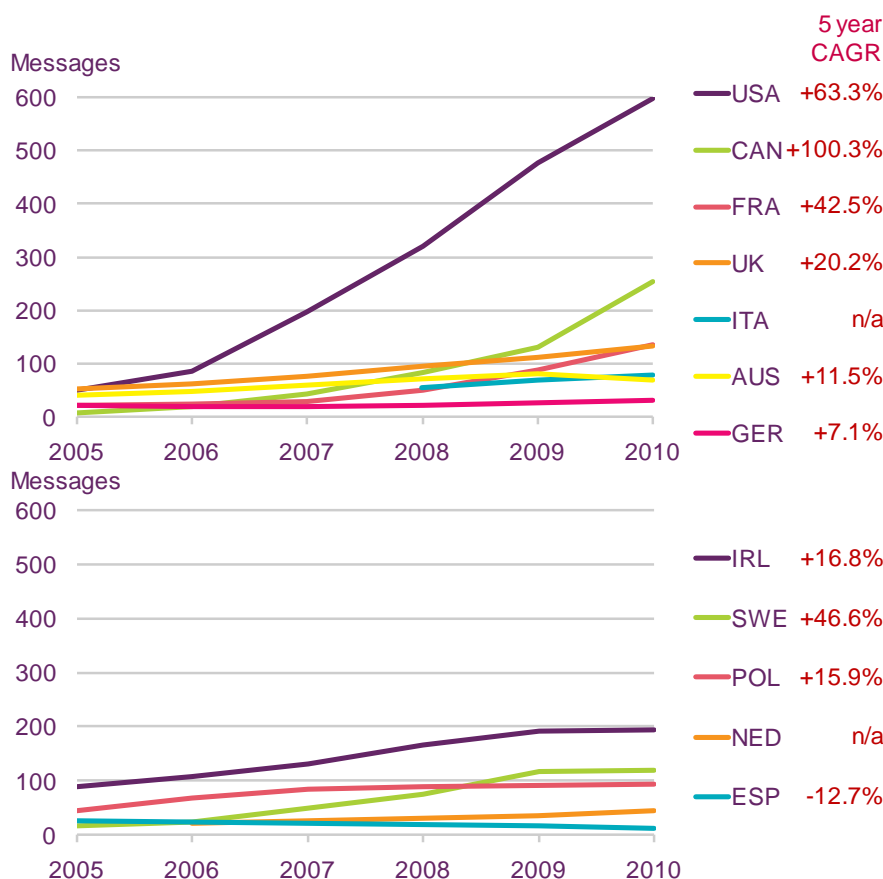
Falls in total SMS volumes during the first half of 2011 have been reported⁷⁶ in the Netherlands, France, Ireland, Portugal and Spain. A factor behind these declines is likely to be an increase in consumers' use of over-the-top messaging services, which some are using instead of SMS. It is also the case that text messaging is barely used in Japan (although data on the use of SMS are not available), because email has long been used on mobile phones.

⁷⁶ <http://www.mobilebusinessbriefing.com/articles/sms-on-the-decline-as-third-party-messaging-gains-traction/19001/>

Average messaging use per connection was highest in the US, where it increased by over 25% to 597 messages a month in 2010, equivalent to almost 20 messages per connection per day, although this includes push-to-text messages, which are excluded from the figures in other countries. Outside the US, the highest use of mobile messaging was in Canada, where average mobile messaging use almost doubled; to 253 messages a month in 2010. Average annual growth in messages per mobile connection in Canada in the five years to 2010 was over 100%, and in 2010 average use per connection overtook that in Ireland where use had previously been highest. In the UK, the number of monthly mobile messages sent per connection increased by an average of 20.2% a year in the five years to 2010; to 133 messages per month, the fourth highest average use outside the US.

Different levels of use are likely to reflect different the tariffs available from operators. For example, in the UK, tariffs including unlimited SMS messages are widely available, some at less than £15 per month. Growth in text messaging is also likely to be driven by increasingly easy-to-use interfaces on smartphones, which include keyboards and present text messages in the form of a 'conversation', almost equivalent to instant messaging interfaces.

Figure 6.37 Monthly outbound messages per mobile connection; 2005 to 2010



Source: IDATE / industry data / Ofcom

Note: Figures for the USA include push-to-text and are not comparable to the other comparator countries

The total number of mobile connections fell in the Netherlands in 2010

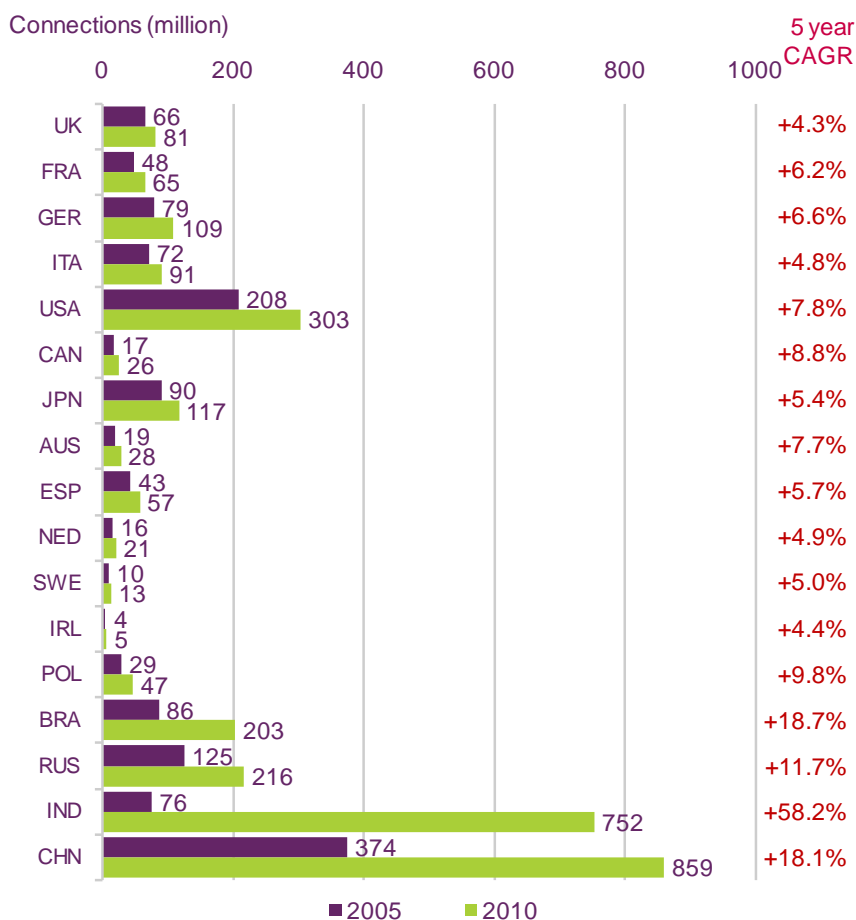
Despite high take-up in many countries, the number of mobile connections continues to grow as take-up of mobile broadband and use of multiple connections per person increases (as more mobile data-enabled devices become available). The Netherlands was the only

comparator country where the total number of mobile connections fell in 2010, the first time that this has happened in the country, although among our other comparator countries the number of mobile connections had previously fallen in Italy and Ireland in 2009 (Figure 6.38).

As mobile markets have matured, the rate of connection growth has slowed, and average growth across the non-BRIC comparator countries (where mobile markets are more mature) was 4.4% in 2010, compared to 22.7% in the BRIC countries where mobile penetration is lower and mobile markets are still developing. The fastest growth in mobile connections across our comparator countries in 2010 was in India, where the number of connections increased by 43.2% (277 million) to 752 million; however, in China there were the most mobile connections at the end of the year, at 859 million. Overall, there were more than twice as many mobile connections in the BRIC countries than in our other comparator countries combined, at the end of 2010.

The UK had the lowest average rate of mobile connection growth among our comparator countries in the five years to 2010, at 4.3%. This was partly due to a change in the definition of an 'active subscriber' for T-Mobile's UK base (following its 2010 merger with Orange to form Everything Everywhere) which led to a fall in the reported subscriber base. Outside the UK, the lowest rate of subscriber growth over the period was in Sweden, at 4.4%, and highest in India at 58.2% (where mobile penetration was very low, at just seven connections per 100 people, in 2005).

Figure 6.38 Mobile connections: 2005 and 2010



Source: IDATE / industry data / Ofcom

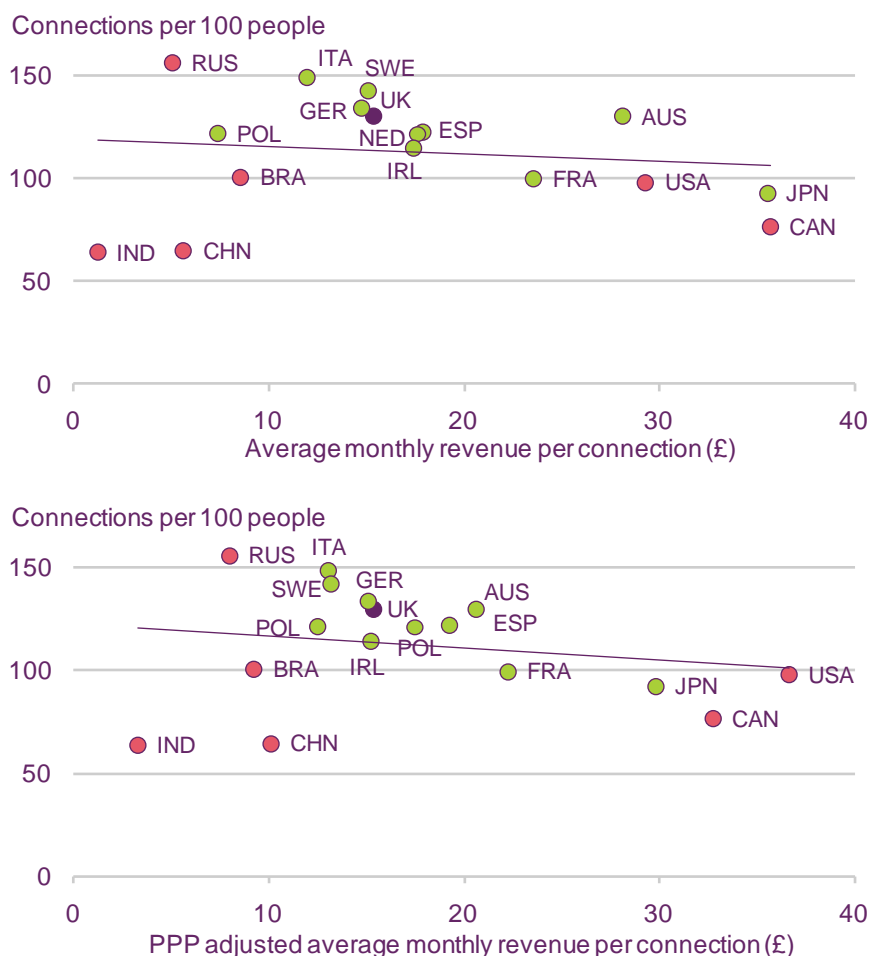
Countries with higher mobile penetration tend to have slightly lower revenue per user

The two charts which make up Figure 6.39 below plot mobile penetration against average monthly revenue per connection, across all of our comparator countries, in order to enable us to assess whether there is a correlation between the two. They show that among most of our comparator countries, there is a relationship between the two, with, in general, take-up being highest where average spend is lowest (although it is not possible to draw any conclusions as to cause and effect) and this relationship is more pronounced when average monthly spend is adjusted for PPP, as in the second chart.

Average spend was highest (and take-up relatively low) in Japan, Canada and the US. In Canada and the US average spend is high as a result of a charging regime in which mobile users are charged for incoming calls, while in Japan higher spend is partly a result of high use of mobile data services. Conversely, take-up was highest (and spend comparatively low) in Russia and Italy, where many consumers have more than one pre-pay connection and spend is spread across more than one connection. The main outliers were India and China, where both average spend and take-up were low, even following the PPP adjustments which have been made in the second chart.

This analysis includes data on the use of mobile broadband services, which will increase the penetration levels and reduce the average spend in this analysis, as spend per connection on mobile broadband services is lower than on standard mobile phone tariffs. This is particularly relevant to the UK, Sweden, Italy and Ireland, where take-up of mobile broadband is relatively high.

Figure 6.39 Mobile take-up and average monthly revenue per connection: 2010



Source: IDATE / industry data / Ofcom

Note: USA and CAN revenues from incoming calls

The share of connections that are contract is increasing in most countries

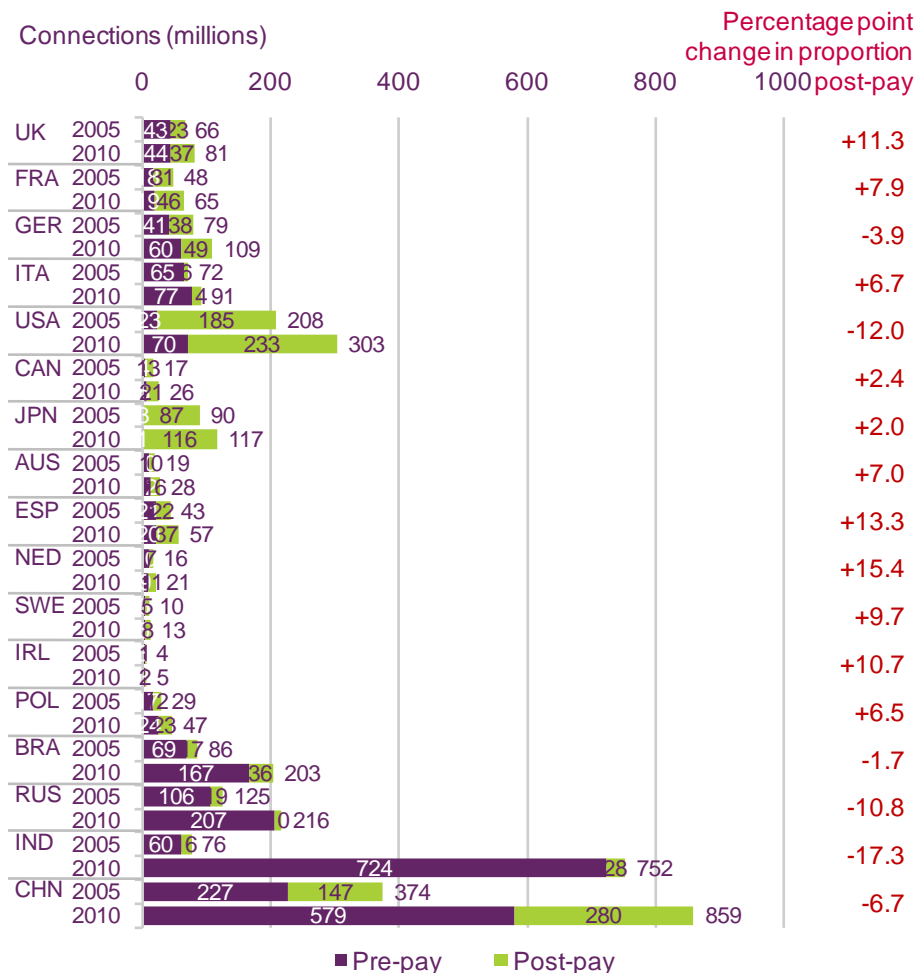
There is some evidence that a shift towards contract (pay-monthly) subscriptions is taking place in many of our comparator countries, a relatively new phenomenon. As shown in Figure 1.40, there were more pre-pay (pay-as-you-go) mobile connections than contract in most of our comparator countries at the end of 2010, but in 11 of the 17 countries, the proportion of connections that were post-pay increased in the five years to 2010.

This is a reflection of changing operator strategies as mobile markets mature. In mature mobile markets there is little subscriber growth, and operators concentrate on maximising revenues from their existing customer base. One way of doing this is to incentivise pre-pay customers to switch to monthly contracts; post-pay customers typically spend more and are less likely to churn as they are tied into minimum-term contracts.

However, the six countries where the percentage of subscribers that are pre-pay has risen in the five years to 2010 include India, China and the USA, which have the largest number of mobile subscribers of our comparator countries. Accordingly, in total across all our comparator countries, the percentage of mobile subscribers that are prepay has risen over the five-year period by 2.6 percentage points to 67.7%. In India and China, the growth in the percentage of subscribers that are pre-pay may be due to mobile networks reaching poorer communities that cannot afford post-pay contracts, or that do not have the banking facilities

required to use to post-pay, and it may also be due to multiple SIM ownership, which tends to occur more with pre-pay. In the US, the increase in the percentage of subscribers that are prepay may be due to operators trying to find new niches in a saturated market.

Figure 6.40 Mobile connections, by type: 2005 and 2010



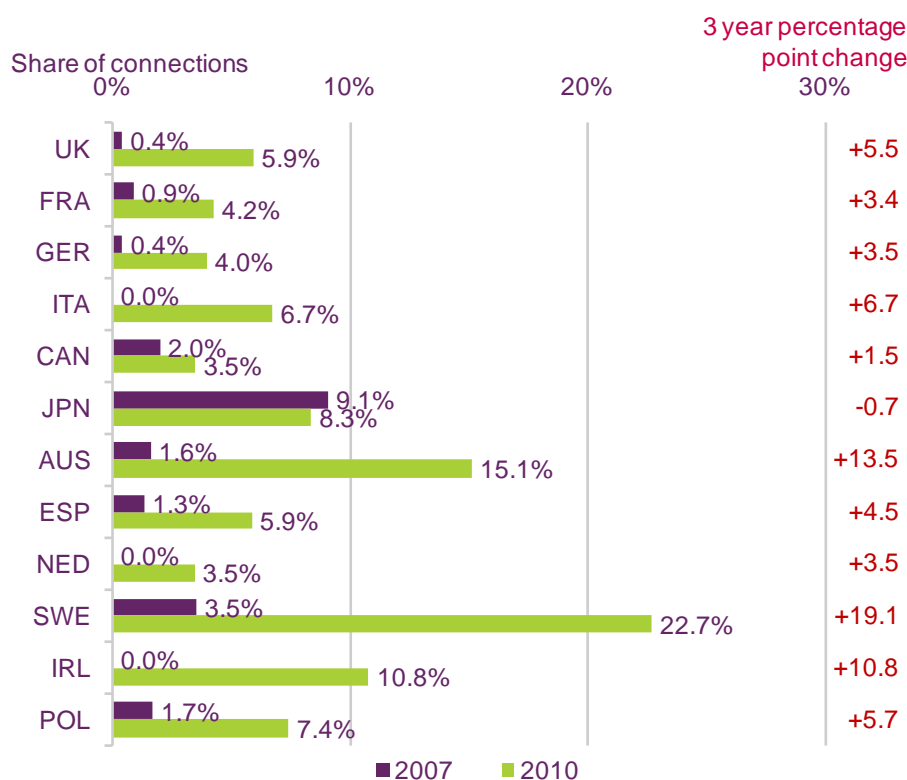
Source: IDATE / industry data / Ofcom

The US had the highest proportion of mobile connections that were mobile broadband

At the end of 2010 the proportion of mobile connections that were mobile broadband datacards or dongles ranged from 3.5% in Canada and the Netherlands to 22.7% in Sweden, among those comparator countries for which data were available (Figure 6.41). Japan had the highest number of mobile broadband connections at the end of 2010, at 9.8 million, while the fastest growth in the proportion of mobile connections that were mobile broadband in the three years to 2010 was in Sweden, where it increased by over 19 percentage points during the period. Japan was the only country where this proportion fell over the period, down by -0.7 percentage points to 8.3%, despite the number of mobile broadband connections having increased by 0.7 million over the period.

In the UK there were 4.8 million active UK mobile broadband connections at the end of 2010, equivalent to 5.9% of total mobile subscriptions, compared to 0.3 million (0.4% of the total) at the end of 2007.

Figure 6.41 Mobile broadband as a proportion of total mobile connections: 2007 and 2010



Source: IDATE / industry data / Ofcom

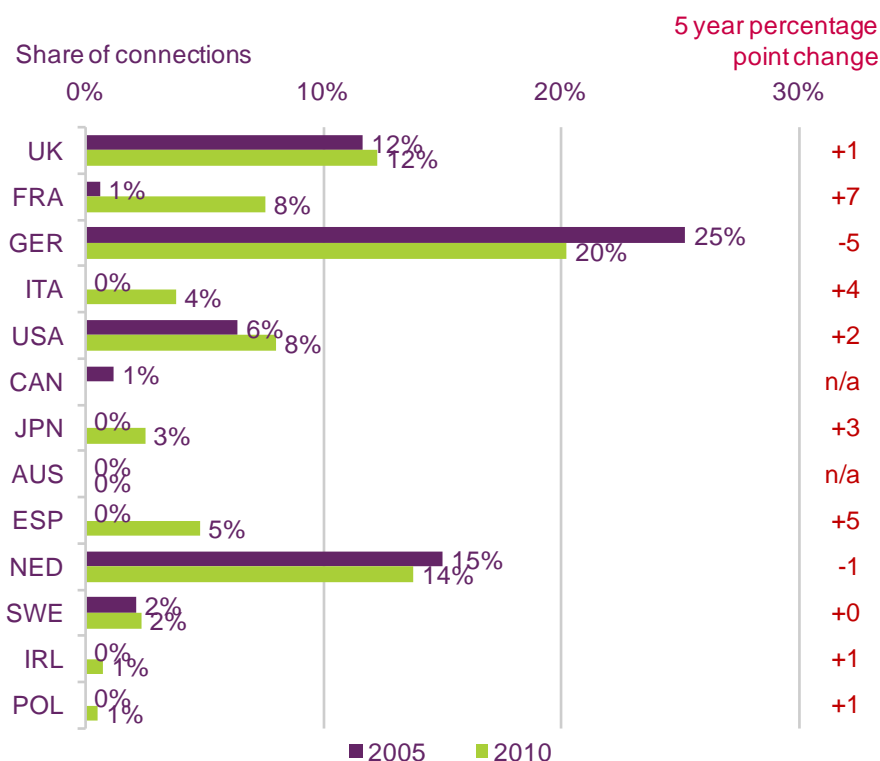
Germany had the highest proportion of subscribers using MVNOs in 2010

A mobile virtual network operator (MVNO) is a mobile provider that resells mobile services purchased on a wholesale basis from a network operator. This allows MVNOs to offer mobile services to their customers without the significant investment required to purchase their own spectrum allocation and network infrastructure, thereby increasing the level of competition in a market.

At the end of 2010 the proportion of mobile connections held by MVNOs was highest in Germany (among the 13 comparator nations for which figures were available), at 20% (including independent service provider resellers), and lowest in Australia at zero (Figure 6.42). In most countries the MVNOs' share increased in the five years to 2010, although in a few countries (including Germany) it fell during the period. The strongest growth in MVNOs' share was in France, where it increased from 1% to 8%, largely driven by Virgin Mobile, which accounted for around 40% of all MVNO connections in France in 2010.

In the UK, MVNOs accounted for 12% of mobile connections at the end of 2010, one percentage point higher than at the end of 2005, driven by the launch of supermarket MVNOs such as those run by Tesco and Asda, and providers which target immigrant communities in the UK by offering low-cost international calls, such as Lycamobile and Lebara Mobile.

Figure 6.42 MVNO share of total mobile connections: 2005 and 2010



Source: IDATE / industry data / Ofcom

Note: UK and GER figures includes resellers' connections in addition to full MVNOs

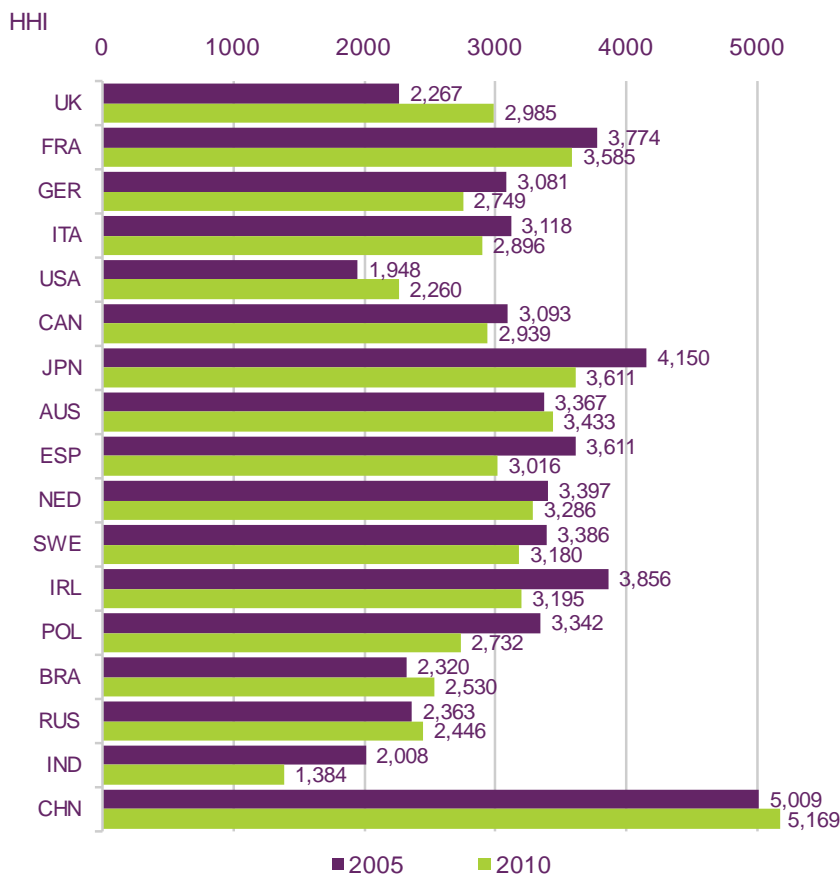
India had the least concentrated mobile market in 2010

The Herfindahl-Hirschman Index of market concentration (HHI) is a measure of the concentration of a market, calculated using the market share of individual operators. The HHI scale ranges from 0 for a perfectly competitive market (i.e. one with a large number of competitors equal with a small market share) to 10,000 for a single-player monopoly.

China had the most concentrated market in terms of connections at the end of 2010, with an HHI index of 5,169 (Figure 6.43), largely due to China Telecom having a market share of around 70%. Conversely, the lowest market concentration was found in India, as a result of there being a relatively large number of operators offering services at different coverage levels, (including regional, pan-regional and national), although this it should be treated with caution as a measure of competition, as many of these providers will not be in direct competition with each other.

Having had the second least-concentrated mobile market at the end of 2009, the UK had the ninth least-concentrated market at the end of 2010. This increase in market concentration was a result of the merger of the UK operations of Orange and T-Mobile, the third and fourth largest UK mobile networks by number of subscribers, to form Everything Everywhere. Their merger was finalised in April 2010.

Figure 6.43 Herfindahl-Hirschman index of mobile concentration: 2005 and 2010



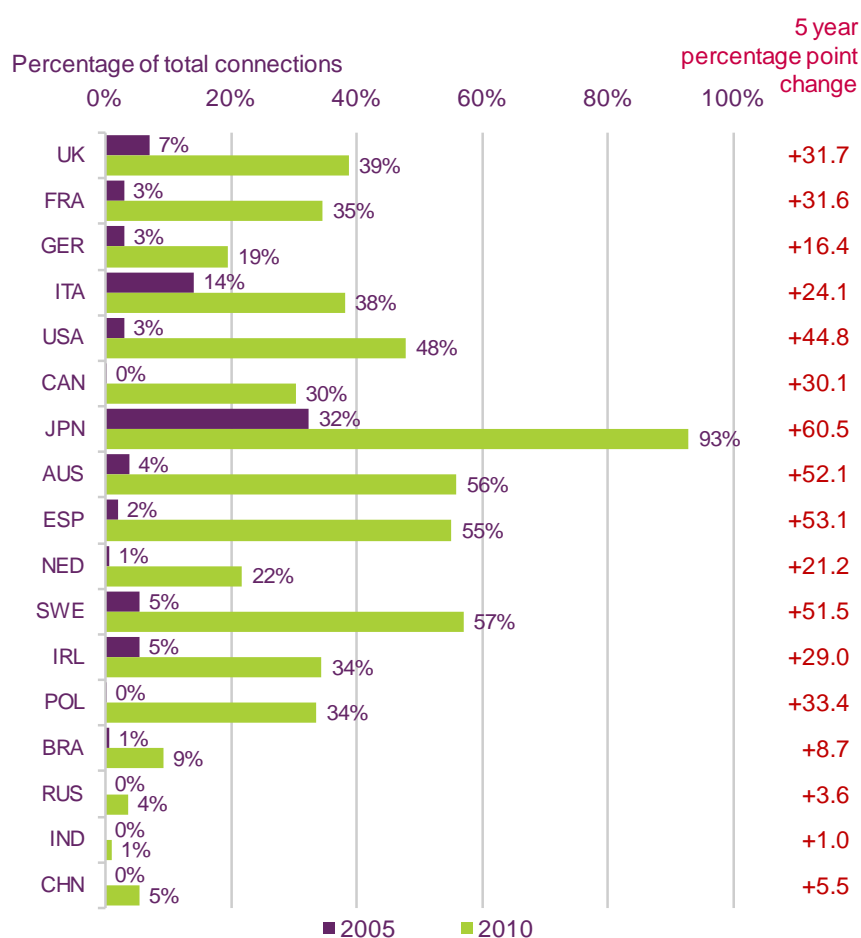
Source: IDATE

Japan had the highest take-up of 3G mobile services

Use of 3G mobile services among our comparator countries was highest in Japan, where 93% of mobile connections used 3G at the end of the year (Figure 6.44). This was partly as a result of Japan being the first to launch 3G services (in 2001), and Japan was also where the fastest growth in the adoption of 3G services in the five years to 2010 was found, with the proportion of connections using 3G increased by 60 percentage points over the period.

Outside Japan, the only countries where over half of mobile connections were 3G were Spain, Australia and Sweden (in the UK the figure was 39%, up from 7% in 2005). The lowest take-up of 3G was to be found in the BRIC countries, where an average of 4% of mobiles used 3G, double the 2% average a year previously, reflecting the ongoing roll-out of 3G networks and services in these countries, and the fact that take-up is stifled by the relatively high price of 3G devices. Meanwhile, in some more developed markets (including the US and Sweden) 4G LTE networks have already launched.

Figure 6.44 3G as a proportion of total mobile connections: 2005 and 2010



Source: IDATE / industry data / Ofcom

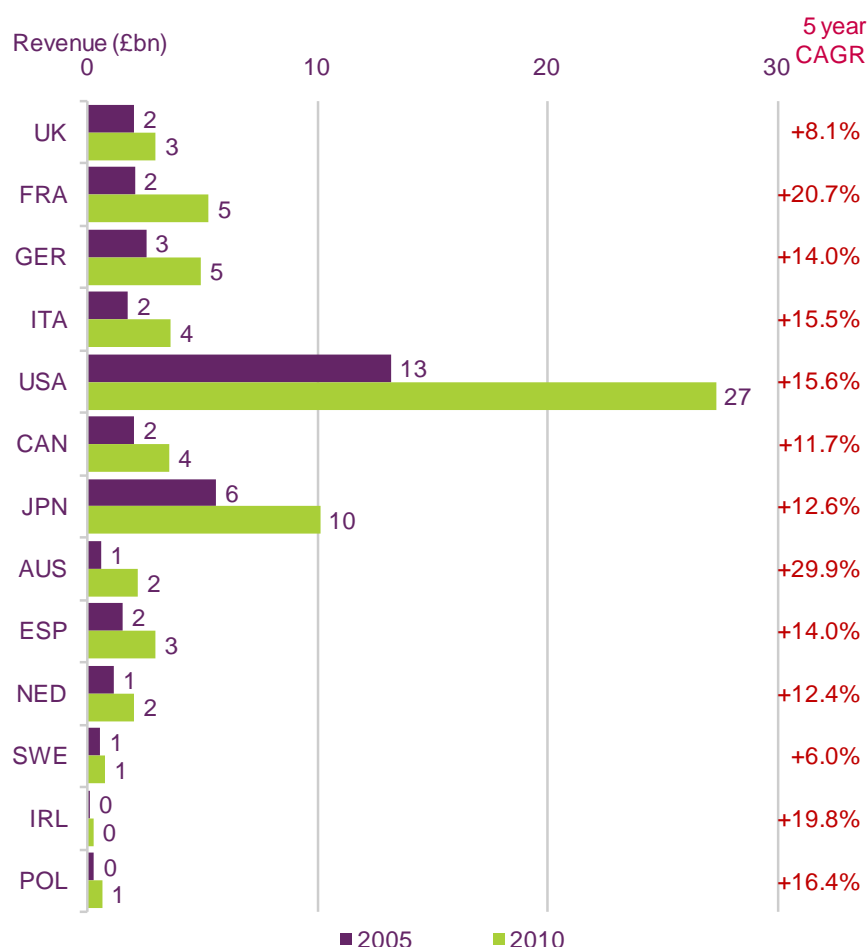
6.2.5 Fixed broadband services

The UK was one of only three countries where fixed broadband revenues fell in 2010

Fixed broadband revenue growth averaged 15% among the comparator countries for which figures were available in the five years to 2010, although this was lower than the 19% average in the five years to 2009 (Figure 6.45). The UK, Sweden and Poland were the only countries where fixed broadband revenues fell in 2010; in the UK the 4.8% decline was a result of falling prices due to continued competition and increased service bundling, and occurred despite increasing average connection speeds.

The highest average fixed broadband revenue growth rates in the five years to 2010 were in Australia and France, where revenues increased by an average of 29.9% and 20.7% a year respectively, albeit from low starting points. The lowest rate of growth in the five years to 2010 was in Sweden, at 6.0% per year, and second lowest in the UK, at 8.1%.

Figure 6.45 Fixed broadband revenues: 2005 and 2010



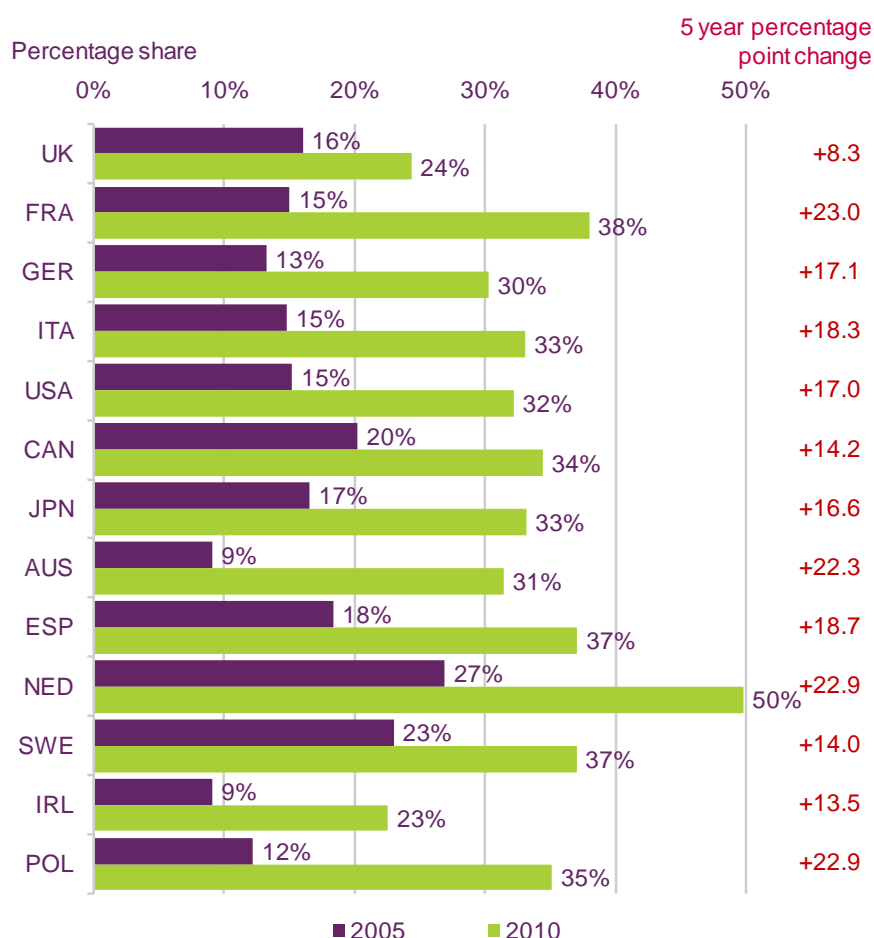
Source: IDATE / industry data / Ofcom

Broadband accounted for 33% of fixed telecoms revenues in 2010

The average proportion of total fixed line revenues that were generated by broadband services (among the 13 comparator countries for which figures were available) was 33% in 2010, up from 16% in 2005 and 30% in 2009 (Figure 6.46). The proportion of fixed revenues generated by broadband ranged from 23% in Ireland to 50% in the Netherlands in 2010, while in the UK just under a quarter (24%) of fixed revenues were generated by broadband services.

In the five years to 2010 the largest increase in the proportion of fixed revenues generated by broadband was in France, where it increased by 23 percentage points to 38%, mainly as a result of increasing broadband take-up, but also due to declining fixed-voice revenues (see Figure 6.23) as low-cost VoIP-based services gained popularity. The lowest increase was in the UK, where the proportion of fixed revenues generated by broadband increased by just 8% over the period, a reflection of the relatively low cost of fixed broadband in the UK.

Figure 6.46 Fixed broadband as a proportion of total fixed revenues: 2005 and 2010



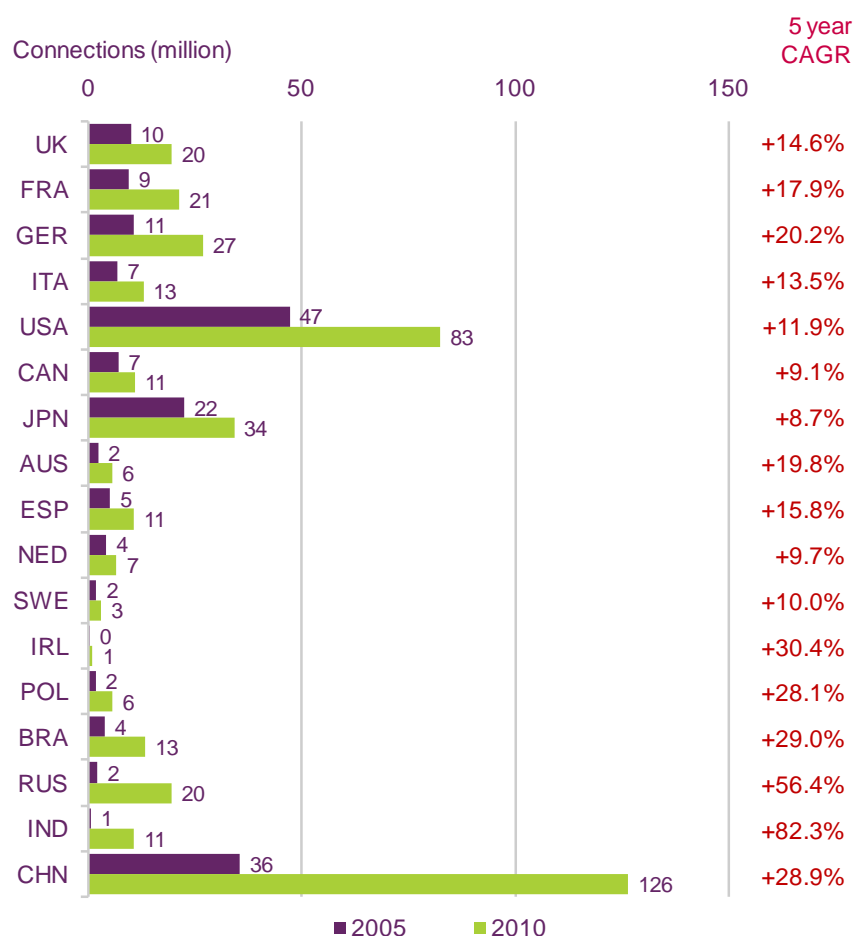
Source: IDATE / industry data / Ofcom

Fixed broadband connections up by one-eighth in 2010 in our comparator countries

At the end of 2010 there were a total of 410 million fixed broadband connections among our 17 comparator countries, 44 million (12%) more than there had been at the end of 2009 (Figure 6.47). More than half of the growth in connections in 2010 was in China, which had the most fixed broadband connections among our comparator countries at the end of the year, at 126 million, a 23 million connection increase on 2009.

However, it was another BRIC country, India, that achieved the fastest average rate of connection growth. In the five years to 2010 the average rate of connection growth in India was over 80%, largely due to there being a low broadband base in 2005 (less than a million connections). Conversely, growth rates were lower among those comparator countries which had higher levels of take-up in 2005: Japan had the lowest average annual rate of growth in fixed broadband connections over the period (8.7% a year), while the number of broadband connections in the UK almost doubled between 2005 and 2010, an average annual increase of almost 15%.

Figure 6.47 Fixed broadband connections: 2005 and 2010



Source: IDATE / industry data / Ofcom

45% of UK fixed broadband connections have a headline speed of 10Mbit/s or more

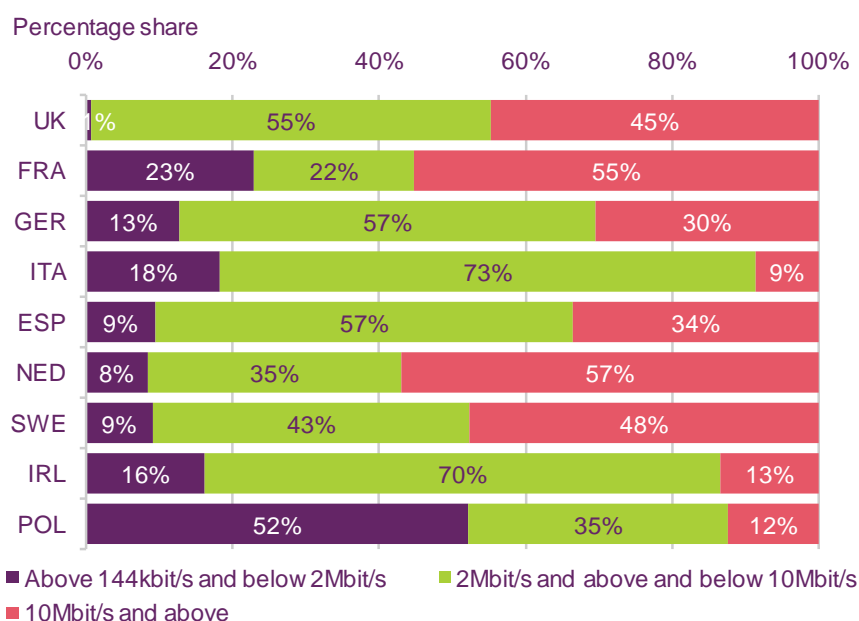
Figures published by the European Commission allow a comparison of the ‘headline’ speeds of broadband connections across selected member states. It should, however, be noted that the actual speeds delivered by DSL broadband are typically much slower than headline speeds: this is at least partly due to the speed of a DSL connection decreasing with distance from the exchange.

The difference is highlighted by Ofcom findings in May 2010, when we identified that the average speed of a UK ‘up to’ 8Mbit/s ADSL1 connection was 3.2Mbit/s and that of an ‘up to’ 20/24Mbit/s ADSL2+ connection was 6.3Mbit/s⁷⁷.

Figure 6.48 shows the split of fixed broadband connections by ‘up to’ headline speed in nine European comparator countries at the end of December 2010. This shows that the proportion of connections with a headline speed of ‘up to’ 10Mbit/s and above ranged from 9% in Italy to 57% in the Netherlands. In the UK, 45% of connections offered headline speeds of ‘up to’ 10Mbit/s and above, a higher level than in Germany (30%), Italy and Spain (34%) but lower than in France (55%). The figure for the UK reflects the fact that ADSL2+ is widespread (offering headline speeds of typically 20Mbit/s) but that fibre broadband is not ubiquitous.

⁷⁷ UK fixed-line broadband performance, May 2011, <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/broadband-speeds/broadband-speeds-may2011/>

Figure 6.48 Split of fixed broadband connections, by headline speed: Q4 2010



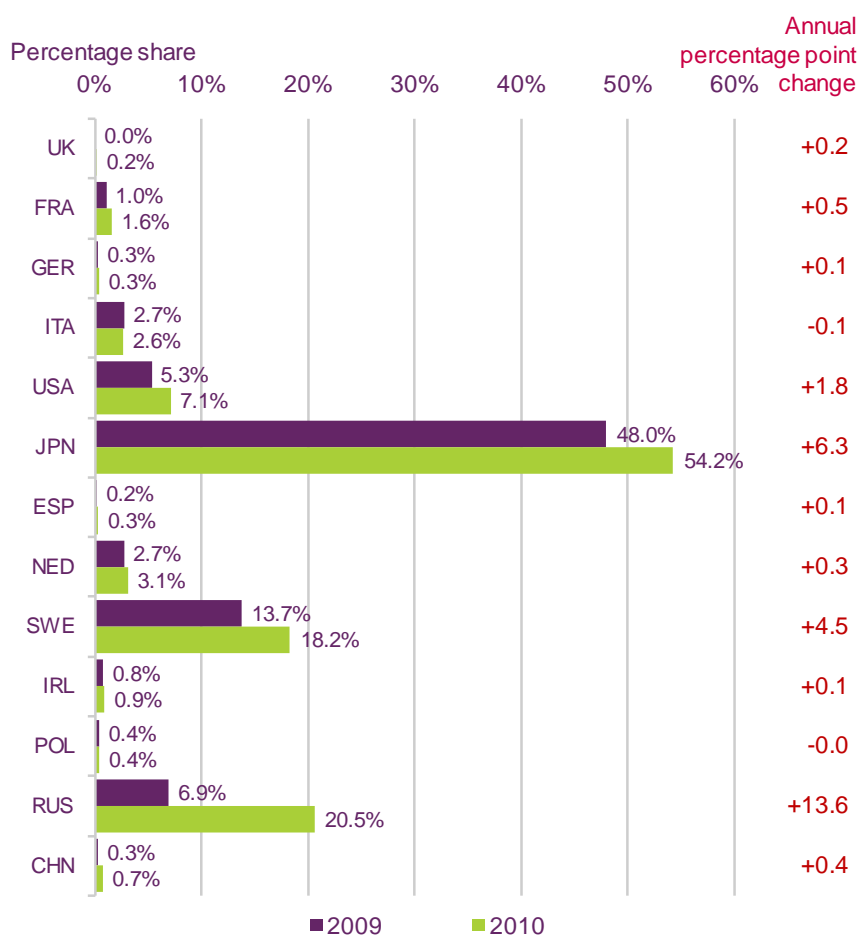
Source: European Commission, http://ec.europa.eu/information_society/digital-agenda/scoreboard/docs/pillar/digital_agenda_scoreboard_telecom_database.xls

More than half of fixed broadband connections in Japan are fibre-based

In all of our comparator countries investment in upgrading the broadband infrastructure to high-speed fibre-based networks is taking place, although the rate of fibre roll-out and growth in service take-up differs widely between nations (Figure 6.49). Ninety-three per cent of Japan's population have access to fibre-based broadband. By the end of 2010, 54% of Japan's fixed broadband connections were fibre-based, more than twice the proportion in any other country (across all of our comparator countries an average of 8% of fixed broadband connections used a fibre technology).

In the UK just 0.2% of broadband connections were fibre-based at the end of 2010, up from less than 0.1% a year previously, and this has increased further in 2011 as BT has aggressively rolled out its fibre-to-the-cabinet (FTTC) services. We estimate that by September 2011 24% of UK homes were able to access BT's fibre services, up from 13% in January 2011. In addition, 48% of UK homes are able to access superfast cable broadband services (there are high rates of cable broadband adoption in Poland, Ireland, Brazil and Germany) and in total, around 61% of UK homes can access superfast fixed broadband services.

Figure 6.49 Fibre-based connections as a proportion of all fixed broadband connections: 2005 and 2010



Source: IDATE / industry data / Ofcom

Total market share of the top three providers remains unchanged at 66% in 2010

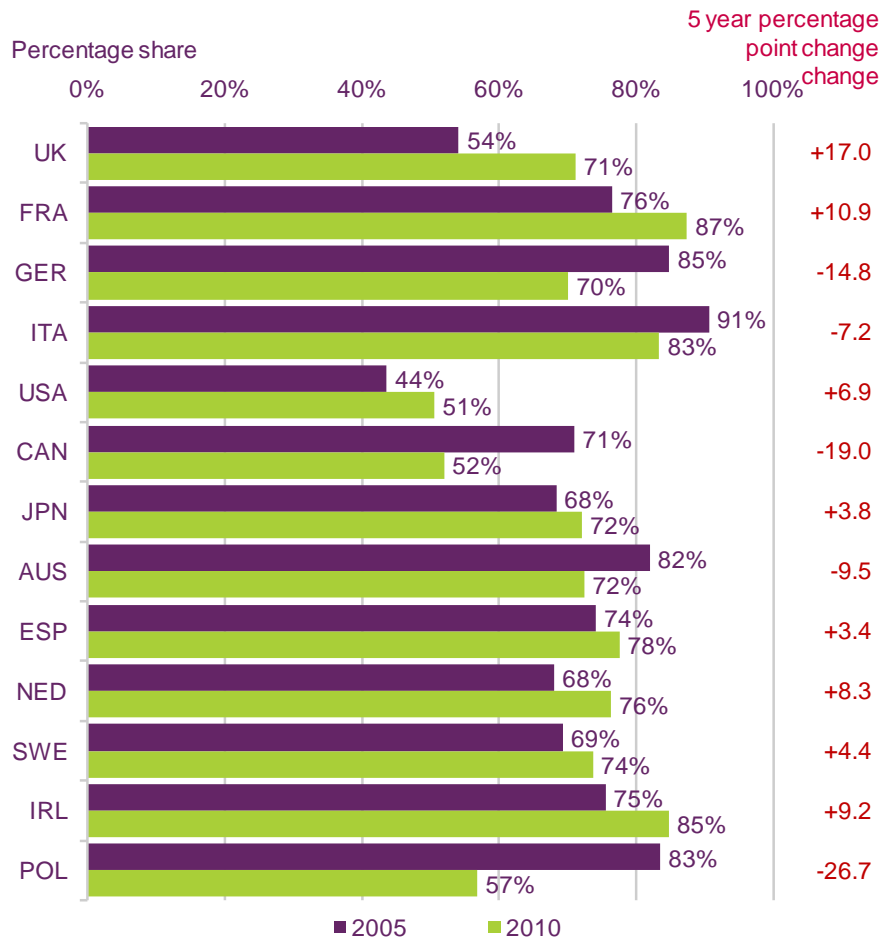
In order to look at the competitiveness of the broadband markets in our comparator countries we calculated the combined retail market share of the three largest broadband providers in each country (Figure 6.50). On average, across the 13 comparator countries for which figures were available, the combined connection share of the largest three providers was unchanged at 66% in 2010.

The change in the market share of the largest three internet service providers (ISPs) in the five years to 2010 among these comparator countries ranged from a 27 percentage point fall, to 57%, in Poland, to a 17 percentage point increase in the UK. In Poland this was as a result of smaller ISPs gaining market share at the expense of incumbent Telekomunikacja Polska (which saw its market share of fixed broadband connections more than halve; from 71% to 35% over the period), while in the UK the increase in the aggregate market share of the three largest providers came as a result of a series of mergers and acquisitions (in particular the acquisition of AOL Broadband and Tiscali by TalkTalk), and by the end of 2010 the three largest ISPs (BT, Virgin Media and TalkTalk) had a combined connection share of 71%.

The most concentrated broadband market at the end of 2010 was France, with the largest providers (Orange, Free and SFR) accounting for 87% of connections. Excluding the US and Canada (where infrastructure-based competition between local incumbent telecoms

providers and cable operators makes the share of the largest three operators a less useful measure of competition) the least concentrated broadband market among our comparator countries was in Poland.

Figure 6.50 Retail connection share of the top three fixed broadband providers: 2005 and 2010



Source: IDATE / industry data / Ofcom

6.3 The telecoms user

6.3.1 Introduction

This section looks at trends in the availability and use of telecoms services in the 17 countries covered by this report.

The analysis is based on Ofcom figures for the UK telecoms market, which are collected as part of our regular data collection programme, international data that has been compiled for use in this report, and third-party sources. In addition, we commissioned consumer research, undertaken in October 2011, in the UK and five of our comparator countries (France, Germany, Italy, the US and Australia).

The key points highlighted in this section include:

- **High-speed mobile coverage using HSPA technology is becoming close to ubiquitous in mature mobile markets, with countries in Western Europe and North America having more than 90% population coverage.** The UK has broadly similar 2G coverage (to the nearest percentage point, 100% of the UK population have 2G coverage outside their homes from at least one mobile network) and 3G/HSPA coverage (99%, using the same criteria) to its West European and North American peers.
- **Consumers in Australia spent more on telecoms services than those in any of our other comparator countries, at £739 per person in 2010.** UK consumers spent an average of £434 each. Across the 17 countries, the trend is downwards – primarily led by declines in mobile expenditure.
- **Out of six comparator countries, UK consumers are the most, or second most, satisfied with their fixed and mobile voice and broadband services.** Consumers in the US are the most satisfied. But UK consumers switch telecoms services just as frequently as their counterparts in other countries.
- **Voice telephony is significantly more expensive in Japan than in our other comparator countries, with an average price of 23p/minute for a fixed call and nearly 17p/minute for a mobile call.** UK costs compare favourably to other countries for fixed voice, and moderately for mobile, at just over 7p/minute and 8p/minute for fixed and mobile calls respectively.
- **Though there is widespread concern from consumers about the cost of voice and broadband services, UK consumers were the third least concerned about both.** Consumers in Spain were the most concerned about voice charges, France's consumers the most concerned about fixed broadband charges and Australia's the most concerned about mobile broadband charges.
- **Take-up of fixed-line voice services is generally in decline in the face of substitution for mobile services.** While some countries, including Italy and France, have seen a steep decline in fixed voice lines, declines have been limited in other countries, including the UK (with three fixed lines fewer per 100 people in 2010 than in 2005), where the general requirement to have a fixed voice line for broadband access constrains households from going mobile-only.
- **Mobile penetration has increased markedly over a five-year period, with very rapid growth in India and China, where there are now nearly two SIMs for every**

three people. The number of mobile connections continues to increase at a slower rate in the UK, which currently has an average of 1.31 mobile connections per person, partly driven by multiple device ownership.

- **Fixed broadband growth is slowing, due to market maturity, but mobile broadband (accessing the internet on a PC via a cellular network) remains in its infancy, with take-up rising quickly in some countries.** The Netherlands led the fixed broadband comparison in 2010, with 89 broadband connections per 100 households. The UK was fourth of the 17 comparator countries, with 74 broadband connections per 100 households. Sweden was a clear leader in mobile broadband, with 32 connections per 100 people, well ahead of the UK's 7.7 connections per 100 people.
- **Over three-quarters of consumers in our comparator countries (76%) purchase additional telecoms services with fixed broadband; that is, they buy 'bundles' of services.** In the UK, 78% of consumers with fixed-line broadband buy it in a bundle.

6.3.2 Availability of mobile and broadband services

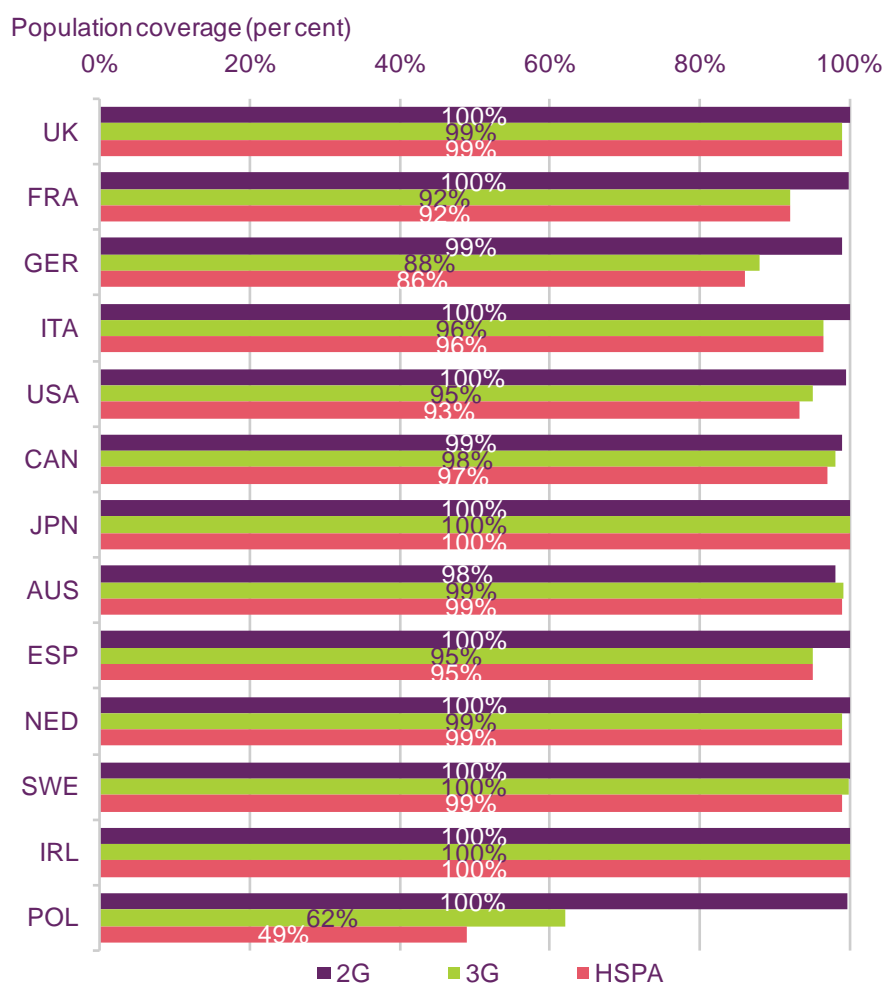
HSPA roll-out nears completion in most countries

It is difficult to compare mobile coverage, as operators and regulators use different methodologies for identifying coverage, and in most countries there is little information on the extent to which the footprints of the different operators' mobile networks overlap with each other. Figure 6.51 compares population coverage, using the most reliable data available to Ofcom, by depicting the network coverage of the operator in each country which has the largest coverage, but this should be treated with caution. The UK figure is not directly comparable with other countries because it shows the combined population coverage⁷⁸ of all four mobile networks.

The chart does demonstrate that the upgrade from 3G to the higher-speed HSPA technology is complete, or nearing completion, in most comparator countries. HSPA coverage increased in France by four percentage points (to 92%) during 2010, with Spain gaining six percentage points (to 89%). An HSPA network has 100% population coverage in Ireland (up from 94% at the end of 2009), and also in Japan. The only Eastern European country that we compare is Poland, which has far lower availability of HSPA (49%) than the other countries. All figures are given to the nearest percentage point.

⁷⁸ Further details on UK mobile coverage can be found in Ofcom's *Infrastructure Report*. See <http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf>

Figure 6.51 Mobile availability for the largest operator, by technology: 2010



Source: IDATE and Ofcom.

Note: CDMA 2000 EV-DO standards are available alongside HSPA in the USA and CAN. UK figures are more up-to-date (2011) and show the percentage of premises that are covered by at least one mobile network.

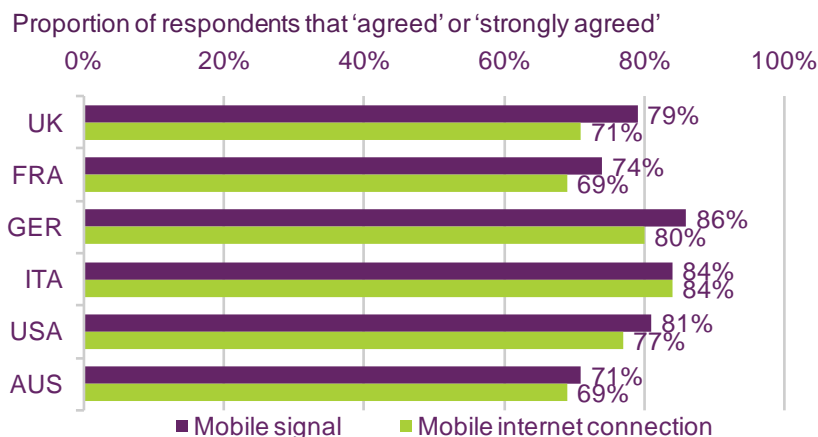
Actual experiences of connectivity can be poorer than population statistics suggest

Although mobile networks cover the vast majority of populated areas, this does not necessarily mean that consumers will be able to make a call, or connect to the internet using their smartphone, whenever they want to. The data represent outdoor coverage, and mobile signals do not penetrate inside every home where there is outdoor coverage; and of course consumers make some calls in sparsely-populated areas, including when they are travelling. In order to explore this, we commissioned research to ask consumers if they could always make a call when they wanted, and whether they could always connect to the internet using their smartphone when they wanted (Figure 6.52).

Respondents were, in general, satisfied with levels of coverage. More consumers in Germany than in any other country agreed, or strongly agreed, that they could always get a mobile signal (86%). Consumers in the UK felt they had less good coverage, with just 79% agreeing, or strongly agreeing, that they could always get a mobile signal. UK consumers were even less content with their connections to the internet, with just 71% of smartphone users agreeing, or strongly agreeing, that they could always get a mobile internet connection. Although 3G population coverage of the UK is high, area coverage remains

quite low, which could explain why UK smartphone users are facing problems connecting to data services. Consumers in Australia appear to be having the most connectivity issues, which may be explained by wide areas of lack of network coverage in the country's vast, sparsely-populated areas.

Figure 6.52 Consumer perceptions of reliability of voice and data connectivity, 2011



Source: Ofcom consumer research, October 2011.

Base: all mobile phone users (number of smartphone users in brackets): UK=929 (506), France=914 (445), Germany=945 (502), Italy=989 (498), USA=902 (416), Australia=957 (490).

Q. Thinking about when you use your smartphone or mobile phone, please select an answer to each of the following:

I always have a mobile signal when I want to make a call [question asked of all mobile phone users]

I can always connect to the internet when I want to [question asked only of smartphone users]

[Choose from strongly agree, slightly agree, neither agree nor disagree, slightly disagree, strongly disagree, don't know]

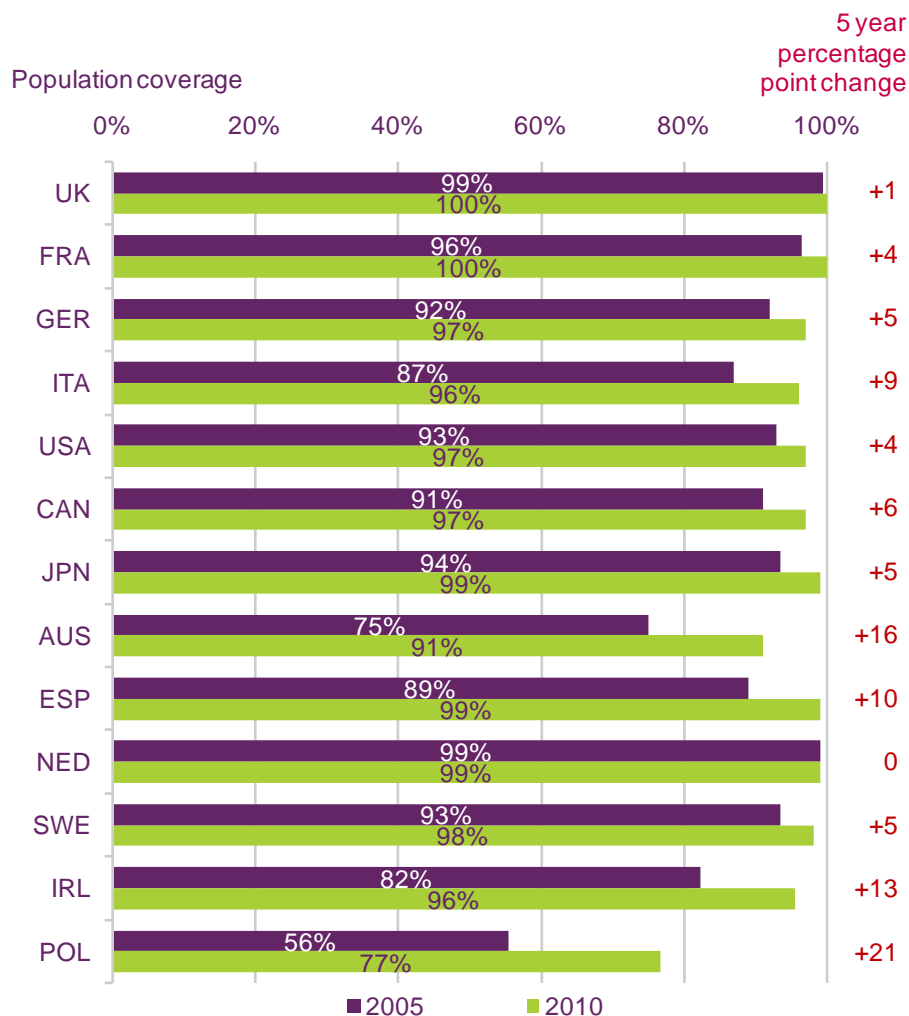
Fixed broadband laggards are catching up

Although virtually all households in the UK could access fixed broadband networks by the end of 2010⁷⁹, the same has not been true of many of the comparator countries over the past five years (Figure 6.53). In 2005, Italy, Australia, Spain, Ireland and Poland offered less than 90% of citizens the option of broadband connectivity. But since then, and despite considerable macroeconomic difficulties globally, and in some European nations in particular, there has been significant investment in broadband infrastructure, with only Poland still having less than 90% availability in 2010 (some way behind countries in Western Europe).

Broadband availability in Australia (91%) has increased rapidly in recent years, but remains lower than in many other countries. However, the government has made superfast broadband roll-out a policy priority, and the implementation of the National Broadband Network (NBN) is under way, which will bring fibre-optic broadband to most of the population.

⁷⁹ At the end of 2010 over 99.9% of UK homes were connected to an ADSL-enabled local exchange (although some people living in these areas may not be able to receive ADSL broadband services, or may only be able to do so at very slow speeds, as a result of the long length or poor quality of the copper telephone line from their premises to the local telephone exchange)

Figure 6.53 Fixed broadband availability: 2005 and 2010



Source: IDATE / industry data / Ofcom

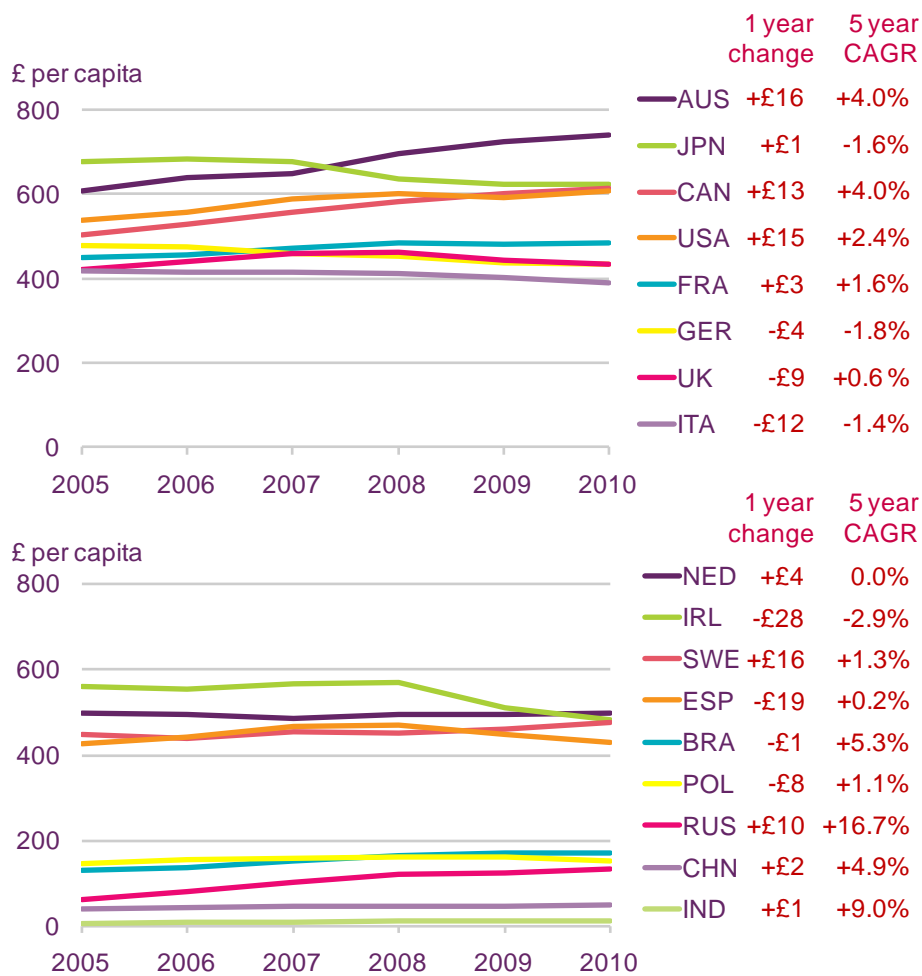
6.3.3 Expenditure

Australian consumers are the largest telecoms spenders

We use retail revenue per capita as a proxy for spending on telecoms services, although it should be noted that this incorporates both residential and business spending, and makes no allowance for retail taxes. For the third year running, Australia topped the list of spending on telecoms services among our comparator countries, and spending there continues to increase, rising by £16 per person, from £723 in 2009 to £739 in 2010 (Figure 6.54). Much of this has been driven by increasing numbers of contract mobile customers.

The story across the other 16 countries was mixed: ten (the US, Japan, Canada, France, the Netherlands, Sweden, Poland, Russia, China and India) saw an increase, and six a decrease, with the overall trend marginally downward. Countries that have suffered most in the economic downturn have tended to see the greatest decline in telecoms expenditure, namely Ireland, Italy and Spain. UK retail revenue per head declined by £10 in 2010, to £434. The fastest-growing country over the past five years is Russia, at 16.7% compound annual growth rate (CAGR).

Figure 6.54 Total telecoms service retail revenue per capita: 2005 to 2010

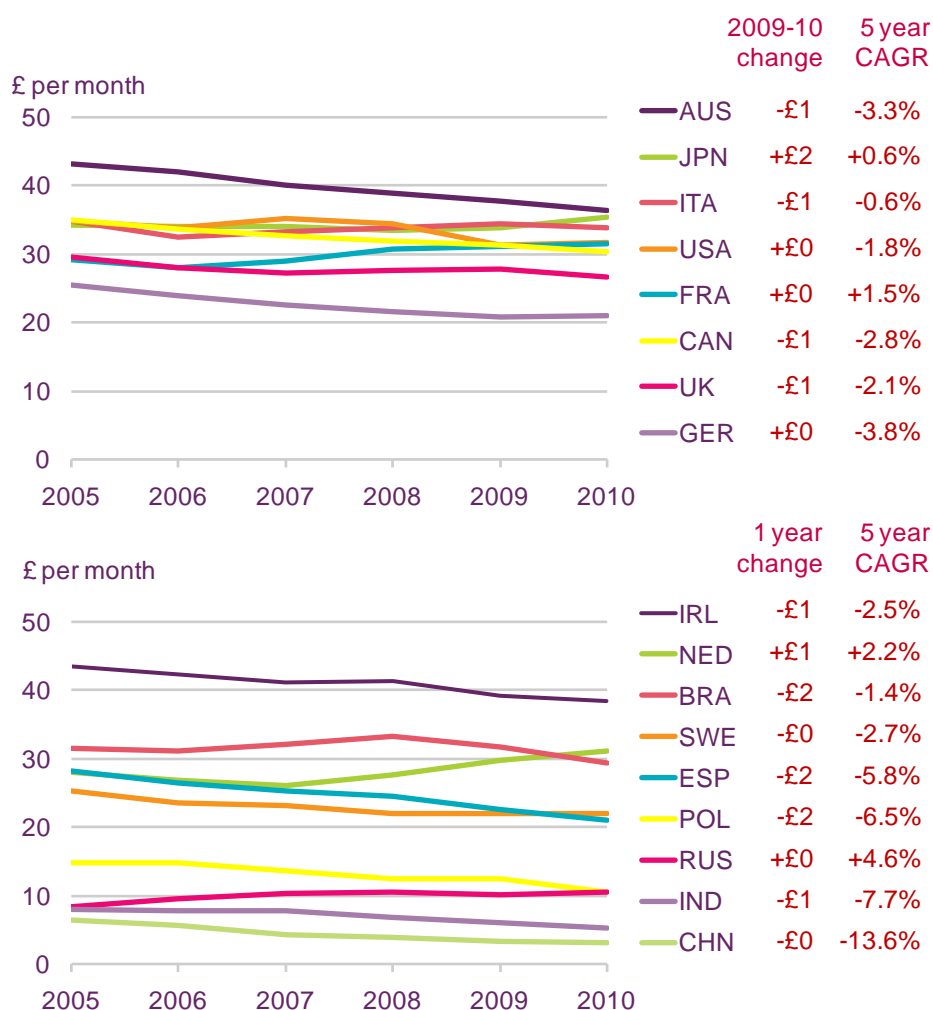


Source: IDATE / industry data / Ofcom

After years of decline, signs of increasing fixed voice expenditure appear

Spending on fixed line rental and telephony has been steadily declining in recent years, as shown in Figure 6.55. However, during 2010 there were indications that this trend was reversing: across our comparator countries spending remained level, with retail revenues per user increasing in the US, Germany, Japan, France, the Netherlands and Russia.

Figure 6.55 Retail fixed voice average revenue per user (ARPU): 2005 to 2010



Source: IDATE / industry data / Ofcom

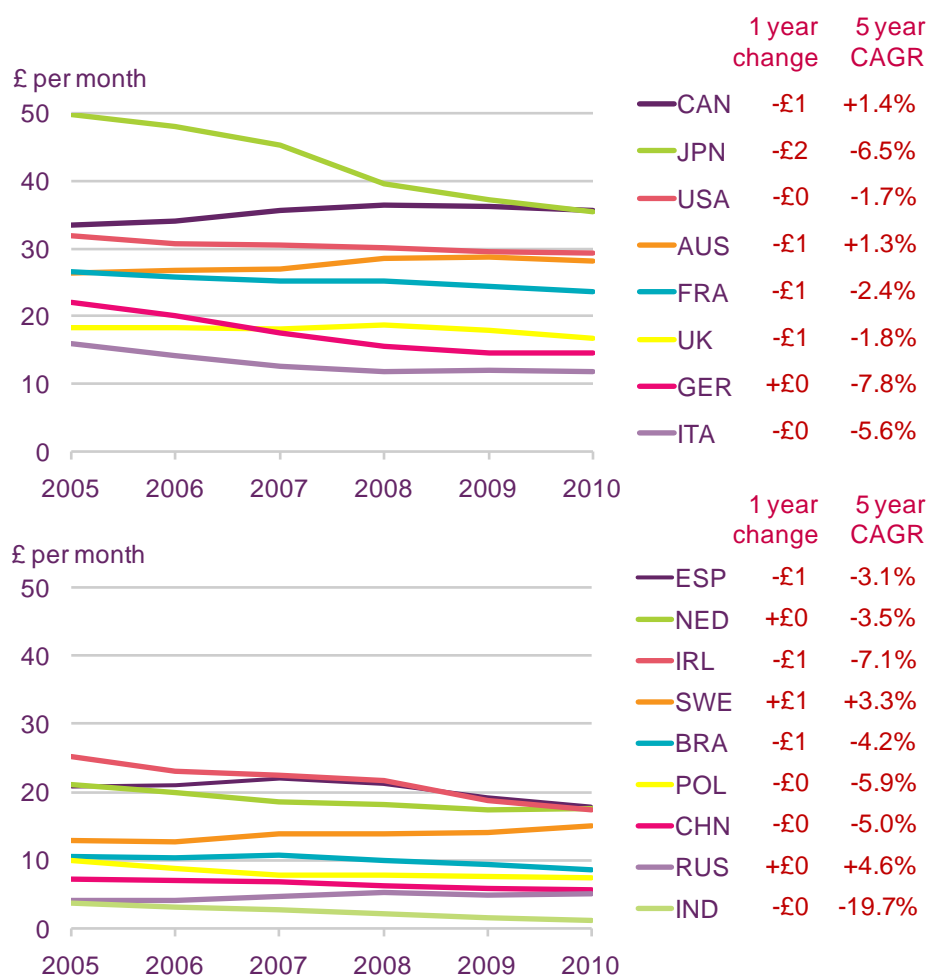
Mobile spending continues to decline

In contrast, mobile revenues per user fell in 2010 in all countries except Sweden (Figure 6.56). High levels of competition, plus mandatory reductions in mobile termination rates and roaming fees imposed by national regulatory authorities and the European Commission, have been major contributors to these declines. At the same time, some use of VoIP and substitution of voice for messaging (SMS and instant messaging) may be affecting voice revenues. Hit by the severity of economic conditions, consumers in Ireland have slashed their mobile voice expenditure by a cumulative 21.9% over two years.

The Irish picture contrasts sharply with a significant uptick in Sweden, where consumers spent nearly £1 per month per head more on mobile services in 2010. This may be attributed to increasing numbers of contract mobile subscribers, together with a substantial switch from pre-pay to post-pay, with consequential increase in ARPU, and the early roll-out of LTE, which brings the prospect of faster access to data services. Though the per-user revenue figures for India have dropped sharply, the number of SIMs per person has significantly increased, which largely explains the fall. Overall expenditure per user is significantly higher in Japan, Canada, the US and Australia than in the European countries included in this analysis, perhaps reflecting greater competitive intensity in Europe. Expenditure per user is

lowest in the BRIC countries and in Poland, where prices are lower than in the other comparator countries, reflecting lower average incomes.

Figure 6.56 Retail mobile average revenue per user (ARPU): 2005 to 2010



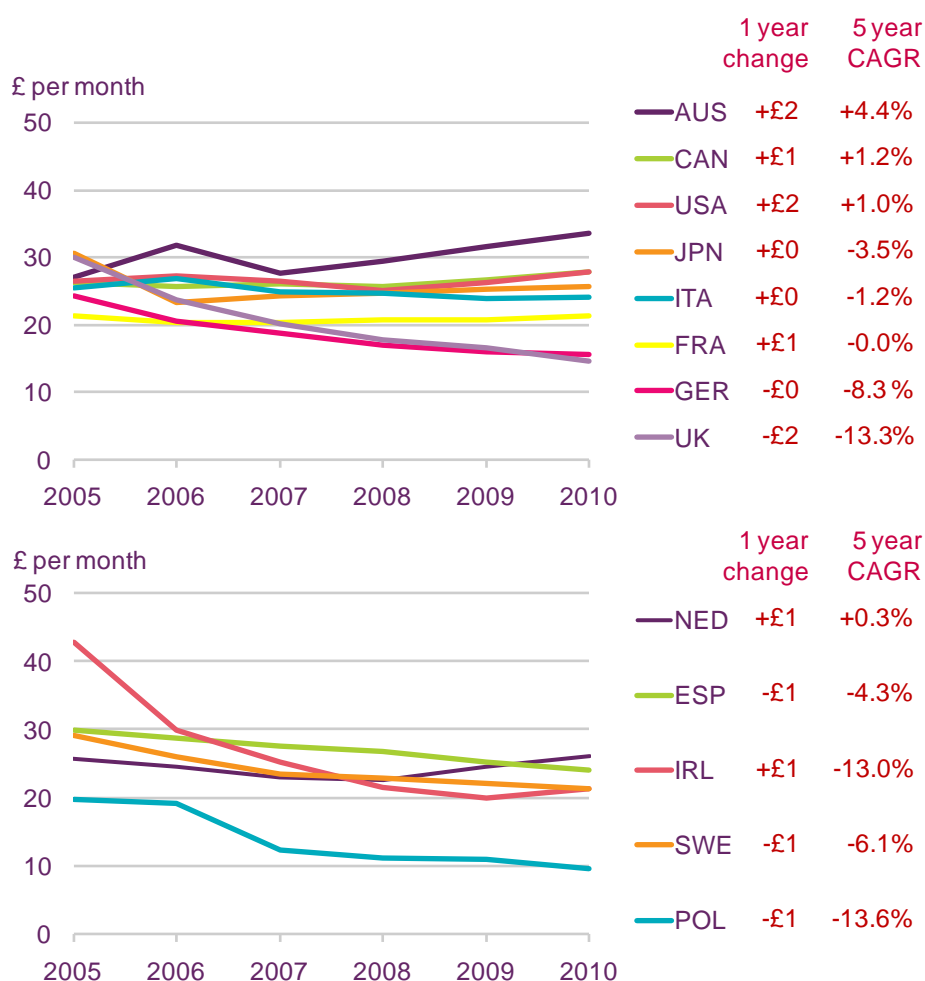
Source: IDATE / industry data / Ofcom

Spend on fixed broadband increases in countries with high take-up of NGA services

Over the past five years, consumers in Ireland have gone from spending the most per fixed broadband connection to spending the sixth-least among our comparator countries (Figure 6.57). At the same time, per-capita spending in Australia has grown, and it is now the only country where subscribers spend over £30 each per month on fixed broadband. Overall, average expenditure on fixed broadband connections appeared to bottom-out in 2008 and 2009, with a 1% increase in 2010. This may be because some consumers are increasing their expenditure in return for higher-speed services. It is notable that in countries where there have been increases in fixed broadband expenditure, there is often relatively high take-up of superfast next-generation broadband services (e.g. Japan, the US and Canada).

Average expenditure per broadband user in the UK fell by 11.8% as a result of falling prices, particularly in the context of the take-up of bundled services, where broadband is purchased in association with voice ('dual-play') and sometimes also television ('triple-play') services. However, the cost of line rental is generally excluded from this analysis (it is attributed to voice telephony) – and as line rental is required for most broadband services in the UK (and in many other countries), the data are not a complete representation of the actual price of broadband services.

Figure 6.57 Retail broadband average revenue per user (ARPU): 2005 to 2010



Source: IDATE / industry data / Ofcom

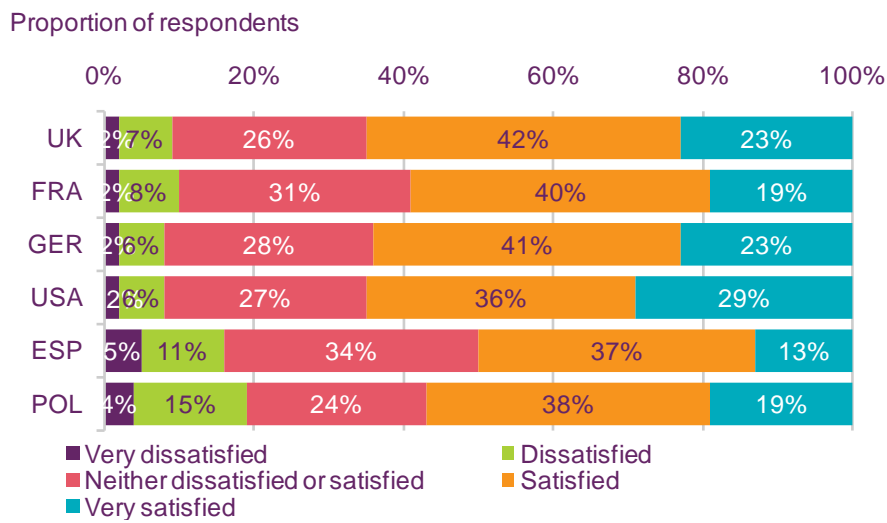
6.3.4 Satisfaction and switching

Customers in all comparator countries are least satisfied with mobile broadband

Compared with fixed telephony, mobile telephony and fixed broadband, consumers are more dissatisfied with their mobile broadband service, according to Analysys Mason's *Connected Consumer Survey 2011*, which surveyed consumers in six of Ofcom's comparator countries. Between 15% of survey respondents (in the US and France) and 25% of survey respondents (in Spain) said they were either dissatisfied, or very dissatisfied, with their mobile broadband service (Figure 6.61). This compared with a range of 8% - 23% for mobile voice (Figure 6.59), 9% - 22% for fixed broadband (Figure 6.60) and 8% - 19% for fixed voice (Figure 6.58) among the comparator countries.

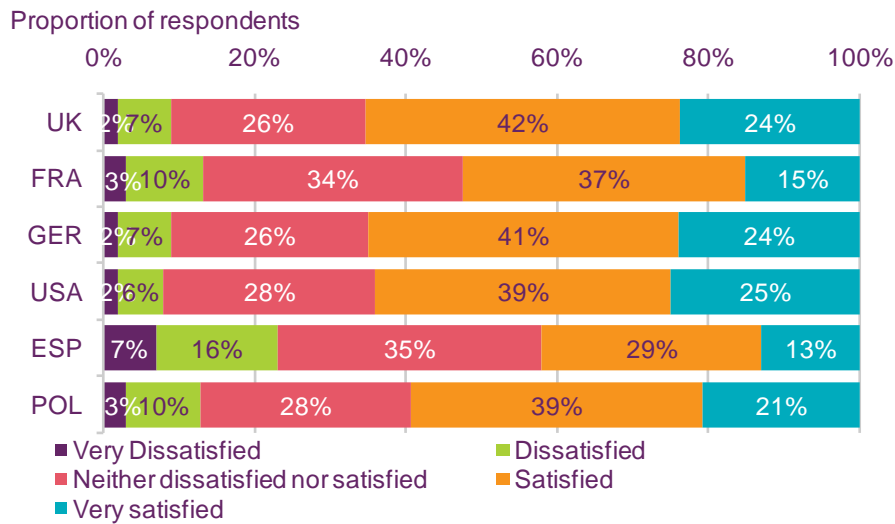
US consumers were the least dissatisfied with their services, having the joint-lowest proportion of dissatisfied and very dissatisfied customers for fixed voice and fixed broadband, and the lowest proportion for mobile voice and mobile broadband. Spanish consumers were the most dissatisfied for mobile voice and fixed broadband, and the second most dissatisfied for fixed voice and mobile broadband. UK consumers appear fairly happy with their telecoms services, having the third-lowest percentage of dissatisfied and very dissatisfied customers for fixed voice, joint second-lowest for mobile voice and mobile broadband, and joint lowest for fixed broadband.

Figure 6.58 Satisfaction with fixed voice services



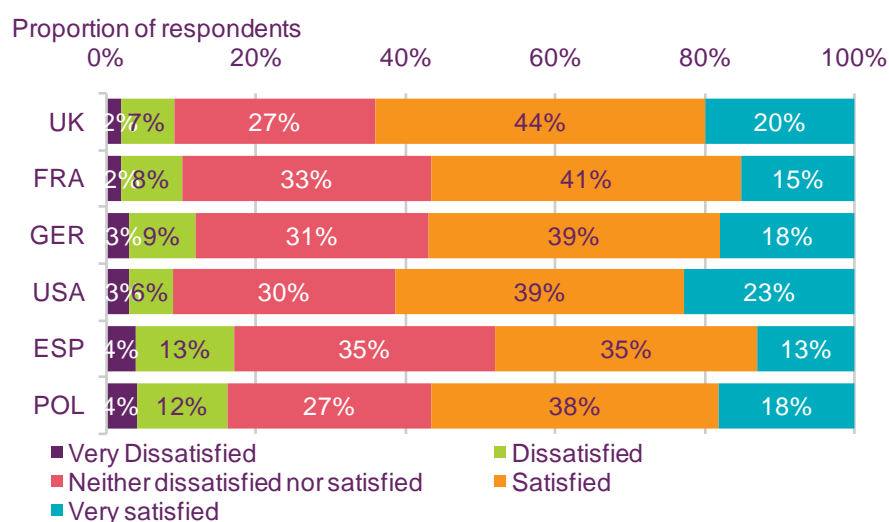
Source: Analysys Mason Connected Consumer survey, 2011.
 Q: Respondents were asked how satisfied they were with their fixed voice provider.

Figure 6.59 Satisfaction with mobile voice services



Source: Analysys Mason Connected Consumer survey, 2011.
 Q: Respondents were asked how satisfied they were with their mobile voice provider.

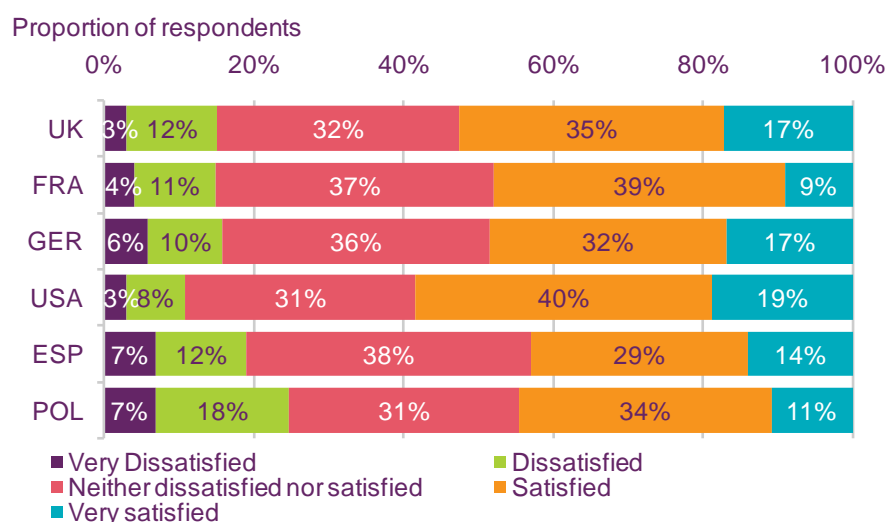
Figure 6.60 Satisfaction with fixed broadband services



Source: Analysys Mason Connected Consumer survey, 2011.

Q: Respondents were asked how satisfied they were with their fixed broadband provider.

Figure 6.61 Satisfaction with mobile broadband services



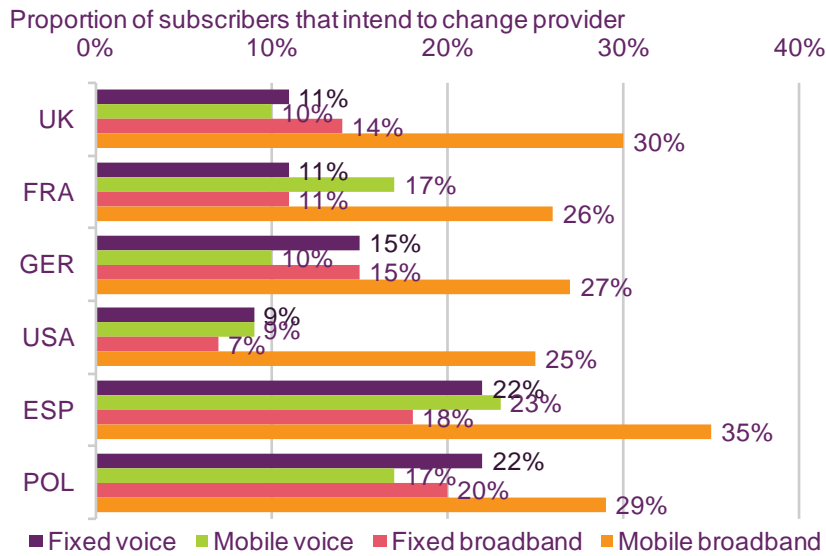
Source: Analysys Mason Connected Consumer survey, 2011.

Q: Respondents were asked how satisfied they were with their mobile broadband provider.

US consumers are the least likely to change provider and Spanish the most

Closely reflecting dissatisfaction with their services, consumers in Spain said they were most likely to change supplier (Figure 6.62). US consumers – the most satisfied – said they were least likely to change, with UK consumers the second least likely to change. However, three in ten UK mobile broadband subscribers said they intended to change from their current provider. Relatively high levels of dissatisfaction with mobile broadband services appears to be leading to a significant intention to change provider: 29% of mobile broadband subscribers across the six countries said they intended to change subscriber, according to the same Analysys Mason survey. The figures for fixed broadband, fixed telephony and mobile telephony are all much lower, at between 14% and 15%.

Figure 6.62 Proportion of subscribers who intend to change service provider: 2011

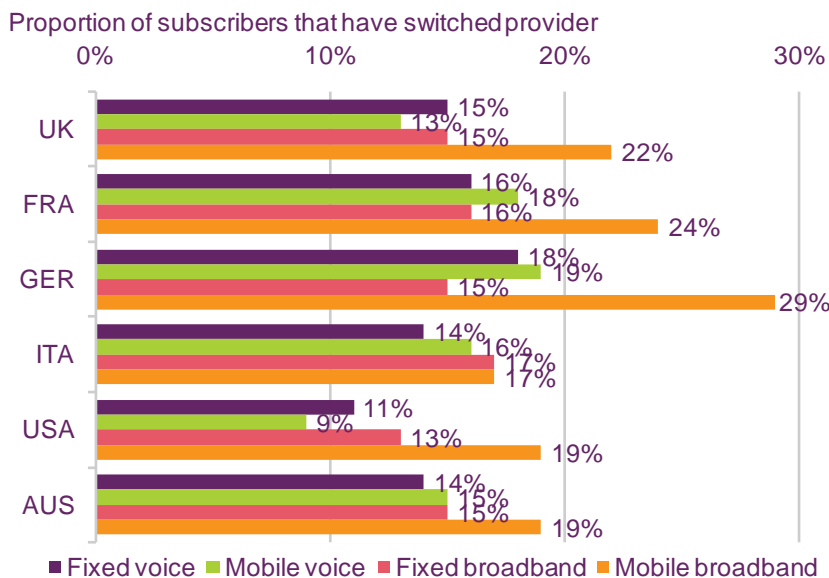


Source: Analysys Mason Connected Consumer Survey, 2011

Mobile broadband subscribers most likely to have switched in the past year

Not only are mobile broadband customers the most dissatisfied, and have the highest intention to change provider, they have also changed provider the most frequently in the past twelve months. Ofcom research among consumers in six countries found that 21% of mobile broadband subscribers that have had the service for over a year have changed provider in the past year (Figure 6.63). This compares with just 15% for fixed broadband, 14% for fixed voice and 14% for mobile voice. In the past twelve months, UK consumers claimed to have changed provider roughly as much as their peers in the other six countries. Consumers in Japan have shown the least willingness to change provider, and those in Germany the most.

Figure 6.63 Proportion of users who have switched provider in the past 12 months: 2011



Source: Ofcom consumer research, October 2011.

Base: subscribers to each service of more than one year.

Q. Which of the following is the case for each of these services that your household pays for? Options given: Switched provider in the last 12 months; stayed with the same provider over the last twelve months.

6.3.5 Voice

Fixed-line take-up much more resilient in the UK than in other countries

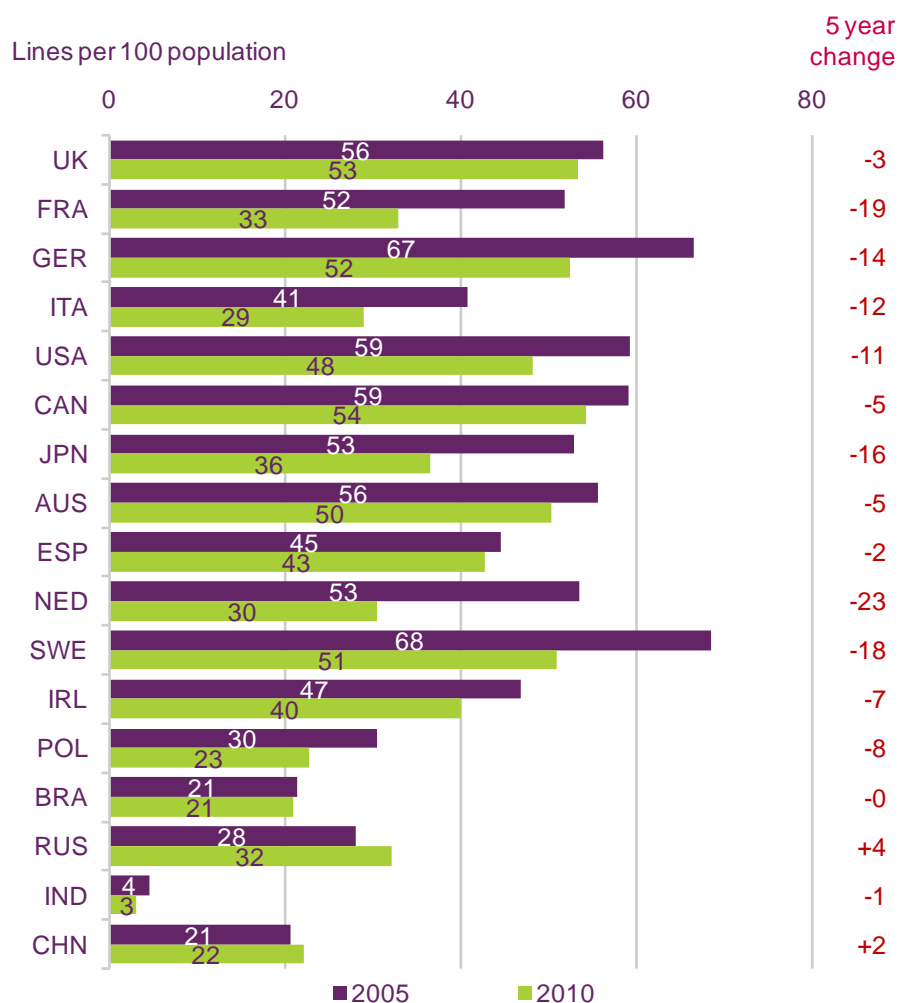
There is considerable variation both in the levels of fixed-line take-up and in the trends across the 16 comparator countries for which we have data (Figure 6.64). Although a general trend has been a decline in fixed lines, the base of fixed lines has been more resilient in some countries. In the UK, fixed-line penetration fell by three lines per 100 people between 2005 and 2010 (to 53 lines per 100 people), and by the end of 2010 take-up of fixed-line voice was the second highest among our comparator countries. Take-up has also been resilient in Canada, Australia, Spain, Ireland, Brazil and Russia.

By contrast, there has been a much greater decline in fixed-line penetration in other countries, in particular France, Germany, Italy, Japan, the Netherlands, Sweden, Poland and India. Despite having relatively low fixed-line penetration, India has seen a decline in its fixed-line figures, indicating that fixed voice lines are playing little role in its economic development, as the country embraces mobile connectivity. It should also be noted that the number of households has been increasing in India, exacerbating the rate of decline per 100 households of a slowly growing fixed infrastructure. In the Netherlands, France, Sweden and Germany, a contributory factor is the large number of households that now rely on VoIP for fixed-line voice telephony.

The slower rate of decline in fixed-voice lines in the UK and Spain is likely to be due to the requirement to have a voice line for most broadband connections. In France, the Netherlands and Sweden, 'naked DSL' is available; customers are not required to have a PSTN voice line in order to receive broadband services over their phone line. In Germany, large numbers of cable broadband subscribers receive a fixed broadband service but not a voice service. By contrast, a voice line is mandatory in the UK for all DSL broadband subscribers (representing over 75% of all broadband customers and around 55% of all households), while the pricing strategy of cable operator Virgin Media provides little incentive for broadband customers to give up a voice line.

Of the comparator countries, the lowest take-up of fixed-line services is in India and Poland, which have never had nation-wide fixed-line infrastructures. However, to a significant extent households have bypassed fixed services and gone straight to mobile. Despite significant economic growth since 2005 and an explosion in the take-up of mobile, fixed-line penetration has increased only slightly in China – which in that way makes it akin to India.

Figure 6.64 Fixed lines per 100 population: 2005 and 2010

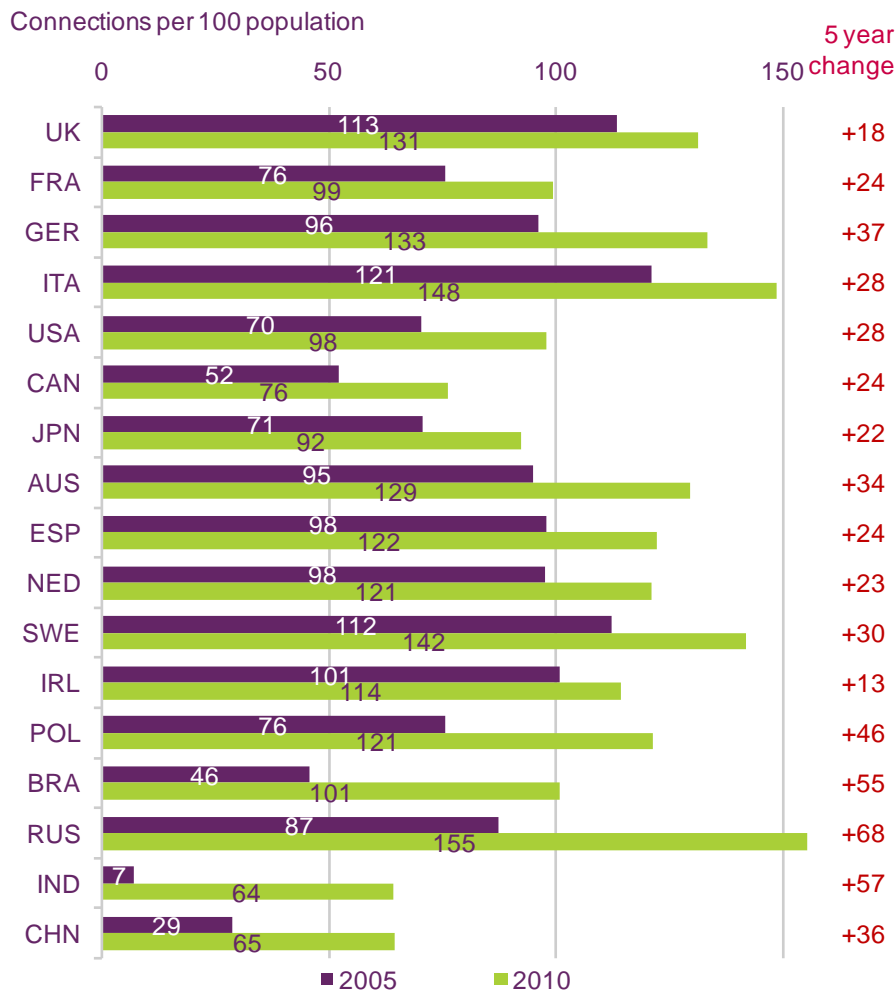


Source: IDATE / industry data / Ofcom

Mobile connections continue to rise

In contrast to the decline in fixed telephony, Figure 6.65 illustrates the rapid growth in mobile telephony across all countries over the five-year period to 2010. Indeed, there are now more mobile connections than people in most of our comparator countries as individuals have more than one device, or buy SIM cards on multiple networks in order to achieve the lowest prices for different types of call (this is particularly common in India and China where dual-SIM phones make switching between different networks very easy).

Figure 6.65 Mobile connections per 100 population

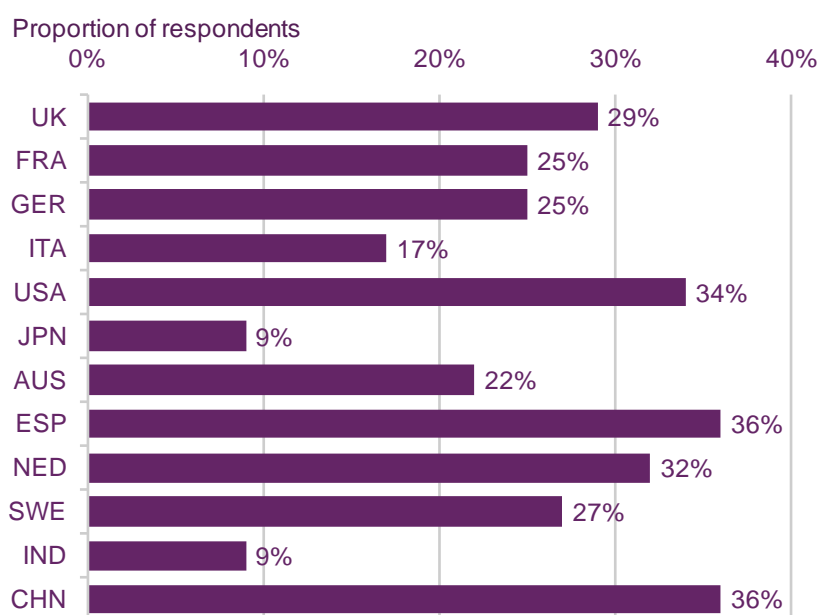


Source: IDATE / industry data / Ofcom

Multiple device ownership is commonplace

Data from Forrester Research in Q2 2011 indicate the proportion of each population that owns multiple handsets (if not multiple active SIMs). Of the countries compared, China and Spain have the highest incidence of multiple handset ownership, followed by the US and the Netherlands (Figure 6.66). The UK has the fifth highest level of multiple handset ownership, with over a quarter of adult mobile subscribers owning two or more handsets. The figures for China and India refer to urban populations only and therefore may not be representative of those countries' populations as a whole.

Figure 6.66 Mobile subscribers aged 18+ with two or more handsets



Source: Forrester Research, Inc. *European Technographics® Benchmark Survey, Q2 2011*; *North American Technographics Benchmark Survey, Q2/Q3 2011 (US, Canada)*; *Asia Pacific Technographics Benchmark Survey, Q2 2011*. Data published in Forrester Research 'Global Mobile Behaviours 2011'.

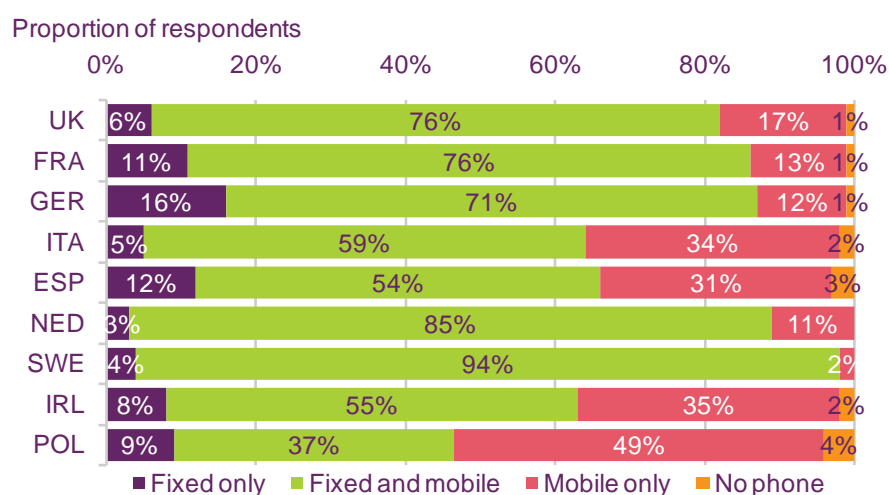
Mobile-only households are becoming commonplace in some countries

European Commission research into household take-up of fixed and mobile telephony provides insight into the extent to which mobile telephony is a substitute for, or complement to, fixed telephony. The results show marked differences between nations. Of the nine European Union nations that are also Ofcom comparator countries, Poland is by far the most mobile-only, with 49% of its households taking at least one mobile service, but no fixed service (Figure 6.67).

In contrast, only 4% of households in Sweden are mobile-only, with 94% of households taking both mobile and fixed phone services. Germany had the highest proportion of fixed-only households (16%) out of the nine nations. According to this survey, just over three-quarters of UK households (76%) have both a fixed and mobile telephony service, with 6% being fixed-only and 17% mobile-only. One per cent of UK households have no telephony service⁸⁰.

⁸⁰ Ofcom's own consumer research found that in Q1 2011 79% of UK households had both fixed and mobile phones, 15% were mobile only and 6% fixed only, see Fig 5.70 (p304) in Ofcom's UK *Communications Market report 2011*, http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf

Figure 6.67 Household penetration of fixed and mobile telephony: 2011



Source: European Commission consumer research, July 2011.

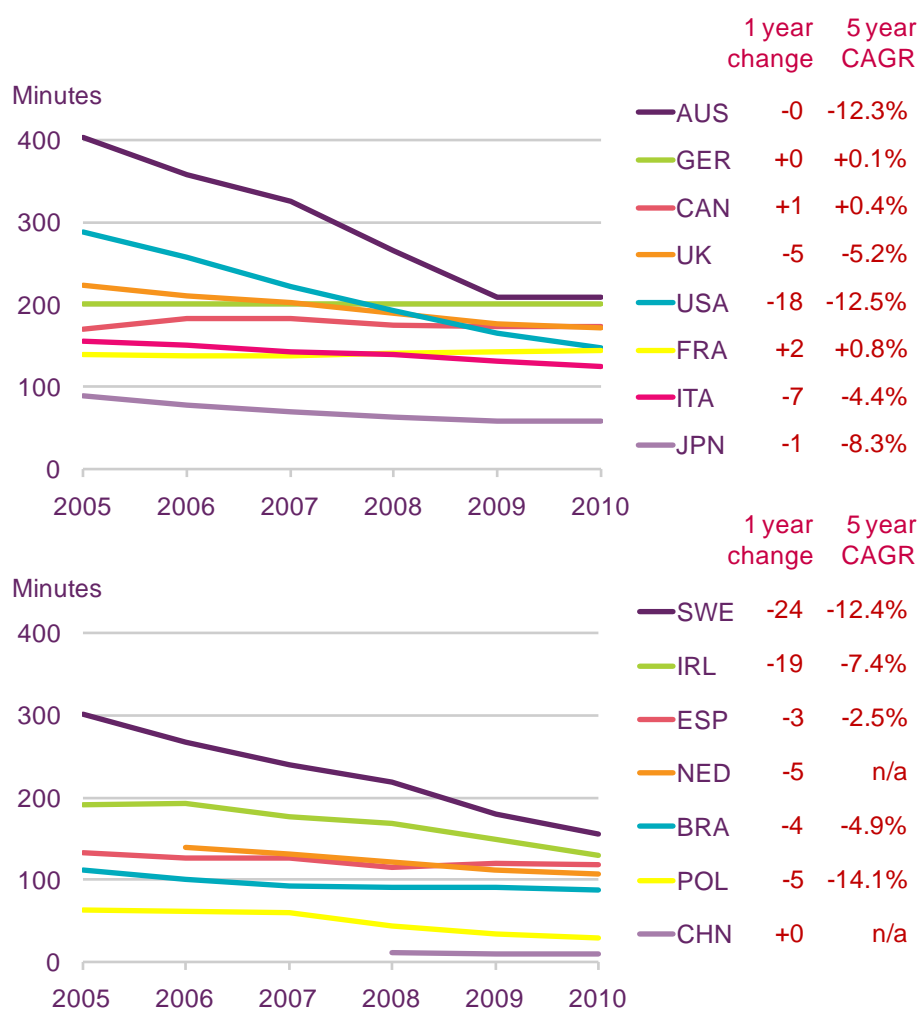
Base: UK=1322, Germany=1622, Spain 1004, France=1035, Ireland=1007, Italy 1027, Netherlands=1012, Poland=1000, Sweden=1024.

Fixed telephony use tumbles as fixed lines are abandoned

Given the large-scale abandonment of fixed lines in many countries, it is unsurprising that call volumes have also decreased. The greatest falls have been in the US, Australia, Sweden and Poland, where call volumes fell by around 50% in the five years to 2010. Even in the UK and Spain, where the number of fixed lines has remained comparatively resilient, call volumes have fallen significantly. In the UK, consumers have substituted mobile calls for fixed-line calls as the price difference between fixed and mobile calls has reduced. And in Spain, there are now fewer voice calls being made in total, perhaps in part due to the economic downturn and also as people use alternative ways of communicating, such as email, instant messaging and social networks.

France and Germany are anomalies, because although the number of fixed lines has fallen, the number of minutes made per person over fixed lines has not. Indeed, in France the number of fixed minutes per person has risen every year since 2007, while mobile minutes remain close to static, suggesting that mobile-to-fixed substitution is occurring. This may be driven by high levels of take-up of VoIP services, where low-cost voice services are charged at a flat rate: Figure 6.68 below indicates that the cost per minute for fixed voice services has been falling in France and Germany in recent years, and is among the lowest of our comparator countries, while the price per minute for mobile calls is comparatively high (see Figure 6.72 below).

Figure 6.68 Monthly fixed line voice call minutes per person: 2005 to 2010

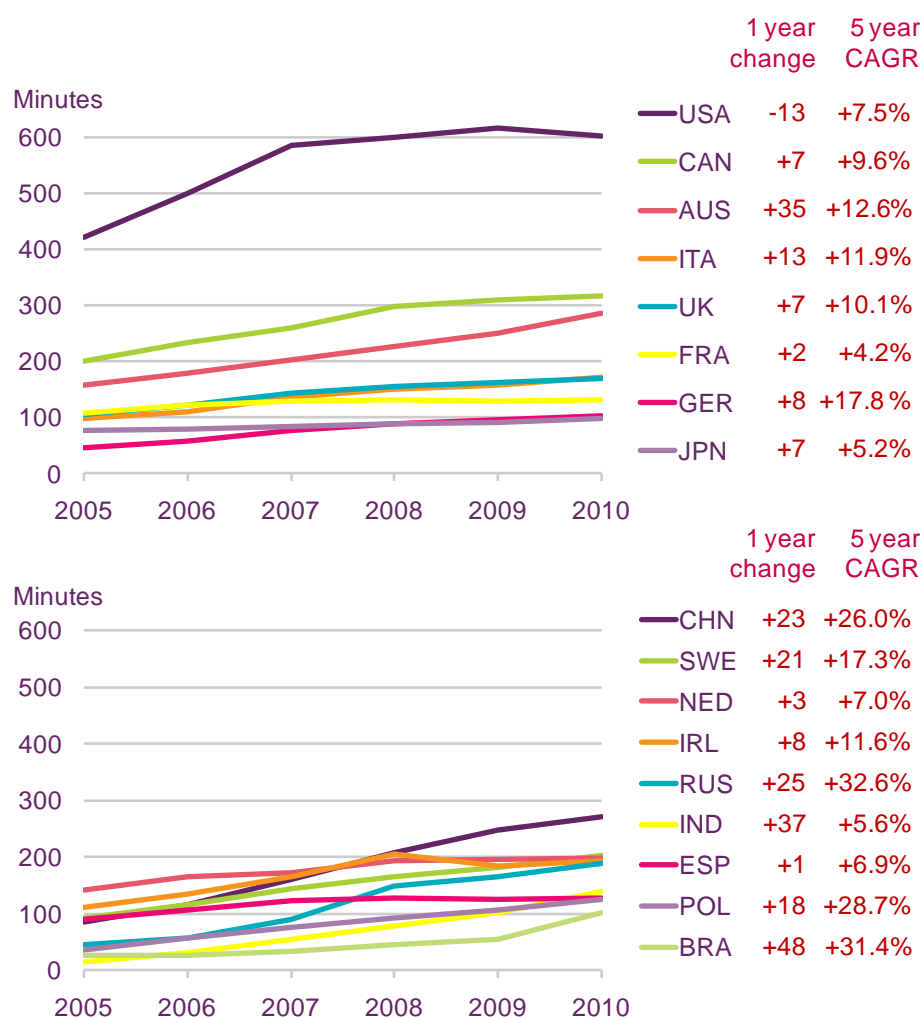


Source: IDATE / industry data / Ofcom

Mobile call volumes continue to surge

Mobile use continued to increase in all of our comparator countries except the US during 2010, although there is some evidence of a slowdown in growth rates as markets become saturated (Figure 6.69 and Figure 6.35). Mobile use in the BRIC nations has rocketed in the past five years, driven by economic growth and service take-up, with call volumes more than tripling in Brazil, Russia, India and China between 2005 and 2010. It should be noted that the data for the US, Canada, and all four BRIC nations include some proportion of incoming calls (see footnote) and are therefore not directly comparable with European figures (this is a consequence of a different regulatory policy for mobile termination charges, which means that inbound as well as outbound calls are chargeable in some countries).

Figure 6.69 Monthly mobile voice call minutes per head: 2005 to 2010



Source: IDATE / industry data / Ofcom

Note: USA, Canada and China – incoming calls included; Brazil, India and Russia – incoming calls included except on-net mobile-mobile

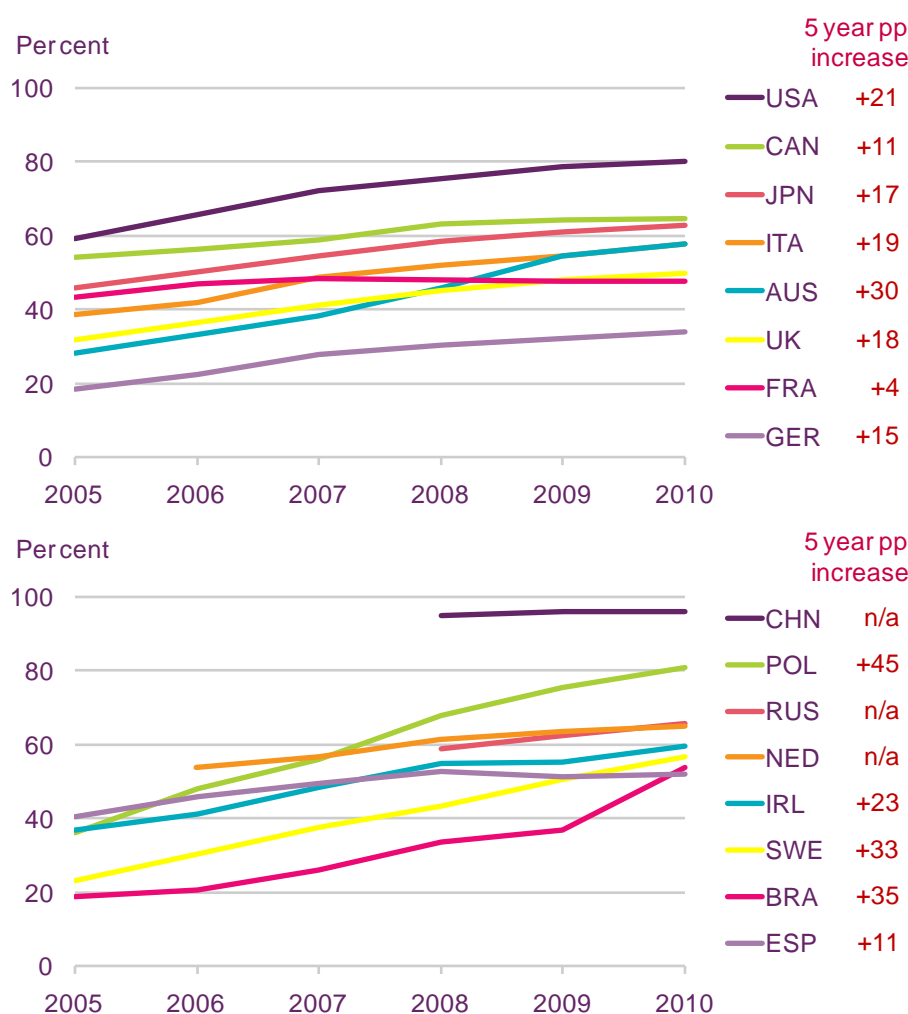
Mobile voice traffic exceeds fixed voice traffic in most comparator countries

The rate of substitution of mobile voice calls for fixed voice calls is indicated in Figure 6.70. Consumers in Australia, Sweden, Poland and Brazil are migrating the quickest from fixed voice to mobile voice, while in China the dominance of mobile has strengthened still further. France, followed by Canada, the Netherlands and Spain, have seen the least fixed-mobile substitution over the five-year period, and in the past two years migration appears to have stopped or reversed in these three nations.

Thirteen of the 16 nations for which data are available carried more mobile voice traffic than fixed voice traffic at the end of 2010. Data collected by Ofcom indicate that the UK became the fourteenth during the fourth quarter of 2010.⁸¹

⁸¹ Mobile call volumes exceeded fixed call volumes in the fourth quarter of 2010, as shown in Ofcom's quarterly telecoms data updates: <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/tables/>

Figure 6.70 Percentage of voice minutes originating from a mobile: 2005 to 2010



Source: IDATE / industry data / Ofcom

Note: USA, Canada and China – incoming calls included; Brazil, India and Russia – incoming calls included except on-net mobile-mobile

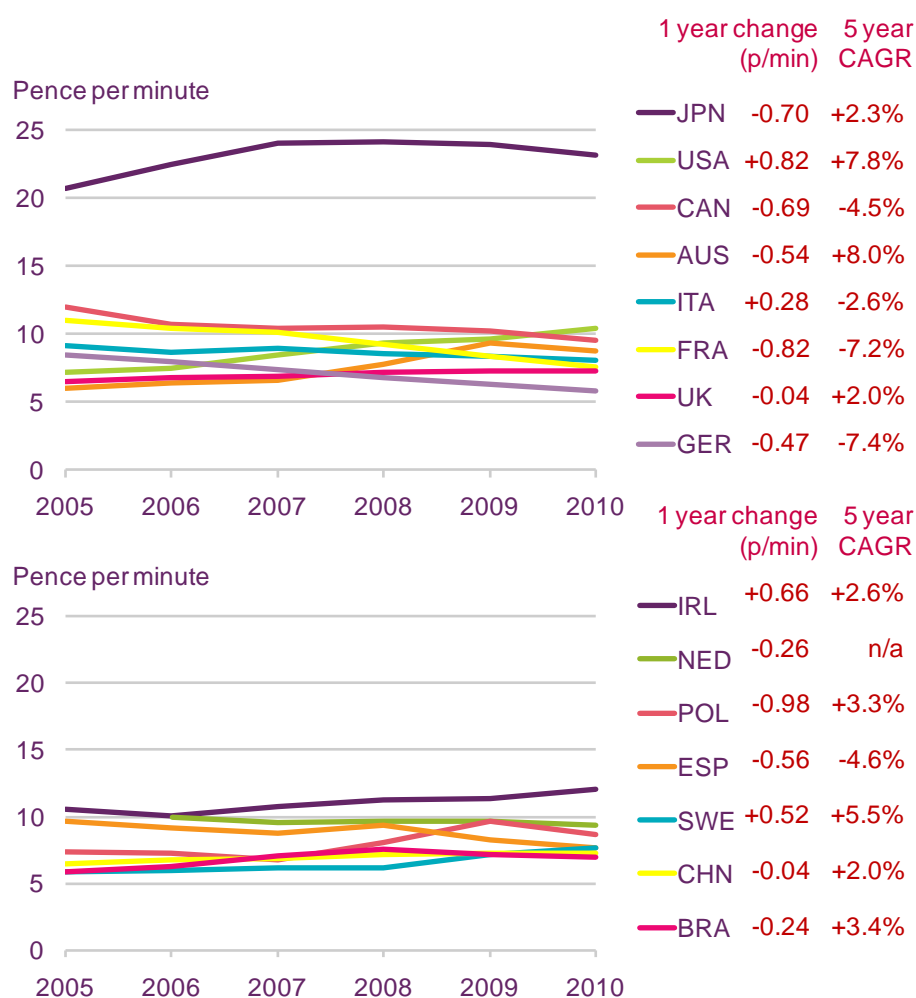
Japan remains the most expensive country for fixed telephone calls

In Section two of this report we compare pricing in the UK with that in France, Germany, Italy, Spain and the US, by analysing tariffs to compare the price of baskets of communications services. Another way of comparing prices is to look at the cost per minute, which we calculate from voice revenues and voice volumes. This can be very instructive in looking at trends, but should be treated with some caution as cost-per-minute is not necessarily a reflection of price (for example, many fixed-line tariffs and some mobile tariffs offer unlimited calls for some call types), while the inclusion of access charges as well as metered charges means that some of the costs may not necessarily be associated with voice services – for example, voice line rental is a requirement for many fixed-line broadband services, while monthly access charges for post-pay mobile services often include data services and sometimes include the cost of the mobile handset.

Among our comparator countries, Japan remains clearly the most expensive for the cost-per-minute of fixed telephone calls, at nearly double the price of the second most expensive country, Ireland (Figure 6.71). The UK is one of the least expensive, although most major operators have increased standard prices for line rental during 2011. The lowest cost per minute among our comparator countries was in Germany, where prices fell by 32% between

2005 and 2010. Germany (along with Australia) has the highest fixed call volumes per head (see Figure 6.68 above), so low cost-per-minute in part reflects high usage.

Figure 6.71 Average cost of a fixed voice call minute: 2005 to 2010



Source: IDATE / industry data / Ofcom

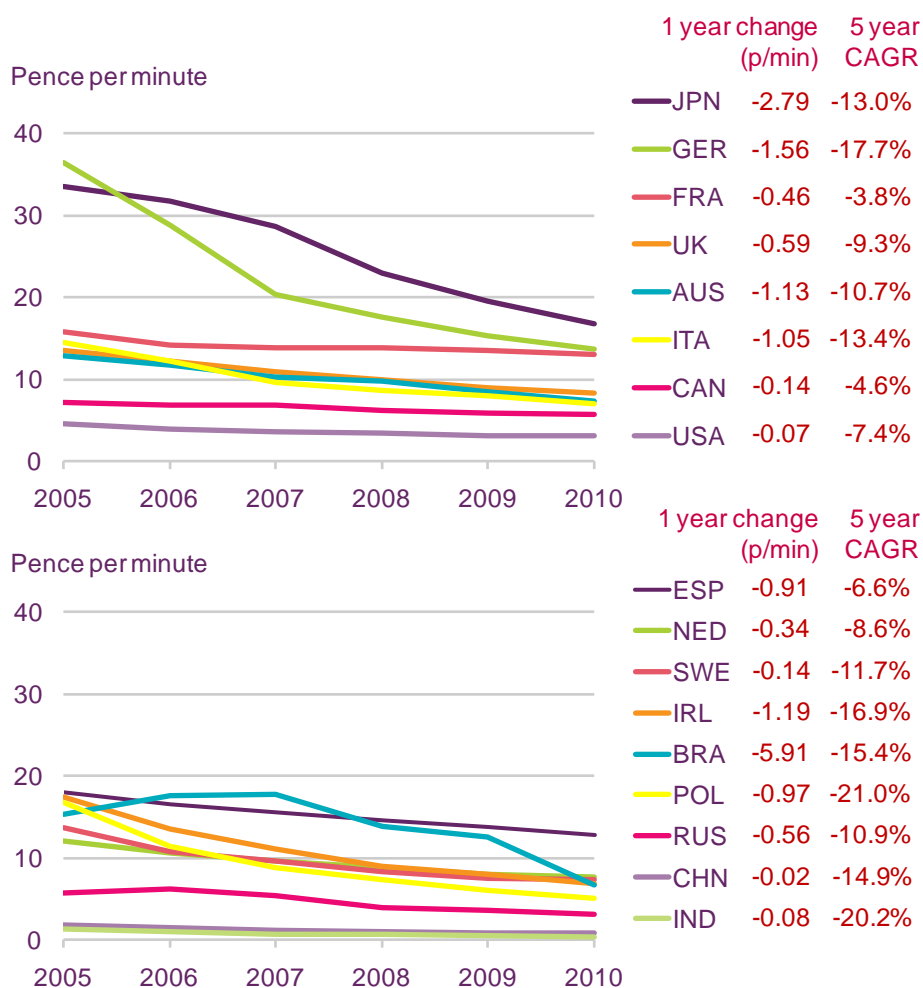
Japan remains the most expensive for mobile too, but prices are falling

Japan also has the most expensive mobile voice calls in terms of cost per minute, although the situation has improved: prices halved between 2005 and 2010 (Figure 6.72). Every country has seen falling mobile prices over the five-year period, as well as during 2010. Lower cost per minute comes in the context of increasing use and high levels of competition in saturated markets, characterised by price disruption from new entrants looking to gain market share (including MVNOs). Regulation, which has capped mobile termination rates and roaming charges, is also a driver of falling prices, particularly in Europe. Price per minute in Italy and the UK has historically been lower than in the other European comparator countries, in part because of the pricing strategy of 3G-only operator Three, while costs in Germany have fallen steeply in recent years but remain higher than in other European countries. Cost per minute is lowest in China and India, driven by lower cost bases and lower average incomes.

The mobile cost-per-minute figures are likely to be overstated, particularly in countries which have high take-up of post-pay mobile, as the monthly access charge often includes data services and sometimes the cost of the mobile handset. In the UK, for example, post-pay

mobile contracts typically include a fully- or partly-subsidised handset; in Q2 2011 nearly three-quarters of mobile data users paid no additional data charge outside their monthly access fee.⁸² The figures for the US and Canada are not directly comparable with the other countries because the figures include revenues from, and volume of, incoming calls, and the BRIC countries are not comparable because they are calculated from incoming call volumes.

Figure 6.72 Average cost of an outgoing mobile voice call minute: 2005 to 2010



Source: IDATE / industry data / Ofcom

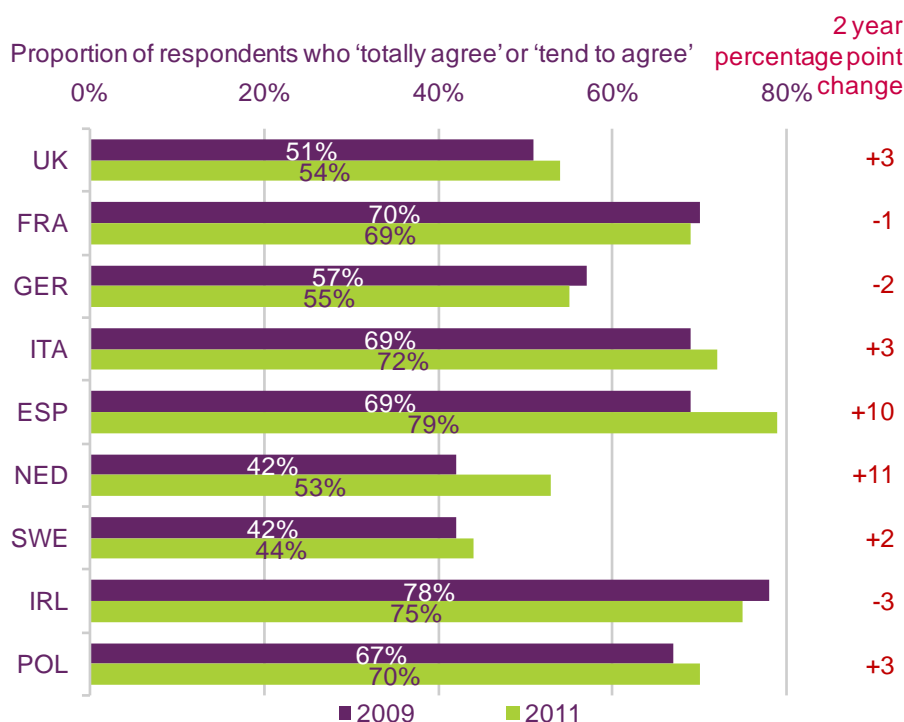
Affordability concerns increase despite price declines

Despite falling average prices of fixed and mobile calls, consumers' concerns about their ability to afford mobile phone charges appear to have increased across the majority of our comparator countries (Figure 6.73). Concerns increased the most in Spain and the Netherlands, according to European Commission research. In a survey conducted in February and March 2011, 79% of consumers in Spain said that they limited their mobile phone calls because they were concerned about the charges – up from 69% in the EC's previous survey in November and December 2009. In the Netherlands, 53% of consumers said they limited their calls because they were concerned about the charges – up from 42% in the earlier survey. The concerns in Spain may be partly related to its relatively high mobile pricing, but also to the macroeconomic downturn.

⁸² See Ofcom Communications Report 2011, Fig 5.22 p 266, http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/UK_CM_2011_FINAL.pdf

In the UK, 54% of respondents to the 2011 survey said that they limited mobile calls because of concerns about the charges, up from 51% in 2009. Among our comparator countries, Sweden had the lowest proportion of consumers concerned about mobile phone costs, although its total rose to 44% from 42%. Affordability concerns lessened in Germany, France and Ireland – in the latter, from very high levels. In the previous survey, consumers in Ireland had been the most concerned about affordability; now, the country is second; behind Spain.

Figure 6.73 Level of concerns about the affordability of voice: 2009 and 2011



Source: European Commission consumer research, published July 2011.
 Base: UK=1322, Germany=1622, Spain 1004, France=1035, Ireland=1007, Italy 1027, Netherlands=1012, Poland=1000, Sweden=1024.
 Statement: You limit your calls with your mobile phone because you are concerned about communication charges. Answers: Totally agree/tend to agree/tend to disagree/totally disagree/not applicable/don't know.

6.3.6 Broadband

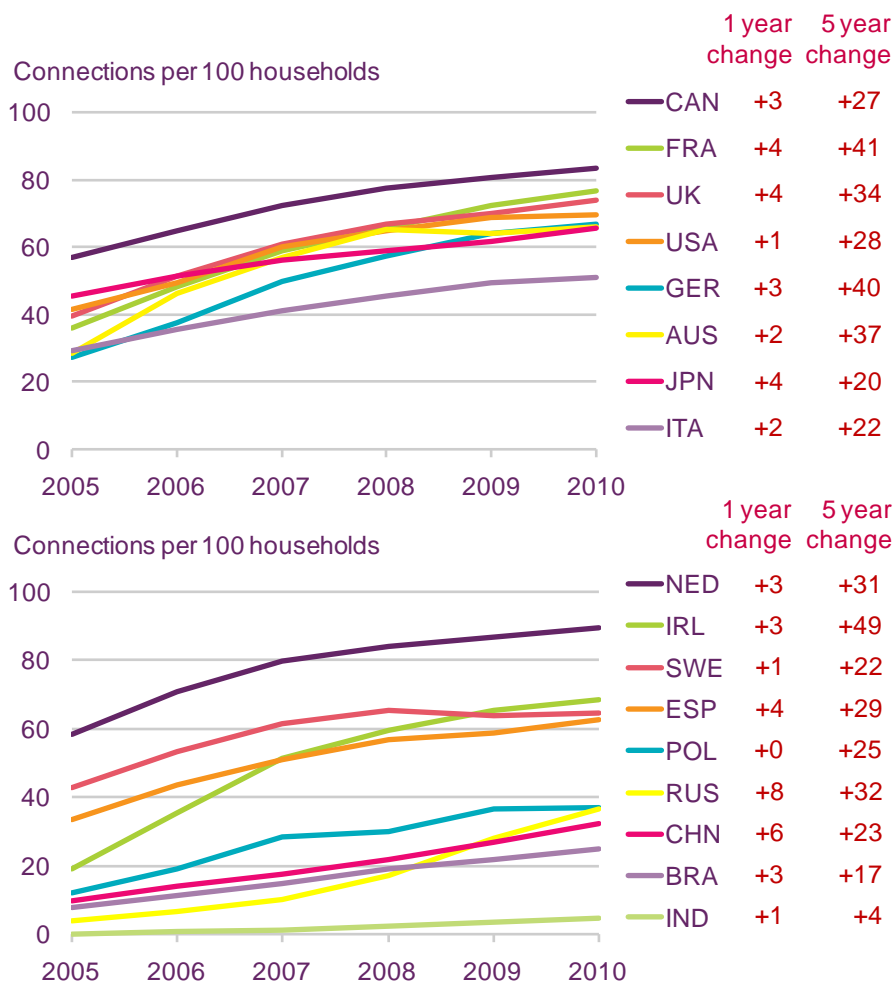
Growth in fixed broadband take-up is slowing

Perhaps the most significant global telecoms trend in the first decade of the 21st century was the massive and rapid take-up of fixed broadband. All of our comparator countries saw very significant growth in take-up between 2005 and 2010 (Figure 6.74). The Netherlands, and Canada, lead the country comparison, with over eight connections for every 10 households by the end of 2010 (availability is 99% of the population for the former and 97% for the latter). However, along with most other developed markets, growth in those countries is slowing and 2010 marked less than three percentage points growth for each of these two leading countries: having reached mass adoption, take-up among late adopters is slower.

Penetration in the UK continues to grow, increasing from 70 connections per 100 households to 74 connections during 2010; indeed, the growth rate in the UK in 2010 was higher than in 2009. Poland and the BRIC nations have lower take-up but are growing rapidly. But as mobile broadband establishes a foothold in these countries it may be that the

take-up of fixed broadband will never approach levels in Western Europe, North America and Japan. Indeed, slowing growth rates in mature markets may be partly driven by increasing take-up of mobile broadband services. High-speed mobile services using the LTE standard (often known as 4G) have launched in some countries, and the early launch of LTE in Sweden (where one in three households have mobile broadband) by TeliaSonera in 2009 (the first LTE deployment to go live) may be constraining further growth of fixed-line broadband.

Figure 6.74 Fixed broadband connections per 100 households: 2005 to 2010



Source: IDATE / industry data / Ofcom

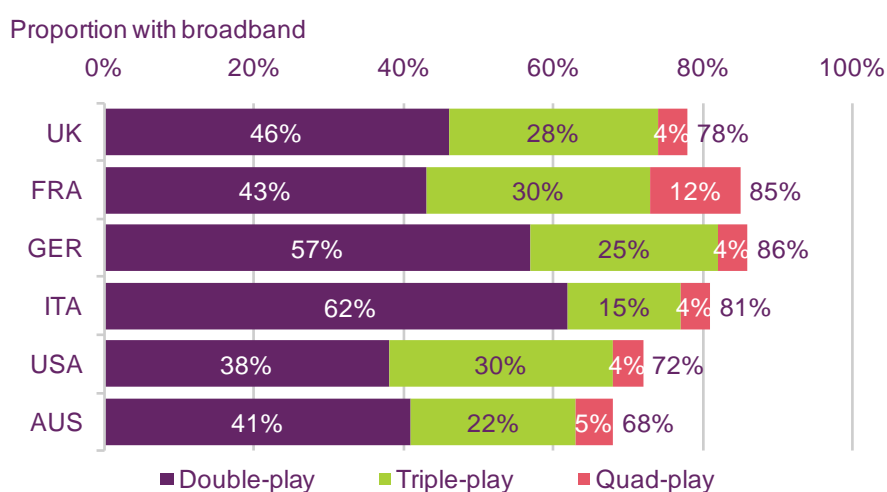
Fixed broadband is typically bought with one additional telecoms service

A characteristic of the 'convergence' of communications services is that multiple services are frequently purchased in a 'bundle' from the same provider, generally at a discounted price compared to purchasing the services individually. An Ofcom survey of broadband users found that in all six countries researched, most broadband customers purchased the service in a 'bundle' (Figure 6.75). The most common additional service is fixed voice (35% of respondents across all comparator countries), followed by fixed voice and pay TV (14%) then fixed voice and mobile voice (10%). The most popular 'bundle' of services was two services, known as 'dual-play': 45% per cent of broadband subscribers took a dual-play bundle, with 25% taking three services (triple-play) and 5% taking four services (quad-play). Twenty-four per cent of consumers took broadband on its own.

Among the seven countries surveyed, consumers in Germany were most likely to buy broadband in a bundle: six in seven did this. A majority bought just one additional service: fixed voice. UK consumers are the third most likely to buy other services with broadband, with 78% of broadband customers buying a bundle. The most common UK bundles were a dual-play fixed voice and broadband bundle (35%) and a triple-play bundle including broadband, fixed voice and pay TV (24%). UK telecoms operators have focused strongly in recent years on selling bundles of voice and broadband (a trend which increased in 2009 when deregulation by Ofcom permitted BT to offer discounted bundles), while pay-TV operators Virgin Media and Sky have strongly promoted triple-play services.

UK cable and mobile virtual network operator Virgin Media has had modest success in selling quad-play services that also include mobile. The highest take-up of quad-play is in France (12%) where France Telecom (Orange), Free and SFR have, in the last couple of years, promoted mobile services as an add-on to long-established triple-play services.

Figure 6.75 Take-up of multi-service ‘bundles’ among fixed broadband customers



Source: Ofcom consumer research, October 2011.

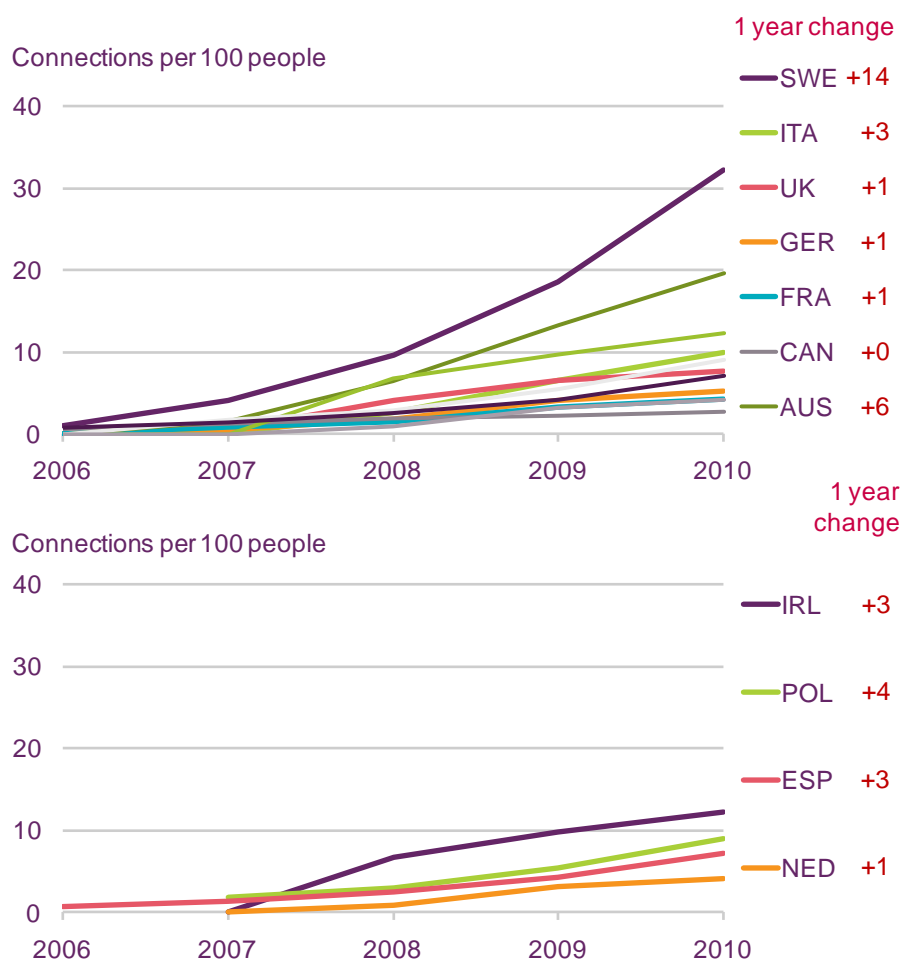
Base: All those with fixed broadband, UK=940, France=977, Germany=833, Italy=872, USA=905, Australia=794.

Q: Do you receive any of the following from the same supplier as your broadband as part of a package (i.e. you receive one bill for all services)? (multiple choice containing the commonly found double-play, triple-play and quad-play service bundles).

Mobile broadband is ratcheting up

Mobile broadband services (defined as services delivered to a PC via a cellular modem) are still in relative infancy, with a minority of consumers purchasing services. However, subscriber figures are growing. In Sweden, nearly one in three consumers have an active mobile broadband connection five years after mass-market services launched (Figure 6.76). In Ireland, one in eight consumers have an active mobile broadband connection three years after launch, in part driven by the government’s National Broadband Scheme, which has promoted the provision of mobile broadband to areas of Ireland where no broadband service was previously available. Take-up in the UK is nearly five percentage points behind Ireland, although in line with other large European countries.

Figure 6.76 Mobile broadband connections per 100 people: 2006 to 2010



Source: IDATE / industry data / Ofcom

One in five households in Australia have mobile broadband as their only internet connection

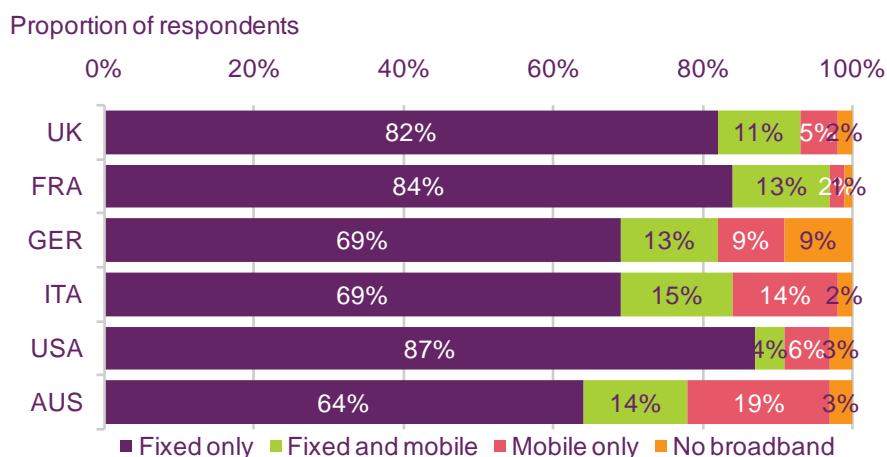
Mobile broadband can be used either as a complement to fixed-line broadband (where consumers use fixed-line broadband for in-home use and mobile broadband when they are out and about), or as a substitute for it (when consumers use mobile broadband as their only home internet connection). Our research in the UK and six comparator countries indicates different levels of take-up of fixed and mobile broadband, and different levels of mobile-only households (Figure 6.77).

The lowest levels of take-up of mobile broadband were in France and the US. This may appear counter-intuitive; both countries have also been characterised by rapid decline in the number of fixed voice lines. However, the availability of 'naked DSL' in both countries and high take-up of cable services in the US in particular means that customers are able to take a fixed broadband service without having a fixed voice line – and this may mean that there is less incentive to go 'mobile-only' for broadband, as the incremental cost for fixed broadband is lower than in countries where a fixed voice line is also required. In France the widespread availability of triple-play services offering broadband, voice over IP (VoIP) telephony and IPTV provides a further incentive of households to have a fixed broadband service, while in the US relatively expensive mobile broadband data charges, and the widespread roll-out of fibre-to-the-home services, are likely to play a role in limiting take-up of mobile broadband as a substitute for fixed broadband services.

Australia and Italy have the highest proportion of households relying entirely on mobile broadband for internet access. In Italy, this is likely to be driven by a high proportion of mobile-only households, which is itself the result of historically lower take-up of fixed voice lines than in the other large European countries. Australia was late to offer widespread fixed-line broadband network availability, and this, combined with the early availability of high-speed HSPA mobile networks, and the fact that in some of the sparsely populated areas mobile is the cheapest technology to be deployed, means that nearly one in five consumers who completed our online survey had mobile broadband as their only connection.

The survey was carried out online, so it can be expected that the 'no broadband' figure is lower than could be expected for a truly representative sample of each population.

Figure 6.77 Household penetration of fixed and mobile broadband: 2011



Source: Ofcom consumer research, October 2011.

Base: All respondents, UK=1015, France=1014, Germany=1014, Italy=1045, USA=1002, Australia=1012

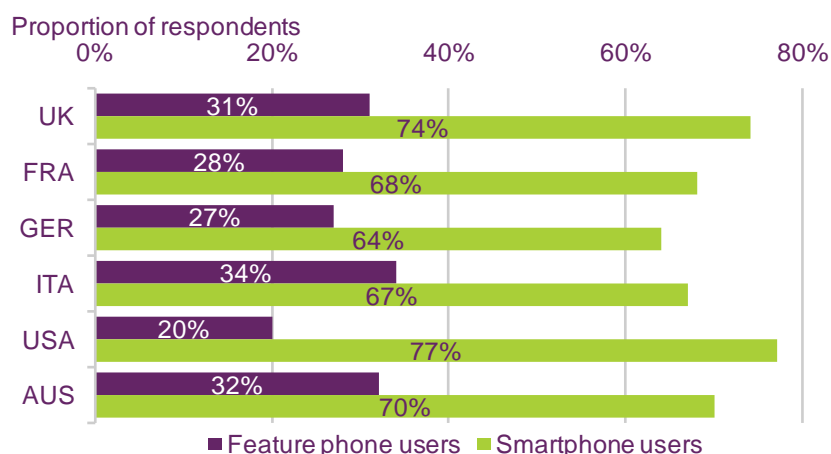
Q.

Smartphone take-up leads to increasing use of mobile phones to access the internet

In recent years the launch of high-speed mobile networks and the increasing take-up of smartphones has led to a significant increase in the use of mobile devices to access the internet. Further increases are constrained by the large installed base of feature phones, which are not well-suited to the internet. In Ofcom's research (Figure 6.78), each of the six countries listed below showed far higher use of mobile internet services among smartphone users.

The UK's smartphone users were the second most likely to access the internet (74%), although UK feature phone users are much less likely to access the internet on their mobile device (31%) – broadly in line with the comparator countries.

Figure 6.78 Proportion of feature phone and smartphone users that access the internet via their mobile device: 2011



Source: Ofcom consumer research, October 2011.

Base (smartphone users): UK=506, France=445, Germany=502, Italy=498, USA=416, Australia=490

Base (feature phone users): UK=423, France=469, Germany=443, Italy=491, USA=486,

Australia=467. For the purposes of these results, we have classified feature phone users as those survey respondents who said they owned a mobile phone but not a smartphone.

Q: Which, if any, of the following activities do you use your smartphone / mobile phone for? Multiple answers allowed, including 'access the internet'. Use of voice over IP is lower in the UK than in other countries

Our survey of broadband users found that fewer consumers in the UK than in the other six countries surveyed used their internet connection to make voice calls, with 19% claiming to make voice calls over their home internet connection, and only 12% doing so at least once per week (Figure 6.79). This compares with 28% and 17% respectively in Italy, and 26% and 19% respectively in France. There are a number of reasons why UK consumers are not making large quantities of voice-over-IP (VoIP) calls, relative to other countries. Firstly, UK fixed network operators tend not to widely promote VoIP services, and they offer little choice of such services. Additionally, they tend to offer unlimited calls on some standard telephony tariffs, limiting the attractiveness of VoIP services.

Voice over IP is much more appealing for consumers in countries where it can enable them to replace their telephone line. This is not the case in the UK, where a telephone line is required if the consumer wants a DSL broadband service. Furthermore, in countries like France, cheap bundled deals of broadband and VoIP calls are available, sometimes including unlimited calls to landlines, making these bundles much more attractive.

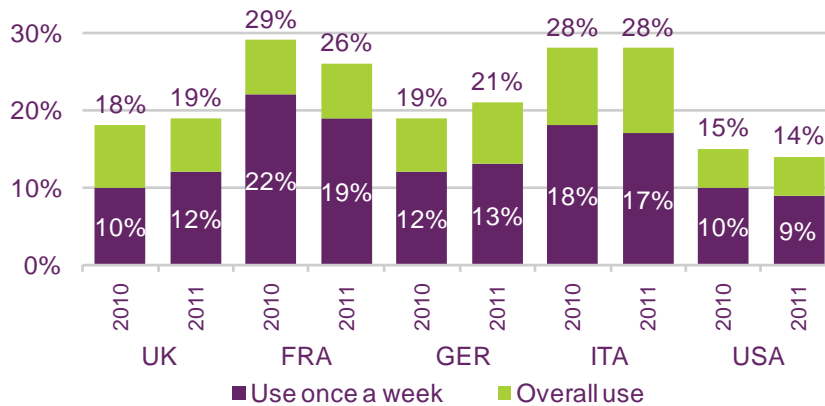
However, across the six comparator countries, growth in the use of VoIP appears to have slowed or stopped since 2010. Previous research, reported in *Ofcom's International Communications Market Report 2010*, suggested that the fastest growth in VoIP take-up came in 2007 and 2008.⁸³

Voice over IP is an important technology trend because it has the potential to significantly reduce fixed telecoms revenue and fixed line take-up in countries where it is popular: fixed line take-up is falling more quickly in France than in the other comparator countries. Calls can be made using a telephone handset connected to a broadband line, or by using a headset connected to a PC which is then connected to a broadband line. This range of options, plus the fact that consumers are unaware of the route their calls is taking, can mean

⁸³ See Ofcom, *International Communications Market Report 2010*, Section 6.1.5, http://stakeholders.ofcom.org.uk/binaries/research/cmr/753567/icmr/ICMR_2010.pdf

that some consumers are unaware that they are using VoIP services. Therefore, our consumer research may underestimate actual usage.

Figure 6.79 Take-up of voice-over-IP services among fixed broadband users



Source: Ofcom consumer

research, October 2011.

Base: All fixed broadband users, UK=940, France=977, Germany=833, Italy=872, USA=905
 Q. Which, if any, of the following activities do you use your home internet connection for?

UK lags behind its peers on broadband speed satisfaction

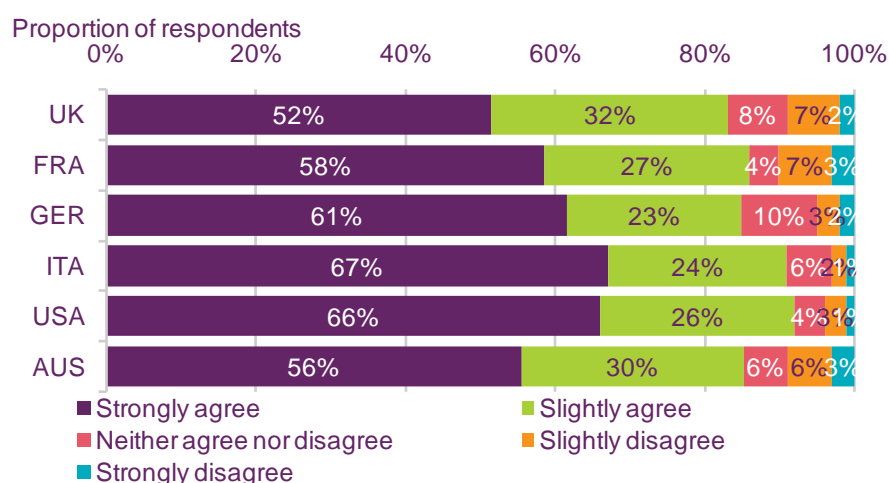
The speed of broadband connections is high up the policy agenda for governments and regulators across the world. Investment in higher-speed networks is viewed as essential for future competitiveness, while monitoring the actual speeds delivered, and ensuring that consumers have information about the speed of services available to them, are important in promoting competition based on speed and ensuring that consumers are able to choose the best service for their needs.⁸⁴ In order to gain insight into consumer perceptions of the speed of their services, our research asked broadband users in six countries whether their internet connections – fixed and mobile - are fast enough for what they do online.

Across the six countries, most consumers said their fixed broadband speeds were fast enough. Consumers in Italy (91%) and the US (92%) were the most likely to agree that their broadband was always fast enough (Figure 6.80). In the UK, 84% of consumers agreed that their broadband was fast enough, but a higher proportion than in other countries (15%) said that they disagreed.

Satisfaction with mobile broadband speeds was lower than with fixed broadband in every comparator country (unsurprising, given that current-generation mobile networks typically offer much lower speeds than fixed-line networks and are subject to radio propagation characteristics that mean that coverage can change). In the UK, 21% of smartphone users disagreed, or strongly disagreed, that their broadband speed was fast enough for what they do online (Figure 6.81). Smartphone users in Australia (27%) were most likely to consider that speeds were not sufficient (27%), while those in Germany (13%) and Italy (14%) were least likely to consider that speeds were not fast enough.

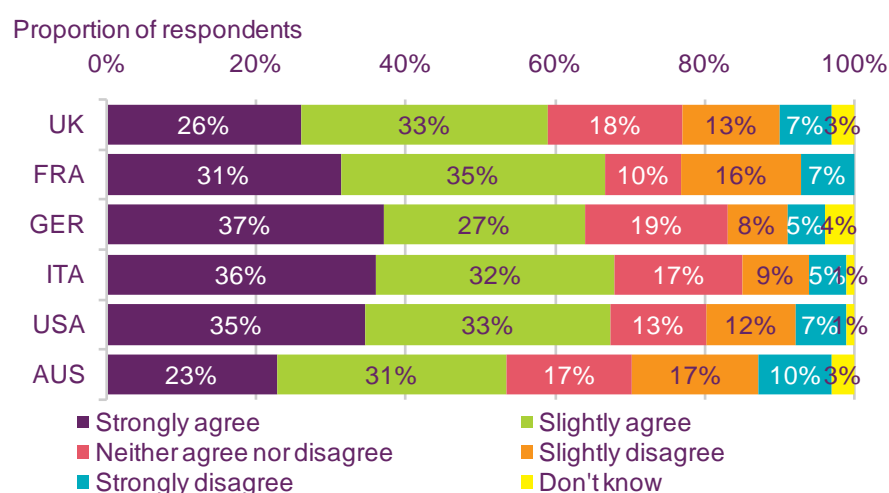
⁸⁴ Since 2009, Ofcom has researched and published data on actual speeds delivered by UK providers, while similar research has been undertaken in the US and the European Commission has commissioned research into actual speeds delivered across all its member states which is scheduled for publication in 2012.

Figure 6.80 Satisfaction with the speed of fixed broadband: 2011



Source: Ofcom consumer research, October 2011.
 Base: UK=940, France=977, Germany=833, Italy=872, USA=905, Australia=794.
 Statement: My internet connection is always fast enough for what I do online.

Figure 6.81 Satisfaction with the speed of mobile broadband: 2011



Source: Ofcom consumer research, October 2011.
 Base: smartphone users, UK=506, France=445; Germany=502; Italy=498, USA=416, Australia=490
 Statement: My internet connection is always fast enough for what I do online.

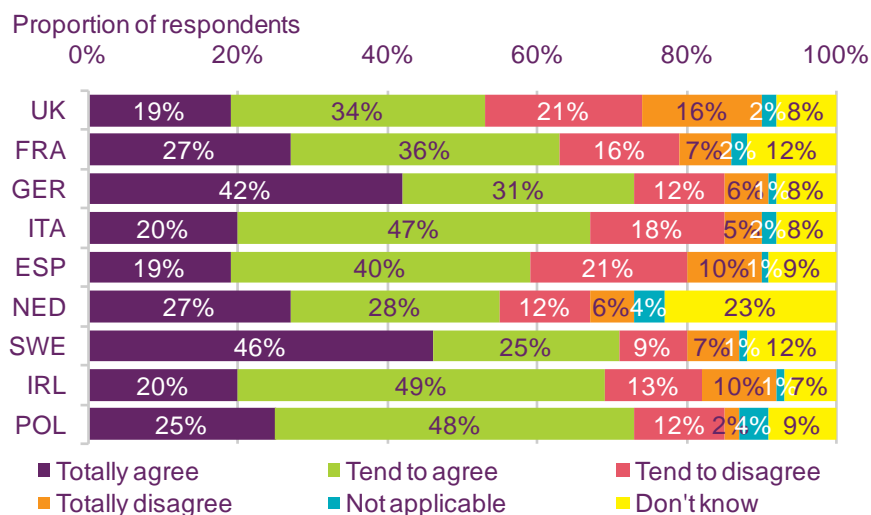
UK consumers are most aware of actual speed falling short of advertised speed

Perhaps one of the reasons for comparatively high levels of dissatisfaction with the speed of broadband connections among UK consumers is their apparently high level of awareness of how their actual broadband speed differs from the headline speed advertised by their ISP. A 2011 survey conducted on behalf of the European Commission found that UK citizens feel the strongest about there being a difference between actual and headline speeds, out of all the EU27 countries (Figure 6.82).

Asked if actual download and upload speeds matched their contract conditions, 37% of UK consumers disagreed or strongly disagreed. Among our comparator countries, the next highest of the comparator countries was in Spain, with 31%. Consumers in Poland felt that their actual experience most closely matched advertised speeds, with just 14% disagreeing or strongly disagreeing. The gap between actual and headline speeds has received

considerable media attention in the UK in recent years, promoted in part by Ofcom's research into actual broadband speeds and also by a review by the UK's advertising regulator of the guidelines around how broadband should be advertised.

Figure 6.82 Perception of the difference between contract and actual broadband speeds: 2011



Source: European Commission consumer research, July 2011.

Base: UK=1322, Germany=1622, Spain 1004, France=1035, Ireland=1007, Italy 1027, Netherlands=1012, Poland=1000, Sweden=1024.

Statement: The download/upload speed and capacity matches your contract conditions.

Consumers remain concerned about broadband costs, particularly mobile

Our research also asked consumers whether they could use their broadband connections without worrying about the cost. Again, users of mobile broadband tended to have greater levels of concerns, which reflects the lower data limits typically associated with mobile broadband contracts. Two in seven (28%) consumers across the six countries disagreed or strongly disagreed with the statement that they could use as much data as they liked without worrying about cost. This compares with just 12% of fixed broadband customers who disagreed or strongly disagreed.

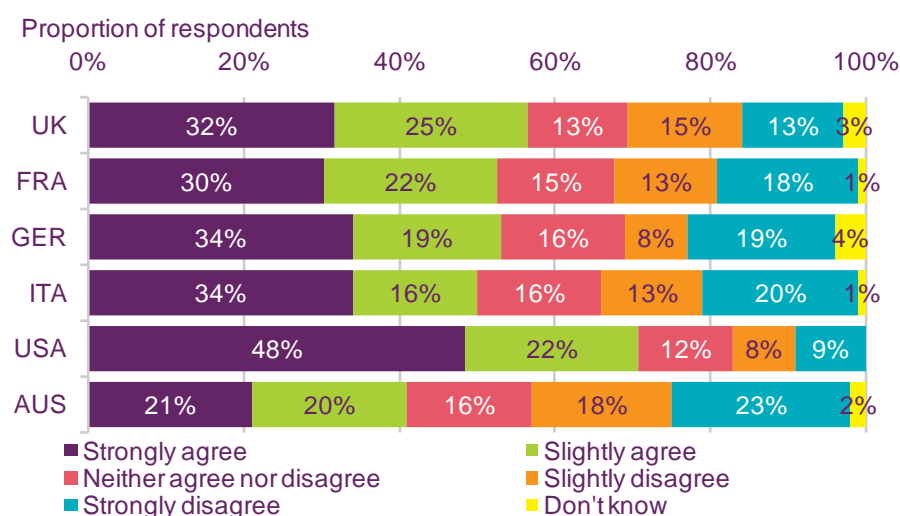
The most concerned mobile broadband consumers (see Figure 6.83) were in Australia, where 41% of mobile broadband customers disagreed or strongly disagreed. Twenty-eight per cent of UK consumers disagreed or strongly disagreed, which was the same as the average across the six countries.

Consumers in France were the most likely to be concerned about the costs of data on fixed broadband connections (Figure 6.84), with 26% disagreeing or strongly disagreeing that they could use as much data as they liked without worrying about the cost. This is perhaps surprising, because broadband charges are relatively low in that country, so the dissatisfaction may be partly connected with the recent VAT rise which forced up broadband prices.

France's concerns contrast with Germany's consumers, where just 3% disagreed or strongly disagreed. This is indicative that most broadband tariffs in Germany include unlimited data

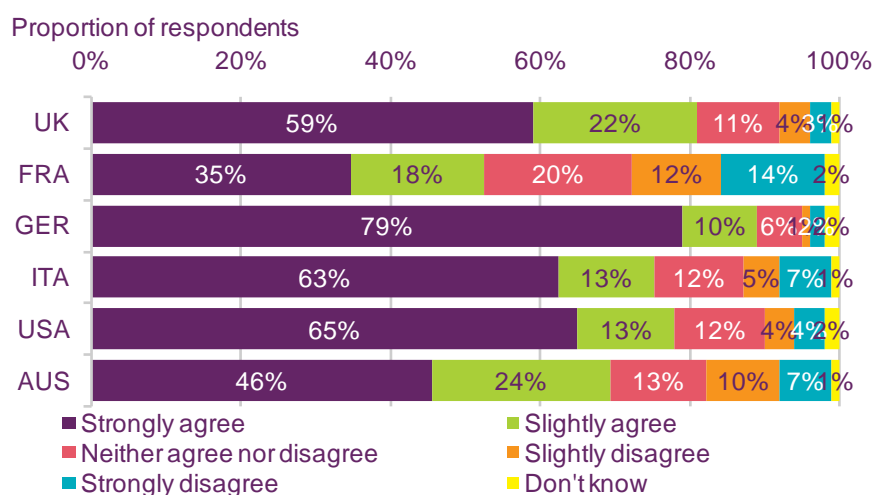
downloads. The figure was 7% for the UK – although there were clearly still some concerns, reflecting the fact that some broadband tariffs in the UK include data caps.⁸⁵

Figure 6.83 Ability to consume mobile broadband data without worrying about cost: 2011



Source: Ofcom consumer research, October 2011.
 Base: Smartphone users, UK=506, France=445, Germany=502, Italy=498, USA=416, Australia=490
 Statement: I use as much data as I like without worrying about cost.

Figure 6.84 Ability to consume fixed broadband data without worrying about cost: 2011



Source: Ofcom consumer research, October 2011.
 Base: Fixed broadband users, UK=940, France=977, Germany=833, Italy=872, USA=905, Australia=794.
 Statement: I use as much data as I like without worrying about cost.

⁸⁵ Many ISPs in the UK include a data cap on their lowest price broadband service – For example BT’s Option 1 has a cap of 10GB of usage every month (with an additional fee of £5 per 5GB) and Sky’s Broadband Everyday Lite has a 2GB monthly limit. According to Ofcom’s Infrastructure report (<http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf>), the average UK broadband subscriber uses 17GB per month.