



The International Communications Market 2014

6 Telecoms and networks

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6.1 Key market developments in telecoms and networks

6.1.1 Overview

The telecoms section of this report looks at the fixed voice, fixed broadband and mobile voice and data markets in our 18 comparator countries. The section is split into three parts:

- **Key market developments** – provides an overall context, and highlights key developments in international telecoms markets, including the growth of next generation access (NGA) networks and the increasing use of VoIP services.
- **The telecoms industry** – provides a ‘top-down’ approach by looking at the telecoms sector from an industry and operator viewpoint, 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, fixed broadband and mobile voice and data use.

6.1.2 Introduction

The availability and take-up of internet services continued to increase in 2013. Online services have become more important to consumers and businesses, as availability and reliance on the internet for transactions, information and entertainment, among other things, grows. Increasing internet access speeds allow the internet to be used in a variety of new ways, and next generation access (NGA) technologies are becoming increasingly available as the industry moves to meet increasing demand from consumers for higher speeds.

Take-up of fixed-line broadband services grew across the majority of the comparator countries in 2013, with Japan experiencing the largest annual change in fixed broadband take-up, from 32 connections per 100 population in 2012 to 35 connections per 100 population in 2013. The availability of fixed-line broadband services also increased across our comparator countries in the five years to 2013, except in the UK, South Korea, and Australia, which remained at a stable high level (100%, 100% and 95% respectively).

Mobile data use has increased significantly across our comparator countries in the five years to 2013. In 2008, the average mobile data use was 70MB a month per mobile data connection, increasing to an average of 426MB a month per mobile data connection over the five years to 2013. This growth in mobile data use has been driven by several factors such as the increase in the number of mobile data connections (including handsets and dedicated mobile data connections) and the advancement of mobile data technology (from 2G to 3G and 4G¹⁰⁵). In our comparator countries, the number of mobile data connections has increased from 483 million in 2008 to 1.9 billion in 2013.

Smartphones have had a large effect on the mobile data landscape, and increasing data use is due in part to the increasing take-up of smartphones. As a result of the numerous applications on smartphones that require mobile data, and the fact that smartphones can be

¹⁰⁵ The fourth generation of mobile communication standards, providing higher speeds than the preceding standards (1G, 2G and 3G)

used to access the internet, it is likely that when a consumer upgrades from a non-smart phone, their data use will increase.

The number of 4G connections has increased year on year since the commercial launch of 4G services. In 2013 4% of total mobile subscriptions were 4G across our comparator countries, more than double the proportion a year previously. While this is a relatively small proportion, the figure is much higher in some countries, such as South Korea (51%) and Singapore (24%).

In this section we analyse two of the key developments which are currently shaping telecoms markets, looking at both consumer and industry data:

- **The growth of next generation access (NGA) connections, both in terms of take-up and availability.** We look at how NGA availability and take-up is shaping consumers' use of online services as well as its effects on consumer satisfaction.
- **The revenues, take-up and use of managed VoIP connections.** We look at the managed VoIP market, concentrating on the patterns of use and take-up, including an analysis of the devices used to access VoIP services.

Figure 6.1 Key telecoms indicators: 2013

	UK	FRA	GER	ITA	USA	JPN	AUS	ESP	NED	SWE	POL	SGP	KOR	BRA	RUS	IND	CHN	NGA
Telecoms service revenues (£bn)	29	21	27	19	179	85	16	16	8	5	6	3	19	31	22	15	106	7
Monthly telecoms revenues per capita (£)	37	26	27	26	47	56	58	28	37	39	14	51	33	13	13	1	7	3
Fixed voice connections per 100 population (inc. managed VoIP)	59	60	45	37	42	45	44	41	43	41	18	36	55	22	29	2	20	0
Monthly outbound fixed minutes per capita	137	131	172	92	124	87	144	94	100	111	25	85	108	70	84	5	9	0
Mobile connections per 100 population	130	117	140	159	106	114	131	107	128	148	148	156	113	137	169	71	91	73
Mobile data connections per 100 population	77	64	51	74	100	113	136	79	60	133	110	153	110	76	61	18	38	40
4G as % of all mobile connections	4	4	5	3	23	22	20	3	4	11	2	24	51	0	1	0	0	0
Monthly outbound mobile minutes per capita	175	175	117	205	339	132	149	126	115	222	165	279	203	181	269	127	178	67
Average mobile data volumes per person (Mbyte)	251	192	271	469	794	1101	763	239	421	2,305	261	439	1,369	102	135	8	58	65
Fixed broadband connections per 100 population	36	38	34	23	29	35	28	26	41	34	21	30	37	10	18	1	15	0
Average monthly fixed broadband data volumes per person (Gbyte)	11	10	9	6	15	27	8	7	15	24	4	20	43	2	3	0	2	0
NGA connections per 100 population	11	3	9	1	20	25	9	7	23	20	7	19	33	4	11	0	4	0
Dedicated data-only mobile broadband connections per 100 population	8	6	10	13	8	10	26	4	7	23	11	3	5	3	13	0	1	3
Managed VoIP connections per 100 population	7	36	16	5	15	20	3	6	31	16	3	8	19	3	1	0	1	0

Sources: IHS / industry data / Ofcom

6.1.3 Next generation access (NGA) networks expand in both availability and take-up as networks continue to grow

NGA network availability and technology greatly differed by country in 2013

There are many factors that lead to the varied availability of NGA connections across countries. Available investment for new infrastructure is a large factor in the coverage differences between comparator countries, with more developed countries often having higher coverage percentages than developing countries. Another large factor is housing density; it is more expensive to provide coverage in countries with lower housing densities, along with the presence of existing cable networks.

Next generation access (NGA) technology and 'superfast' broadband

'Superfast' broadband is generally considered to be a broadband service that delivers speeds of 30Mbit/s or higher. Next generation access (NGA) refers to those technologies that are capable of delivering superfast broadband services.

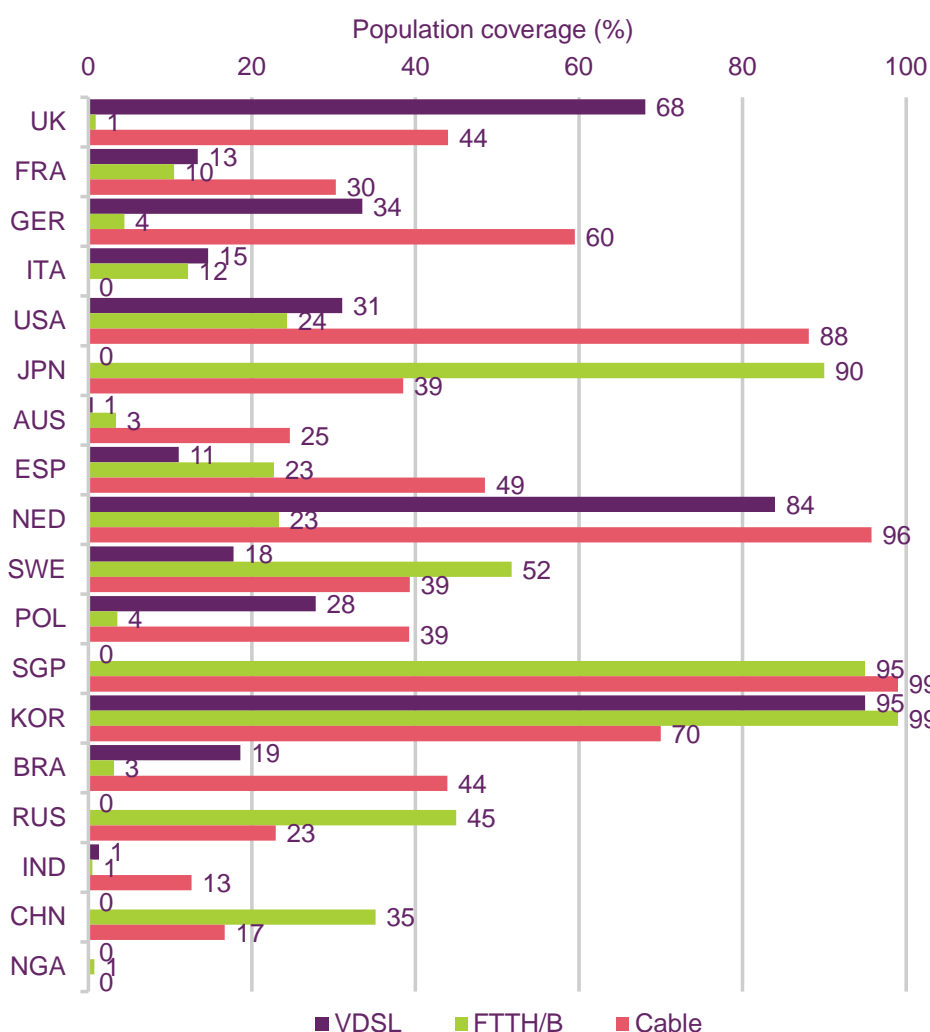
The terms 'superfast broadband' and 'NGA' are often used interchangeably. NGA connections do not always deliver 'superfast' speeds. Examples of this are fibre-to-the-cabinet, where the speed the consumer receives may be below 30Mbit/s if the copper wires between the cabinet and the house are relatively long, or where a service that it provided over an NGA technology is capped at a speed below 30Mbit/s.

As the measurement of broadband services in different countries improves, and 'superfast' take-up increases, this distinction is becoming both measurable and more important. Therefore we have decided to define 'superfast' broadband as a broadband service providing modem sync speeds of 'more than or equal to' 30Mbit/s. The modem sync speed represents the highest possible speed at which data can be transferred across the line.

In the UK, VDSL NGA technology was available to 68% of the population, while cable services were available to 44%, at the end of 2013 (Figure 6.2). These figures are comparable to the majority of comparator countries, excluding South Korea, Singapore and Japan, which typically had very high availability of most NGA technologies. FTTH/B technology was only available to around 1% of the UK population by the end of 2013, a low figure compared to the majority of non-BRIC comparator countries. This is partly due to BT making the investment decision to deploy VDSL instead of FTTH/B. Building the infrastructure for VDSL is considerably less expensive than rolling out FTTH/B, although it is a generally slower technology.

In countries such as Singapore, Japan and South Korea, the providers upgraded directly from non-NGA connections such as ADSL to FTTH/B connections, leading to the current high availability of this connection type at the end of 2013, at 95%, 90% and 99% respectively.

Figure 6.2 Availability of NGA networks by technology and country: 2013



Source: IHS

Take-up of NGA broadband varies widely between countries

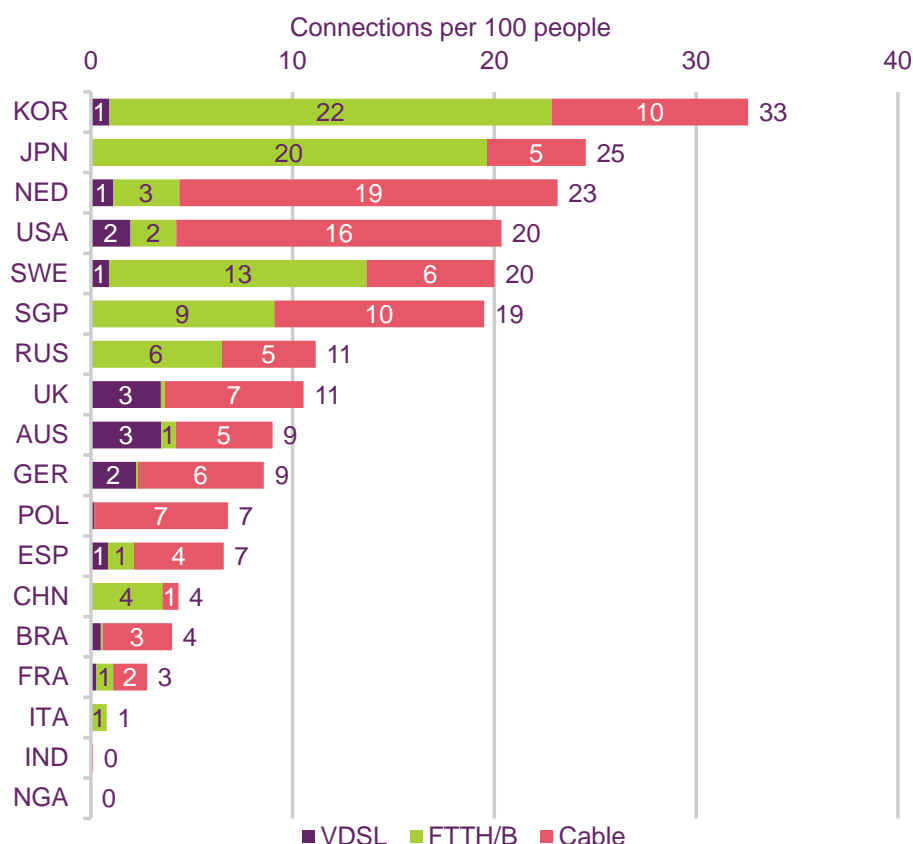
The number of NGA connections per 100 people at the end of 2013 varied between countries, from zero (in India and Nigeria) to 33 connections per 100 population (in South Korea).

India, Brazil, Nigeria and China had low take-up of NGA services at the end of 2013, possibly due to lower economic prosperity and lower levels of investment in infrastructure (Figure 6.3). South Korea had the highest number of NGA connections per 100 people at the end of 2013, followed by Japan, at 25 connections. This is likely to be due to the early introduction of NGA technology in these countries, as well as the high population densities. The UK had 10 NGA connections per 100 people at the end of 2013, ranking eighth among our comparator countries. The majority of the NGA connections in the UK were cable connections; there was less than one FTTH/B connection per 100 people at the end of 2013.

The number of FTTH/B connections per 100 people was low across most comparator countries in 2013, except in the case of Japan, Sweden and South Korea, which had 20, 13 and 22 FTTH/B connections per 100 people respectively. The relatively low take-up of FTTH/B is probably due to a lack of availability, because of the high cost of infrastructure for this technology. In contrast, cable and VDSL were the most prevalent NGA technologies

across the comparator countries at the end of 2013, most likely due to the existence of legacy cable infrastructure and the relative cost of VDSL compared to FTTH/B.

Figure 6.3 NGA broadband connections per 100 people, by technology: end 2013



Source: IHS

Note: NGA on the left hand side of the chart is the country code for Nigeria, and does not refer to next generation access technologies.

The UK has the highest proportion of fixed broadband connections, with headline speeds of 30Mbit/s or higher among the EU5 countries

In every comparator country, the proportion of fixed broadband connections with a headline speed 'less than or equal to' 2Mbit/s dropped in the five years to 2013 (excluding those which already had a proportion of less than 1% in 2008). Germany had the smallest decrease of the comparator countries, at less than one percentage point. The proportion of connections with a headline speed greater than 2Mbit/s and 'less than or equal to' 8Mbit/s fell in the majority of countries, excluding Italy, Australia, Poland and India, where it is likely that connections in this range replaced the slower connections.

The UK's proportion of headline speeds of 'more than' 30Mbit/s increased in the five years to 2013, with connections 'more than or equal to' 30Mbit/s and 'less than' 100Mbit/s increasing in proportion by 23 percentage points, and connections 'greater than or equal to' 100Mbit/s increasing by one percentage point; from 0% to 1%. These changes in the UK fixed-line broadband take-up by headline speed are indicative of the year-on-year average actual speed increases that the UK has been experiencing.¹⁰⁶ When compared to the other EU5

¹⁰⁶ <http://stakeholders.ofcom.org.uk/market-data-research/other/telecoms-research/broadband-speeds/broadband-speeds-may2014/>

countries, the UK (at 24%) came first in terms of its proportion of connections ‘greater than or equal to’ 30Mbit/s.

South Korea had the highest proportion of connections with a headline speed of ‘more than or equal to’ 100Mbit/s. This is likely to be due to high levels of government and ISP investment in fixed-line broadband infrastructure (mainly FTTH/B), as well as high population concentration and the prevalence of high-rise residential buildings.

Figure 6.4 Fixed broadband connections, by headline speeds: 2008 and 2013



Source: IHS

Other than price, download speed is the biggest factor in respondents’ choice of broadband service across our comparator countries

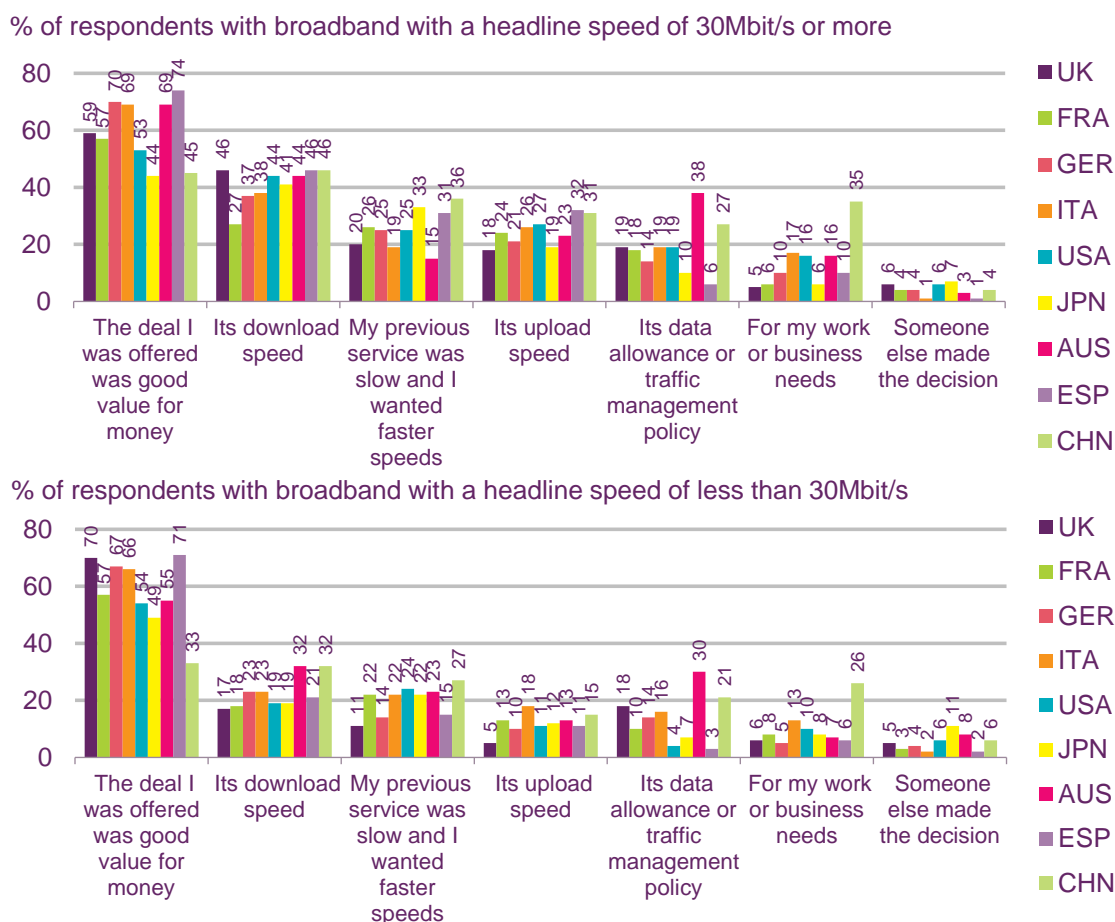
Value for money was the reason most frequently cited by respondents for choosing their current fixed broadband service, both among those with connections at a headline speed of 30Mbit/s or more, and those with speeds less than 30Mbit/s (Figure 6.5).

Respondents whose fixed broadband connections had a headline speed of 30Mbit/s or higher were more likely than those with slower ones to cite download speed as a reason for choosing their broadband service, and this difference was most marked in the UK (46% vs.

17%). Across both headline speed groupings, and all comparator countries, more people cited download speeds than upload speeds as a reason for choosing their fixed broadband service.

The reason: 'Its data allowance or traffic management policy' was cited by less than 20% of respondents in all countries except for Australia and China¹⁰⁷.

Figure 6.5 Reason for choosing current fixed broadband service



Source: Ofcom consumer research October 2014

Base: All respondents with superfast broadband, UK=238, FRA=190, GER=254, ITA=114, USA=141, JPN=314, AUS=140, ESP=229, CHN=240

Base: All respondents with non-superfast broadband, UK=249, FRA=199, GER=269, ITA=304, USA=137, JPN=107, AUS=122, ESP=359, CHN=534

Q.29 Why did you choose your home broadband service?

¹⁰⁷ [1] As internet penetration is low in China (around 46%, and centred in the cities), the people responding to our online survey are likely to be early adopters of new technology, and do not closely represent China's 1.4 billion inhabitants. Further information on our online market research methodology is presented in Appendix A: Consumer research methodology and a perspective on the results of our market research in China can be found in Appendix C: A perspective on China.

6.1.4 Increasing number of consumers use managed VoIP as an alternative to traditional telephony

The Netherlands had the highest proportion of fixed voice revenues¹⁰⁸ generated by managed VoIP services in 2013

The proportion of fixed voice revenues that were generated by managed voice over internet protocol (VoIP) services was highest in the Netherlands, among our comparator countries, in 2013, at 29%, a 17 percentage point increase compared to 2008 (Figure 6.6). The second highest proportions were seen in the US and Japan, both at 23%.

VoIP definitions

Managed VoIP refers to the provision of a packet-switched voice over internet protocol (VoIP) service over a fixed broadband network such as xDSL, FTTP and cable. Managed VoIP includes VoIP as a primary service (such as VoIP over FTTP or naked xDSL) and as a secondary service (such as VoIP over xDSL, where the subscriber also pays a monthly fee for a PSTN line). OTT VoIP services consumed over fixed broadband connections, such as Skype, are not included within the definition of managed VoIP because they do not support emergency calling and are therefore not marketed as landline replacement services.

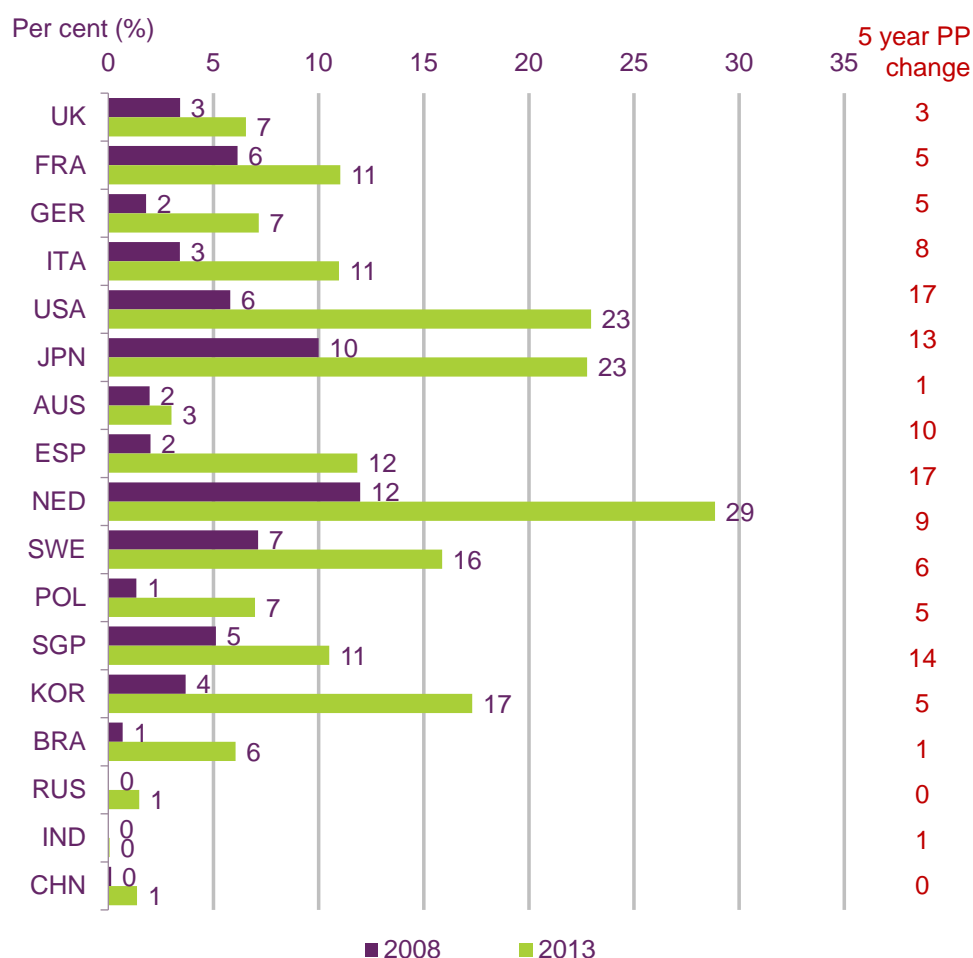
Over-the-top (OTT) services are provided over the internet rather than a managed network and are delivered directly to the end-user by the service provider, independent of the internet service provider (ISP) which owns the network over which the service is provided.

In the BRIC countries (Brazil, Russia, India and China), managed VoIP services represent only a small fraction of the fixed voice market, although the proportion of total fixed voice revenues generated by managed VoIP services increased from 1% to 6% in Brazil in the five years to 2013. Nigeria was the only country where managed VoIP was not present in 2013, and we have excluded Nigeria from the analysis in this section of the report.

In the UK, the proportion of total fixed voice revenues generated by managed VoIP services was 7% in 2013, the same proportion as in Germany, but lower than in Spain (12%), France and Italy (both 11%). However, in terms of growth, the UK had the lowest level of increase of the EU comparator countries in the analysis; three percentage points in the five years to 2013.

¹⁰⁸ Total fixed voice revenue is defined by the total revenue from traditional fixed line voice services plus the total revenue from managed VoIP services.

Figure 6.6 Managed VoIP revenues as a proportion of fixed voice revenues: 2008 and 2013



Sources: IHS / Industry data / Ofcom

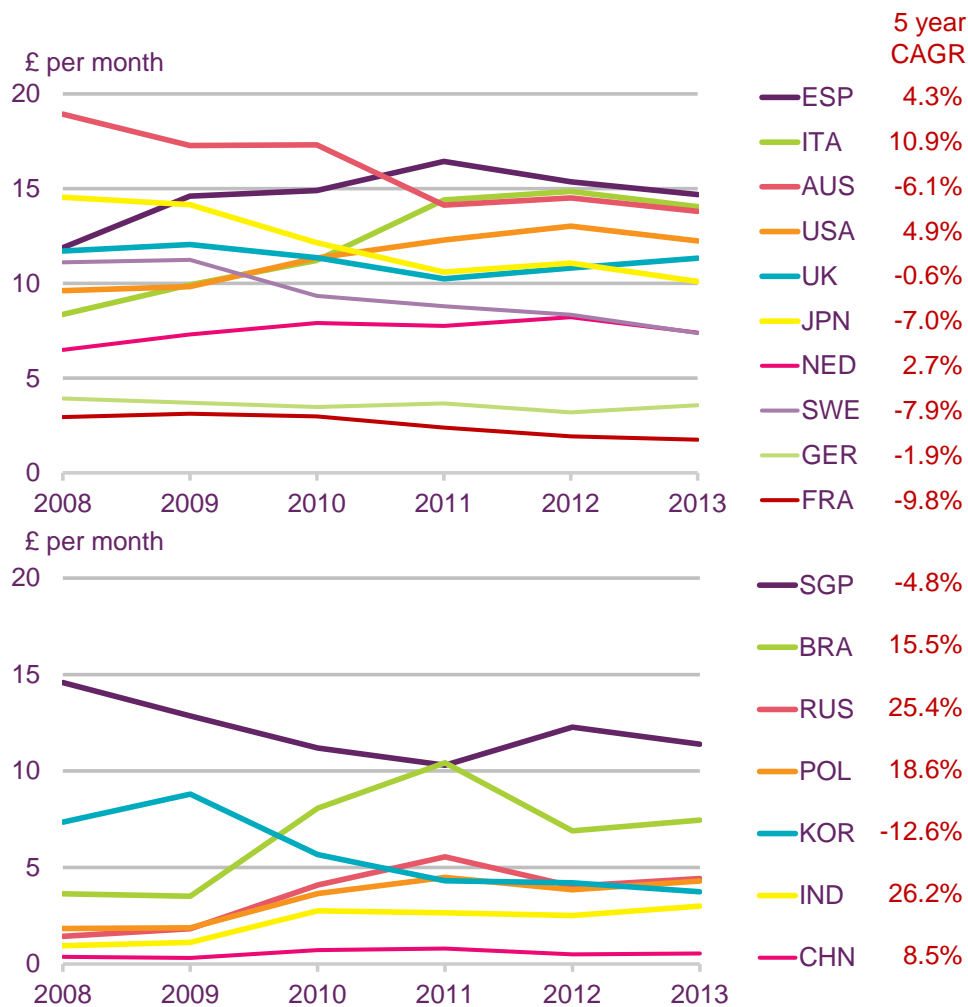
India had the largest average annual growth in monthly managed VoIP revenue per connection in the five years to 2013

Spain had the highest average revenue per managed VoIP connection among our comparator countries for which managed VoIP data were available in 2013, at £14.68 per month, followed closely by Italy at £14.05 (Figure 6.7). In contrast, China had the lowest average managed VoIP revenues per connection in 2013, at just £0.55 a month.

Among the EU comparator countries, France had the lowest average managed VoIP revenues per connection in 2013, at £1.75 per month, although it had the highest penetration of managed VoIP connections of all the comparator countries (see Figure 6.11). This is probably because France has a highly competitive fixed voice market and the majority of managed VoIP connections are delivered over naked DSL connections (internet connections that do not require a fixed voice line of any description). In the UK, the average monthly revenue per managed VoIP connection was £11.33 in 2013.

In the five years to 2013, India had the highest average growth rate of managed VoIP monthly revenue per connection, at 26.2% per year, followed by Russia (up 25.4% on the year) and Poland (up 18.6%), while South Korea saw the largest average decline over the same period, falling by 12.6% per year. In comparison, the average monthly revenue generated by managed VoIP services in the UK fell by 0.6% per year between 2008 and 2013

Figure 6.7 Monthly managed VoIP revenue per connection



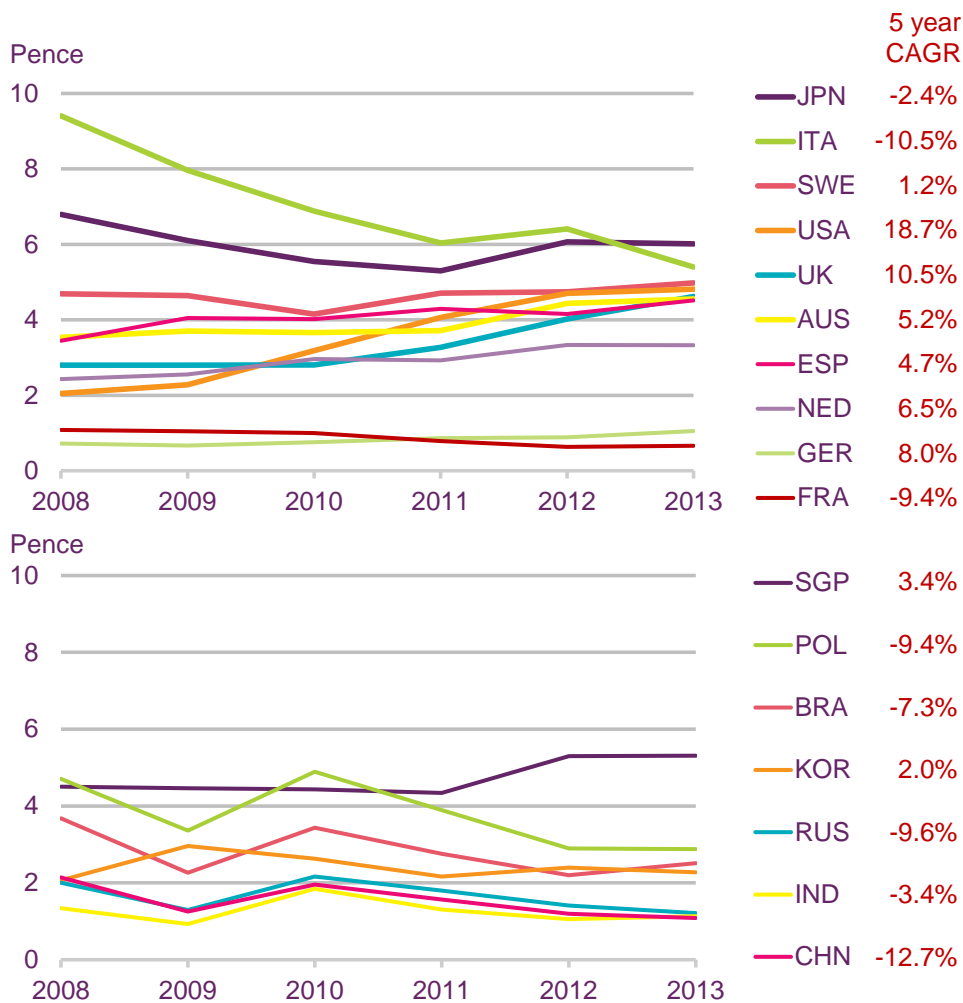
Source: IHS / industry data / Ofcom

Average per-minute managed VoIP prices were lowest in France among our comparator countries in 2013

France had the lowest average price per managed VoIP call minute in 2013, at 0.7 pence per minute, followed by Germany and China at 1.1 pence per minute (Figure 6.8). The average price per managed VoIP call minute was highest in Japan, Italy and Singapore in 2013, at 6.0, 5.4 and 5.3 pence per minute respectively (in the UK it was 4.6 pence, the sixth most expensive among all comparator countries where managed VoIP data were available).

The US had the largest average annual increase in the price of a managed VoIP minute in the five years to 2013, up by 18.7% a year. The UK had the second largest average increase over the same period; its per-minute managed VoIP call price rose by an average of 10.5% per year over this period. The largest fall in the average price of a VoIP call minute was in China, where prices fell from 2.1 pence per minute in 2008 to 1.1 pence per minute in 2013 (an average annual fall of 12.7%).

Figure 6.8 Average price per managed VoIP minute



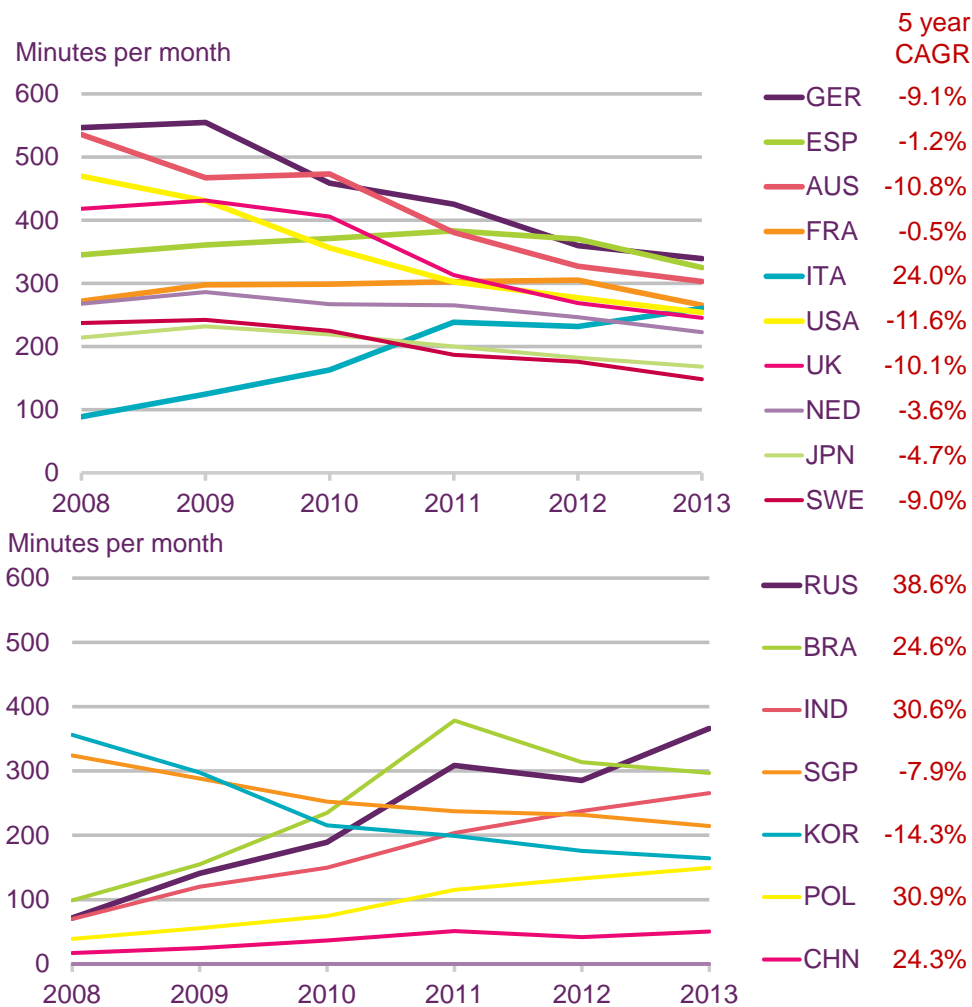
Source: IHS / industry data / Ofcom

Germany had the highest average monthly managed VoIP call minutes per connection in 2013

Germany had the highest level of managed VoIP minutes per connection in 2013, with an average volume of 339 minutes per month, while the monthly average use of managed VoIP was 245 minutes per connection in the UK (Figure 6.9). The average volume of managed VoIP was lowest in China in 2013, at 50 minutes per month per connection.

The highest average annual growth in monthly managed VoIP call minutes per connection was seen in Russia and Poland between 2008 and 2013, with increases of 38.6% and 30.9% respectively. Average monthly managed VoIP volume per connection fell by 14.3% a year on average in South Korea in the five years to 2013. Among the EU5 countries, Italy was the only country in which the monthly average use of VoIP increased between 2008 and 2013, rising by 24.0% a year per connection. Average monthly managed VoIP minutes per connection fell in the UK over the same period, at an average rate of 10.1% per year.

Figure 6.9 Average monthly managed VoIP call minutes per connection



Source: IHS / industry data / Ofcom

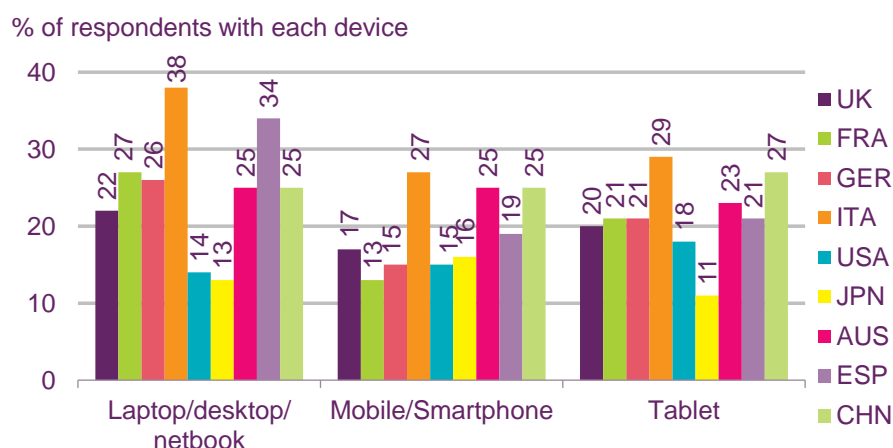
Cited levels of VoIP use on computers¹⁰⁹, tablets and mobile phones¹¹⁰ are higher in Italy than in all other comparator countries

Italy had the highest proportion of respondents who claimed to use VoIP on each of the three device types: 38% for computers, 27% for mobile phones and 29% for tablets. For use on computers, Spain was in line with this, at 34%, while the US (14%) and Japan (13%) had the lowest levels of VoIP use. Japan had the lowest claimed use of VoIP on a tablet (11%). In the UK, around one in five owners of each device type used it to make VoIP calls (laptop/computer 22%, mobile phone 17% and tablet 20%). Despite the difference in scale, the US, Japan, Australia and China all showed similarly little variation between devices in this respect.

¹⁰⁹ Computers includes desktops, laptops and tablets.

¹¹⁰ Mobile phones includes smartphones

Figure 6.10 VoIP use, by device type



Source: Ofcom consumer research October 2014

Base: All who own each device, UK=905/540/318, FRA=953/469/270, GER=949/531/263, ITA=902/762/384, USA=907/443/274, JPN=934/566/209, AUS=944/579/325, ESP=903/742/394, CHN=947/808/446

Q.9B. Which, if any, of the following ways of communicating over the internet do you use each of your devices for?

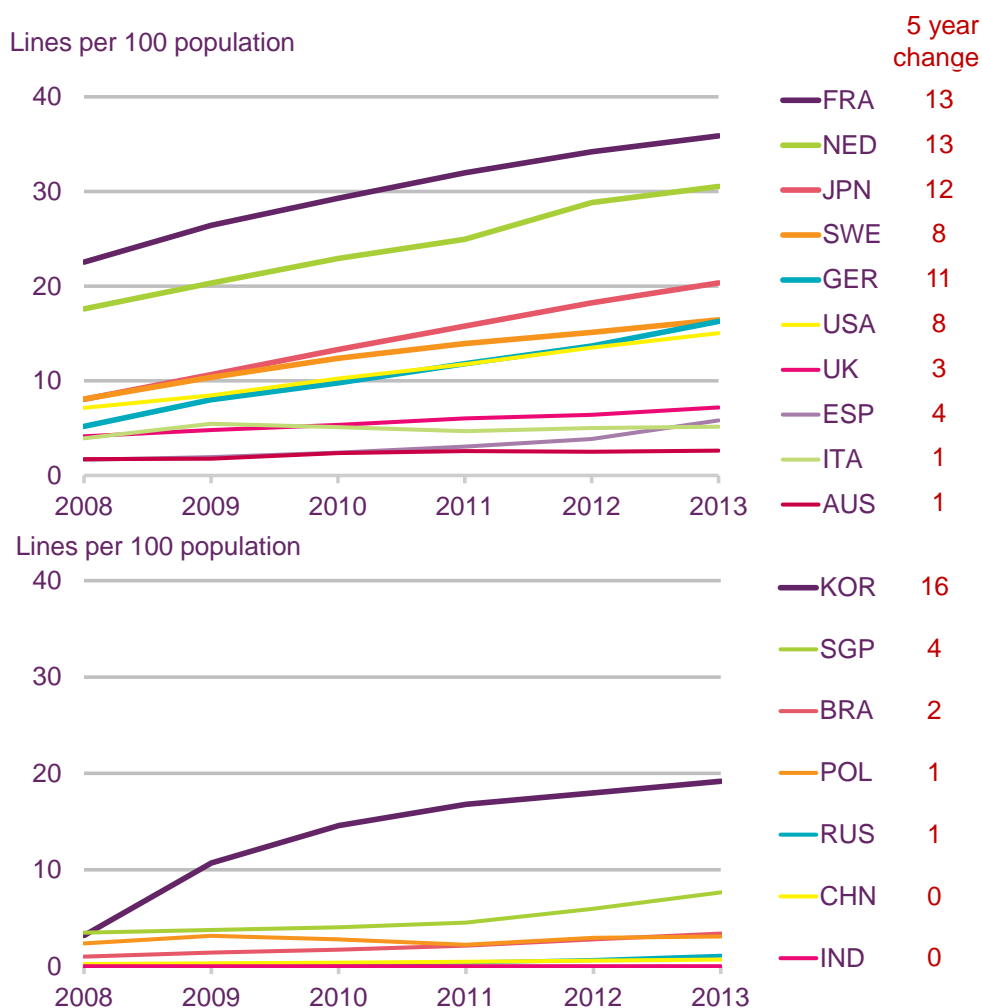
Managed VoIP connections per 100 people had increased in all comparator countries by the end of 2013

The number of managed VoIP connections per 100 people increased in all comparator countries (where managed VoIP data were available) between 2008 and 2013, with the largest increase being in South Korea; up by 16 connections from three connections per 100 people in 2008 (Figure 6.11). The increase in managed VoIP connections among the other comparator countries in the five years to 2013 ranged from less than one connection per 100 people in India to 13 per 100 people in France. The UK had an increase of three connections, to seven managed VoIP connections per 100 people, over this period.

In France, there were 36 managed VoIP connections per 100 people at the end of 2013; the highest among our comparator countries where managed VoIP data were available. As mentioned before, this is likely to be due to a combination of the high availability of naked unbundled DSL services, and the fact that managed VoIP services are cheaper than those delivered over traditional fixed lines.

The Netherlands had the second highest number of managed VoIP connections of our comparator countries at the end of 2013, with 31 connections per 100 people. At the end of 2013, the number of managed VoIP connections for the other comparator countries ranged from less than one per 100 people in India to 20 per 100 people in Japan.

Figure 6.11 Managed VoIP connections per 100 people



Source: IHS / industry data / Ofcom

The Netherlands and France had the most managed VoIP connections as a proportion of total fixed voice connections¹¹¹ at the end of 2013

Virgin Media, the UK's largest cable provider, provides fixed voice services using PSTN technology. However, cable networks in some other comparator countries (such as the Netherlands) were not deployed with this capability, and where they do have the capability, fixed voice services are provided over managed VoIP connections, and take-up of managed VoIP services tends to be high.

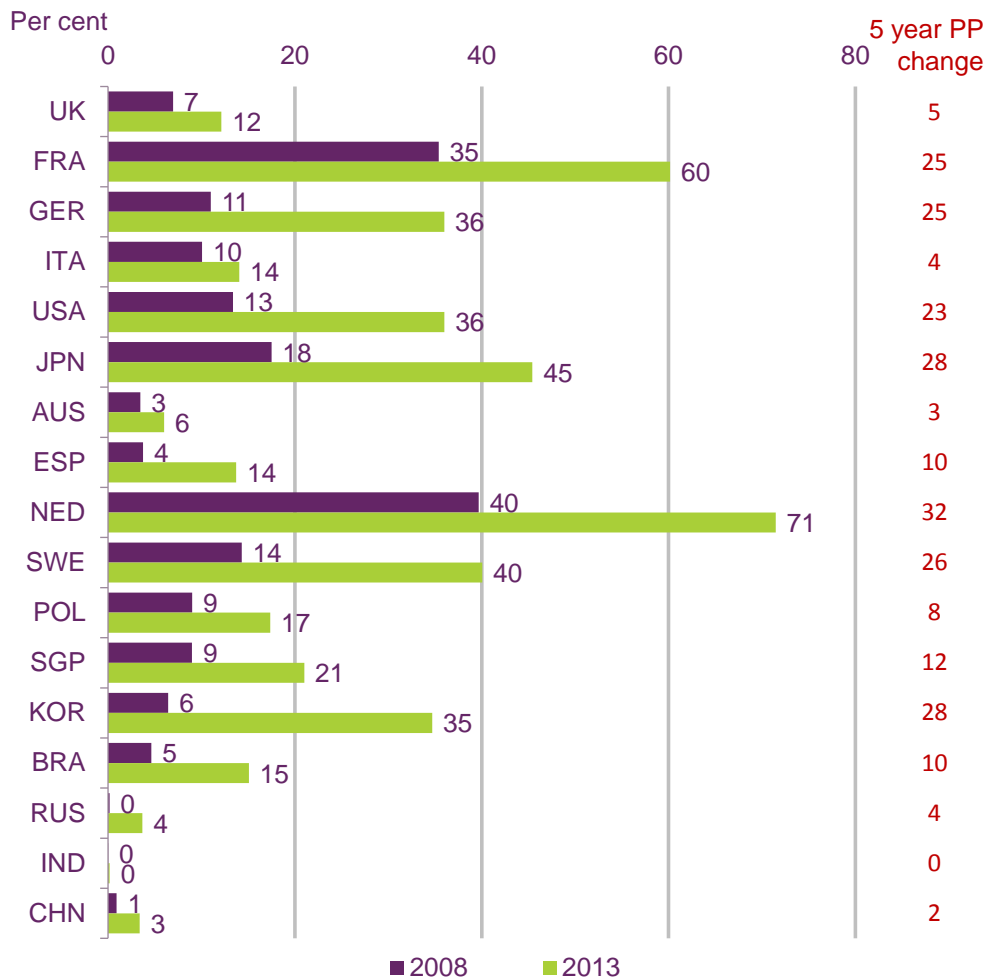
Managed VoIP connections as a proportion of total fixed voice connections were highest in the Netherlands and France at the end of 2013, at 71.5% and 60.2% respectively, while the proportion in the other comparator countries where managed VoIP data were available ranged between 0.2% in India and 45.4% in Japan (Figure 6.12). In the UK, 12.1% of all fixed voice connections were managed VoIP connections at the end of 2013.

The largest rise in the proportion of fixed voice connections that were provided using managed VoIP was in the Netherlands; up by 32 percentage points between 2008 and 2013.

¹¹¹ Total fixed voice connections is defined as the total number of fixed landline connections plus the total number of VoIP connections.

The increase in the proportion of managed VoIP connections was five percentage points in the UK between 2008 and 2013, while for our other comparator countries where managed VoIP data were available, it ranged from less than one percentage point in India to 28 percentage points in South Korea over the same period.

Figure 6.12 Managed VoIP connections as a proportion of total fixed voice connections



Source: IHS / industry data / Ofcom

6.2 The telecoms industry

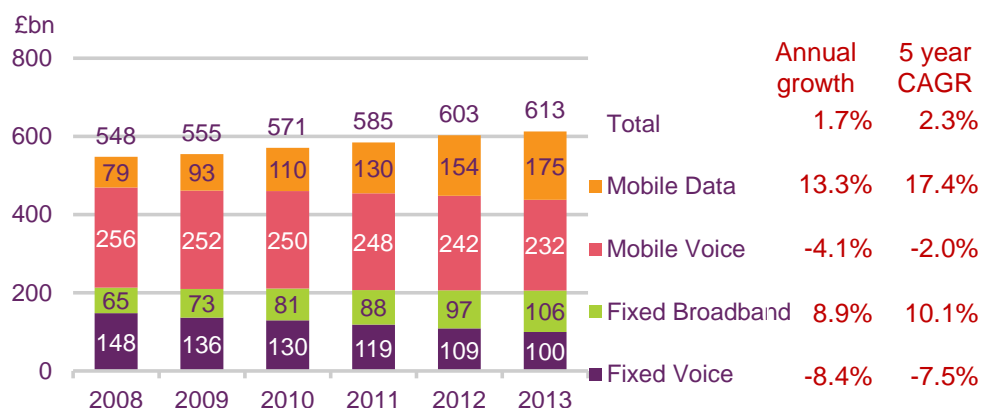
6.2.1 Market overview

Total comparator country retail telecoms revenues increased by 1.7% in 2013

Total retail telecoms revenues (including those generated by fixed voice, fixed broadband, mobile voice and mobile data services, but excluding narrowband internet revenues) increased by £10bn (1.7%) to £613bn across our 18 comparator countries in 2013 (Figure 6.13). Mobile services contributed 66.4% of retail revenues in 2013, a similar proportion as in the previous year. Total fixed voice revenues decreased by 8.4% (£9bn) to £100bn in 2013, as a result of falling fixed call volumes (down 8.0%) and fixed lines (down 5.7%). Total fixed broadband revenues increased by 8.9% (£9bn) to £106bn during the past year, due to a 7.2% increase in the total number of fixed broadband connections.

Total mobile voice revenues decreased by 4.1% (£10bn) to £232bn in 2013, despite increasing mobile voice call volumes (up 7.5%) and mobile connections (up 6.0%). Total mobile data revenues (including mobile messaging and mobile internet services) increased by 13.3% (£21bn) to £175bn in 2013, as a result of a 19.7% increase in mobile internet revenues, which was offset by a 4.0% fall in mobile messaging revenues. Total mobile data revenues more than doubled between 2008 and 2013, increasing by an annual average rate of 17.4%. Overall, fixed and mobile voice services generated 54.2% of the total revenue shown below, down from 58.2% in 2012 and 73.7% in 2008.

Figure 6.13 Total comparator country retail telecoms revenue, by sector: 2008 to 2013



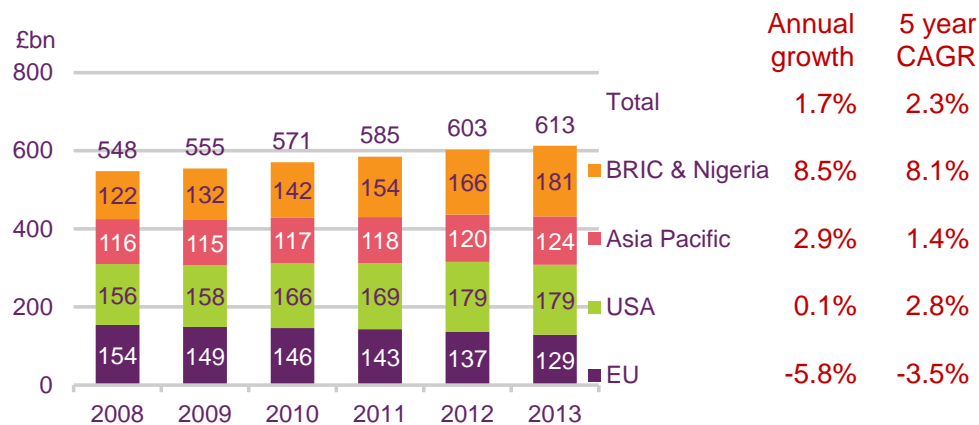
Sources: IHS / industry data / Ofcom

Note: Fixed voice revenues include managed VoIP revenues; voice revenues include access/line rental revenues and may include revenues relating to bundled data services.

The BRIC countries and Nigeria had the largest increase in total retail telecoms revenues in 2013

As shown in Figure 6.14, the 1.7% increase in the total comparator country retail telecoms revenue in 2013 was the result of revenue increase in BRIC countries and Nigeria (up by 8.5% to £181bn) and in Asia Pacific (up by 2.9% to £124bn). BRIC and Nigeria contributed the largest proportion of total comparator country revenues; 29.5% of the total telecoms revenues in 2013, overtaking the US, which was the largest contributor between 2008 and 2012. The total retail telecoms revenues were unchanged at £179bn in the US in 2013, while revenue decreased by 5.8% to £129bn in our EU comparator countries.

Figure 6.14 Total comparator country retail telecoms revenue, by country type: 2008 to 2013



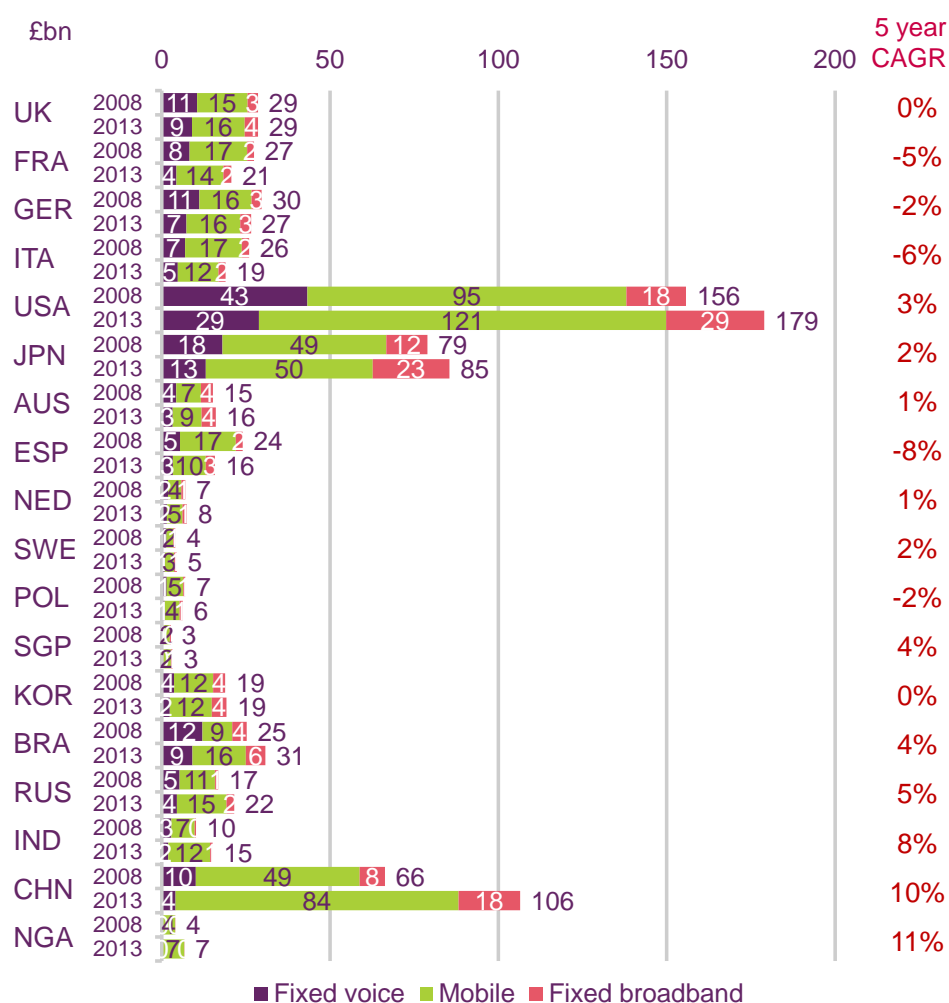
Sources: IHS / industry data / Ofcom

The US and China contributed almost half the total retail telecoms revenue in 2013

The US continued to have the highest comparator country retail telecoms revenue, at £179bn in 2013, while China overtook Japan to become the second largest comparator country in terms of telecoms revenue, generating £106bn in 2013 (Figure 6.15). The US and China contributed almost half (47%) of the total retail telecoms revenues in 2013. The telecoms market in China grew rapidly, with an average annual growth rate of 10% in total telecoms revenues in the five years to 2013. Only in Nigeria did telecoms revenues increase faster (up by 11% a year) over the same period, although the Nigerian telecoms market was the third smallest in 2013, at £7bn (only Singapore and Sweden were smaller).

Telecoms retail revenues decreased in five EU comparator countries between 2008 and 2013; the largest fall was in Spain, at an average rate of 8% a year, partly due to the ongoing effect of the economic downturn. The other four EU comparator countries with falling revenues were Italy (down 6% a year), France (down 5% a year), Germany (down 2% a year) and Poland (down 2% a year) over the same period. The figures were unchanged in the UK and South Korea (at £29bn and £19bn respectively), although in both countries fixed voice revenues decreased, while both mobile and fixed broadband revenues increased in the five years to 2013.

Figure 6.15 Telecoms service retail revenues, by country and sector: 2008 and 2013



Sources: IHS / industry data / Ofcom

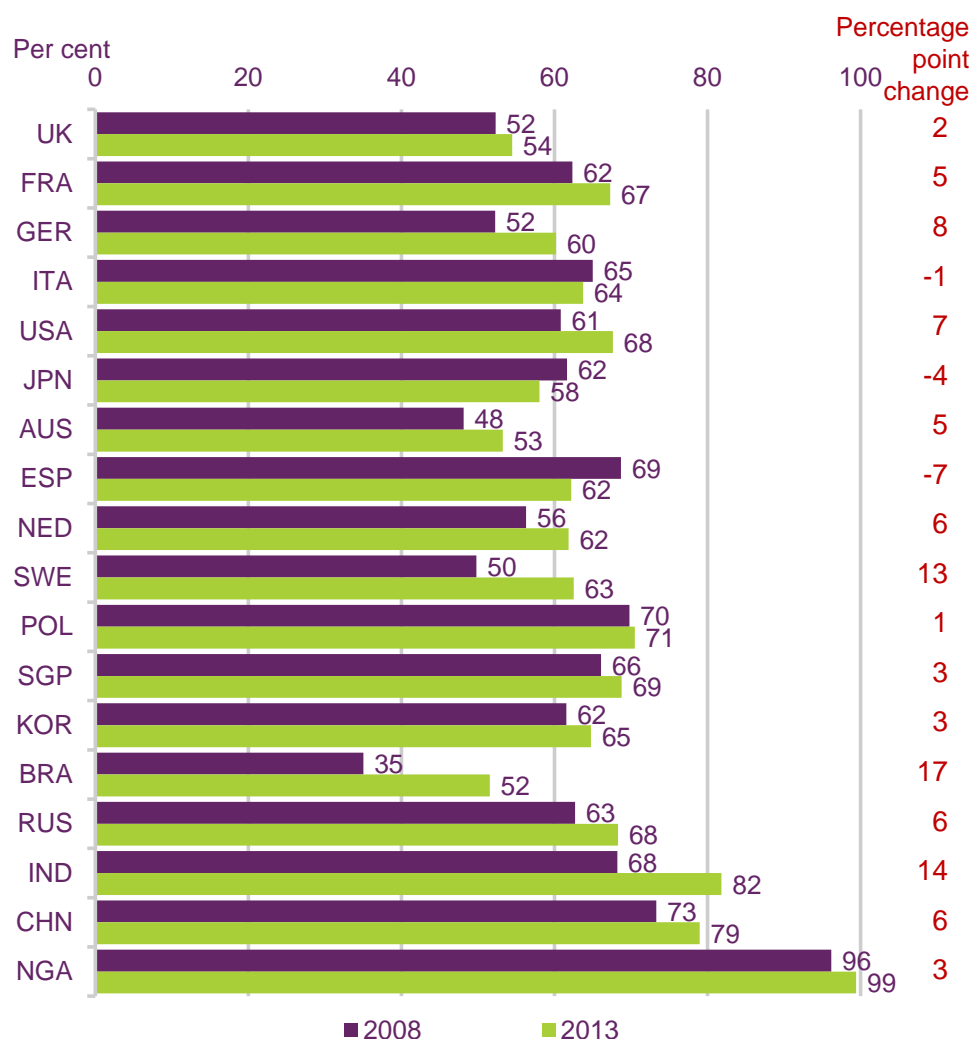
Note: Fixed voice revenues include managed VoIP revenues.

Mobile services generated two-thirds of total comparator country telecoms revenues in 2013

In most of our comparator countries the proportion of telecoms revenues generated by mobile voice and data services was above 60% in 2013, except in Brazil, Australia, the UK and Japan, where the proportions were lower, at 52%, 53%, 54% and 58% respectively (Figure 6.16).

The three countries with the highest proportion of mobile telecoms revenues were Nigeria, India and China (at 99%, 82% and 79% respectively) in 2013, due to fast growing mobile markets in these countries, and low fixed-line availability and penetration in Nigeria and India (0.2 and 2.3 fixed lines per 100 populations respectively). The proportion of telecoms revenues generated by mobile services increased in almost all comparator countries in the five years to 2013, with the largest increase being in Brazil, at 17 percentage points, followed by India (14pp) and Sweden (13pp). The proportion of telecoms revenues generated by mobile services decreased in three comparator countries over the same period, with the biggest fall in Spain (down 7 percentage points), followed by Japan (down 4pp) and Italy (down 1pp).

Figure 6.16 Mobile as a proportion of total telecoms revenues: 2008 and 2013



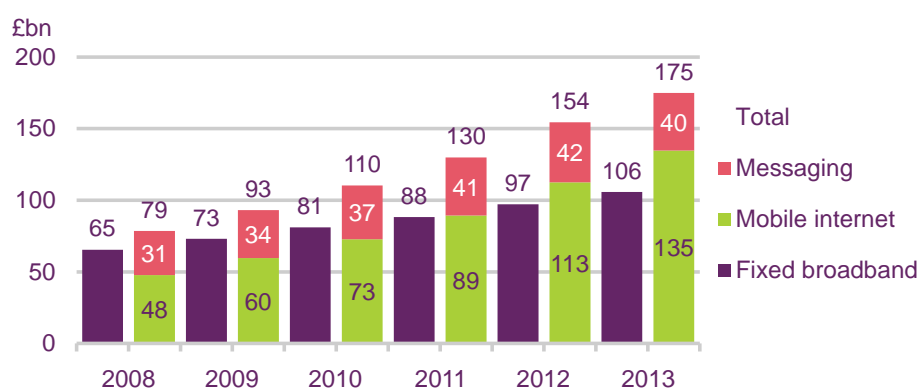
Sources: IHS / industry data / Ofcom

Mobile data revenues continued to exceed fixed broadband revenues

Total mobile data revenues (including mobile messaging and mobile internet services) increased by 13.3% (£21bn) to £175bn in our 18 comparator countries in 2013 (Figure 6.17). Mobile internet service revenues increased by 19.7% (£22bn) to £135bn in 2013 (when they were almost three times higher than in 2008), mainly as a result of increasing smartphone take-up and consumers upgrading to 4G services. The proportion of total telecoms data revenues generated by mobile internet services increased from 33.2% in 2008 to 48.0% in 2013.

Total mobile messaging revenues (including SMS and MMS) fell for the first time in 2013, down by 4.0% (£2bn) to £40bn. The main reasons for this decline are the substitution of OTT (over-the-top) messaging services for network-based services, and increasing smartphone take-up, as more sophisticated handsets enable mobile users to access alternative communication methods, such as emails, instant messaging and social networking sites. Fixed broadband services generated £106bn in revenue in 2013, a £9bn (8.9%) increase compared to 2012 and £40bn more than in 2008. The main reason for this growth is the increasing number of fixed broadband connections in almost all our comparator countries.

Figure 6.17 Total fixed broadband and mobile data revenues: 2008 to 2013



Sources: IHS / industry data / Ofcom

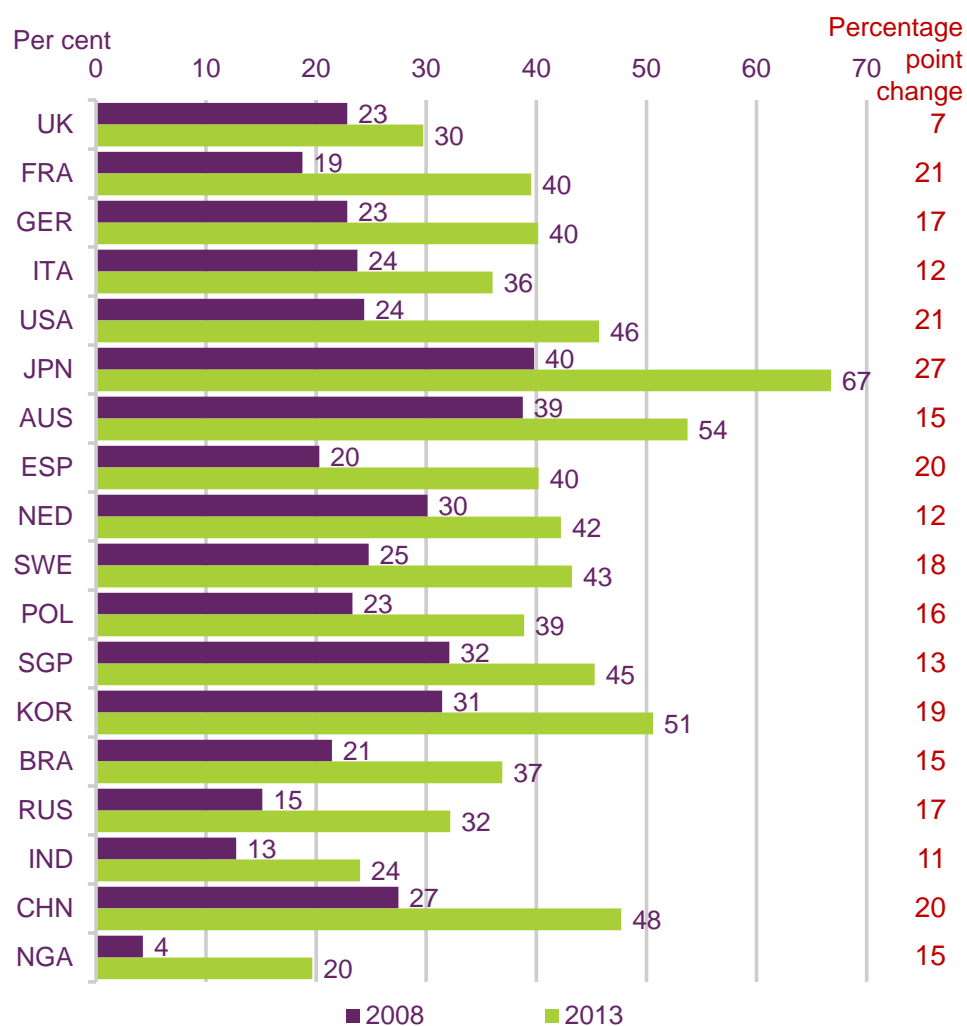
Note: Messaging includes SMS and MMS.

Japan continued to have the highest proportion of total telecoms revenues that were generated by data services in 2013

Japan had the highest proportion of total telecoms revenues that were generated by data services (including both fixed and mobile data services), at 67% in 2013 (Figure 6.18). This was as a result of a 47% increase in the number of fixed broadband connections, and an 84% increase in the number of mobile data connections (including handset and dedicated mobile broadband connections) in the five years to 2013. The UK had the third lowest proportion of total telecoms revenues generated by data services (after India and Nigeria), at 30% in 2013, although this figure will be understated as it excludes revenues from bundled data services that are included in post-pay mobile subscription revenues.

Although Nigeria had the lowest proportion of data service revenues, its market expanded rapidly, from 4% in 2008 to 20% in 2013, which was only 4pp lower than the proportion of data revenue in India, which had the second lowest proportion. The proportion of total telecoms revenues generated by data services increased in all our comparator countries in the five years to 2013. Japan had the biggest increase compared to 2008, at 27 percentage points, while the UK had the lowest increase, at 7pp (although this increase will be understated for the reasons outlined previously).

Figure 6.18 Data revenue as a proportion of total telecoms revenue: 2008 and 2013



Sources: IHS / industry data / Ofcom

6.2.2 Fixed voice services

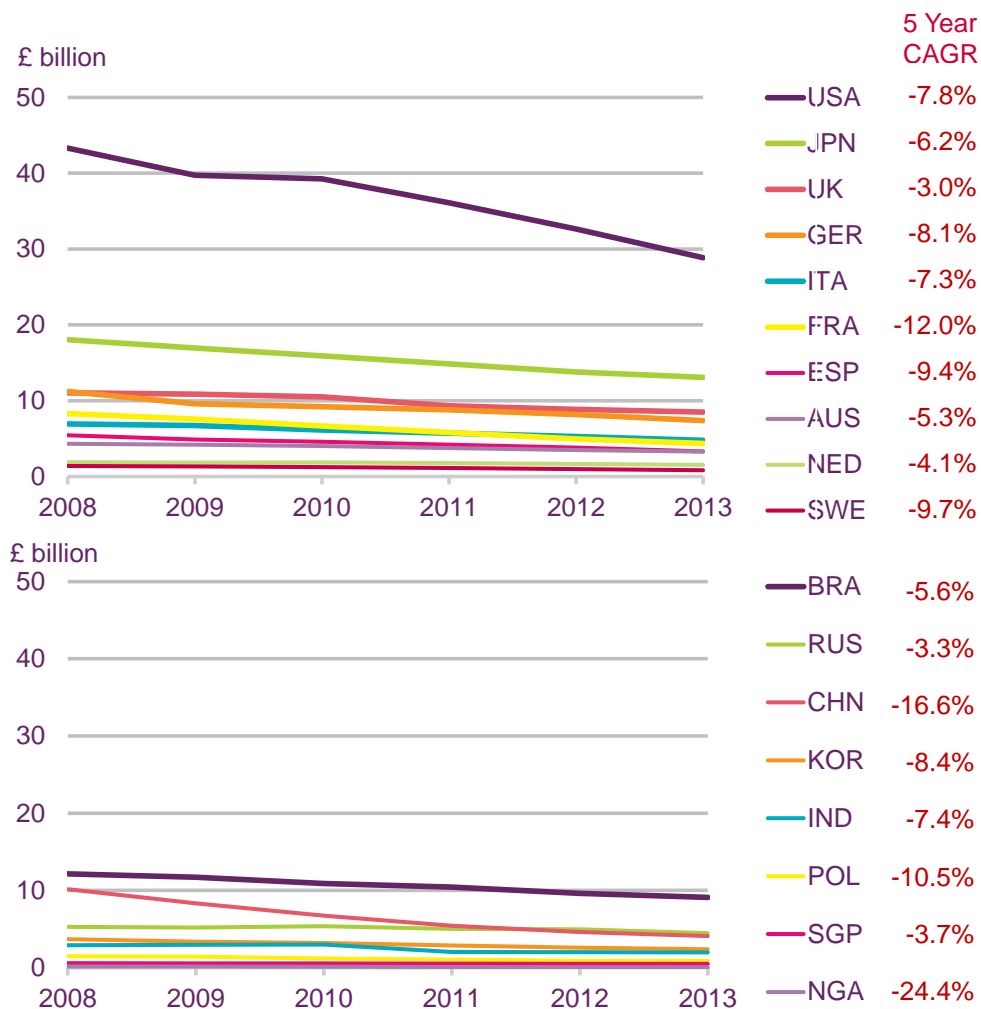
The UK had the lowest average rate of decline in retail fixed voice revenues in the five years to 2013

Retail fixed-line voice revenues fell by an average of 8.4% across our comparator countries in the year to 2013, higher than the average annual drop of 7.5% in the five years to 2013 (Figure 6.19). The main reason behind this decline is the increasing migration of consumers from traditional fixed voice services to mobile and alternative voice and non-voice communication methods, such as VoIP and instant messaging (as shown in Figure 6.11). The number of managed VoIP connections per head increased in all of our comparator countries between 2008 and 2013, while data provided to Ofcom by IHS show that total instant messaging volumes in our comparator countries increased from 113 billion to 10.1 trillion in the five years to 2013.

The fastest rate of decline in fixed voice revenues over the five-year period was in Nigeria, at an average of 24.4% a year (although Nigeria's fixed voice market is very small), followed by China, at an average annual rate of 16.6%. The next two highest annual rates of decline were found in comparator EU countries: France (down 12.0% as a result of increasing take-up of low-cost managed VoIP services) and Poland (down 10.5%). In the UK, retail fixed-line

voice revenues fell by an annual average rate of 3.0% to £9bn in the five years to 2013, the slowest rate of decline among our countries. This decline was mainly due to falling fixed voice call volumes per line, as the decline in the number of fixed lines was comparatively low in the UK (see Figure 6.23).

Figure 6.19 Retail fixed-line voice revenues: 2008 to 2013



Sources: IHS / industry data / Ofcom
 Note: Includes managed VoIP revenues.

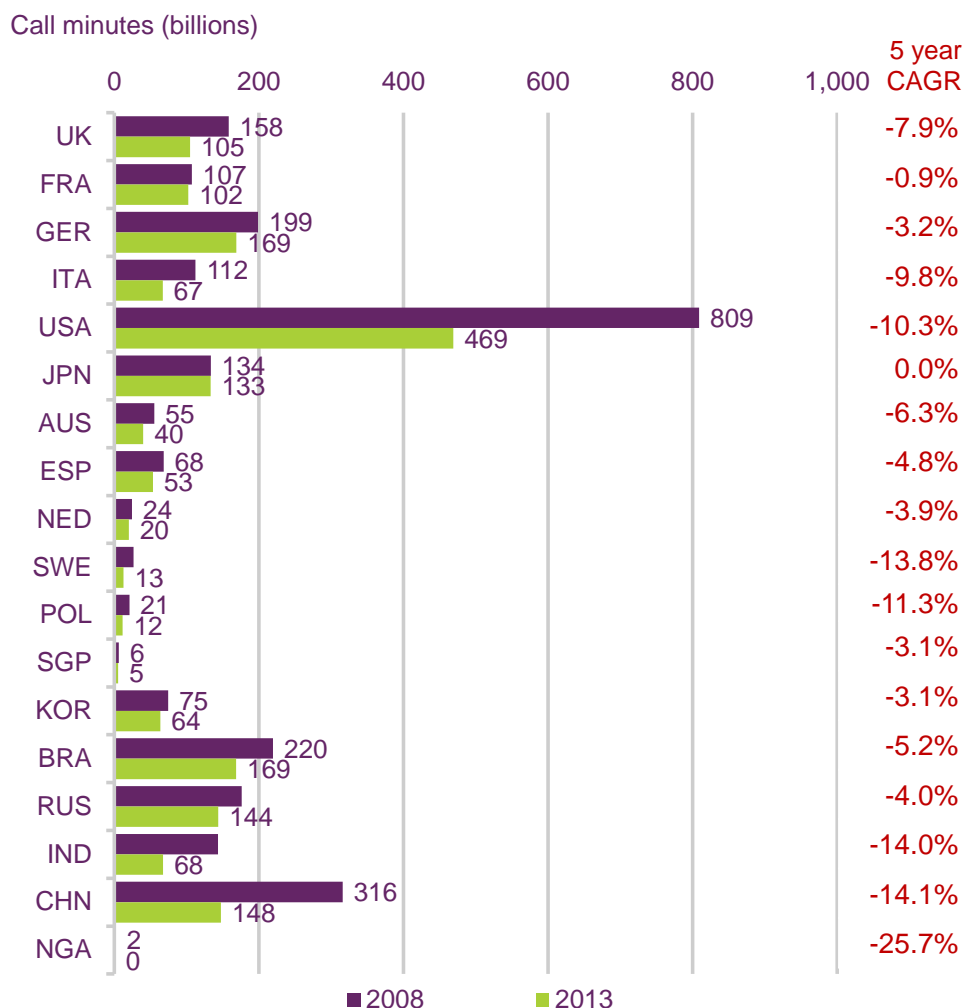
Fixed-line voice call volumes fell across all comparator countries between 2008 and 2013

Total fixed-line voice call volumes across all our comparator countries fell by an average annual rate of 7.7% to 1.8 trillion minutes in the five years to 2013 (Figure 6.20). This decline was due to falling traditional fixed call volumes (which fell by an average of 10.5% annually during this period), as managed VoIP call volumes increased in almost all comparator countries over the five-year period (up by an average of 9.1% a year). Further information regarding managed VoIP services can be found in Section 6.1.4 of this report.

In the UK, total fixed-line call volumes decreased by an annual average rate of 7.9% to 105 billion minutes between 2008 and 2013. The steepest fall in fixed-line voice call volumes was seen in Nigeria (where total fixed call volumes were the lowest among our comparator countries as a result of low fixed-line take-up) at an annual average rate of 25.7%, followed

by China (down 14.1% a year) and India (down 14.0% a year). The main reasons behind falling fixed call volumes in most comparator countries are increasing mobile phone use (mobile voice call volumes were up by an annual average of 12.6% across our comparator countries in the five years to 2013) and easy access to alternative communication methods, such as email, instant messaging and social networking sites,.

Figure 6.20 Fixed line voice call volumes: 2008 and 2013



Sources: IHS / industry data / Ofcom

Note: Includes managed VoIP calls. Figures for USA and CHN include incoming calls.

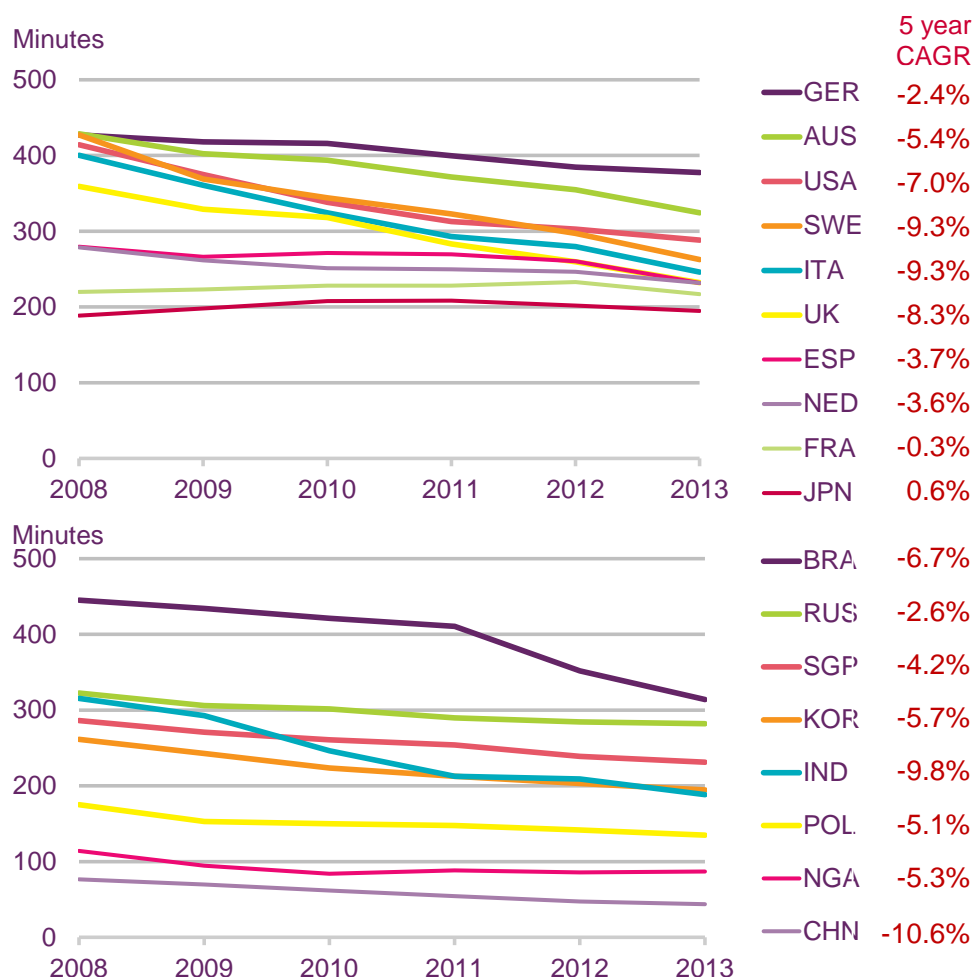
Germany had the highest monthly outbound minutes per fixed line in 2013

The number of monthly outgoing call minutes per fixed line (including managed VoIP calls and connections) decreased by an average 5.4% a year to 184 minutes a month across the comparator countries in the five years to 2013 (Figure 6.21). China (which had the lowest number of outbound call minutes per fixed line, at 44 minutes a month in 2013) had the steepest fall over the five-year period, down by an annual average of 10.6%, followed by India, Sweden and Italy (down 9.8%, 9.3% and 9.3% a year respectively). The only comparator country where average monthly minutes per fixed line increased between 2008 and 2013 was Japan, up by an average annual rate of 0.6%.

Germany had the highest monthly outbound minutes per fixed line in 2013, at 378 minutes, mainly due to the significant difference between the average fixed and mobile voice cost (at

4.4 pence/min and 7.4 pence/min respectively in 2013). In the UK, the number of outgoing call minutes per fixed line was at 232 minutes a month in 2013, down from 359 minutes five years previously. This represents an average rate of decline 8.3% a year during this period, mainly as a result of growing fixed-to-mobile substitution and the increasing use of non-voice communication methods such as email and instant messaging.

Figure 6.21 Monthly outbound minutes per fixed line: 2008 to 2013



Sources: IHS / industry data / Ofcom

Note: Includes managed VoIP calls. Figures for USA and CHN include incoming calls.

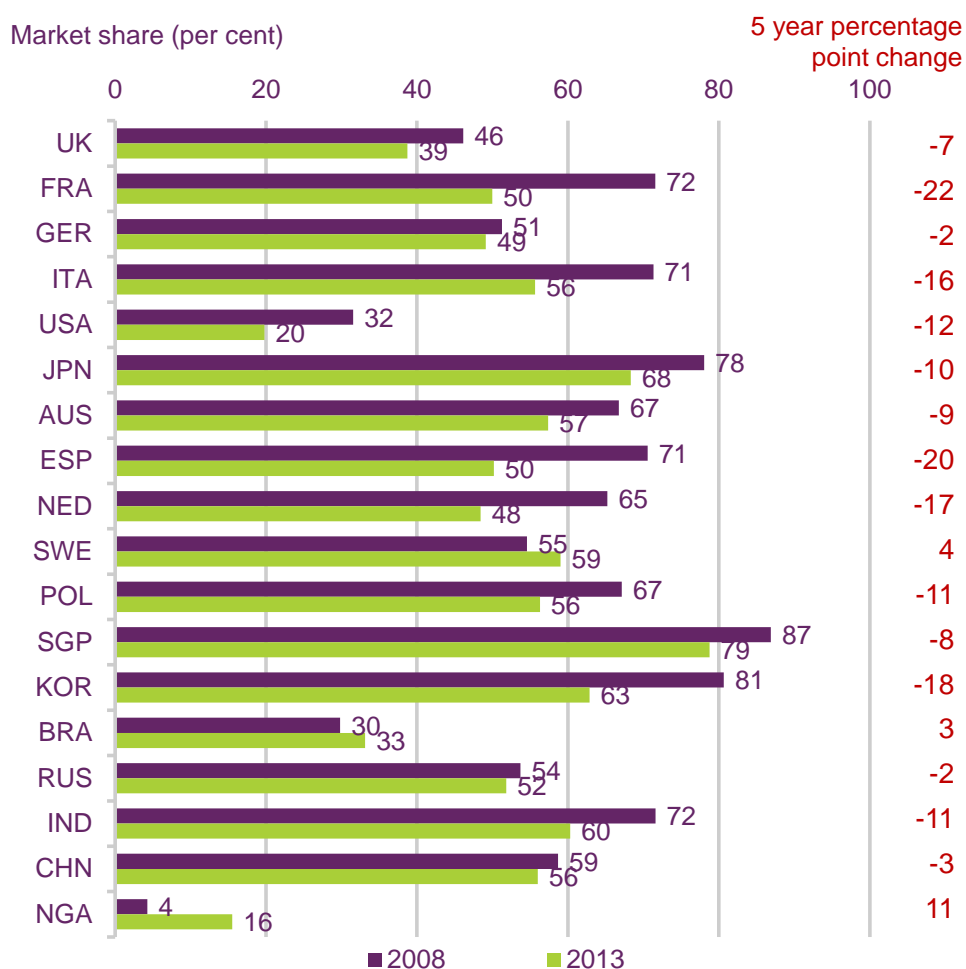
The incumbent operator's share of fixed voice call volumes declined in most comparator countries in the five years to 2013

The incumbent operator's share of fixed voice call volumes was the highest in Singapore in 2013 (at 79%), followed by Japan and South Korea (at 68% and 63% respectively), due to the late liberalisation of the fixed-line markets (Figure 6.22).

The decline of the incumbent operator's share of fixed call volumes was highest in France, at 22 percentage points (down to 50%) in the five years to 2013, followed closely by Spain at 20pp (also down to 50%). The share of fixed voice call volumes increased in only three countries. In Sweden, Telia's market share increased from 55% in 2008 to 59% in 2013; in Brazil, Oi's market share increased by 3pp to 33%; and in Nigeria, Nitel's share grew by 11pp (the highest across the comparator countries) to 16% in the five years to 2013. In the UK, BT's share of fixed voice call volumes decreased by seven percentage points to 39%

over the five-year period, due to competition from operators providing services using local loop unbundling (LLU).

Figure 6.22 Incumbent operators' share of fixed voice call volumes: 2008 and 2013



Sources: IHS / industry data / Ofcom

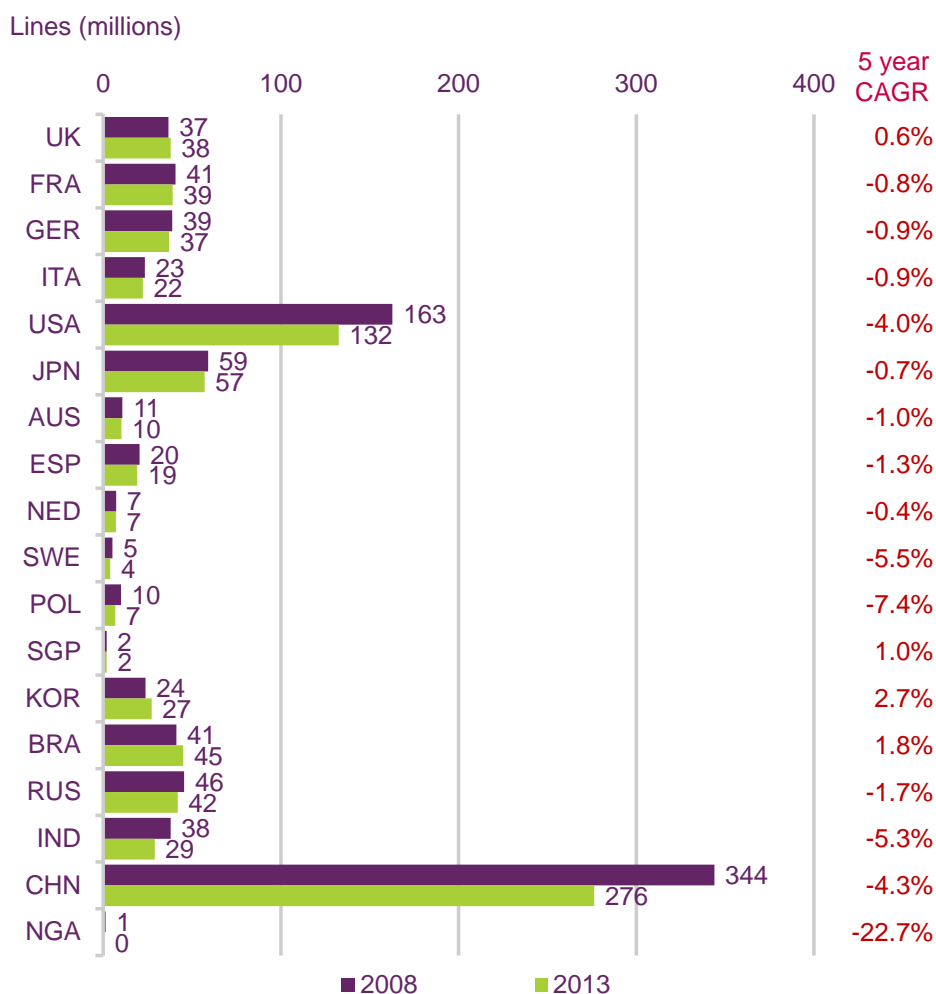
Numbers of fixed voice connections fell in most comparator countries in the five years to 2013

The total number of comparator country fixed voice connections (which includes PSTN lines and managed VoIP connections) fell by 21 million (2.5%) to 795 million in 2013, and by an annual average rate of 2.7% in the five years to 2013 (Figure 6.23). The UK was one of just two comparator countries (along with Brazil) where the number of fixed voice connections increased in 2013; in the UK the number of connections was 38 million at the end of the year, an increase 0.2 million (1.6%) which is likely to be due to an increase in the number of households and the requirement for most UK homes to have a landline in order to be able to access fixed broadband services.

The number of fixed voice connections fell in all but four of our comparator countries (the UK, Singapore, South Korea and Brazil) between 2008 and 2013, with the fastest average annual decline being in Nigeria, at 22.7%, over this period. The main driver behind the fall in fixed voice connections in these countries is fixed-to-mobile substitution, although there have also been increases in the use of text-based forms of communication (such as email, instant messaging and social networking sites). The average annual increase in the number of fixed

voice connections was highest in South Korea in the five years to 2013, at 2.7% (in the UK it averaged 0.6% a year over this period).

Figure 6.23 Fixed voice connections: 2008 and 2013



Sources: IHS / industry data / Ofcom
 Note: Includes managed VoIP connections

6.2.3 Fixed broadband services

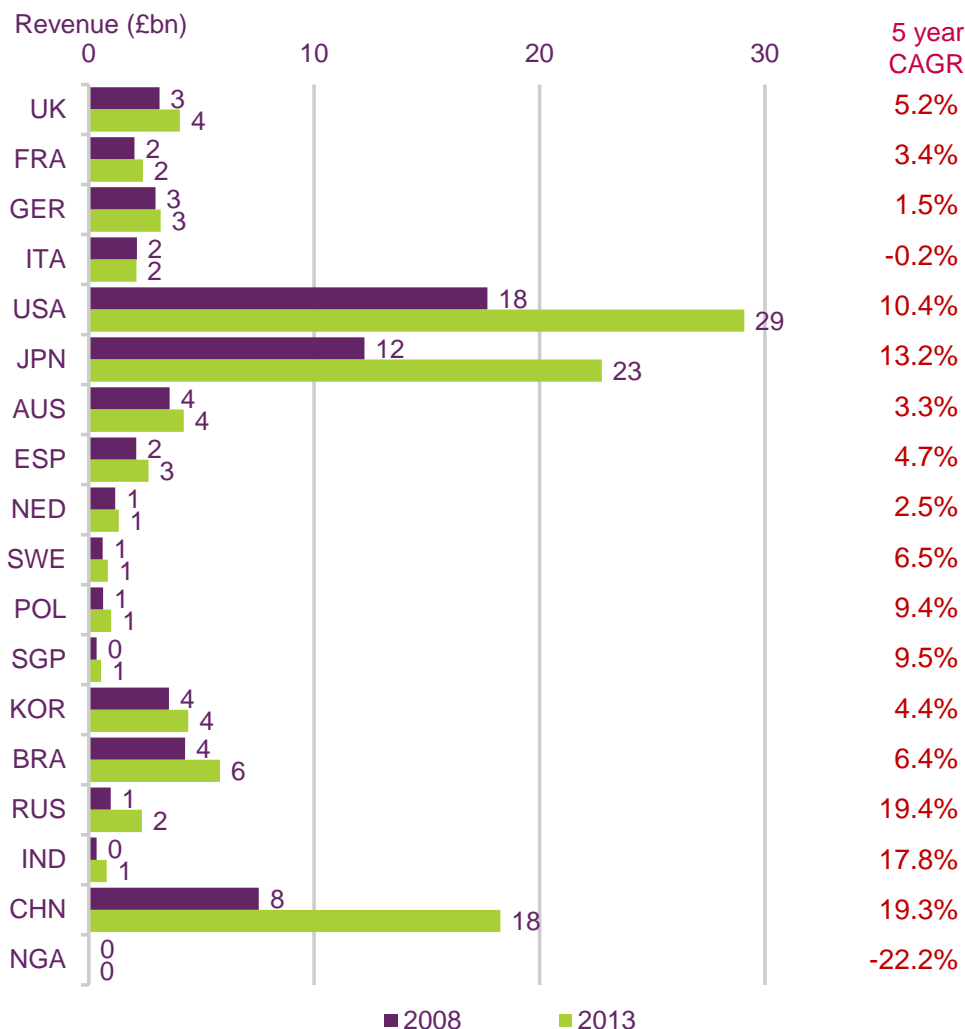
Total fixed broadband revenues more than doubled in the BRIC countries between 2008 and 2013

Total fixed broadband revenues increased by £40bn to £106bn among our comparator countries in the five years to 2013, equivalent to an average annual growth rate of 10.1% (Figure 6.24). The BRIC countries had the fastest increase over the five-year period, with Russia experiencing the highest average annual growth rate, at 19.4%, followed closely by China (up 19.3% a year) and India (up 17.8% a year). The reason behind this high increase is the fast-growing fixed broadband connection base (up by an annual average rate of 19.2% in those three countries between 2008 and 2013) and comparatively low take-up in 2008.

Fixed broadband revenues decreased in only two countries in the five years to 2013; the largest fall was in Nigeria (where take-up is very low), at 22.2% a year, followed by Italy with a slight average decrease of 0.2% a year, although in Italy fixed broadband revenues increased by 2.1% in 2013 compared to the previous year, while Nigeria experienced a

53.0% year-on-year fall. In the UK, fixed broadband revenues increased by an average annual rate of 5.2% to £4bn in the five years to 2013, as a result of a 5.6% annual average growth in the number of broadband connections, and increasing take-up of higher bandwidth connections.

Figure 6.24 Fixed broadband revenues: 2008 and 2013



Sources: IHS / industry data / Ofcom

The proportion of total fixed telecoms revenues generated by fixed broadband services increased in all our comparator countries in the five years to 2013

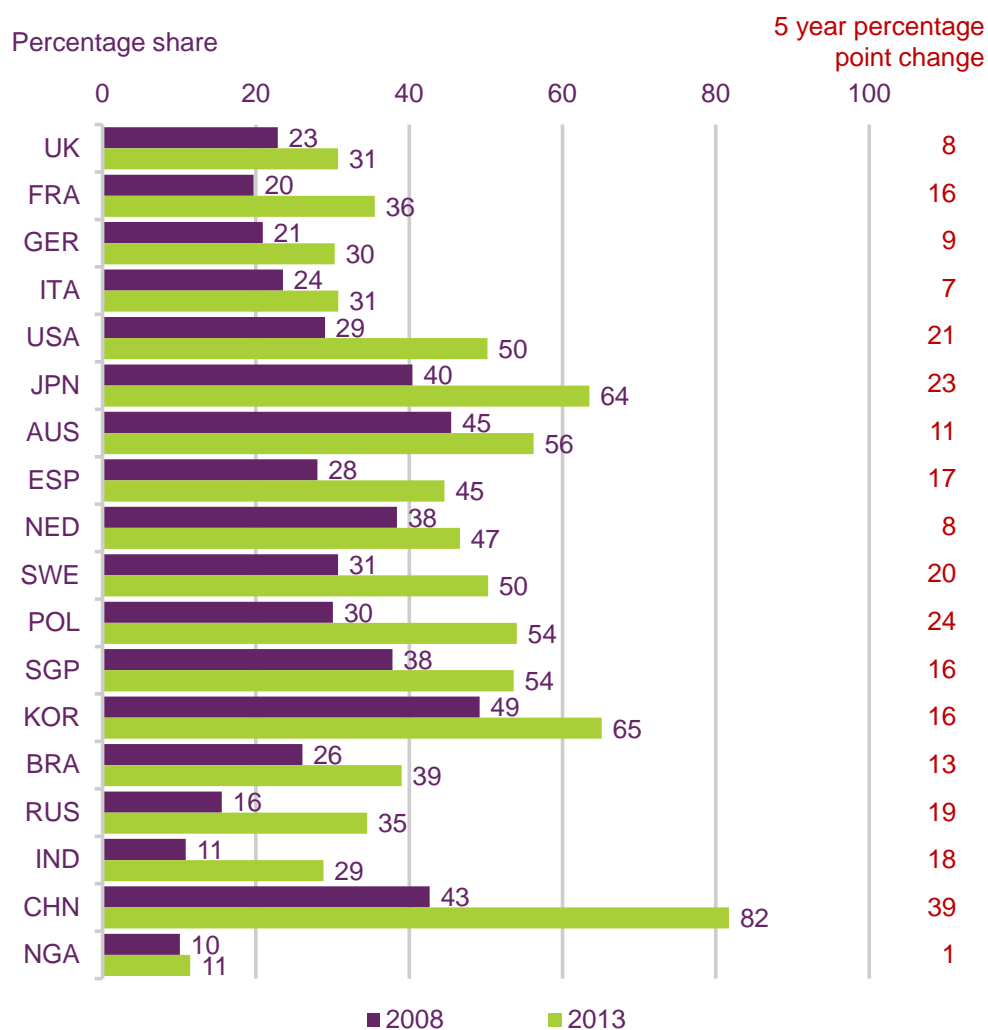
The proportion of total fixed revenues generated by fixed broadband services increased by an average of 21 percentage points to 51% across our comparator countries between 2008 and 2013 (Figure 6.25). This was the result of a 10% average annual increase in total fixed broadband revenues in the five years to 2013 and an 8% a year average fall in total fixed voice revenues over the same period (Figure 6.13).

The proportion of fixed telecoms revenues that were generated by broadband services was highest in China, at 82% in 2013. China also had the largest increase in this proportion (among our comparator countries) between 2008 and 2013, at 39pp. This was the result of a large increase in the number of fixed broadband connections (as shown in Figure 6.27, the number of fixed lines increased by an average of 18% a year in China in the five years to

2013) and despite low fixed broadband prices in China (the third lowest behind Russia and India, at £8.07 per connection per month).

The proportion of total fixed-line revenues generated by fixed broadband services was the lowest in Nigeria in 2013, at 11%, where take-up of both fixed voice and fixed broadband is very low, followed by India (at 29%) and Germany (at 30%). In the UK, the proportion of fixed broadband revenues was 31% in 2013, eight percentage points higher than in 2008.

Figure 6.25 Fixed broadband as a proportion of total fixed revenues: 2008 to 2013



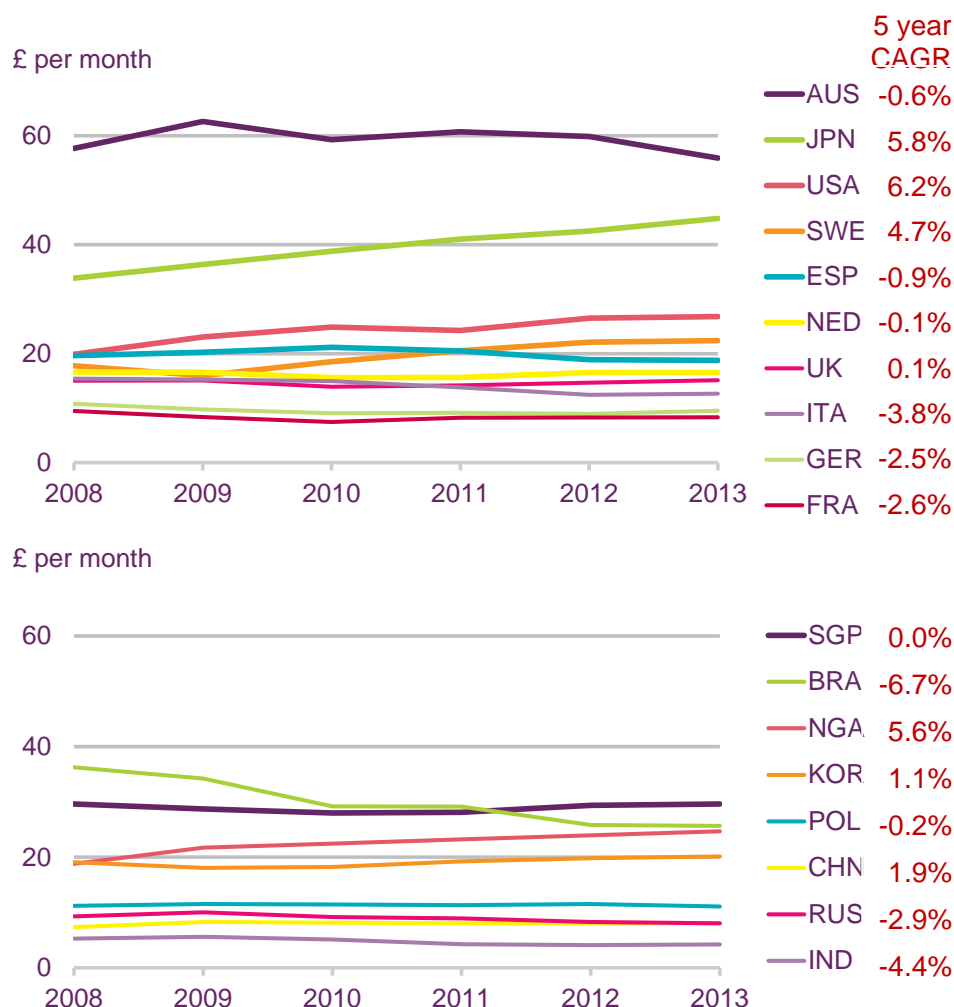
Sources: IHS / industry data / Ofcom

Australia had the highest monthly retail fixed broadband average revenue per connection in 2013

Monthly retail fixed broadband revenues increased by an average of 0.2% a year to £16.83 per connection across our comparator countries in the five years to 2013 (Figure 6.26). While average fixed broadband revenues per connection decreased in ten of our comparator countries between 2008 and 2013, seven countries have seen an increase over the same period, with the largest increase being in the US (up by an average of 6.2% a year), followed by Japan (up 5.8% a year). In the UK, average fixed broadband revenues increased slightly, by an annual average rate of 0.1% to £15.10 in the five years to 2013.

Average monthly fixed broadband revenue was unchanged in Singapore compared to 2008, at £29.61 per connection in 2013. Average revenue per fixed broadband connection had the largest decrease in Brazil (down by 6.7% a year), followed by India (down 4.4% a year) between 2008 and 2013. Monthly retail fixed broadband average revenue was highest in Australia, at £55.90 per connection, and lowest in India, at £4.22 per connection in 2013.

Figure 6.26 Retail fixed broadband average revenue per connection: 2008 to 2013



Sources: IHS / industry data / Ofcom

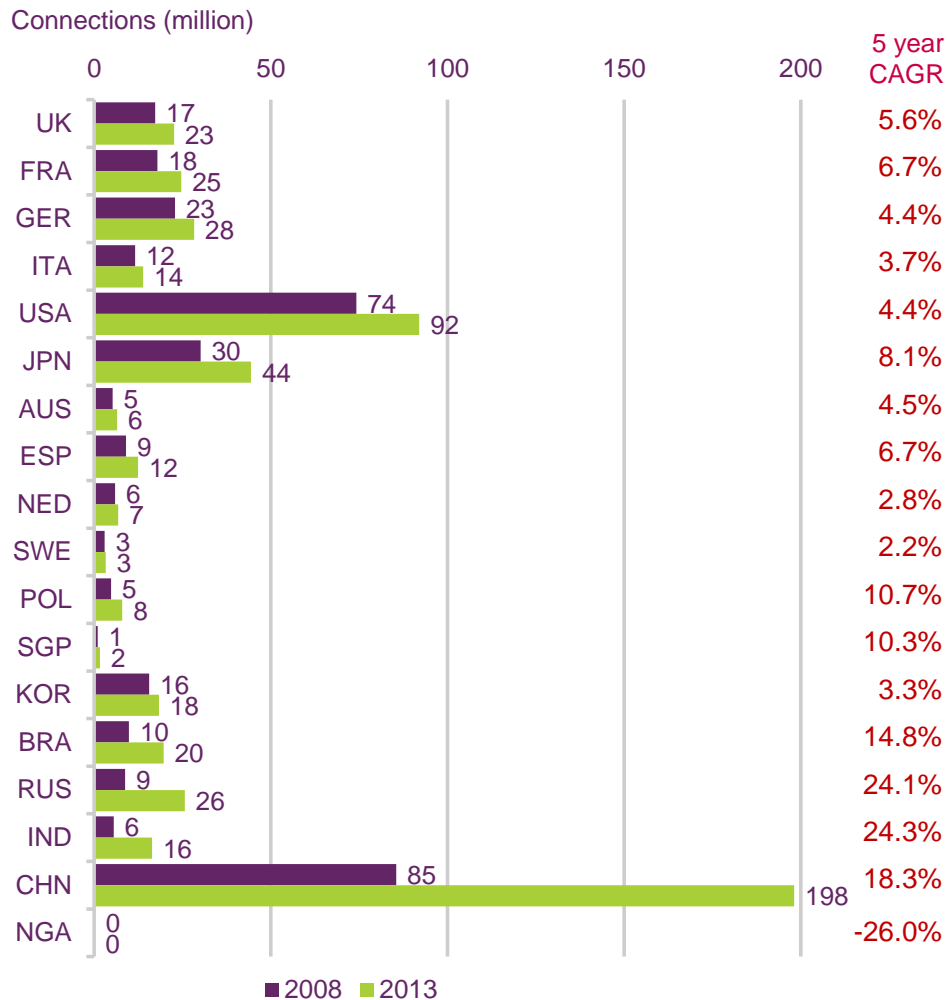
The total number of fixed broadband connections increased by an average of 10.6% a year across our comparator countries in the five years to 2013

The number of fixed broadband connections increased by 214 million to 542 million in the five years to 2013 (Figure 6.27). The average annual rate of growth in fixed broadband connections was highest in BRIC countries, ranging between 14.8% a year in Brazil to 24.3% a year in India, mainly because these countries had comparatively low fixed broadband take-up in 2013 and are still catching up with other nations in terms of broadband penetration (as shown in Figure 6.51, the BRIC countries had the four lowest broadband penetration rates in 2013, behind Nigeria).

Among our non-BRIC countries, the highest average annual rate of growth between 2008 and 2013 was in Poland (up 10.7% a year), followed by Singapore (up 10.3% a year). In only one country did the number of fixed broadband connections fall during this period: Nigeria,

where fixed broadband availability is low, and where the number of connections fell by an average of 26.0% a year as a result of rapid growth in the use of mobile data services. In the UK, the total number of fixed broadband connections increased by an average annual growth rate of 5.6% to 23 million in the five years to 2013.

Figure 6.27 Fixed broadband connections: 2008 to 2013



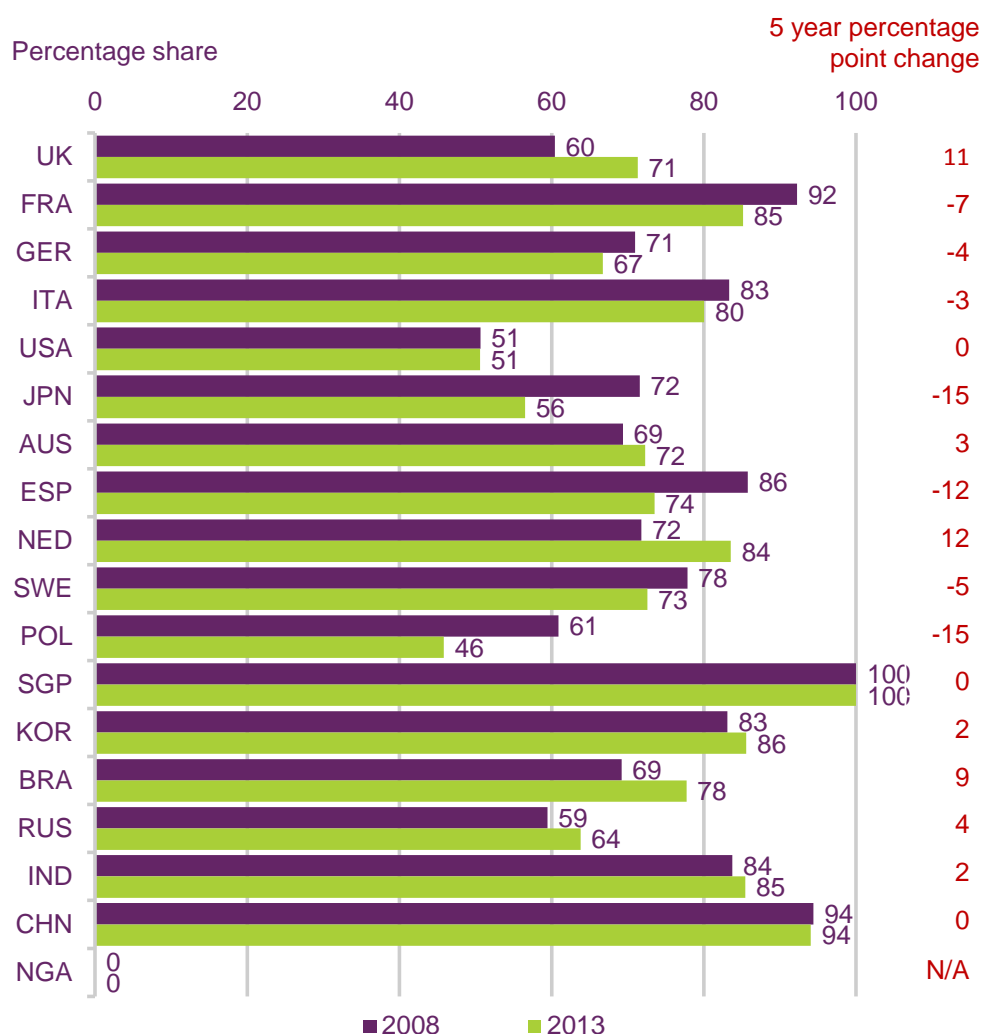
Sources: IHS / industry data / Ofcom

Singapore had the most concentrated fixed broadband market in 2013

The retail connection share of the three largest fixed broadband providers was highest in Singapore, at 100% in 2013, followed by China at 94% and South Korea at 86% (Figure 6.28).

In the five years to 2013, seven of the 17 comparator countries for which data were available (we do not have any data for Nigeria) saw a decrease in combined fixed broadband connection share: Japan and Poland (both down 15 percentage points), Spain (down 12pp), France (down 7pp), Sweden (down 5pp), Germany (down 4pp) and Italy (down 3pp). The Netherlands had the greatest increase, of 12 percentage points, in the three largest providers' combined share of fixed broadband connections between 2008 and 2013, followed by the UK, with an 11pp increase over the same period.

Figure 6.28 Retail connection share of the three largest fixed broadband providers: 2008 to 2013



Sources: IHS / industry data / Ofcom

6.2.4 Mobile voice and data services

Total mobile internet revenues increased by 19.7% across our comparator countries in 2013

Total mobile telecoms revenues (including voice, messaging and mobile internet services) increased by £11bn (2.7%) to £407bn in our comparator countries in 2013, as a result of increasing mobile internet revenues (Figure 6.29). Total mobile internet revenues almost tripled; from £48bn to £135bn in the five years to 2013, an annual average of 23.0% increase over the five-year period, and by 19.7% (£22bn) in 2013. This was largely the result of growth in take-up of mobile data services (including handset and dedicated mobile data connections) across our comparator countries in the five years to 2013 (Figure 6.63). Overall, the proportion of total mobile revenues generated by mobile internet services increased from 14.3% to 33.1% between 2008 and 2013.

Total mobile messaging revenues (including SMS and MMS) saw a decline of £2bn (4.0%) to £40bn in 2013, after a continuous increase since reporting started. The reason behind this fall was an 8.7% decrease in total messaging volumes in 2013, which was due to the increasing use of newer communication methods such as instant messaging, email and

social networking. Total voice revenues continued to fall in 2013, decreasing by 4.1% (£10bn) to £232bn, mainly due to falling prices (total mobile voice call volumes increased by 7.5% across our comparator countries in 2013).

Figure 6.29 Total comparator country retail mobile telecoms revenue, by sector: 2008 to 2013

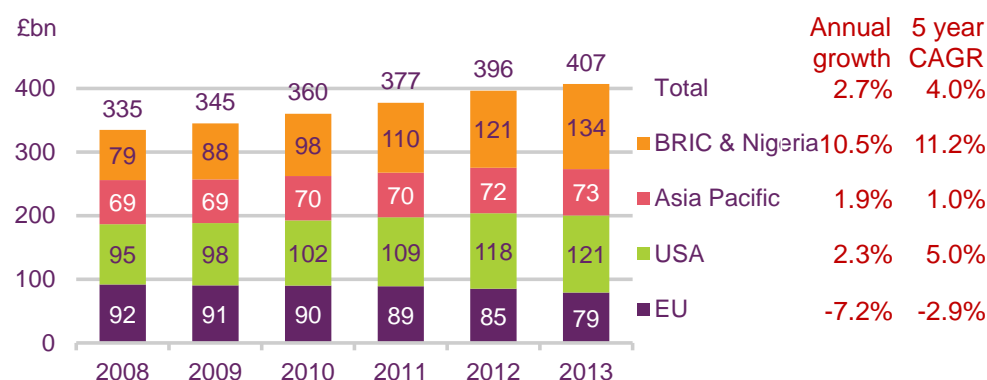


Sources: IHS / industry data / Ofcom
 Note: Messaging includes SMS and MMS.

Total retail mobile telecoms revenues increased by 10.5% in the BRIC countries and Nigeria in 2013

Total retail mobile telecoms revenues increased by an annual average rate of 4.0% in our comparator countries in the five years to 2013 (Figure 6.30). The BRIC countries and Nigeria had the largest increases, up by an annual average of 11.2% over the five-year period and by 10.5% compared to 2012, as a result of rapid growth in the number of mobile connections. Mobile telecoms revenues also increased in the US (up 2.3% in 2013) and in Asia Pacific (up 1.9% in 2013), mainly as a result of increasing mobile internet revenues. Mobile telecoms revenues decreased among our EU comparator countries, down by 7.2% in 2013 and by an average of 2.9% a year in the five years to 2013, due to falling prices.

Figure 6.30 Total comparator country retail mobile telecoms revenue, by country type: 2008 to 2013



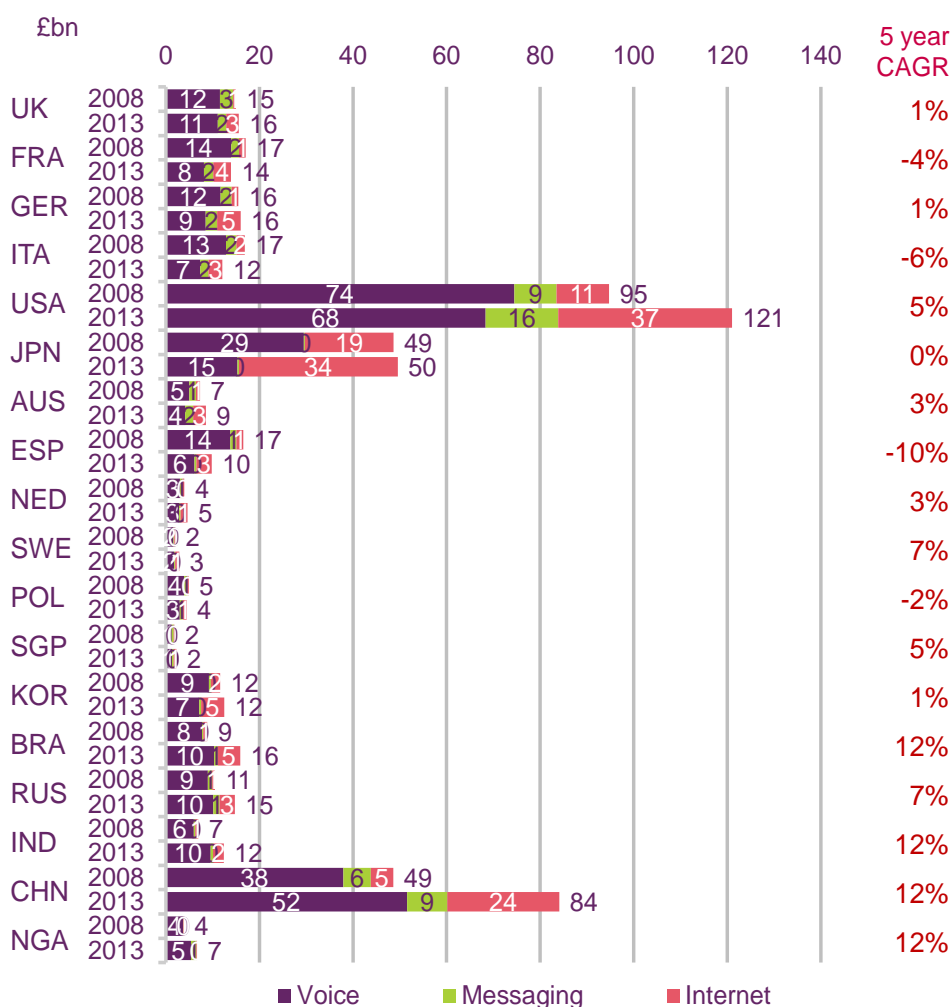
Sources: IHS / industry data / Ofcom

Retail mobile revenues increased in most of our comparator countries in the five years to 2013

The greatest increases in mobile service revenues over the five-year period were found among the BRIC countries and Nigeria, with revenues increasing by an average of 12% a year in Brazil, India, China and Nigeria, and by 7% in Russia (Figure 6.31). This was mainly due to large increases in the number of mobile connections. Total retail mobile revenues decreased in four of our 18 comparator countries, with the steepest fall in Spain (down by 10% a year as a result of the continued effect of the economic downturn), followed by Italy, France and Poland (down by 6%, 4% and 2% a year respectively).

Three comparator countries (US, China and Japan) generated 63% of the total retail mobile revenues across our comparator countries, although revenue growth has slowed significantly both in the US and Japan. The proportion of mobile revenue generated by voice services decreased in all the comparator countries, while mobile data revenues had a sharp increase. In the UK total mobile revenues increased by an average annual rate of 1%, as a £2bn increase in mobile internet revenue was partly offset by falling voice and messaging revenue (it should be noted that UK mobile messaging and data revenues will be understated as they exclude revenues generated by bundled services).

Figure 6.31 Retail mobile revenues, by service and country: 2008 and 2013

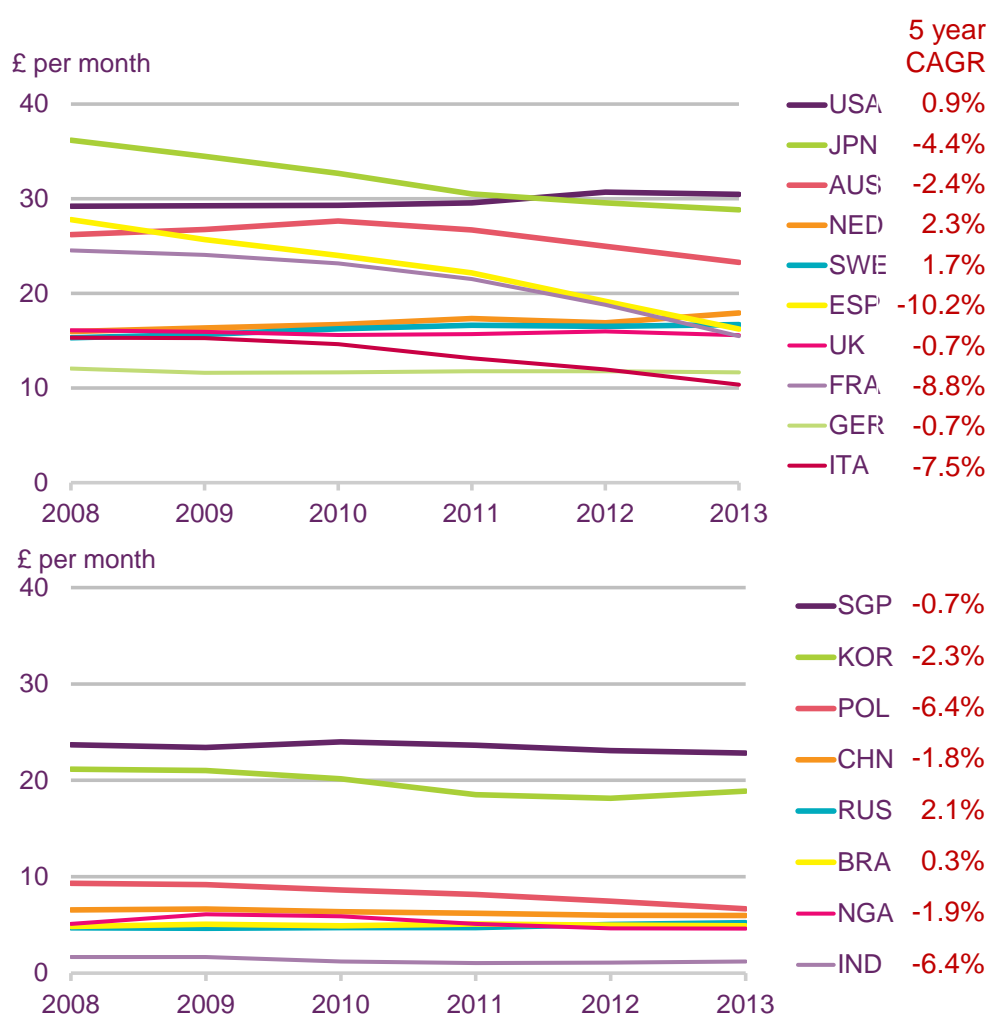


Sources: IHS / industry data / Ofcom
 Note: Messaging includes SMS and MMS.

The US had the highest average monthly revenue per mobile connection in 2013

In the US, the average monthly revenue per mobile connection increased by an annual rate of 0.9% to £30 in the five years to 2013, which is the highest average monthly mobile revenue among our comparator countries in 2013 (Figure 6.32). The Netherlands had the highest average annual increase in average revenue per mobile connection in the five years to 2013 (2.3%). Outside the US and the Netherlands, the only other comparator countries where the average monthly revenue per connection increased in the five years to 2013 were Russia, Sweden and Brazil (up by 2.1%, 1.7% and 0.3% a year respectively). Spain had a significant average annual fall, of 10.2% a year, between 2008 and 2013, followed by France, down by 8.8% a year over the same period. In the UK, the average monthly mobile revenue per connection was £16 in 2013, £1 less than in 2008.

Figure 6.32 Average monthly revenue per mobile connection: 2008 to 2013



Sources: IHS / industry data / Ofcom

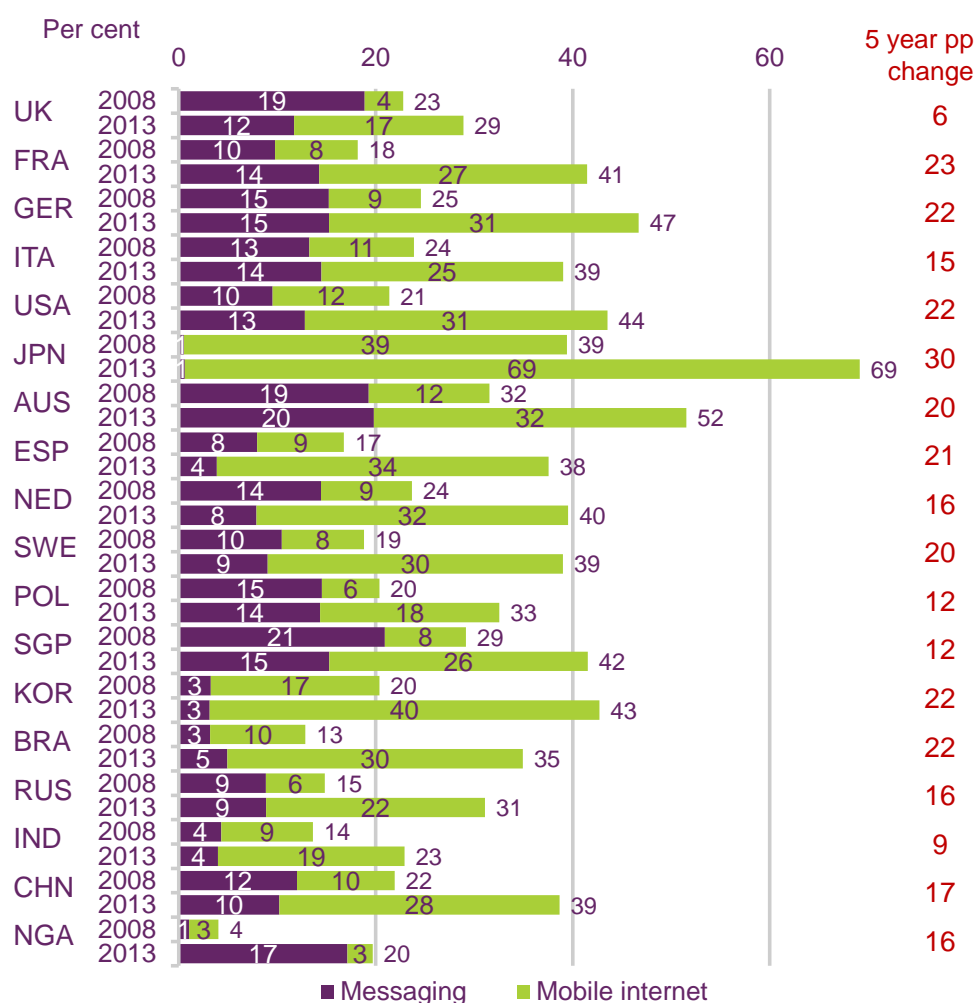
Japan had the largest proportion of mobile revenue generated by data services in 2013

The proportion of total mobile revenue generated by data services (including mobile messaging and mobile internet) increased by 20 percentage points to 43% across our comparator countries in the five years to 2013 (Figure 6.33). This is the result of an average annual growth rate of 23% in mobile internet revenues over the same period. All of our

comparator countries saw an increase in the proportion of mobile data to total mobile revenues over the five-year period to 2013, with the largest increase being in Japan, at 30 percentage points, and the lowest in the UK, at six percentage points. It should be noted that in the UK mobile data revenues are understated, as revenues from bundled data services will be included in subscription revenues.

Japan had the highest proportion of mobile revenues generated by data services across our comparator countries in 2013, at 69%, due to a strong post-pay market and high average mobile data consumption. Nigeria had the lowest proportion of mobile data revenues, at 20% in 2013, although this proportion increased by 16 percentage points in the five years to 2013, mainly due to an increase in mobile messaging revenues.

Figure 6.33 Data as a proportion of total mobile service revenues: 2008 and 2013



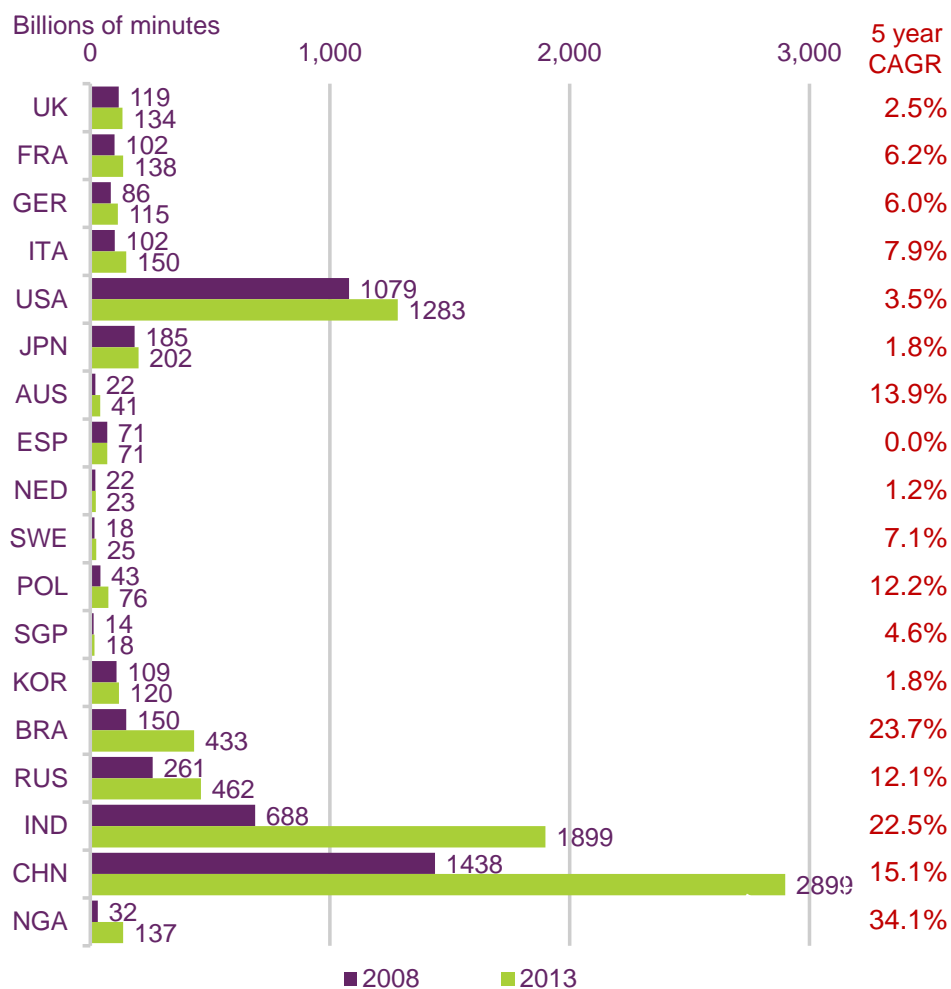
Sources: IHS / industry data / Ofcom
 Note: Messaging includes SMS and MMS.

Mobile voice call volumes increased in almost all comparator countries in the five years to 2013

Total mobile voice call volumes increased by an average annual rate of 12.6% across our comparator countries in the five years to 2013, and by 7.5% in 2013 (Figure 6.34). China had the highest number of mobile voice call volumes in 2013, at 2.9 trillion, followed by India at 1.9 trillion, and the US at 1.3 trillion.

Mobile voice call volumes increased rapidly among the BRIC countries and Nigeria in the five years to 2013, as a result of the increasing number of mobile connections. Nigeria had the highest average annual growth rate between 2008 and 2013, at 34.1%, followed by Brazil (up 23.7% a year) and India (up 22.5% a year). However, the growth rate in BRIC countries is slowing (all had a lower growth rate in 2013 than their five-year CAGR), while Nigeria still had the biggest increase in 2013, at 66.6%, followed by France (up 14.7%) and the US (up 13.8%). Spain was the only country where mobile voice call volumes were unchanged in the five years to 2013, but saw a slight increase of 0.9% in 2013.

Figure 6.34 Mobile voice call volumes: 2008 and 2013



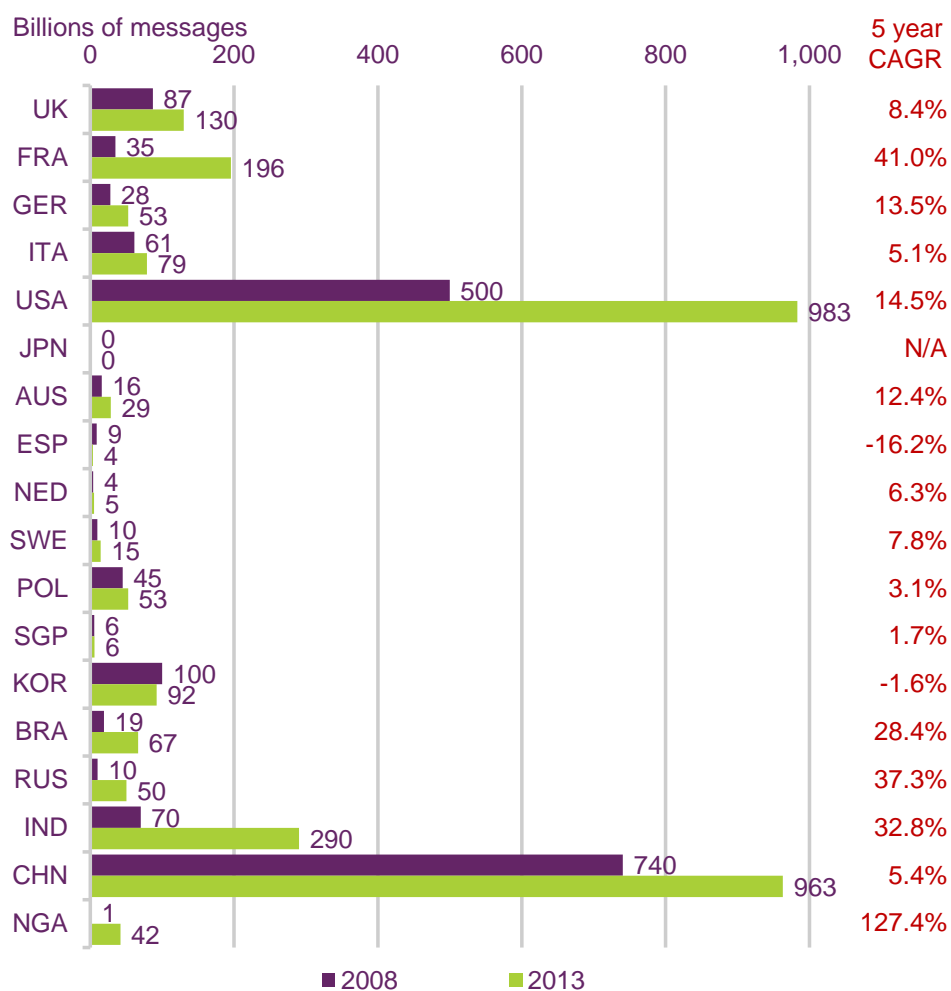
Sources: IHS / industry data / Ofcom

The mobile messaging market declined steeply in almost all comparator countries in 2013

The total number of mobile messages (including SMS and MMS) increased by an average annual rate of 11.9% to 3.0 trillion between 2008 and 2013, despite an 8.7% decline in 2013 (Figure 6.35). The fall was the result of the increasing use of communication methods such as email, instant messaging and social media. In the five years to 2013, mobile messaging volumes decreased in only two countries: Spain (down by an average rate of 16.2% a year) and South Korea (down by an average rate of 1.6% a year). Almost all our comparator countries saw a fall in messaging volumes in 2013; the exceptions were Nigeria (up 104.2% due to lower SMS pricing and increased subscription growth), and Russia, France, Australia and Brazil (up 25%, 6.0%, 4.0% and 2.1% respectively).

Total mobile messaging volumes were highest in the US, at 983 billion in 2013, followed closely by China, at 963 billion, although the average per-capita monthly mobile message volumes were much higher in the US, at 259 a month, compared to 59 a month in China (see Figure 6.59). In the UK, total mobile messaging volumes increased by an average annual rate of 8.4% to 130 billion in the five years to 2013, but fell by 24.3% in 2013.

Figure 6.35 Mobile messaging volumes: 2008 and 2013



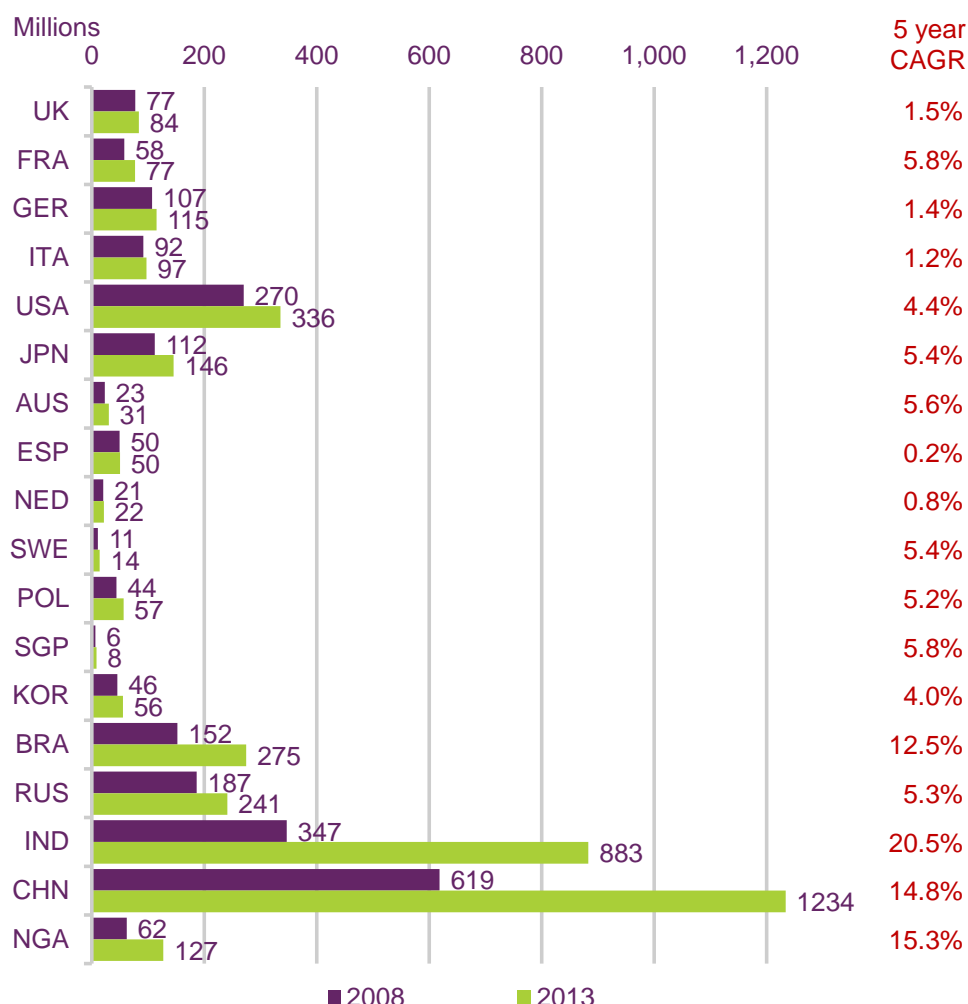
Sources: IHS / industry data / Ofcom
 Note: Includes SMS and MMS messages.

The number of mobile connections increased in all of our comparator countries in the five years to 2013

The total number of mobile connections increased by an annual average rate of 11.0% to 3.9bn across our comparator countries between 2008 and 2013 (Figure 6.36). The average annual increase was highest in the the BRIC countries and Nigeria over the five-year period, with India leading at 20.5% a year, followed by Nigeria (up 15.3% a year), China (up 14.8% a year) and Brazil (up 12.5% a year). In the non-BRIC countries, the increase was much slower in the five years to 2013, as these countries tend to have more mature markets. France and Singapore had the highest average growth, both at 5.8% a year, and Spain had the lowest average increase, at 0.2% a year between 2008 and 2013. The increase in mobile connection figures slowed down over the five-year period, and two countries saw a decrease in 2013: Spain (down 1.0%) and the Netherlands (down 0.8%). In the UK, total mobile connections increased by an annual average rate of 1.5% in the five years to 2013.

China had the highest total number of mobile connections, at 1.2 billion, followed by India, at 883 million. As shown in Figure 6.62, both countries had relatively low mobile penetration in 2013, at 91 and 71 connections per 100 people respectively. In the EU comparator countries, Germany had the highest number of mobile connections in 2013, at 115 million, followed by Italy at 97 million, and the UK at 84 million.

Figure 6.36 Mobile connections: 2008 and 2013



Sources: IHS / industry data / Ofcom

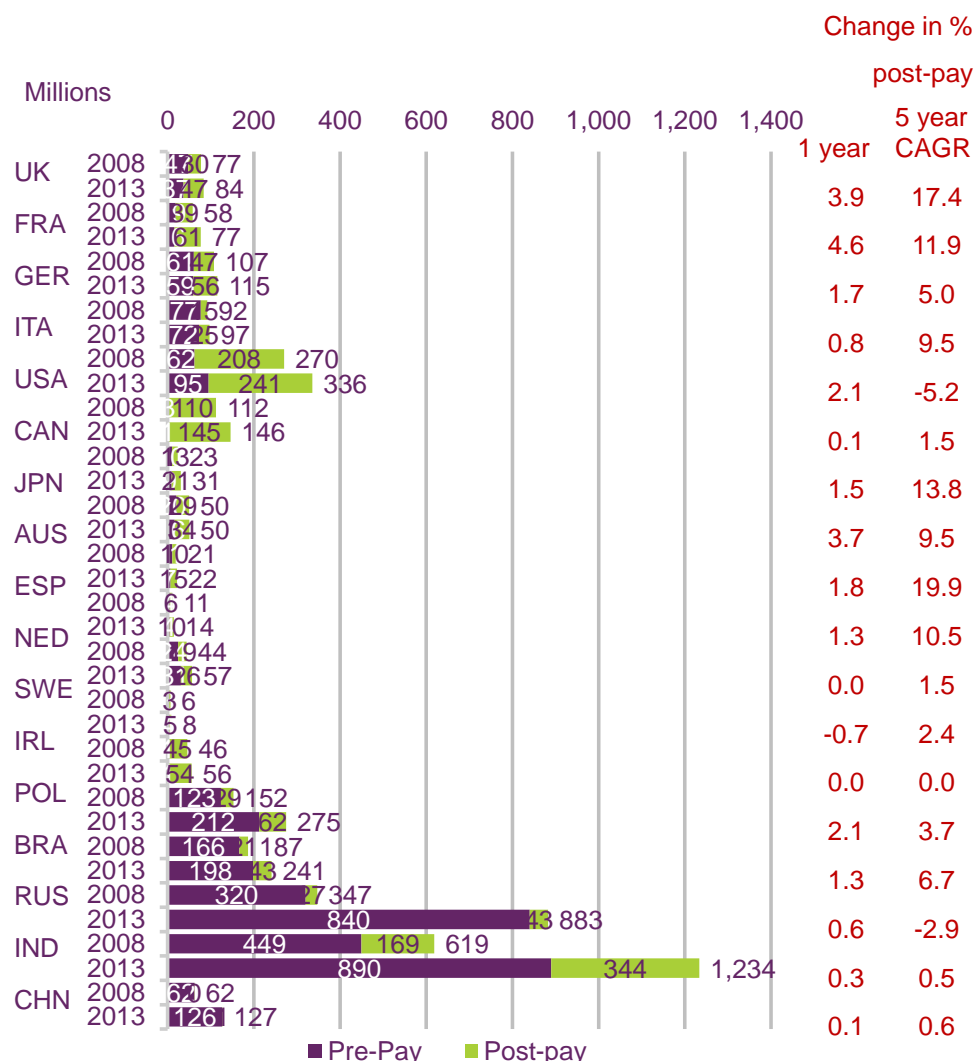
The proportion of mobile connections that were post-pay decreased in the US and China in the five years to 2013

The total number of post-pay mobile connections increased by an average annual rate of 8.5% across our comparator countries in the five years to 2013, while the total number of pre-pay connections increased by an average rate of 12.3% a year over the same period (Figure 6.37). The proportion of mobile connections that were post-pay was 32.0% across our comparator countries in 2013, a four percentage point decrease since 2008.

The proportion of mobile connections that were pre-pay was highest in Nigeria, at 99.1% in 2013, followed by India, at 95.1%. Outside the BRIC countries, the pre-pay mobile proportion was highest in Italy, at 74.5% in 2013. The proportion of connections that were post-pay was highest in Japan, at 99.3% in 2013, followed by South Korea, at 97.9%. In the UK, the

proportion of mobile connections that were post-pay increased by 4pp to 56.1% in 2013 and by 17pp in the five years to 2013.

Figure 6.37 Mobile connections, by type: 2008 and 2013



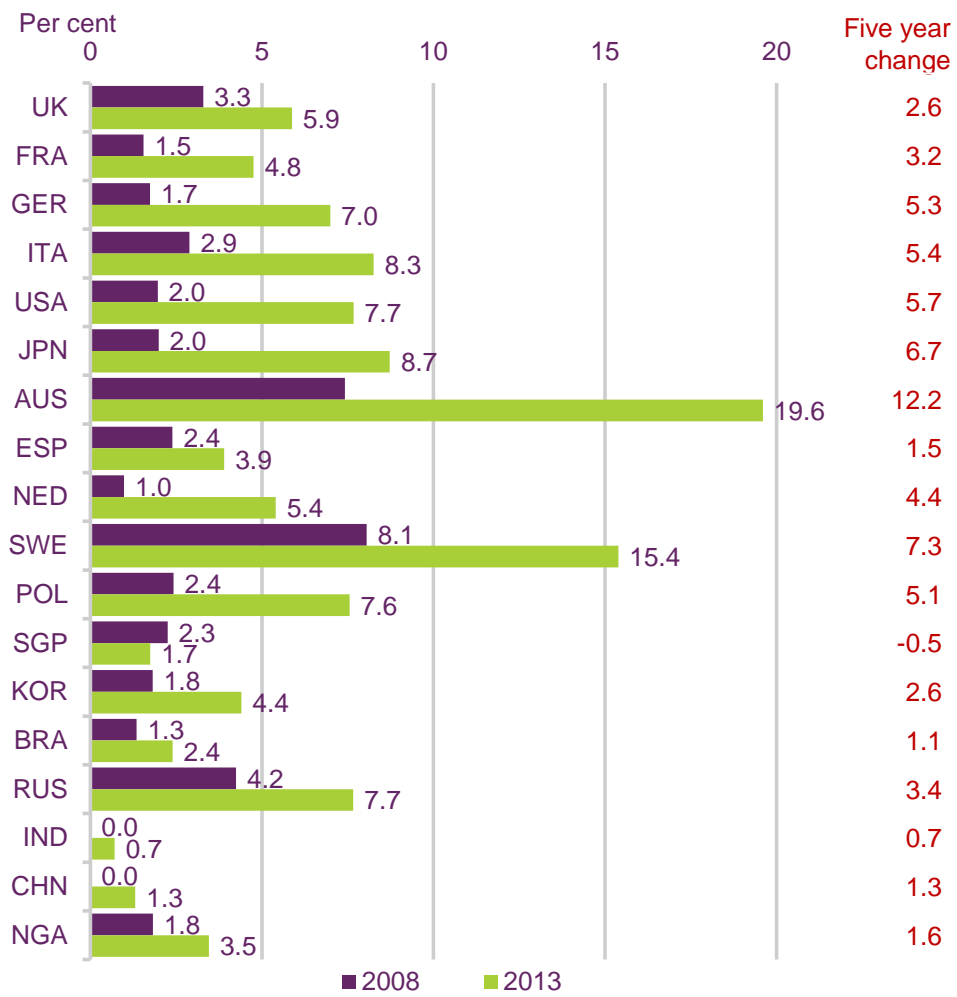
Sources: IHS / industry data / Ofcom

Australia had the highest proportion of mobile connections that were dedicated data connections in 2013

The total number of dedicated data-only mobile broadband connections (such as dongles and data-only SIMs) increased by an annual average rate of 32.5% to 133 million across our comparator countries in the five years to 2013 (Figure 6.38). The proportion of total mobile connections that were dedicated mobile broadband connections increased from 1.4% in 2008 to 3.5% in 2013 across the comparator countries.

The proportion of data-only connections was highest in Australia, at 19.6% in 2013, followed by Sweden at 15.4%. These were also the two countries with the largest increase in this proportion between 2008 and 2013: Australia, with a 12.2 percentage point increase and Sweden with a 7.3 pp increase. Singapore was the only comparator country in which the proportion of mobile connections that were data-only decreased over the five-year period; down by 0.5 pp to 1.7%. In the UK the proportion of dedicated mobile broadband connections increased by 2.6 percentage points to 5.9% in the five years to 2013.

Figure 6.38 Dedicated mobile broadband as a proportion of total mobile connections: 2008 and 2013



Sources: IHS / industry data / Ofcom

6.3 The telecoms user

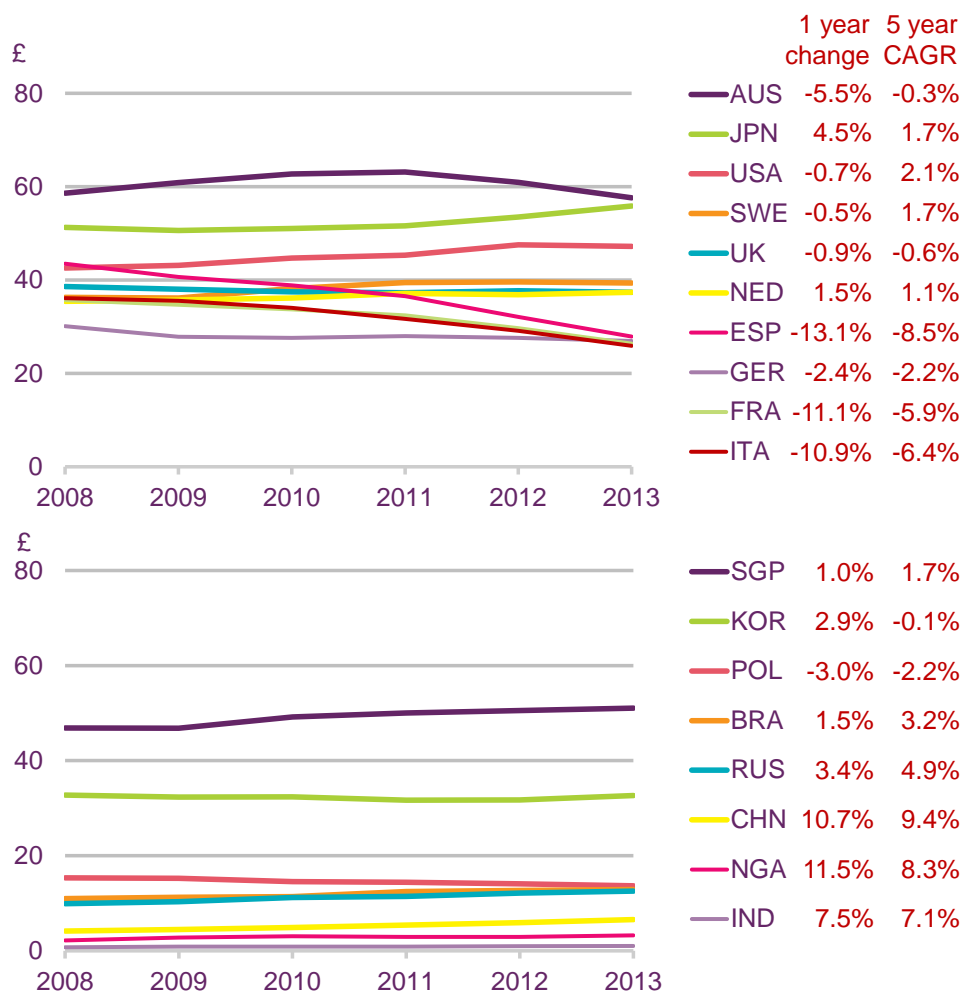
6.3.1 Overview

Per-capita UK telecoms revenue fell by 0.6% a year in the five years to 2013

Average monthly telecoms spend per head showed significant variation among our comparator countries in 2013, ranging from £1 per person in India to £58 per person in Australia (Figure 6.39). Average spend declined in nine of our 18 comparator countries during the year, including the UK where it fell by 0.9% to £37 per person per month, this being the sixth highest average telecoms spend among the countries included in the analysis.

The largest percentage fall in per-capita telecoms spend during 2013 was a 13.1% drop, to £28 per month, in Spain (which is partly related to the continued effect of the economic downturn), while the highest rate of growth was an 11.5% increase (to £3 per month) in Nigeria, which was largely due to the growing use of mobile services. Spain had the largest average annual fall in average per-capita spend in the five years to 2013 (down by 8.5% a year), while the largest average increase over the period was in China, at 9.4% (in the UK, per-capita spend fell by an average of 0.6% a year in the five years to 2013).

Figure 6.39 Per-capita monthly telecoms service revenue: 2008 to 2013



Source: IHS / industry data / Ofcom

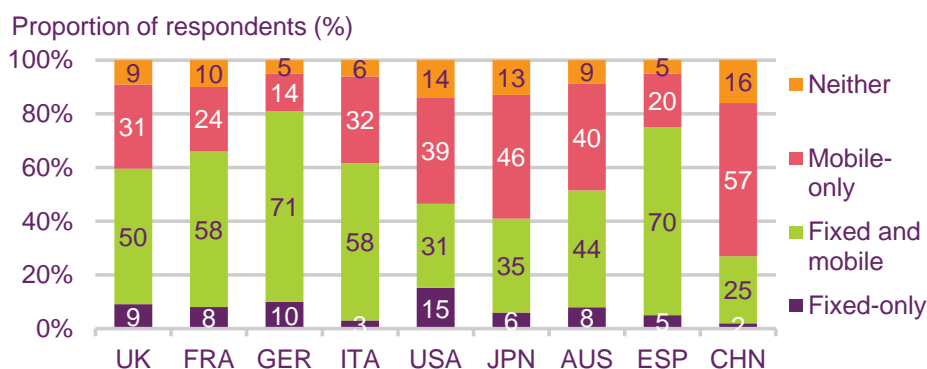
Note: Includes spend by businesses, and is therefore not representative of average consumer spend.

Over half of respondents in Japan and the US are not regular users of landline services

As shown in Figure 6.40, in three of the countries where our consumer research took place (China, Japan and the US), less than half of respondents claimed to use a landline phone (either 'fixed-only', or 'fixed and mobile') at least once a week. In China¹¹², the proportion was 27%, compared to 81% in Germany, where landline use was highest (in the UK, the figure was 60%).

The proportion of respondents who regularly used mobile services (either 'mobile-only', or 'fixed and mobile') was lowest in the US, at 70%, and highest in Italy (91%) and Spain (90%), while the percentage of respondents who said that they were regular users of both fixed and mobile telephony ranged from 25% in China to 71% in Germany (in the UK it was 50%). China (16%), the US (14%) and Japan (13%) had the highest proportion of respondents who indicated that they used neither a landline nor a mobile phone; this figure was 10% or lower in the remaining countries.

Figure 6.40 Regular use of fixed and mobile telephony services



Source: Ofcom consumer research October 2014

Base: All respondents, UK=1011, FRA=1027, GER=1006, ITA=1006, USA=1000, JPN=1003, AUS=1000, ESP=1002, CHN=1010.

Q6. Which of the following do you regularly do (at least once a week)?

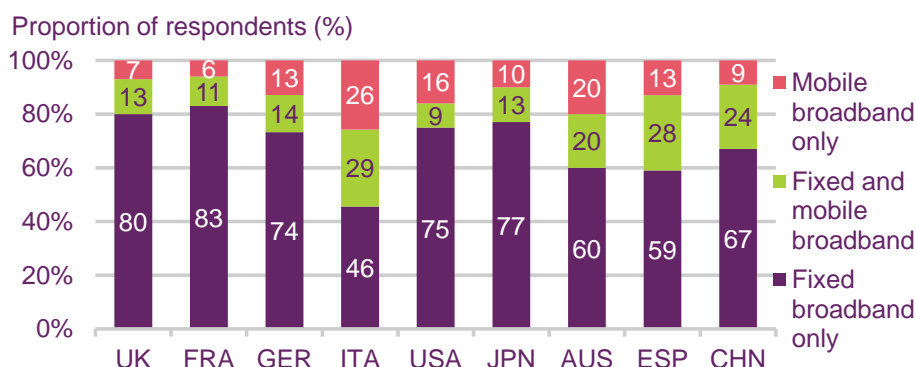
Over half of internet households in Italy use dedicated mobile data services

Italy was the only one of the nine comparator countries where less than half of internet users lived in a household that solely used fixed broadband services (Figure 6.41). In Italy, 55% of internet users said that their household used dedicated mobile broadband services (i.e. through a dongle or data-only SIM); in France and Spain the figures were 17% and 41%, and in the UK this figure was towards the lower end of the scale, at 20%.

The proportion of internet users who lived in a household with a fixed broadband connection ranged from 75% in Italy to 94% in France, while the proportion living in a household which used mobile broadband only was lowest in France (at 6%) and highest in Italy (at 26%). The UK level was similar to France; 93% of internet users said they had a fixed broadband connection, and 7% said they only used a dedicated mobile broadband connection.

¹¹² As internet penetration is low in China (around 46%, and centred in the cities), the people responding to our online survey are likely to be early adopters of new technology, and do not closely represent China's 1.4 billion inhabitants. Further information on our online market research methodology is presented in Appendix A: Consumer research methodology and a perspective on the results of our market research in China can be found in Appendix C: A perspective on China.

Figure 6.41 Household take-up of fixed and dedicated mobile broadband data connections



Source: Ofcom consumer research October 2014

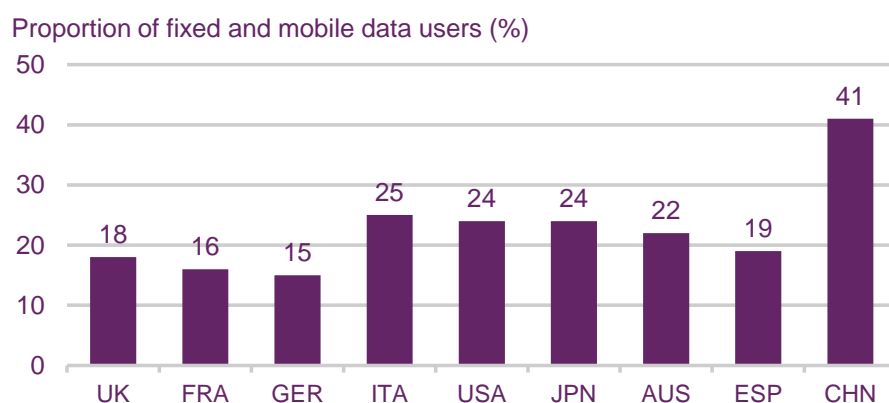
Base: All respondents with broadband, UK=929, FRA=945, GER=844, ITA=877, USA=747, JPN=737, AUS=910, ESP=903, CHN=923.

Q3b. Which of the following services do you have in your home?

Over four in ten internet users in China make VoIP calls at least once a week

Across our comparator countries, people in China were the most likely to say they made VoIP calls at least once a week, with 41% of fixed and mobile data users claiming to do this (Figure 6.42). However, this figure should be treated with caution as the research was conducted online. Among the other eight countries in which the research took place, the proportion who said that they used VoIP services at least once a week ranged from 15% in Germany to 25% in Italy. It should be noted that these figures may be understated in countries such as France, Germany, the US and Japan, where the use of managed VoIP services is comparatively high, as consumers may not be aware that they are using VoIP (further information regarding the use of managed VoIP can be found in Section 6.1.4 of this report). In the UK, 18% said that they used VoIP services at least once a week.

Figure 6.42 Proportion of respondents using VoIP services at least once a week



Source: Ofcom consumer research October 2014

Base: All respondents with mobile broadband internet access or those who access the internet access via a mobile handset, UK=339, FRA=361, GER=383, ITA=662, USA=284, JPN=250, AUS=464, ESP=620, CHN=568

Q.27 How often, if at all, do you use your main mobile phone to do each of the following?

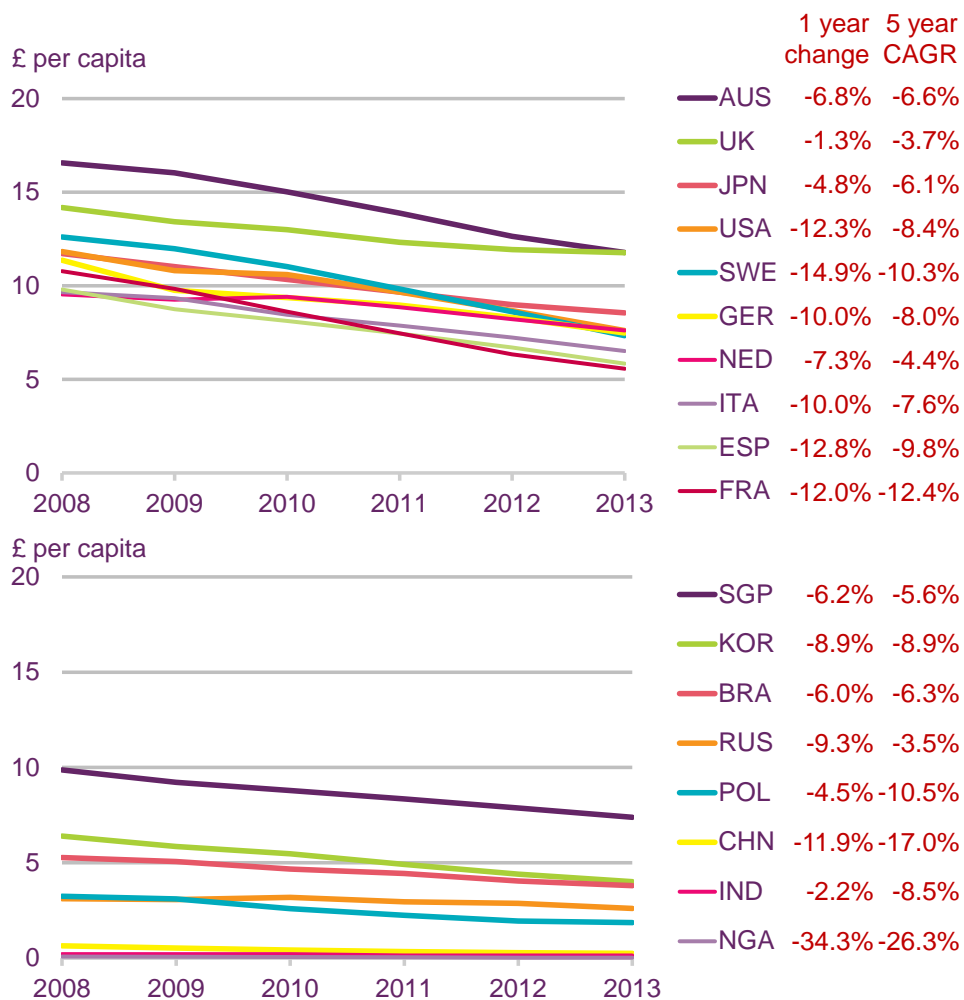
6.3.2 Fixed voice services

The UK had the second highest average spend on fixed voice services among our comparator countries in 2013

Although Australia experienced a 6.8% fall in average per-capita spend on fixed voice services (including managed VoIP) in 2013, it continued to have the highest average fixed voice spend per person among our comparator countries during the year, at £11.78 per month (Figure 6.43). The UK had the second highest average spend on fixed voice services, at £11.77 per person per month, and the gap between Australia and the UK narrowed significantly between 2012 and 2013. Average monthly fixed voice spend was lowest in Nigeria in 2013, at just £0.02 per person; this is because fixed voice service availability and take-up are low (there were just 0.2 fixed lines per 100 people in Nigeria at the end of 2013).

Per-capita monthly fixed voice spend declined in all of our comparator countries in 2013, ranging from a 1.3% drop in the UK to a 34.3% fall in Nigeria. Per-capita monthly fixed voice spend fell in all countries over the five-year period; the largest decline, again, was in Nigeria at 26.3% a year (in the UK it fell by an average of 3.7% a year, the second lowest rate of decline over the period after Russia, at 3.5%).

Figure 6.43 Average monthly per-capita fixed voice revenue: 2008 to 2013



Source: IHS / industry data / Ofcom
 Note: Includes managed VoIP revenues.

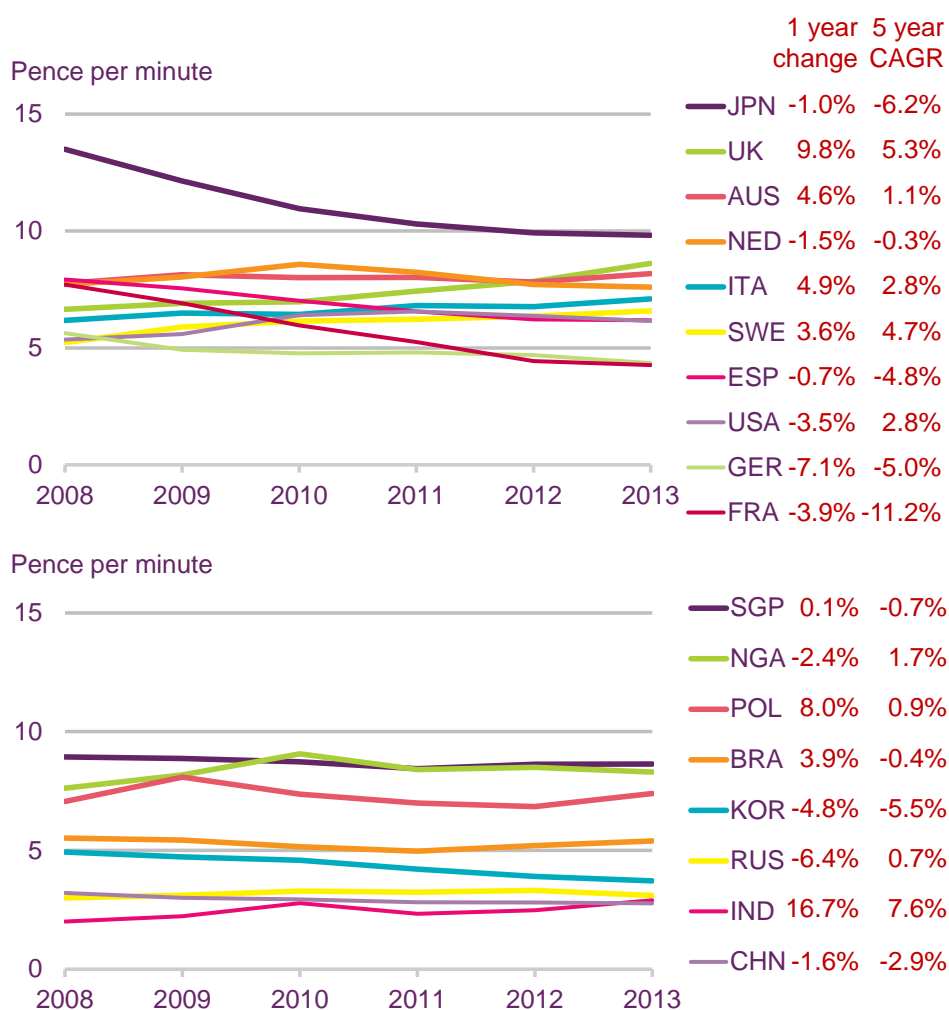
The average price of a fixed voice call minute was highest in Japan in 2013

We can calculate the average price of a fixed voice call minute by dividing total fixed voice revenues (including the line rental fee) by the number of call minutes originated on fixed networks. It should be noted that the average call price figures below will be slightly understated where a bundled allowance of fixed calls is included in the monthly fee of another communications service (for example, fixed broadband) as none of that revenue is allocated to fixed voice services.

The UK had the second highest average price for an outgoing fixed voice call minute among our comparator countries in 2013, at 8.6 pence per minute (this was highest in Japan, at 9.8 pence per minute). The UK average price per minute in 2013 increased by 0.8 pence (9.8%) compared to 2012, whereas in Japan it fell by 0.1 pence per minute (1.0%) during the year (Figure 6.44). In eight of our 18 comparator countries (the UK, Australia, Italy, Sweden, Singapore, Poland, Brazil and India) the average price of a fixed voice call minute increased in 2013. This increase was most marked in India (the only country where the average price of a call minute was rose more steeply than in the UK in 2013) at 16.7%. The highest rate of decline in the price of a fixed call minute in 2013 was in Germany, which experienced a 7.1% decrease in the average cost of a fixed voice call, to 4.4 pence per minute, during the year.

The steepest rate of decline in fixed voice prices between 2008 and 2013 was in France, where the cost of a fixed call minute fell by an average of 11.2% per year as a result of the availability of low-cost bundled VoIP-based fixed telephony services. The average cost per minute of a fixed voice call increased at an average rate of 5.3% per year between 2008 and 2013 in the UK; this was the second-highest average increase among our comparator countries, after India (7.6%). Further information on communications service pricing can be found in Section 2 of this report.

Figure 6.44 Average price of a fixed voice call minute: 2008 to 2013



Source: IHS / industry data / Ofcom

Note: Includes managed VoIP call; figures for USA and CHN include incoming calls.

Japan had the only increase in average per-capita monthly fixed voice call minutes between 2008 and 2013

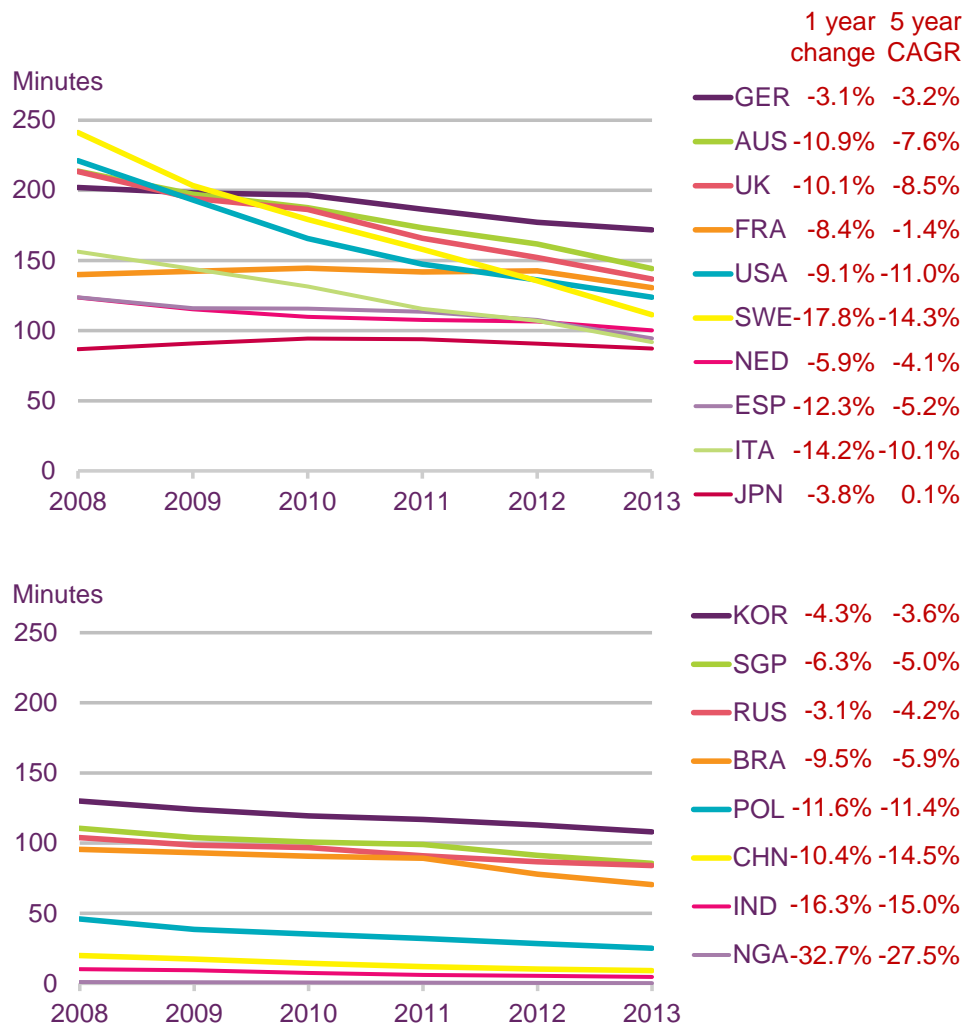
Japan was the only comparator country where the average number of outgoing fixed voice call minutes per person increased between 2008 and 2013, growing by an average of just 0.1% a year to 87 minutes per person per month (Figure 6.45). This increase was despite average outbound fixed call minutes per person having been in decline since 2010, offsetting the increases recorded between 2008 and 2010.

The average volume of outgoing fixed-line calls per person was lowest in Nigeria, where fixed voice service use is low, at 0.2 minutes per month in 2013. Conversely, the highest average for outgoing fixed voice call minutes was in Germany (where fixed voice calls are comparatively cheap compared to mobile calls) at 172 minutes per month (in the UK, the average was 137 minutes per person per month, the third highest figure after Germany and Australia). Average per-capita fixed call use in the UK in 2013 was 10.1% lower than the 152 minutes per person per month figure for 2012, and 36.0% lower than the 213 minute average recorded in 2008.

France had the smallest average annual decline in per-capita fixed call volumes between 2008 and 2013, at just 1.4%. Nigeria had the largest average annual decline over the period,

at 27.5%, mainly due to the growing use of mobile voice services. It is important to note that average monthly fixed call use per person did not exceed one minute per month in Nigeria between 2008 and 2013, and the large percentage decrease in average use over this period relates to a very small decrease in actual terms (an average decrease of less than 0.8 minutes per person per month).

Figure 6.45 Per capita monthly fixed voice call minutes: 2008 to 2013



Source: IHS / industry data / Ofcom

Note: Includes managed VoIP calls; figures for USA and CHN include incoming calls.

Over a quarter of internet users in Japan have a home phone that is not used regularly

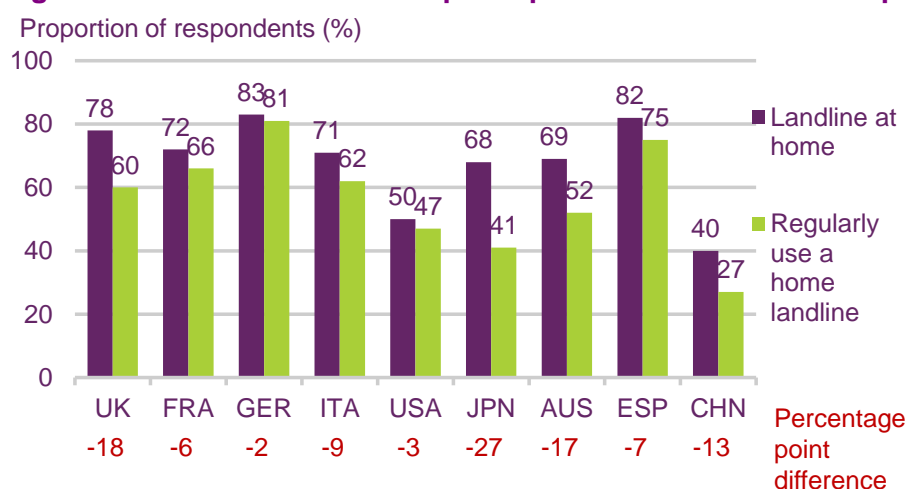
A landline is often required in order to be able to buy fixed broadband services, meaning that consumers may purchase a landline service that they do not use, or use infrequently, in order to be able to have fixed broadband. In the UK, Virgin Media (which offers cable broadband services to just under half of UK premises) is the only major ISP to offer a fixed broadband without the requirement for a fixed line, whereas in some countries (such as France and the Netherlands) naked DSL and fibre services (which do not require a landline of any description) are available.

Our research asked consumers in nine countries whether they were regular users of fixed telephony services at home and whether they had a landline at home, to try to gain an idea

of the extent to which consumers are purchasing landline services in order to be able to use fixed broadband (Figure 6.46).

The proportion of internet users who had a home landline ranged from 40% in China to 83% in Germany among the nine comparator countries in which the research took place (in the UK, the proportion was at the higher end of this range, at 78%). Similarly, the proportion of internet users who were regular users of landline services at home (i.e. they used them at least once a week) ranged from 27% in China to 81% in Germany (in the UK it was 60%). Japan had the largest difference (27pp) between the proportion of people who had a home landline and used it regularly), while the UK also had a fairly wide difference (18pp). The smallest difference was in Germany, at just two percentage points, implying that a large majority of those who had a landline used it at least once a week.

Figure 6.46 Household take-up and personal use of fixed telephony services



Source: Ofcom consumer research October 2014

Base: All respondents, UK=1011, FRA=1027, GER=1006, ITA=1006, USA=1000, JPN=1003, AUS=1000, ESP=1002, CHN=1010.

Q3b. Which of the following SERVICES do you have in your home? Q9a. Which, if any, of the following internet activities do you use each of your devices for?

Almost all comparator countries saw a decrease in the number of fixed voice connections per 100 people between 2008 and 2013

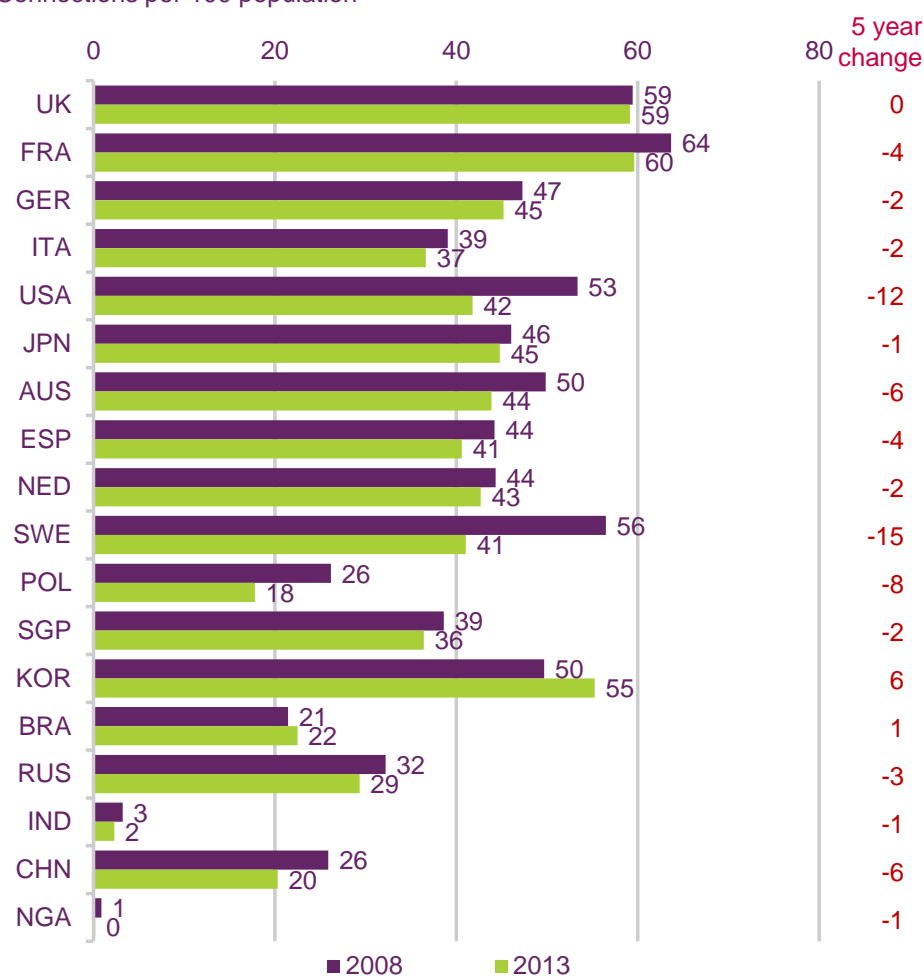
France and the UK had the largest number of fixed voice connections per 100 people (including PSTN lines and managed VoIP connections) at the end of 2013, at 60 and 59 respectively. In the UK, this figure was unchanged from five years previously, while in France it represented a fall of four connections per 100 (Figure 6.47). Nigeria and India had the lowest take-up of fixed voice services at the end of 2013, at less than one and two connections per 100 people respectively. This is due to the lower availability of fixed telecoms infrastructure in these countries.

All of our comparator countries apart from South Korea and Brazil (where take-up increased by one and six connections per 100 people respectively) saw a fall in the number of fixed voice connections per 100 people in the five years to 2013. These falls are related to growing mobile voice use in most countries, along with increasing use of other forms of communication, such as email, mobile messaging, instant messaging, VoIP and social networking, as well as increased take-up and use of mobile phones (including smartphones).

Sweden had the largest decrease in per-capita fixed voice between 2008 and 2013, with the number of fixed voice connections falling by 15 per 100 people to 41 during this period, as a result of high levels of mobile voice and data use. This decline was much greater than those recorded in our other comparator countries, among most of which the fall was less than five connections per 100 people during this period.

Figure 6.47 Fixed voice connections per 100 population: 2008 and 2013

Connections per 100 population



Source: IHS / industry data / Ofcom

Note: Includes managed VoIP connections

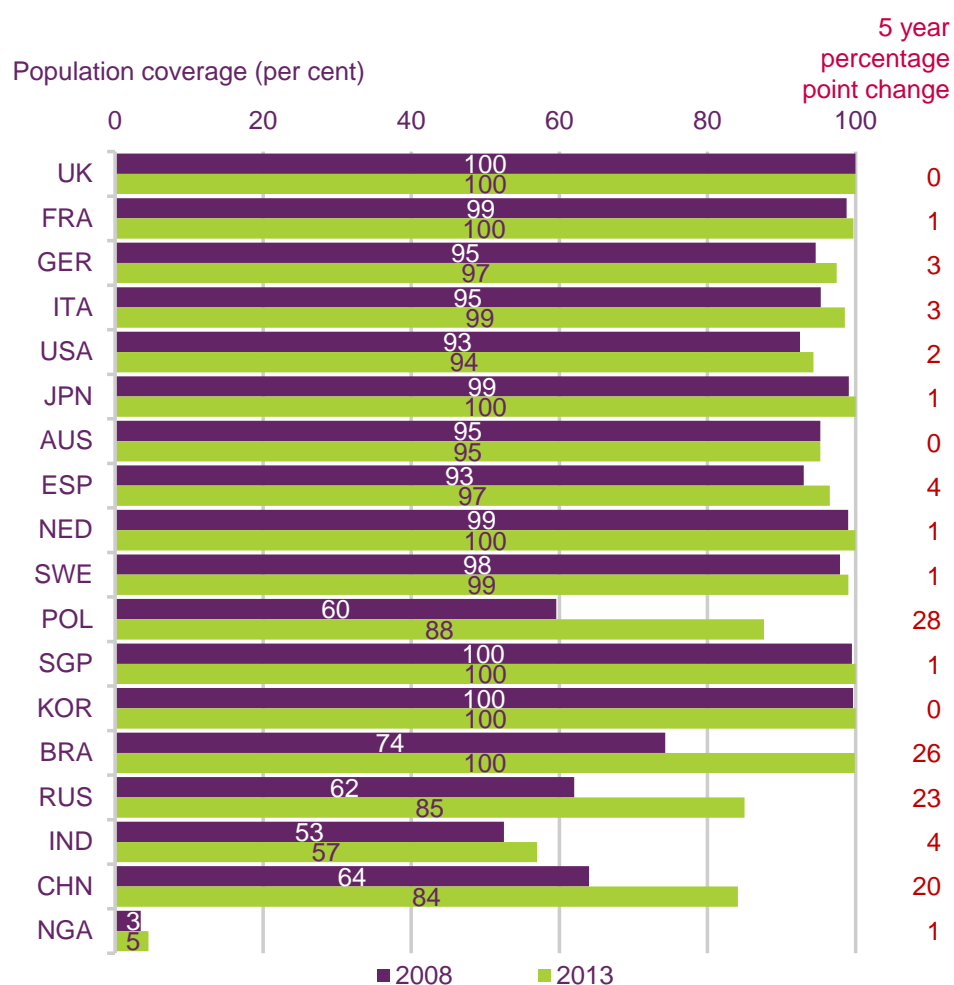
6.3.3 Fixed broadband services

Most comparator countries had over 95% fixed broadband population coverage in 2013

In almost all of our comparator countries most of the population were able to access fixed broadband services by the end of 2013. The exception was Nigeria, where just 5% of the population could do this (Figure 6.48). In the UK, ADSL fixed broadband services have been available to almost all of the population for a number of years, and in other comparator countries, including France, Japan, the Netherlands, Singapore, South Korea and Brazil, fixed broadband services were available to over 99% of the population by the end of 2013.

There were significant increases in the availability of fixed broadband services in Poland, Brazil, Russia and China between 2008 to 2013, and in all of these countries the proportion of people living in areas where fixed broadband services were available increased by over 20 percentage points during this period. Poland had the largest increase in the five years to 2013, at 28 percentage points, with fixed broadband availability standing at 88% of the population by the end of this period.

Figure 6.48 Fixed broadband availability: 2008 and 2013



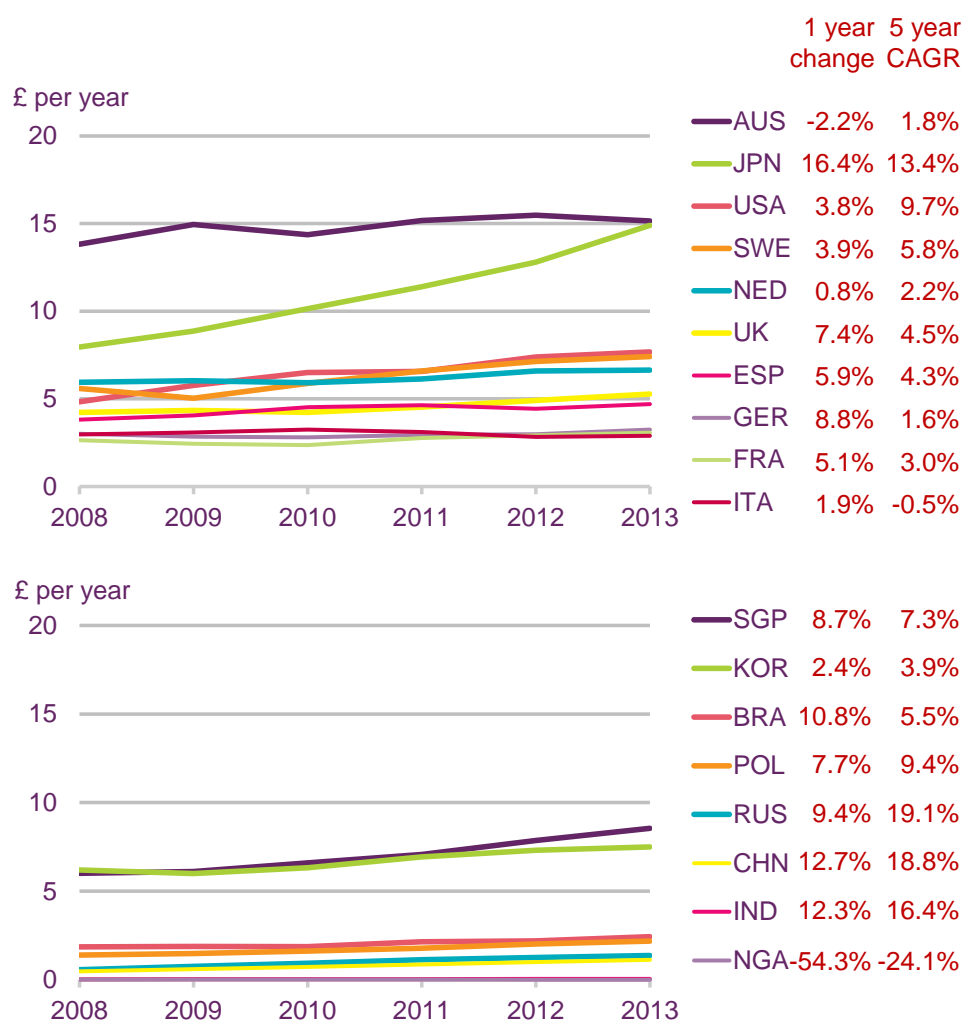
Source: IHS / industry data / Ofcom

Russia had the highest average annual increase in per-capita fixed broadband revenue between 2008 and 2013

Average per-capita monthly fixed broadband spend (which is calculated using the total population as a base, rather than broadband population or households) was highest in Australia at £15 per person in 2013, and lowest in Nigeria (where fixed broadband availability and take-up are both low) at less than one pence per person. In the UK it was £5 per person in 2013, the eighth highest average spend among our comparator countries (Figure 6.49).

Between 2008 and 2013, per-capita monthly expenditure on fixed broadband services increased in all of our comparator countries except Italy and Nigeria (where it fell by 0.5% and 24.1% respectively). Russia recorded the largest increase in average fixed broadband spend per person over this period, with an average annual growth rate of 19.1%, which was mainly due to rapid growth in the number of fixed broadband connections. The smallest average annual increase between 2008 and 2013 was in Germany at 1.6%, mainly because the German fixed broadband market was already comparatively mature in 2008, and due to reduced average revenue per connection. In the UK, the increase averaged by 4.5% a year during this period, as a result of growing fixed broadband take-up, and consumers migrating to faster services.

Figure 6.49 Average per-capita fixed broadband revenue: 2008 to 2013



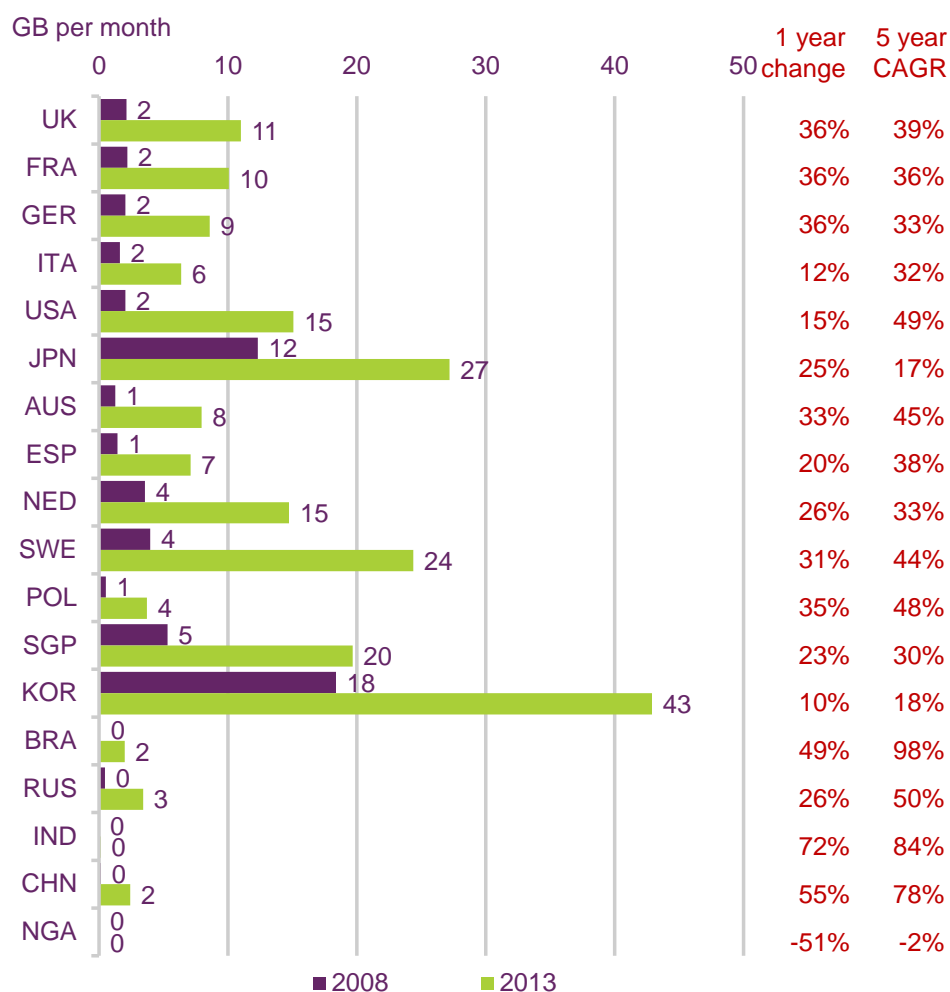
Source: IHS / industry data / Ofcom

Average monthly fixed broadband data volumes per person increased in all comparator countries between 2008 and 2013

South Korea had the highest average monthly per-capita fixed broadband data use in 2013, at 43GB per person, followed by Japan at 27GB per person, both of which were more than double the 11GB average monthly average in the UK during the year (Figure 6.50). The lowest levels of average monthly fixed broadband data use per person were found in Nigeria (at less than 0.1GB per person) and India (0.1GB per person), where lower average use is related to low fixed broadband availability and take-up.

There was a large increase in average fixed broadband data use per person in most comparator countries in the five years to 2013, in part driven by growing use of video-on-demand (VoD) services along with increasing connection speeds. Among our comparator countries, the average annual change in fixed broadband data use per person between 2008 and 2013 ranged from a 2% a year fall in Nigeria (where use is very low) to a 98% annual increase in Brazil (where average monthly fixed broadband data use per person was just 0.1GB per month in 2008). In the UK, where most public service broadcasters provide an online catch-up or VoD service, and commercial video streaming services such as Netflix and Amazon Instant Video have proved to be popular, average data use per person increased by an average of 39% a year in the five years to 2013.

Figure 6.50 Average monthly fixed broadband data volume per person: 2008 and 2013



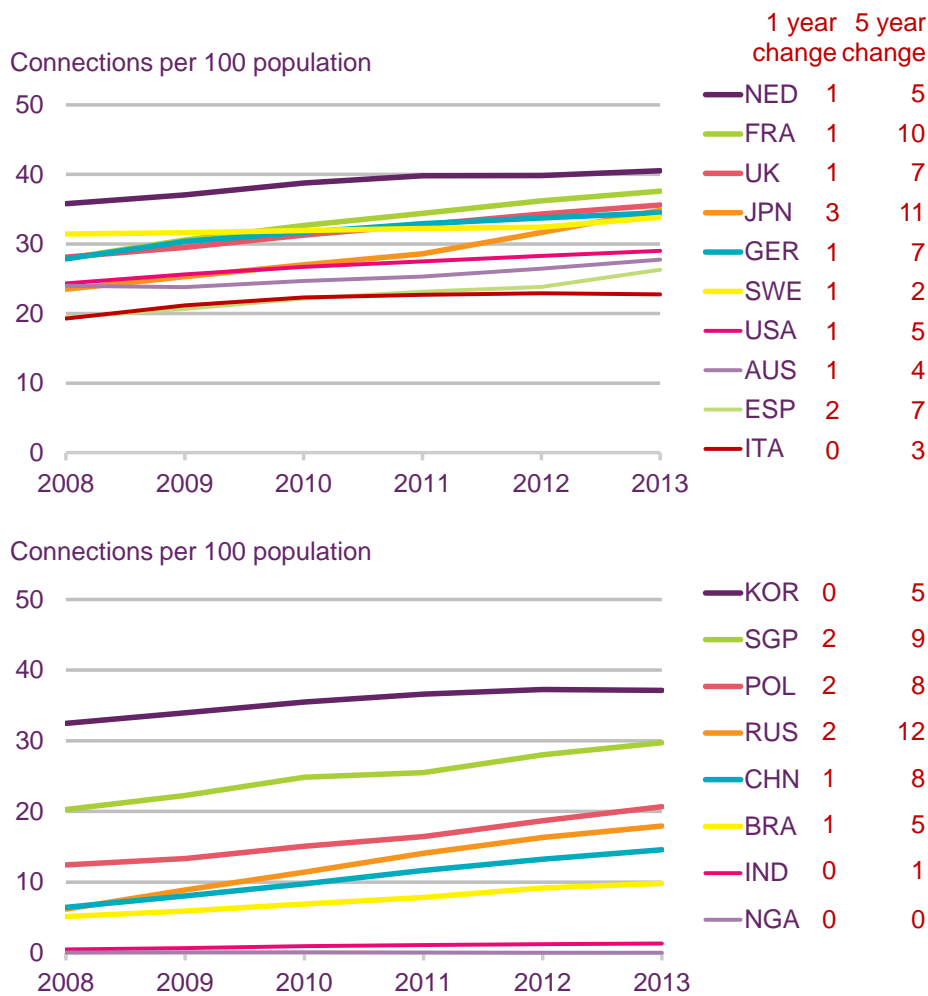
Source: IHS / industry data / Ofcom

Russia had the largest increase in the number of fixed broadband connections per 100 people in the five-year period to 2013

The number of fixed broadband connections ranged from less than one per 100 people in Nigeria to 41 per 100 people in the Netherlands among our 18 comparator countries in 2013 (Figure 6.51). The comparatively low take-up in Nigeria is a result of the low availability of fixed broadband services, while in the Netherlands fixed broadband take-up has been the highest among our comparator countries for some time, partly as a result of high cable coverage and take-up.

The UK had 36 fixed broadband connections per 100 people at the end of 2013, the fourth highest figure after the Netherlands, France and South Korea. Russia had the largest increase in the number of fixed broadband connections per 100 people among our comparator countries between 2008 and 2013, up by 12 connections per 100 people to 18 connections per 100 people. The increase was lowest in Nigeria, at less than one connection per 100 people (in the UK take-up increased by seven connections per 100 people over the period).

Figure 6.51 Fixed broadband connections per 100 population: 2008 to 2013



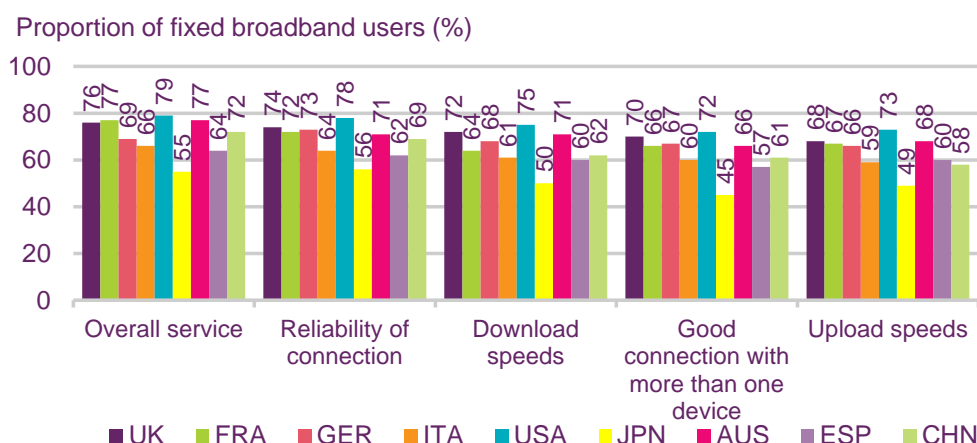
Source: IHS / industry data / Ofcom

Over three-quarters of UK fixed broadband users are satisfied with their service

Figure 6.52 shows the proportion of fixed broadband users in nine of our comparator countries who said that they were either ‘very’ or ‘fairly’ satisfied with various aspects of their service.

The US scored highest for all five of the aspects shown below; 79% of fixed broadband users were satisfied with their overall service, although this figure was at a similar level to France and Australia (both 77%) and the UK (76%). Japan scored lowest for all five aspects, with just 55% of users being satisfied with their service overall, and less than half of users being satisfied with the performance of their connection when using more than one device, and upload speeds.

Figure 6.52 Satisfaction with fixed broadband service



Source: Ofcom consumer research October 2014

Base: All respondents with fixed broadband, UK=861, FRA=885, GER=738, ITA=640, USA=638, JPN=664, AUS=727, ESP=785, CHN=843

Q.30 To what extent are you satisfied or dissatisfied with the following aspects of your current home broadband service?

6.3.4 Mobile voice and data services

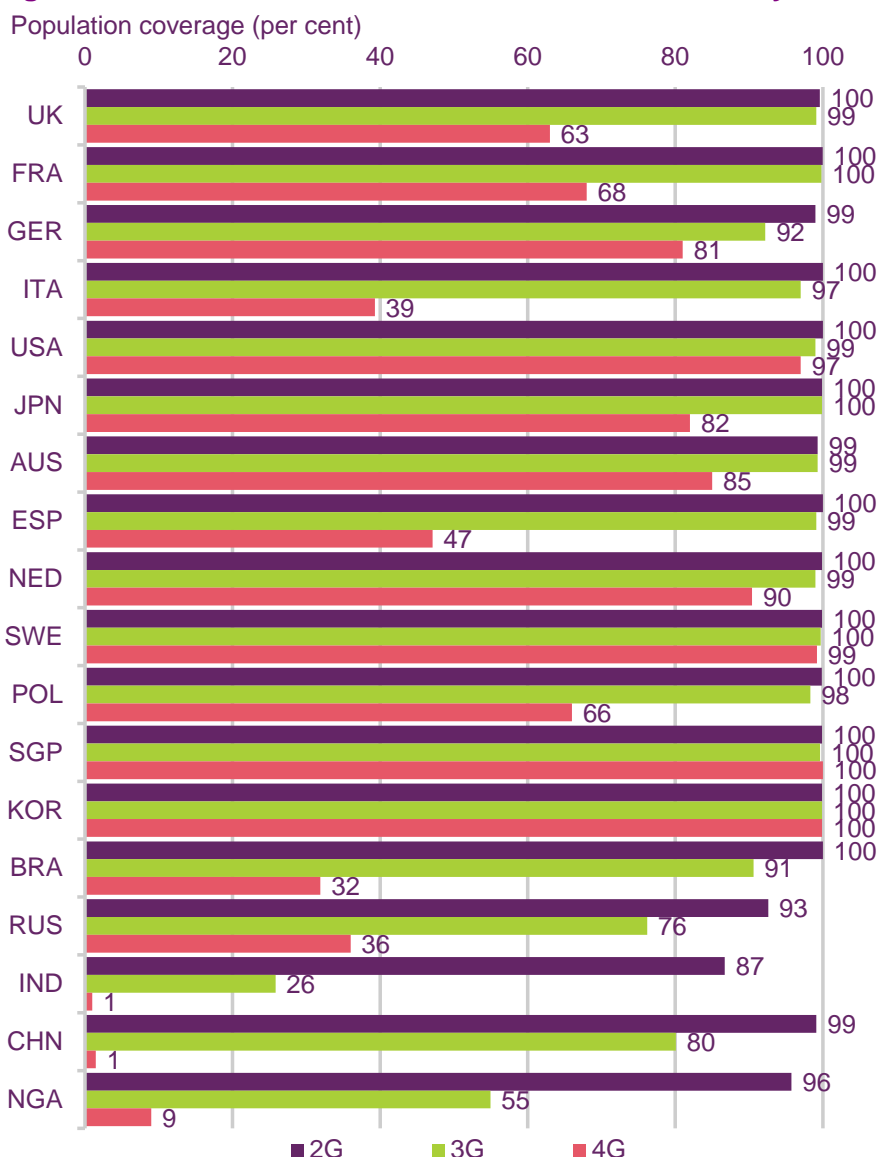
South Korea and Singapore had the highest 4G availability at the end of 2013

According to data provided by IHS, there were only three comparator countries where no mobile technology had 99% or higher population coverage in 2013: India, Russia and Nigeria, with 87%, 93% and 96% 2G mobile coverage at the end of the year (Figure 6.53).

Third-generation (3G) mobile population coverage was also high in most countries, and was 95% or higher in all of our countries except Germany (92%), Brazil (91%), China (80%), Russia (76%), Nigeria (55%) and India (26%), by the end of the year. 3G coverage is comparatively low in Germany because each 3G licence holder has an obligation to cover only 50% of the population, and there is no guidance regarding network overlap. In all the other countries studied, except Brazil, 3G population coverage was very low in 2008.

As 4G long term evolution (LTE) mobile services are still being deployed in many countries, the variation in population coverage was much larger than for 2G and 3G services, ranging from 1% availability in India and China to 100% in Singapore and South Korea (in the UK it was 63%). Further information on 4G services can be found in Section 1.4.

Figure 6.53 2G, 3G and LTE mobile network availability: end 2013



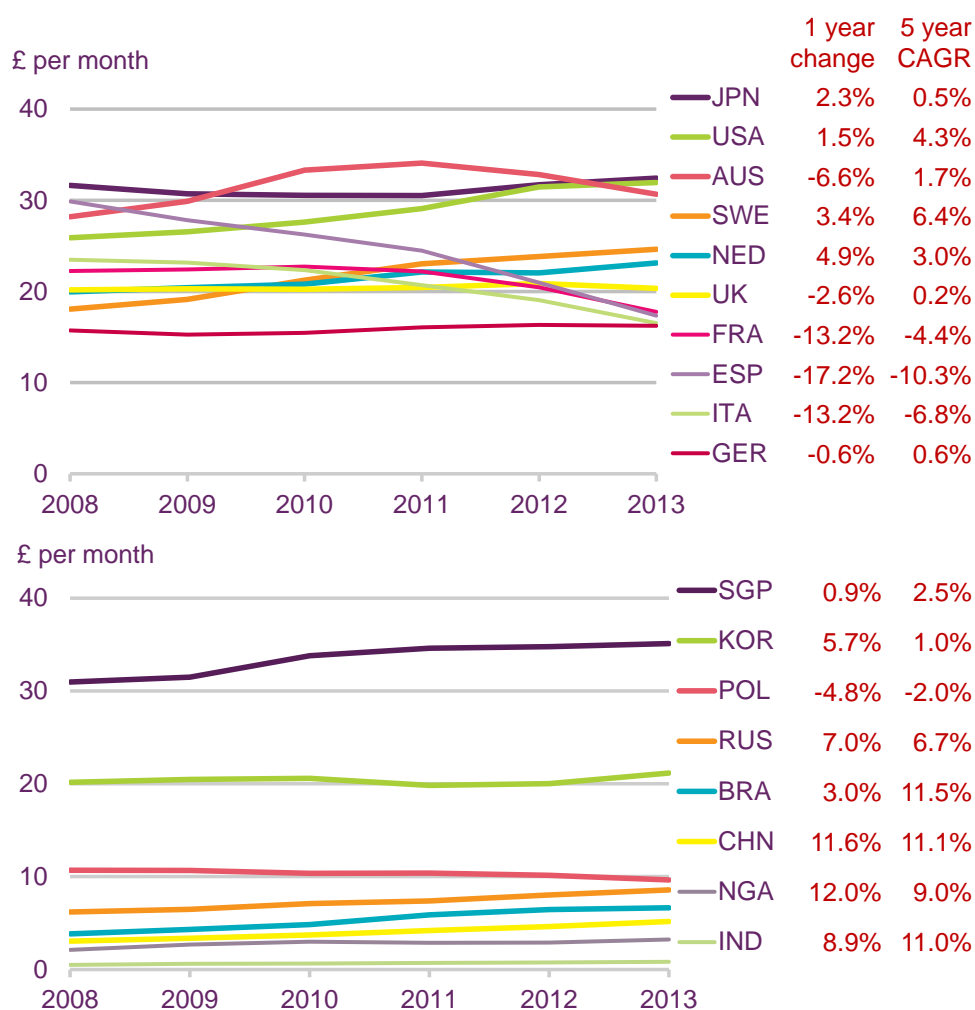
Source: IHS / industry data / Ofcom

Average per-capita mobile spend fell in over a third of our comparator countries in 2013

Per-capita spend on mobile services ranged from less than £1 per month in India to £35 per month in Singapore among our comparator countries in 2013 (in the UK it was £20, the eighth highest figure among our countries).

The UK was one of seven comparator countries where average monthly spend per person on mobile services fell in 2013 (Figure 6.54). This was mainly due to a decrease in out-of-bundle SMS messaging volumes and revenues (which were partially offset by increasing revenues from mobile internet services as a result of growing smartphone take-up). Among those countries where average mobile spend fell in 2013, the decline ranged from a 0.6% fall (to £16 per person per month in Germany), to a 17.2% fall (to £17 per person per month in Spain). In the UK, average spend fell by 2.6% during the year. The largest average annual increases in spend in the five years to 2013 were found in the BRIC countries (where spend was lowest in 2013).

Figure 6.54 Average per-capita monthly retail mobile revenue: 2008 to 2013



Source: IHS / industry data / Ofcom

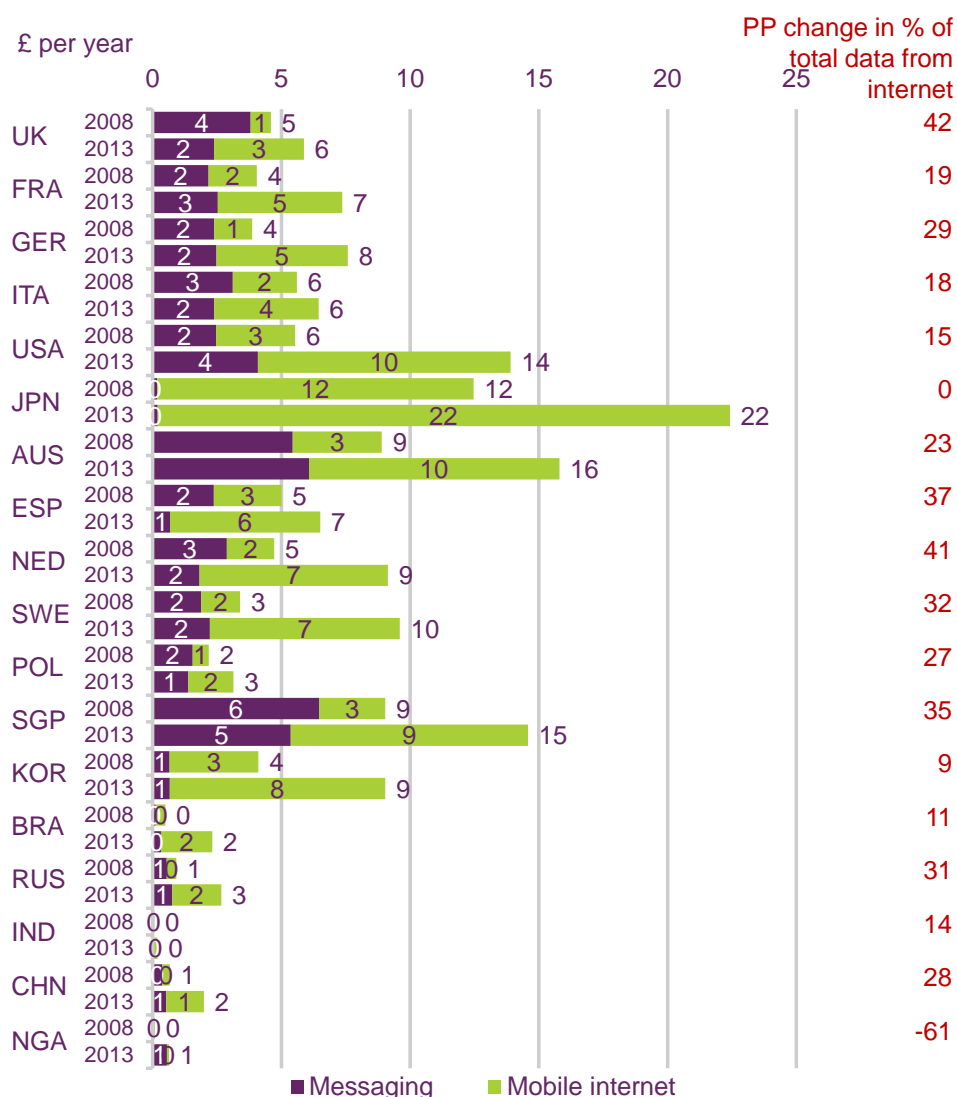
The UK had the largest increase in the proportion of mobile data revenue generated by internet services between 2008 and 2013

Average monthly spend per person on mobile data services (which includes spend on mobile messaging and other mobile data services, referred to here as ‘mobile internet’ services) increased in all of our comparator countries in the five years to 2013 (Figure 6.55). It is important to note that figures for the UK will be understated as they exclude revenues relating to SMS, and data allowances that are bundled in with monthly line rental fees.

The main driver for the increasing mobile data spend in most of our countries was a rise in mobile internet use, as a result of growing smartphone and mobile broadband take-up, although in six comparator countries (including the UK) these increases were offset by falling mobile messaging revenues. In 2013, the average per-capita spend on mobile internet services (which excludes SMS and MMS) ranged from eight pence per month in Nigeria, where 3G population coverage was just 55% at the end of the year (see Figure 6.53) to £22 per month in Japan (in the UK it was £3 per month).

The proportion of total mobile data spend that was generated by mobile internet services ranged from 13% in Nigeria to 99% in Japan in 2013 (in the UK it was 59%), while the change in this proportion over the previous five years ranged from a 61 percentage point decrease in Nigeria (where mobile messaging has grown at a faster rate than mobile internet due to regulation to reduce SMS costs and increased mobile subscription growth) to a 42 percentage point increase in the UK.

Figure 6.55 Per-capita mobile data average monthly revenue: 2008 and 2013



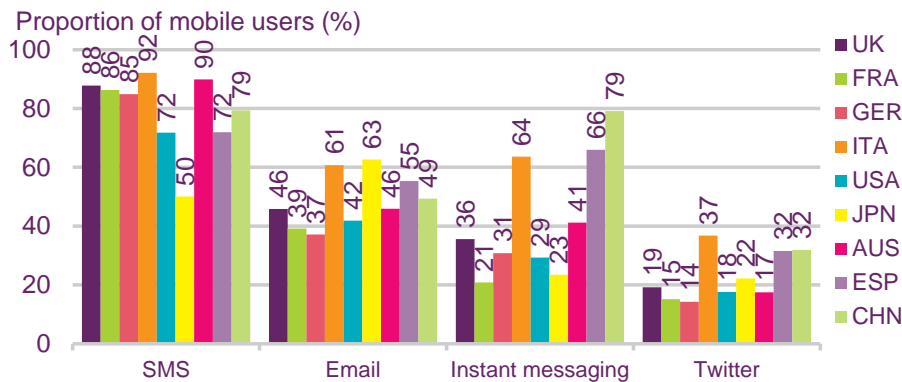
Source: IHS / industry data / Ofcom

Use of data services on mobile handsets is widespread as a result of growing smartphone take-up

Ofcom research conducted in nine of our comparator countries asked mobile users about the services they accessed on their mobile handsets (Figure 6.56). In all of the countries except Japan (50%) more than seven in ten mobile users said that they used SMS messaging. As well as in Japan, SMS use was comparatively low in the US and Spain (both 72%), while the figure in all other countries was around nine in ten (88% in the UK, for example).

Japan (63%) and Italy (61%) had the highest proportion of respondents claiming to use email on a mobile phone, while Germany (37%), France (39%), and the US (42%) were all at lower levels (in the UK the proportion was 46%). The percentage of mobile users claiming to use instant messaging services on their handsets was highest in China, at 79%, while in the UK it was less than half this, at 36%. The percentage of mobile users who said they posted messages on Twitter (tweeted) on their mobile phone ranged from 14% in Germany to 37% in Italy (in the UK it was 19%).

Figure 6.56 Use of data services on mobile phones



Source: Ofcom consumer research October 2014

Base: All respondents, UK=1011, FRA=1027, GER=1006, ITA=1006, USA=1000, JPN=1003, AUS=1000, ESP=1002, CHN=1010.

Q9b. Which, if any, of the following ways of communicating over the internet do you use each of your devices for?

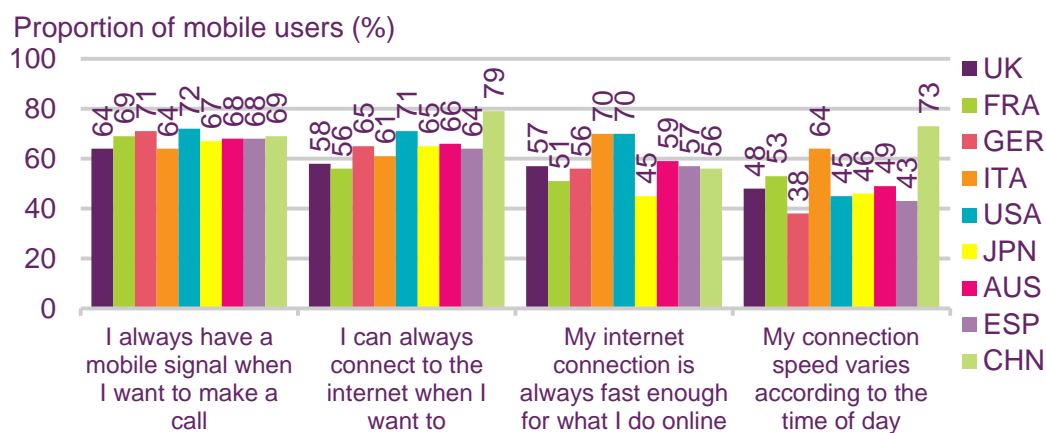
Q9e. Which, if any, of the following do you use your mobile phone or smartphone for?

Fifty-eight per cent of UK mobile users say they can access the internet whenever they want to.

Our consumer research asked mobile users about how easy they found it to connect to voice and data services over their mobile network. This showed that there was little variation in the proportion of mobile users who said that they always had a signal when they wanted to make an outgoing voice call, ranging from 64% in the UK and Italy to 72% in the US (Figure 6.57). China had the highest proportion of respondents who said that they could always access the internet on their mobile network when they wanted to (79%); however, as the research was undertaken online, it is likely that the results for China (where internet use tends to be concentrated in large cities) are not representative of the country as a whole.

Among the other countries in which the research took place, the proportion who said that they did not have difficulty accessing mobile data services ranged from 56% in France to 71% in the US (in the UK it was 58%). Italy and the US had the highest percentage of mobile users who said that their mobile internet connection was always fast enough (both 70%) while this proportion was lowest in Japan, at less than half (45%) of mobile users (in the UK the proportion was 57%). China also had the highest proportion of mobile users who said that the speed of their mobile data connection varied by time of day at 73%, followed by Italy (64%).

Figure 6.57 Mobile phone connectivity



Source: Ofcom consumer research October 2014

Base: All respondents with a mobile phone/ smartphone, UK=827, FRA=797, GER=861, ITA=890, USA=748, JPN=801, AUS=869, ESP=866, CHN=853

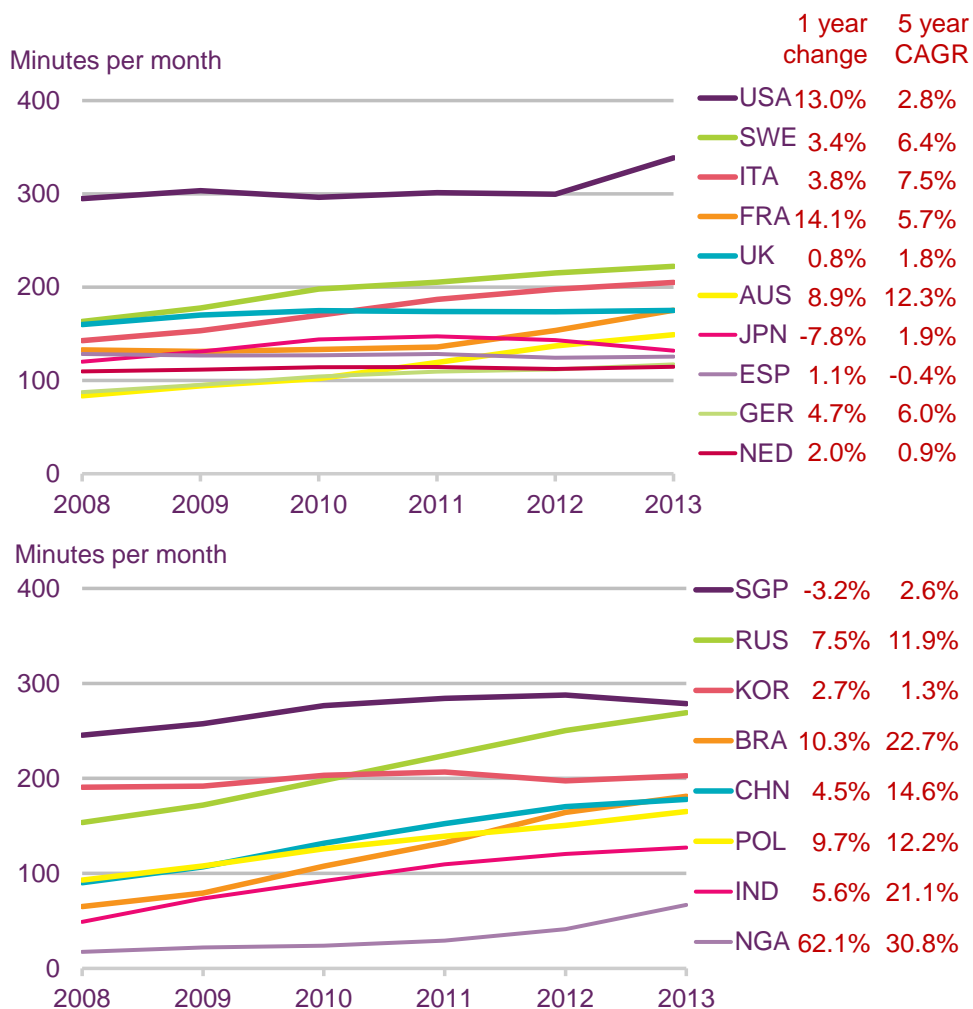
Q.10 Thinking about when you use your mobile phone, please select an answer to each of the following...

Average per-capita monthly mobile call minutes increased in most comparator countries in 2013

Average per-capita outgoing mobile voice call minutes ranged from 67 per month in Nigeria to 339 per month in the US (where there has been a shift towards unlimited voice and messaging plans) among our comparator countries in 2013 (Figure 6.58). In the UK, residents made an average of 175 minutes of outgoing mobile voice call minutes per month, the ninth lowest figure among our comparator countries.

Average per-capita call minutes fell in two of our countries in 2013: Japan (down by 7.8% to 132 minutes per month) and Singapore (down by 3.2% to 279 minutes). It is likely that the increasing use of non-voice communication on mobile devices (such as email and instant messaging) are contributing to these declines. Average use in the UK increased by one minute per person per month (0.8%) over the year. The largest increases in outgoing monthly mobile calls per person in the five years to 2013 were found in Poland, Australia, Nigeria and the BRIC countries, among which average annual growth rates ranged from 11.9% (in Russia) to 30.8% (in Nigeria).

Figure 6.58 Average per-capita monthly mobile voice call minutes: 2008 to 2013



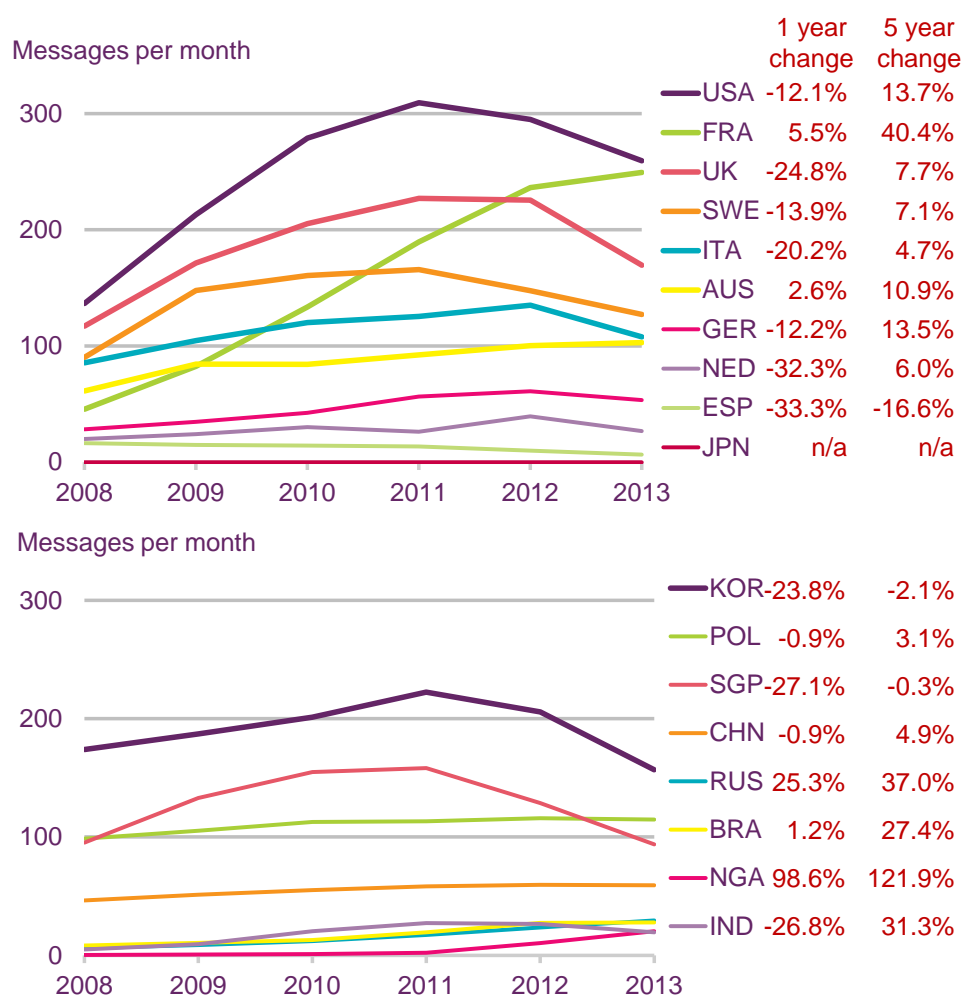
Source: IHS / industry data / Ofcom

People in the US and France had the highest average mobile messaging use in 2013

Average monthly mobile messaging use per person (which includes SMS and MMS messages) ranged from no messages per month in Japan (where email and instant messaging are used rather than traditional mobile messaging services) to 259 per month in the US (Figure 6.59). Average mobile messaging use per person fell in 12 of our comparator countries in 2013, including the UK. As smartphone take-up increases, more consumers have access to alternatives to SMS and MMS messaging (email, IM, over-the-top messaging services and those included on social networking sites), and consequently the use of traditional messaging services is starting to decline in many countries (see Figure 6.61).

Spain had the highest rate of decline in average mobile messaging use per person in 2013, down by a third (33.3%) over the year; however, this fall was only equivalent to three messages per person per month, as mobile messaging services are comparatively expensive in Spain, and average use is low. The largest decline in terms of average messages sent in 2013 was in the UK, where the fall was 56 messages per person per month (24.8%), down to 170 messages per month, the third highest usage level among our comparator countries. Conversely, France had the largest increase in average mobile messages sent per person during 2013, up by 13 messages per month (5.5%) to 249 per person.

Figure 6.59 Average number of monthly mobile messages per head: 2008 to 2013



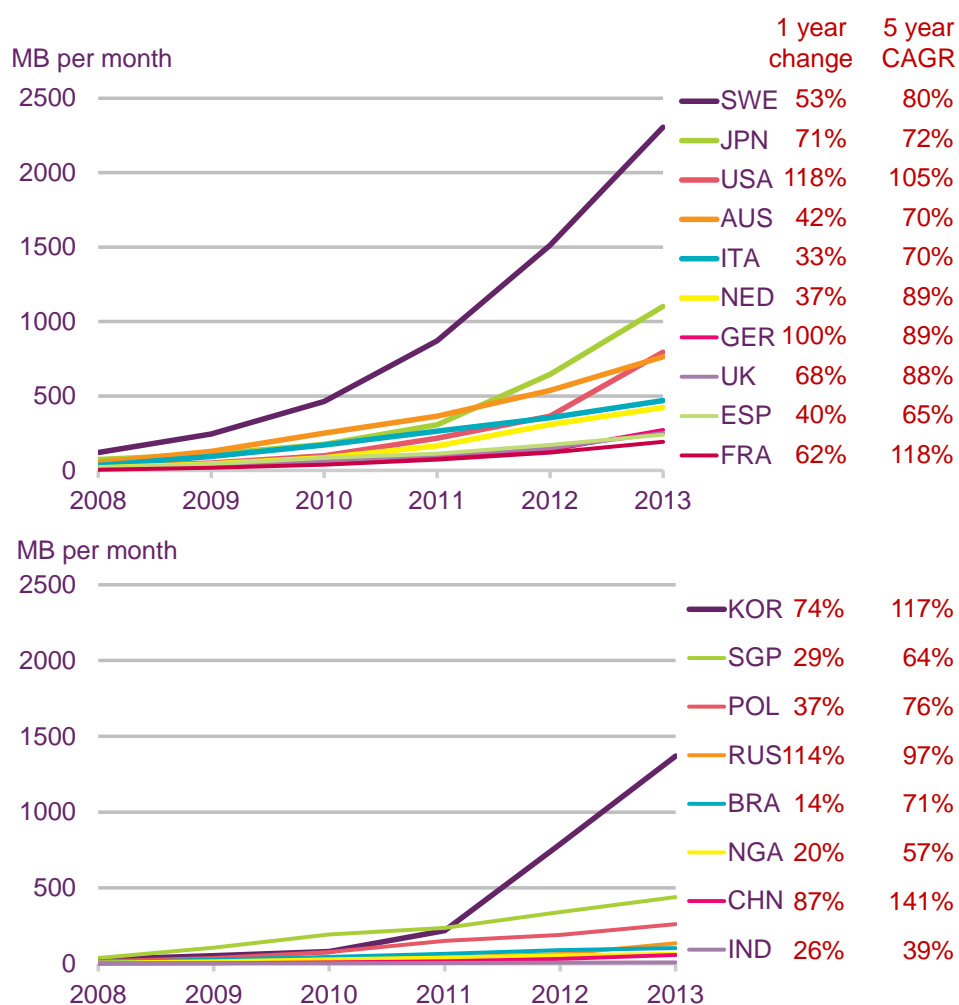
Source: IHS / industry data / Ofcom
 Note: Messaging includes SMS and MMS

The highest average per-capita mobile data use among our comparator countries was in Sweden in 2013

Average mobile data use per person ranged from 8MB per month in India to 2,305MB (i.e. 2.3GB) per month in Sweden among our comparator countries in 2013 (Figure 6.60). Italy had the highest average use among the EU5 countries in 2013, at 469MB per person per month. In the UK, average use was 251MB per person per month in 2013, the eighth lowest figure among our comparator countries, although it was only slightly lower than Germany (271MB per month) and was higher than in France and Spain (192MB and 239MB per month respectively).

Average data use increased in all of our comparator countries over both the one-year and five-year timeframes. In the five years to 2013 the average annual growth in mobile data volume per person ranged from 39% in India (where use was lowest in 2013) to 118% in France and 141% in China (which had the second lowest average monthly use in 2013, at 58MB per person). In 2013, the change in average mobile data use per person ranged from a 14% increase in Brazil to 118% growth in the US. In the UK, the increase in average per-capita mobile data use in 2013 was 68%, while the average annual increase between 2008 and 2013 was 88%.

Figure 6.60 Average per-capita monthly mobile data use: 2008 to 2013



Source: IHS / industry data / Ofcom

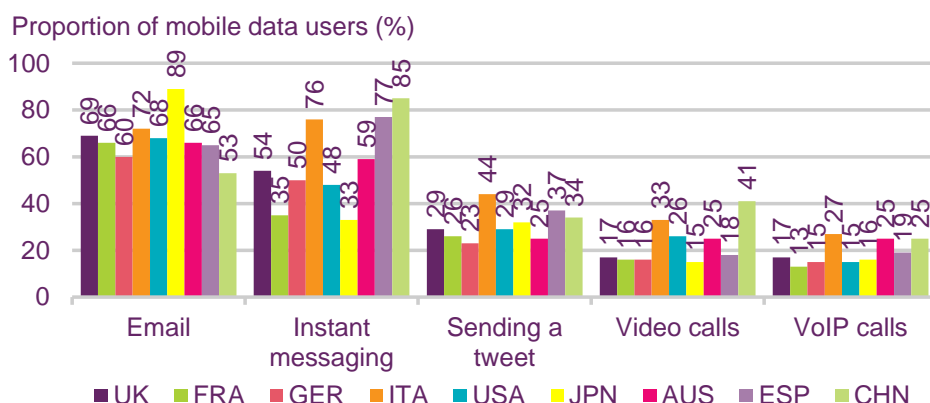
Mobile internet users in Japan have the highest use of email on their mobile handsets

Ofcom research conducted in October 2014 asked mobile internet users in nine of our comparator countries about the methods of communication (other than traditional voice calls and SMS/MMS messages) that they used on their mobile handsets (Figure 6.61). The proportion of mobile internet users who said that they used their mobile handset to send and receive email ranged from 53% in China to 89% in Japan; in the UK it was 69%. Claimed use of instant messaging services was highest in China, where 85% of mobile data users said they used their mobile phone for this¹¹³. Among our other eight countries, this measure ranged from 33% in Japan to 77% in Spain (in the UK it was 54%).

China also had the highest claimed use of mobile video calling, at 41% (with the same caveats applying), while the highest claimed Twitter use on mobile handsets was in Italy (44%). In the UK 17% of mobile data users used VoIP on their handset (the same proportion that said they used it to made video calls), while 29% said that they accessed Twitter on their mobile phone.

¹¹³ As internet penetration is low in China (around 46%, and centred in the cities), the people responding to our online survey are likely to be early adopters of new technology, and do not closely represent China's 1.4 billion inhabitants. Further information on our online market research methodology is presented in Appendix A: Consumer research methodology and a perspective on the results of our market research in China can be found in Appendix C: A perspective on China.

Figure 6.61 Activities undertaken on a mobile phone



Source: Ofcom consumer research October 2014

Base: All respondents who access internet with a mobile phone/ smartphone, UK=540, FRA=469, GER=531, ITA=762, USA=443, JPN=566, AUS=579, ESP=742, CHN=808

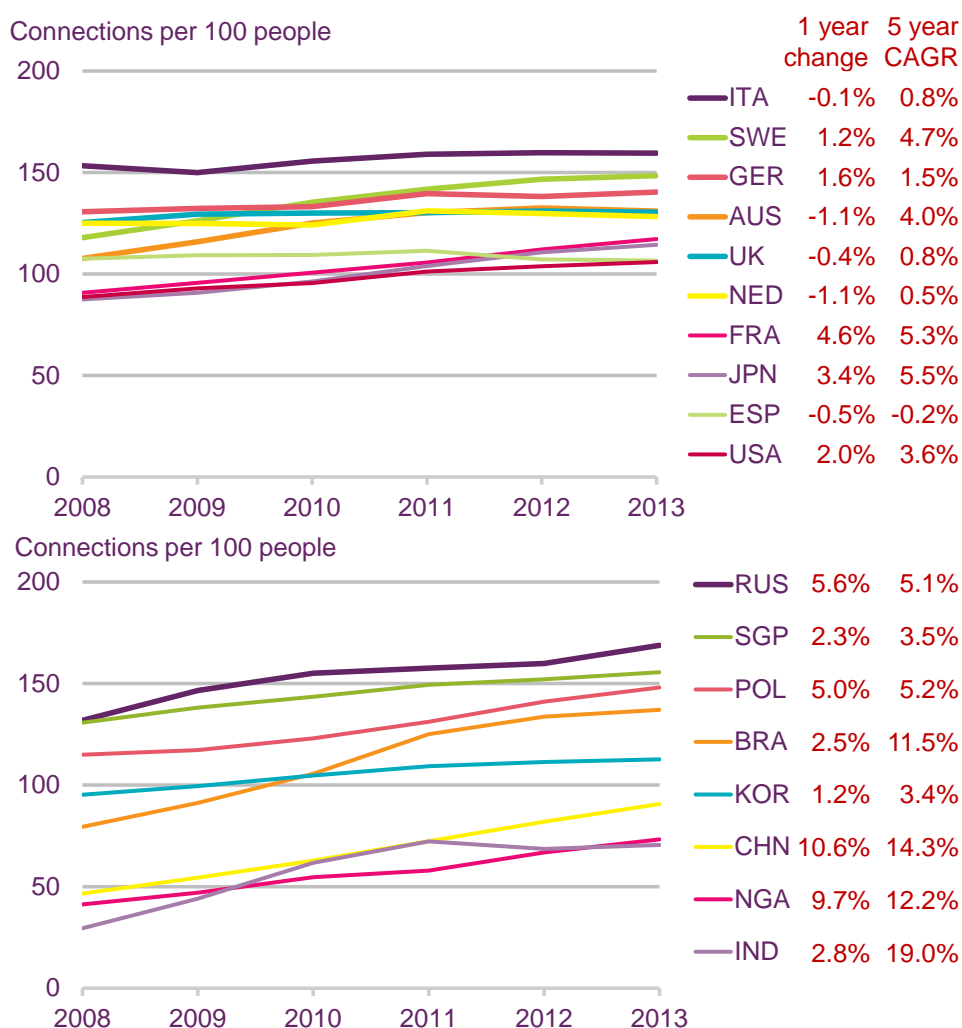
Q.9b Which, if any, of the following ways of communicating over the internet do you use each of your devices for?

Russia, Italy and Singapore had more than 1.5 mobile connections per person at the end of 2013

There were more mobile connections than people in all of our comparator countries except India, Nigeria and China at the end of 2013 (Figure 6.62). This is because many people have more than one mobile connection: for example, one handset for personal use and another provided by their employer; or a separate mobile handset and dedicated mobile data connection; or a number of different providers' SIM cards in order to take advantage of different call rates.

The highest number of per-capita mobile connections per person at the end of 2013 was in Russia, at 169 per 100 people, closely followed by Italy at 159 connections per 100. Italy was one of five comparator countries (along with the UK, Australia, Spain and the Netherlands) where the number of mobile connections per 100 people fell in 2013. In the UK there were 130 mobile connections per 100 people at the end of the year, a decline of less than one connection per 100 people compared to 2012.

Figure 6.62 Mobile connections per 100 people: 2008 to 2013



Source: IHS / industry data / Ofcom

Mobile data connections per 100 people increased in the UK and all comparator countries in 2013

Singapore had the highest take-up of mobile data services (including dedicated mobile broadband data services and access on mobile phone handsets) among our comparator countries at the end of 2013, with 153 connections per 100 people. This was twice the UK figure (77 connections per 100 people); the UK had the ninth highest number of connections per 100 people among our comparator countries. India, China and Nigeria had the lowest mobile data take-up among the comparative countries, with 18, 38 and 40 mobile data connections per 100 people respectively (Figure 6.63)

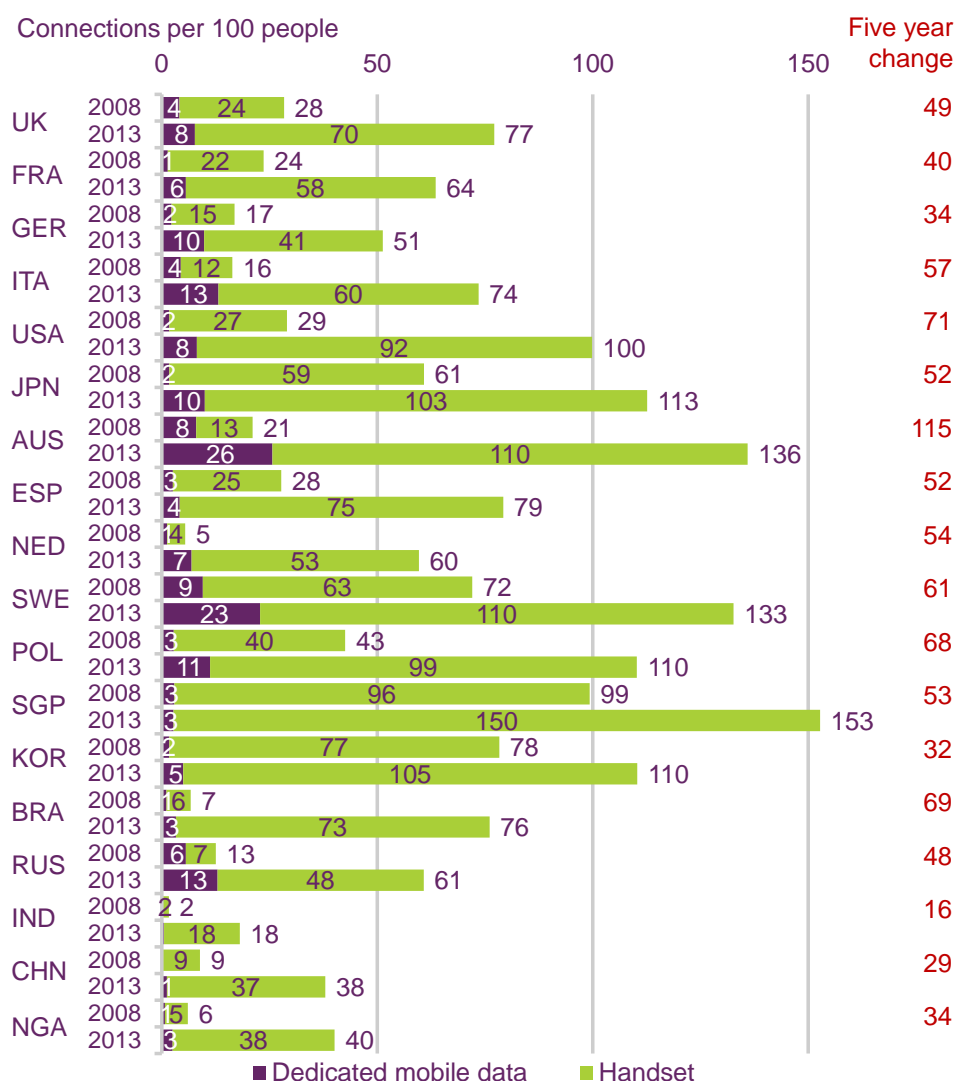
Australia had the largest increase in the number of mobile data connections per 100 people in the five years to 2013 (up by 115 connections per 100 people) followed by the US (up by 71 connections per 100 people) and Brazil (up by 69 connections per 100 people). The smallest increase was in India (up by 18 connections per 100 people). In the UK the increase over this period was 49 connections per 100 people, the eighth lowest growth among our comparator countries.

Australia also had the most dedicated mobile broadband connections per 100 people at the end of 2013, at 26 per 100 people, while take-up was also high in Sweden, where there were

23 connections per 100 people. It was lowest in India, where there was less than one connection per 100 people. The high mobile broadband take-up in Australia is partly related to the widespread availability of 4G LTE services (see Figure 6.53), while low mobile broadband take-up in India is because of the low levels of 3G and 4G availability, with access to mobile data networks being concentrated in metropolitan areas. In the UK there were eight dedicated mobile broadband connections per 100 people at the end of 2013.

Growing smartphone take-up resulted in rapid increases in the number of mobile handset data connections in most of our comparator countries in the five years to 2013, and at the end of this period the number of handset data connections per 100 people ranged from 18 in India to 150 in Singapore (in the UK there were 70 per 100 people, the ninth lowest figure among our countries).

Figure 6.63 Mobile data connections per 100 people: 2008 and 2013

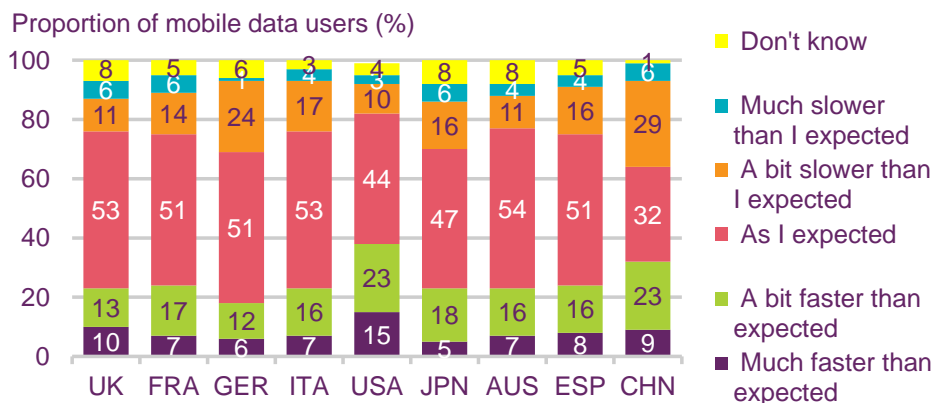


Source: IHS / industry data / Ofcom
 Note: Messaging includes SMS and MMS

In the US, 38% of mobile data users' connection speeds exceeded their initial expectations

Our consumer research asked mobile data users about how far the speed of their mobile data connection met their initial expectations (Figure 6.64). Consumers in the US were most likely to say that their service was either 'a bit' or 'much' faster than expected; 38% of mobile data chose one of these responses. This may be related to comparatively high levels of 4G mobile take-up in the US (more information regarding 4G mobile services can be found in Section 1.4 of this report). This proportion was lowest in Germany, at 18% (in the UK it was 23%). The proportion of mobile data users who said that their service was either 'a bit' or 'much' slower than expected was highest in China (35%) across our comparator countries; in the UK it was around half this level, at 17%.

Figure 6.64 Performance of mobile internet connection compared to initial expectation



Source: Ofcom consumer research October 2014

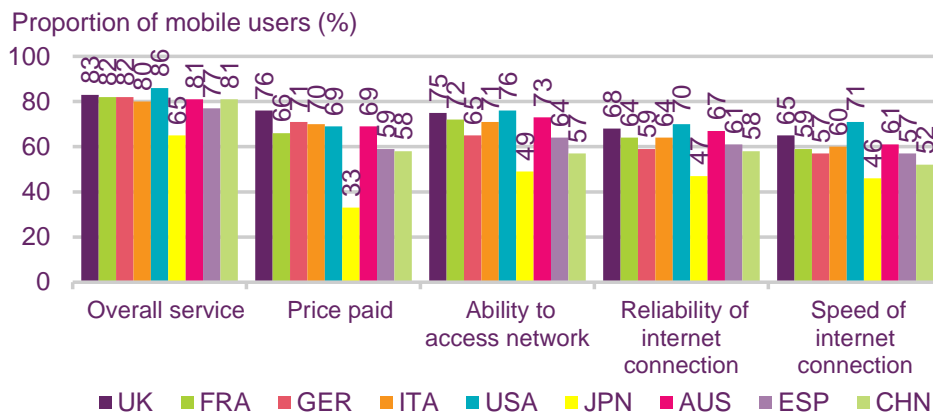
Base: All respondents with mobile broadband internet access or those who access the internet access via a mobile handset, UK=339, FRA=361, GER=383, ITA=662, USA=284, JPN=250, AUS=464, ESP=620, CHN=568

Q.26 How does the download speed of your current mobile internet connection compare with what you expected when you signed up for it?

Eighty-three per cent of mobile users in the UK are satisfied with their service

Figure 6.65 below shows the proportion of mobile data users who were satisfied (either 'very' or 'fairly') with different aspects of their mobile service. Mobile data users in the US had comparatively high levels of satisfaction with their service (both overall at 86%, and across all service aspects, except for price paid). This is possibly related to the high levels of 4G take-up mentioned previously (see Section 1.4 for more details). Japan had the lowest satisfaction levels for all five of the measures below (this was also the case for fixed broadband services, as shown in Figure 6.52); satisfaction with price paid was particularly low compared to other countries, at 33%. The UK had comparatively high satisfaction levels with all of the service aspects asked about, with 83% for overall service and 76% for price.

Figure 6.65 Satisfaction with mobile service



Source: Ofcom consumer research October 2014

Base: All respondents with mobile broadband internet access or those who access the internet access via a mobile handset, UK=339, FRA=361, GER=383, ITA=662, USA=284, JPN=250, AUS=464, ESP=620, CHN=568

Q.25 To what extent are you satisfied or dissatisfied with the following aspects of your mobile phone service?