



The European Broadband Scorecard

Research Document

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Section 1

Introduction

1.1 Background to the European Broadband Scorecard

In December 2010, the Department for Culture, Media and Sport (DCMS), in partnership with the Department for Business, Innovation and Skills, published a strategy document entitled *Britain's Superfast Broadband Future*. The document set out the Government's ambition that the UK 'should have the best superfast broadband network in Europe by 2015'.¹ As well as committing to benchmark the UK against other EU countries, the Government intends to ensure that all UK premises can experience download speeds of at least 2Mbit/s by 2015 and that ninety per cent of premises can access superfast broadband. To this end, it has allocated £530 million to stimulate commercial investment in the rollout of high speed broadband in rural communities.²

Within DCMS, Broadband Delivery UK (BDUK) proposed a Scorecard for measuring the development of the UK's broadband network relative to those in other EU countries, based on four headline indicators: coverage and take-up, speed, price and choice (Figure 1).

Figure 1 BDUK's proposed metrics for inclusion in the Scorecard

| Coverage and take-up | Speed | Price | Choice |
|--|-----------------------|------------------------------|---|
| Standard broadband coverage and take-up | Fixed download speed | Price of standard broadband | Market concentration in fixed broadband market |
| Superfast broadband coverage and take-up | Fixed upload speed | Price of superfast broadband | Market concentration in mobile broadband market |
| Mobile broadband coverage and take-up | Mobile download speed | Price of mobile broadband | |

Source: BDUK

In December 2011, Ofcom agreed to identify, collate and publish the best available data relating to each of these metrics.³ We revised BDUK's framework, splitting 'coverage and take-up' into two and including information on the proportion of the population that use the internet and perform tasks online (Figure 2).

¹ DCMS / BIS, *Britain's Superfast Broadband Future*, 2010, p. 2, at <http://www.culture.gov.uk/images/publications/10-1320-britains-superfast-broadband-future.pdf>.

² See http://www.culture.gov.uk/what_we_do/telecommunications_and_online/7763.aspx.

³ Ofcom, *International Communications Market Report 2011*, 2011, p. 43, at <http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr11/icmr/ICMR2011.pdf>.

Figure 2 Ofcom’s proposed metrics for inclusion in the Scorecard

| Coverage | Take-up and usage | Speed | Price | Choice |
|------------------------------|-----------------------------|-----------------------|------------------------------|---|
| Standard broadband coverage | Standard broadband take-up | Fixed download speed | Price of standard broadband | Market concentration in fixed broadband market |
| Superfast broadband coverage | Superfast broadband take-up | Fixed upload speed | Price of superfast broadband | Market concentration in mobile broadband market |
| Mobile broadband coverage | Mobile broadband take-up | Mobile download speed | Price of mobile broadband | |
| | Use of online services | | | |

In August 2012, the Secretary of State for Culture, Media and Sport set a further target that the UK should have the fastest broadband of any major European country by 2015.⁴

The charts in this Scorecard focus on the UK’s position relative to the other EU5 countries (France, Germany, Italy and Spain). The factors that affect the development of broadband networks, such as geography, population size and density and legacy infrastructure, differ significantly between the 27 EU Member States. For this reason we consider it more appropriate to compare the UK’s broadband network with those in other major European economies than with those in all EU27 countries. For completeness, however, Annex A provides EU27 data for the metrics in the Scorecard, where such data are available.

Figure 3 EU27 country codes (highlighting EU5)

| Code | Country | Code | Country | Code | Country | Code | Country |
|-----------|----------------|-----------|---------------|------|-------------|-----------|-----------------------|
| BE | Belgium | EL | Greece | LU | Luxembourg | RO | Romania |
| BG | Bulgaria | ES | Spain | HU | Hungary | SI | Slovenia |
| CZ | Czech Republic | FR | France | MT | Malta | SK | Slovakia |
| DK | Denmark | IT | Italy | NL | Netherlands | FI | Finland |
| DE | Germany | CY | Cyprus | AT | Austria | SE | Sweden |
| EE | Estonia | LV | Latvia | PL | Poland | UK | United Kingdom |
| IE | Ireland | LT | Lithuania | PT | Portugal | | |

Source: Eurostat

⁴ See http://www.culture.gov.uk/news/ministers_speeches/9299.aspx.

1.2 Challenges of providing data

Due to the complexity of gathering data across comparator countries we have faced a number of practical considerations in compiling the Scorecard. These relate to ensuring that the data we publish are comparable, reliable and the most recent available at the time of preparing the Scorecard.

Comparable. The notes to the charts in the Scorecard contain the definitions of ‘standard’ fixed-line broadband, ‘superfast’ fixed-line broadband and mobile broadband that Ofcom or other organisations used in collecting the relevant data. In some cases these are different in different charts and countries. However, in general, standard comprises technologies capable of providing speeds over 144Kbit/s and less than 30Mbit/s and superfast comprises technologies capable of providing speeds equal to or greater than 30Mbit/s.

We take these definitions of standard and superfast broadband from those that the European Commission (EC) uses in collecting data to measure progress against its Digital Agenda Targets.⁵ We consider that the EC is one of the primary sources of robust data comparing broadband networks across the EU27 and as such it is useful to adopt its definitions in the Scorecard.

In the interests of transparency the Scorecard shows publicly available data (with the exception of pricing data, as explained below). We publish the source of the data in the notes to the charts.

As one of the aims of the methodology we used to compile this data was to ensure consistency across the EU27 to enable comparison between countries, the figures we publish here may differ from those that Ofcom or other organisations publish elsewhere, which may have been collected and analysed for a different purpose or using a different methodology.

For example, Ofcom publishes estimates of fixed broadband penetration per 100 premises in EU5 countries.⁶ This figure overstates household penetration as businesses will be the users of many of the connections, The Scorecard is specifically intended to compare ‘take-up and usage’ across the EU5 and we consider household penetration a more useful measure of take-up among the population than premises penetration. Thus we have used survey data that excludes business connections to illustrate fixed broadband penetration per 100 households in the Scorecard (Figure 13). We also present fixed broadband connections per 100 people (Figure 12), a different measure of fixed broadband penetration based on industry data,

The metrics in Figure 2 are useful indicators of how broadband networks compare across the EU at a given point in time. However, they are just that: given the diverse topography, population density and legacy infrastructure of EU states (to name just a few factors), the direct comparison of individual metrics does not take account of the dynamics and relative challenges of developing broadband networks in different countries.

Reliable. Where we have any comments about the basis on which we or our sources collected or analysed the data in the Scorecard we have noted these in the charts’ accompanying commentary.

⁵ See <https://ec.europa.eu/digital-agenda/en/scoreboard>.

⁶ Ofcom, *International Communications Market Report 2012*, p. 269-270.

At the time of publication we did not consider that there were suitable data available to illustrate three of the metrics in Figure 2. These were fixed-line download speed, fixed-line upload speed and mobile download speed. We have not been able to identify fixed-line upload speed and mobile download speed datasets that might be considered for publication in this Scorecard. While fixed-line download speed datasets are publicly available, in our opinion there are limitations to the methodology used to obtain these datasets that mean that they may not offer comparable, robust estimates of national average fixed-line download speed. For this reason we have not included the data in this Scorecard. We discuss the availability of broadband speed data further in Annex B.

Most recent available. Collecting data across different countries can often take a long time. This means that some of our datasets may have been collected many months before the Scorecard's publication. Given the speed at which broadband markets are moving, comparable and robust data covering the EU5 may not reflect the state of individual markets at the time of this Scorecard's publication and more up-to-date information for each country may be available elsewhere. The notes to each chart set out the date to when its data refer.

We have published data in the Scorecard that we consider best meet these challenges. However, we invite users to submit comments on how we might improve the quality and presentation of the data in future to market.intelligence@ofcom.org.uk by 1 September 2013.

1.3 Next steps

As we did in publishing this Scorecard, we will apply the following principles to determine if and when it is appropriate to publish an updated Scorecard in future:

- We will only publish data in the Scorecard that we consider sufficiently robust and that refer to as recent a period as possible;
- The Scorecard will contain comparable data covering all EU5 countries as far as possible;⁷
- Dependent on the availability of sufficiently robust data, future Scorecards should contain the metrics that this Scorecard contains as a minimum; and
- In the interests of transparency, we will publish publicly available data in the Scorecard if they are sufficiently robust, timely and allow helpful comparison between countries.

We currently intend to publish any future Scorecards in our annual *International Communications Market Report*, which contains communications sector data covering a number of comparator countries, including the EU5.⁸

⁷ We reiterate that the metrics in Figure 2 are *indicators* of how broadband networks compare across the EU at a given point in time.

⁸ See <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr12/international/>.

Section 2

The Scorecard

2.1 Overview

Figure 4 provides an overview of the UK's position relative to that of EU5 countries across the Scorecard's metrics.

Figure 4 Overview of the UK's position on the Scorecard relative to the EU5 (excluding pricing)

| Coverage | EU5 | Take-up and usage | EU5 | Speed | EU5 | Choice | EU5 |
|------------------------------|------|--------------------------------------|--------------|-----------------------|-----|---|------|
| Standard broadband coverage | =1/5 | Standard broadband take-up | 3/5 and 1/5* | Fixed download speed | N/A | Market concentration in fixed broadband market | 1/5 |
| Superfast broadband coverage | 3/5 | Superfast broadband take-up | 3/5 | Fixed upload speed | N/A | Market concentration in mobile broadband market | =1/5 |
| Mobile broadband coverage | =1/5 | Mobile broadband take-up | 2/5 | Mobile download speed | N/A | | |
| | | % accessing internet regularly | 1/5 | | | | |
| | | % never used internet | 1/5 | | | | |
| | | % buying goods or services | 1/5 | | | | |
| | | % interacted with public authorities | 3/5 | | | | |

* 3/5 for broadband penetration per 100 people. 1/5 for broadband penetration per 100 households.

Figure 5 Visual overview of the UK's position on the Scorecard relative to the EU5: coverage

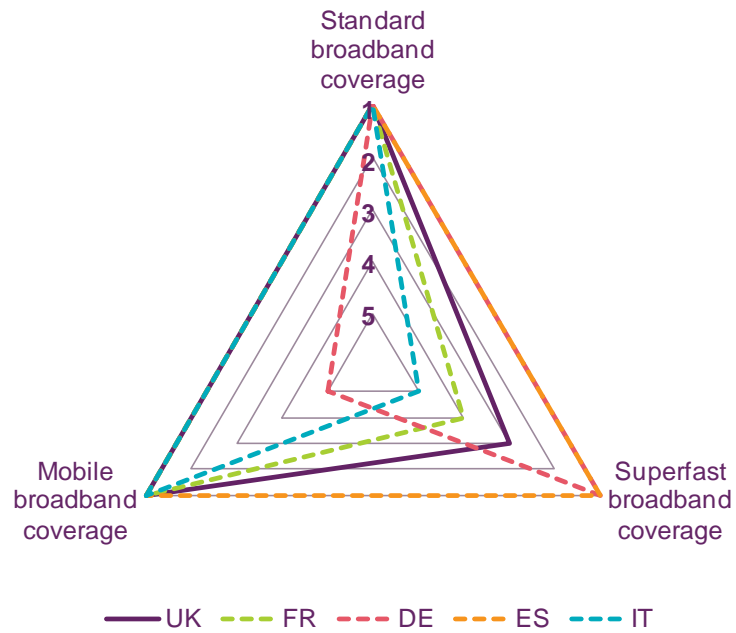


Figure 6 Visual overview of the UK's position on the Scorecard relative to the EU5: take-up

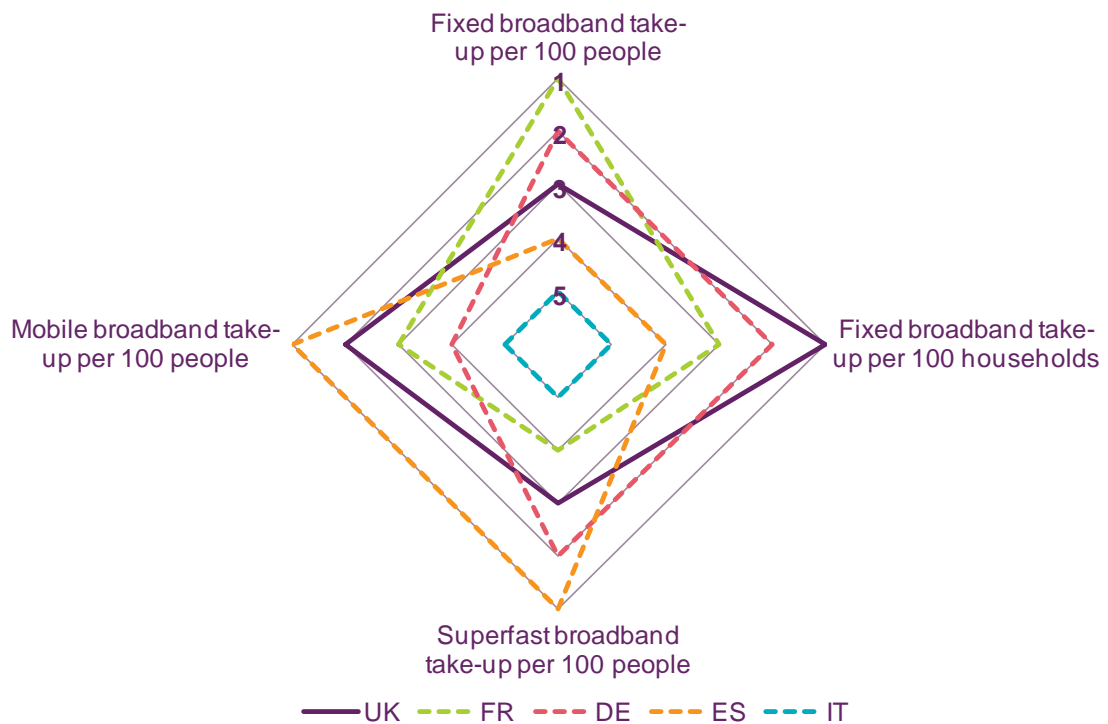


Figure 7 Visual overview of the UK's position on the Scorecard relative to the EU5: usage

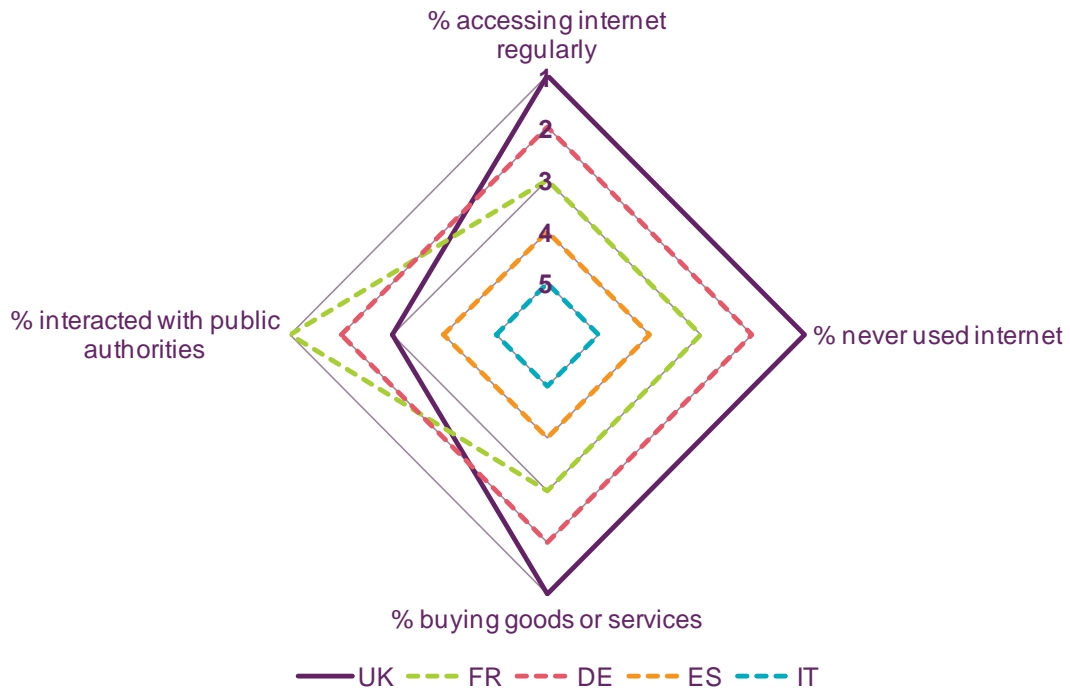


Figure 8 ranks the UK against comparator countries based on the prices of different baskets of communications services. We define 'price' is different ways: for example, as an average of the three lowest prices available for a bundle of services that meet a basket's requirements (simply average bundle pricing); or as the lowest price that a consumer could pay for each basket of services, potentially through bundled services ('best offer' pricing). We explain our methodology in full in section 2.4.

Figure 8 Overview of the UK's position on the Scorecard relative to the EU5: pricing

| | Weighted average single-service pricing | Simple average bundle pricing | Best offer pricing |
|----------------------------------|---|-------------------------------|--------------------|
| 8Mbit/s, 10GB data, 350 mins | 1/5 | =1/5 | 1/5 |
| 16Mbit/s, 20GB data, 350 mins | 1/5 | 1/5 | 1/5 |
| 30Mbit/s, 30GB data, 350 mins | 1/5 | 2/3 | 2/4 |
| 1GB data (mobile broadband only) | | | 1/5 |
| 3GB data (mobile broadband only) | | | 2/5 |
| 5GB data (mobile broadband only) | | | 2/5 |

Note: (1) Weighted average single-service pricing is the sum of the weighted average prices of the three cheapest standalone fixed broadband and three cheapest standalone fixed voice services that

fulfil each basket's requirements. We weight the averages for each service by the relevant providers' market shares. (2) Simple average bundle pricing is the mean of the three lowest prices for bundled fixed broadband and fixed voice services that fulfil each basket's requirements. (3) Best offer pricing is the lowest price that a consumer could pay for each basket of services including, where appropriate, bundled services. (4) We have used three baskets including fixed broadband and fixed voice telephony in our analysis: a fixed broadband connection with a minimum headline speed of 'up to' 8Mbit/s and 10GB of data use per month, alongside a fixed line with 350 minutes of outgoing calls per month; a fixed broadband connection with a minimum headline speed of 'up to' 16Mbit/s and 20GB of data use per month, alongside a fixed line with 350 minutes of outgoing calls per month; and a fixed broadband connection with a minimum headline speed of 'up to' 30Mbit/s and 30GB of data use per month, alongside a fixed line with 350 minutes of outgoing calls per month. (5) The UK is ranked against fewer than 5 countries where tariffs fulfilling basket requirements were not available in comparator countries.

Figure 9 Overview of the UK's position on the Scorecard relative to the EU5: fixed broadband pricing

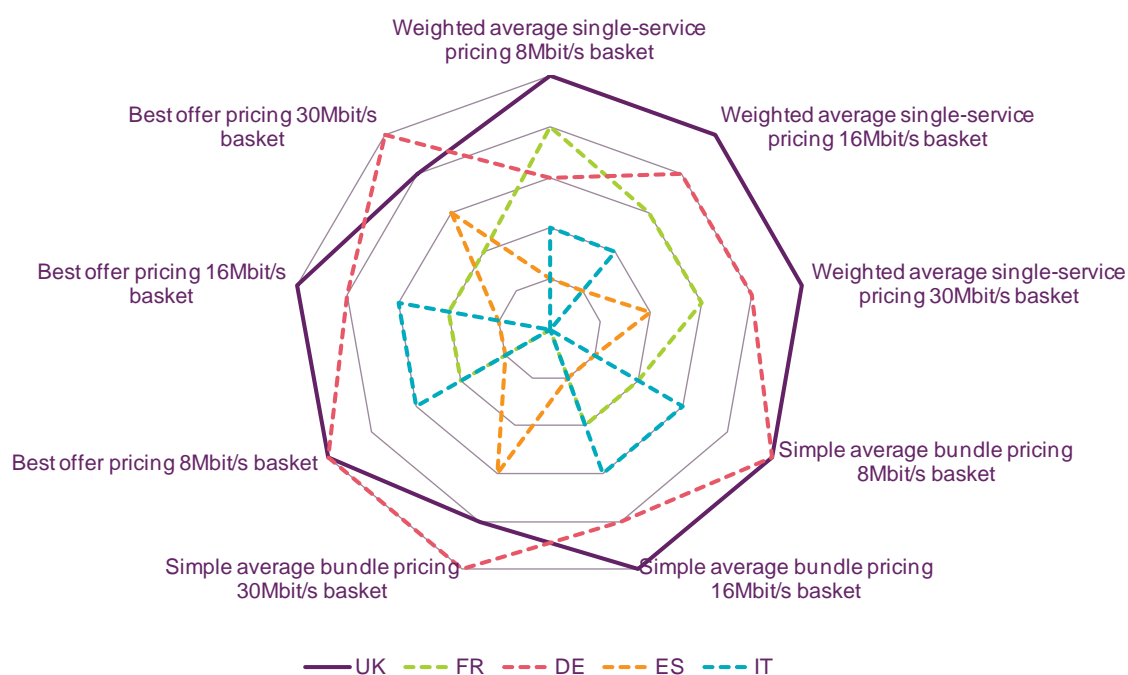
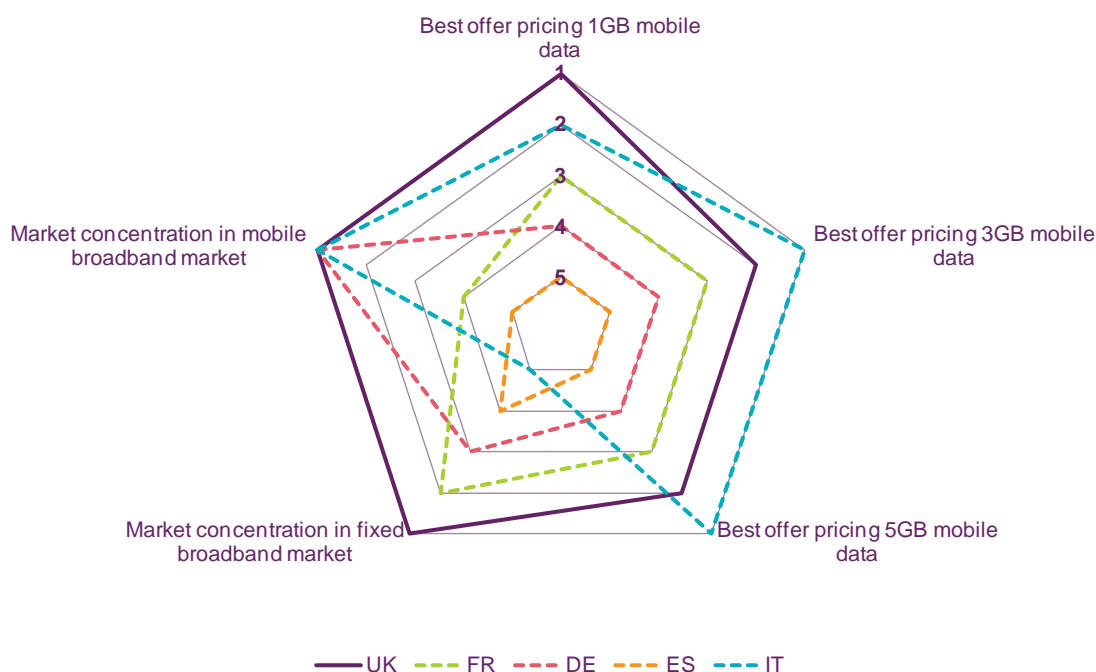


Figure 10 Overview of the UK's position on the Scorecard relative to the EU5: mobile broadband pricing and market penetration



2.2 Coverage

Standard broadband, superfast broadband and mobile broadband coverage

Broadband network analysts Point Topic published the most recent estimates of standard, superfast and mobile broadband coverage at a national level for EU5 countries.⁹ Prepared on behalf of the EC, the study was published in November 2012 and refers to year-end 2011. Point Topic is, to our knowledge, the only provider of broadband coverage data to have estimated the proportion of households in each EU member state that can access standard or superfast broadband through any of the technologies that provide it.

Point Topic estimates standard and superfast broadband coverage as the proportion of households in a region that can access a fixed line technology theoretically capable of providing headline download speeds of at least 144kbit/s and less than 30Mbit/s for standard broadband and 30+Mbit/s for superfast broadband.¹⁰ It calculates mobile broadband coverage as the percentage of households within a region that can access an HSPA-upgraded 3G network.

The regions for which Point Topic collects data are the smallest of the EC's 'nomenclature of territorial units for statistics' (NUTS), NUTS 3. NUTS 3 regions generally contain populations

⁹ Point Topic / EC, *Broadband Coverage in Europe 2011, 2012*, at <https://ec.europa.eu/digital-agenda/en/news/study-broadband-coverage-2011>.

¹⁰ Point Topic defines DSL, FTTP, WiMAX and Standard Cable as capable of offering download speeds of at least 144kbit/s and less than 30Mbit/s. It defines Next Generation Access (NGA) technologies (VDSL, FTTP and DOCSIS3.0 cable) as capable of providing 30Mbit/s download speeds. Full methodological information on Point Topic's study is available at <https://ec.europa.eu/digital-agenda/en/news/study-broadband-coverage-2011>.

between 150,000 and 800,000. Point Topic estimates the number of households within each region from its population.¹¹

Point Topic estimates the proportion of households in a region that can access standard, superfast or mobile broadband as the mean of minimum possible coverage in the region (the proportion of households that can access the most widespread standard, superfast or mobile technology) and maximum possible coverage (the sum of coverage by all relevant technologies to a maximum of 100%).¹² Point Topic further calculates standard, superfast and mobile broadband coverage nationally as the sum of the number of households covered in each region.

Broadband coverage in Europe is developing quickly and Point Topic's superfast broadband coverage figure for the UK, which refers to year-end 2011, differs from our latest published coverage figure, which refers to June 2012. Point Topic reports that 58% of households could access superfast broadband in the UK at year-end 2011, while we calculate that 6 months later in June 2012 it was available to 65% of UK premises.¹³

As we have noted, Point Topic's figures are, to our knowledge, the only estimates of the proportion of households in EU countries able to access standard and superfast broadband through any of the fixed-line technologies that the study encompasses. However, in our view there are some factors additional to those above that affect how Point Topic measures coverage, of which readers should be aware:

- As Point Topic calculates coverage by estimating the availability of technologies theoretically capable of providing certain headline speeds, its figures do not always reflect the speeds actually available. Point Topic reports that 100% of UK households could access standard broadband at year-end 2011 because ADSL technology had been rolled out to almost every UK telephone exchange. Ofcom's latest analysis estimates that, in fact, 1.3% of UK premises were in potential broadband notspots in June 2012.¹⁴ Equally, access to NGA technologies does not guarantee speeds of 30+Mbit/s. For example FTTC with VDSL over the copper sub loop between the cabinet and household is a technology capable of delivering superfast speeds. However, if the length of the sub loop is too long then it will not achieve 30Mbit/s.
- Point Topic has not received consistent coverage data from all national regulatory agencies (NRAs) and operators. For example, in Germany ADSL is defined as offering download speeds of at least 1Mbit/s. Thus Point Topic reports that standard broadband coverage is 95% in Germany, despite the fact that a higher proportion of German households may experience speeds of at least 144kbit/s.
- NRAs and operators typically provide mobile broadband household coverage figures measured outdoors. Point Topic also chooses to report outdoor mobile broadband coverage, treating mobile broadband as a potential substitute for fixed broadband for the purposes of measuring progress against the EC's Digital Agenda targets.

¹¹ The study includes coverage estimates for 1324 NUTS 3 regions across the EU27.

¹² Example calculation of standard broadband coverage in a region where 95% of households can access DSL, 90% can access Standard Cable and 15% can access WiMax:

Minimum possible coverage = 95%

Maximum possible coverage (to a maximum of 100%) = 90% + 15% = 105% therefore 100%

Standard broadband coverage = (95% + 100%) / 2 = 97.5%

¹³ Ofcom, *Infrastructure Report 2012 Update*, 2012, p. 2, at

<http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/infrastructure-report/Infrastructure-report2012.pdf>.

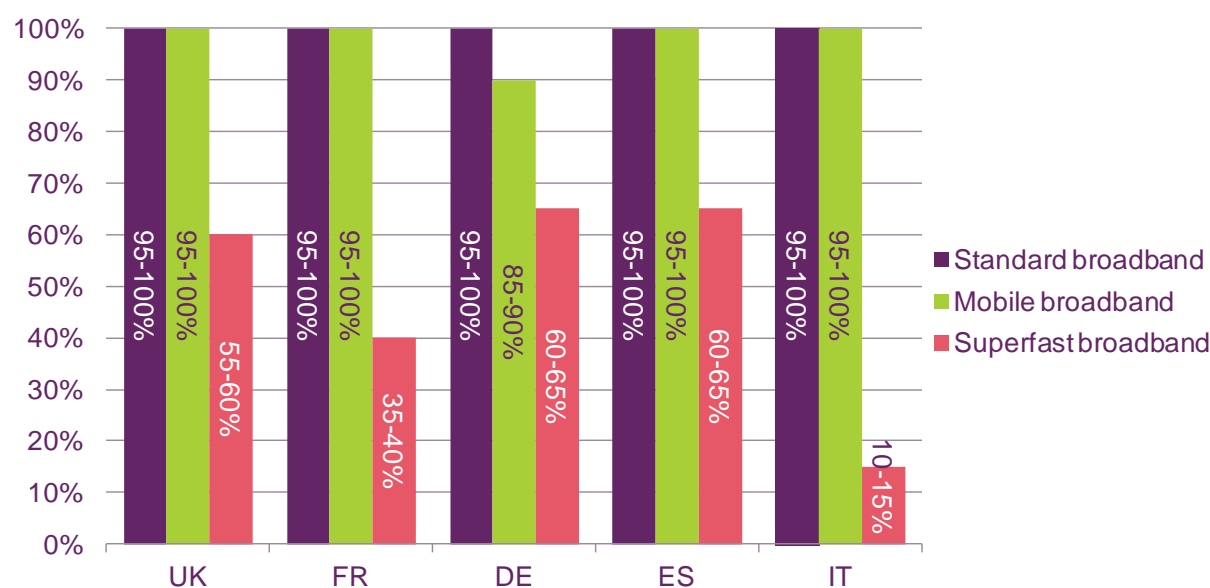
¹⁴ Ofcom, *Infrastructure Report 2012 Update*, p. 10.

Geographic coverage and indoor coverage are likely to be significantly less than outdoor household coverage. We estimate that 24.3% of the UK's geographic area had no 3G signal from any operator in June 2012. Household coverage data is also unlikely to adequately reflect local hotspots that affect particular networks. We estimate that, in June 2012, only 77.3% of premises had a signal from all four operators and 0.9% of all UK premises had no 3G signal from any operator.¹⁵

Point Topic has not published margins of error for its figures. However, in acknowledgement of the difficulties of accurately measuring coverage to a single percentage point (and comparing countries where coverage levels are very similar), we report Point Topic's figures within bands of five percentage points. For example, 97% coverage or 95% coverage will be placed in the 95%-100% coverage band.

In all five comparator countries, at least 95% of households are in areas served by standard broadband. At least 95% of households are in areas served by mobile broadband in every EU5 country except Germany, where between 85% and 90% of households are in areas with coverage. In Germany and Spain superfast broadband coverage is highest (60-65% of households), followed by the UK (55-60%), France (35-40%) and Italy (10-15%).

Figure 11 Percentage of households in areas served by standard, superfast and mobile broadband



Source: Point Topic / EC, *Broadband Coverage in Europe 2011*, November 2012.

Note: (1) Data refer to year-end 2011. (2) Ofcom has banded Point Topic's figures within a range between the nearest integers divisible by 5. (3) 'Standard broadband' refers to DSL, FTTP, WiMAX and Standard Cable, the main fixed line technologies capable of providing headline speed of at least 144kbit/s and less than 30Mbit/s download speed for end-users. (4) 'Superfast broadband' refers to NGA technologies, including VDSL, FTTP and DOCSIS3.0 cable, those needed to provide 30Mbit/s download speeds for end users. (5) 'Mobile broadband' refers to coverage by at least one HSPA-upgraded 3G mobile network.

¹⁵ *Ibid.*, p. 29.

2.3 Take-up and usage

At the time of the Scorecard's preparation, the EC's Communications Committee (Cocom) and Eurostat offer the most recent assessments of broadband take-up in the forms of fixed broadband, superfast broadband and mobile broadband penetration per 100 people or per 100 households across the EU5.¹⁶

Cocom measures broadband penetration per 100 people based on NRA and operator data. Its figures refer to January 2012 and it publishes the following relevant metrics:

- Fixed broadband penetration per 100 people (Figure 12);
- Superfast broadband penetration per 100 people (Figure 14); and
- Mobile broadband connections per 100 people (Figure 15).

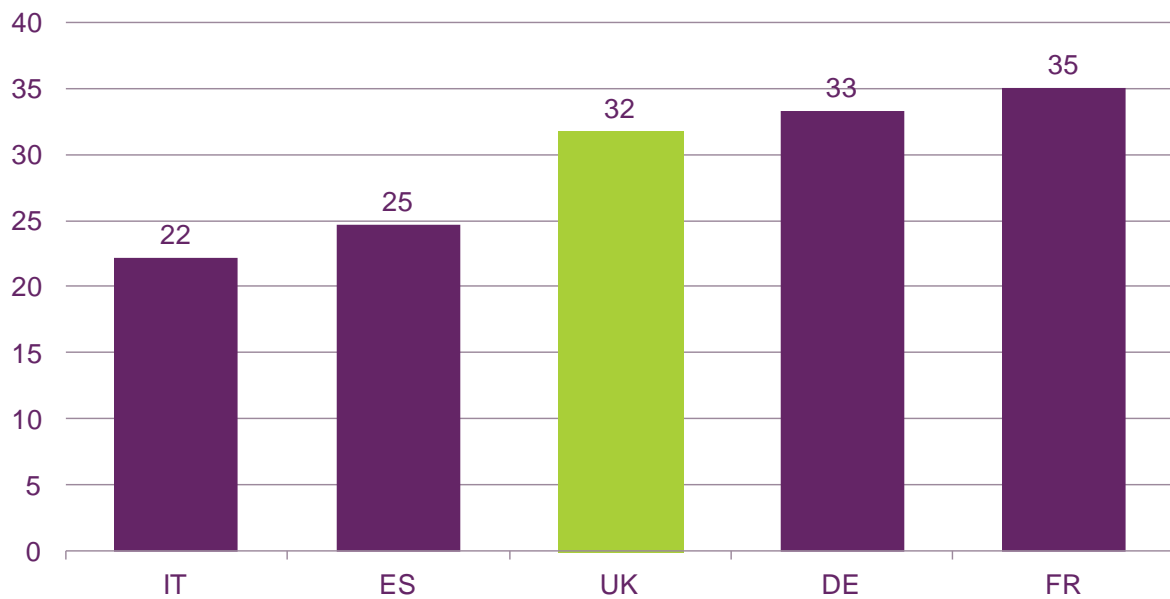
Eurostat publishes survey data on the proportion of households that had access to fixed broadband in Q1 2011 (Figure 13).

Fixed broadband take-up

Cocom reports that there were 32 fixed broadband connections of any speed per 100 people in the UK in January 2012. This was slightly less than in France (35) and Germany (33). However penetration in the UK was considerably higher than in Italy (22 connections per 100 people) and Spain (25).

¹⁶ Cocom, EC, Digital Agenda Scoreboard 2012, at https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/broadband_lines_agreements.xls; Eurostat, *Community survey on ICT usage in Households and by Individuals*, 2012, at <http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tin00073&language=en>.

Figure 12 Fixed broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Note: (1) Data refer to January 2012. (2) These data refer to all forms of fixed line broadband, including standard and superfast connections.

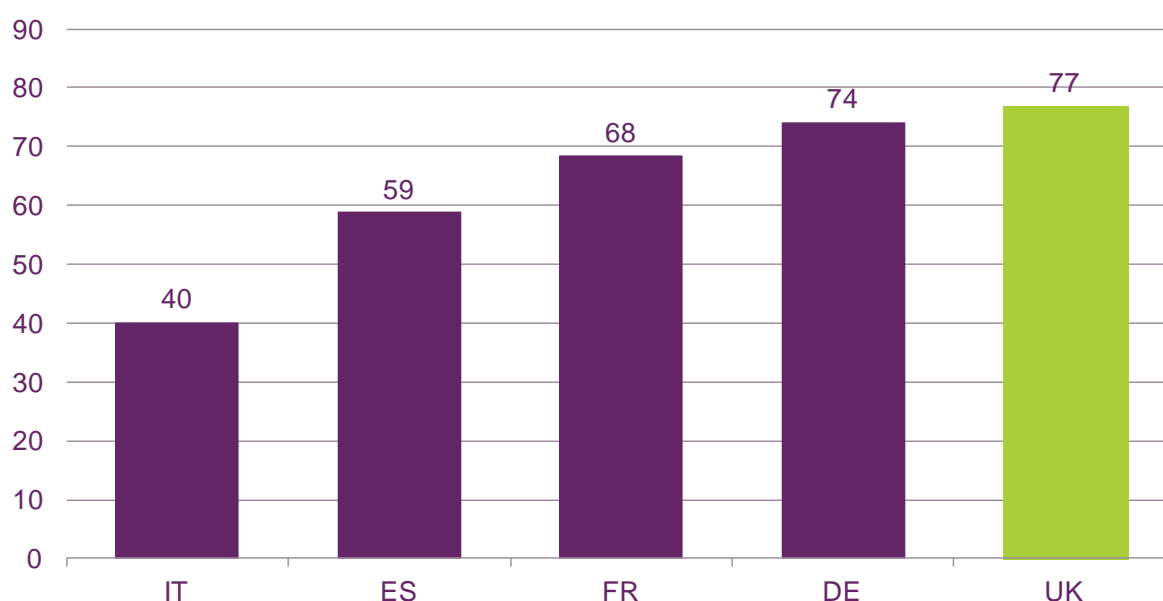
Eurostat data suggests that 77% of UK households had fixed broadband access at that time, the highest reported rate of household penetration among the EU5.

Our own research suggests that 71% of UK premises (including businesses and other buildings as well as homes) had fixed access broadband connections in a later period, June 2012.¹⁷ Our data also indicates that the rate of fixed broadband penetration per 100 premises in Germany was lower at year-end 2011 than Eurostat reports among German households in Q1 2011. Eurostat states that 74% of German households had fixed broadband access in Q1 2011, while our data suggests that 69% of German premises had access at year-end 2011.¹⁸ This may be because a higher proportion of households are subscribing to fixed broadband than do all premises.

¹⁷ Ofcom, *Infrastructure Report 2012 Update*, p. 1.

¹⁸ Ofcom, *International Communications Market Report*, p. 270. We do not report broadband penetration per 100 premises in this Scorecard as we consider household penetration per 100 households to be the more useful indicator of 'take-up and usage', which the Scorecard is intended to assess.

Figure 13 Fixed broadband connections per 100 households



Source: Eurostat, *Community survey on ICT usage in Households and by Individuals, 2011*.

Note: (1) Data refer to Q1 2011. (2) These data refer to all forms of fixed line broadband, including standard and superfast connections. (3) Data relates to households with at least one member aged 16-74 years.

Superfast broadband take-up

Cocom reports superfast broadband penetration, defining this as the number of broadband connections per 100 people that access the internet via NGA technologies theoretically capable of offering headline speeds of 30+Mbit/s, including VDSL, FTTP and DOCSIS3.0.

As these data on superfast broadband penetration relate to January 2012, they do not capture the more recent development of networks capable of delivering superfast speeds, which are evolving quickly in the UK and across the EU. In the UK in 2012:

- Virgin Media began a programme upgrading all its customers to higher-speed packages offering headline download speeds of 20, 30, 60 or 120Mbit/s;¹⁹
- Openreach introduced FTTC plus VDSL technology that allows speeds of up to 80Mbit/s. It also introduced FTTP lines that allow up to 330Mbit/s. BT Retail, TalkTalk, BSkyB and a number of other retail providers are exploiting these; and
- Superfast rollout, supported by public subsidy, has successfully taken place in territories like Northern Ireland, which has the highest proportion of premises in rural areas in the UK. Since 2009, the Northern Ireland Department of Enterprise, Trade and Industry and BT have invested in the rollout of superfast technologies to Northern Ireland so that they were available to 95% of premises in 2012 and 11% had taken them up.²⁰ The UK's Broadband Stakeholder Group reported that the UK's

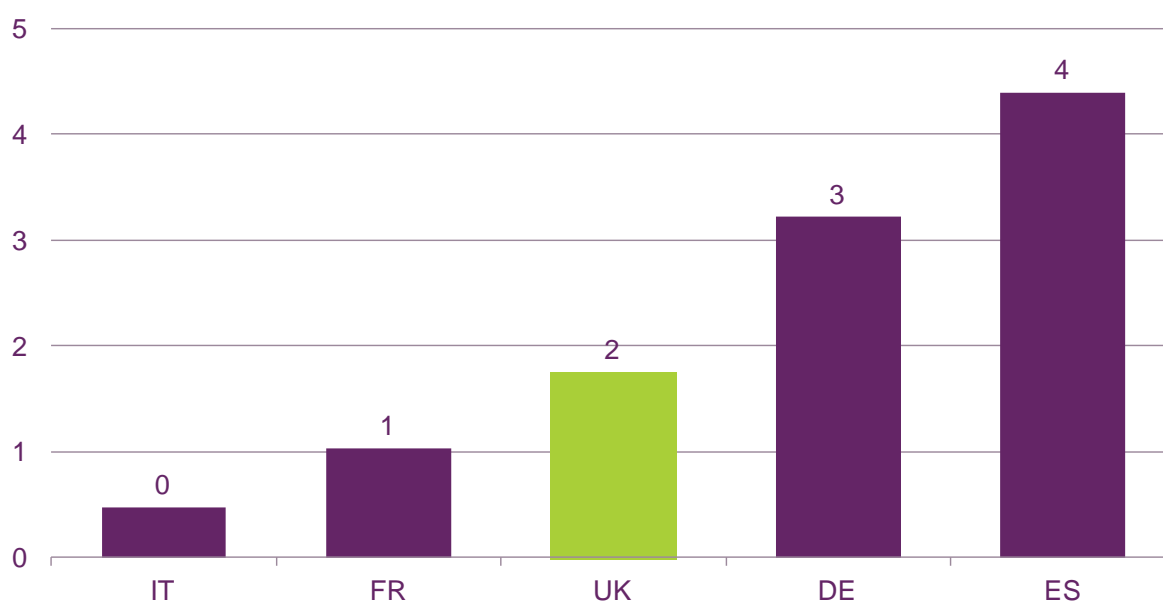
¹⁹ See <http://mediacentre.virginmedia.com/Stories/Virgin-Media-s-speed-doubling-starts-2380.aspx>.

²⁰ Ofcom, *Infrastructure Report 2012 Update*, p. 2.

superfast rollout 'has been amongst the quickest and broadest [amongst the comparator countries it studies], in terms of coverage'.²¹

Ofcom estimates that 7% of UK premises had a superfast connection in June 2012. In January that year, using a different measure of superfast broadband penetration, Cocom reports that there were 2 superfast connections per 100 people. The highest superfast penetration rate among the EU5, Cocom reports, was in Spain, where there were 4 connections per 100 people.

Figure 14 Superfast broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Note: (1) Data refer to January 2012. (2) 'Superfast broadband' refers to NGA technologies, including VDSL, FTTP and DOCSIS3.0 cable, those needed to provide 30Mbit/s download speeds for end users.

Mobile broadband take-up

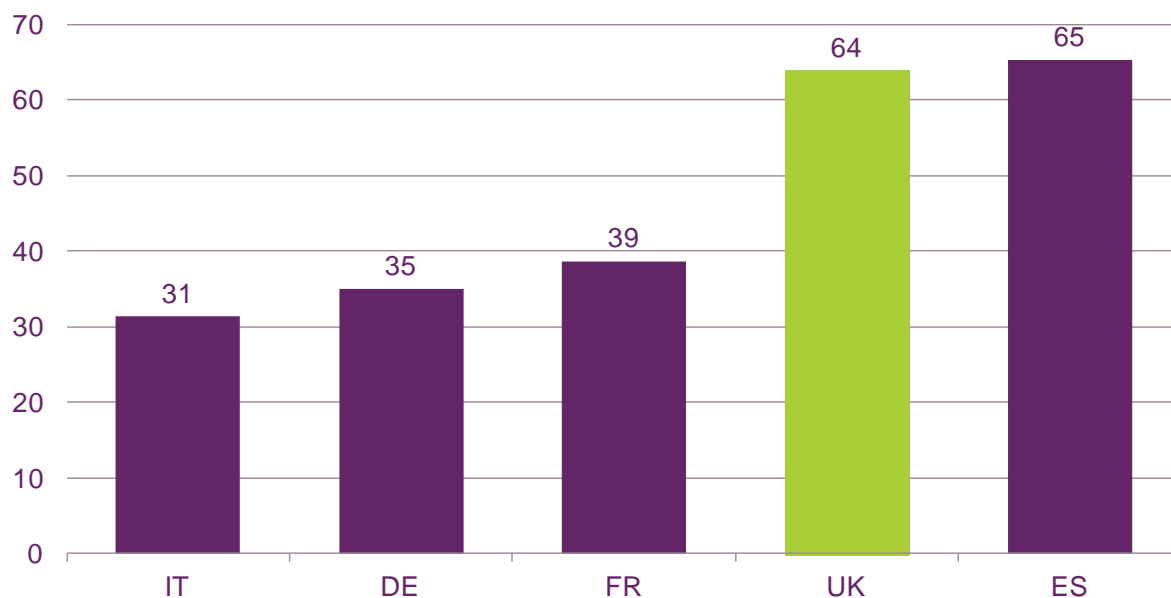
Cocom calculates mobile broadband penetration as the combined number of the following subscriptions per 100 people:

- Subscriptions that have connected to the internet in the preceding ninety days through a smartphone or web-enabled handset;
- Subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as a standalone service (modems/dongles); and
- Subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as an add-on data package requiring an additional subscription.

²¹ Broadband Stakeholder Group, *Demand for Superfast Broadband*, p. 13, at <http://www.broadbanduk.org/wp-content/uploads/2012/11/superfastbroadband.pdf>.

In the UK there were 64 such connections per 100 people in January 2012. In Spain the rate of penetration was slightly higher, at 65 per 100 people. In Italy (31 connections per 100 people), Germany (35) and France (39) the rate of mobile broadband penetration was lower.

Figure 15 Mobile broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Notes: (1) Data refer to January 2012. (2) Data combine the number of subscriptions that have connected to the internet in the preceding ninety days through a standard mobile subscription, the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as a standalone service (modem/dongle) and the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as an add-on data package requiring an additional subscription. (3) Mobile broadband connections may use technologies including 3G, HSPA and LTE.

Use of online services

Eurostat survey data covering the EU5 includes the following metrics relating to internet usage:²²

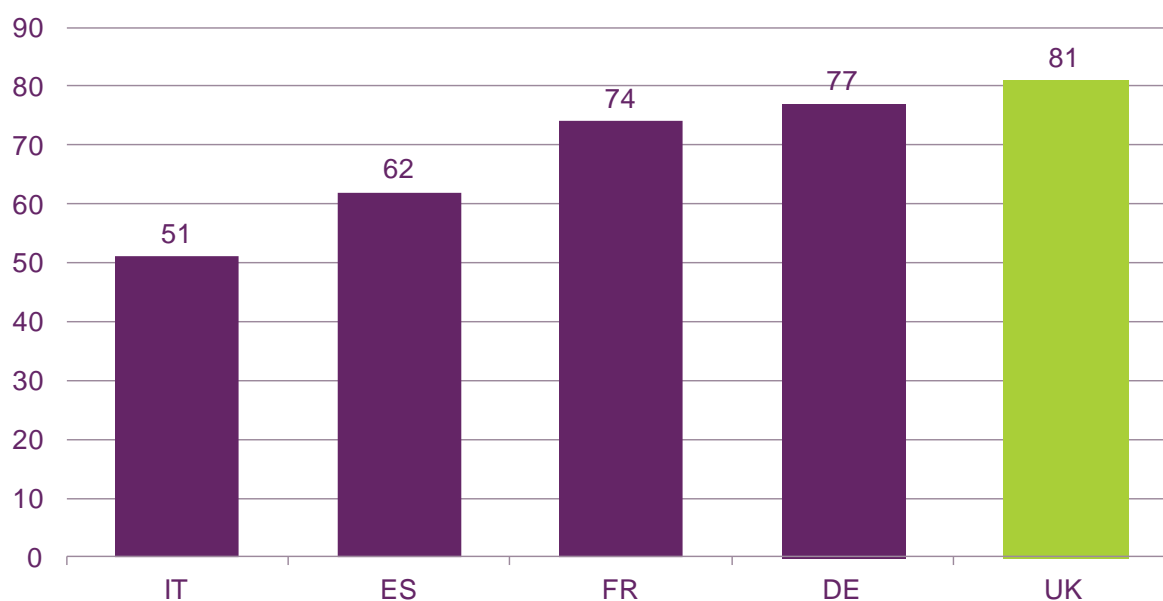
- The percentage of individuals accessing the internet at least once a week (Figure 16);
- The percentage of individuals who have never used the internet (Figure 17);
- The percentage of individuals who bought or ordered goods or services online within the last 12 months (Figure 18); and
- The percentage of individuals who have interacted online with public authorities within the last 12 months (Figure 19).

In Q1-Q2 2011, the proportion of individuals who accessed the internet at least once a week was 81% in the UK, a higher proportion than in any other EU5 country. Italy contained the

²² See [http://scoreboard.lod2.eu/index.php?scenario=1&indicators\[\]=i_blt12_IND_TOTAL_%_ind](http://scoreboard.lod2.eu/index.php?scenario=1&indicators[]=i_blt12_IND_TOTAL_%_ind)

lowest proportion of individuals who accessed the internet weekly (51%), followed by Spain (62%).

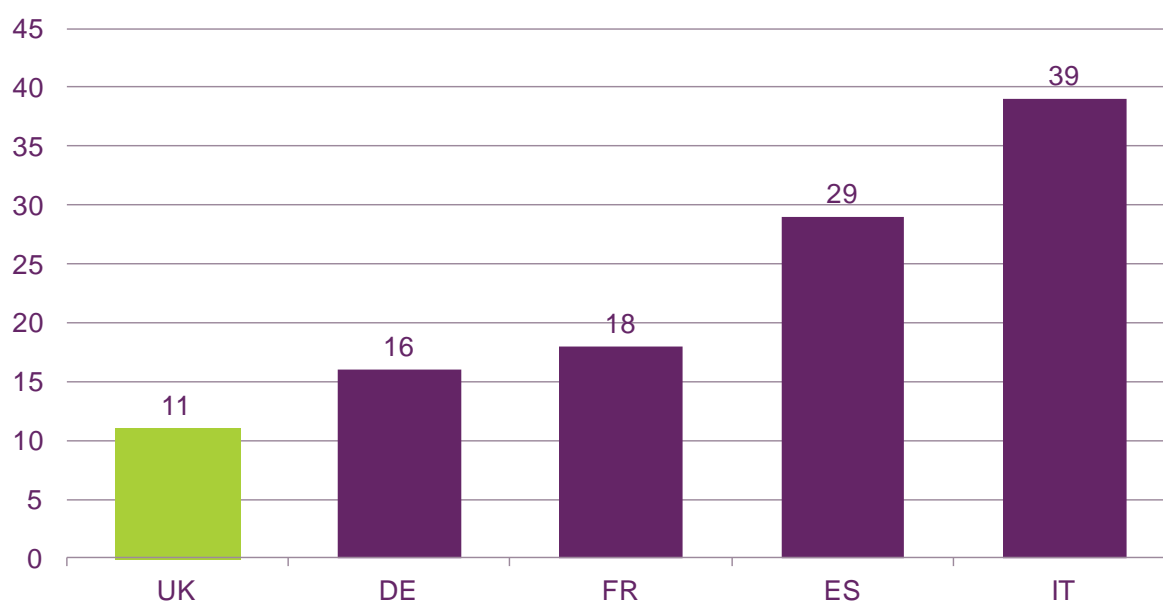
Figure 16 Percentage of individuals accessing the internet at least once a week



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.
Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

The UK contained a lower proportion of individuals who had never used the internet than any other EU5 country in Q1-Q2 2011 (11%). Sixteen per cent of people in Germany and eighteen per cent of people in France had never been online at period. A larger proportion of people in Italy (39%) and Spain (29%) had never done so.

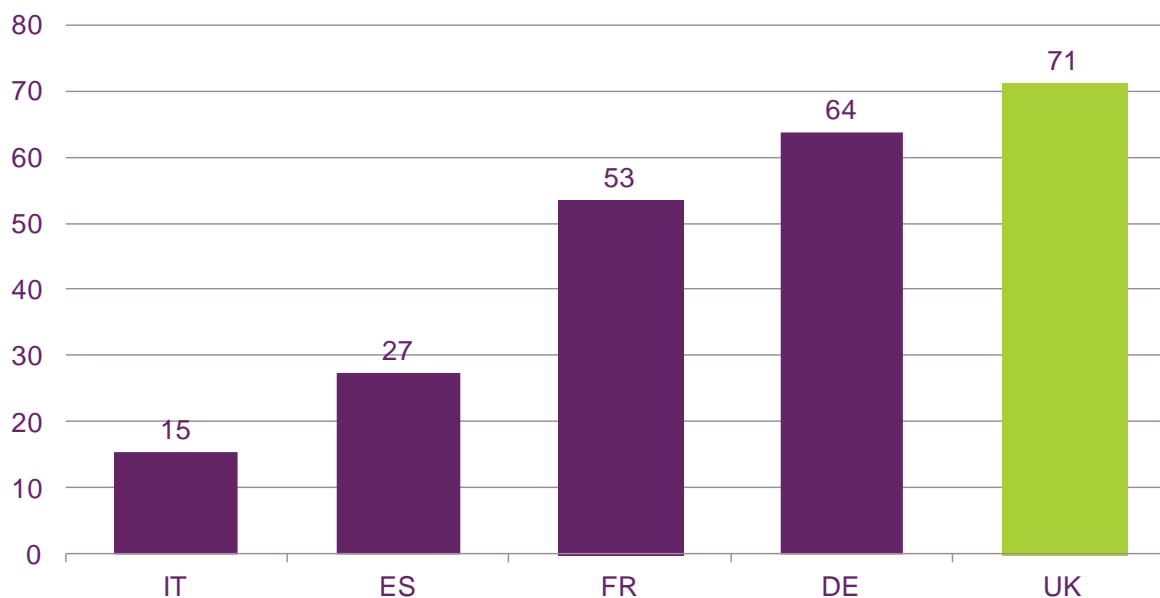
Figure 17 Percentage of individuals that have never used the internet



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.
Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

The UK contained the highest proportion of individuals who had bought or ordered goods or services online within the twelve months to Q1-Q2 2011 among the EU5 (71%). In Germany 64% of individuals had done so, while in Italy 15% had shopped online in the previous 12 months, the lowest proportion in an EU5 country.

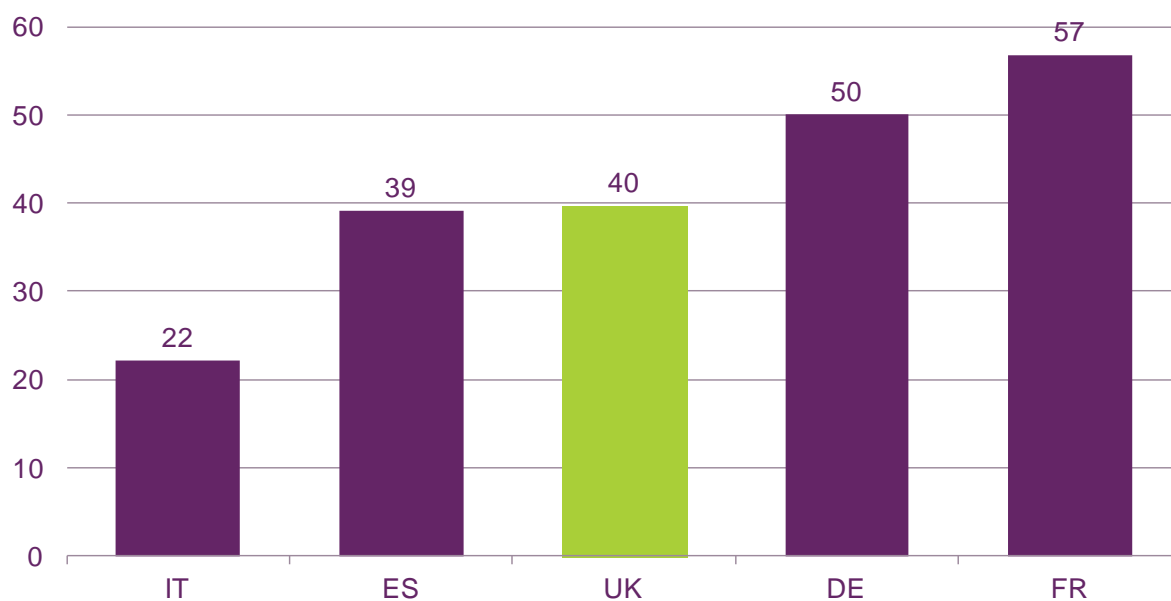
Figure 18 Percentage of individuals who bought or ordered goods or services online within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.
Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

A lower proportion of individuals had interacted with public authorities online in the twelve months to Q1-Q2 2011 in the UK (40%) than in France (57%) or Germany (50%). A similar proportion of people had done so in Spain (39%) to that in the UK. Italy contained the lowest proportion of people who had interacted with public authorities online in the previous twelve months among the EU5 (22%).

Figure 19 Percentage of population who interacted online with public authorities within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.

Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

2.4 Price

Ofcom compares the price of communications services in the UK, France, Germany, Italy, Spain and the US in its *International Communications Market Report*.²³

We do this using a model that incorporates the residential tariffs offered by the largest providers of consumer fixed broadband, fixed voice, mobile broadband and pay-TV services in these six countries, including bundled tariffs. Using this data, the model calculates the lowest possible monthly price at which a consumer could meet the usage requirements of pre-defined baskets of services.²⁴

Using this model we have undertaken additional analysis to determine the monthly cost of three baskets of fixed broadband and fixed voice services among EU5 countries. We present them in three different ways:

- **Weighted average single-service pricing.** This is the sum of the weighted average prices of the three cheapest standalone fixed broadband and three cheapest standalone fixed voice services that fulfil each basket's requirements. We weight the averages for each service by the relevant providers' market shares (Figure 20);
- **Simple average bundle pricing.** This is the mean of the three lowest prices for bundled fixed broadband and fixed voice services that fulfil each basket's requirements (Figure 21); and

²³ Ofcom, *International Communications Market Report 2012*, at <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr12/international/>.

²⁴ This model, provided by Teligen, incorporates the tariffs offered by those communications providers that make up 80% of the market by connection share for each service in each country, or a maximum of five providers for each service.

- **‘Best offer’ pricing.** This is the lowest price that a consumer could pay for each basket of services including, where appropriate, bundled services (Figure 22).

We have used the following baskets in this analysis:

- A fixed broadband connection with a minimum headline speed of ‘up to’ 8Mbit/s and 10GB of data use per month, alongside a fixed line with 350 minutes of outgoing calls per month;²⁵
- A fixed broadband connection with a minimum headline speed of ‘up to’ 16Mbit/s and 20GB of data use per month, alongside a fixed line with 350 minutes of outgoing calls per month; and
- A fixed broadband connection with a minimum headline speed of ‘up to’ 30Mbit/s and 30GB of data use per month, alongside a fixed line with 350 minutes of outgoing calls per month.

We have also analysed the price of mobile broadband services. Below, we display the single-service best offer prices of connections requiring 1GB, 3GB and 5GB of data per month using a datacard or dongle (not taking into account connection speed) (Figure 23).

We adjust all of our figures for purchasing power parity (PPP) so that they have equivalent purchasing power across countries.

There are limitations to how accurately our analysis can reflect the prices that consumers actually pay:

- Analysis of single-service tariffs excludes bundled offers. Ofcom research suggests that, in May to June 2012, 72% of UK residential fixed broadband users bought their connection in conjunction with another communications service;²⁶
- Best offer pricing data reflects tariffs that are often unavailable to many customers (for example if they do not have access to the requisite infrastructure); and
- Average pricing data does not give an indication of the range of prices among the tariffs from which we take the average.

However, by defining the cost of our baskets in different ways as set out above we have mitigated the risk that the analysis in the Scorecard distorts the experiences of consumers. We also believe that our data is the most recent available that compares fixed and mobile broadband prices across the EU5. We therefore consider that it is the most appropriate dataset for inclusion in the Scorecard.

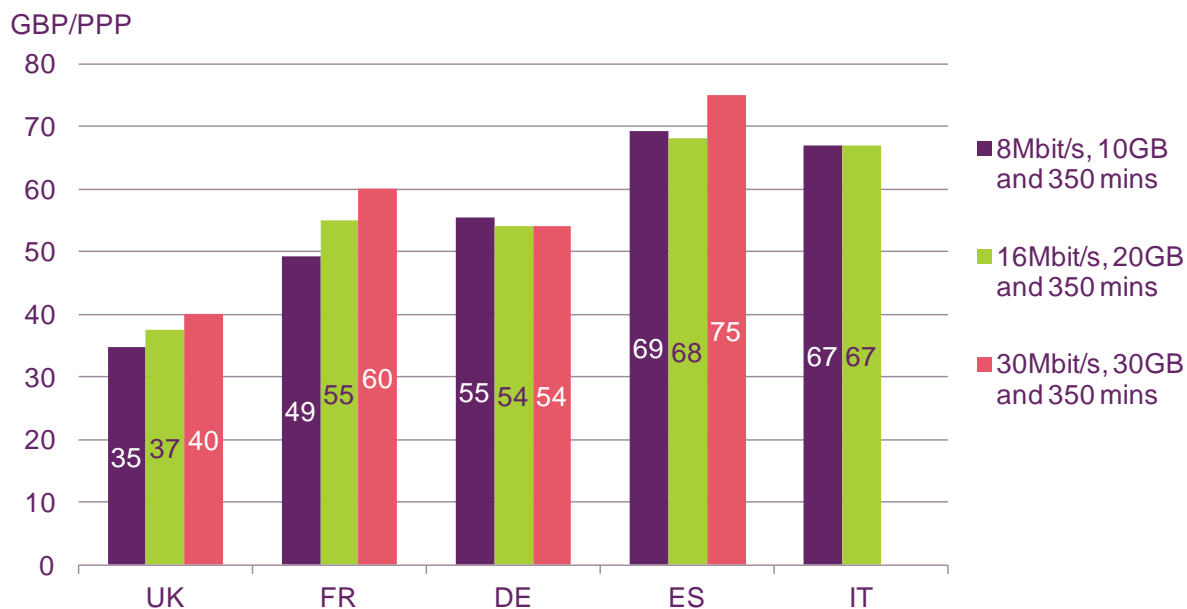
The average of the lowest available prices for standalone fixed broadband and fixed voice services, weighted by the relevant provider’s market share, was less in the UK than in any other EU5 country for all three baskets. The weighted average monthly price of single-service tariffs for fixed broadband and fixed voice offering 8Mbit/s headline download speed, 10GB of data use and 350 voice minutes was £35 in the UK. For 16Mbit/s, 20GB and 350

²⁵ According to data compiled for Ofcom’s *International Communications Market Report 2012*, the average monthly volume of fixed calls per exchange line across the EU5 countries was 351 minutes in 2011.

²⁶ Ofcom Technology Tracker, Wave 2 2012, at <http://stakeholders.ofcom.org.uk/binaries/research/statistics/2012Sept/data-tables-wave-2.pdf>.

minutes it was £37 and for 30Mbit/s, 30GB and 350 minutes it was £40. The highest weighted average standalone prices for all three baskets were found in Spain.

Figure 20 Weighted average single-service pricing for fixed broadband and fixed voice services

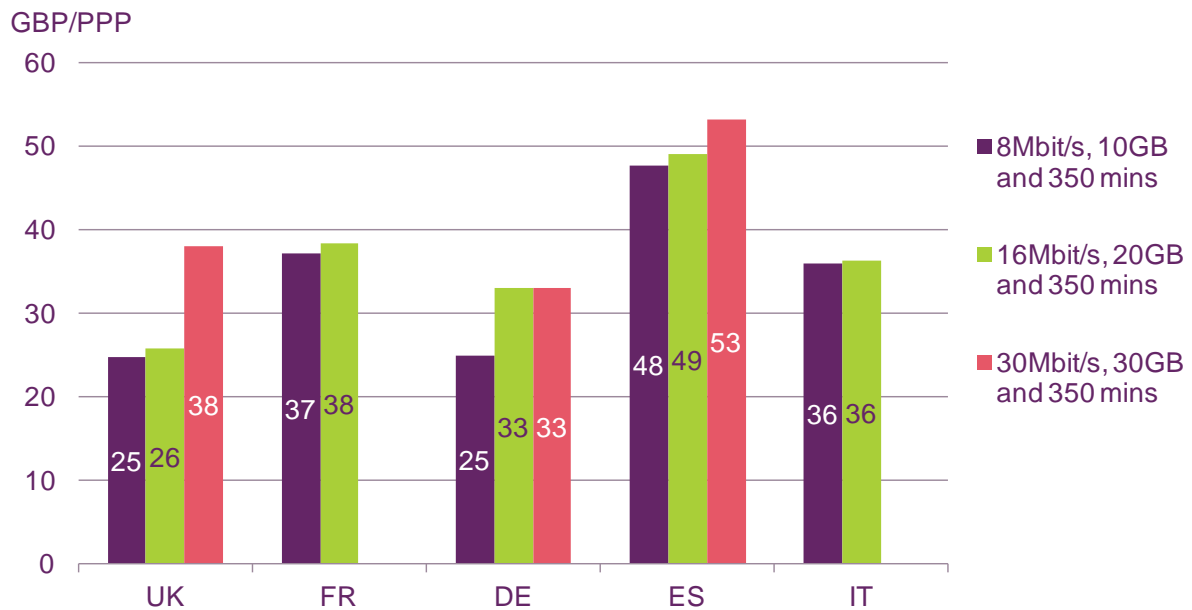


Source: Ofcom, using data supplied by Teligen.

Note: (1) Average of three lowest single-service tariffs available in each country, weighted by market share. (2) Data refer to July 2012. (3) In Italy no provider included in the Teligen model offered fixed broadband with a headline download speeds of 30Mbit/s or higher in July 2012. (4) PPP adjusted.

The averages of the lowest available bundled prices for a basket of fixed broadband and fixed voice services offering 8Mbit/s headline download speed, 10GB data use and 350 voice minutes were lowest in the UK and Germany at £25 per month (£24.79 and £24.94 respectively). For 16Mbit/s, 20GB of data and 350 minutes the lowest average price among the EU5 countries was in the UK at £26 per month, while the lowest average monthly price for a bundle offering 30Mbit/s, 30GB of data and 350 minutes was £33 in Germany. No bundles in Italy and France included in the Teligen model fulfilled the headline download speed and other requirements of this basket, so we cannot compare their prices to those in Germany (£33), the UK (£38) or Spain (£53).

Figure 21 Simple average bundle pricing for fixed broadband and fixed voice services

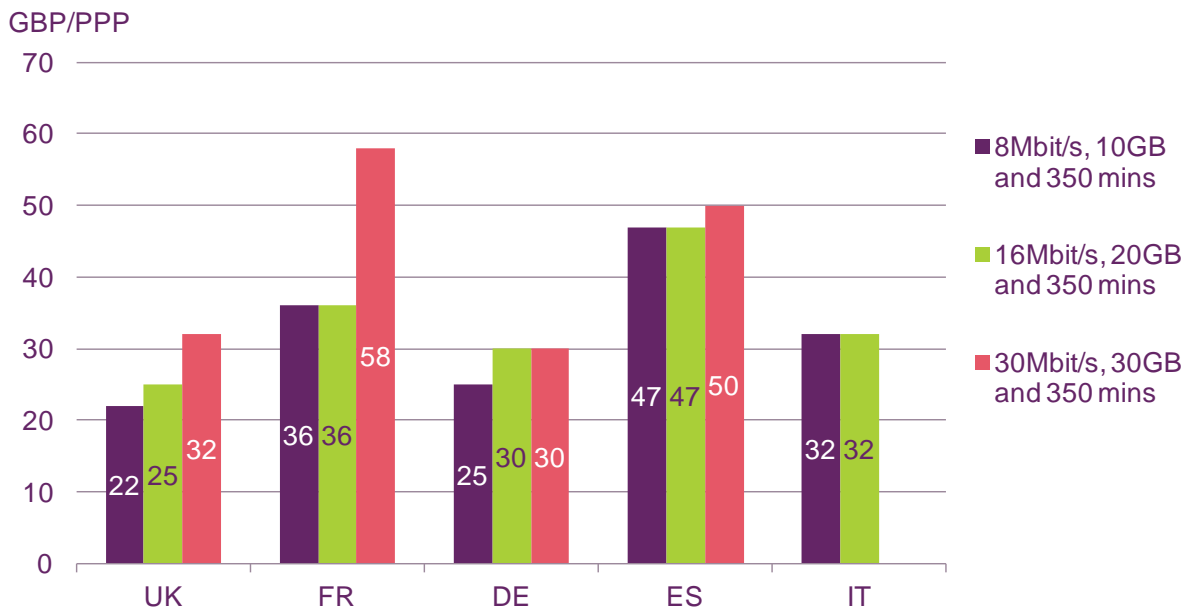


Source: Ofcom, using data supplied by Teligen.

Note: (1) Average of the three lowest bundled tariffs available in each country. (2) Data refer to July 2012. (3) In France and Italy no provider included in the Teligen model offered a bundled service including fixed broadband with a headline download speeds of 30Mbit/s or higher in July 2012. (4) PPP adjusted.

The best offer prices (including for bundled tariffs) of baskets of fixed broadband and fixed voice services offering 8Mbit/s headline download speed, 10GB of data use and 350 minutes and 16Mbit/s, 20GB data and 350 minutes were cheaper in the UK than in any other EU5 country at £22 and £25 per month respectively. However, the best offer price of a bundle offering 30Mbit/s, 30GB and 350 minutes was £30 in Germany, £2 a month less than that in the UK.

Figure 22 Best offer pricing for fixed broadband and fixed voice services, including bundled tariffs

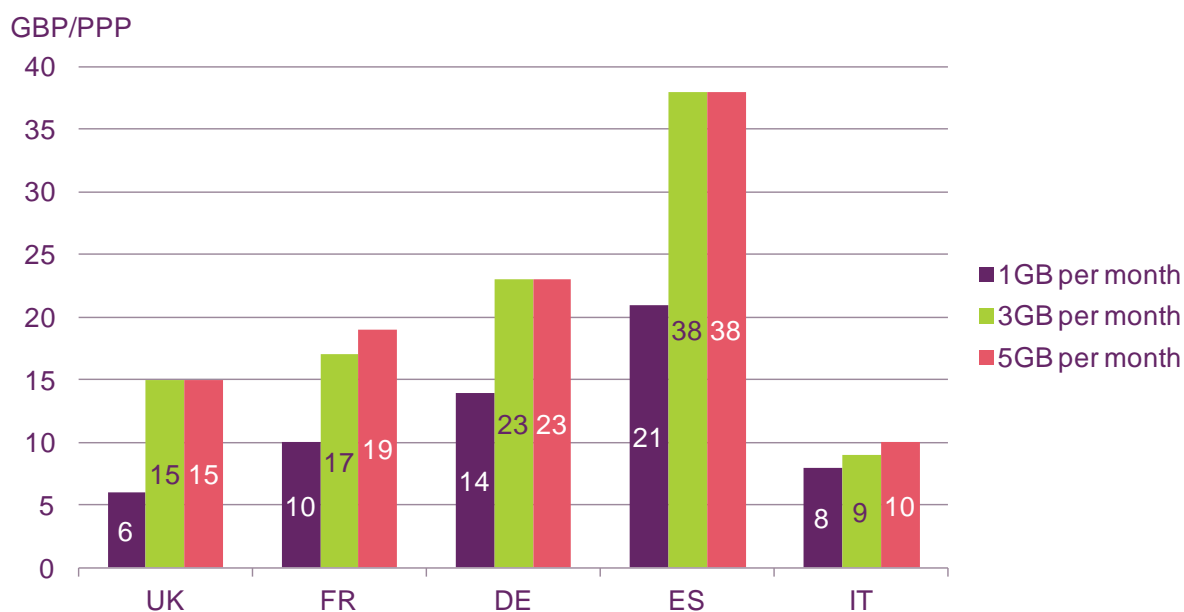


Source: Ofcom, using data supplied by Teligen.

Note: (1) Lowest tariff available in each country. (2) Data refer to July 2012. (3) In Italy no provider included in the Teligen model offered headline fixed broadband download speeds of 30Mbit/s or higher in July 2012. (4) In France no provider included in the Teligen model offered a bundled service including fixed broadband with a headline download speed of 30Mbit/s or higher. Therefore the figure shown is that for standalone services. (5) PPP adjusted.

The lowest best offer price for mobile broadband offering 1GB of data per month was from a UK operator (£6). The cheapest best offer prices for mobile broadband offering 3GB per month and 5GB per month were from operators in Italy (£9 and £10), with UK operators offered the second-lowest prices (£15 for both).

Figure 23 Best offer mobile broadband pricing



Source: Ofcom data supplied by Teligen.

Note: (1) Lowest tariff available from any of the largest providers by market share in each country. (2) Data refer to July 2012. (3) PPP adjusted.

2.5 Choice

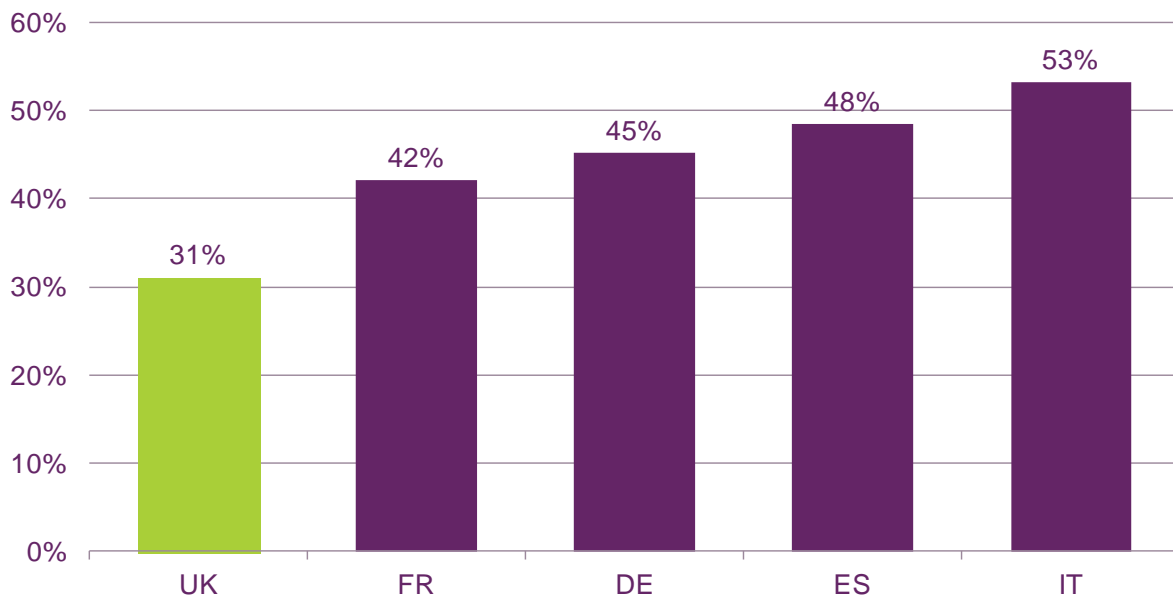
Market concentration in fixed broadband market

Figure 24 and Figure 25 illustrate two proxy measures of consumer choice in the broadband market: the percentage of all fixed broadband subscriptions that incumbent providers in EU5 countries operate and the market share of the largest mobile network operator (MNO) in each EU5 market. Cocom provides these market concentration data, which refer to January 2012 and October 2011 respectively.²⁷

The incumbent fixed broadband provider in the UK, BT, operated a lower proportion of lines (31%) than the incumbent provider in any other EU5 market. The second least-concentrated fixed broadband market was France (42%). The incumbent operated the highest proportion of lines in Italy (53%).

²⁷ See https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/broadband_lines_agreements.xls and <http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/KKAH12001ENN-chap3-PDFWEB-3.pdf>.

Figure 24 Percentage of fixed broadband lines operated by incumbent



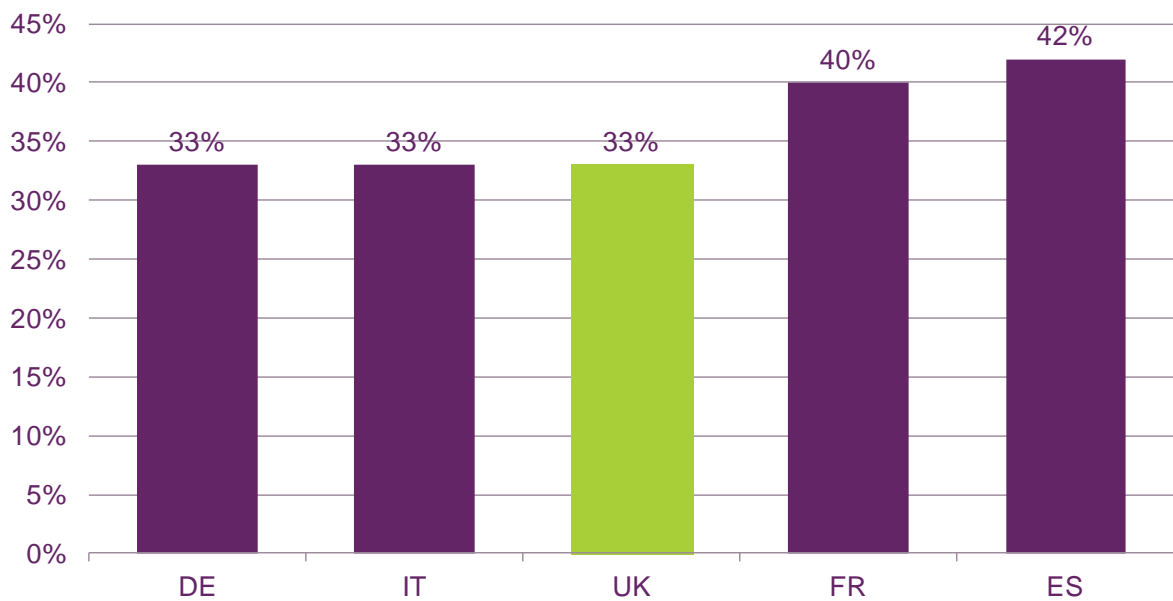
Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Note: (1) Data refer to January 2012. (2) These data refer to all forms of fixed line broadband, including standard and superfast connections.

Market concentration in mobile broadband market

EE (formerly Everything Everywhere) operated 33% of UK mobile connections in January 2012. In Germany and Italy the leading MNOs operated same proportion of connections. The markets in Spain (where the leading MNO operated 42% of connections) and France (40%) were more concentrated.

Figure 25 Percentage market share of leading MNOs



Source: Commission services, Fast and ultrafast broadband services, 2012.

Note: Data refer to October 2011.

Annex A: EU27 data

1.1 Overview

The charts in this Annex illustrate the Scorecard's metrics using data on all EU27 countries, where these data are available. We include these charts for completeness. However, as we explained above, we consider that it is more appropriate to compare the UK's broadband network against those of other major European economies, as we have done in the Scorecard, than against all EU countries.

The data below are from the same sources as those in the Scorecard except in the case of pricing, as Ofcom's pricing model only incorporates tariffs from EU5 countries. Instead, in this Annex we present pricing data commissioned by the EC that covers the EU27. The methodology of this pricing analysis differs from Ofcom's analysis, as explained below.

Figure 26 Overview of the UK's position on the Scorecard relative to the EU27

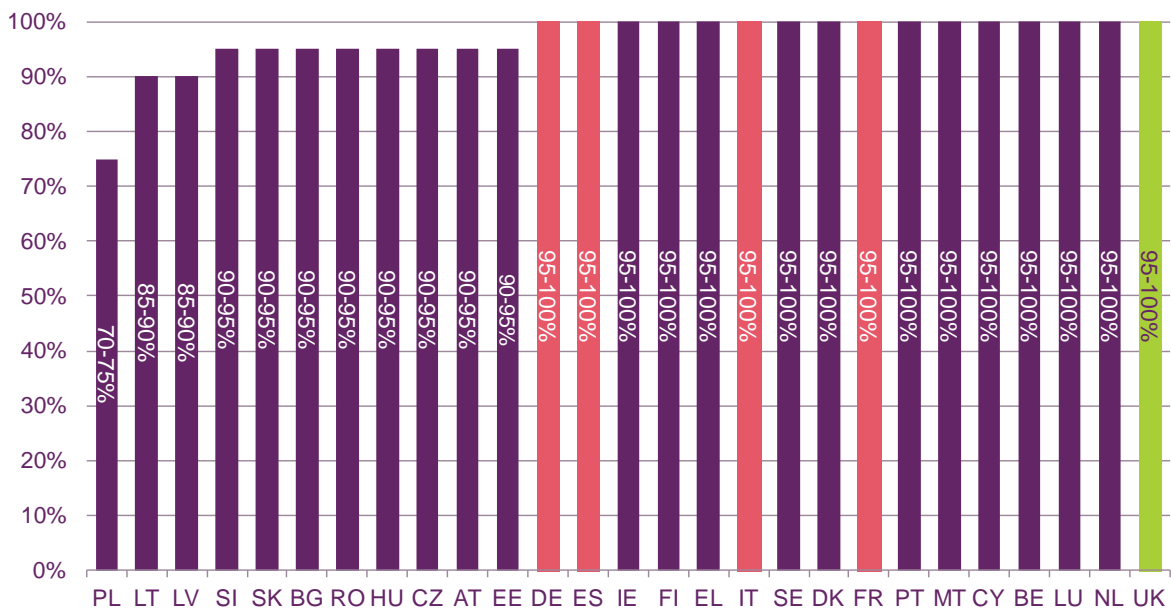
| Coverage | EU27 | Take-up and usage | EU27 | Speed | EU27 | Price | EU27 | Choice | EU27 |
|------------------------------|-------|--------------------------------------|----------------|-----------------------|------|------------------------------|------|---|-------|
| Standard broadband coverage | =1/27 | Standard broadband take-up | 8/27 and 3/27* | Fixed download speed | N/A | Price of standard broadband | N/A* | Market concentration in fixed broadband market | 4/27 |
| Superfast broadband coverage | 17/27 | Superfast broadband take-up | 21/27 | Fixed upload speed | N/A | Price of superfast broadband | N/A | Market concentration in mobile broadband market | =2/27 |
| Mobile broadband coverage | =1/27 | Mobile broadband take-up | 6/27 | Mobile download speed | N/A | Price of mobile broadband | N/A | | |
| | | % accessing internet regularly | 6/27 | | | | | | |
| | | % never used internet | 6/27 | | | | | | |
| | | % buying goods or services | 1/27 | | | | | | |
| | | % interacted with public authorities | 16/27 | | | | | | |

* 8/27 for broadband penetration per 100 people. 5/27 for broadband penetration per 100 households.

** We derive the EU27 pricing data below from a different source to the EU5 pricing figures in the Scorecard, above. To avoid confusion we have not summarised the UK's ranking relative to EU27 countries in this chart with regard to pricing.

1.2 Coverage

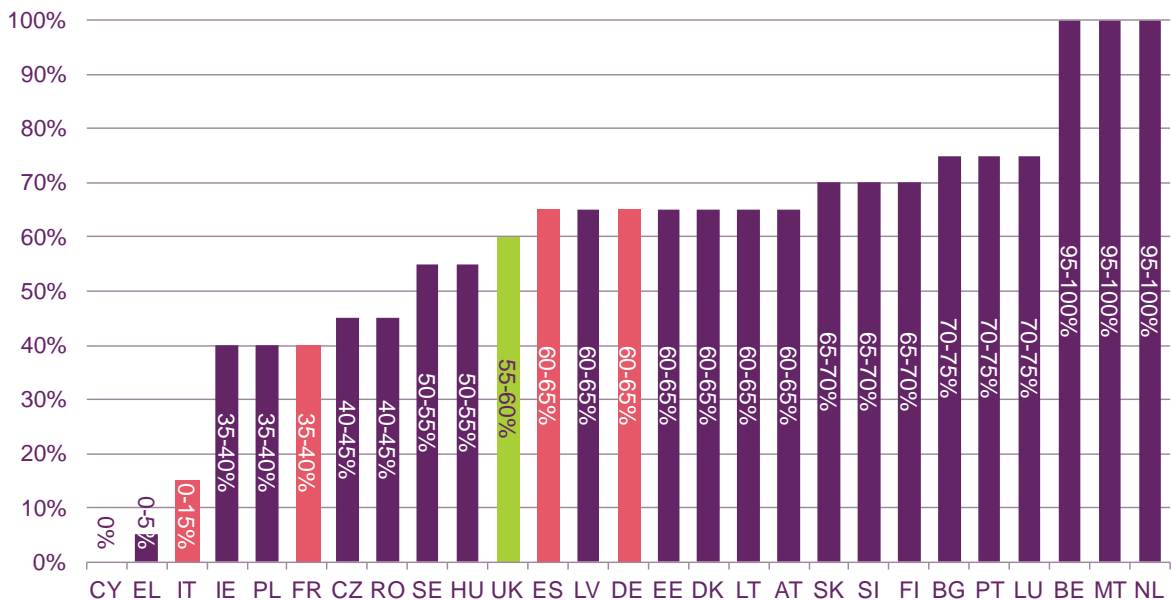
Figure 27 Percentage of households in areas served by standard broadband



Source: Point Topic / EC, *Broadband Coverage in Europe 2011*, November 2012.

Note: (1) Data refer to year-end 2011. (2) Ofcom has banded Point Topic's figures within a range between the nearest integers divisible by 5. (3) 'Standard broadband' refers to DSL, FTTP, WiMAX and Standard Cable, the main fixed line technologies capable of providing headline speed of at least 144kbit/s and less than 30Mbit/s download speed for end-users.

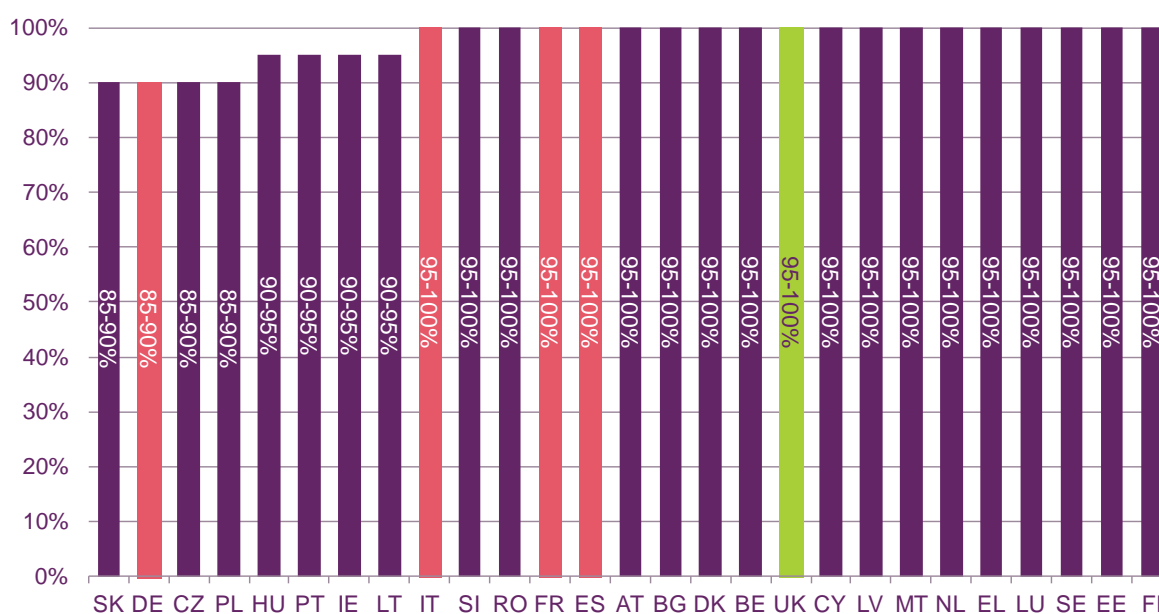
Figure 28 Percentage of households in areas served by superfast broadband



Source: Point Topic / EC, *Broadband Coverage in Europe 2011*, November 2012.

Note: (1) Data refer to year-end 2011. (2) Ofcom has banded Point Topic's figures within a range between the nearest integers divisible by 5. (3) 'Superfast broadband' refers to NGA technologies, including VDSL, FTTP and DOCSIS3.0 cable, those needed to provide 30Mbit/s download speeds for end users.

Figure 29 Percentage of households in areas served by mobile broadband

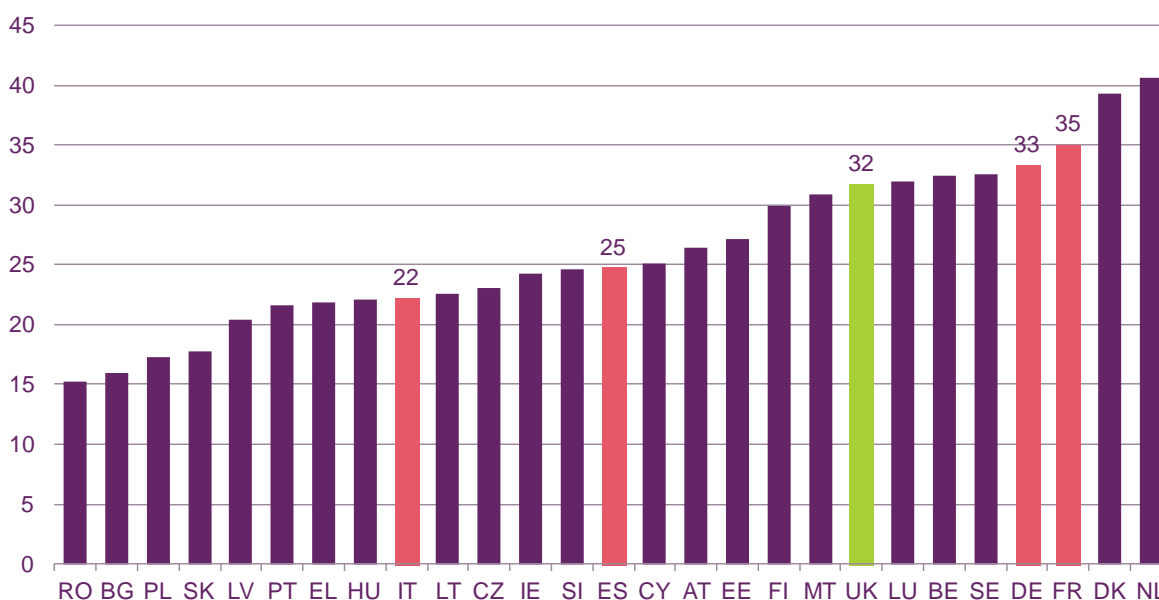


Source: Point Topic / EC, *Broadband Coverage in Europe 2011*, November 2012.

Note: (1) Data refer to year-end 2011. (2) Ofcom has banded Point Topic's figures within a range between the nearest integers divisible by 5. (3) 'Mobile broadband' refers to coverage by at least one HSPA-upgraded 3G mobile network.

1.3 Take-up and usage

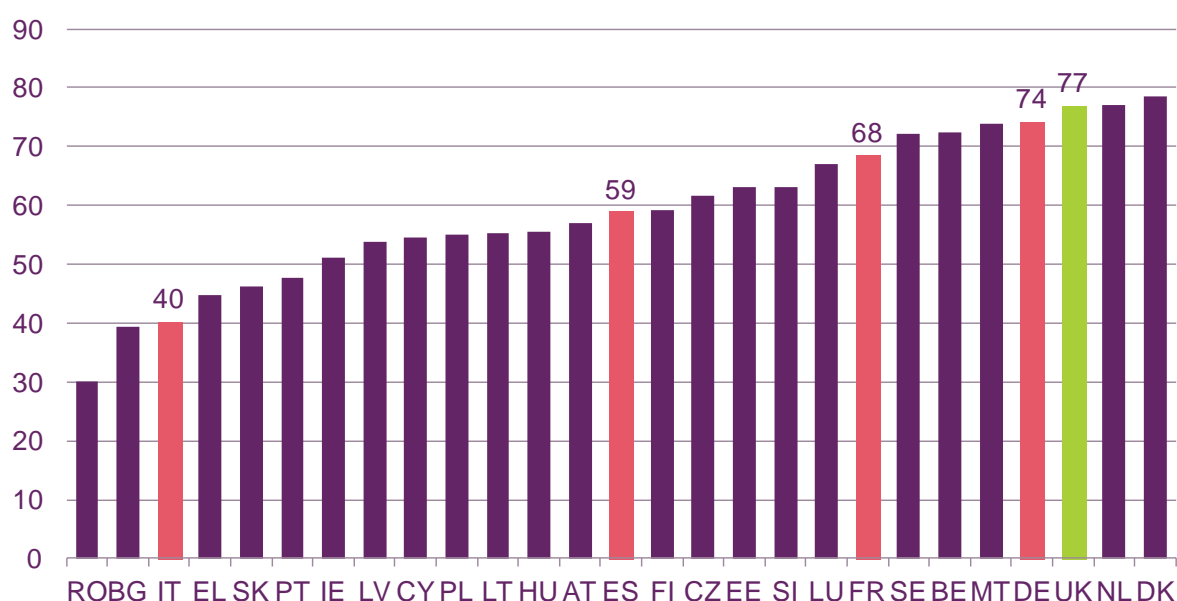
Figure 30 Fixed broadband connections per 100 people



Source: Cocom, EC, *Digital Agenda Scoreboard 2012*.

Note: (1) Data refer to January 2012. (2) These data refer to all forms of fixed line broadband, including standard and superfast connections.

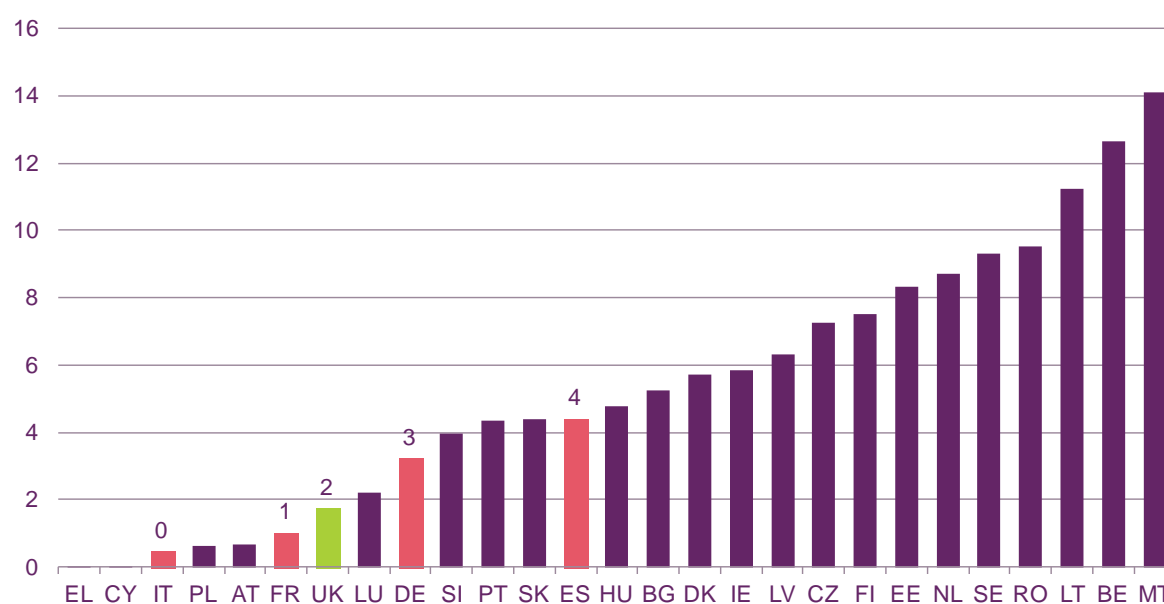
Figure 31 Fixed broadband connections per 100 households



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.

Note: (1) Data refer to Q1 2011. (2) These data refer to all forms of fixed line broadband, including standard and superfast connections. (3) Data relates to households with at least one member aged 16-74 years.

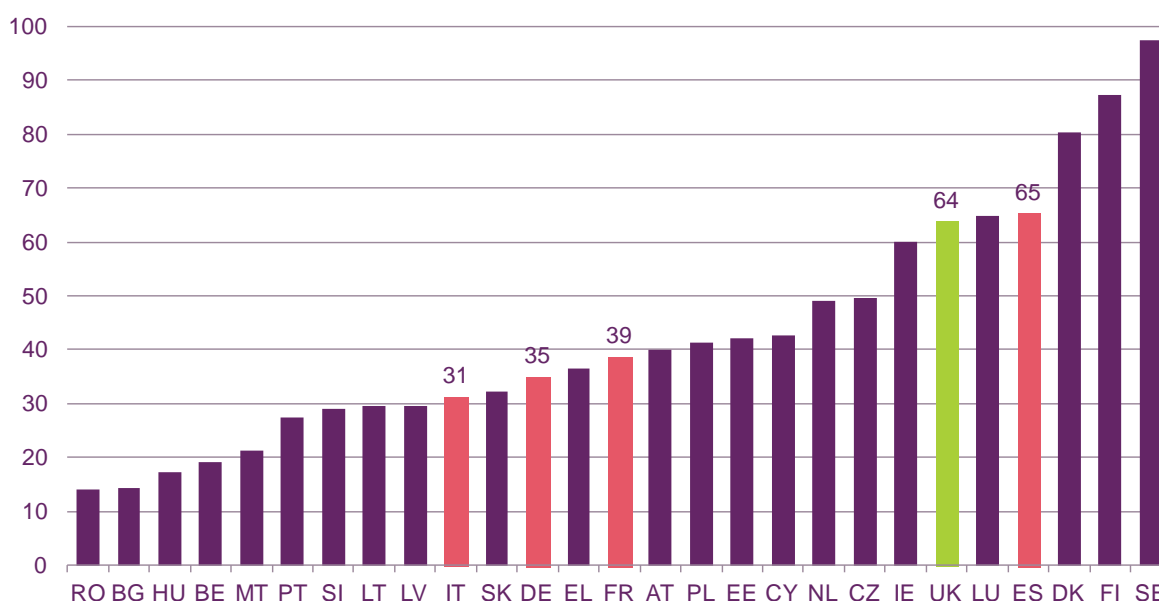
Figure 32 Superfast broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Note: (1) Data refer to January 2012. (2) 'Superfast broadband' refers to NGA technologies, including VDSL, FTTP and DOCSIS3.0 cable, those needed to provide 30Mbit/s download speeds for end users.

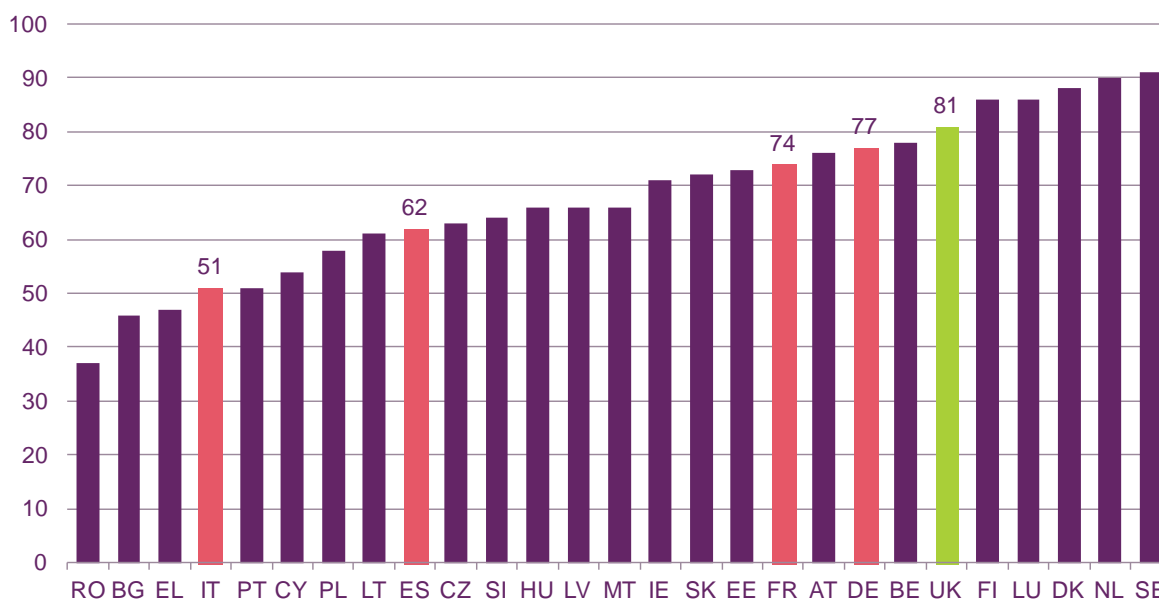
Figure 33 Mobile broadband connections per 100 people



Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Notes: (1) Data refer to January 2012. (2) Data combine the number of subscriptions that have connected to the internet in the preceding ninety days through a standard mobile subscription, the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as a standalone service (modem/dongle) and the number of subscriptions to dedicated data services over a mobile network that are purchased separately from voice services as an add-on data package requiring an additional subscription. (3) Mobile broadband connections may use technologies including 3G, HSPA and LTE.

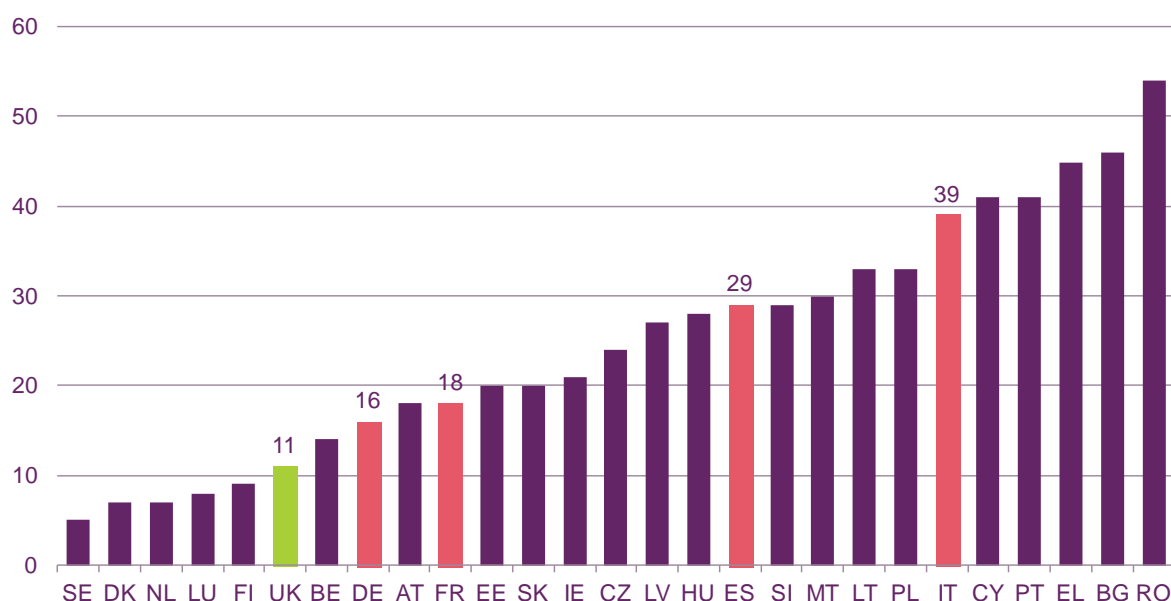
Figure 34 Percentage of individuals accessing the internet at least once a week



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.

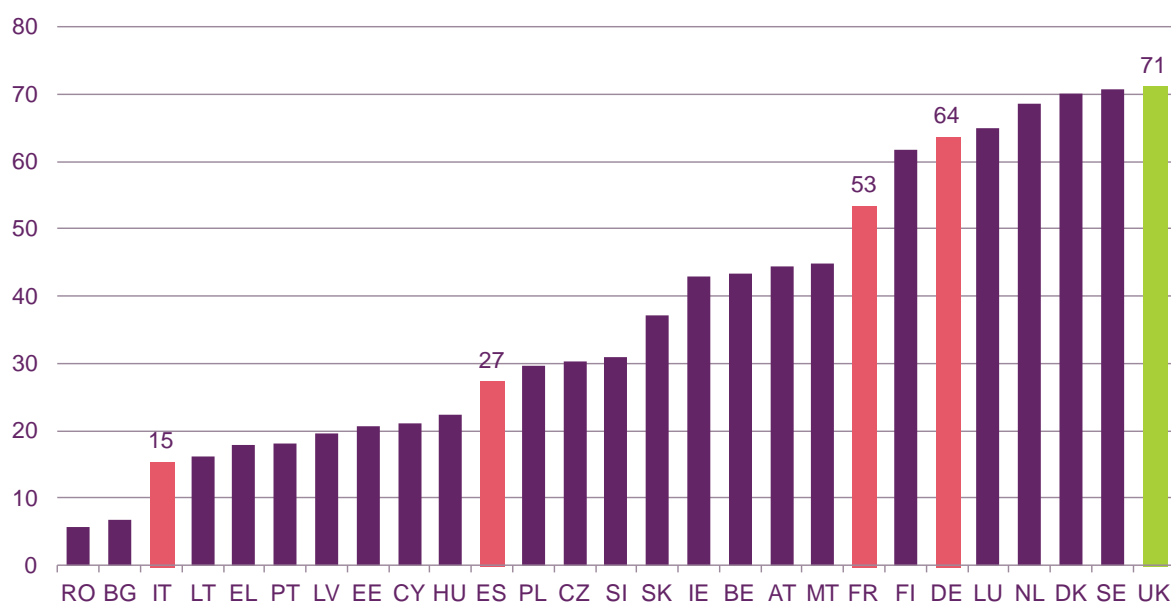
Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

Figure 35 Percentage of individuals that have never used the internet



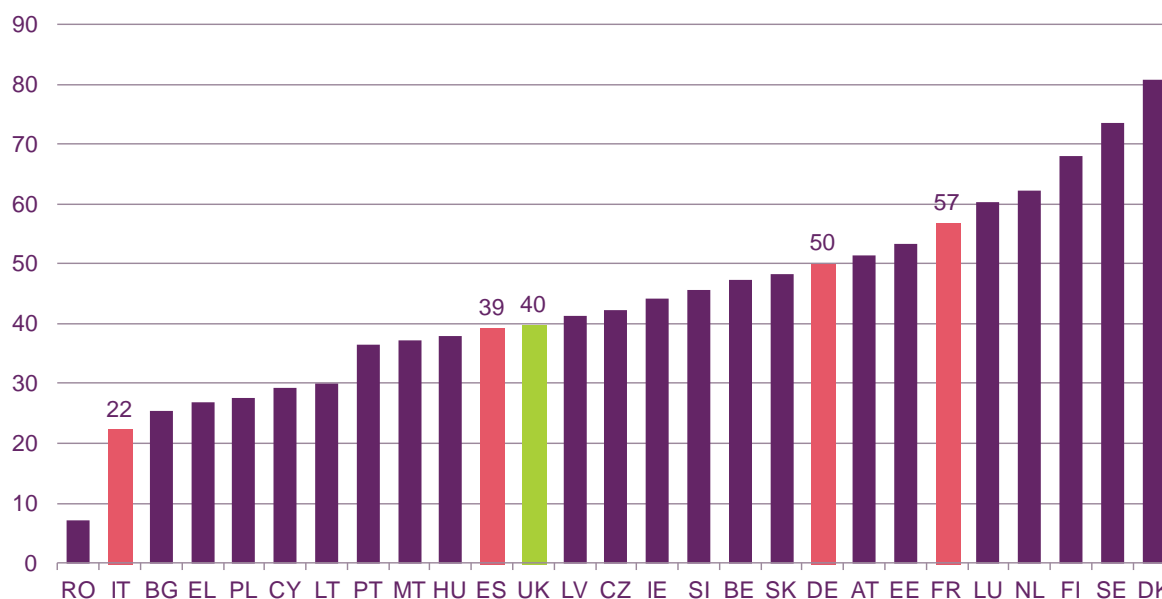
Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.
 Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

Figure 36 Percentage of individuals who bought or ordered goods or services online within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.
 Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

Figure 37 Percentage of population who interacted online with public authorities within the last 12 months



Source: Eurostat, Community survey on ICT usage in Households and by Individuals, 2011.

Note: (1) Data refer to Q1-Q2 2011. (2) These data cover individuals aged 16 to 74.

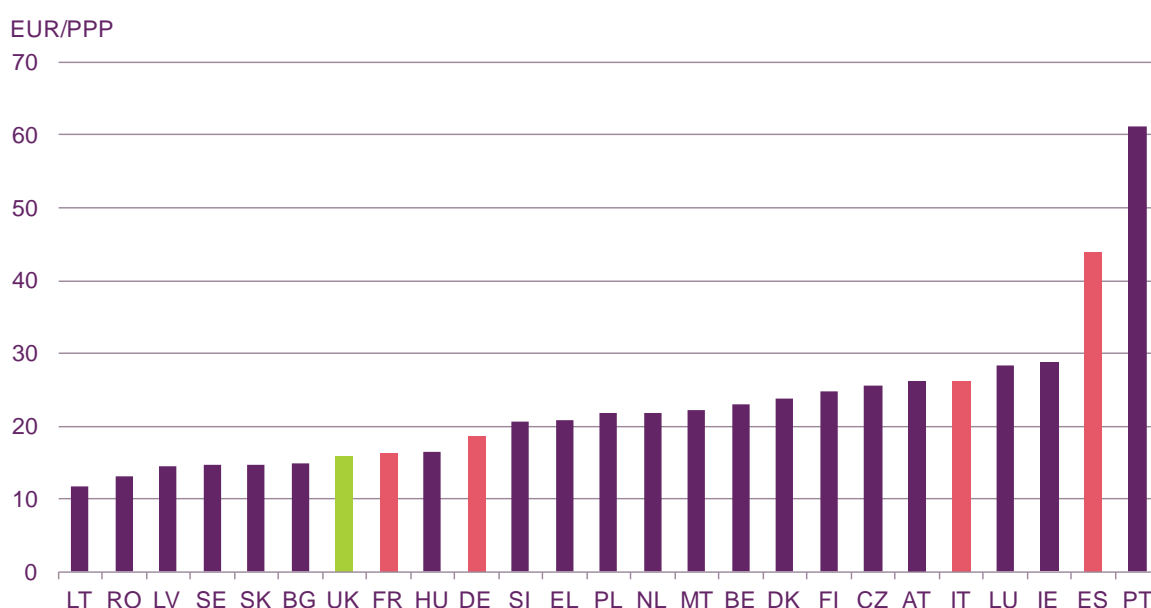
1.4 Price

We have included analysis from our Teligen model in the Scorecard because it uses the most recent pricing data available for the EU5; however, it does not include tariffs from all EU27 countries.

The EC has commissioned Van Dijk Management Consultants (VDMC) to compare the cost of broadband access across the EU27 and other comparator countries.²⁸ Below we show a sample of VDMC's results, relating to best offer single-service fixed broadband tariffs and best offer bundles of fixed broadband and fixed voice telephony services. VDMC publishes its results in Euros, adjusted for PPP. They refer to February 2012.

²⁸ See VDMC / EC, *Broadband Internet Access Cost 2012*, 2012, at <http://ec.europa.eu/digital-agenda/en/news/broadband-internet-access-cost-2012-biac>.

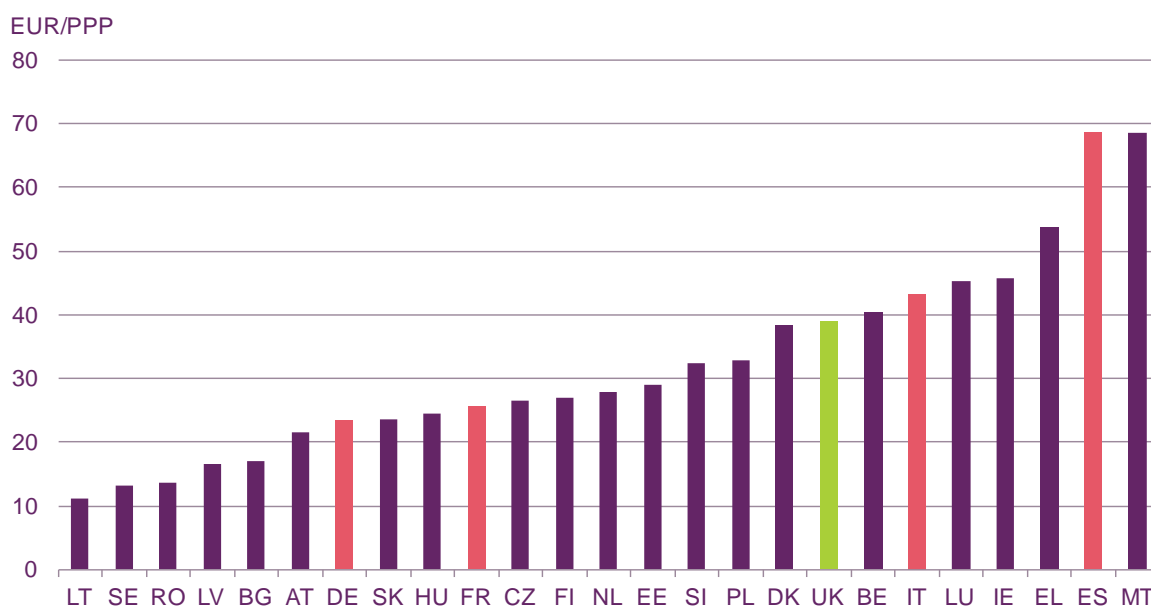
Figure 38 Best offer single-service standard broadband pricing



Source: VDMC / EC, *Broadband Internet Access Cost*, 2012.

Note: (1) Best offer monthly cost of single-service fixed-line broadband access with a headline download speed of 12-30Mbit/s (inclusive). (2) Data refer to February 2012. (3) Some offers are metred with 10GB monthly download limits. (4) Sampled ISPs represent at least 90% of national markets except in very fragmented markets, where VDMC sampled 8 ISPs. (5) Includes the cost of non-recurring charges, such as installation or activation charges, divided over a period of 36 months. (6) No offer available in VDMC model for Cyprus or Estonia.

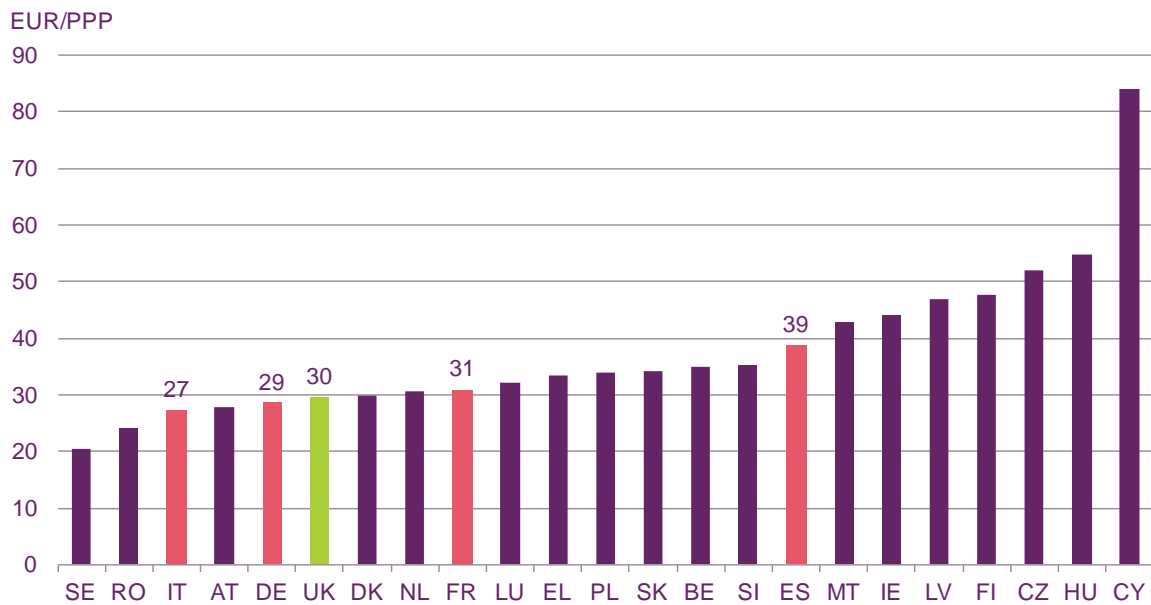
Figure 39 Best offer single-service superfast broadband pricing



Source: VDMC / EC, *Broadband Internet Access Cost*, 2012.

Note: (1) Best offer monthly cost of single-service fixed-line broadband access with a headline download speed of 30+Mbit/s. (2) Data refer to February 2012. (3) Some offers are metred with 30GB monthly download limits. (4) Sampled ISPs represent at least 90% of national markets except in very fragmented markets, where VDMC sampled 8 ISPs. (5) Includes the cost of non-recurring charges, such as installation or activation charges, divided over a period of 36 months. (6) No offer available in VDMC model for Cyprus or Portugal.

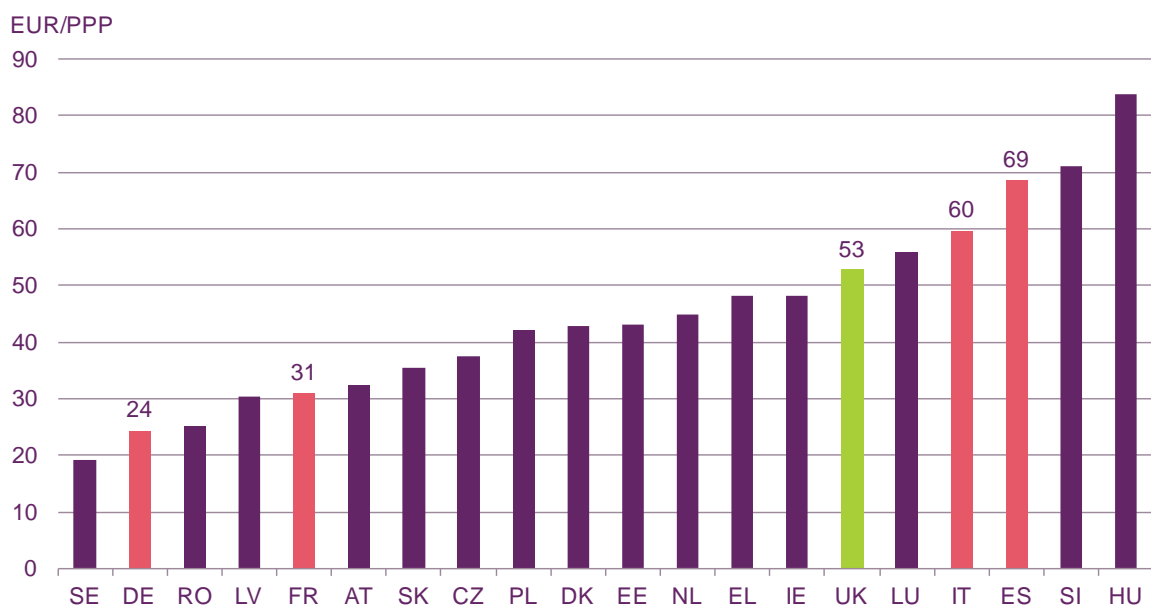
Figure 40 Best offer pricing for a bundle of standard broadband and fixed voice services



Source: VDMC / EC, Broadband Internet Access Cost, 2012.

Note: (1) Best offer monthly cost of a bundle of fixed-line broadband access with a headline download speed of 12-30Mbit/s (inclusive) and fixed voice services. (2) Data refer to February 2012. (3) Some offers are metred with 10GB monthly download limits; fixed telephony services are metered with 70 minutes to fixed networks and 30 minutes to mobile networks. (4) Sampled ISPs represent at least 90% of national markets except in very fragmented markets, where VDMC sampled 8 ISPs. (5) Includes the cost of non-recurring charges, such as installation or activation charges, divided over a period of 36 months. (6) No offer available in VDMC model for Bulgaria, Estonia, Lithuania or Portugal.

Figure 41 Best offer pricing for a bundle of superfast broadband and fixed voice services



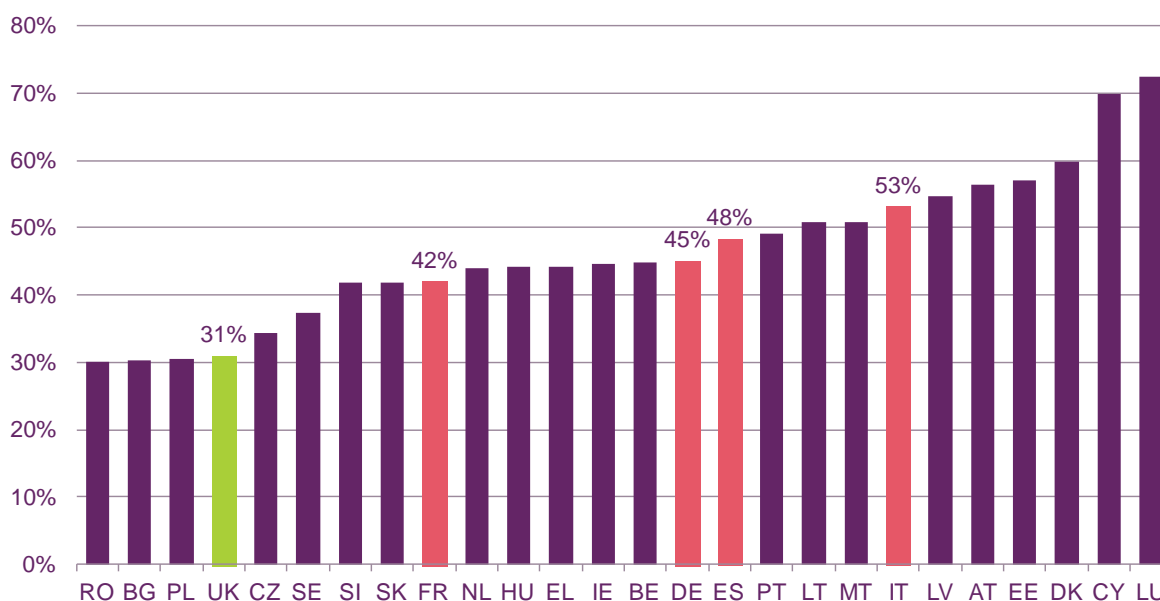
Source: VDMC / EC, Broadband Internet Access Cost, 2012.

Note: (1) Best offer monthly cost of a bundle of fixed-line broadband access with a headline download speed of 30+Mbit/s and fixed voice services. (2) Data refer to February 2012. (3) Some offers are

metered with 10GB monthly download limits; fixed telephony services are metered with 70 minutes to fixed networks and 30 minutes to mobile networks. (4) Sampled ISPs represent at least 90% of national markets except in very fragmented markets, where VDMC sampled 8 ISPs. (5) Includes the cost of non-recurring charges, such as installation or activation charges, divided over a period of 36 months. (6) No offer available in VDMC model for Belgium, Bulgaria, Cyprus, Finland, Lithuania, Malta or Portugal.

1.5 Choice

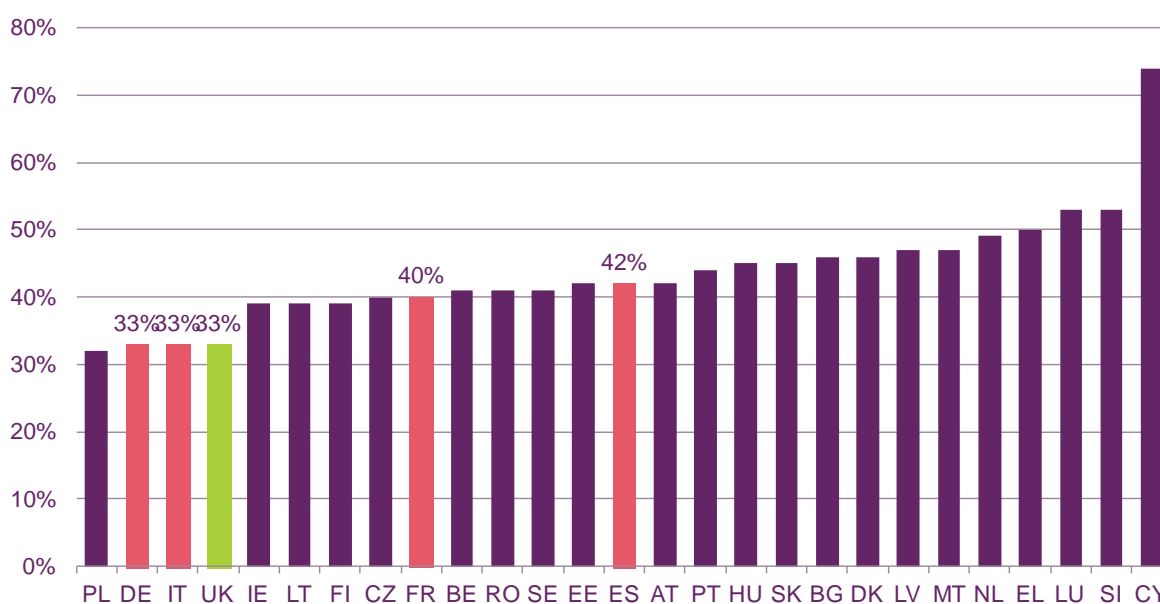
Figure 42 Percentage of fixed broadband lines operated by incumbent



Source: Cocom, EC, Digital Agenda Scoreboard 2012.

Note: (1) Data refer to January 2012. (2) These data refer to all forms of fixed line broadband, including standard and superfast connections.

Figure 43 Percentage market shares of leading MNOs



Source: Commission services, Fast and ultrafast broadband services, 2012.

Note: Data refer to October 2011.

Annex B: Analysis of broadband speed data

Below we set out our analysis of existing fixed-line broadband download speed datasets and why we have not published this metric in the Scorecard. We have not been able to identify fixed-line broadband upload speed and mobile broadband download speed datasets that might be considered for publication in this Scorecard.

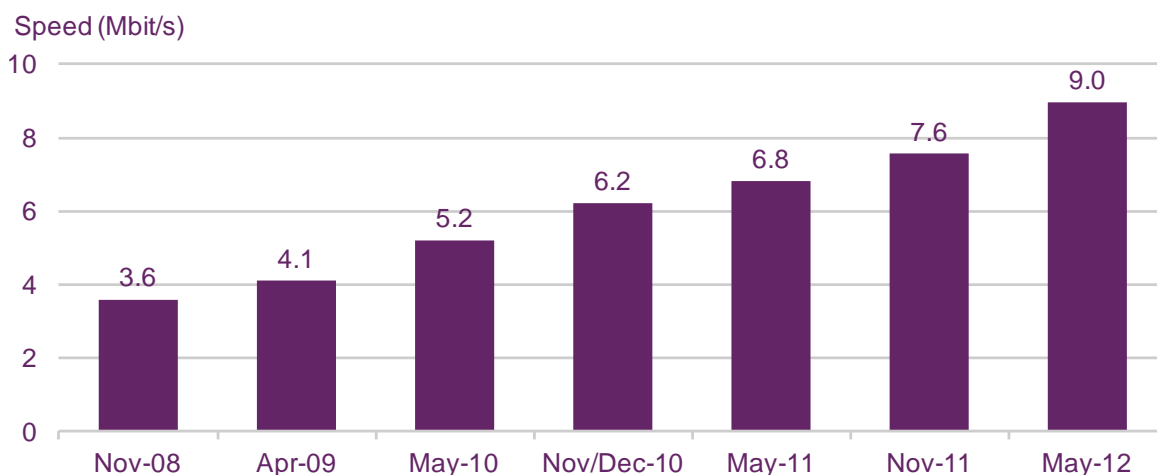
2.1 Ofcom's speed measurement work in the UK

To estimate the UK's national average broadband speed with appropriate accuracy, Ofcom tests a carefully-controlled sample of consumers' broadband connections using hardware installed in their homes.

Ofcom has measured the broadband speed that consumers receive in the UK since 2008. We publish our results twice a year, including the average speed of broadband in the UK. Broadband speed analysts SamKnows currently collect this data on our behalf. Our most recent published figure for the average speed of broadband in the UK is 9.0Mbit/s, which was derived from data collected in May 2012.

The chart below shows the average UK broadband speed since 2008.

Figure 44 Average broadband download speed in the UK: 2008-2012



Source: SamKnows / Ofcom

Note: (1) Data from all panel members with a connection in stated month. (2) Data weighted by ISP package and LLU/non-LLU connections, whether rural/urban, geographic market classification and distance from exchange to ensure that they are representative of UK residential broadband consumers as a whole. (3) As sufficient sample sizes were not available for consumers on packages offering headline download speeds of 'up to' 2Mbit/s or less, data collected for these packages in April 2009 has been factored in, in proportion to share of all connections in May 2010. (4) Data collected from single-thread download speed tests.

SamKnows obtain the data using test equipment called 'white boxes' in homes. White boxes are connected to the customer's modem or router and run tests to measure the speed of the broadband line.

As we know how the boxes are distributed, their location, the package to which the home subscribes and how and when the tests take place, we are confident that our data generates a reliable estimate of the average UK broadband speed that consumers experience. However, there are currently no data available on national average broadband speed across the EU5 that is derived from such hardware testing.

2.2 Other ways to measure speed

There are alternative ways to measure the speed of broadband networks, which have generated a number of fixed-line broadband speed datasets.²⁹ Drawing on our experience of collecting fixed-line speed data, we believe that there are limitations to the methodologies used to obtain these datasets that mean that we cannot be confident that they offer estimates of national average speed based on comparable testing and samples across countries and that are reflective of the speeds that consumers experience in practice. For these reasons we have not included the data in this Scorecard. We examine these alternative methods and their limitations below.

Sync speed measurement. The sync speed is the maximum speed a broadband line can support and is normally higher than the average speed consumers actually receive. As part of the process of collecting data for publication in Ofcom's *Infrastructure Report*, we survey a large majority of the broadband lines in the UK to obtain their sync speed from network providers.³⁰ This requires the largest communications providers in the country to provide data on every broadband line they operate. In our most recent analysis of data derived from this method, collected in June 2012, we calculated that the average UK fixed-line download speed was 12.7Mbit/s.

This approach provides an accurate measure of the consumer access network's performance. However, it does not take account of factors such as contention, traffic management policies or protocol overheads, so its results usually exceed the speed that consumers will experience in practice.

Software testing. These are tests of end users' connections that do not require the installation of hardware on the user's premises. For example, users can test their connection speed using downloaded applications, the providers of which may collate results to estimate national average broadband speeds. Alternatively, some content providers estimate users' connection speed from the time taken to deliver content of a known size. Both methods of testing are inexpensive to perform and can generate data from a large number of consumers quite easily.

However, it is more difficult to control the environment in which software testing generates its results in comparison with equipment-based testing, for example:

- The use of an end user's broadband connection in a separate session during a test can affect its results;
- Deriving data from the time required to deliver small amounts of content may not take account of the effect of the start-up processes of network protocols;
- Connection speed may not affect the time required to deliver data if providers stream that data at a constant speed (typically the case with video);

²⁹ See for example www.speedtest.net and www.akamai.com.

³⁰ Ofcom, *Infrastructure Report 2012 Update*.

- Variation in the amounts of data that end users consume in different countries and their transit or peering arrangements can skew some software-based testing; and
- The use of Wi-Fi to access broadband service can affect its speed and levels of Wi-Fi adoption may vary between countries.

2.3 Publishing broadband speed data in the Scorecard

Software testing can be a useful tool for consumers and generates large amounts of international data. However, given the factors set out above, we do not consider this data suitable for deriving comparable national average fixed-line download speed estimates.

We will keep the availability of data relating to fixed-line download speed, fixed-line upload speed and mobile download speed under review, so as to publish it in future versions of the Scorecard if possible.