



Brussels, 18.5.2018
SWD(2018) 198 final

PART 1/6

COMMISSION STAFF WORKING DOCUMENT

Digital Economy and Society Index (DESI) 2018

Digital Economy and Society Index Report 2018

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Introduction

The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe’s digital performance and tracks the progress of EU Member States in digital competitiveness.

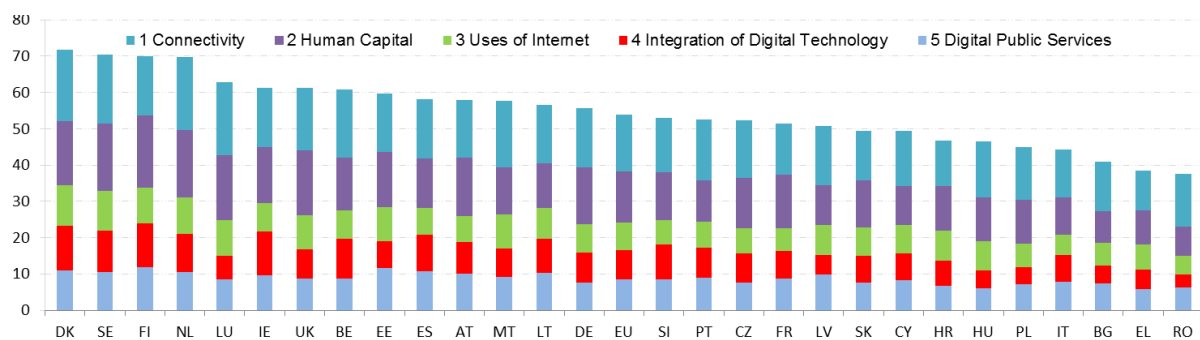
Denmark, Sweden, Finland and the Netherlands have the most advanced digital economies in the EU followed by Luxembourg, Ireland, the UK and Belgium.

Romania, Greece, Bulgaria and Italy have the lowest scores on the index.

Figure 1.1 The five dimensions of the DESI

1 Connectivity	Fixed Broadband, Mobile Broadband, Fast and Ultrafast Broadband and prices
2 Human Capital	Basic Skills and Internet Use, Advanced skills and Development
3 Use of Internet Services	Citizens' use of Content, Communication and Online Transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

Figure 1.2 Digital Economy and Society Index (DESI) 2018



Source: DESI 2018, European Commission

1. Connectivity: Broadband market developments in the EU

For **Connectivity**, the highest score was registered by the Netherlands followed by Luxembourg, Denmark and Sweden. Greece, Croatia and Italy had the weakest performance in this dimension of the DESI.

The connectivity dimension looks at both the demand and the supply side of fixed and mobile broadband. Under fixed broadband, it assesses the availability as well as the take-up of basic, fast (Next Generation Access – NGA providing at least 30 Mbps) and ultrafast (at least 100 Mbps) broadband and also considers the prices of retail offers. On mobile broadband, the availability of 4G and the take-up of mobile broadband are included. Digital Connectivity is considered as a social right in the EU.¹

A comparative assessment of fixed broadband (basic, fast and ultrafast) shows the Netherlands, Belgium, Luxembourg, Malta and Denmark, as the strongest performers. In contrast, Greece, Poland, Italy and Croatia are shown to be among the weakest performers.

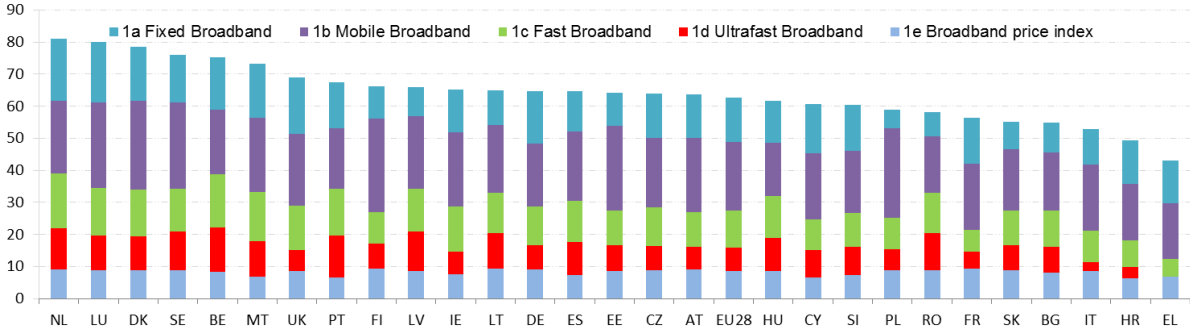
As for mobile broadband, the Nordic countries (Finland, Sweden and Denmark) lead Europe along with Latvia and Poland, while the lowest scores were registered by Hungary, Greece and Romania.

Figure 1.3 Connectivity indicators at EU level in DESI 2018

1a1 Fixed Broadband Coverage	97%
% households	2017
1a2 Fixed Broadband Take-up	75%
% households	2017
1b1 4G Coverage	91%
% households (average of operators)	2017
1b2 Mobile Broadband Take-up	90
Subscriptions per 100 people	2017
1c1 Fast Broadband (NGA) Coverage	80%
% households covered by VDSL, FTTP or Docsis 3.0	2017
1c2 Fast broadband take-up	33%
% homes subscribing to >= 30Mbps	2017
1d1 Ultrafast Broadband Coverage	58%
% households covered by FTTP or Docsis 3.0	2017
1d2 Ultrafast Broadband take-up	15.4%
% homes subscribing to >= 100Mbps	2017
1e1 Broadband price index	87
Score (0 to 100)	2017

¹ <https://composite-indicators.jrc.ec.europa.eu/social-scoreboard/>

Figure 1.4 Digital Economy and Society Index (DESI) 2018, Connectivity



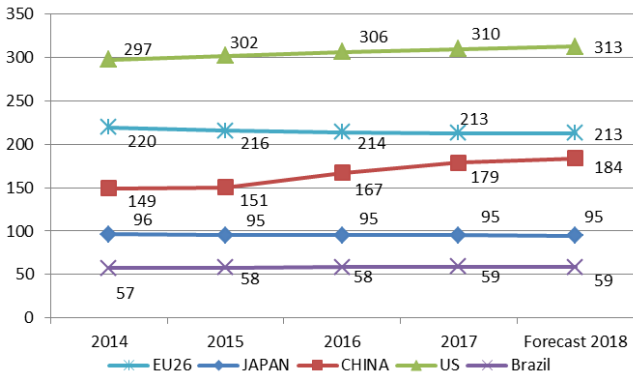
Source: DESI 2018, European Commission

Total telecom services revenues have slightly declined (by 3.1 %) in Europe since 2014. **Mobile and fixed voice revenues** have decreased by 16 % since 2014. An increase in **mobile data and internet services** was not enough to offset the major decline in voice services.

Telecom operators in Europe generated less revenue than the US operators. Revenues went slightly down from EUR 220 billion in 2014 to EUR 213 billion in 2017 in Europe. At the same time, the US revenues also slightly increased from EUR 297 billion to EUR 310 billion, despite its smaller population.

China increased its revenues by 23.3 %, from EUR 149 billion in 2014 to EUR 179 billion in 2017.

Figure 1.5 Total telecom services revenues per region, billion €, 2014-2018²



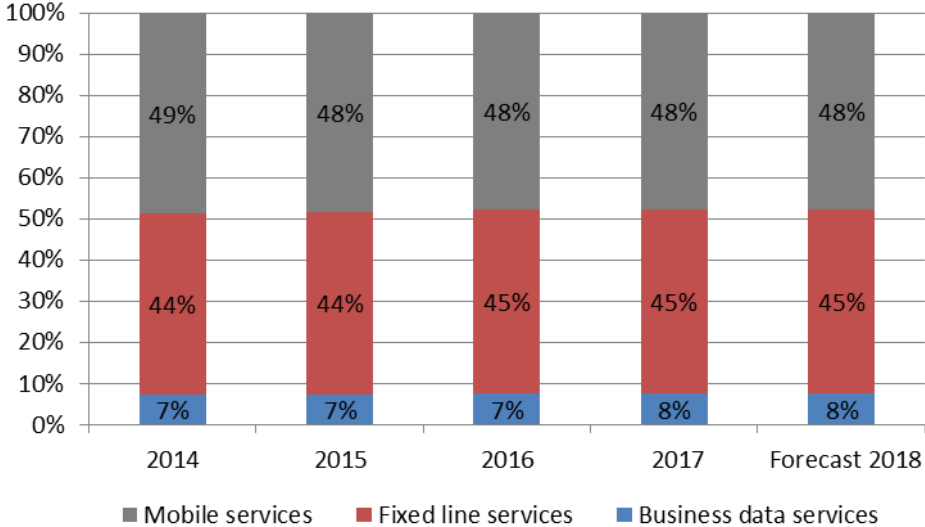
Source: 2017 - 2018 European IT Observatory (EITO) in collaboration with IDC.

² This analysis is based on detailed figures from 26 Member States, which covered about 98% of the total EU market (total telecom carrier services). Data is not available for Malta and Cyprus.

The analysis of telecommunications revenues (carrier services) by segment shows a decline in voice services (both fixed and mobile) revenues. Fixed voice service revenues have fallen by 11.6 % since 2014, compared to 20.4 % for mobile services over the same period (2014 – 2017). Together, fixed and mobile voice services represented 44 % of total telecom revenues in 2017, compared with 51 % in 2014.

Mobile data services represented 27 % of total revenues in 2017, up from 24 % in 2014. The growth in mobile data services could not, however, compensate for the major decline in voice services and overall revenues fall by 3 %.

Figure 1.6 Telecom services revenues by segment, % of total, 2014 - 2018³



Source: 2017 - 2018 European IT Observatory (EITO) in collaboration with IDC.

Broadband coverage: fast broadband (Next generation access - NGA) covers 80 % of homes, up from 76 % a year ago, while Ultrafast broadband (Fibre to the Premises and Docsis 3.0 cable) is available in 58 %. 4G mobile is almost universal at 98%. Rural coverage improved substantially in 4G and NGA technologies.

Our Targets (under the Digital Agenda for Europe)

Basic broadband for all by 2013: 100 % in 2017

Fast broadband (>30 Mbps) for all by 2020: 80 % in 2017

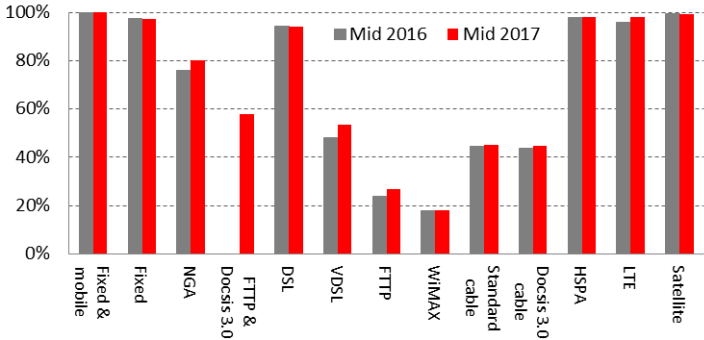
³ Note: this analysis is based on figures from 9 Member States, Belgium, Luxembourg, France, Germany, Italy, Spain, Greece, Spain and the UK, which covered about 70% of the total EU market (total telecom carrier services).

Basic broadband is available to all homes in the EU, when considering all major technologies (xDSL, cable, fibre to the premises - FTTP, WiMax, HSPA, LTE and satellite). Fixed and fixed-wireless technologies cover 97 % of EU homes.

Coverage of NGA technologies (VDSL, Cable Docsis 3.0 and FTTP) capable of delivering at least 30 Mbps download reached 80 %, thanks to an increase of 5 percentage points in VDSL and 3 percentage points in FTTP last year.

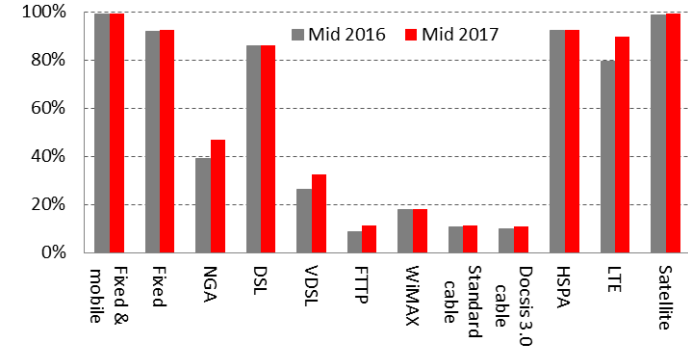
Rural areas remain challenging, as 8% of homes are not covered by any fixed network, and 53% are not covered by any NGA technology.

Figure 1.7 Total coverage by technology at EU level, 2016-2017



Source: IHS and Point Topic

Figure 1.8 Rural coverage by technology at EU level, 2016-2017



Source: IHS and Point Topic

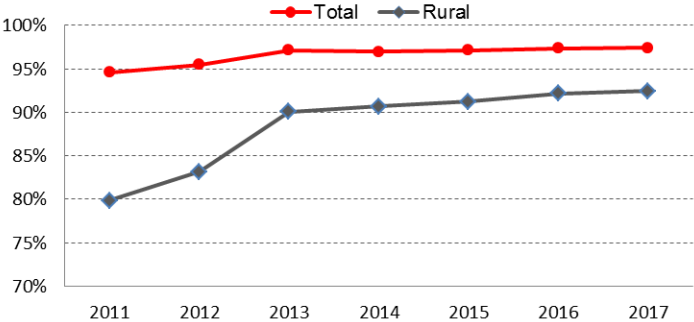
Coverage of fixed broadband remained at 97 %. In about half of the Member States more than 99 % of homes are covered. Poland, Romania, Slovakia and Estonia are lagging behind with less than 90 % of homes covered.

Primary internet access at home is provided mainly by fixed technologies. Among these technologies, xDSL has the largest footprint (94 %) followed by cable (45 %) and WiMAX (18

%). Fixed coverage is the highest in the Member States with well-developed DSL infrastructures, and is over 90 % in all but four Member States.

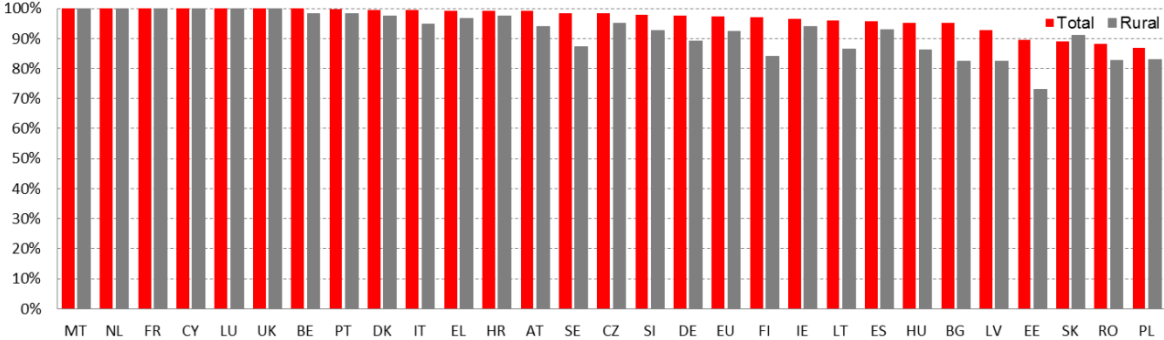
Overall coverage of fixed broadband has only marginally increased since 2011, but rural coverage improved by 12 percentage points. Developments have slowed down, as Member States have diverted their focus to NGA and wireless technologies.

Figure 1.9 Fixed broadband coverage in the EU, 2011-2017



Source: IHS, VVA and Point Topic

Figure 1.10 Fixed broadband coverage, June 2017



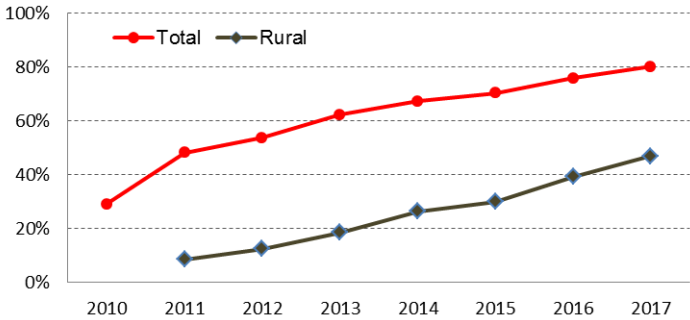
Source: IHS and Point Topic

Coverage of Next Generation Access (NGA) technologies continued to increase and reached 80 %. NGA improved significantly in rural areas, from 39 % to 47 % of homes compared to last year.

At mid-2017, VDSL had the largest NGA coverage at 53 %, followed by cable (45 %) and FTTP (27 %). While cable coverage only marginally increased last year, VDSL went up by 5 percentage points. There was progress also in FTTP (from 24 % in 2016 to 27 % in 2016), but FTTP coverage is still low.

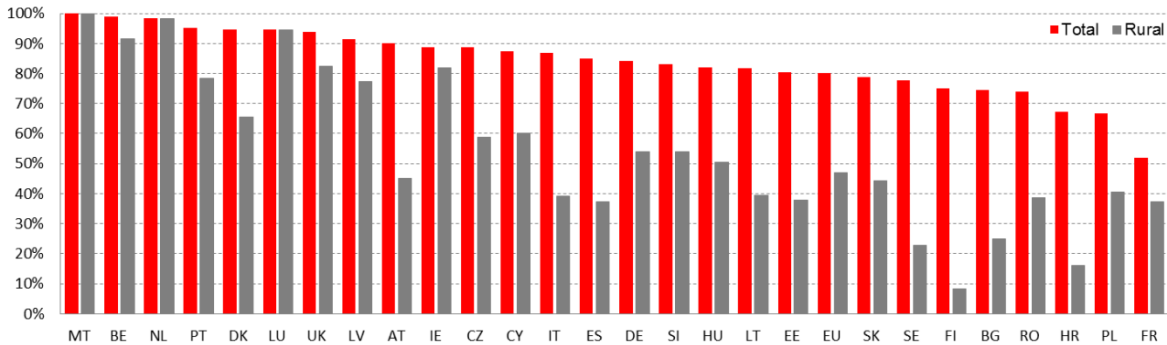
Rural NGA is still far behind national coverage.

Figure 1.11 Next Generation Access (NGA) broadband coverage in the EU, 2010-2017



Source: IHS, VVA and Point Topic

Figure 1.12 Next Generation Access (FTTP, VDSL and Docsis 3.0 cable) coverage, June 2017



Source: IHS and Point Topic

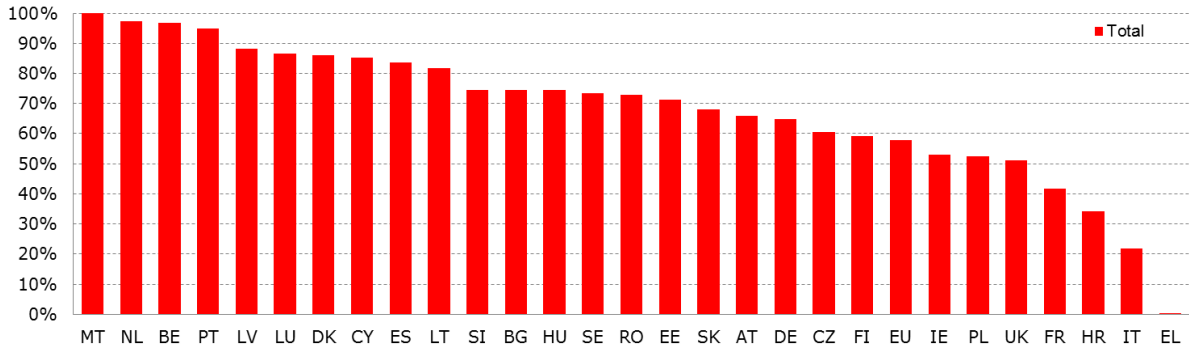
Ultrafast broadband (FTTP & Cable Docsis 3.0) is available in 57% of European homes. In Malta, the Netherlands, Belgium and Portugal more than 90% of homes have access, while in Greece such networks do not yet exist.

The Digital Agenda for Europe set a target that by 2020 at least 50 % of European homes should subscribe to ultrafast broadband of at least 100 Mbps. A precondition to achieving this target is the wide availability of ultrafast broadband networks.

Currently, FTTP and Docsis 3.0 cable networks are capable of delivering ultrafast connectivity. Cable covers 45 %, while FTTP covers 27 % of homes. Cable and FTTP networks overlap, and mainly cover urban areas. 57 % of homes have access to at least one of the ultrafast technologies.

Looking at the Member States, the top three countries (Malta, the Netherlands and Belgium) provide ultrafast connectivity mainly through cable, while in Portugal and Latvia (the next two countries in the ranking) FTTP is the more widespread ultrafast technology. At the bottom of the list, Greece has neither FTTP nor cable, while Italy purely has FTTP available in some cities.

Figure 1.13 Ultrafast (FTTP and Cable Docsis 3.0) coverage, June 2017

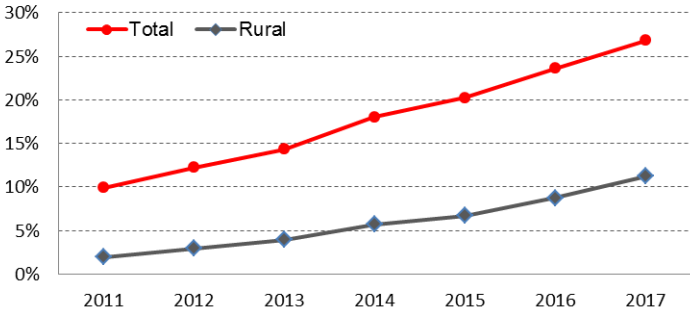


Source: IHS and Point Topic

Coverage of Fibre to the Premises (FTTP) grew from 10 % in 2011 to 27 % in 2017, although it remains a primarily urban technology. Portugal, Latvia, Lithuania and Spain are the leaders in FTTP in Europe.

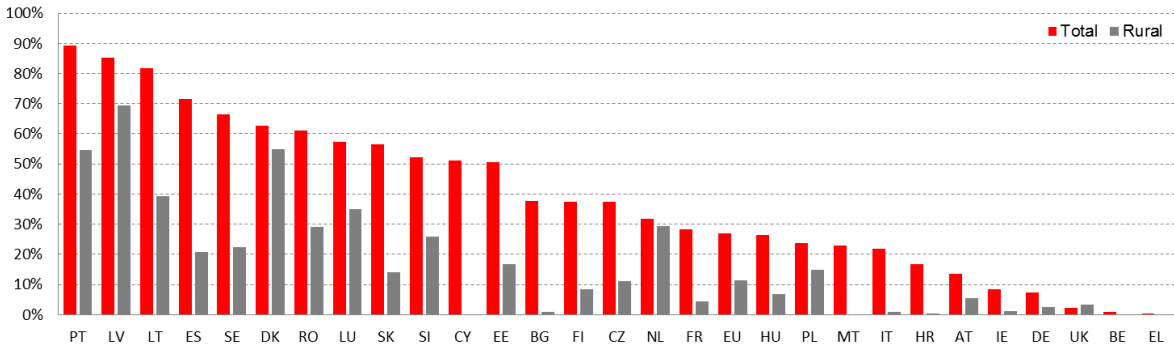
FTTP is catching up in Europe, as coverage of homes has more than doubled since 2011. However, the FTTP footprint is still significantly lower than that of cable Docsis 3.0 and VDSL. In Portugal, Latvia, Lithuania and Spain more than 70 % of homes can already subscribe to FTTP services, while in Greece, Belgium, the UK, Germany and Ireland less than 10 % can do so. FTTP increased the most in Spain (8.6 percentage points) and France (7.5 percentage points). FTTP services are available mainly in urban areas with the exception of Portugal, Latvia and Denmark, where more than 50 % of rural homes also have access to it.

Figure 1.14 Fibre to the Premises (FTTP) coverage in the EU, 2011-2017



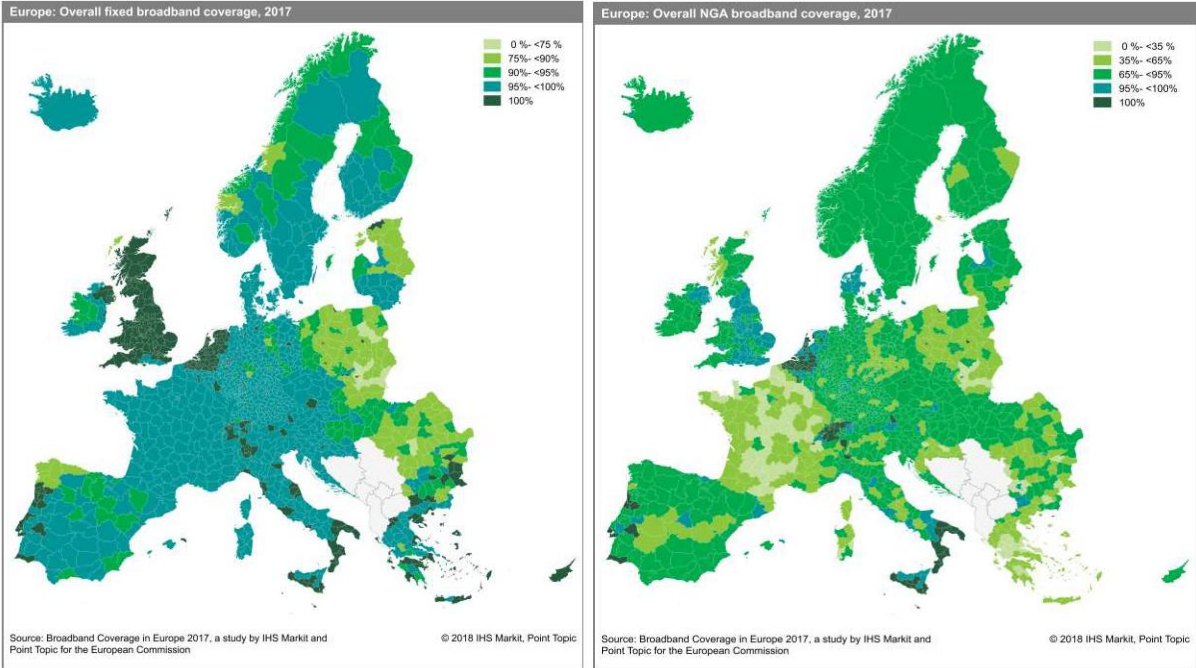
Source: IHS, VVA and Point Topic

Figure 1.15 Fibre to the Premises (FTTP) coverage, June 2017



Source: IHS and Point Topic

Figure 1.16 Overall fixed broadband and NGA broadband coverage by region



Source: IHS and Point Topic

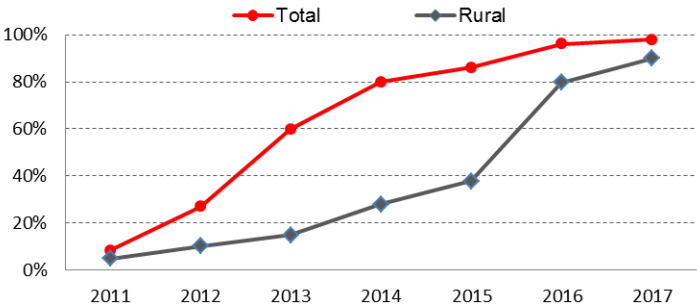
4G mobile coverage: 98 % of homes are covered by at least one operator in Europe (overall coverage). Rural coverage went up from 38 % in 2015 to 90 % in 2016. **Average 4G availability⁴** stands at 91 %, up from 86 % a year ago.

4G (LTE) is now as widely available as advanced 3G (HSPA) and fixed broadband. 4G expanded mainly in Romania (by 18 percentage points) and Bulgaria (by 15 percentage points) last year.

⁴ This indicator measures the average of mobile telecom operators' coverage within each country.

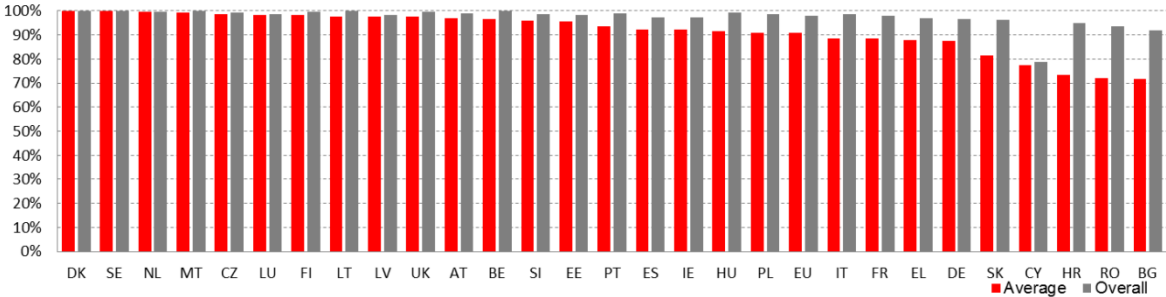
Average 4G availability (calculated as the average of each operator's coverage) is somewhat below the overall coverage and stands at 91 %.

Figure 1.17 4G mobile coverage in the EU, 2011-2017



Source: IHS, VVA and Point Topic

Figure 1.18 4G mobile coverage, June 2017



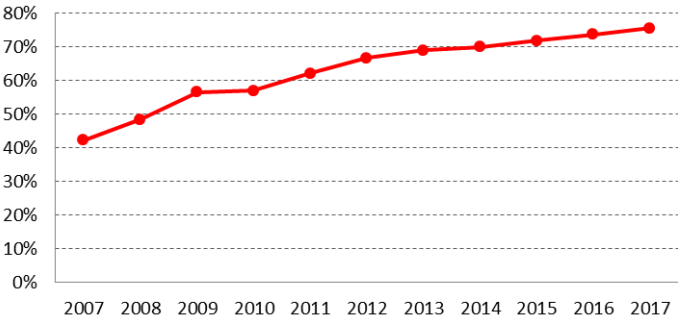
Source: IHS and Point Topic

75 % of EU homes had a **fixed broadband subscription** in 2017. The Netherlands, Luxembourg, Germany and the UK registered the highest figures in the EU, while Italy, Finland and Bulgaria had the lowest take-up rates.

Although fixed broadband is available to 97 % of EU homes, 25 % of homes do not have a subscription. Growth in take-up was very strong until 2009, but has slowed down in the last few years, partially due to fixed-mobile substitution.

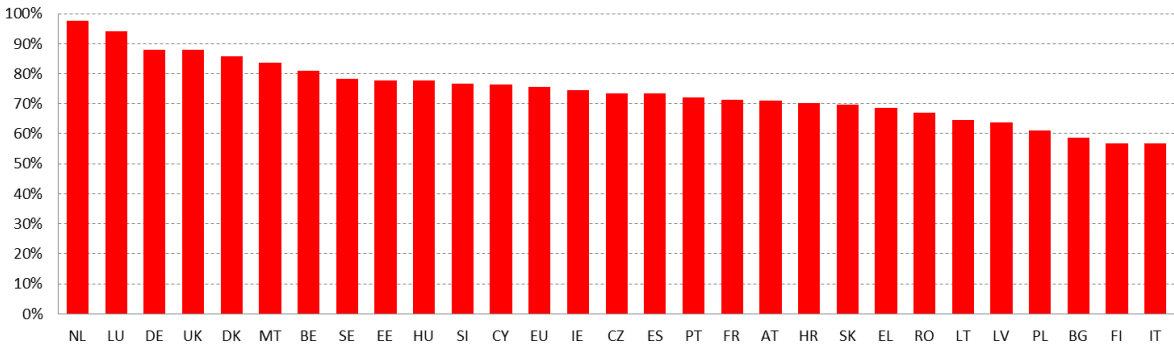
At Member State level, take-up rates ranged from only 57 % in Italy and Finland to 98 % in the Netherlands.

Figure 1.19 Households with a fixed broadband subscription (% of households), 2007 - 2017⁵



Source: Eurostat

Figure 1.20 Households with a fixed broadband subscription (% of households), 2017



Source: Eurostat

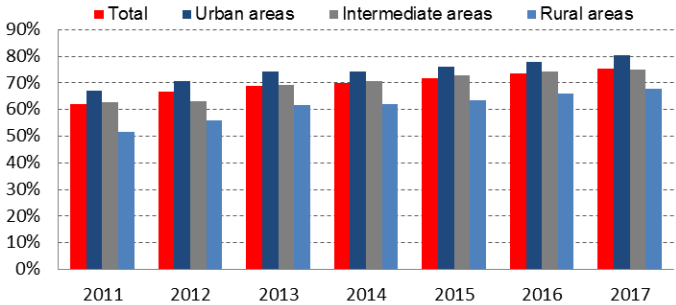
68 % of rural homes in the EU had a fixed broadband subscription in 2017. The Netherlands, Luxembourg, the UK and Germany registered the highest figures, while in Bulgaria and Finland, less than half of rural homes subscribed.

There is a substantial gap between rural and national penetration rates. This gap, however, slightly decreased from 10 percentage points in 2011 to 7 percentage points in 2017.

In the Netherlands, Germany, the UK, Belgium, Austria and Sweden, rural and national penetration rates are identical or almost identical. However, in Finland, Bulgaria, Portugal, Romania and Greece, where fixed rural take-up is among the lowest in Europe, there are significant gaps of 15-18 percentage points compared to the national take-up.

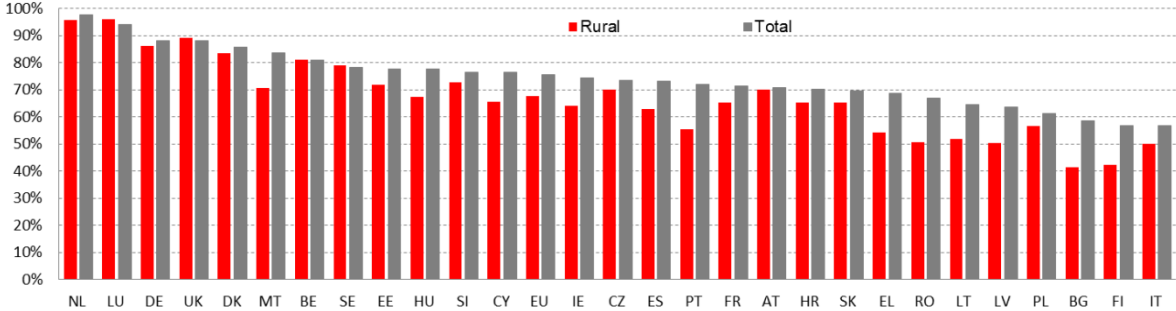
⁵ Penetration figures include also mobile subscriptions until 2009.

Figure 1.21 Households having a fixed broadband subscription per degree of urbanisation at EU level (% of households), 2011 - 2017



Source: Eurostat

Figure 1.22 Households penetration rural vs total (% of households), 2017⁶



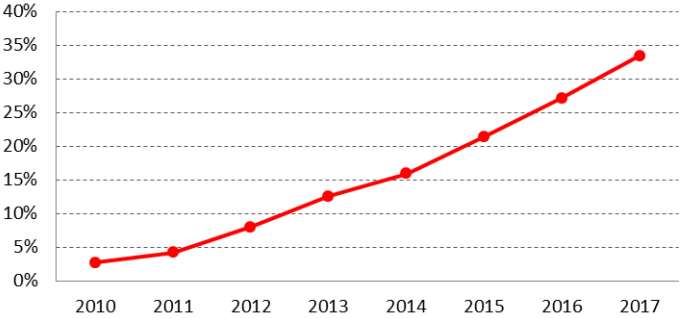
Source: Eurostat

One third of European homes subscribe to **fast broadband access** of at least 30 Mbps. There has been a significant increase since 2010. The Netherlands and Belgium are the leaders in Europe in fast broadband take-up.

There has been a sharp upward trend in the take-up of fast broadband in the EU since 2010, triggered also by continuous deployment of infrastructure. Most cable subscriptions were migrated to high-speed plans, and high-speed VDSL and fibre services are also catching up. In the Netherlands and Belgium more than two thirds of homes already subscribe to fast broadband, while in Greece, Cyprus and Italy, take-up still remains marginal.

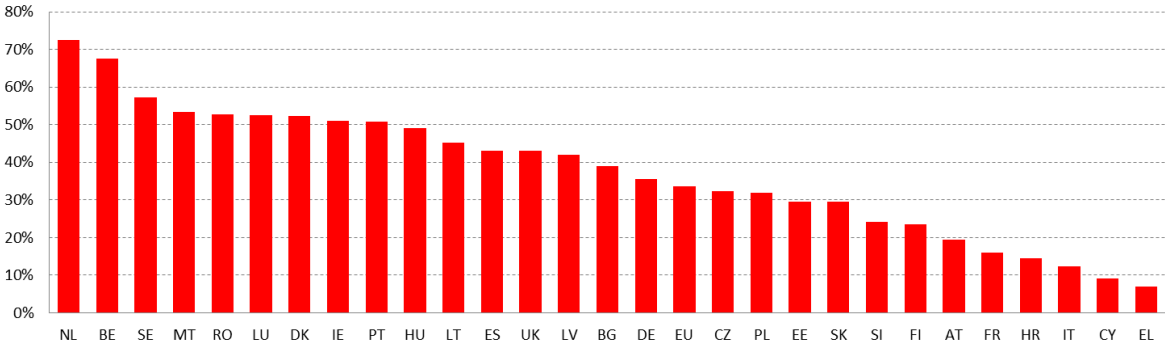
⁶ Rural data for Malta is not reliable

Figure 1.23 Households with a fast broadband (at least 30 Mbps) subscription (% of households), 2010 – 2017



Source: Communications Committee and Eurostat

Figure 1.24 Fast broadband (at least 30 Mbps) household penetration (% of households), July 2017

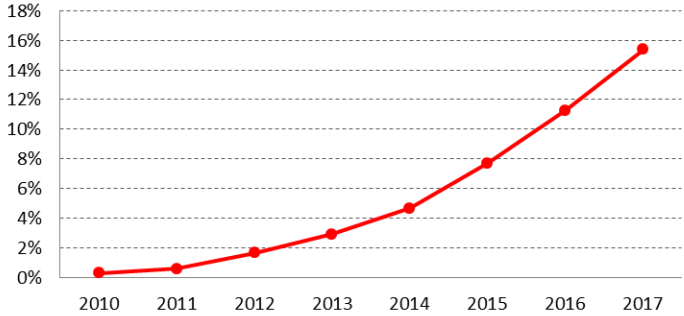


Source: Communications Committee and Eurostat

15 % of European homes currently subscribe to **ultrafast broadband (at least 100 Mbps), a marked improvement from 0.3 % 7 years ago. Sweden, Romania, Belgium, Portugal and Latvia are the most advanced in ultrafast broadband adoption.**

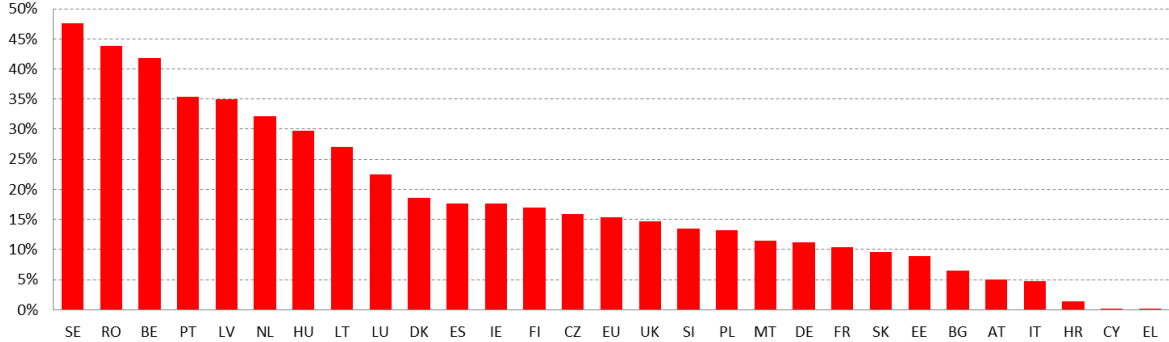
The Digital Agenda for Europe set the objective that at least 50 % of homes should subscribe to ultrafast broadband by 2020. In June 2017, 58 % of homes were covered by networks capable of providing 100 Mbps. As service offers are emerging, take-up is growing sharply. The penetration is the highest in Sweden, Romania and Belgium with over 40% of homes subscribing to at least 100 Mbps. In Greece, Cyprus and Croatia take-up is very low.

Figure 1.25 Households with an ultrafast broadband (at least 100 Mbps) subscription (% of households), 2010 – 2017



Source: Communications Committee and Eurostat

Figure 1.26 Ultrafast broadband (at least 100 Mbps) household penetration (% of households), July 2017

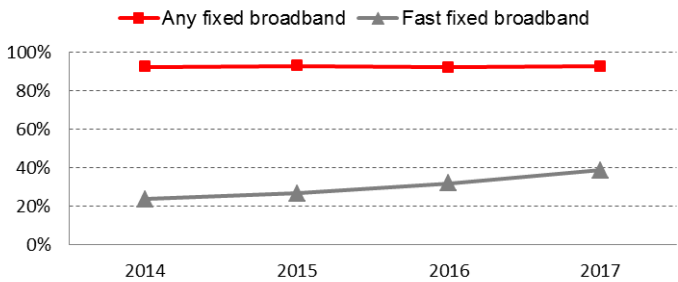


Source: Communications Committee and Eurostat

At EU level, 93 % of companies have a fixed broadband subscription. However, only 38 % have fast broadband (at least 30Mbps). While almost all large companies use broadband, 8 % of small enterprises are not yet connected.

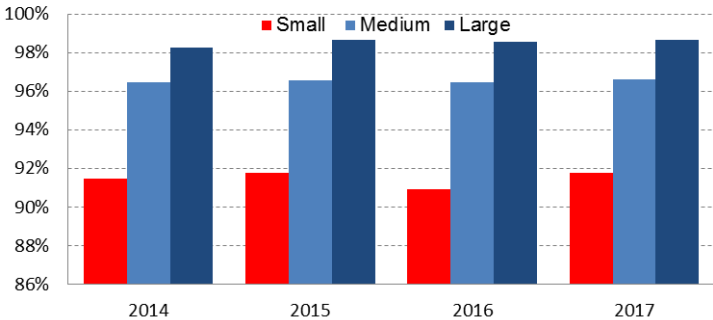
While the vast majority of European businesses use broadband, only 38 % of companies and 33 % of private homes subscribed to fast broadband in 2017. The penetration of fast broadband varies greatly between companies of different size. While 69 % of large companies benefit from broadband speeds of at least 30 Mbps, only 35 % of small enterprises do so. The penetration of fast broadband went up from 24 % to 38 % among all enterprises in 4 years.

Figure 1.27 Enterprises having a fixed broadband connection at EU level, 2014-2017



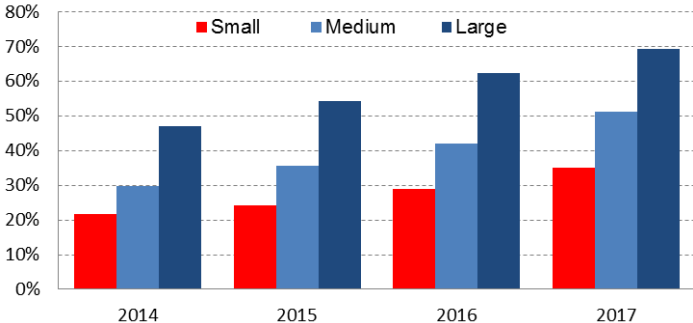
Source: Eurostat

Figure 1.28 Percentage of enterprises having any fixed broadband connection, by Enterprise size at EU level, 2014 - 2017



Source: Eurostat

Figure 1.29 Percentage of enterprises having a fast fixed broadband connection, by Enterprise size at EU level, 2014-2017



Source: Eurostat

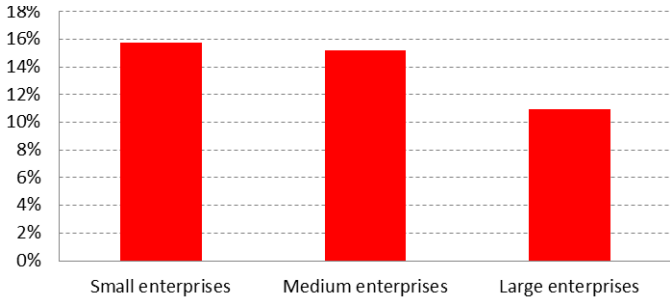
16 % of European enterprises consider that the speed of their fixed connection is not sufficient for the current needs of the company. Germany, France, Croatia and the UK are the countries where this perception is the highest. Bulgarian, Latvian,

Bulgarian, Latvian and Estonian companies are the most satisfied with the speed of their broadband connection.

Satisfaction with broadband speeds vary greatly in the Member States. Those with the lowest satisfaction rates all have relatively low coverage of FTTP.

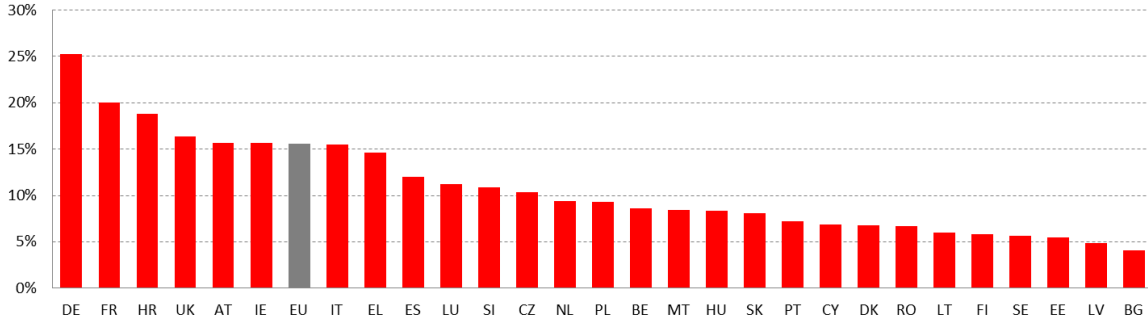
Large companies are generally better served than small ones. While only 11 % of large companies consider that their internet speed is not fast enough, this percentage increases to 16 % in small enterprises.

Figure 1.30 Enterprises that consider that the speed of their fixed internet connection is not sufficient, by Enterprise size at EU level, 2017



Source: Eurostat

Figure 1.31 Percentage of enterprises that consider that the speed of their fixed internet connection is not sufficient, 2017



Source: Eurostat

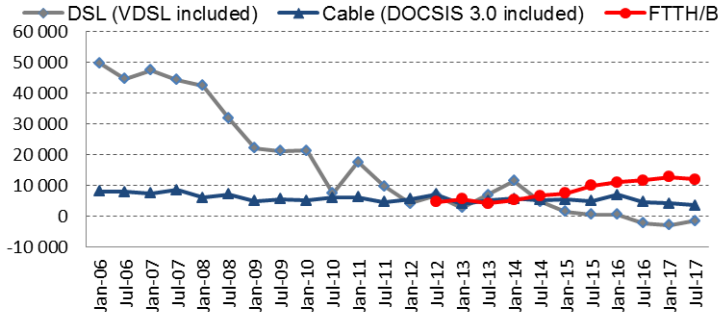
64 % of subscriptions are xDSL, although this technology is slightly losing market share. Cable is second with 19 % of the market. Fibre to the Home/Building (FTTH/B) is the fastest-growing technology.

Although DSL is still the most widely used fixed broadband technology, its market share declined from 80 % in 2009 to 64 % in 2016. In the last 18 months, the number of xDSL subscriptions declined despite the growth of VDSL. The main challenger — cable — increased

its share slightly during the same time period, but most of the net adds⁷ were posted by FTTH/B during the last 3 years.

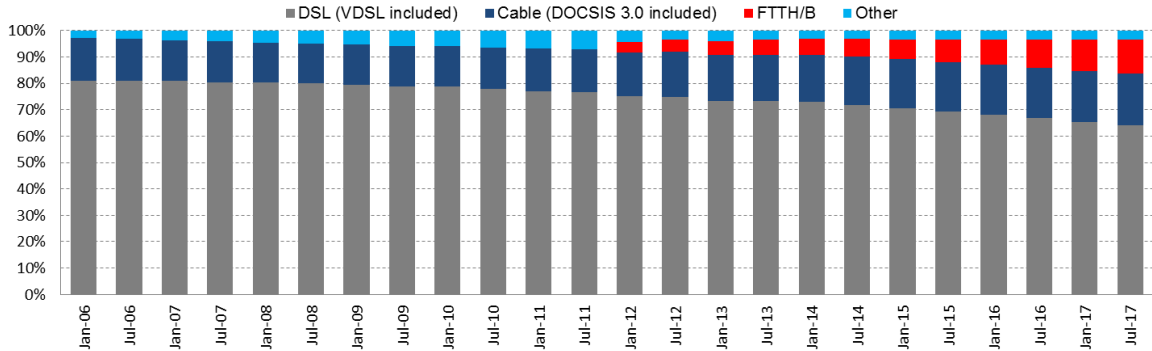
Nevertheless, DSL continues to be predominant, and its market share can still grow thanks to the increasing VDSL coverage.

Figure 1.32 Fixed broadband net adds by technology at EU level, 2006-2017



Source: Communications Committee

Figure 1.33 Fixed broadband subscriptions - technology market shares at EU level, January 2006 - July 2017



Source: Communications Committee

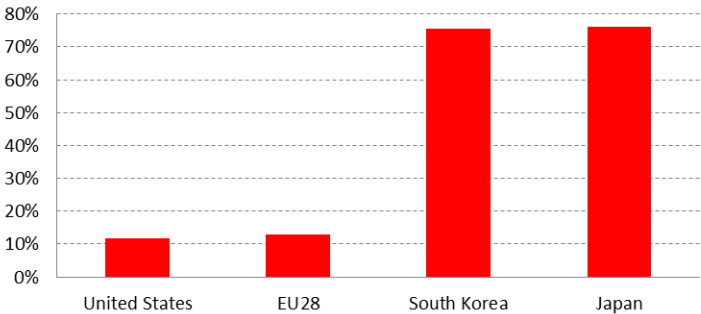
xDSL is particularly important in Greece and Italy, and has the lowest market share in Bulgaria, Lithuania and Romania. **Cable** has a very high market share in Belgium, Hungary, Malta and the Netherlands. **FTTH/B** is the most widely used technology in Lithuania, Latvia, Romania, Bulgaria, Portugal, Estonia and Sweden.

⁷ The difference between sales and churn.

The share of xDSL ranges from 11 % in Bulgaria to 100 % in Greece. DSL is generally less dominant in eastern Europe. Looking at alternative technologies, cable is present in all but two Member States and it is the major technological competitor of DSL in the majority of the Member States.

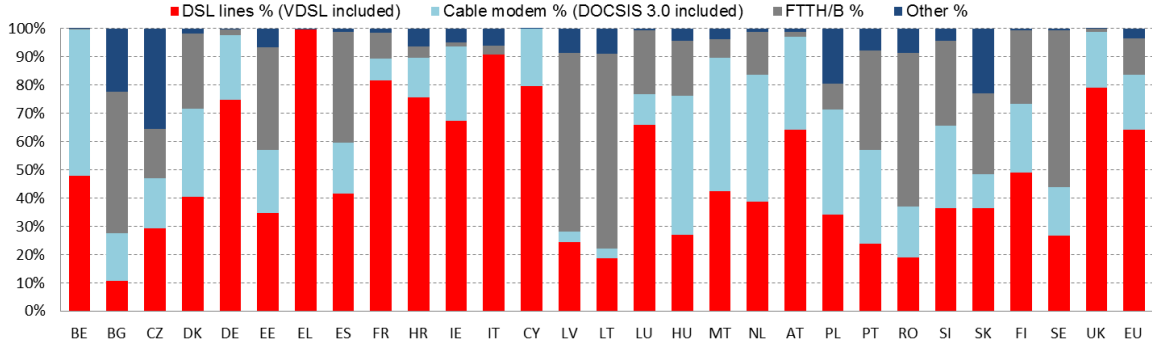
FTTH and FTTB together represent 13 % of EU broadband subscriptions. In these technologies, Europe continues to lag behind global leaders such as South Korea and Japan.

Figure 1.34 Share of fibre connections in total fixed broadband, July 2017



Source: OECD and Communications Committee

Figure 1.35 Fixed broadband subscriptions - technology market shares, July 2017



Source: Communications Committee

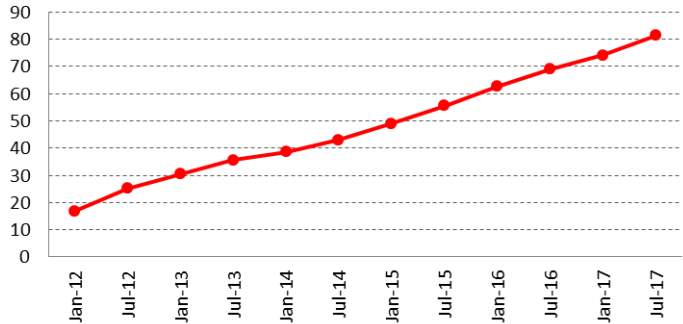
NGA subscriptions went up sharply by 26 million in the last 2 years, and just below 50 % of all subscriptions are NGA. In seven Member States, NGA's market share is higher than 75%. By contrast, its take-up remains low in Greece, Cyprus, Italy, France and Austria.

NGA subscriptions have been steadily increasing in the EU since 2012 and currently account for 48 % of all EU fixed broadband subscriptions.

European leaders in NGA take-up are Belgium, and the Netherlands. In these two countries, both VDSL and cable Docsis 3.0 are widely available.

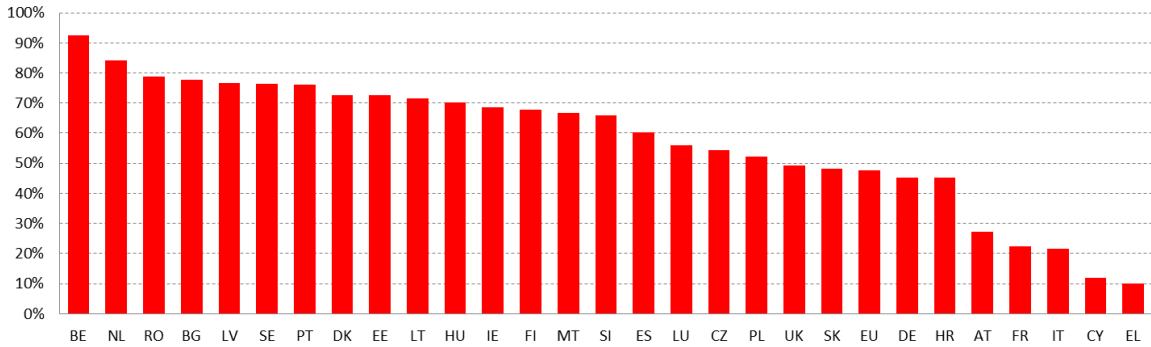
The highest growth in the last 12 months was observed in Estonia (14 percentage points) Germany (11 percentage points).

Figure 1.36 Evolution of NGA subscriptions (in millions) in the EU, 2012-2017



Source: Communications Committee

Figure 1.37 NGA (FTTH, FTTB, VDSL, Cable Docsis 3.0 and other NGA⁸) subscriptions as a % of total fixed broadband subscriptions, July 2017



Source: Communications Committee

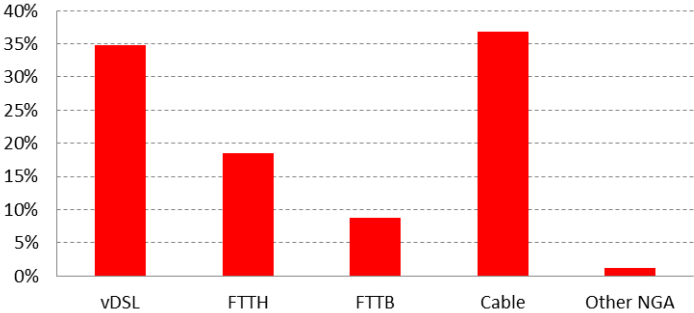
Cable Docsis 3.0 is currently the most widespread NGA technology in the EU in terms of take-up. VDSL is catching up.

37 % of NGA subscriptions are Docsis 3.0, which is a relatively high figure given that cable broadband in total represents only 19 % of all EU fixed broadband subscriptions. While almost all cable networks have been upgraded to NGA, only 55 % of the xDSL network is VDSL-enabled. Nevertheless, in the last twelve months VDSL coverage went up by 11 % and the

⁸ Any other fixed or fixed-wireless technology capable of providing at least 30 Mbps download.

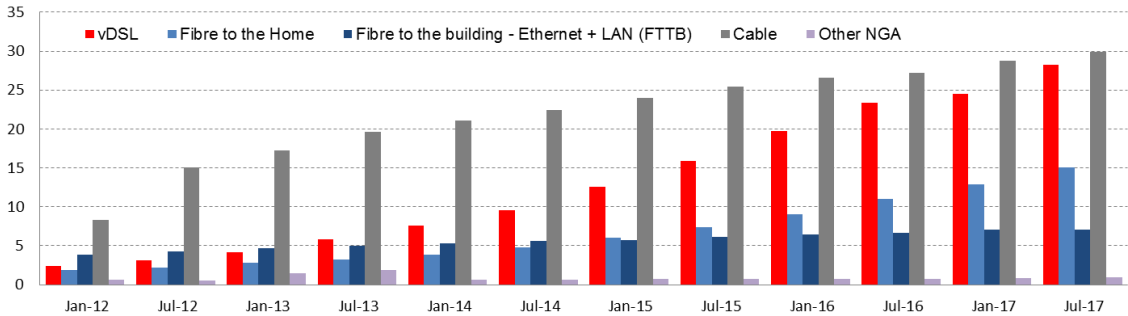
number of subscriptions by 21 %. FTTH and FTTB have a 19 % and 9 % share in total NGA subscriptions respectively.

Figure 1.38 Share of different NGA technologies in total NGA subscriptions, July 2017



Source: Communications Committee

Figure 1.39 NGA subscriptions (millions) by technology at EU level, January 2012 - July 2017

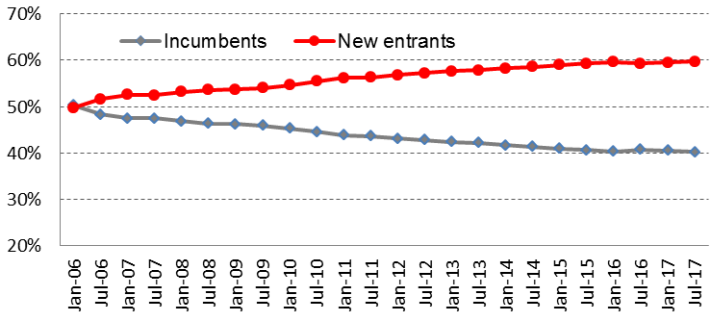


Source: Communications Committee

Competition in the fixed broadband market: new entrant operators are continuously gaining market share, but incumbents still control 40 % of subscriptions.

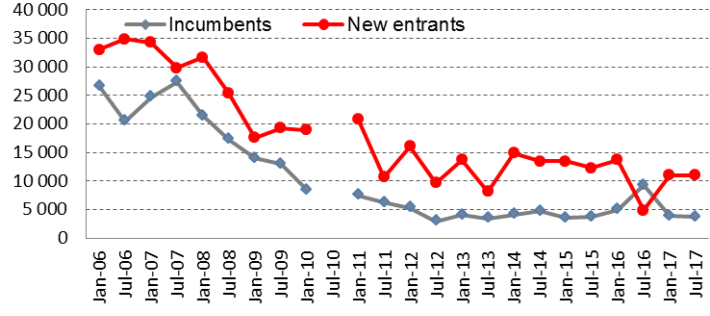
Incumbent operators are market leaders in almost all Member States, although their market share is gradually decreasing. During the last 10 years, new entrant operators have consistently posted higher net gains than the incumbents in each year. Overall, the market share of incumbents in the EU has decreased by 10 percentage points since 2006.

Figure 1.40 Fixed broadband subscriptions - operator market shares at EU level, January 2006 - July 2017



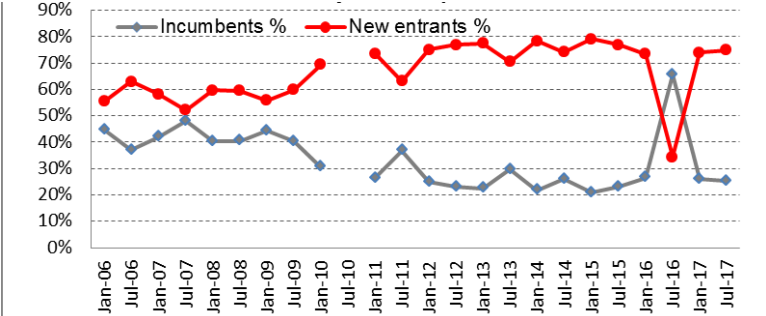
Source: Communications Committee

Figure 1.41 Fixed broadband subscriptions growth per day by operator at EU level, January 2006 - July 2017



Source: Communications Committee

Figure 1.42 Fixed broadband subscriptions growth per day by operator at EU level, January 2006 - July 2017



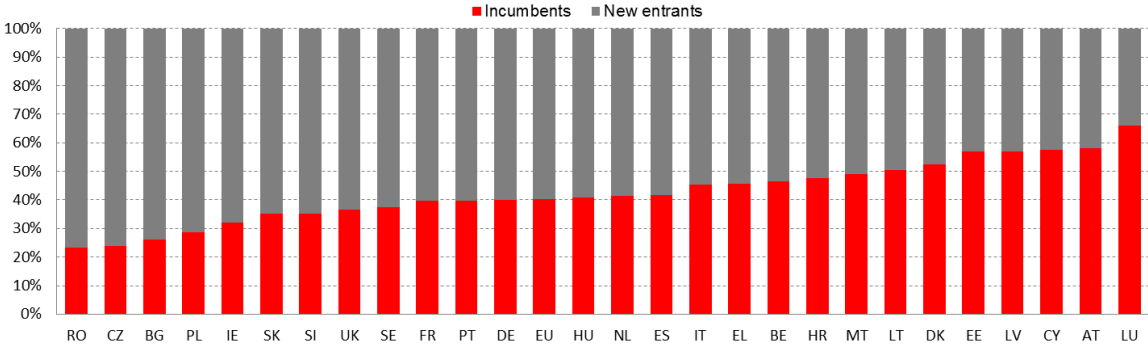
Source: Communications Committee

Market shares of incumbents show large differences across Europe. In 7 out of the 28 Member States, at least half of the subscriptions are provided by incumbent operators.

Market shares are calculated at national level for incumbents and new entrants. However, broadband markets are geographically fragmented suggesting that a large number of homes are served by only one provider (most likely the incumbent operator in this case).

Incumbents have the highest subscription market share in Luxembourg, Austria and Cyprus. In contrast, incumbents are the weakest in Europe in Romania, the Czech Republic, Bulgaria and Poland. In all these four Member States most subscribers use technologies other than xDSL.

Figure 1.43 Fixed broadband subscriptions - operator market shares, July 2017

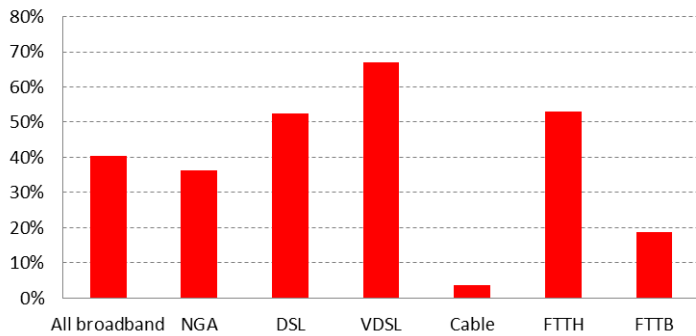


Source: Communications Committee

In the **DSL** market, unbundling reduced the dominance of incumbents, but for **VDSL** incumbents hold 67 % of subscriptions. Nevertheless, **NGA** is provided mainly by new entrants because of the high share of **cable**.

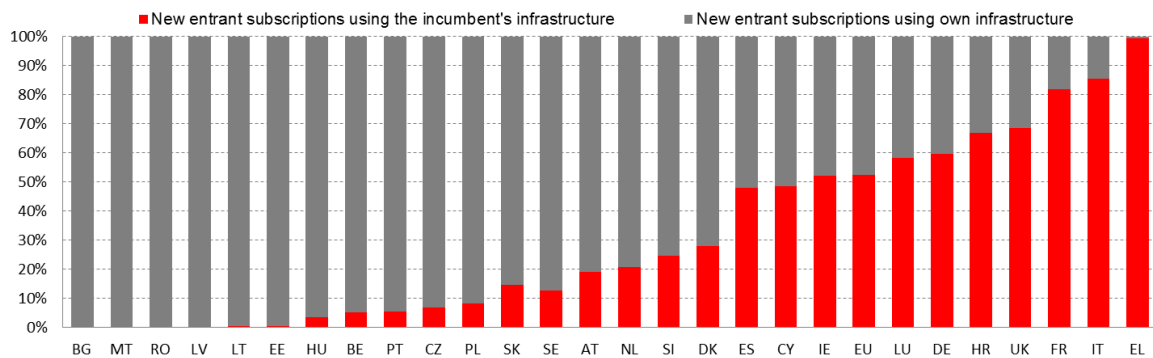
New entrant operators can compete with incumbents by using either the incumbent's network or their own network to offer internet access. In Greece, competition is entirely based on regulated access to the incumbents access network, while in Italy and France over 80 % of subscriptions are DSL. In eastern European Member States, competition is based rather on competing infrastructures. This applies also to Belgium, Malta, Portugal and the Netherlands.

Figure 1.44 Incumbents market share by technology, July 2017



Source: Communications Committee

Figure 1.45 New entrants subscriptions - using own infrastructure or the incumbent's network, July 2017

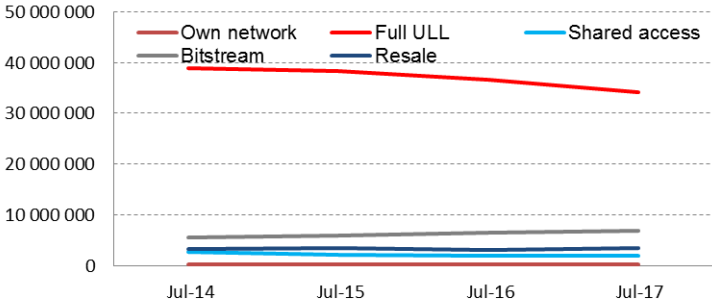


Source: Communications Committee

53 % of DSL subscriptions are with incumbents. New entrants mainly use Local Loop Unbundling to sell DSL. In six Member States, the new entrants presence in the DSL market is marginal.

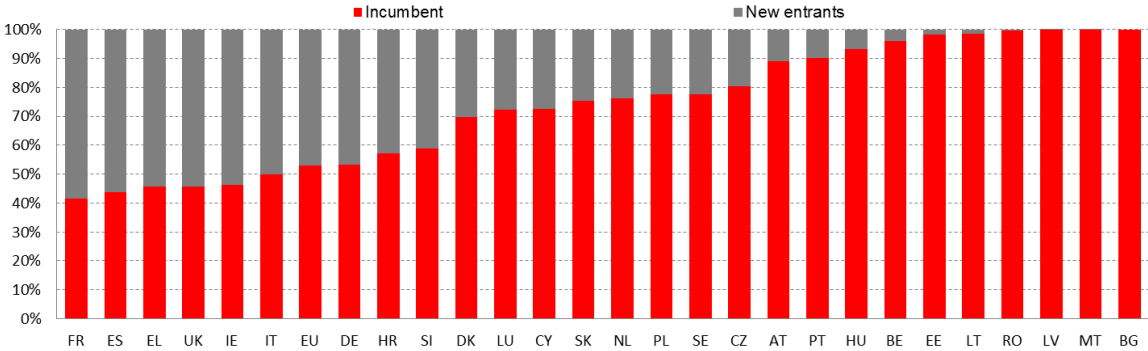
In Bulgaria, Romania, Malta, Latvia, Estonia and Lithuania, there is literally no competition in the DSL market. These Member States, however, have strong platform competition. In France, Greece, the UK, Spain and Ireland new entrants account for the majority of xDSL subscriptions. In all these Member States, competition is strong due to the possibility of entry via DSL subscriptions provided through Local Loop Unbundling.

Figure 1.46 New entrants' DSL subscriptions by type of access at EU level (VDSL excluded), 2014-2017



Source: Communications Committee

Figure 1.47 DSL subscriptions - operator market shares (VDSL included), July 2017



Source: Communications Committee

Average connection speeds for fixed broadband range from 7 Mbps to 23 Mbps in Europe. Sweden, Finland, Denmark and the Netherlands are among the top countries in Europe and worldwide.

South Korea is the world leader in average internet connection speed at 28.6 Mbps, followed by Norway and Sweden at 23.5 and 22.5 Mbps respectively.

The EU has an average speed of 14.1 Mbps, well below the preceding leading countries, and also Japan (20.2 Mbps), Canada (16.2 Mbps) and the US (18.7 Mbps).

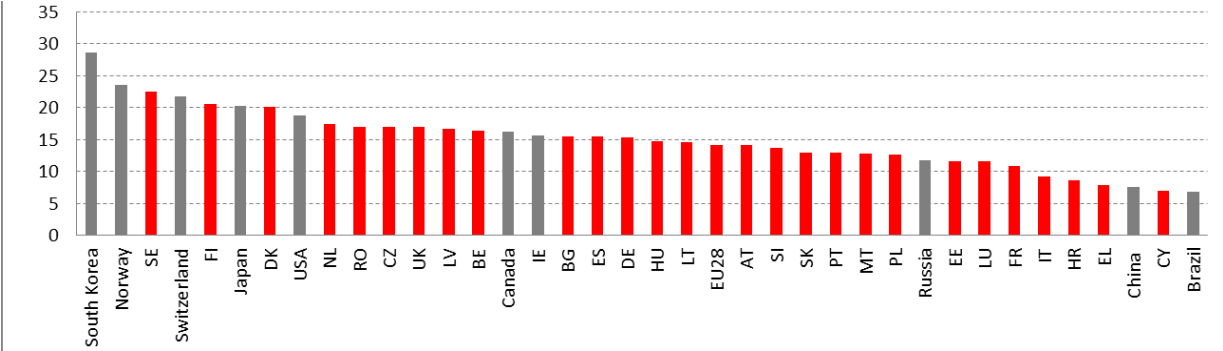
Last year, five Member States had higher speeds than the US. This year only three did.

Among the selected countries, Brazil has the lowest average speed at only 6.8 Mbps, below Cyprus (6.9 Mbps) and China (7.6 Mbps). At European level, the worst performing countries include Cyprus, Greece, Croatia and Italy with speeds of less than 10 Mbps. With the exception

of Cyprus, all these countries have a relatively low coverage of fast broadband technologies (NGA).

The lower speeds in the EU can be explained by relatively low use and/or coverage of FTTH and cable technologies.

Figure 1.48 Average connection speed (Mbps) by country, 2017



Source: Akamai, Q1 -2017

Average 4G (LTE) download speed ranges from 20 Mbps to 42 Mbps in Europe. The Netherlands, Hungary, Bulgaria and Denmark are among the top countries in Europe and worldwide.

The Netherlands is among the world leaders in average LTE download speed at 42.1 Mbps, followed by Norway and South Korea at 41.2 and 40.4 Mbps respectively.

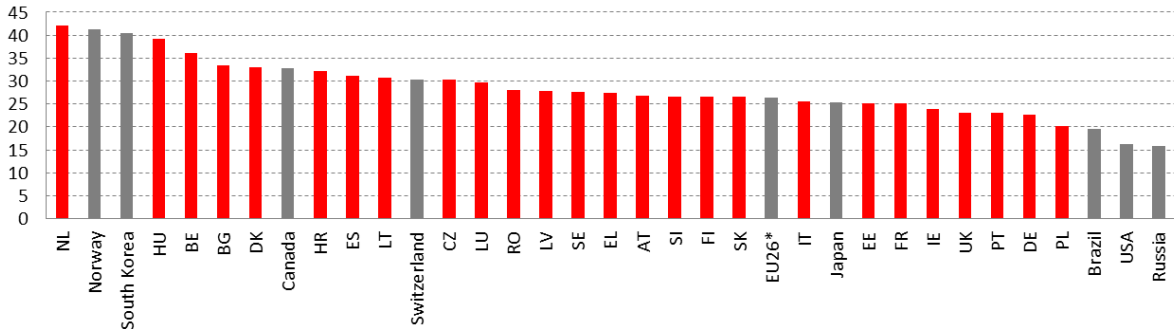
The EU26⁹ has an average download speed of 26.3 Mbps, which is above Japan (25.4 Mbps), Brazil (19.7 Mbps), the US (16.3 Mbps) and Russia (15.8 Mbps).

All Member States had higher LTE average download speeds than the US.

Among the selected countries, Russia is the country that shows the lowest average download speed at only 15.8 Mbps, below all Member States with reported data. When benchmarking only European countries, Poland, Germany, Portugal, the UK, Ireland, France, Estonia and Italy score below the EU average.

⁹ Data not available for Cyprus and Malta.

Figure 1.49 Average LTE connection speed (Mbps) by country¹⁰, 2017



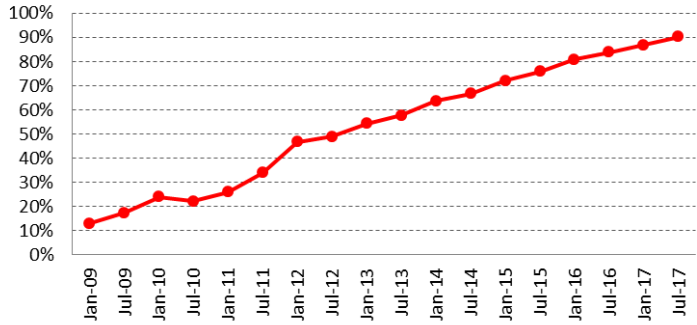
Source: Open Source, Q4-2017, published in February 2018.

There are 90 active mobile broadband SIM cards per 100 people in the EU. The growth was linear over the last 5 years, with over 40 million new subscriptions added every year.

Mobile broadband represents a fast growing segment of the broadband market. About two thirds of all active mobile SIM cards use mobile broadband.

In the Nordic countries and Estonia, Luxembourg and Poland, there are already more than 120 subscriptions per 100 people, while in Hungary and Greece the take-up rate is less than half of that. Most mobile broadband subscriptions are used on smartphones rather than on tablets or notebooks.

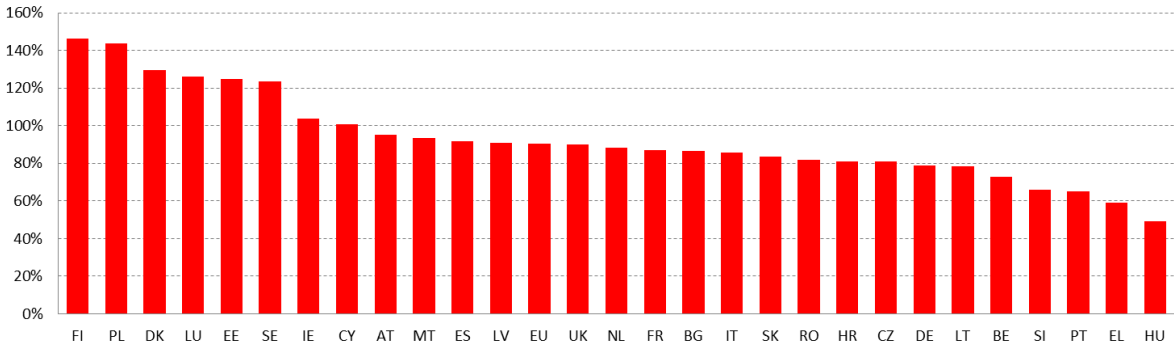
Figure 1.50 Mobile broadband penetration at EU level, January 2009 - July 2017



Source: Communications Committee

¹⁰ No data available for Cyprus and Malta.

Figure 1.51 Mobile broadband penetration - all active users as a % of population, July 2017



Source: Communications Committee

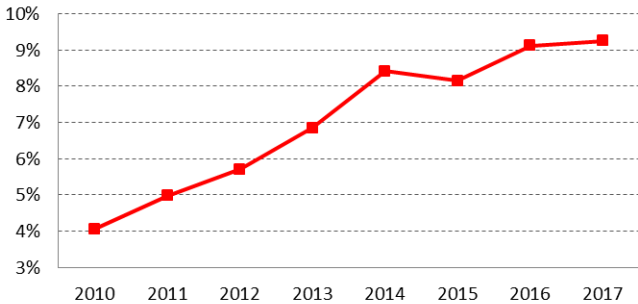
Mobile broadband is still mainly complementary to fixed broadband. In 2017, 9.3 % of EU homes accessed the internet only through mobile technologies. Finland and Italy were leaders in mobile internet access at 37% and 23 % of homes.

Europeans access the internet primarily using fixed technologies at home. However, there are a growing number of homes with only mobile internet use. The percentage of homes with purely mobile broadband access grew from 4.1 % in 2010 to 9.3 % in 2017.

The Netherlands was the Member State with the lowest mobile-only access at less than 0.2 % of homes.

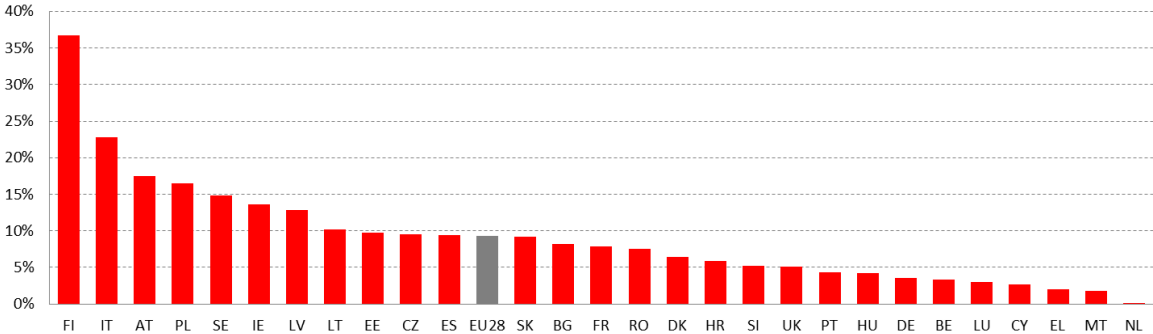
By contrast, in Finland, where fixed broadband take-up has been declining, 37 % of homes rely purely on mobile technologies at home.

Figure 1.52 Households using only mobile broadband connection at home at EU level (% of households), 2010 - 2017



Source: Eurostat

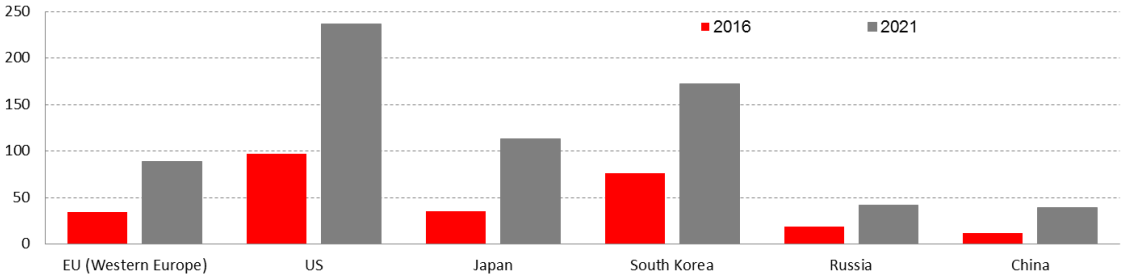
Figure 1.53 Households using only mobile broadband at home (% of households), 2017



Source: Eurostat

Internet traffic per capita in western Europe¹¹ is currently 34 GB per month. By 2021, this figure is estimated to go up to 89 GB, while in the US it will be 237 GB.

Figure 1.54 IP traffic per capita (Gigabytes per month and region), 2016 – 2021



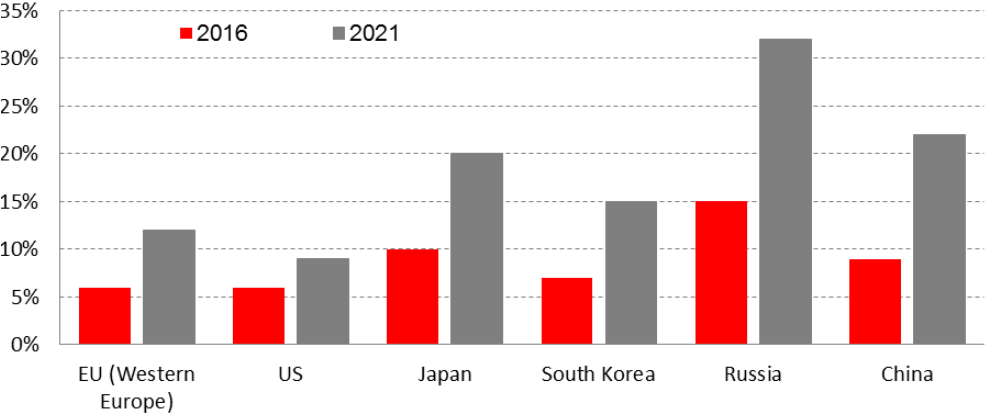
Source: Cisco, VNI Forecast Highlights

Internet traffic per capita in western Europe is well below the figures for the US and South Korea.

Mobile data traffic is a fraction of total IP traffic, and this will remain so despite the large increase forecast by Cisco. Mobile data currently represents 6% of European internet traffic, and this ratio is estimated to double by 2021. Nevertheless, the share of mobile traffic will be significantly higher in Japan (20 %), China (22 %) and Russia (32 %). The US, on the other hand, will have only 9 % of its internet traffic on mobile networks.

¹¹ France, Germany, Italy, Spain, Sweden, the United Kingdom, Denmark, Netherlands, Belgium, Ireland, Norway and Iceland.

Figure 1.55 Percentage of mobile data share of total Internet traffic, 2016 – 2021



Source: Cisco, VNI Forecast Highlights