



EUROPEAN SEMESTER THEMATIC FACTSHEET

DIGITAL SINGLE MARKET: BROADBAND AND E-COMMUNICATIONS

1. INTRODUCTION

At a time when Europe is looking for new sources of growth and employment, the Digital Single Market holds enormous potential. The use of digital technology has spread to the whole economy and plays a key role in most business processes, from production to marketing and sales. The Digital Single Market can enable SMEs, including start-ups, to reach out to a market of over 500 million people and to transform traditional industries.

Achieving the Digital Single Market requires a comprehensive approach to a number of interrelated factors: 1-Better access for consumers and businesses to online goods and services across Europe; 2-creating the right conditions for digital networks and services to flourish; and 3-maximising the growth potential of our European Digital Economy.

Since the mid-nineties a decline in the prices of ICT has led to significant investment in ICT equipment and to an increase in economic growth for the economy as a whole. Between 2001 and 2011, the increased usage of ICT (digitisation) accounted for 30% of GDP growth in the EU¹ and has also helped achieve higher efficiency gains (total factor productivity growth), although this has been more visible in the US than in the EU. Significant investment is still needed, notably in broadband

infrastructure. Evidence shows that a 10 p.p. increase in the broadband penetration rate leads to an annual growth in per-capita GDP of some 1 to 1.5 p.p.² Broadband infrastructure stimulates organisational innovation, improves business processes and reduces costs. It stimulates the development of new markets, creates new jobs and reduces mismatches in the labour market. A dynamic and competitive market for electronic communications is essential in this respect.

The Digital Economy and Society Index (DESI) 2016 summarises relevant indicators on Europe's digital performance and tracks the progress of the Digital Single Market in EU Member States³. This fiche deals with the Connectivity dimension i.e. the extent of the deployment of broadband infrastructure and its quality.

The fiche is structured as follows: Section 2 reviews the performance in EU countries with regard to coverage and take-up of broadband networks. Section 3 discusses the available evidence on potential policies to effectively address the challenges of coverage and take-up of broadband networks, and reviews the approach taken at the EU level. Section 4 sketches good policy practice to meet these challenges among EU countries,

¹ B. van Ark et al. "Unlocking the ICT growth potential in Europe: Enabling people and businesses, 2013

² Czernich et al, Broadband Infrastructure and Economic Growth, 2009

³ The index includes five main dimensions: connectivity, human capital, use of the Internet, integration of digital technology, and digital public services.

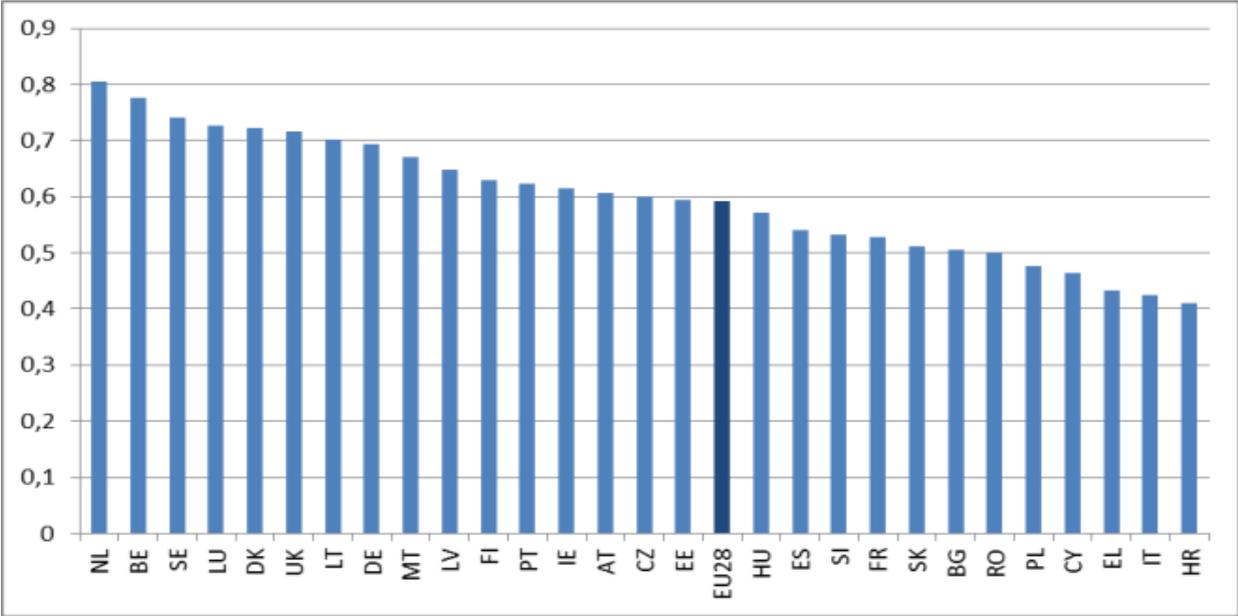
notably by describing the approach to broadband deployment in Sweden and the Netherlands. In addition, an overview of the state of play among all EU countries for the consumer aspects is provided.

2. POLICY CHALLENGES

A necessary condition for the development of a digital society is the ability of its members to connect to the Internet. Nowadays, a simple Internet connection is no longer sufficient. In order to benefit from the full spectrum of developments brought about by the Internet, fast Internet connections are essential. Connectivity is a critical building block for the digital economy and society.

The connectivity dimension of the Digital Economy and Society Index (DESI) 2016 measures the deployment of broadband infrastructure and its quality. Access to fast broadband-enabled services is a necessary pre-requisite for competitiveness. The dimension is calculated as the weighted average of the four sub-dimensions: Fixed Broadband (33%), Mobile Broadband (23%), Speed (33%) and Affordability (11%). Country scores are normalised between 0 and 1 (Table 1). The level of deployment of broadband infrastructure and its quality and affordability (digital connectivity) is unevenly developed across the European Union according to the Digital Economy and Society Index 2016 (Figure 1).

Figure 1 – Digital Economy and Society Index – Connectivity Dimension



Source: European Commission, 2016

2.1. Broadband coverage

The Digital Agenda for Europe set two targets for broadband coverage: (1) broadband should be available to all Europeans by 2013, and (2) fast broadband coverage at 30 Mbps or more for all Europeans by 2020.

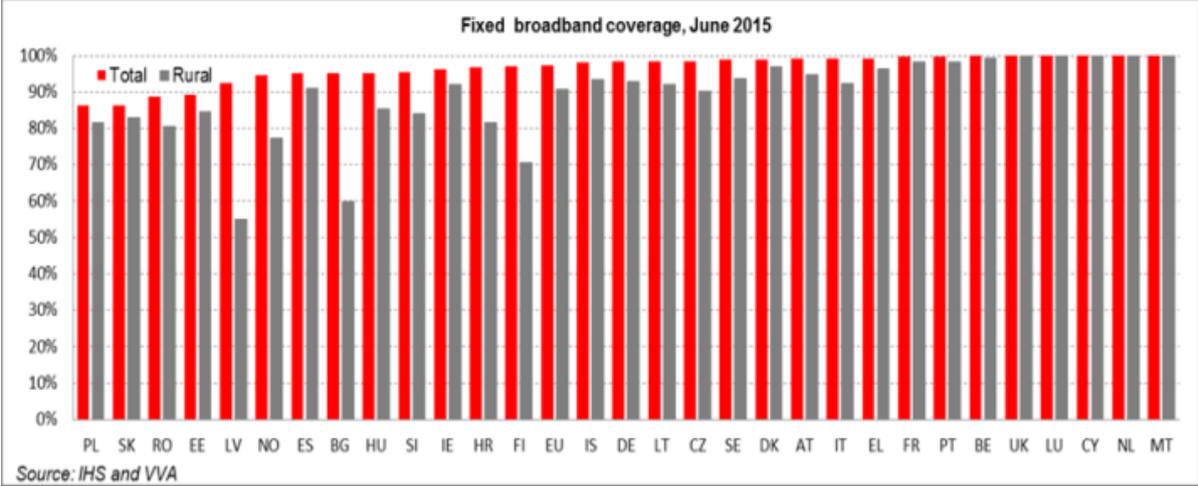
The first target has been achieved, as basic broadband is available to all in the

EU, when considering all major fixed and mobile technologies (xDSL, Cable, Fibre to the Premises, WiMax, 3G, 4G and Satellite). However, taking only fixed and fixed-wireless technologies into account, coverage extends to 97.4% of EU homes, leaving 5.7 million homes unconnected. (Figure 2)

In about half of the Member States more than 99% of homes are covered. At the same time, Poland, Slovakia, Estonia and Romania score less well compared to

other Member States. Looking at rural areas, rural fixed broadband coverage is the lowest in Latvia, Bulgaria and Finland.

Figure 2 – National and rural fixed broadband coverage



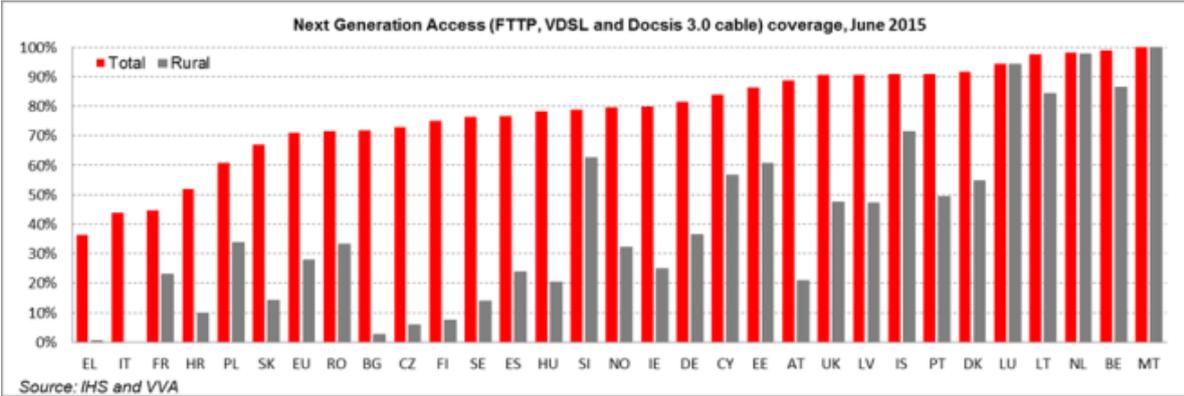
Source: IHS and VVA, Broadband Coverage in Europe 2015. These figures refer to the roll-out of fixed and fixed-wireless broadband, and do not account for mobile wireless and satellite solutions.

For the second target, fast broadband coverage at 30 Mbps (so called Next Generation Access, NGA technologies) or more for all Europeans by 2020, coverage continued to increase and reached 71% of EU homes. The deployments still focus mainly in urban

areas, while only 25% of rural homes are covered (Figure 3).

This means that there are still differences in the quality of broadband coverage between urban and rural areas and there is a risk of economic and social exclusion.

Figure 3 – National and rural fast broadband (Next Generation Access) coverage



Source: IHS and VVA, Broadband Coverage in Europe 2015. These figures refer to the roll-out of fixed and fixed-wireless broadband and do not account for mobile wireless and satellite solutions.

Looking on the mobile side, 4G networks have been commercially launched in all Member States and 4G mobile broadband availability reached 86 % in June 2015 (Figure 4), up from 27 % in

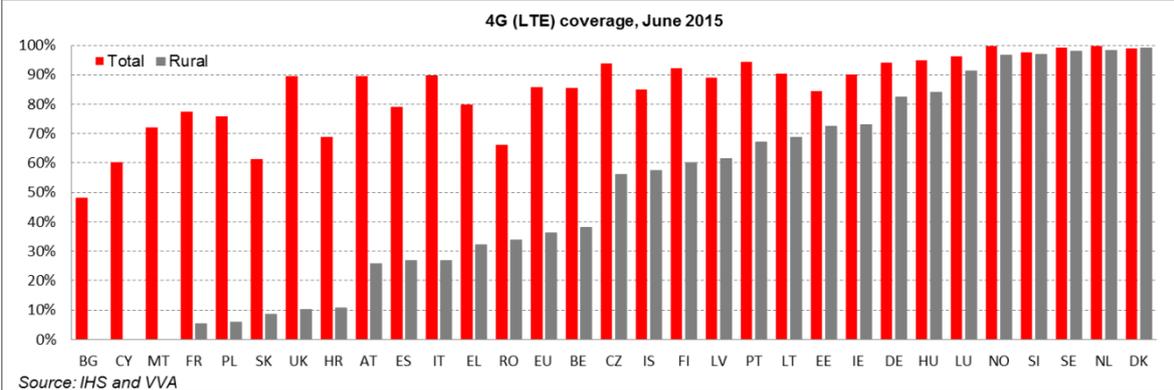
2012. In 2015, the coverage went up from 79 % of homes to 86 % in six months. Nevertheless, 4G coverage is still substantially below that of 3G (HSPA). As of October 2015, 80 % of

Mobile Network Operators in the EU offered 4G services on LTE networks.

LTE is most widely developed in the Netherlands, Sweden and Denmark, while commercial 4G services were launched only last year in Bulgaria.

LTE deployment has focused so far mainly in urban areas, as only 36 % of rural homes are covered. However, in 14 Member States, LTE is also already available in the majority of rural homes, with very high rates in Denmark, Sweden, Slovenia, Luxembourg and the Netherlands.

Figure 4 – 4G (LTE) coverage



Source: IHS and VVA

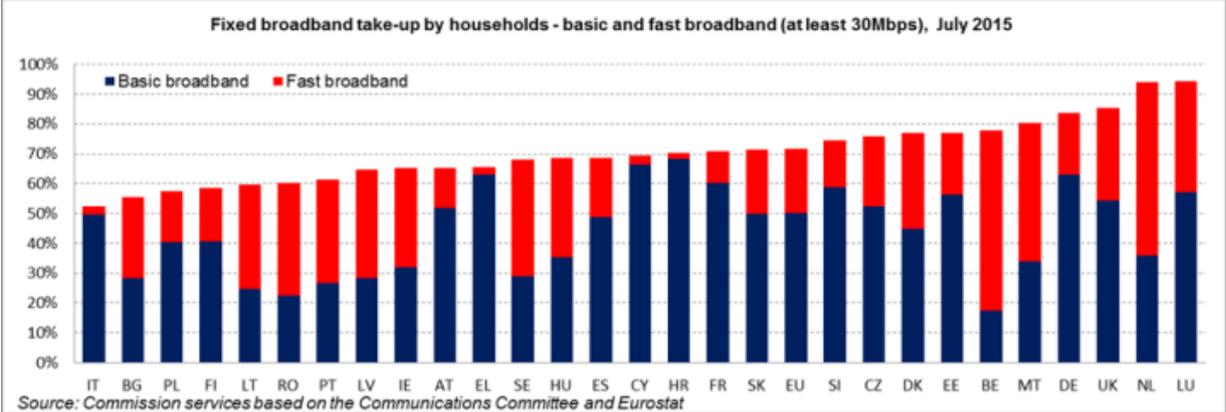
2.2. Broadband take-up (subscription to broadband connection)

22% of European homes have a subscription to fast broadband of at least 30Mbps. At the same time, according to the Digital Agenda for Europe, 50% of European households should have a subscription above 100Mbps (ultra-fast broadband) by 2020. Only 8% of homes have a subscription for ultrafast broadband as of June 2015. However, ultra-fast broadband is already available to one in two homes. Slow take-up of

fast and ultra-fast broadband affects Europe’s ability to innovate, spread knowledge and distribute goods and services, and leaves rural areas isolated.

In terms of take-up of fixed broadband by households, Italy, Bulgaria and Poland have the lowest levels well below the European average of 72%. The highest take-up levels can be found in Luxembourg and the Netherlands with more than 90% (Figure 5).

Figure 5 – Fixed broadband — basic and fast (NGA) broadband take-up by households

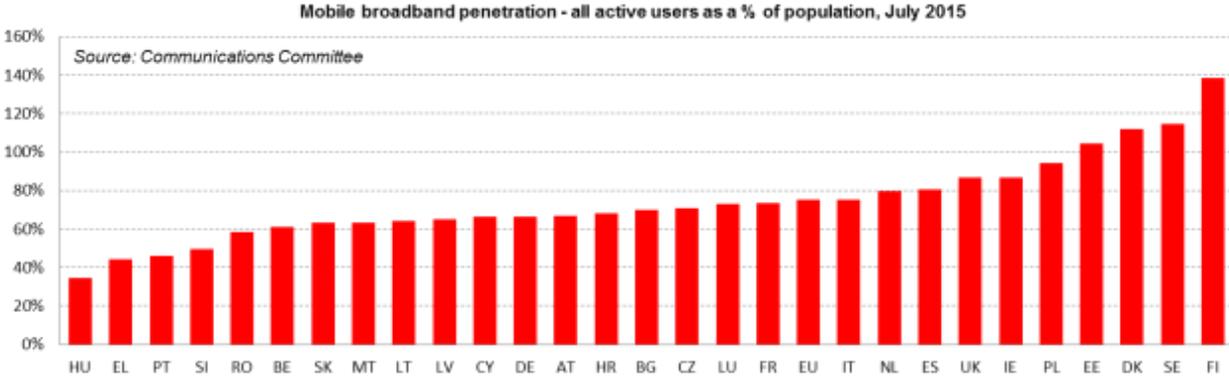


Source: Commission services based on the Communications Committee and Eurostat.

Mobile broadband represents a fast growing segment of the broadband market. In terms of take-up of mobile broadband, there are 75 active mobile broadband SIM cards per 100 people in the EU, up from 34 four years ago. In the Nordic countries and Estonia, there

are already more than 100 subscriptions per 100 people, while in Hungary, Greece, Portugal and Slovenia the take-up rate is still below 50 %. Most of the mobile broadband subscriptions are used on smartphones rather than on tablets or notebooks. (Figure 6)

Figure 6 – Mobile broadband take-up



Source: Commission services based on the Communications Committee and Eurostat.

3. IDENTIFICATION OF APPROPRIATE POLICY LEVERS

Telecommunications markets in Europe remain predominantly national, regional or local in scope, with different supply and demand conditions. Telecommunications operators have national strategies even when they form part of larger multinational groups. Important differences exist within the EU as regards telecommunications regulation and spectrum policies, which cannot be justified by national circumstances and which hinder the potential for further investment and the emergence of innovative businesses at EU level. This prevents the EU from reaping the full potential of an EU-wide telecommunications market in which players active at a multi-territorial or pan-European level would compete with innovative local providers relying largely on their own infrastructure and could reach new types of commercial agreements to facilitate further extension of very high capacity networks.

The current regulatory framework for electronic communications (in force since 2002 and updated in 2009) has successfully liberalised previously monopolistic national markets and reduced barriers to entry, promoting effective competition and creating common principles for electronic communications markets across the EU. The main economic regulation provisions of the framework are based on market analysis by national regulatory authorities (NRAs), which impose ex-ante remedies to ensure effective competition in the presence of significant market power (or dominance) of one or more operators. The current framework is therefore premised on the implementation of rules by national regulatory authorities in 28 Member States.

While there appears to be a general consensus with regard to the need to regulate access to broadband networks in certain circumstances, the regulatory remedies chosen by the national regulatory authorities to redress specific market failures and competition problems identified tend to vary considerably.

This situation increases the burden on operators to invest in networks and related services on a cross-border basis or to enter new markets on the basis of a mere extension of existing commercial and technical models. As a result, consumers and businesses in all sectors may have access to electronic communication services of varying quality across countries; low quality access networks hinder the performance of certain economic sectors and reduce citizens' interest in engaging in online activities.

The current regulatory framework has been broadly successful in creating the conditions for effective competition in the distinct national markets. Traditional providers of vertically integrated telecommunications services ("incumbents") compete against access seekers ("entrants") and with providers of cable networks (historically delivering television services). Innovation in mobile broadband networks has delivered a new service platform.

Delivering on its Digital Single Market strategy, the Commission adopted on 14 September 2016 a set of initiatives and legislative proposals to place the EU at the forefront of internet connectivity⁴:

1. a set of new, non-binding connectivity targets for a competitive Digital Single Market by 2025⁵;
2. a new European Electronic Communications Code⁶ which merges four existing telecoms Directives (Framework, Authorisation, Access and Universal Service Directive) and an updated Regulation on the Body of European Regulators of Electronic Communications (BEREC)⁷ ;

⁴ http://europa.eu/rapid/press-release_IP-16-3008_en.htm

⁵ <https://ec.europa.eu/digital-single-market/news-redirect/34110>

⁶ <https://ec.europa.eu/digital-single-market/news-redirect/34112>

⁷ <https://ec.europa.eu/digital-single-market/news-redirect/34114>

3. a Regulation to support local communities in providing free public Wi-Fi to their citizens⁸;
4. an Action Plan to deploy 5G in the EU⁹.

3.1. Connectivity targets for a competitive Digital Single Market by 2025

Building on the EU's existing 2020 broadband targets, the Commission has set out a vision for a European Gigabit Society, where availability and take-up of very high capacity networks would enable the widespread use and also the development of products, services and applications in the Digital Single Market. The new targets for 2025 are as follows:

1. All main socio-economic drivers, such as schools, universities, research centres, transport hubs, all providers of public services such as hospitals and administrations, and enterprises relying on digital technologies, should have access to extremely high-gigabit connectivity (allowing users to download/upload 1 gigabit of data per second).
2. All European households, rural or urban, should have access to connectivity offering a download speed of at least 100 Mbps, which can be upgraded to Gbps.
3. All urban areas as well as major roads and railways should have uninterrupted 5G coverage, the fifth generation of wireless communication systems. As an interim target, 5G should be commercially available in at least one major city in each EU Member State by 2020.

Reaching the connectivity objectives is estimated to require €500 billion investment over the coming decade. This money will largely have to come from private sources. However, under current investment trends, there is likely to be a €155 billion investment shortfall.

⁸ <https://ec.europa.eu/digital-single-market/news-redirect/34228>

⁹ <https://ec.europa.eu/digital-single-market/news-redirect/34115>

3.2. The new European Electronic Communications Code

In order to address the investment challenge, the Commission has proposed a modernisation of the current EU telecoms rules, which were last updated in 2009. The new European Electronic Communications Code will stimulate competition which drives investments and strengthens the internal market and consumer rights.

The Code proposes:

- **Increased competition and predictability for investments:** In whichever sector they operate, investors need long-term certainty. This means a stable regulatory environment which reduces divergences between regulatory practices across the EU. The proposed Code will apply market regulation only where end-user interest requires it and where commercial arrangements between operators do not deliver competitive outcomes. The new Code will substantially reduce regulation where rival operators co-invest in very high-capacity networks and make it easier for smaller players to be part of investment projects, thanks to the pooling of costs, the overcoming of scale barriers, etc. The proposed new rules are designed to make the investment case more predictable for "first movers" who take the risk to invest in those networks in less profitable areas, such as rural areas. With the new Code, it is not only about competition for access to networks anymore, but also competition for investments in these networks.
- **Better use of radio-frequencies:** Reducing divergences between regulatory practices across the EU is particularly relevant in the area of radio spectrum, which is the key raw material for wireless communications. The Code proposes long licence durations, coupled with more stringent requirements to use spectrum effectively and efficiently. It also proposes to coordinate basic parameters such as the timing of assignments to ensure timely release of spectrum to the EU market and more converged spectrum policies with the

aim to provide full wireless coverage across the EU.

- **Stronger consumer protection,** in areas where general consumer protection rules do not address the sector-specific needs. Updated rules will make it easier to switch suppliers when consumers are signed up to bundles (packages combining internet, phone, TV, mobile etc.) and ensuring that vulnerable groups (like the elderly, disabled and those receiving social assistance) have the right to affordable internet contracts.
- **A safer online environment for users and fairer rules for all players:** Selected rules are to be extended to new online players which offer equivalent services to traditional operators, to ensure that security requirements (making sure networks and servers are secure) apply. The proposals also foresee the possibility for users to reach the EU emergency number 112 via such online services in the future. This will not imply any additional costs for the users.

The Commission has proposed to **reinforce the role of national regulators and the Agency - BEREC** to ensure consistent and predictable application of the rules throughout the Digital Single Market, limiting current fragmentation and inconsistencies. The proposal for transforming BEREC into a fully-fledged agency goes hand in hand with the proposed new European Communications Code, which identifies areas where BEREC should contribute to achieve the connectivity and regulatory consistency objectives (such as cross-border matters, guidance for national regulatory authorities, etc.).

In particular relevant for broadband, **access regulation** for networks owned by operators with significant market power remains an important part of the regulatory framework for electronic communications. This means that these operators will continue providing access to their networks to other operators against payment, and that regulators can intervene if this is not the case. However, it is proposed that the

conditions under which such access is granted are simplified and adapted to stimulate the deployment of new high capacity networks. Additionally, based on current best practices across the European Union, the Commission proposes a more focused approach to ensure that access obligations are imposed only when and where necessary to address the shortcomings of the market. The Commission also proposes to extend the current maximum three-year market review period to five years, giving operators more stability as to the regulatory environment.

In order to better target regulation and to stimulate investment in under-served areas, the proposed Code will require national regulators to map network investment intentions and to organise calls for interest for network deployment in areas where no very high capacity network is planned. For improving investment certainty, the proposed rules empower regulators to act against operators who deviate from their declared intention in these areas. In this way, the Code will encourage alternative network operators who focus on smaller geographical areas and contribute to bring high quality connectivity to citizens outside cities.

Furthermore, two models are proposed that allow operators to reduce their burden of regulation, in particular:

1) **Co-investment:** Competition drives investment, in particular where infrastructure competition is possible (e.g. in densely populated areas). In other areas, co-investment can help to pool resources and lower deployment costs. It gives alternative operators who wish to invest a more realistic possibility to do so, and could allow dominant operators who upgrade their networks to differentiate themselves from those who do not invest. Such an approach encourages a wide range of market players to join their forces from the beginning to deploy high capacity networks and fully benefit from them. It also has the potential to stimulate new commercial access agreements as the network capacity increases.

Furthermore, people living in the less dense areas will benefit from the more rapid deployment of very high capacity networks which these models support.

2) **Wholesale-only:** market players who realise privately-funded investments in networks and then only deal with selling or renting access to them without offering services to end-users will also benefit from lighter access obligations if they are still deemed dominant players in the market. By offering access to several service providers, the investor can pool revenues and ensure better returns on capital needed to build infrastructure.

Rules for greater coordination of the assignment of **radio spectrum** will also make it easier for investors, especially to scale up across borders. The Code proposes long licence durations to incentivise investments accompanied by rigorous requirements to use spectrum effectively and efficiently. It also proposes to coordinate in particular the timing of spectrum assignments and those licence conditions which most impact the market structure and business strategies to ensure spectrum is timely delivered to the EU market. The new rules will reduce the costs for telecoms operators of operating in multiple countries thus contributing to creating the internal market.

Wireless broadband contributes significantly to bringing fast broadband connections to people in remote areas and to making innovative services available on mobile devices (e.g. smartphones, tablets, and laptops) anywhere across Europe. Through efficient use of radio spectrum, favoured by harmonised spectrum access conditions enabling interoperability and economies of scale for wireless equipment, digital products and services have the potential to support all aspects of citizens' lives and drive Europe's economic recovery.

3.3. WiFi4EU

Wireless local area networks (Wi-Fi) are increasingly set up by providers of public

services – from administrations to libraries, universities and hospitals – for their internal use, but also very often for visitors. Building on this practice, the Commission encourages each community - from villages to cities - to provide at least one public and free Wi-Fi access points for its citizens. This is complementary to the proposal to consider broadband access as a universal service under the new European Communications Code.

The Commission has proposed a scheme to help interested local authorities to offer free Wi-Fi connections to any citizen, for example, in and around public buildings, health centres, parks or squares. With an initial budget of €120 million, this new voucher scheme has the potential to deliver connectivity to thousands of public spaces, generating 40 to 50 million Wi-Fi connections per day.

Financing for the installation of local wireless access points should be available quickly, after adoption of the scheme by the European Parliament and Member States. A minimum of 6000 to 8000 local communities should benefit from this new project by 2020.

3.4. The 5G Action Plan

The 5G Action Plan is a key initiative to tackle the market and investment challenges to the launch of commercial 5G services everywhere in Europe by 2020. In particular, the Commission will address with stakeholders the policy and regulatory obstacles for deployment, for example by promoting the timely availability of radio spectrum, more favourable conditions for small cell deployment or tackling sectorial issues preventing the deployment of particular services. This action will complement the overall positive effect of the review of the Regulatory Framework. Its success relies on the voluntary and mutually beneficial coordination of all players.

The Plan also foresees to accelerate the development of new connectivity-based innovation ecosystems by bringing together all European partners, public

and private actors across all relevant sectors from telecoms to logistics, transport, energy, health and manufacturing, around a common agenda towards 5G.

In addition, the Plan bridges ongoing efforts in research and development for 5G and future market take-up. It will include advanced 5G demonstration and large scale pre-commercial trial activities as well as a consistent EU strategy for 5G standardisation. Finally, the Plan aims at establishing a clear roadmap for public and private investment in 5G infrastructure in the EU, in line with the strategic importance of 5G connectivity for the economy and society.

The Plan builds on the many efforts of the Commission so far to ensure that the EU is a global leader for the development of 5G. As early as in 2013, the Commission launched a Public-Private Partnership on 5G, endowed with an EU funding of €700 million under the Horizon 2020 programme, spanning a period extending up to 2020. This is to leverage at least €3.5 billion from the private sector. The Commission is also cooperating on a bilateral basis with its counterparts in several strategic trading partner countries to promote the joint development of 5G, namely South Korea, Japan, China and Brazil. The EU is also in close contact with key organisations in the US.

3.5. Spectrum assigned to the provision of e-communications services including wireless broadband

One of the key policy objectives of the Radio Spectrum Policy Programme (RSPP) adopted in 2012 was to identify at least 1200 MHz of spectrum suitable for wireless broadband by 2015. Member States are individually responsible for assigning rights to use the spectrum.

Some Member States still need to complete the authorisation process in the already harmonised bands, as requested by the Radio Spectrum Policy Programme (RSPP). Meanwhile, other frequency bands were identified for EU

harmonisation, such as the 1.5 GHz band - and the 700 MHz band. The latter is of particular importance to ensure the provision of broadband services in rural areas and, like the 800 MHz band, allows the deployment of cost-efficient wireless networks with ubiquitous indoor and outdoor coverage. The 700 MHz band is currently used across the Union for digital terrestrial television (DTT) and wireless audio equipment for Programme Making and Special Event (PMSE). Therefore it needs to be released in a coordinated manner by Member States, while accommodating the specific needs of audio-visual media distribution. On 2 February 2016 the Commission presented a Proposal for a Decision of the European Parliament and of the Council to coordinate the use of the 700 MHz band for mobile services as part of a balanced long-term approach for the use of the whole ultra-high frequency (UHF) band.

While the EU gets closer to reaching the 1200 MHz target, some Member States still need to assign more than 30% of harmonised spectrum. On the one hand, only France and Germany have already assigned the 700 MHz band, while in some Member States the repurposing process could take several years. On the other, lack of market demand for frequencies above 1 GHz is reported, although the situation is changing, also due to growing interest in high frequency bands in view of 5G deployment. See Table 2 for an overview of the situation in Member States with respect to the authorisation process in bands designated in the Radio Spectrum Policy Programme for the provision of wireless broadband electronic communications services.

4. CROSS-EXAMINATION OF POLICY STATE OF PLAY

4.1. Good practices

Broadband in Sweden

Sweden scores well above EU average in the DESI 2016 Connectivity dimension. With fixed broadband available to 99% of homes, there is a strong foundation

for the digitisation of society. 4th generation networks and related mobile broadband services are also available to 99% of homes, thanks to timely spectrum awards and licence terms that favoured market investments and development of LTE networks also in rural areas. Operators have therefore been able to fulfil the increasing demand for wireless services, reflected also by very high mobile broadband take-up and considerable mobile data consumption among Swedes.

In rural areas, fixed broadband covered 93.6% of homes, above the EU average of 90.6%, a good result given the geographical configuration of the country. Sweden scores only 18th among Member States as regards Next Generation Access coverage, with 76% of homes having broadband capable of providing at least 30 Mbps download (compared with 71% in the EU), lower than its performance in other dimensions. However, newly published data in Sweden indicates a recent increase in NGA coverage. On the other hand there is very good availability and take up of high speed broadband connections above 100 Mbps, due to continual deployment of fibre driven by consumer demand.

Fibre investments are now focusing on rural areas, and single dwelling units have been an increasing part of last mile investments, also financed by consumers. Subscriptions with speeds of 1Gbps are available on the market, approaching the Gigabit connectivity consumer services that characterise the Japanese and Korean markets.

The current broadband strategy was adopted in 2009 with the overarching goal that Sweden should have world-class broadband. The long term objective is to achieve 90 % coverage of households and businesses with 100 Mbps by 2020. Sweden's Government emphasizes the role of private capital and the market in making investments in the network infrastructure and mainly confines its own role to provision of a conducive regulatory and market environment. State aid for deployment of

broadband infrastructure with very high speed is available in remote areas where market players are unwilling to invest. The aid is distributed through the two EU-funds: The Rural Development Programme and, in the northern part of Sweden, also the European Regional Development Fund.

Swedish municipalities play a crucial role in the development of very high speed broadband infrastructures, by defining local digital strategies, deploying networks and owning fibre-based infrastructure, also with the aim of offering welfare services to citizens, i.e. municipal information, services in education, health and social care over broadband networks. Fibre deployment is also fostered by the policies of municipal housing companies, since they invest in fibre to the apartments, while tenants' associations agreed increased rents for fibred properties with property owners, reflecting the added value of a fibre connection for the end user.

Broadband in the Netherlands

The Netherlands is performing well and making good progress in the DESI 2016 Connectivity dimension. Both with regard to broadband and fast broadband coverage, the Netherlands is in the top 3. Every Dutch household can have access to broadband Internet. Next Generation Access networks capable of providing at least 30 Mbps are available to practically all Dutch households (98% compared to 71% in the EU). Of all fixed broadband subscriptions, 62% are for fast broadband, up from 46% last year and significantly above the average for the EU (30%). The Netherlands is therefore well on track to comply with the 2020 targets set out by the Digital Agenda for Europe.

The Netherlands is also leading the way in Europe with virtually 100% LTE (4G) coverage. Over the last year, the

number of mobile broadband subscriptions increased from 77 to 80 per 100 people, which is just above the EU average. The percentage of assigned spectrum in the EU harmonised bands is also close to 100%, significantly above the EU average of 68%.

The Dutch broadband strategy is formulated in "Digital Agenda.nl – ICT for innovation and economic growth" published by the Ministry of Economic Affairs in May 2011. It seeks to ensure that "By 2020, networks will match the demand from users and suppliers of services", and signals that the local government's main task is to create the right conditions, such as planning and coordinating excavation work, shortening and reducing the costs of licensing procedures and promoting the development and use of applications and services. Where market-based infrastructure roll-out fails, local and regional actors may assist in finding other funding and financing instruments. The Netherlands will publish its Digital Agenda 2016-2017 in April this year. The main action lines are expected to be maintained in order to meet future challenges and improve benefits for the overall economy stemming from its excellent digital infrastructure.

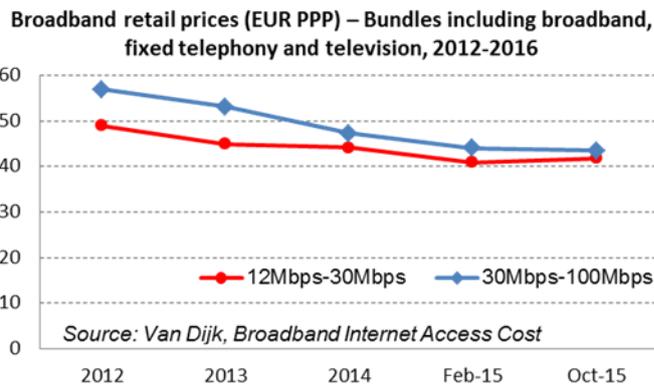
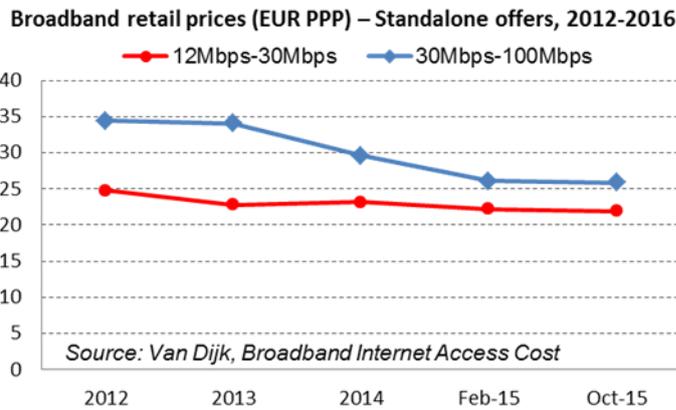
4.2. Consumer aspects

The main indicators to assess the consumer aspects are retail price trends (Figure 7) perceived ease of switching providers (Figures 8 and 9) and consumer satisfaction (Figure 10).

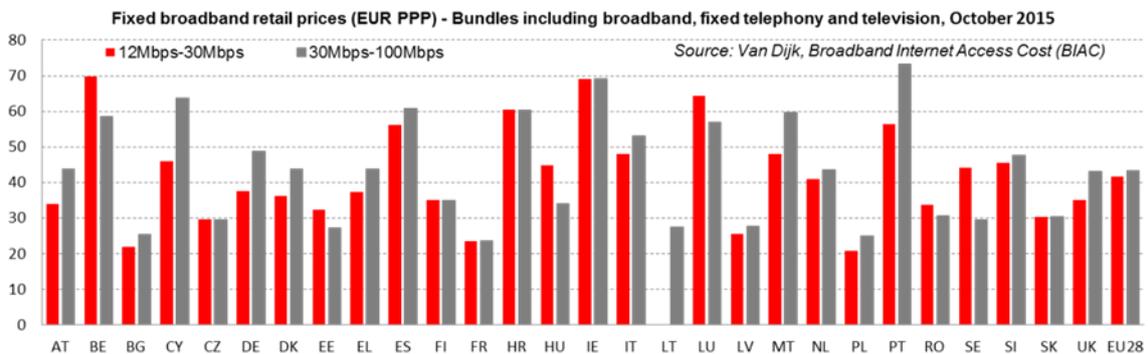
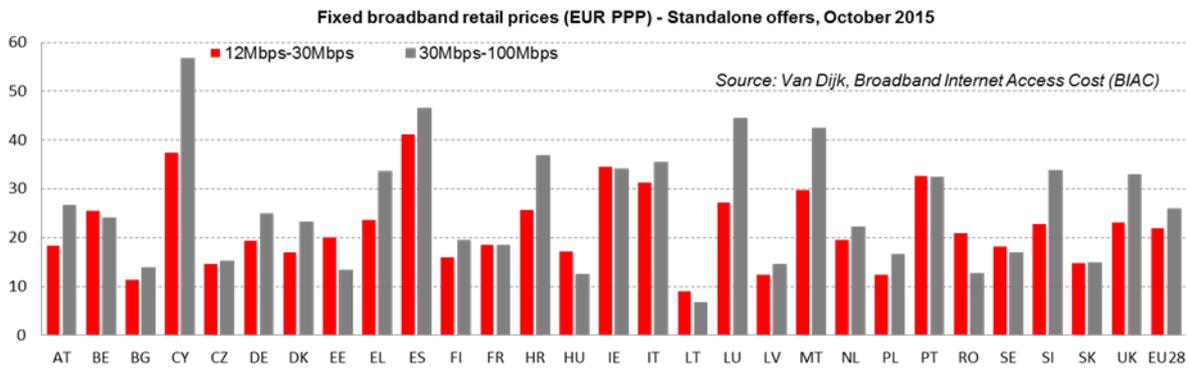
Prices of mobile communication services have fallen substantially for all usage patterns since 2002 in the EU. They fell by at least 30 % between 2006 and 2010.

As for broadband, fixed broadband prices has been falling substantially since 2012, although there was a slowdown in the trend in 2015. (Figure 7)

Figure 7 – Broadband retail prices in purchasing power parity

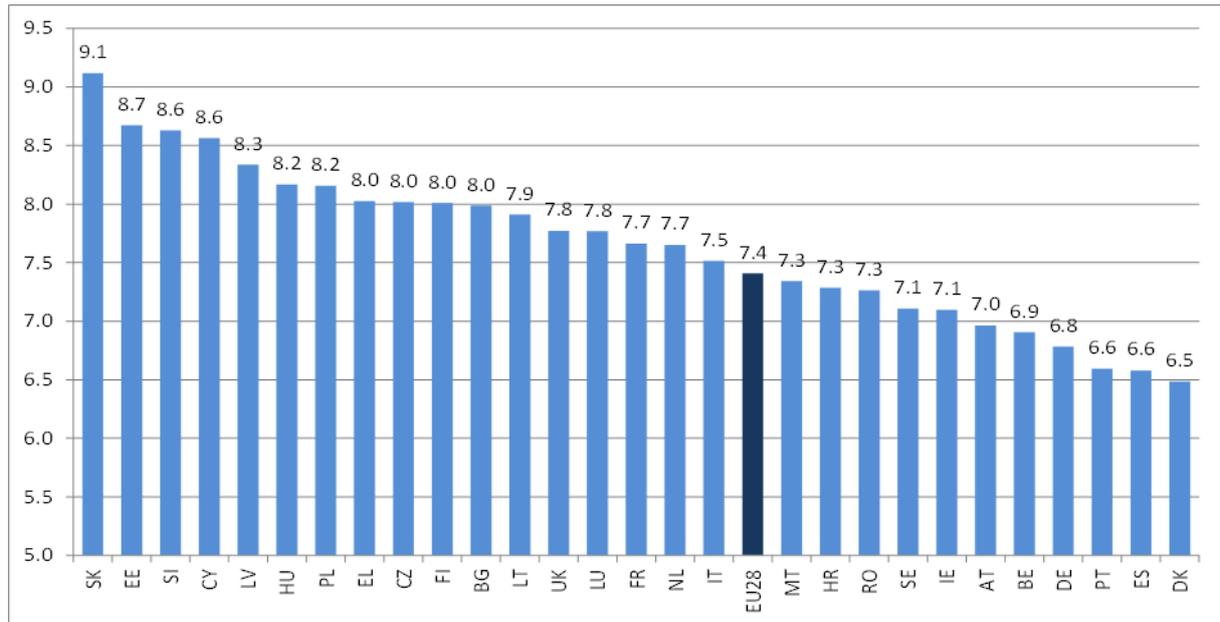


Source: Van Dijk: Broadband Internet Access Cost. Prices are as of Autumn 2015.



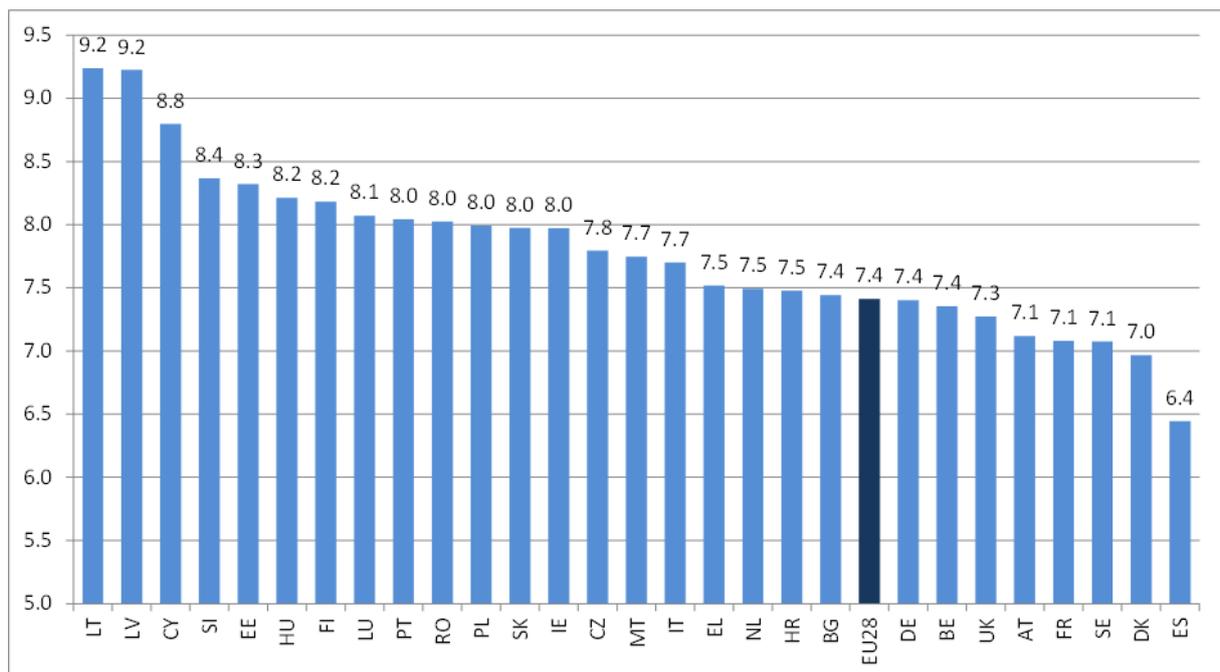
Source: Van Dijk: Broadband Internet Access Cost. Prices are as of Autumn 2015.

Figure 8 – Perceived ease of switching Internet service providers¹⁰



Source: European Commission, Market Monitoring Survey 2015 to be published in the Consumer Markets Scoreboard July 2016. Scale from 0 to 10 showing how difficult (0) or easy (10) it is to switch operators.

Figure 9 – Perceived ease of switching mobile phone operators¹¹



Source: European Commission, Market Monitoring Survey 2015 to be published in the Consumer Markets Scoreboard July 2016. Scale from 0 to 10 showing how difficult (0) or easy (10) it is to switch operators.

¹⁰ The data comes from the large-scale EU-wide consumer survey carried out among consumers with recent purchasing experience. The 2015 wave of the survey will be published in the Consumer Markets Scoreboard in July 2016. Details about the methodology and detailed results can be found in Table 3 .

http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/10_edition/index_en.htm

¹¹ Idem.

While liberalisation and competition in the e-communications sector have benefited European consumers, providing more choice at lower prices, there are still barriers that limit consumers' ability to take full advantage of the increased competition. A study on internet service provision¹² showed that service interruption while switching, the lack of transparent and comparable information, as well as contractual barriers (such as long contract duration and charges for early contract termination) discourage consumers from switching. **The ease of switching** measured through the Market Monitoring Survey¹³ reflects consumers' ability to make meaningful use of the choice available in the market. The main indicator is the perceived ease of switching internet service providers and mobile phone operators (Figures 8 and 9 and Table 3). **Switching internet service providers** is assessed as most difficult in Denmark, Spain, Portugal, Germany and Belgium (Figures 8), **while switching mobile phone operators** is assessed as most difficult in Spain, Denmark, Sweden, France and Austria. (Figure 9).

E-communications markets consistently feature as causing most problems for consumers in the Commission's Consumer Markets Scoreboards. A fifth (20%) of EU consumers report **problems in the market for internet service provision**, with the highest percentages in Croatia (40%), Spain, Ireland (both 34%) and Denmark (31%). Likewise, 20% of EU consumers report problems in the **market for mobile telephone services**, with the highest percentages in Spain (43%),

Bulgaria (39%), Sweden (28%) and Poland (27%) (Figures 10 and 11)¹⁴. The high incidence of problems with internet service provision has been confirmed by a Commission study¹⁵, with interruptions in the internet connection and a slower than anticipated speed being the most common problems. The overall detriment to consumers due, among other things, to internet outages and time spent solving problems has been estimated at between EUR 1.4 billion and EUR 3.9 billion for EU27.

The main indicator to assess detrimental impact on consumers in the e-communications sector (markets for Internet service provision and mobile telephony) is the incidence of reported problems (either with the service or the supplier) in the past 12 months. (Figures 10 and 11 and Table 3).

Following the adoption on 25th November 2015 of Regulation (EU) 2015/2120 on open internet and roaming, as from mid-June 2017, Europeans will pay the same price to use their mobile devices when travelling in the EU as they do at home. The Regulation also protects the right of every European to access the content of their choice over the internet, without interference or discrimination. The new legislation also improves transparency for consumers. Operators will have to inform their subscribers about the committed internet speeds and the remedies available if they do not get those speeds. The new legislation also creates contract termination rights (pursuant to national law) for end users if contractual data speeds of internet access service are not delivered.

¹² The functioning of the market for internet access and provision from a consumer perspective in the European Union. Study on behalf of the European Commission by Civic Consulting.

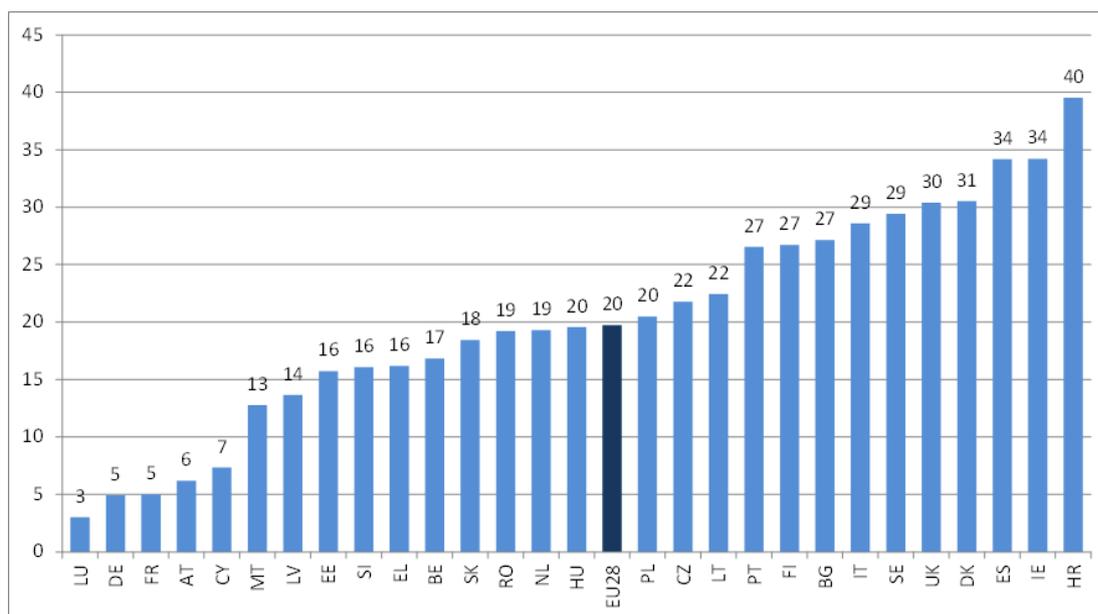
http://ec.europa.eu/consumers/consumer_evidence/market_studies/internet_services/index_en.htm

¹³ The Market Monitoring Survey is a large-scale EU-wide consumer survey carried out once every two years among consumers with recent purchasing experience.

¹⁴ Market Monitoring Survey 2015 published in the Consumer Markets Scoreboard July 2016

¹⁵ Consumer market study on the functioning of the market for internet access and provision from a consumer perspective (2012) — conducted on behalf of the European Commission by Civic Consulting. http://ec.europa.eu/consumers/consumer_evidence/market_studies/internet_services/index_en.htm

Figure 10 – Incidence of problems in the market of internet service provision (percentage of respondents)¹⁶, 2015



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5. USEFUL RESOURCES

- Digital Single Market - <https://ec.europa.eu/digital-single-market/en/news/digital-single-market-strategy-europe-com2015-192-final>
- Digital Scoreboard - <https://ec.europa.eu/digital-single-market/digital-scoreboard>
- Digital Economy and Society Index (DESI) - <https://ec.europa.eu/digital-single-market/desi>
- Communication and Staff Working Document – [Connectivity for a Competitive Digital Single Market – towards a European Gigabit Society](#)
- Action Plan and Staff Working Document Communication – [5G for Europe](#)
- Proposal for an [European Electronic Communication Code](#)
- Proposal for a [Regulation on the Body of European Regulators of Electronic Communications \(BEREC\)](#)
- Proposal for a Regulation on the promotion of Internet connectivity in local communities and public spaces (WiFi4EU)

¹⁶ The data comes from the large-scale EU-wide consumer survey carried out among consumers with recent purchasing experience. The 2015 wave of the survey will be published in the Consumer Markets Scoreboard in July 2016. Details about the methodology and detailed results can be found in Table 3.

ANNEX

Table 1 – Digital Economy and Society Index 2016 – Connectivity

Country name	Country code	Scores (0-1)¹⁷
Netherlands	NL	0.80
Belgium	BE	0.77
Sweden	SE	0.74
Luxembourg	LU	0.72
Denmark	DK	0.72
United Kingdom	UK	0.71
Lithuania	LT	0.70
Germany	DE	0.69
Malta	MT	0.67
Latvia	LV	0.64
Finland	FI	0.62
Portugal	PT	0.62
Ireland	IE	0.61
Austria	AT	0.60
Czech Republic	CZ	0.60
Estonia	EE	0.59
European Union 28	EU28	0.59
Hungary	HU	0.57
Spain	ES	0.54
Slovenia	SI	0.53
France	FR	0.52
Slovakia	SK	0.51
Bulgaria	BG	0.50
Romania	RO	0.49
Poland	PL	0.47
Cyprus	CY	0.46
Greece	EL	0.43
Italy	IT	0.42
Croatia	HR	0.41

¹⁷ In order to aggregate indicators expressed in different units into the sub-dimensions and dimensions of the DESI, those indicators were normalised. In DESI, normalisation was done using the min-max method, which consists of a linear projection of each indicator onto a scale between 0 and 1. For indicators with positive direction (i.e., where higher is better), the 0 value in the normalised scale was anchored to the minimum value in the indicator original scale, and the value 1 in the normalised scale was anchored to the maximum value in the indicator's scale. The opposite happened for indicators with negative direction. To allow for inter-temporal comparisons of index scores, the minima and maxima for the normalisation of each indicator were fixed and will be used for normalisation in the future versions of the DESI.

Table 2 – Situation in Member States with respect to the authorisation process in bands designated in the Radio Spectrum Policy Programme for the provision of wireless broadband electronic communications services

Band Sub-band spectrum available (MHz)	800 MHz	900 MHz	1800 MHz	2.5-2.69 GHz	3.4-3.8 GHz	
					3.4-3.6 GHz	3.6-3.8 GHz
	60	70	150	190	200	200
AT	√√√	√√√	√√√	√√√	√√√ (at least partially)	0
BE	√√√	√√√	√√√	√√√	√√√	0
BG	0	√√√	√√√	L	√√√ (at least partially)	0
CY	√√√	√√√	√√√	√√√	L	L
CZ	√√√	√√√	√√√	√√√	√√√ (at least partially)	0
DE	√√√	√√√	√√√	√√√	√√√	√√√
DK	√√√	√√√	√√√	√√√	√√√ (at least partially)/L	√√√ (at least partially)/ L
EE	√√√	√√√	√√√	L	√√√	√√√
EL	√√√	√√√	√√√	√√√	√√√ (at least partially)	L
ES	√√√	√√√	√√√	√√√	√√√ (at least partially)	0
FI	√√√	√√√	√√√	√√√	√√√ (at least partially)	L
FR	√√√	√√√	√√√	√√√	L	L
HR	√√√	√√√	√√√	L	√√√ (at least partially)/L	L
HU	√√√	√√√	√√√	√√√ (at least partially)	√√√ (at least partially)	L
IE	√√√	√√√	√√√	0	√√√ (at least partially)	√√√
IT	√√√	√√√	√√√	√√√	√√√ (at least partially)	√√
LT	√√√	√√√	√√√	√√√	√√√ (at least partially)	√√√ (at least partially)
LU	√√√	√√√	√√√	√√√	L	L
LV	√√√	√√√	√√√	√√√	√√√ (at least partially)	√√√
MT	√√	√√√	√√√	L	√√√ (at least partially)	L
NL	√√√	√√√	√√√	√√√	√√√ (at least partially)	L
PL	√√√	√√√	√√√	√√√	√√√	√√√
PT	√√√	√√√	√√√	√√√	√√√	√√√ (at least partially)
RO	√√√	√√√	√√√	√√√	√√√ (at least partially)	√√√ (at least partially)
SE	√√√	√√√	√√√	√√√	√√√ (at least partially)	√√√
SI	√√√	√√√	√√√	√√√	√√√ (at least partially)/L	√√√ (at least partially)/L
SK	√√√	√√√	√√√	√√√	√√√	√√√ (partially)/ √√
UK	√√√	√√√	√√√	√√√	√√√(at least partially)	√√√ (partially)/ √√

√√√ – done; √√- Authorisation process ongoing; L – Lack of demand for more than half of the band; 0 – No plan / no information

Table 3 – Situation Consumers' assessment of telecom markets

The Commission's biennial Consumer Markets Scoreboards monitor the performance of 52 consumer markets, including the markets for Internet provision and mobile telephone services. The data comes from the large-scale EU-wide consumer survey carried out among consumers with recent purchasing experience in each market¹⁸. The performance of different markets is assessed on the basis of six main components, which are measured by eight questions ():

1) Comparability

On a scale from 0 to 10, how difficult or easy was it to compare the [internet provision/ mobile telephone services] offered by different [internet service providers/operators]?

2) Trust

On a scale from 0 to 10, to what extent do you trust [internet service providers/ mobile telephone operators] to respect the rules and regulations protecting consumers?

3) Problems and detriment

"Within the past year, did you experience any problem with the [internet provision/ mobile telephone services] you paid for, either with the service or the provider, where you thought you had a legitimate cause for complaint?"

and

" On a scale from 0 to 10, within the past year, to what extent have you suffered detriment as a result of problems experienced either with the [Internet provision/ mobile telephone services] or the [Internet service providers/operators]?"

4) Expectations

On a scale from 0 to 10, to what extent are you satisfied with the number of [internet provision/ mobile telephone services] on offer from different [internet service providers/ operators] live up to your expectations within the past year?

5) Choice

On a scale from 0 to 10, would you say there are enough different [internet service providers/ mobile telephone operators] you can choose from?

6) Switching

Have you switched tariff plan or [internet service provider/ operator] in the past year?

and

On a scale from 0 to 10, how difficult or easy do you think it was/ was it to switch [internet service provider/ mobile telephone operator] in the past year?

and

Why didn't you switch?

- *Because you are not interested in switching (1)*
- *Because you thought it might be too difficult (2)*
- *You tried to switch but you gave up because of the obstacles you faced (3)*
- *For other reasons (spontaneous)*

The first five indicators are applicable to all the surveyed markets and feed into the **'Market Performance Indicator'** (MPI) – a composite index serving as the basis for the main ranking of the 42 markets. The five components of the index are weighted according to the importance they were given by the respondent and the score is on a scale from 0 to 100¹⁹.

¹⁸ The survey is based on telephone interviews with a representative sample of 500 people (aged 18+) for each of the 52 markets in each EU Member States, Iceland and Norway (250 people in Cyprus, Luxembourg, Malta and Iceland). The number of markets surveyed differs per edition. In the 2015 Market Monitoring Survey a selection of 42 markets were surveyed. The results will be published in the Consumer Markets Scoreboard 2016 (July 2016).

¹⁹ For the 'comparability', 'trust' and 'satisfaction' components, the score was calculated by taking the mean of the answers of all respondents (on a scale from 0 to 10). The score of the 'problems and detriment' component is calculated as follows: When a respondent did not

Market for internet provision

INTERNET PROVISION										
	Market Performance Indicator (0-100)	Comparability (0-10)	Trust (0-10)	Problems (% of consumers)	Detriment (0-10)	Expectations (0-10)	Choice (0-10)	Complaints (% of consumers with problems)	Ease of switching (0-10)	Actual switching %
Belgium	74.1	6.9	6.4	16.8	5.0	7.7	6.6	85.6	6.9	8.3
Bulgaria	77.2	7.8	6.8	27.2	4.7	7.8	7.3	90.8	8.0	15.2
Czech Republic	76.6	7.8	7.1	21.8	4.7	7.1	6.9	93.5	8.0	12.4
Denmark	75.2	6.2	7.0	30.5	3.5	7.7	7.2	90.8	6.5	27.1
Germany	84.3	8.0	8.1	4.9	6.1	8.2	8.1	93.9	6.8	10.1
Estonia	79.0	7.5	7.4	15.7	4.6	7.8	7.3	52.5	8.7	11.9
Ireland	71.9	6.9	6.9	34.2	5.6	7.3	6.4	89.4	7.1	18.9
Greece	77.4	7.5	6.8	16.2	5.6	7.7	7.4	87.2	8.0	19.9
Spain	65.6	6.2	5.0	34.2	6.2	7.0	6.5	94.8	6.6	15.8
France	84.3	8.0	8.1	5.0	7.2	8.1	8.3	89.6	7.7	5.6
Croatia	71.1	7.0	5.8	39.5	5.0	7.3	7.1	84.7	7.3	20.1
Italy	73.1	7.3	6.4	28.6	5.9	7.4	7.0	90.4	7.5	19.2
Cyprus	81.1	7.9	7.4	7.3	6.1	8.0	7.6	78.1	8.6	8.6
Latvia	81.8	7.8	7.6	13.6	5.4	8.3	7.7	74.7	8.3	10.7
Lithuania	80.7	7.8	7.5	22.4	4.4	8.3	7.6	87.4	7.9	12.7
Luxembourg	86.6	8.3	8.4	3.0	5.5	8.3	8.4	79.5	7.8	5.4
Hungary	81.7	7.7	7.7	19.6	5.2	8.4	8.0	80.4	8.2	5.9
Malta	80.5	8.0	7.6	12.8	6.3	8.1	7.3	87.5	7.3	4.9
Netherlands	74.1	6.9	6.4	19.3	4.9	7.5	6.9	88.7	7.7	9.8
Austria	83.5	7.9	8.0	6.2	5.7	8.1	8.0	96.1	7.0	6.9
Poland	75.2	7.4	6.6	20.5	5.8	7.4	7.0	84.5	8.2	15.7
Portugal	73.6	7.5	5.9	26.5	6.0	7.5	7.2	88.3	6.6	16.5
Romania	81.6	8.3	7.5	19.2	4.9	8.1	7.7	68.0	7.3	10.0
Slovenia	78.5	7.1	7.1	16.1	4.3	8.0	7.6	90.0	8.6	10.7
Slovakia	80.2	7.7	7.3	18.4	4.1	8.2	7.3	78.6	9.1	9.2
Finland	74.2	6.3	6.7	26.7	5.1	7.8	7.5	86.4	8.0	12.9
Sweden	72.9	6.1	6.6	29.4	4.0	7.5	6.9	89.8	7.1	15.6
United Kingdom	75.0	6.9	6.9	30.4	5.3	7.6	7.4	89.1	7.8	15.3

experience any problems (and therefore did not receive the detriment question), a score of 10 was assigned to this component. When a respondent experienced a problem the extent of perceived detriment is deducted from 10 so that the problems & detriment component reflects the amount of detriment: the higher the detriment rating, the lower the score on problems & detriment.