Human Capital:
Digital Inclusion and Skills

The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU Member States in digital competitiveness.
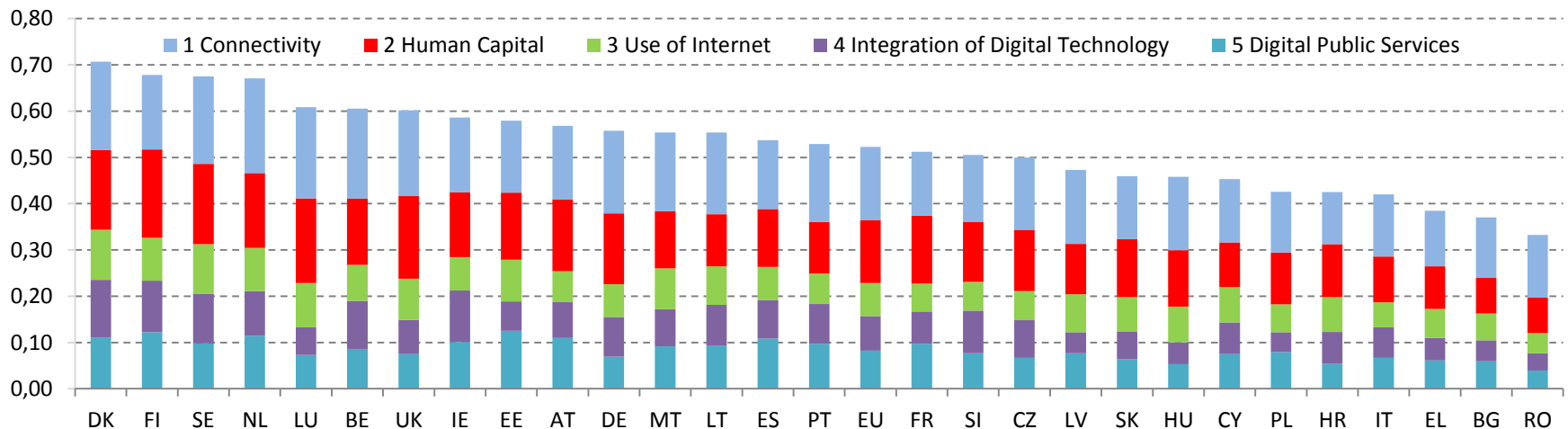
Denmark, Finland, Sweden and the Netherlands have the most advanced digital economies in the EU followed by Belgium, the UK and Ireland.

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

The five dimensions of the DESI

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

Digital Economy and Society Index (DESI) 2017 ranking

Legend: 1 Connectivity, 2 Human Capital, 3 Use of Internet, 4 Integration of Digital Technology, 5 Digital Public Services

Countries (left to right): DK, FI, SE, NL, LU, BE, UK, IE, EE, AT, DE, MT, LT, ES, PT, EU, FR, SI, CZ, LV, SK, HU, CY, PL, HR, IT, EL, BG, RO

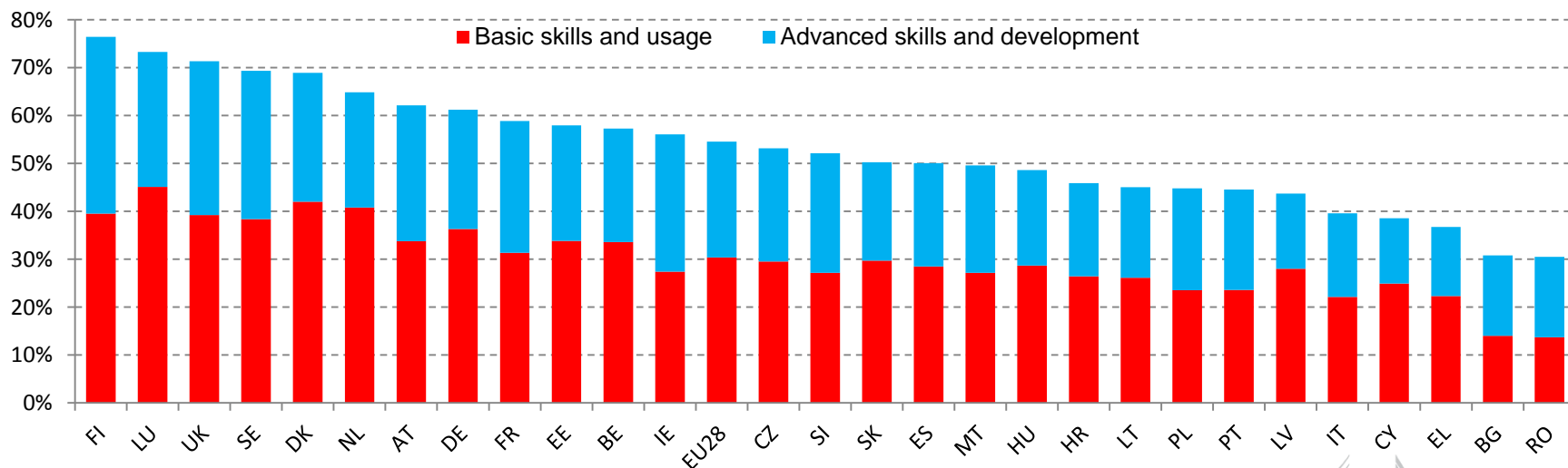**EDPR 2017 – Digital inclusion and Skills**

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Finland, Luxembourg, United Kingdom and Sweden obtained the highest scores under the Human Capital dimension of DESI. Romania, Bulgaria, Greece and Cyprus got the lowest ones.

The Human Capital dimension of DESI has two sub-dimensions covering **'basic skills and usage'** and **'advanced skills and development'**. The former includes indicators on internet use by individuals and digital skills - individuals with at least basic skills in the Digital Skills Indicator. The latter includes indicators on ICT specialist employment and graduates in STEM (Science, Technology Engineering and Mathematics) disciplines. According to 2016 data, Finland, the UK and Sweden were the highest scorers under both the basic skills and usage and advanced skills and development sub-dimensions. Romania, Bulgaria, Greece and Cyprus rank lowest overall on the Human Capital dimension of DESI.

	EU 28
2a1 Internet Users % individuals (aged 16-74)	79% (2016)
2a2 Basic Digital Skills % individuals (aged 16-74)	56% (2016)
2b1 ICT Specialists % employed individuals	3.5% (2015)
2b2 STEM Graduates Graduates in STEM per 1000 individuals (aged 20 to 29)	19 (2014)

Digital Economy and Society Index (DESI) 2017, Component 2 - Human Capital, by aggregate scores, 2017

Legend: ■ Basic skills and usage ■ Advanced skills and development

Categories: FI, LU, UK, SE, DK, NL, AT, DE, FR, EE, BE, IE, EU28, CZ, SI, SK, ES, MT, HU, HR, LT, PL, PT, LV, IT, CY, EL, BG, RO

Source: European Commission, Digital Scoreboard

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79% of EU citizens go online weekly, whereas **71%** do so every day. **63%** of disadvantaged people use the internet weekly. Despite ongoing improvements, the elderly and those with low education levels or on low incomes continue to be at risk of digital exclusion.

Growing numbers of Europeans are using the internet on a regular basis. In 2016, 79% of EU citizens went online at least weekly and 71% daily or almost (compared with, respectively, 76% and 67% a year earlier).

In 2016, regular internet use grew particularly fast among disadvantaged groups: 63% of the total in 2015 compared to 60% a year earlier. 57% of those aged 55-74 went online at least weekly, a 4 pp. increase y/y. The same applies to those with low education levels (4 pp. increase to 58%) and the retired or inactive (from 49% to 54%).

People on **low incomes** also use the internet less often: 61% of them did so weekly in 2016 compared to 58% a year earlier.

All these figures signal **undeniable progress** yet underscore the need to further pursue ongoing efforts to **fight digital exclusion.**

**Daily and weekly use of internet in the EU (% of individuals aged 16-74)**
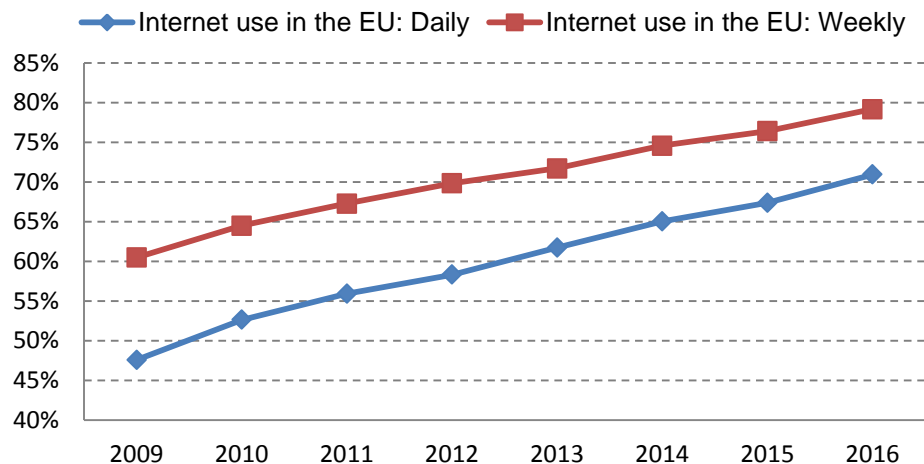
Weekly internet use by disadvantaged groups (% of individuals)
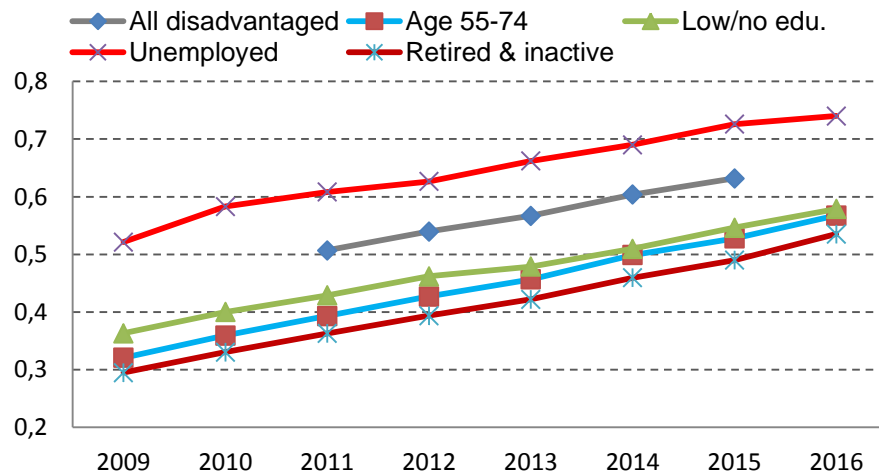
Source: Eurostat - Community survey on the ICT usage in households and by individuals

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The trend towards convergence in weekly internet use among EU Member States continued in 2016, although major gaps still exist.

Despite the relative high dispersion of rates of regular internet use across Member States, three main groups can be distinguished: **(1) Countries with the vast majority of their population using the internet regularly** (at least once a week): Scandinavian countries, Luxemburg, the Netherlands and the United Kingdom, all of which feature rates exceeding 90**%; (2) Countries in the process of rapidly catching up with the "top pack"**, such as Estonia and Germany, and **(3) Countries with rates still significantly below the EU average** (and as low as 56% and 58% in, respectively, Romania and Bulgaria in 2016). Most Member States in the latter group have, however, made significant progress in recent years; e.g. between 2010 and 2016 regular internet use increased by 25 pp., 24 pp. and 22 pp. in, respectively, Greece, Cyprus and Romania. Hungary (+ 6 pp.), Croatia and Poland (both +5 pp.), in turn, saw the greatest annual increases in 2016. This evolution partly reflects low starting levels of regular internet use.
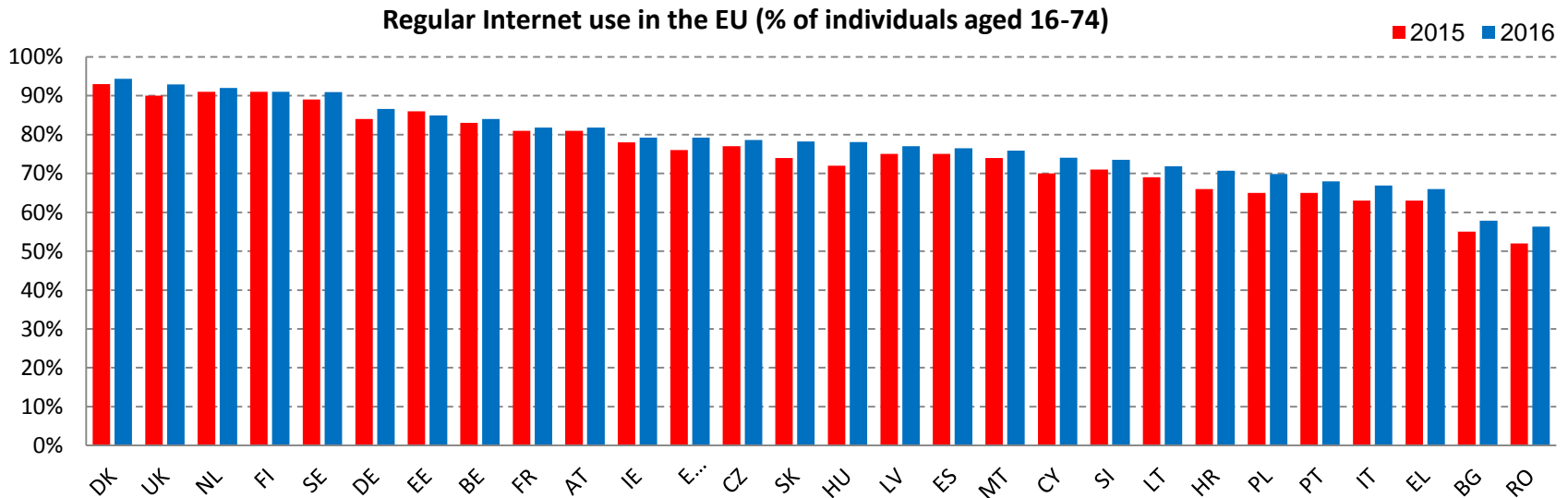

Regular Internet use in the EU (% of individuals aged 16-74)

Source: Eurostat - Community survey on the ICT usage in households and by individuals

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The number of non-internet users fell further in 2016, particularly in Member States with large shares of non-users. However, still today, 14% of the EU population has never used the internet.

The share of non-internet users continued its decline in 2016 to 14% (compared to 16% in 2015). As for regular internet use figures, the numbers of new internet users increased in the vast majority of Member States last year. Proportionally, the most significant increases ocurred in those with comparatively larger shares of "off-line" population; e.g. Poland reduced the share of people aged 16-74 who have never used the internet by 5 pp., whereas Croatia, Cyprus, Lithuania and Italy all achieved reductions of about 3 p.p. The Member States where the share of non-internet users fell the most between 2010 and 2016 are Romania (-27 pp.), Greece (-24 pp.), Cyprus (-22 pp.) and Portugal (-20 pp.).

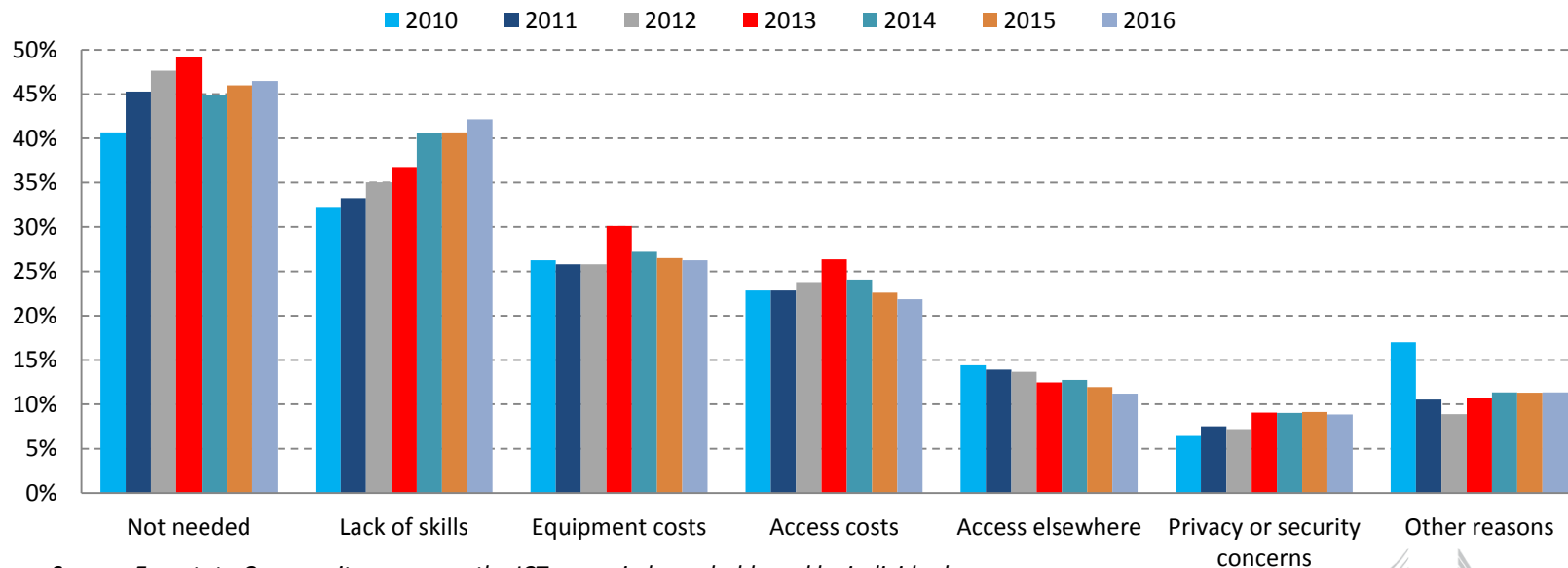**Individuals who never used internet (% of individuals aged 16-74)** ■2015 ■2016
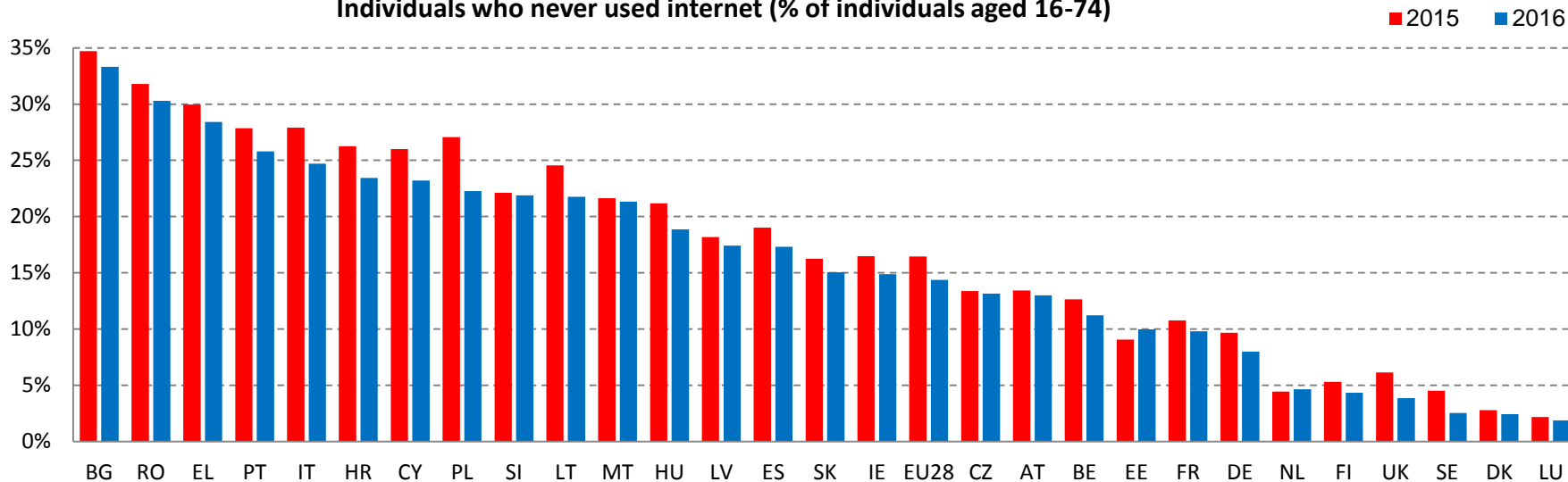
Source: Eurostat - Community survey on the ICT usage in households and by individuals

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Lack of need or interest, insufficient skills and cost-related barriers are the most common reasons given by households for not having internet access at home. **Lack of skills** is an increasingly important factor in this respect.

The three main reasons evoked by households for not having internet access continue to be the lack of need or interest (46% of households without internet access in 2016), insufficient skills (42%) and the high costs of equipment (26%) and access (22. Cost-related factors are of much greater importance in the case of poorer households as well as those with dependent children. In a context of accelerating technological change and digitisation of the daily lives of Europeans, lack of relevant skills is, understandably, the fastest-growing factor deterring households from having internet access at home (+10 pp. since 2010). In the same vein, the pre-eminence of perceived lack of need as deterring factor may be related to that very skills deficit; e.g. low awareness of potential benefits from accessing the internet at home.

Barriers to internet access at home in the EU (% households without internet access)

■ 2010 ■ 2011 ■ 2012 ■ 2013 ■ 2014 ■ 2015 ■ 2016

Source: Eurostat - Community survey on the ICT usage in households and by individuals

In 2016, 44% of the EU population had an insufficient level of digital skills. 19% had none at all, as they did not use the internet.

According to the **Digital Skills Indicator**, a composite indicator based on the Commission's digital competence framework, 19% of the EU population had no digital skills in 2016, the main reason being that they did not use the internet or did so only seldom. 44% of the EU population in 2016 can be considered as lacking sufficient digital skills insofar as they had either low or no digital skills , which means they did not possess the minimum, basic digital skills to meet current needs. Despite constituting an improvement from last year, these figures (which in 2015 reached, respectively, 21% and 45%) signal a strong need for ratcheting up efforts to enhance the digital skills of Europeans (an estimated 60m+ people in the EU have learned to use the Internet over the past decade), thus ensuring that they do not miss out on the life-enriching opportunities and economic benefits of functioning effectively online.

There **are large disparities across Member States**, with the share of people without digital skills ranging from 3% in Luxembourg to 41% in Bulgaria and Romania. In ten of them (Portugal, Poland, Slovenia, Croatia, Lithuania, Italy, Greece, Cyprus, Bulgaria and Romania), at least one-quarter of the population had no digital skills in 2016. Moreover, in Bulgaria and Romania, nearly three-quarters of the adult population can be considered as lacking basic digital skills. Many of these Member States are also among those with the largest shares of internet users with low digital skills (e.g. 55% in Bulgaria compared to an average 30% for the EU as a whole).

Digital skills of the EU population, 2016 (% individuals, by level of skills*)

Source: Commission services based on Eurostat data
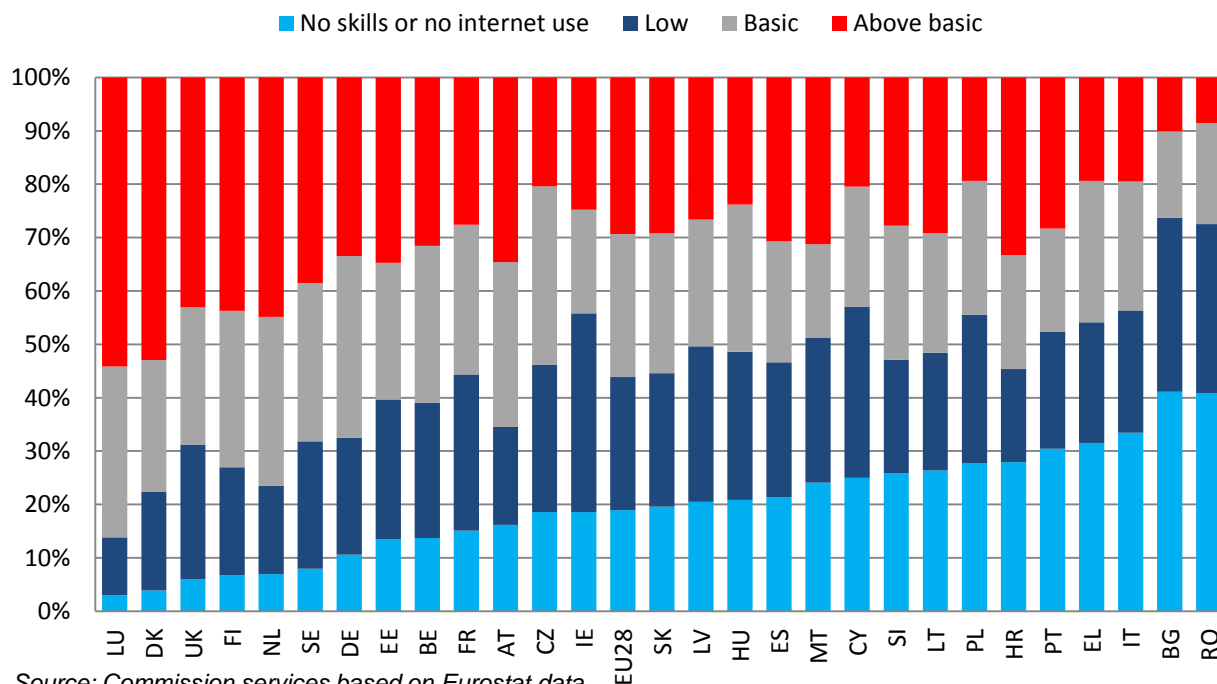
*To be classified as *low skilled*, an individual has to have carried out activities from only one of the four Digital Competence dimension included in the index (information, communication, content-creation and problem-solving). To be considered as having *basic skills*, an individual has to have *basic* in at least one dimension, but *no skills* in none. To be classified as *above basic*, the individual has to score *above basic* in each of the four dimensions.

Digital Agenda Scoreboard 2014
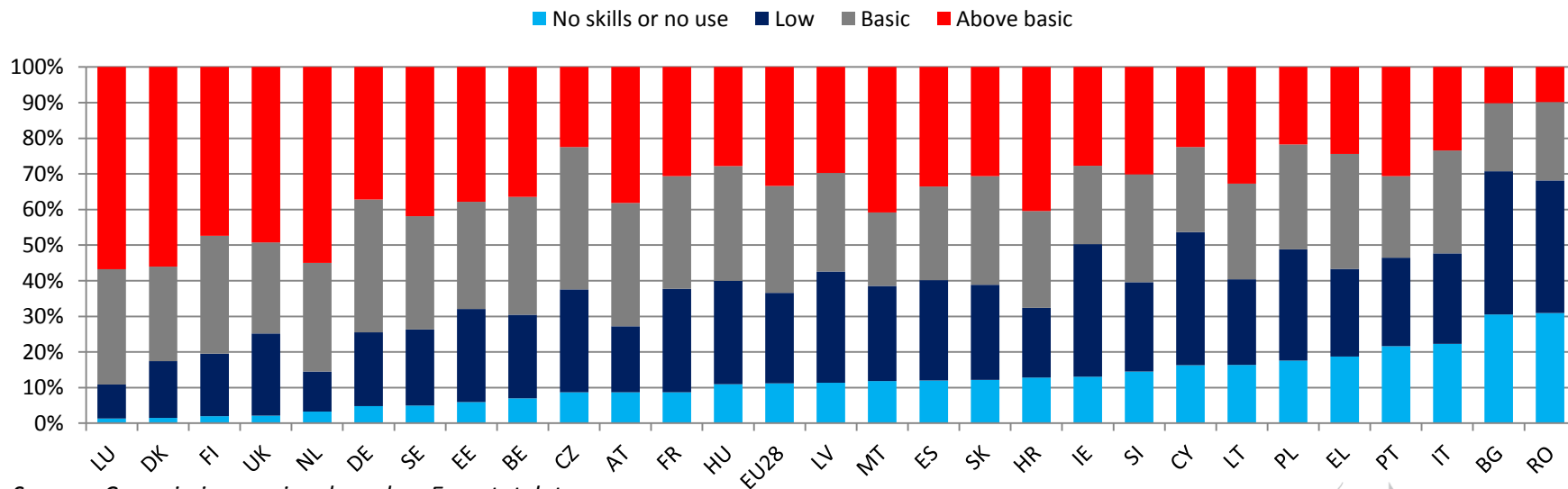
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In 2016, 37% of the EU labour force had an insufficient level of digital skills. 11% had no digital skills at all, as they did not use the internet.

Although most jobs currently require a basic level of digital skills*, **11% of the EU's labour force in 2016 still had none** (2 pp. improvement compared to 2015). In countries like Portugal, Italy, Bulgaria and Romania, this figure exceeds one-fifth of the labour force (more than 30% in Romania and Bulgaria). If we factor in those who have only a low level of skills, nearly 37% of the EU's labour force could be considered to be insufficiently digitally skilled (about 70% in Bulgaria and Romania).

The present situation suggests that **massive efforts continue to be required to up-skill and re-skill the European labour force as well as the population at large** so they can fully benefit from the digital transformation that is currently underway. As underscored by the OECD**, ensuring that everyone has the right digital skills for an increasingly digital and globalised world is essential to promote inclusive labour markets and to spur innovation, productivity and growth.

*SWD(2016) 195 final. In 2014, 71% of EU employees surveyed in the European Skills and Jobs survey (ESJ) declared that they need *some fundamental level of digital skills* to perform their jobs. Cedefop (2016), The Great Divide: Digitisation and digital skills gaps in the EU workforce', ESJsurvey Insights, No. 9, Thessaloniki: Greece. **OECD (2016), "Skills for a Digital World", Policy Brief on the Future of Work, OECD Publishing, Paris.

Digital skills of the EU labour force, 2016 (% individuals, by level of skills)

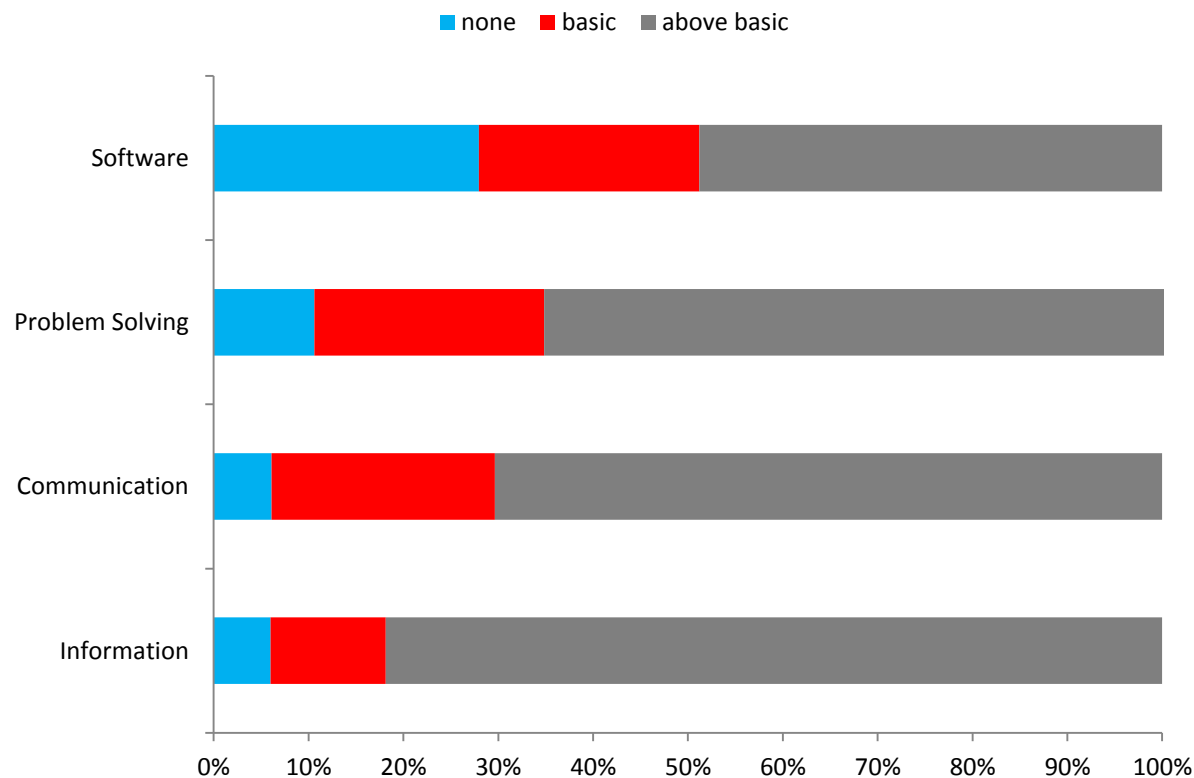*Source: Commission services based on Eurostat data*

Only a small share of the EU's internet users has advanced software skills, which are becoming increasingly critical to access the labour market. In 2016, 28% of European internet users had no software-related skills.

Across competence dimensions, the most urgent need for improvement relates to software and content creation. Indeed, the share of internet users with no skills in this area (i.e. those who had not carried out any of the activities considered under this dimension, which range from relatively basic text treatment and spreadsheet-based work to video editing and coding) reached 28% in 2016 compared to about 6% for those not having performed any of the information or communication activities. The largest shares of internet users without software/content creation skills are found in Bulgaria (52%), Romania (50%) and Ireland (44%), compared to software-savvier populations in Luxembourg, Denmark and Croatia (respectively, 69%, 63% and 59% of internet users with above basic skills) in 2016.

Among those considered, the **least-practiced activities** include **writing code** in a programming language (only 7% of internet users) and using **spreadsheet advanced functions** (29%). This is all the more critical since advanced digital skills are becoming a key prerequisite for entry into many jobs* and have a wide range of applications, even beyond domains where they are needed for core tasks.

*Berger and Frey (2016), quoted in Cedefop (2016), 'The Great Divide: Digitalisation and digital skill gaps in the workforce', #ESJsurvey Insights, No. 9, Thessaloniki: Greece.

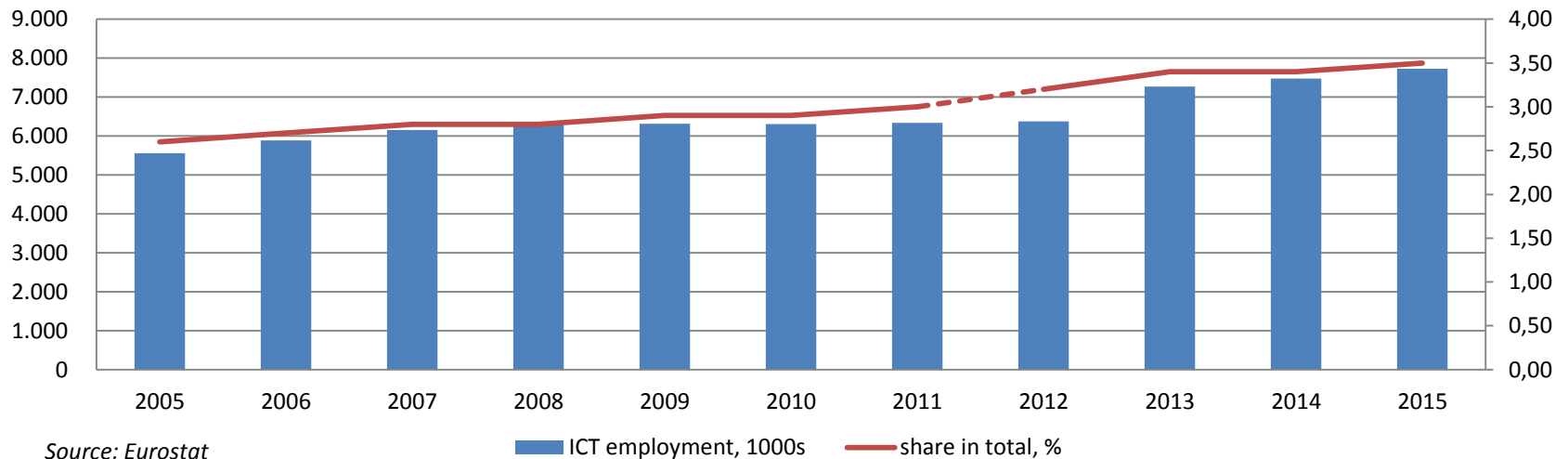**Digital skills by competence dimension and level, 2016 (% of internet users)**

■ none ■ basic ■ above basic

Source: Commission services based on Eurostat data

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Employment of ICT **specialists grew by more than 2 million workers** in the EU over the past decade, leading to a **35% increase in the share of ICT jobs in total employment.**

Between 2005 and 2015, **employment of ICT specialists in the EU grew by 2.2 million to reach 7.7 million in 2015**. This amounts to a 35% increase in the share of ICT jobs in total employment, from 2.6% to 3.5%. The compound annual growth rate over the same period stood at about 3% (allowing for breaks in the time series). This is to be compared the much slower growth in total employment, which returned to pre-crisis levels only in 2014.

All EU Member States have seen an important increase in ICT specialist employment over the past decade (2005 to 2015). In absolute terms, the largest increases occurred in DE (659,000), FR (381,000), the UK (192,000) and Italy (135,000). However, growth in ICT specialist employment has also been very substantial in many smaller countries. According to 2015 data, the Member States with the highest shares of ICT specialists in total employment are Finland (6.5%), Sweden (6.1%), Netherlands and the UK (both 5%). The UK employs the largest number of ICT specialists in absolute terms (1.54 million in 2015), although Germany (1.47 million) has nearly doubled its ICT employment over the past decade and is rapidly catching it up. Despite the positive evolution in recent years, the **gap between demand and supply of ICT specialists in the EU is expected to grow from 373 000 in 2015 to about 500,000 by 2020***. In other words**, the employment potential of specialised ICT skills remains underexploited.**

Employment of ICT specialists in the EU, in absolute terms ('000) and as share of total employment, 2005-2015

Source: Eurostat

ICT employment, 1000s   share in total, %

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Through its Digital Skills and Jobs Coalition, the Commission seeks to further reduce digital skills gaps by fostering the sharing, replication and upscaling of best practices in areas such as training and matching for digital jobs, certification and awareness raising.

Building on the positive results of the Grand Coalition for Digital Jobs 2013-2016 and the EU e-skills strategy, and in coordination with the work under Education and Training 2020, The Commission has launched the [Digital Skills and Jobs Coalition](#), which brings together Member States and stakeholders and aims at **developing a large digital talent pool and ensuring that individuals and the labour force in Europe are equipped with adequate digital skills**. This is to be done by means of pledging action and identifying and sharing best practices (including in terms of innovative funding opportunities) that can be replicated and scaled up. The Commission will monitor progress annually as part of the EDPR. The Digital Skills and Jobs Coalition is one of the 10 concrete actions under the New Skills Agenda for Europe, which prioritises digital skills in all its actions.

More than 80 stakeholders, representing enterprises, education providers and NGOs have already made concrete commitments to help reduce digital skills gaps, encompassing a broad range of actions in areas such as training and matching for digital jobs, certification and awareness raising.

Likewise, **National Coalitions for Digital Jobs** seeking to facilitate high-impact actions at local level have already been launched **in 13 Member States** and more are under development.

Digital Skills and Jobs Coalition