EUROPEAN
COMMISSION

Brussels, 6.5.2015
SWD(2015) 100 final

**COMMISSION STAFF WORKING DOCUMENT**

# A Digital Single Market Strategy for Europe - Analysis and Evidence

***Accompanying the document***

**Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions**

**A Digital Single Market Strategy for Europe**

{COM(2015) 192 final}

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# 1. COMPLETING THE DIGITAL SINGLE MARKET

The European Commission has identified the completion of the Digital Single Market (DSM) as one of its ten political priorities. The DSM is also a key priority for the European Council and the European Parliament and has been highlighted in the Annual Growth Survey 2015[1].

A Digital Single Market is one in which the free movement of goods, persons, services and capital is ensured and where citizens, individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence. Achieving a Digital Single Market will ensure that Europe maintains its position as a world leader in the digital economy helping European companies to grow globally. A fully functioning DSM will present European businesses, particularly small and medium-sized enterprises (SMEs), with a potential customer base of more than 500 million people, enabling companies to make full use of ICT to scale up for productivity gains, creating growth along the way.

It offers opportunities also for citizens, beyond their economic activity, provided they are equipped with sufficient digital skills. Enhanced use of digital technologies can improve citizens' access to information and culture, and can promote open government, equality and non-discrimination. It can create new opportunities for citizens' engagement in society at large, including democratic participation[2], and for better public services, information exchange and national and cross-border cooperation.

To maximise these opportunities the Commission is launching a Strategy which sets out ambitious steps towards a completed DSM and focusses on three strands[3]:

- Better access for consumers and businesses to digital goods and services across Europe (making sure the Internal Market is ready for the digital age with rapid actions, and helping to ensure a "single" digital market by removing barriers that hold back cross-border e-commerce);

- Creating the right conditions, level playing field and environment for digital networks and content services to flourish (actions to create the right conditions for infrastructure investment, ensuring a level playing field between market players and improving the European basis for the digital economy);

- Maximising the growth potential of the digital economy (actions with far-reaching effects on European industrial competiveness, investment in ICT infrastructures and technologies such as Cloud computing and Big Data, research and innovation as well as inclusiveness and skills).

The purpose of this document is to provide the background and evidence base which underpins the DSM Strategy. The following chapter provides a horizontal economic analysis of the DSM, while chapters 3 to 5 provide a detailed analysis structured along the three main strands of the DSM Strategy. Chapter 6 presents the EU financial means in support of the DSM.

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1 COM(2014) 902 final

2 Anttiroiko, A.-V., 'Building Strong e-Democracy: The Role of Technology in Developing Democracy for the Information Age', *Communications of the ACM*, Volume 46, Issue 9, 2003

3 COM(2015) 192

## 2. POLICY CONTEXT

### 2.1. Digital economy and digital society

Digitalisation has been changing not just our economy but also our daily lives for at least the last twenty years, and it is expected that this process will continue. Where digital technology was once a niche market for specialists, it has become a general purpose technology which affects all sectors of the economy and society.

This digital economy has the potential to create growth and employment by providing opportunities for investment and innovation, which leads to expanding markets and more choice in goods and services at lower prices. Better information flows can improve everything, from health, food safety and food security and resource efficiency to energy, intelligent transport systems and smart cities. Digital technologies have already made a major contribution to economic growth. Between 2001 and 2011, digitalisation accounted for 30% of GDP growth in the EU[4].

The key variable for the digital economy is scale. Digital technologies, which know no borders, enable businesses, including small ones, to serve large numbers of customers cheaply. The positive effect of digitalisation on the economy is therefore correlated with the number of potential customers. The larger the market in which companies operate, the stronger the growth impulse. Put another way, the larger the market, the more consumers can benefit from the opportunities offered by wider choice and better prices.

Therefore the DSM is very much intertwined with the global digital market. European companies face significant barriers in a wide variety of third countries (such as requirements to store data locally). Such barriers particularly affect European firms, because the EU is the biggest global exporter of digital services. Global digital openness could hence be a priority for European trade and investment policy.

Innovation in all parts of society is the cornerstone of the development of a digital economy and of the deepening of the DSM. Never before has innovation been so easy with the immediate circulation of information and technologies. New business models are emerging: scaling up or down, digital solutions have never been easier with marginal costs close to zero.

Policy makers have to keep pace with rapid innovation, often of a disruptive nature (such as the rise of the "sharing economy"), and balance risks with intelligent regulatory and governance models preserving the values of our societies. Small start-ups or web entrepreneurs are particularly vulnerable and may be strongly affected by ill-adapted regulatory measures. There is a high demand from policy makers for reliable evidence to support better decision-making, monitor policy implementation, as well as measure new economic and social phenomena. The data revolution, which makes data cheaper, should also ensure that policy makers and citizens have better access to quality information. Hence, the necessary infrastructure for such information, especially for official statistics, must be an integral part of the policy measures[5].

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4 Van Welsum, D. et al., *Unlocking the ICT Growth Potential in Europe: Enabling People and Businesses*, The Conference Board for the European Commission, 2013

5 Regulation (EC) No 223/2009 of the European Parliament and of the Council on European statistics provides the basic legal framework for the production of statistics where necessary for the purposes of the performance of the activities of the Union (Article 338 TFEU)

## 2.2. Benefits of the Digital Single Market

Between 2001 and 2011, ICT accounted for 30% of GDP growth in the EU but for 55% in the US. The difference is partly the result of the sectoral composition of the corresponding economies but also the result of disparities in the perception of ICT, investment volume in ICT production and use. For the period 2006-2011, the estimated productivity differential between the US and EU due to ICT was 0.2% growth annually

The DSM is an opportunity to close this gap. The potential contribution to European GDP from achieving such a fully functioning DSM has been estimated at EUR 415 billion[6]. The long-run impact on GDP growth of the already observed digital reform efforts has been estimated at above 1%, while further efforts in line with the Digital Agenda for Europe targets would lead to an additional 2.1% of growth[7]. Benefits from the current level of cross-border e-commerce are estimated at 0.27% of GDP[8]. On the other hand, without a completed, secure and trustworthy DSM, new digital services for consumers and businesses, as well as services underpinning them (the Internet of Things, big data and cloud computing), may happen later or to a lesser extent in Europe.

e-Commerce is an important element of the DSM, providing increased choice and economies of scale. Cross-border e-commerce**,** allows citizens and business to enjoy a wider variety of goods and services and lower prices through increased price competition[9]. Some of these benefits will increase GDP (lower prices increase purchasing power for other goods, increasing demand), while others, even though they do not show up in national accounts, will improve quality of life (the so-called consumer surplus, i.e. the option to buy a good or service which better corresponds to the consumer's desires)[10]. There are also beneficial impacts in economic and societal terms. Thus for instance, a completed DSM will help consolidate Europe's leading position in the production of cultural goods and services[11].

Businesses benefit from cross-border e-commerce by exploiting economies of scale which reduce costs, increase efficiency and promote competitiveness, improving total factor productivity[12]. In many cases, without these economies of scale an online business may not be viable, either because there is not enough demand in a single Member State or because lower production increases prices to unaffordable levels. This is especially important for SMEs that remain confined to a small home market with high production costs. If the DSM can lower

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6 European Parliament Research Service, *Mapping the cost of Non-Europe, 2014-19*, 2015

7 Lorenzani, D. and Varga, J., 'The Economic Impact of Digital Structural Reforms', *European Commission Economic Papers* No 529, 2014

8 Francois, J. et al., 'The Macro-economic Impact of Cross-border e-commerce in the EU', *JRC/IPTS Digital Economy Working Paper* No 2014-10, 2014

9 Duch-Brown, N. and Martens, B., 'Consumer Benefits from the EU Digital Single Market: Evidence from Household Appliances Markets', *JRC/IPTS Digital Economy Working Paper* No 2014-03, 2014 – it is estimated that consumer surplus from e-commerce in household appliances could reach EUR 34 billion or 0.3% of EU-27 GDP

10 Pantea, S. and Martens, B., 'The Value of the Internet for Consumers', *JRC/IPTS Digital Economy Working Paper* No 2014-08, 2014 – using a conservative measure, this study estimates the consumer surplus value of the Internet at 1-2% of GDP

11 Benzoni, L., *The Economic Contribution of the Creative Industries to the EU in terms of GDP and Jobs*, TERA Consultants, 2014 – according to this study, cultural and creative industries make a substantial contribution to Europe's economy in terms of GDP and EU workforce :4.4% and 3.8% or 8.5 million jobs respectively

12 Aguiar, L. and Waldfogel, J., 'Quality Predictability and the Welfare Benefits from New Products: Evidence from Digitization of Recorded Music', *JRC/IPTS Digital Economy Working Paper* No 2014-12, 2014 – the authors estimate the consumer welfare benefits from increased online music choice and quality at 15 times the benefits of the long tail

cross-border trade costs for SMEs, it could increase their production, lower production costs and make them more competitive[13].

Moreover, e-commerce also helps businesses to improve their sourcing strategies, by making available a wider variety of production inputs and enabling them to take advantage of lower prices through competitive forces. In fact, business-to-business (B2B) e-commerce accounts for the lion's share of e-commerce (87% in revenue terms[14]).

A DSM is also of particular importance for innovative businesses setting-up online-only operations. Pure online retailers, online intermediaries or other web start-ups can scale up to the entire European market.

For EU businesses to benefit from the expanded market provided by cross-border e-commerce, the demand side must be fully unleashed. Consumer expenditure accounts for 57% of the EU's GDP. However, there is consistent evidence to show that consumers have less trust in cross-border e-commerce than in shopping online nationally[15] and are more inclined to buy from domestic sellers than cross-border[16]. Whilst this "home bias" can be attributed to some extent to cultural and proximity factors (language, brand recognition, etc.), a strong and harmonised regulatory framework and consistent enforcement of consumer rights across the EU will increase their willingness to engage with suppliers from other Member States.

Such engagement will boost the volume of cross-border transactions and increase consumer surplus through increased availability of a wide variety of products and better prices. Moreover, it will exert competitive pressure on products and services supplied nationally and will result in more transparent and dynamic consumer markets. It is estimated that consumer welfare gains from e-commerce in goods in an integrated DSM could reach over EUR 200 billion, with two thirds of these gains coming from increased online choice[17].

Several studies have stressed the growing importance of the demand side beyond just e-commerce: today, consumers are key drivers of technology and change as new digital tools – such as comparison websites, social media, customisation of goods and services and mobile shopping – have empowered them. Their adoption of technologies and online engagement are crucial in creating an environment in which ICT innovation (e.g. big data analytics) can flourish[18].

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13 Francois, J. et al., 'The Macro-economic Impact of Cross-border e-Commerce in the EU', *JRC/IPTS Digital Economy Working Paper* No 2014-10, 2014 estimate the impact of reduced trade costs at up to 0.27% of GDP for e-commerce

14 European Commission, Eurostat, ICT survey of Enterprises, 2014

15 European Commission, Flash Eurobarometer 397, 'Consumer attitudes towards cross-border trade and consumer protection', 2014 (data to be published in the next Consumer Conditions Scoreboard, forthcoming 2015) - while 61% of EU consumers feel confident about purchasing via the Internet from a retailer/provider located in their own country, only 38% feel confident about purchasing via the Internet from a vendor located in another EU country

16 European Commission, Eurostat, ICT survey of Households and Individuals, 2014 – only 15% of consumers reported having bought online from other EU countries in 2014, while 44% did so domestically (for a total of 50% of Europeans shopping online

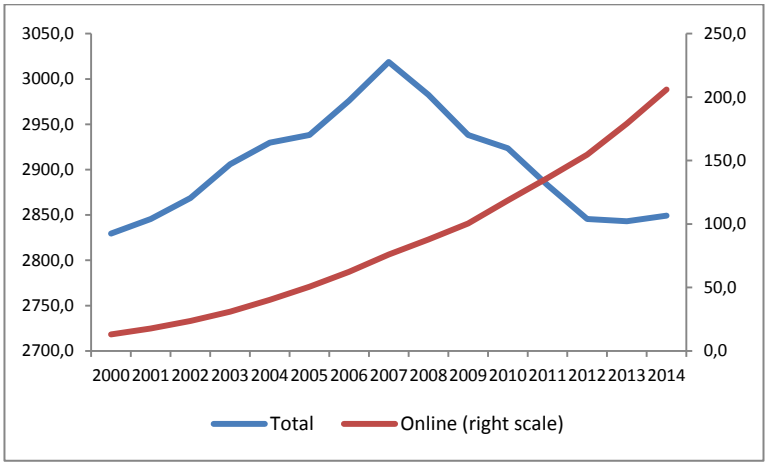
17 Civic Consulting for the European Commission, *Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods*, 2011 – the consumer welfare gains from an integrated EU market for e-commerce in goods assuming 15% share of internet retailing was estimated at EUR 204.5 billion per year (EUR 70.4 billion from lower online prices and EUR 134.1 billion from increased choice)

18 Van Welsum, D. et al., *Unlocking the ICT Growth Potential in Europe: Enabling People and Businesses*, The Conference Board for the European Commission, 2013

The scale provided by a DSM is also important for the deployment of high-speed infrastructure to enable advanced digital services and the development and adoption of new technologies in Europe, such as the Internet of Things, big data analytics or cloud computing. Companies may refrain from investing in the deployment of these technologies if they have to use different costly specifications or have to invest in new infrastructure (e.g. cloud based data centres), as regards the transfer of data or cross-border service delivery, making it unprofitable to innovate. In the long run, this can lead to a further weakening of Europe's industrial base, as competitors from abroad with more advanced technology backed up by a larger market with scale will take more market share.

e-Commerce is growing rapidly in the EU at an average annual growth rate of 22%, surpassing EUR 200 billion in 2014 and reaching a share of 7% of total retail sales. Out of this, 40% of sales are by pure Internet retailers which operate only online and around 14% corresponds to mobile commerce. Online sales are concentrated on a limited number of products such as clothing and footwear, consumer electronics and appliances and media products, which represent nearly half of all online e-commerce transactions (49%)[19].

**Chart 1. Evolution of total and online retail sales in goods in the EU, 2000-2014 (EUR billion)**




*Source: Duch-Brown, N. and Martens, B., 2015 (a)*

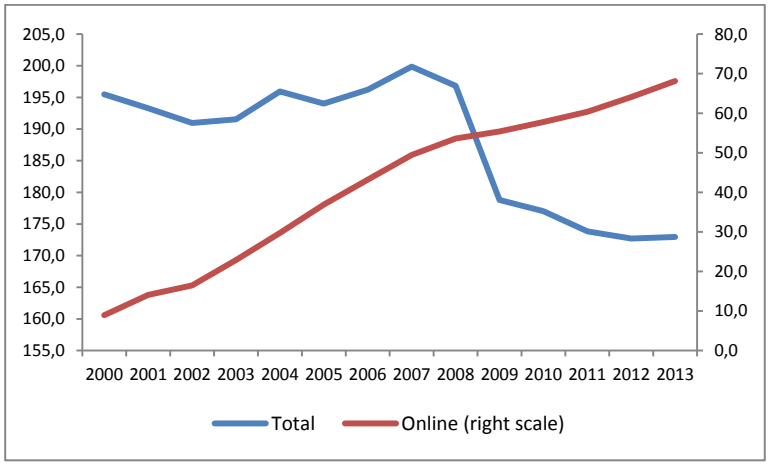
Online sales represent a much larger proportion of services. For instance, in the travel and tourism sector – one of the activities most affected by the Internet revolution – online sales represent some 40% of total retail sales. In 2013 in the EU, online sales in this sector reached a volume close to EUR 70 billion[20]. For goods, online sales in this sector increased steadily during the period 2000-2013 despite the sharp fall in total retail sales registered after 2007[21].

19 Duch-Brown, N. and Martens, B., 'The European Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015 (a)

20 Ibidem

21 Ibidem

**Chart 2. Evolution of total and online retail sales in travel and tourism services, 2000-2014 (EUR billion)**




*Source: Duch-Brown, N. and Martens, B., 2015 (a)*

European firms have been slow in adapting to selling online. The proportion of firms selling online has been growing rather modestly over recent years, increasing only from 12% in 2009 to 15% in 2014. Turnover from online sales has similarly increased from 12% to 15%[22]. The expansion in the volume of online sales has been driven by increasing sales by firms already present in online markets. The top 100 online retailers represent 52% of total online retail turnover in 2013. Average turnover per firm increased significantly in the period 2010-2013, for the top 100 online retailers from EUR 674 to 924 million (+37%). For the top 500 online retailers, online turnover increased by 56% in the same period[23]. For the vast majority of online sellers these electronic sales are not their major distribution channel; indeed, for two thirds of them, online sales account for less than 25% of sales. At the other end of the spectrum, for 11% of firms, more than 75% of their sales are online[24].

On average, 80% of EU online expenditures go to domestic shops. Consumers in smaller Member States have a stronger tendency to shop across borders because local supply and variety is more limited and better price deals may be found across the border[25]. Regressions based on data from a 2015 consumer survey show that the probability of doing cross-border e-commerce increases by 4% when cheaper prices, and by 7% when better quality, are cited as the main reasons to shop online for the average European online shopper[26]. Among the top 100 online retailers, 52% only sell in their home country. While 17% of SMEs in the EU sell online[27] (which is already very low), only 7%[28] sell cross-border to other EU countries.

Concentrating on retailers (companies selling goods and/or services to final consumers), the picture is somewhat more favourable: in 2014, 41% of these businesses sold online to final

22 European Commission, Eurostat, ICT survey of Enterprises 2009 and 2014; European Commission, Digital Agenda Scoreboard

23 Duch-Brown, N. and Martens, B., 'The European Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015 (a)

24 European Commission, Flash Eurobarometer 413, 2015

25 Gomez-Herrera, E., Martens, B., and Turlea, G. 'The drivers and impediments to cross-border e-commerce in the EU', *JRC/IPTS Digital Economy Working Paper 2013-02*, 2013

26 Cardona, M., Duch-Brown, N., and Martens, B., 'Consumer perceptions of (cross-border) e-commerce in the EU Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015

27 European Commission, Eurostat, ICT survey of Enterprises, 2014

28 European Commission, Eurostat, ICT survey of Enterprises, 2013

consumers and 12% sold online cross-border within the EU[29]. Among the retailers who sell online cross-border, higher risk of fraud and non-payments, differences in national contract laws, national tax regulations and national consumer protection rules are the most frequently quoted obstacles to the development of cross-border sales (indicated respectively by 42.7%, 38.8%, 38.6% and 38.4% of businesses)[30].

For companies selling online cross-border, these international sales account for about 15% of their revenues, of which two-thirds (i.e. 10%) are from other Member States[31]. For firms which have experience with selling online cross-border (either currently or in the past), the following are the most important barriers to cross-border selling identified:

**Chart 3. Barriers to online cross-border sales identified by firms which have experience with selling online cross-border**


*Source: Flash Eurobarometer 413, 2015*

Lowering the cost of resolving complaints and disputes could increase the likelihood of engaging in cross-border e-commerce by 9%. Similarly, limiting the suppliers' restrictions to selling abroad would induce an increase in the propensity to sell online across the border by 11%. Finally, reducing delivery prices could boost the probability of European firms engaging in cross-border e-commerce by 7.5%. Looking on a sector by sector basis, for retailers the biggest impact would come from lifting restrictions by suppliers to selling abroad (20%), while copyright restrictions are the most important for information and communication providers (31%)[32].

In terms of online purchases across borders, improving security of payments to other countries would increase online purchases from another EU Member State by 5%, improving language skills for dealing with foreign countries would have a similar effect, and lowering

[29] European Commission, Flash Eurobarometer 396, 'Retailers' attitudes towards cross-border trade and consumer protection', 2014 (data to be published in the next Consumer Conditions Scoreboard, forthcoming 2015)
[30] Ibidem
[31] European Commission, Flash Eurobarometer 413, 2015
[32] Ibidem

the costs of resolving complaints and disputes cross-border would increase the likelihood of firms purchasing online across borders by 12%[33].

There are big differences by firm size. SMEs are more exposed to barriers to cross-border e-commerce than large firms, both in engaging in online trade with other Member States and in increasing online export volumes. Similar results are found when looking at electronic purchases in terms of sector and size differences[34].

While information costs have declined very substantially in the online economy compared to offline costs, cross-border trade costs are not zero. The fixed costs associated with establishing an active presence in foreign markets remain significant, especially for SMEs that have insufficient market size prospects to amortize these fixed costs through their cross-border sales. Thus, in cross-border business-to-consumer (B2C) transactions, the costs for businesses of adapting to the laws of other Member States are roughly EUR 9,000 per business and per country targeted. For a small enterprise (92% of all EU companies) which is exporting to only four other countries, this represents on average 17% of its average annual turnover. Therefore, it was estimated that the cumulative contract law related costs incurred by companies active in cross-border B2C trade (legal, IT and translation costs) ranged between approximately EUR 4 and 8 billion[35].

## 3. ONLINE ACCESS TO GOODS AND SERVICES ACROSS EUROPE

### 3.1. The online trader's perspective

In a DSM, the rights and obligations arising between e-commerce traders and their customers should be governed by a common set of rules and principles. EU law provides protection for EU consumers, irrespective of how goods are purchased. Harmonized EU legislation ensures safety of the goods being placed on the market. Moreover, the Consumer Rights Directive (2011/83/EC) has fully harmonised certain aspects of consumer and contract law applicable to online sales to consumers, such as pre-contractual information the customer should receive and the right of withdrawal from the contract[36]. However, in other areas there are only minimum EU rules, which Member States may supplement with stricter requirements. For example, the Consumer Sales Directive (1999/44/EC) has set a minimum level of harmonisation for the remedies available when tangible goods are not in conformity with the contract of sale. Member States can also go beyond the requirements of the Unfair Contract Terms Directive (93/13/EEC), which provides protection against unfair clauses which have

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33 Duch-Brown and Martens, 'Barriers to firms' cross-border e-commerce in the EU Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015 (b)

34 Ibidem

35 European Commission, *SME Panel Survey on the Impacts of European Contract Law*, 2011; European Commission, *European Business Test Panel European Contract Law*, 2011; European Commission, Flash Eurobarometer 321, 'European contract law, consumer transactions', 2011 – the estimate of the cumulative contract-law related costs incurred by companies is based on these surveys. A detailed analysis could be found in Annex III to the Impact Assessment accompanying the 'Proposal for a Regulation of the European Parliament and the Council on a Common European Sales Law', 2011, p.13.

36 There is also sector specific European legislation that protects consumers when buying specific products online. For instance, in the area of consumer credits, borrowers have the right to obtain standardised advertisements, pre-contractual and contractual information. If the medium does not enable full information, the creditors have to provide full information immediately after the conclusion of the contract. More generally, in all cases of distance marketing of financial services, consumers have the right to receive information about the identity of the trader and about the features of the product sold before the contract is concluded, and then have the right to withdraw from the contract during 14 days after its conclusion (or after reception of terms and conditions).

not been individually negotiated in B2C contracts relating to both tangible goods and digital content products.

When it comes to remedies for non-conformity with the contract for digital content products (such as cloud services, web-streamed music or movies or sports events broadcast over the Internet), no specific EU rules exist. This means that in this area national laws apply, which differ from one Member State to another. This is not only because the national laws diverge, but also because the relevant contracts for the supply (e.g. download or streaming) of such digital products are qualified[37] differently in the Member States. In some Member States the rules on services, on lease or on sales contracts are applied while others may apply any of those rules, depending on the content of the specific contract.

There is also a risk of specific new, divergent national laws appearing. For instance, the UK has recently adopted new rules on the conformity with the contract and the corresponding remedies for certain digital content products. The Netherlands has also proposed rules to clarify remedies available to the consumer depending on the type of digital content product.

As the situation now stands, while online traders may choose the contract law of their own Member State to apply in B2C transactions, when a product or service is targeted to a consumer in another Member State, the mandatory protections afforded to that consumer by their national law must be respected[38]. Also, in case of conflict in such situations, the consumer may go to the courts of their country of domicile. In practice, traders appear to have difficulties in understanding how the existing rules apply in a digital environment.

In addition, regulatory differences between Member States may not be limited to contract law: different technical specifications or rules on labelling and selling arrangements may also apply in specific areas and, depending on where in the EU the consumer is located, they may require the trader to adapt their products and packaging accordingly. This complex legal situation means that online suppliers of goods and services who wish to serve a pan-European market may potentially need to know about, and comply with, 28 differing sets of national regulations. Finding out which regulation applies in which case may be difficult. 37% of firms in the EU that have experience with selling online to other Member States stated that lack of knowledge on the rules that have to be followed presents a barrier to selling online cross-border. Moreover, 63% of firms that have no experience with selling online cross-border stated that they believe that lack of awareness of which rules have to be followed may present a barrier[39]. This shows that the perceived barriers are significantly higher than the real barriers and that there is space for better communication and transparency. This situation creates significant information and compliance costs for many online traders, especially for SMEs, in particular when the value of the transaction remains low. Adding up only costs related to contract law differences, the costs suffered by businesses when they sell to consumers in other EU Member States have been estimated at between EUR 4 and 8 billion[40]. These set-up costs are of course more difficult to amortize for smaller businesses interested in online cross-border sales.

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37 Loos, M. B. M. et al., *Comparative analysis, Law & Economics analysis, assessment and development of recommendations for possible future rules on digital content contracts*, study by the University of Amsterdam, Centre for the Study of European Contract Law (CSECL), Institute for Information Law (IViR) and Amsterdam Center for Law and Economics (ACLE), 2011

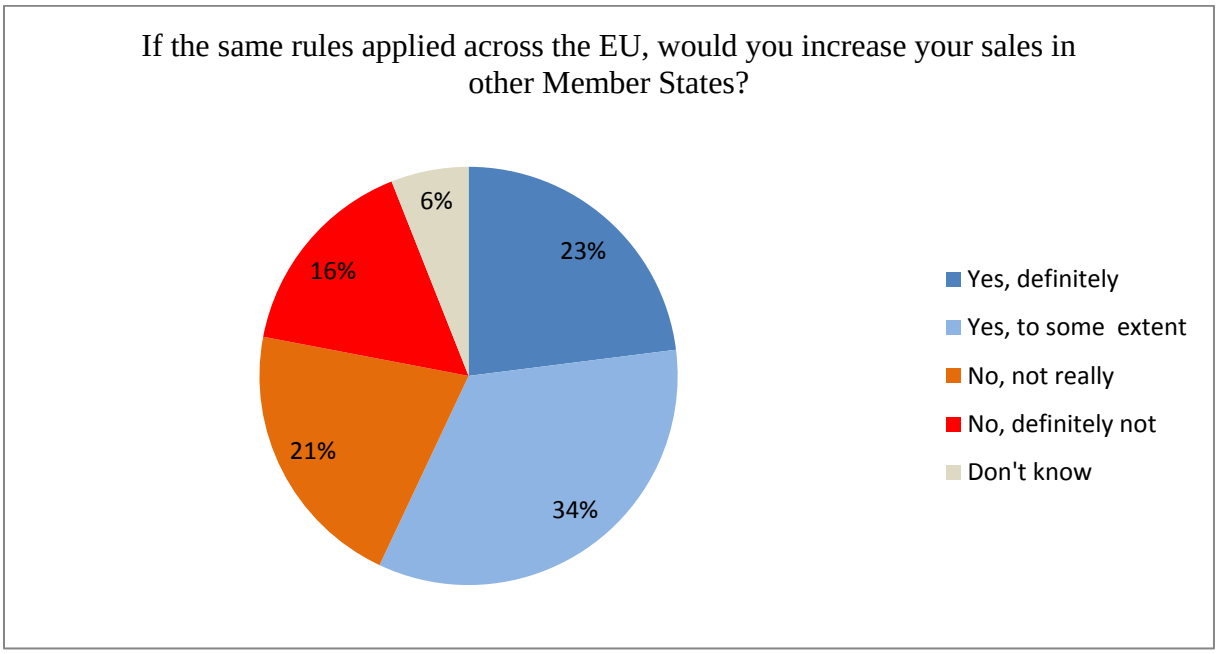
38 Regulation (EC) No 593/2008

39 European Commission, Flash Eurobarometer 413, 2015

40 See footnote 37 – Impact Assessment accompanying the 'Proposal for a Regulation of the European Parliament and the Council on a Common European Sales Law', 2011

Addressing the regulatory fragmentation described above by providing for more harmonised rules for online cross-border consumer contracts, and by allowing traders to rely on their national laws by further harmonising the main rights and obligations of the parties, combined with guidance on which courts have jurisdiction and which laws apply in a digital environment, would result in reduced transaction costs, greater legal certainty for businesses, increased cross-border competition and improved incentives for SMEs to engage in cross-border transactions.

**Chart 4. Believed impact of rules harmonisation on online cross-border sales**




*Source: Flash Eurobarometer 413, 2015*[41]

## 3.2. The consumer's perspective

Many people in Europe remain reticent about engaging in the range of online activities that are now offered via the Internet as a means of facilitating their daily lives. 72% of Internet users in Europe still worry that they are being asked for too much personal data online[42]. 80% of people express concerns about using the Internet for online banking or buying online, up from 75% in 2013. While three quarters of Europeans used the Internet on a regular basis in 2014, only 44% engaged in e-banking, 47% in e-government and 50% in e-commerce[43]. Travel services are among the most popular services bought on-line.

When it comes to cross-border online activity, consumers' trust in the digital environment is even lower. In fact, while 61% of EU consumers in 2014 felt confident about purchasing via the Internet from a retailer/provider located in their own country, only 38% felt confident

41 Base: Companies that sold their products and/or services online in another EU country in 2014 and those that used to do it, tried to do it, are trying to do it or are considering it (N=2423)

42 European Commission, Special Eurobarometer 359, 'Attitudes on Data Protection and Electronic Identity in the European Union', 2011

43 European Commission, Eurostat, ICT survey of Households and Individuals, 2014 – internet use and e-banking in the last 3 months, e-government and e-commerce indicators have a 12-months reference period

about purchasing via the Internet from a vendor located in another EU Member State[44]. When it comes to actual transactions, only 15% of consumers reported having bought online from other EU Member States in 2014, while 44% did so domestically (within a total of 50% of Europeans shopping online)[45]. It is clear that the economic potential of the DSM for consumers and business is currently under-exploited. It was estimated that consumer welfare gains from e-commerce in goods in an integrated DSM could reach over EUR 200 billion per year, with two thirds of these gains coming from increased online choice[46].

**Chart 5. Main reasons for buying products online**


*Source: European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015*

Results from the recent survey of online consumers on DSM obstacles indicate that the most frequently quoted reasons by online shoppers for purchasing online relate to convenience in terms of time (49% being able to order at any time of the day/week, 42% saving time by buying online), price (49% finding cheaper products online, 37% due to ease of comparing prices online) and choice (36% more choice online, 25% finding certain products only online)[47].

The same survey showed that the main consumer concerns about purchasing products online domestically are linked, *inter alia*, to: data protection and payment security (30% of respondents were concerned that personal data may be misused and 25% that payment card

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44 European Commission, Flash Eurobarometer 397, 'Consumer attitudes towards cross-border trade and consumer protection', 2014 (data to be published in the next Consumer Conditions Scoreboard, forthcoming 2015)

45 European Commission, Eurostat, ICT survey of Households and Individuals, 2014

46 Civic Consulting for the European Commission, *Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods*, 2011 – the consumer welfare gains from an integrated EU market for e-commerce in goods assuming 15% share of internet retailing was estimated at EUR 204.5 billion per year (EUR 70.4 billion from lower online prices and EUR 134.1 billion from increased choice)

47 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

details may be stolen) and consumer rights (fear of receiving wrong or damaged products (26%); 25% were concerned that it is not easy to replace or repair a faulty product; 22% were concerned that it is not easy to return a product they did not like and get reimbursement).

When it comes to cross-border purchases from other EU Member States, delivery costs (27%), high return shipping costs (24%) and long delivery times (23%) appear among the main consumer concerns. A large number of perceived obstacles are related to key consumer rights, such as return and replacement (getting a faulty product replaced or repaired, 20%; returning a product consumers did not like and getting reimbursed, 20%). Concerns related to redress are also frequently quoted, i.e. the difficulty of solving problems if something goes wrong (23% of respondents). These problems are very similar to the concerns identified by enterprises[48].

A significant proportion of consumers are also concerned about conformity-related issues, such as non-delivery (15%) or delivery of a wrong or damaged product (15%). These concerns are mirrored in the actual problems encountered by consumers who bought online over the past 12 months: of those consumers reporting problems (a third of all respondents), 15% quoted low product quality, 14% defective products, 13% delivery of wrong products and 13% non-delivery. Moreover, 7% of those facing problems in the past year reported that they could not return products and get reimbursement, while 6% said the seller refused to replace or repair a faulty product[49].

Furthermore, difficulty in assimilating and understanding the implications of the terms and conditions established by the online trader can discourage customers from making online purchases. Results from the recent survey of online consumers on DSM obstacles indicate that trust in and understanding of the terms and conditions are of concern to 8% and 6% respectively of those online users who think about purchasing online from other EU Member States (6% and 3% respectively for domestic purchases). In fact, the average online consumer shopping cross-border is 8% less likely to buy online cross-border when concerned about lack of knowledge of their rights[50].

There is also evidence showing that when buying products and services online, the vast majority of consumers who accept terms and conditions do not read them[51]. 21% of people surveyed in the UK said that they had suffered as a result of blindly accepting online terms and conditions[52]. In particular, consumers are often bound by contracts unbalanced in favour of the trader; for example, they are left without appropriate protection or remedies when the quality of the digital content they acquire is too low[53]. Approximately 5% of respondents who experienced problems with purchases that took place or were attempted during the last 12

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48 See Chart 3

49 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

50 Cardona, M., Duch-Brown, N., and Martens, B., 'Consumer perceptions of (cross-border) e-commerce in the EU Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015

51 Europe Economics, *Digital Content Services for Consumers: Assessment of Problems Experienced by Consumers (Lot 1)*, Report 4: Final Report, 2011, p. 52-53; Bakos, Y. et al., 'Does Anyone Read the Fine Print? Consumer Attention to Standard Form Contracts', *New York University Law and Economics Working Papers*, Paper 195, 2009

52 The Guardian, *Terms and conditions: not reading small print can mean big problems*, 11 May 2011

53 The Commission is investigating the issues involved in "blind" acceptance of terms and conditions and what the most appropriate levers are in this field by means of a behavioural study on Terms and Conditions which is due to be finalised in February 2016

months attributed their most recent problem to sellers not respecting the terms and conditions[54].

Finally, the lack of knowledge of consumer rights when buying online from another EU Member State and the fear of being exposed to a lower level of consumer protection in other EU Member States are of concern to approximately 11% and 8% of online users respectively with regard to buying online from another EU Member State[55]. More guidance on consumer rights in this respect, in particular with respect to applicable law and competent courts in case of dispute, would contribute to fostering trust in engaging in online transactions. Concerning the purchase of combined travel services on-line, the on-going revision of the Package Travel Directive will inject further transparency as to the nature of the contract at stake and related levels of protection.

*Enforcement of consumer rights legislation*

The borderless nature of digital technologies poses challenges for the enforcement of consumer rights by public authorities whose action is constrained by their jurisdictional boundaries. On the other side, big online players implement their business models at the EU level, if not at the global level, directly. To ensure consistent enforcement of consumer rights across the EU and to tackle efficiently infringements of consumer rights legislation spanning over several Member States, it is necessary to coordinate public enforcement activities.

The Regulation on Consumer Protection Cooperation[56] provides the framework for such cooperation. Every year, the network of competent authorities under this Regulation carries out a screening of e-commerce websites in a given sector ("sweeps") to check their compliance with consumer rights legislation and to ensure they are put in conformity when necessary (more than 3,000 websites have been corrected since 2007).

This network has identified a number of online malpractices spreading across the EU and is carrying out joint actions, facilitated by the Commission, directly to require the operators concerned to change these practices. In 2014 for example, it tackled the misleading marketing of online games as "free" when in fact they included in-app offers and the control of payment settings was insufficient to ensure explicit consent for each purchase. This action resulted in a significant change of practices by major Internet platforms and was considered as an efficient and pragmatic model by the business sector and national authorities.

The results of yearly sweeps point to persistent compliance gaps in consumer markets, including for online practices. On average 60-80% of websites checked are found to be non-compliant with the most basic pre-contractual information requirements of the EU consumer and e-commerce legislation. This shows that there is a need to strengthen enforcement to make sure consumers are adequately protected in the DSM.

There is also scope for stepping up enforcement beyond the coordinated actions by national enforcement authorities and beyond traditional infringement proceedings, notably by working proactively with stakeholders and through a much closer cooperation among market surveillance authorities.[57] This is the aim pursued by the Commission for example in its work

[54] European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

[55] Ibidem

[56] Regulation (EC) No 2006/2004

[57] Market surveillance is the activities carried out and measures taken by public authorities to ensure that products comply with the requirements set out in the relevant Union harmonisation legislation and do not

on comparison tools, where it is sensitising stakeholders on the mandatory requirements of the Unfair Commercial Practices Directive and fostering adherence to a series of principles to improve the compliance of comparison tools with the Directive as well as their transparency and user friendliness.

Existing legal instruments should also be adapted so that they can meet the twin challenges of globalisation and digitisation. As part of the scheduled review of the Consumer Protection Cooperation Regulation, a public consultation carried out over the winter of 2013-2014 called for strengthened enforcement capacity at the EU level[58].

Enforcement needs therefore to be faster, more agile, consistent and efficient, and this requires increased cooperation among national authorities. With more effective enforcement and market surveillance, legal certainty for traders and consumers will increase, compliance costs will decrease, administrations will save time and resources and rogue traders will be deterred from playing on enforcement gaps in the Single Market. Such progress in enforcement and market surveillance must be obtained both for the economic rights of consumers and for the safety of products sold online so as to ensure the effectiveness of consumer rights legislation for online and digital purchases[59].

*Consumer advice and redress*

When consumers encounter problems when buying goods or services in the Single Market (the resulting financial losses of which have been estimated at 0.4% of the EU's GDP[60]), it is important that they should be able to seek and obtain redress. Amongst those DSM consumer survey respondents that reported their most recent problem with purchases that took place within the last 12 months, 16% indicated that they didn't take any action whatsoever to remedy the situation. Out of these, 23% reported that it was unlikely that they would get a satisfactory solution to their problem, 19% thought it would take too long and a further 12% did not know how or where to complain. Of those respondents who did complain, between 29% and 38% were dissatisfied with the way their complaints were dealt with (lowest proportion of dissatisfied respondents among those dealing with an out-of-court dispute resolution entity, and highest proportion of dissatisfied respondents among those who went to court)[61]. Indeed, when disputes arise with traders, cross-border proceedings can be disproportionately costly and lengthy for the average online transaction, even if swift and low-cost uniform European procedures already exist (e.g. European Small Claims, European Order for Payment). Even when the consumer obtains a judgment in their favour, it requires costs and effort to enforce it effectively against the trader. At the same time, the possibility of litigation in foreign courts and, even more importantly, differences in the laws applicable to the contract also lead certain businesses to refrain from engaging in cross-border online activities.

Resolving complaints and disputes across borders is expensive for firms as well. Around 21% of firms engaged in cross-border e-commerce declare this issue to be a major problem, affecting particularly micro firms (1-9 employees). Offering easily accessible, efficient and

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endanger health, safety or any other aspect of public interest protection, as set out in Regulation (EC) No 765/2008

58 European Commission, Public consultation on reviewing the Consumer Protection Cooperation (CPC) Regulation (2006/2004/EC)

59 See the European Commission, *Multiannual plan for Market Surveillance 2013-2015*

60 European Commission, Special Eurobarometer 342, 'Consumer Empowerment', 2011

61 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

cost-effective mechanisms to resolve disputes between consumers and businesses engaged in cross-border e-commerce is therefore an important element in creating a DSM.

The European Consumer programme, together with national consumer authorities, funds the Network of European Consumer Centres so that individual consumers can get information and assistance for their cross-border purchases. This network, active since 2005 and now counting an office in all 28 EU Member States, Norway and Iceland, helps solve in an amicable manner more than 35,000 complaints per year.

The Directive on consumer alternative dispute resolution (ADR)[62], which is to be transposed into national law by July 2015, will ensure that quality ADR entities are available in virtually every business sector. The Regulation on consumer online dispute resolution (ODR)[63] provides for the establishment of an EU-wide ODR platform to facilitate the online resolution of disputes between consumers and traders over online transactions. The implementation of this legislation and the planned launch in January 2016 of the ODR platform will benefit traders by saving on costly court proceedings, maintaining their business reputation and good customer relations. The new legislation is also expected to encourage traders to open up their business to consumers from other EU Member States.

The European Small Claims Procedure gives parties easy access to cross-border simplified court procedures. This procedure is currently being revised in order to make it available also for SMEs (by raising the threshold of the claims which fall within the scope of this procedure from EUR 2,000 to EUR 10,000) and to modernise the procedure, bringing it in line with 21st century justice by improving the use of electronic means (e.g. videoconferencing for carrying out oral hearings, electronic service of documents, distance means of payment of court fees). This should reduce the costs and length of cross-border proceedings.

The European e-Justice Portal provides easy to understand access to information on legal systems in other Member States, including consumer rights, as well as on possibilities for redress. The Portal is being adapted to make it easier for consumers to make use of this facility, through electronic assistance in filing the required form, as well as through making it possible to address the form directly to the competent court in another Member State.

### 3.3. Cross-border parcel delivery services

*Problem and problem drivers*

e-Commerce deliveries to consumers continue to drive growth in the European parcels market, which is estimated at EUR 42.8 billion (including B2C and B2B)[64]. Most parcel traffic is still domestic, representing 85% of total EU shipments[65]. The market has increased by 5.7% in value terms compared with 2011, yet it is a very concentrated market, with five Member States[66], where e-commerce markets are already well developed, accounting for 70% of the total EU parcel market.

Consumers and e-retailers are increasingly demanding in terms of delivery services when buying online. In the recent survey of online consumers about DSM obstacles[67], low delivery

62 Directive 2013/11/EU

63 Regulation (EU) No 524/2013

64 Le Groupe La Poste, *Annual Report 2013*, p. 35 – B2B accounts for EUR 28.7 billion compared with EUR 14.1 billion for B2C

65 Okholm, H. B. et al., *e-Commerce and delivery - A study of the state of play of EU parcel markets with particular emphasis on e-commerce*, Copenhagen Economics for the European Commission, 2013

66 Germany, the UK, France, Italy and Spain

67 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

costs (33%), convenient delivery options (e.g. time, place - 22%) and the possibility to deliver to the country of the consumer (20%) were amongst the seven most frequently reported reasons for consumers choosing the website where they conducted their latest online purchase of a tangible good. In addition, those respondents who last purchased a tangible good online reported most often that it was delivered to their home/work address (83%). Other delivery options chosen included picking it up in person from a shop (8%), from a collection point/safe box in a public location (5%) or from a local post office (4%)[68].

Various surveys in recent years show that the growth of cross-border e-commerce is hampered by a lack of affordable, high-quality delivery services. These are consistently cited amongst the top reasons mentioned by both e-retailers and consumers for not engaging in cross-border e-commerce. Stakeholders complain about a lack of transparency, the high prices of delivery for small shipments, the lack of interoperability between the different operators typically involved in a delivery of a cross-border shipment and the lack of convenience for the final consumer. Over 60% of manufacturing and retail (including wholesale) companies selling online across borders declared the high prices of cross-border delivery to be a problem for them. This is the most prevalent barrier to cross-border e-commerce for firms selling online[69].

The recent survey of online consumers on DSM obstacles indicates that indeed concerns with respect to various delivery aspects were amongst the top consumer concerns in relation to purchasing online cross-border (27% high delivery costs, 24% high return shipping costs, 23% long delivery times, 15% non-delivery). Amongst online buyers who reported their most recent problem(s) when purchasing a tangible good in the last 12 months, long delivery times was reported by 17% of respondents (and was the highest ranked consumer problem), while non-delivery and delivery of the wrong product were both reported by 14% of respondents[70].

Likewise, e-retailers are also concerned about the availability, quality and price of delivery options. Between 85 and 100% of e-retailers consider delivery within two to four days, delivery at an agreed time slot, and next day delivery to be the top three most important delivery features[71]. E-retailers want to reflect consumer needs and expectations by offering simple, transparent and reliable shipping services (e.g. track-and-trace, on time delivery). They also want low delivery and return prices to attract (and retain) consumers. Notably, due to their lack of bargaining power, SMEs are the most affected as they face high delivery prices[72] for low volume cross-border shipments. This limits SMEs' competiveness in cross-border e-commerce given that their growth opportunities are dependent on a seamless EU delivery market.

However, the single delivery market is not yet a reality across the EU. The EU delivery market is fragmented, with 28 national delivery markets consisting of national postal operators, alternative parcel delivery operators, express operators or global integrators[73],

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68 Ibidem

69 European Commission, Flash Eurobarometer 413, 2015

70 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

71 Okholm, H. B. et al., *e-Commerce and delivery - A study of the state of play of EU parcel markets with particular emphasis on e-commerce*, Copenhagen Economics for the European Commission, 2013

72 Meschi, M. et al., *Intra-Community cross-border parcel delivery*, FTI Consulting for the European Commission, 2011; Civic Consulting for the European Commission, *Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods*, 2011; YouGov Psychonomics for the European Commission, *Mystery Shopping Evaluation of Cross-Border e-commerce in the EU*, 2009

73 Multinational operators with worldwide presence, such as DHL, Fedex, TNT Express and UPS

logistics players[74] and in-house operators[75]. Global integrators have developed an integrated network traditionally focused on B2B deliveries but in recent years have been increasingly moving into B2C deliveries. Except for integrators, cross-border delivery usually requires the combination of two or more national delivery networks, which can be delivery networks of national postal operators, but also alternative delivery operators. Furthermore, domestic (public) postal networks are traditionally set-up to deal with historically high letter volumes, rather than parcels. Thus, existing postal networks were not designed to address the current rapidly changing needs stemming from growing e-commerce, and especially not cross-border delivery requirements. Postal delivery operators' IT and electronic communication systems were developed independently and primarily for domestic services and are not integrated with each other, resulting in heterogeneous (i) ad-on services (e.g. different track and trace solutions), (ii) labelling practices and (iii) quality measurement across the EU Member States. The lack of compatibility of different logistical solutions affects the quality of the service offered (e.g. relabeling items increases the cost and time of a cross-border delivery), the convenience of the service (alternative delivery options may not be available) and the price. Insufficient interoperability between operators and low consumer volumes result in weak competitive pressure in the cross-border delivery markets. More interoperability can provide for more growth opportunities for both delivery operators and e-retailers.

Concerning price, several research studies estimate that list tariffs for cross-border parcel delivery (for non-account customers) charged by national postal operators are often two to five times higher than comparable domestic prices[76]. High prices are commonly attributed to low volumes and lack of bargaining power by low volume senders, typically SMEs and consumers. Low volumes generate a higher cost per item and may partly explain the narrower range of services available for cross-border deliveries compared to domestic deliveries. On the other hand, high prices may also reflect weak competitive pressure in the cross-border delivery market.

Although in most Member States there are typically more than three delivery operators[77], this does not mean that they all provide the delivery service e-retailers need (e.g. a simple, cheap, traceable and reliable delivery). High prices may also be attributed to complex and opaque interconnection costs. As members of the Universal Postal Union[78], national postal operators comply with a set of rules on tariffs, which, as some studies suggest, may not reflect the real costs incurred[79]. Furthermore, delivery operators can engage in bilateral agreements or

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74 Such as consolidators, brokers, fulfilment services, third party logistics providers. The latter provide assistance to customers for outsourced services for part or all of their logistics, such as pick and pack, warehousing, documentation, labelling procedures and distribution. Online brokers and parcel consolidators offer discounts on single shipments by integrators, or national operators.

75 Operators set up by an e-retailer itself

76 Meschi, M. et al., *Intra-Community cross-border parcel delivery*, FTI Consulting for the European Commission, 2011; Okholm, H. B. et al., *e-Commerce and delivery - A study of the state of play of EU parcel markets with particular emphasis on e-commerce*, Copenhagen Economics for the European Commission, 2013; Civic Consulting for the European Commission, *Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods*, 2011; YouGov Psychonomics for the European Commission, *Mystery Shopping Evaluation of Cross-Border e-commerce in the EU*, 2009

77 Okholm, H. B. et al., *e-Commerce and delivery - A study of the state of play of EU parcel markets with particular emphasis on e-commerce*, Copenhagen Economics for the European Commission, 2013

78 The United Nations' specialised agency for the postal sector

79 Campbell, J. I. Jr et al., *Study on the External Dimension of the EU Postal Acquis*, WIK-Consult for the European Commission, 2010; Copenhagen Economics, *The Economics of Terminal Dues*, 2014

multilateral agreements such as REIMS[80], Express Mail Service (EMS)[81] or E-Parcel Group (EPG)[82]. Some of these agreements may be out of line with the spirit of Article 13 of the Postal Service Directive[83] (PSD) which encourages the cost orientation of cross-border tariffs. Lack of enforceability of the PSD principles on tariffs is also one of the possible reasons for high prices. Only very few postal national regulatory authorities (NRAs) focus their responsibilities also on cross-border delivery markets, as many NRAs have a limited mandate on this segment[84].

A lack of easy availability and transparency of information in this market is also a problem for e-retailers and consumers on a micro-level and for NRAs on a macro-level. Despite the existence of more than three operators in the cross-border parcel delivery segment in most Member States, one in five e-retailers say that they are aware of only one delivery operator[85]. This lack of information extends to the choice of services available. Although most services are offered by delivery operators, e-retailers need sometimes to combine several offers from different delivery operators to be able to offer a wider choice of delivery services to their customers. Consequently integrating these different services increases costs to e-retailers.

From a regulatory perspective, on a macro level adequate information on the parcel market is lacking, making it more difficult to assess the extent of and address effectively any market failures. Currently, information on the delivery market is fragmented and only partly available to national postal regulatory authorities. At present, the latter have a limited mandate to monitor and regulate cross-border delivery, often restricted to parcel markets that fall under the universal service obligations of postal services and represent a small share of the delivery market[86].

*Policy steps taken so far and need for the issue to be addressed at European level*

As shown above, delivery related barriers are considered an obstacle for both e-retailers and consumers, hindering their further participation in e-commerce growth, particularly cross-border. These barriers have already been acknowledged by the Commission both in the Green Paper[87] and in the Roadmap[88] on cross-border parcel delivery. In these documents the Commission identifies the following challenges as action points: lack of transparency of information, excessive costs for low volume shipping, lack of convenient services for the final consumer and lack of interoperability between the different operators typically involved in cross-border delivery. The Roadmap set out a number of actions which aim to improve the quality, availability and affordability of cross-border parcel delivery services (including a

80 The Remuneration of Mandatory Deliveries of Cross-Border Mails is a voluntary multilateral agreement between postal operators setting out rules for calculation of terminal dues, i.e. the remuneration that postal operators pay each other for the delivery of incoming cross-border mail (applicable to mail up to 2 kg)

81 EMS is an international postal Express Mail Service for documents and merchandise, offered by postal operators of the Universal Postal Union (UPU)

82 The EPG is made up of 31 postal parcel operators committed to deliver their priority parcel products through an integrated delivery network. The network uses a track-and-trace system and an automated customer service system linking each postal operator's call centres to ensure stable and reliable quality of service for their customers.

83 Directive 97/67/EC, as amended by Directives 2002/39/EC and 2008/6/EC

84 The European Regulators Group for Postal Services (ERGP), Opinion to the European Commission *European cross-border e-commerce parcels delivery - On a better understanding of European cross-border e- commerce parcels delivery markets and the functioning of competition on these markets*, 2014

85 Okholm, H. B. et al., *e-Commerce and delivery - A study of the state of play of EU parcel markets with particular emphasis on e-commerce*, Copenhagen Economics for the European Commission, 2013

86 Ibidem, p 103 – estimated at around 17% of total EU shipments

87 COM(2012) 698 final

88 COM(2013) 886 final

complaints handling procedure), and the transparency of information about the services on offer.

The Commission's Roadmap defined an eighteen month period for the assessment of industry-led initiatives taken to address the issues identified on cross-border delivery. This period ends in June 2015. The industry (postal/logistics operators and e-retailers) is addressing some of the areas of concern identified in the Roadmap. For example, the postal incumbents have committed themselves to introducing a number of improvements in the area of quality of service and logistics operators are developing tools for better tracing of shipments and for increased interoperability. The Commission's role is to monitor the implementation by the industry of their commitments and ensure that they are fulfilled. Other areas where the industry has not yet proposed any solutions might, however, need complementary measures.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

Improving the availability and affordability of cross-border delivery services will make it easier for e-retailers to sell across borders, especially for SMEs. This would enhance SMEs' growth potential and contribute to more jobs. Consumers would also benefit from cross-border parcel delivery services that are more convenient, as well as from a wider choice and lower prices. Improved cross-border delivery options would be especially beneficial for e-retailers and consumers located in rural or peripheral areas. Moreover, any improvements in the cross-border delivery market might also have further positive spill-overs on the domestic delivery market.

### 3.4. Territorial restrictions and geo-blocking: goods and services

*Problem and problem drivers*

In a single market, consumers expect to be able fully to enjoy the benefits of e-commerce, by comparing and taking advantage of wider choice and better prices. Instead, EU consumers often find that online shops based in a different Member State will not sell certain goods or services or digital content to them or only sell them via a different website specifically targeting their country of residence, frequently under different conditions.

There are two common types of market practices and territorial restrictions which differentiate between consumers within the Internal Market: geo-blocking, i.e. simple refusal to sell or automatic re-routing and geo-filtering, i.e. unjustified diversifying of sale conditions[89]. These practices are commonly based on the location of the consumer, which is for instance determined by means of the IP address used by the consumer, the country which is registered for the customer's means of payment or the postal or delivery address indicated by the consumer.

While 97% of domestic online orders lead to a successful shipment, in only 48% of all attempts at cross-border orders does the seller actually deliver to the country of the consumer[90]. Refusal to deliver is most prominent for electronic goods. 10% of consumers with experience of cross-border online shopping report that on at least one occasion over the past 12 months the foreign seller refused to deliver to their country; 8% were at least once

[89] European Parliament study, *Discrimination of Consumers in the Digital Single Market*, 2013

[90] Cardona, M. and Martens, B., 'Supply side barriers to cross-border e-commerce in the EU', *JRC/IPTS Digital Economy Working Paper* No 2014-13, 2014

redirected to a website in their own country where prices were different, while 5% report that the retailer did not accept payment from their country[91].

In the recent survey of online consumers on DSM obstacles[92], of those respondents who reported on their most recent problem(s) when making or attempting to make a cross-border purchase[93] from another EU Member State, 5% indicated that they were not able to access the seller's website because they were redirected to the seller's website in their own country[94] and a further 6% indicated that foreign sellers refused to sell to them because of their country of residence[95]. Similarly, 7% of respondents attempting to purchase from another EU Member State reported that they could not access the foreign seller's website (or only limited content was displayed to them), whereas another 4% reported that their means of payment was refused by the foreign seller.

In addition, 74% of the complaints concerning services which were received by the European Consumer Centres Network related to consumers facing differences in price or service when buying online cross-border[96]. Cross-border complaints alleging discrimination in online shopping identified refusal to deliver as the main cause, followed by price discrimination and technical requirements such as country of credit card. Only half of the traders contacted could explain the reason for the discrimination and in only 1 in 6 cases did they agree to change their practice.

Automatic rerouting to national websites of a company when booking a service online has been frequently observed in certain sectors. Moreover, price differences based on the country where consumers are resident can be significant even though the prices are often applied to the same service provision taking place at the same location[97]. To analyse the extent of price discrimination the Commission initiated a web-scraping study in 2013. The study showed that a leading car rental company consistently used to set different prices based on the consumer's place of residence (the situation has improved since then). For an identical car rental in a given country, a car could at the time be up to 53% more expensive if the consumer resided in the UK compared to Romania, Slovenia and Poland.

Consumers' behaviour on the market is greatly influenced by their perception of fairness regarding market conditions and prices. In the Internal Market, prices charged by service providers in one Member State, are often used as "reference prices" by consumers in other Member States, which determines their perception of price fairness. This practice has intensified as a result *inter alia* of the increased use of price comparison tools. For that reason,

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91 European Commission, Flash Eurobarometer 397, 'Consumer attitudes towards cross-border trade and consumer protection', 2014 (data to be published in the next Consumer Conditions Scoreboard, forthcoming 2015)

92 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

93 Of tangible goods or services ordered online but used offline (e.g. hotel, transport, etc.)

94 59% experienced this after choosing the delivery address, a further 34% automatically when visiting the foreign seller's website, and 7% after entering their payment card details. It should be noted that such practices, which are not always easy for consumers to notice, may be under-reported.

95 54% experienced this after choosing the delivery address, a further 39% realised that they could not buy the product when visiting the foreign seller's website, and 7% after entering their payment card details. It should be noted that such practices, which are not always easy for consumers to notice, may be under-reported.

96 European Commission, ECC-Net report, *Enhanced Consumer Protection – the Services Directive 2006/123/EC Analysis of Article 20.2 and Article 21 related consumer complaints reported to ECC-Net between 2010 and* 2012, 2013

97 Duch-Brown, N. and Martens, B., 'Consumer Benefits from the EU Digital Single Market: Evidence from Household Appliances Markets', *JRC/IPTS Digital Economy Working Paper* No 2014-03, 2014 – see for evidence on price differentiation in the household appliances market in the EU

consumers' perception of fairness and their sensitivity to price discrimination may be amplified in the context of the Internal Market[98]. At the same time, there are a number of economic realities that can either make a single price impossible or that provide justified reasons for applying price differentiation.

Consumers are also confronted with lack of access to support services from sellers when orders are made from other Member States (e.g. customer service offered only via non-geographic numbers not accessible from other Member States). In the recent survey of online consumers about DSM obstacles, poor customer service was quoted by approximately 13% of those respondents who reported their most recent problem(s) with purchases in the last 12 months from other EU countries[99].

There are a number of reasons why companies limit the geographical scope of their online activity and use geo-blocking practices to apply it in practice. In certain cases, geo-blocking is necessary to comply with legislation. For instance, online companies might need to restrict access of consumers to betting websites when they come from a Member State where online betting is prohibited, or access to certain content might be limited in order to comply with specific legislation (e.g. legislation on advertising, protection of minors, etc.).

In other cases, restrictions on cross-border sales are imposed on the online shops by the manufacturers of the products through contractual agreements. Recent evidence shows that the likelihood of engaging in cross-border e-commerce would increase by 10% should the suppliers' restrictions be removed and the volume of sales would also increase by 6% on average[100].

A company may also decide, as an individual business choice and on the basis of a variety of considerations, not to sell to a customer from another Member State. One of the main underlying causes of the refusal to engage in cross-border sales is found in costs stemming from the current legal fragmentation of contract and consumer law and other regulatory barriers, which discourage companies from selling to foreign consumers (as described in previous sections). In addition, in many cases, companies do not sell abroad because the delivery and overhead costs stemming from occasional online transactions are considered too high (see section 3.3 on parcel delivery).

*Policy steps taken so far and need for the issue to be addressed at European level*

The e-Commerce Directive[101] lays down the country of origin principle for information society services with the aim of dismantling barriers to online activities in the Single Market. The e-Commerce Directive, however, does not contain any particular provision related to geo-blocking. Nevertheless, other tools and instruments applicable to territorial restrictions are in place at EU level.

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98 Kahneman, D. et al., 'Fairness and the Assumptions of Economics', *The Journal of Business* Vol. 59 (4), 1986 or Kahneman, D. et al., 'Fairness as a Constraint on Profit Seeking: Entitlements in the Market', *American Economic Review* Vol. 74 (4), 1986. Other relevant research includes Anderson, E. T. and Simester, D. I., 'Does Demand Fall When Customers Perceive That Prices Are Unfair? The Case of Premium Pricing for Large Sizes', *Marketing Science* Vol. 27 (3), 2008.

99 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

100 Duch-Brown and Martens, 'Barriers to firms' cross-border e-commerce in the EU Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015 (b)

101 Directive 2000/31/EC

Article 101 of the Treaty on the Functioning of the European Union (TFEU) prohibits agreements between undertakings that have as their object or effect the restriction of competition. EU competition law can therefore tackle anti-competitive agreements for the sale and purchase of goods or services which are entered into between undertakings operating at the same (horizontal agreements) or different levels of the production or distribution chain (vertical agreements) that create barriers to cross-border e-commerce. Moreover, under EU competition law (Article 102 TFEU) undertakings with a dominant position are prohibited from abusing their dominant position. Competition law cannot, however, address restrictions that are imposed through unilateral business decisions by non-dominant companies. In order to systematically analyse restrictions that create barriers to cross-border e-commerce, the Commission will launch a sector inquiry into the e-commerce sector in all Member States. The results of this inquiry will help to target competition law enforcement better to remove such restrictions.

The Services Directive prohibits discrimination based on nationality or place of residence in the provision of services, including online services, unless there are objective justifications (Article 20). Specifically, Article 20(2) covers instances where different treatment is applied by service providers – that is, firms or professionals offering services in a market. It obliges Member States to ensure that the general conditions of access to a service, which are made available to the public at large by the provider, do not contain discriminatory provisions relating to the nationality or place of residence of the recipient, but without precluding the possibility of providing for differences in the conditions of access where those differences are directly justified by objective criteria. This provision has at times proven difficult to enforce effectively because of the broad range of potential objective justifications.

Moreover, EU law imposes transparency requirements on sellers vis-à-vis the consumer that also apply to geo-blocking practices. The Consumer Rights Directive requires traders to inform about delivery restrictions clearly and legibly at the latest at the beginning of the ordering process (Article 8(3)).

As far as payment services are concerned, the EU has also taken initiatives that will affect the use of innovative payment services. The draft Interchange Fee Regulation[102], which has been recently adopted by the European Parliament, will enhance transparency for card transactions, pave the way for innovative payment technologies to be rolled out, improve competition in card payments and give more freedom of choice to retailers. It also foresees the possibility for EU citizens to obtain a credit card from any banking institution, regardless of its place of residence.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

Addressing the problem of territorial restrictions in e-commerce within the EU could bring increased price transparency, more competition in cross-border e-commerce and greater availability and choice of products for consumers. Several actions could be considered to reduce the prevalence of these restrictions by eliminating unjustified geo-blocking and addressing the underlying real and perceived obstacles that currently discourage certain companies from extending the scope of their activities to the whole EU.

[102] COM(2013) 550 final – this proposal was adopted by the European Parliament on 10 March 2015 and still need to be formally approved by the Council

Geo-blocking may be examined from a competition law perspective, as well as from other legal perspectives (e.g. non-discrimination and freedom to provide services, enforcement of consumer rights, commercial practices and contract law).

### 3.5. Access to and use of copyright-protected content

The EU copyright system is a key element of the EU's cultural, social and technological environment and of the digital economy, with copyright-intensive industries (e.g. audio-visual, music, books) generating 7 million jobs and contributing around EUR 509 billion to EU GDP[103]. These industries are one of Europe's most dynamic economic sectors and are dominated by micro firms, 95% of which have fewer than 10 employees.

Copyright and related rights provide an incentive for the creation of, and investment in, new works and other protected matter (music, films, print media, software, performances, broadcasts, etc.) and their exploitation, thereby contributing to improved competitiveness, employment and innovation. The EU is a world leader in certain important copyright-intensive sectors (e.g. publishing, music, video-games or scientific, technical and medical journals) and relies on creation and on knowledge-intensive goods and services to compete globally. Digitisation has deeply impacted the ways in which copyrighted works and services are both created and consumed. Consumers expect to be able to access content anywhere and from everywhere and innovation in the knowledge and research sector strongly relies on the availability and ease of access and exchange of copyright-protected material. At the same time, creators expect fair remuneration.

Key copyright-intensive industries are expected to grow in upcoming years and mostly the growth will be driven by digital content[104]. Global consumer books revenue will increase at a Compound Annual Growth Rate (CAGR) of 0.9% to 64.9 billion USD in 2018. While growth in consumer e-books is strong, at a 17.6% CAGR over the next five years, growth is slowing as the market matures, with year-on-year growth down to 10.3% in 2018. In magazine publishing, similarly to books, digital consumer magazine circulation will drive growth. Filmed entertainment revenue is expected to rise globally at a CAGR of 4.5% from 88.3 billion USD in 2013 to 110.1 billion USD in 2018. 'Over the Top' (OTT)/streaming services will see the fastest rates of growth (28.1% CAGR). At the same time, subscription TV should not be daunted by the rise of OTT, as it grows across global markets[105].

*Territorial restrictions in access to digital media content*

Accessing digital (copyright-protected) content is one of the most popular online activities. 35% of Internet users engage in playing /downloading of games, images, films or music[106], making it the most popular online activity. During the next five years global digital spending on entertainment and media is expected to increase at a rate of 12.1%. In addition, behaviour is changing and smartphone viewers in Europe consume more than four hours of video content on a weekly basis, almost half of which they view on-the-go. In parallel, over recent years the availability of legal online offers of digital content has developed significantly. For

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103 European Patent Office and the Office for Harmonization in the Internal Market, *Intellectual property rights intensive industries: contribution to economic performance and employment in the European Union*, Industry-Level Analysis Report, 2013

104 PwC, *Global entertainment and Media Outlook 2014-2018*

105 Ibidem

106 European Audiovisual Observatory, Mavise database, 2014

instance, there were over 2,500 on-demand audiovisual services available in Europe at the end of 2014[107].

However, there are concerns related to accessibility of digital media content in cross-border situations, both when it comes to the portability of content available in the home country and as regards cross-border access to content from another Member State. First of all, 27% of citizens said they would be interested in watching or listening to audiovisual content or music transmitted from their home country when moving temporarily abroad, for example for holidays or for business[108]. However, when crossing an EU border, consumers are frequently prevented from using the content services (music or video services) for which they have paid in their home country and which they expect to be able to carry with them. Indeed, a recent survey showed that of the 31% of respondents who streamed films and TV series in the last 12 months and tried to access streaming services of their own country while being abroad, 43% reported not being able to access the content when abroad[109]. Equally, of the 38% of respondents who streamed live events (e.g. sports matches) in the last 12 months and tried to access streaming services of their own country while abroad, 51% reported not being able to access[110].

Furthermore, there is curiosity in the population for foreign media content, and more generally interest for accessing content across borders. 19% of citizens are interested in watching or listening to content from other EU countries[111]. However, when trying to access or purchase digital media content from another Member State, citizens are in many cases confronted with the message that it is unavailable or cannot be accessed from their own country, or may be automatically redirected to the website of their country of residence, which may offer a different catalogue of content.

Cross-border accessibility of online content services varies, with many services available at national level only. For example, in May 2011, about 35% of broadcasters offering long-form video content on their websites (e.g. through catch-up TV services) used geo-localisation to restrict access to certain types of content, especially US content, international sports and music events[112], which suggests that national content is more broadly available. In addition, the cross-border availability of content is still limited, in particular for audiovisual content: only 40% of all films on offer on a major online distribution platform are available in the 27 national country stores of this platform (for music the share is closer to 80%), and the share is lower for EU-produced films (about 28%)[113]. More evidence on cross-border accessibility of

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107 Ibidem

108 European Commission, Special Eurobarometer 366, 'Building the Digital Single Market – Cross-border Demand for Content Services, 2011

109 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015 – 48% reported that they were not allowed by the content provider, 28% that they were not allowed by the Internet service provider and a further 24% that it didn't work for 'another reason'

110 Ibidem – 39% reported that they were not allowed by the content provider, 35% that they were not allowed by the Internet service provider and a further 26% that it didn't work for 'another reason'

111 European Commission, Special Eurobarometer 366, 'Building the Digital Single Market – Cross-border Demand for Content Services, 2011

112 Plum Consulting for the European Commission, *The economic potential of cross-border pay-to-view and listen audiovisual services*, 2012

113 'Language, copyright and geographic segmentation in the EU Digital Single Market for music and film', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015 – analysis on the basis of the top 300 titles in each country store

Video-on-Demand (VOD) film services[114] shows that variations in overall VOD accessibility in the EU range between 3.6% and 9%. Cross-border accessibility of VOD in the EU varies between 0.4% and 3.8%, with a mid-range value of 1.9%.

Geo-blocking is also applied in the case of political reporting and news broadcasts. This was made apparent, for instance, during the European election campaign, where a number of the debates involving candidates were not visible in some Member States because of systematic geo-blocking by the producers of these debates.

In addition, there is also evidence of a lack of information for consumers about territorial restrictions. In a study carried out by the Commission in 2012 about 1,000 websites proposing digital content downloads were screened; 73% of them remained silent on geographical restrictions and when information was given, it was often presented only in the general terms and conditions and difficult to find[115].

The limited cross-border availability of online content services is largely influenced by the territorial dimension of copyright, by territorial restrictions in licensing agreements between right holders and distributors and by the commercial practices of online service providers.

Rights under copyright are granted by national law and the geographical scope of copyright protection under each national law is limited to the territory of the relevant Member State. A service provider willing to offer content online in several EU Member States may therefore have to acquire a licence for all the different territories in which the content is made available. However, the current copyright regime does not prevent multi-territorial or pan-European licences being granted.

Restrictions to cross-border use often originate from practices aimed at exclusive territorial protection (based on absolute exclusivity in one territory) and are more prevalent for films, TV series and sports programmes. Indeed, producers of audiovisual programmes typically grant an exclusive licence to a single distributor within a given territory. For European films and TV programmes, such an exclusive licence is commonly granted to distributors in order to obtain upfront investments that contribute to the financing of production. For sports programmes, there is an important difference between the value of media rights on the main market, where the level of interest and demand is highest, and the value of those rights in other markets. This variation is often very substantial[116].

In the music sector, multi-territorial selling of rights is more widespread, especially with regard to Anglo-Saxon music and less so for other national music repertoires, which distributors chose to acquire only for certain territories for cultural and linguistic reasons. As regards the book sector, publishers generally acquire rights for a book in a given language on a global or pan-European basis and are therefore able to grant a licence to a distributor for multiple territories. However, there are still some access restrictions to e-books, which may be

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114 Gomez, E. and Martens, B., 'Cross-border access to Video-on-Demand services in the EU28', *JRC/IPTS Digital Economy Working Paper*, forthcoming

115 Stenzel, U. et al., *Study on Digital Content Products in the EU*, IBF International Consulting for the European Commission, 2012

116 Taking the example of professional football, the English Premier League currently sells its media rights annually for EUR 1.3 billion in the UK, and a total of around EUR 200 million in the other 27 EU national territories combined. This reflects the product's primarily national audience, with a value that is much higher in the UK than anywhere else. In France, the rights for Ligue-1 are sold for EUR 700 million, while the income for Ligue-1 from sales in the rest of the Europe amount to EUR 70 million. The situation is similar for other national sports competitions.

linked to business decisions made by the online distributors. This applies to other sectors as well, where service providers may prefer to organise the distribution of online content on a territorial basis, even when they have a multi-territorial licence.

Finally, the cross-border accessibility of digital content is also affected by a range of other factors. Some of these hindering factors are common to all online commercial activities, regardless of the type of good or service offered (e.g. VAT regime, varying national rules regarding protection of minors and consumer policy, lack of a convincing business case or unilateral business decisions of content-delivery platforms not to operate in certain countries or to allocate customers to a specific national store)[117]. Others are more specific to the distribution of online content and may possibly include divergences in national rules or practices on release windows (i.e. media chronology)[118] or the lack of incentives for right holders to make their content available online due to fear of illegal exploitation (e.g. piracy).

Directive 2001/29/EC was designed to update copyright to the Information Society and to implement the two 1996 World Intellectual Property Organization (WIPO) Internet Treaties - the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty. It harmonises several exclusive rights of authors and neighbouring right holders which are essential for the digital transmission of works online: reproduction right, right of communication to the public and making available right.

As explained above, right holders may nevertheless prefer to issue exclusive licences with a limited territorial scope (e.g. matching the territory of a Member State or based on linguistic criteria). In the Premier League cases (joined cases C-403/08 and C-429/08) which addressed issues related to cross-border access to satellite broadcasting services, the Court of Justice of the European Union (CJEU) concluded that right holders and service providers may conclude licencing agreements based on territorial exclusivity but cannot include in such licensing agreements clauses aiming at achieving absolute territorial exclusivity in breach of competition law and the Internal Market freedom to provide services.

In the music sector, the Collective Rights Management Directive[119] – which is to be transposed by April 2016 - should make it significantly easier for online service providers to get multi-territorial licences for the use of authors' online rights in music.

In addition, a stakeholder dialogue on 'Licences for Europe' was launched on 4 February 2013, which led to the adoption of 'Ten pledges to bring more content online', presented at a plenary session on 13 November 2013. One of the pledges took the form of a statement by representatives of the audio-visual sector affirming their willingness to continue to work towards the further development of cross-border portability of films, TV programmes and other audio-visual content for which users have subscribed at home, when travelling in the EU on business or on holidays.

*Cross-border aspects of activities related to access to knowledge, research and heritage*

The copyright legal framework plays an essential role in providing incentives for creativity and for investing in creativity also in the digital environment. Well-defined property rights are a pre-condition for markets to work efficiently. At the same time, copyright rules need to take into account the pursuit of other public policy goals. Moreover, several aspects of the

[117] See other sections on contractual aspects, VAT and territorial restrictions for the sale of tangible goods and services

[118] The length and chronology of release windows (cinema, DVD, VOD, pay TV, etc.) is usually negotiated between right holders and distributors and this often takes place within public funding conditions or sometimes applicable national regulations

[119] Directive 2014/26/EU

copyright framework in Europe (copyright as exclusive rights, the three-step test[120], etc.) are subject to multilateral and bilateral international agreements to which the EU and their Member States are parties and which may have an impact on the scope of exceptions.

Across the EU, as in most world jurisdictions, certain uses of copyright protected works take place on the basis of exceptions and limitations to copyright, which are contemplated in law in response to the inability of the licencing markets to deliver contractual solutions (market failure) or to support public policy objectives. In these cases, a defined group of users does not have to ask for the authorisation of right holders and enter into licensing agreements to carry out certain activities (for example, cultural heritage institutions making copies for preservation purposes). In some cases, exceptions are linked to the existence of licensing schemes, in the sense that if a license agreement is in place, certain exceptions might not apply.

Most exceptions to copyright foreseen in European law remain optional for Member States to implement, resulting in a fragmented landscape across the EU. Exceptions identified as optional in EU law may or may not have been transposed in national law, and their wording and scope can vary considerably. This means that certain activities that are allowed under an exception in one Member State might be illegal in another unless they are covered by a licence.

The most recent development in this area is the Orphan Works Directive, which introduced an exception for the use of orphan works[121] by institutions like libraries, museums and archives. This is one of the very few exceptions in EU law that are harmonised and mandatory for all Member States. In general however, the existence and scope of exceptions to copyright varies in different Member States.

Growing mobility within the EU, as well as increased investment and interest in cross-border activities, make specific exceptions in certain areas like education (including for persons with a disability), research and cultural heritage particularly relevant to the DSM. For example, a recent study identified 253 cross-border higher education programmes operating in the EU[122]. International mobility amongst researchers is quite high with 56% of EU researchers having worked (or currently working) in a country other than the one where they graduated[123]. Exploitation of big data, thanks notably to text and data mining techniques[124], could generate significant benefits in terms of productivity and competitiveness in the field of research[125].

Differences in the way Member States implement exceptions can therefore be problematic for activities where the cross-border aspects or the European significance of a certain activity is

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120 The three-step test is a clause included in several treaties on IP (WTO TRIPS Agreement, WPPT, Berne Convention, the Beijing and Marrakesh Treaties) which provides that exceptions and limitaions may only be applied "in certain special cases which do not conflict with a normal exploitation of the work or other subject-matter and do not unreasonably prejudice the legitimate interests of the right holder"

121 Orphan works are copyright-protected works whose right holders cannot be identified or located after a diligent search

122 Brandenburg, U. et al. Andrew McCoshan, Lukas Bischof, Anne Kreft, Ulrike Storost, Hannah Leichsenring, Frederic Neuss, Britta Morzick, Sabine Noe, *Delivering education across Borders in the European Union*, CHE Consult for the European Commission, 2013

123 Lykogianni, E. and van Den Broeck, K., *Study on mobility patterns and career paths of EU researchers*, MORE for the European Commission, 2010

124 A set of techniques for the automated processing and analysis of large amounts of data in order to obtain new knowledge, insights, patterns or trends

125 European Commission, Report from the Expert Group on Standardisation in the area of innovation and technological development, notably in the field of Text and Data Mining, 2014

relevant and growing in importance, notably in the area of education, access to knowledge and research. Persons with a disability cannot access books in special formats made under a copyright exception in other Member States, which limits the number of works available to them. In the area of research, text and data mining has also emerged as an area where legal uncertainty as regards EU copyright law and divergent approaches at national level could hamper European research, including cross-border research collaboration.

Adequate and well-balanced changes to certain of the existing exceptions would enable the relevant actors to fully grasp the opportunities of the digital age whilst meeting the requirement of an efficient protection of rights. The work of the institutions in charge of promoting access to knowledge should be facilitated, by providing them with a clearer framework and a level playing field regardless of the Member State in which they are based. Research would more fully benefit from the potentialities of text and data mining, thus contributing to innovation and competitiveness.

*Copyright enforcement*

The enforcement of copyright online continues to raise increasingly difficult challenges for right holders, impacting the functioning of the DSM. Improving enforcement against commercial-scale infringements while protecting fundamental rights is an essential feature in promoting an efficient marketplace for copyright works in the DSM. The most recent data available confirm a correlation between the growth of cultural and creative industries and IP protection legislation, showing value destruction and employment losses where measures/policy changes are not taken to address piracy[126]. The fragmentation of rules in this area makes it cumbersome for the right holders to enforce their rights across the EU. As an example, where local legislation implementing Article 8(3) of the Directive 2001/29/EC provides instruments for obtaining injunctive measures against intermediaries whose services are used by a third party to infringe a copyright or related right, certain aspects of the conditions and procedures relating to these injunctions remain fragmented.

Furthermore, any improvement to the mechanisms for enforcement of IP rights in the EU would be useful to support the efforts to seek a balanced and effective enforcement of such rights in third countries where they are sometimes infringed on a systemic and wide-spread scale.

*Digital value transfer related to copyright protected content and remuneration of authors*

With the development of new online services, a sense of unfairness is perceived in the relations between Internet platforms and right holders: there is a growing concern from certain stakeholders from the creative sector regarding the lack of level playing field on the online content market, due to uncertainties in the current legal framework which was designed at a time when technology limited the ways content could be distributed and made it easier to define the roles of different market players. Today, the lines between hosting service providers and content service providers engaging in the act of communication to the public of protected works under copyright rules have become more difficult to distinguish. This legal uncertainty could create distortions on the online content market where platforms that make content available to the public without a licence compete with licensed services for similar or

[126] Benzoni, L., *The Economic Contribution of the Creative Industries to the EU in terms of GDP and Jobs*, TERA Consultants, 2014 – this study has estimated value losses due to piracy in the creative and cultural industires as follows: cumulative value loss in the range of about EUR 35 to almost EUR 50 billion, cumulative job loss between 200,000 and 1 million jobs over the 2008-2011 period

equivalent services to the consumer. The unclear legal situation can also make it hard for right holders to licence their content with the platforms or obliges them to accept licensing conditions that are below the potential value of the content.

Beside the issue of transfer of value, content creators are also generally concerned about the fairness of remuneration conditions. The fragmentation of national legislation in that area could create difficulties for the providers of multi-territorial services in the internal market as they have to comply with a variety of different legal requirements for the remuneration of authors and performers for online exploitation within the EU. Two studies investigating these issues are currently underway and should become available in the course of 2015.

### 3.6. VAT procedures on cross-border online sales

In the EU, in principle, every supply of goods or services for consideration by a business is subject to VAT, which is typically levied at the standard rate of between 17% and 27% of the sales price depending on the Member State[127]. This VAT is – like a general sales tax – a tax on consumption, and by now there is a consensus amongst Member States that VAT revenues should, in principle, accrue to the Member State in which the consumption takes place. This makes sense because it ensures fair competition between domestic and non-domestic businesses selling the same goods and services. It also creates a level playing field for SMEs and other companies that cannot relocate to a lower-tax Member State and who may otherwise lose out to more mobile competitors. Finally, it ensures fair distribution of tax revenues between Member States, as they receive the tax on the goods and services consumed by their own residents.

However, unlike a sales tax that is charged only at the level of final consumption (typically the retail level), VAT is generally levied on the value added (the difference between the sales price and the cost for all purchases) generated by the suppliers involved in the supply chain. This approach minimises the risk of unreported turnover as each supplier has an incentive to report their sales, as otherwise they would not be entitled to claim back the VAT they have paid on their input. Nevertheless, since it cannot be assumed that all suppliers will voluntarily comply with existing VAT obligations, a set of registration and reporting obligations have been put in place as well, which involve an administrative burden for businesses, likely to be felt in particular by SMEs.

In addition, compliance with the VAT rules inevitably becomes more complicated and burdensome when a business engages in online cross-border transactions with customers located in other Member States or third countries. Since VAT (as a tax on consumption) is levied in the country of the customer and in accordance with that country's laws, different national VAT rules will apply and different tax authorities will be involved.

At the same time, digitalisation and the Internet have made industrial and commercial activity more international, while offering opportunities to businesses to shortcut traditional supply chains and interact directly with their customers, wherever they may be, without having to rely on wholesale and retail trading intermediaries. Even SMEs are therefore being given the chance to be international players, something they would not have dreamt of in the traditional "brick and mortar" world.

[127] European Commission, VAT Rates Applied in the Member States of the European Union, 2015 – Luxembourg applies a rate of 17% and Hungary 27% with the majority of Member States applying rates between 20 and 25%

Indeed, as the online ordering of goods and services and the online supply of services turns from being the exception to being the rule, more and more SMEs would like to conduct cross-border e-business but are confronted with having to comply with tax legislation in all the countries in which they have clients, as well as the need to communicate – often in another language – with foreign tax administrations. 38% of traders with experience of selling online cross-border and 54% of potential online cross-border sellers mention dealing with foreign taxation as a problem[128].

In general, a vendor making supplies of tangible goods to consumers in other Member States is required to register and account for VAT in each of those Member States. The situation is somewhat different for vendors of electronic services supplied to consumers in other Member States. Until the end of 2014, VAT on all telecommunications, broadcasting and electronic services was levied in the country where the supplier was located but now, since 1 January 2015, with the coming into effect of new rules, VAT on those electronic services is levied instead where the consumer is located (in accordance with the country of consumption principle).

However, in parallel with this change and in order to simplify compliance with the new rules, a mini "One Stop Shop" has been implemented, which will reduce the costs and administrative burdens for businesses concerned. Instead of having to declare and pay VAT directly to each individual Member State where their customers are based, businesses will be able to make a single declaration and payment in their own Member State. Suppliers will use a web portal in their Member State of establishment to account for the VAT due on sales in other Member States. In this way a vendor of electronically supplied services has to charge the VAT of the country in which the consumer is located, but is only required to register and account for VAT in their home country.

In contrast to this, for goods ordered online from a third country, the non-EU supplier generally benefits from a 'small consignment' import exemption (usually up to EUR 22) to ship its goods VAT free to EU private customers. This puts them at a competitive advantage over EU suppliers and market distortions have already been signalled in various Member States, notably in respect of close territories such as the Aland Islands and the Channel Islands which are not in the EU VAT area. Since 1999, the number of small consignments benefitting from the import exemption has increased from approximately 30 million parcels to 115 million in 2013[129]. That represents an increase of approximately 300%. If this trend were to continue in line with the growth in e-commerce, it is not inconceivable that it could reach 300 million parcels by 2020. In terms of VAT foregone at the level of the EU, it is estimated that there was a loss of between EUR 550 million and EUR 850 million to EU Member States in 2013. Before the exemption was removed by the UK for small consignments coming from the Channel Islands, the VAT foregone was estimated between EUR 650 million and EUR 900 million in 2011. Such a loss in VAT could translate into a reduction of nearly EUR 4.5 billion in turnover for EU business due to the un-level playing field. If this trend were to continue in line with the growth in e-commerce, it is not inconceivable that the VAT foregone could reach up to EUR 2.2 billion by 2020. Thus, a provision aimed at reducing administrative burdens for both tax administrations and business in respect of small-value supplies has turned into an expensive tax subsidy for big global players located outside the EU.

[128] European Commission, Flash Eurobarometer 413, 2015

[129] Ernst & Young study for the Commission, *Assessment of the application and impact of the VAT exemption for importation of small consignments*, forthcoming 2015

The Commission Expert Group on Taxation of the Digital Economy, in its final report of May 2014[130], proposed that the EU should pursue the destination principle for all supplies of goods and services, and specifically recommended that a single electronic registration and payment system for VAT, hosted and managed by the Member State of the supplier, should be extended as a priority to cross-border B2C supplies of goods, and that the VAT exemption for the importation of small consignments from third countries should be removed with suitable simplification arrangements for the businesses affected.

While the single electronic registration and payment system is itself a substantial simplification, two issues need to be considered. The first relates to small start-up businesses which supply goods and services cross-border but which are covered by the current Member State level exemption thresholds for small business, which range from EUR 0 to EUR 110,000 depending on the Member State. Under the 2015 place of supply rules, such businesses are now required to charge and account for the VAT of the Member State of the consumer. There is a perception that this requirement may act as a barrier to trade within the Single Market and therefore some mitigating measures may be needed, such as a common cross-border exemption threshold. As regards the second issue, EU legislation on the mini One Stop Shop provides that controls and audits are to be carried out by the Member State of consumption. For both EU and non-EU companies, this may involve up to 28 different tax administrations auditing the same companies without any coordination and leading to information requests in multiple languages. Not only could this create disproportionate administrative burdens on business but it could also put at stake the efficiency of the audits themselves as well as the level of voluntary compliance (which is particularly sensitive where non-EU companies are involved). Some Member States have agreed audit guidelines which attempt through coordination to alleviate any unnecessary burdens on business. The Commission Expert Group has recommended that "home country control" should be considered, i.e. the supplier will only have to comply with the rules applicable in the Member State where they are established.

If all businesses selling goods and services cross-border could account and remit the tax due in the Member State in which they are established, rather than having to register and remit the tax in every Member State in which they do business, this would significantly simplify and reduce the burden of compliance for many businesses. The following costs have been reported[131]: for hiring accountants, a merchant needs to budget EUR 5,000 per year per country, many of which require the merchant to register for VAT when sales hit a paltry EUR 35,000 a year.

As regards direct taxation, the Commission has already delivered significant progress in the fight against tax avoidance and tax fraud through the implementation of its 2012 Action Plan to Strengthen the Fight against Tax Fraud and Tax Evasion. However the political debate has moved on and the earlier focus on improving tax compliance and administrative cooperation has now expanded to encompass those features of tax systems which contribute to aggressive tax planning. This is why the Commission will shortly present an Action Plan on a renewed approach for corporate taxation in the Single Market, under which profits are taxed where the value is generated, including in the digital economy. Further information on the challenge of the digital economy for direct tax systems is provided in Annex II.

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130 European Commission, Report from the Commission Expert Group on Taxation of the Digital Economy, 2014

131 e-Commerce Europe communication to the Commission, 2015

## 4. CONDITIONS FOR DIGITAL NETWORKS AND SERVICES TO DEVELOP

### 4.1. A single market in telecommunications

All activities in the digital economy depend on electronic communication (broadband) networks. The DSM can only be realised when all European citizens, businesses and public administrations are connected to reliable, high-speed and affordable networks.

*Current situation in Europe*

Telecommunications markets in Europe predominantly remain either national, regional or local in scope, with different supply and demand conditions. Telecoms operators have national strategies even when they form part of larger multinational groups. Important differences exist within the EU as regards telecoms regulation and spectrum policies[132], which cannot be justified by national circumstances and which hinder the potential for further investment and the emergence of innovative businesses at an EU level. This prevents the EU from reaping the full potential of an EU-wide telecoms market in which players active at a multi-territorial or pan-European scale would compete with innovative local providers relying largely on their own infrastructure.

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 authorities in 28 Member States.

Whilst 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 NRAs 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 telecoms 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.

The regulatory framework was crucial in driving take-up of broadband: currently 78% of homes subscribe to broadband compared to only 15% in 2004.

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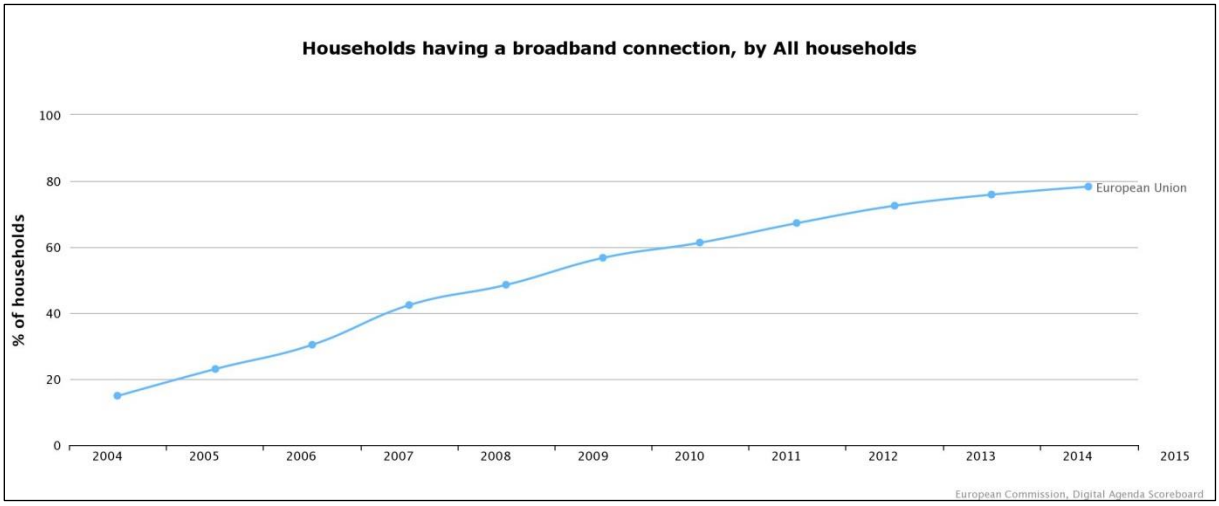
[132] European Commission, *Spectrum policy: Analysis of technology trends, future needs and demand for spectrum in line with Art.9 of the RSPP*, 2013

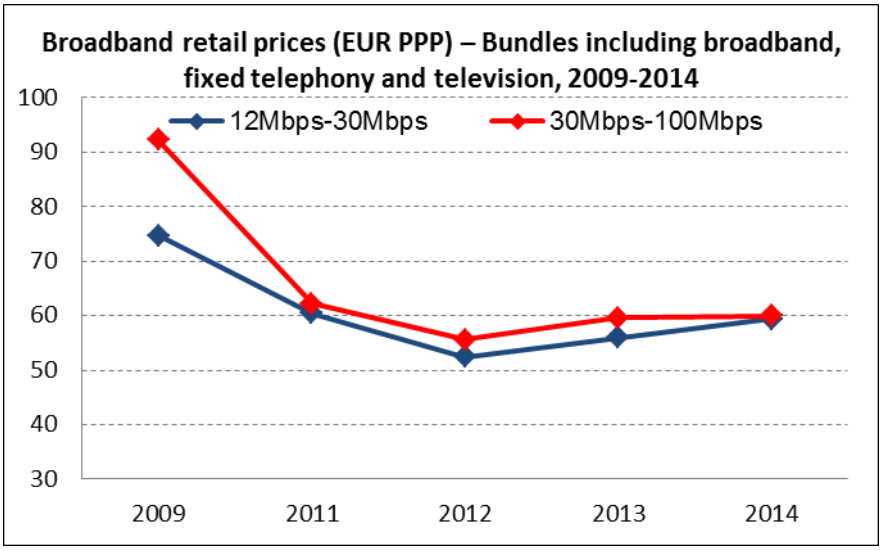
**Chart 6. Households having a broadband connection**




*Source: European Commission, Eurostat, ICT survey of Households and Individuals*

At the same time, broadband has become more affordable, as retail prices decreased by over 20% between 2009 and 2014. Moreover, there is very little in the way of price premium on high-speed broadband offers, which supports migration of consumers. Nevertheless, 26% of those households without Internet access still consider broadband access prices to be a barrier to take-up, while for 30% the required equipment is not affordable.

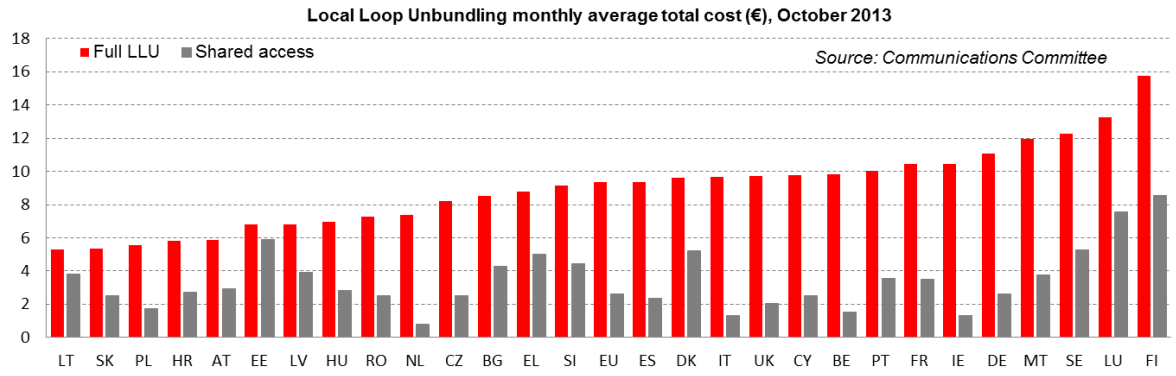
**Chart 7. Broadband retail prices**




*Source: Broadband Internet Access Cost (BIAC), annual studies for the EC realised by Van Dijk*

However, the beneficial effects of liberalisation have only been felt so far at national level and have not resulted in real market integration at EU level, arguably to a significant extent because of inconsistent regulation across Member States. For example, the chart below shows that in 2013 there were significant differences in the monthly rental prices of full and shared local loop unbundling (LLU) in different Member States. These large differences cannot be explained by differing underlying competitive or economic conditions.

**Chart 8. Local Loop Unbundling monthly average cost**




*Source: Communications Committee*

Also, the framework is less well equipped to steer national authorities towards providing favourable conditions for widespread investment in capital-intensive broadband networks of the type likely to be increasingly needed in the future (e.g. with high upload as well as download capacity, and demanding quality of service parameters), especially in less densely populated areas.

Rules in the current framework were initially designed to spur competition in existing networks and have also generated some competitive pressure for incremental upgrades of such networks. However, the social return from investment in higher quality networks tends to be greater than for the individual operator. The framework was not conceived to lead to generalised roll-out of new networks in accordance with public-policy objectives.

*Problem and problem drivers*

Recent technological developments are crucial to understanding the changing environment of electronic communications and the speed of change. Important steps have *inter alia* been: (i) technological convergence of broadband connections of traditional telecoms (copper) and broadcasting (cable) networks; (ii) development and greater political emphasis placed on new generation access networks based on fibre optic technology; (iii) important developments in wireless communications thanks to the quality ensured for mobile broadband by 3G and 4G network standards, the significant provision of wireless connectivity through WiFi offloading to fixed networks, together with the advent of the smartphone and other portable devices; (iv) the introduction of flat-rate offers followed by a trend in bundling telephone, TV, Internet and mobile services; (v) the rise of Internet platforms and of the app ecosystem, including the polarisation of the operating systems.

Competition is a key driver for investment in telecoms. The migration from copper-based to high-capacity fibre-based networks has however been slow. Former incumbents appear often to lack incentives to overbuild their own largely depreciated copper network assets; they react to competition from cable operators by upgrading incrementally existing access networks. Alternative operators, however, may not always have the financial capacity to deploy new networks on a large scale (although they have been behind major network upgrades[133)]. Finally, their investment incentives may be reduced if regulated wholesale access is made

133 European Commission, *Trends in European broadband markets*, presentation for the Digital Agenda Scoreboard, 2014 – alternative operators have proportionately more NGA connections than incumbents; today, incumbents only own 25% of NGA fixed broadband connections although they have, on average, 42% of all fixed broadband connections in the EU

disproportionately attractive, i.e. access seekers' build-or-buy decisions rendered economically inefficient.

As traditional incumbent fixed-line networks increasingly face retail competition, at least at regional level, from cable and sometimes other alternative infrastructure developers such as utilities (often now allied with mobile assets to make bundled offers), proportionate regulation in the face of "infrastructure competition" raises difficult questions. Moreover, the framework is less well adapted to promote to any significant extent a "first-mover advantage", i.e. incentives to be the first to provide qualitatively superior networks to those currently in existence that could override higher investment risk.

In the Digital Agenda for Europe in 2010, the Commission announced a vision for more ambitious connectivity with specific broadband targets. The target of universal access to connectivity at 30 Mbps indicated the ambition to ensure territorial cohesion in Europe. While most connectivity technologies were expected to be able to provide 30 Mbps access, and wireless was assumed from the outset to be part of the mix, the underlying assumption was that such universal access would be provided at a fixed location (e.g. homes and workplaces). The penetration target of 100 Mbps (50% of subscriptions in Europe by 2020) sought to anticipate future competitiveness needs in line with the most likely global developments[134].

According to the Digital Agenda for Europe scoreboard, Next Generation Access (NGA) fixed-line technologies capable of providing at least 30 Mbps are available to 62% of EU households (at the end of 2013). The closer one gets to 100%, the more expensive it becomes to deploy fixed solutions; progress in technology should allow wireless solutions (terrestrial, mobile and/or satellite) to deliver at least 30 Mbps by 2020 and to contribute to covering the last percentages of the population located in the most geographically isolated areas.

Regarding the take-up objective (50% of the population subscribing to ultrafast >100 Mbps services), this currently remains marginal at 1.6 subscriptions per 100 people, corresponding to 3% of homes. The Commission estimates that on currently discernible trends, at least 75-80% of the population would have to be covered with 100 Mbps technologies in order to reach this 50% take-up target, which would currently represent an investment gap of approximately EUR 90 billion[135] (see section 6). Furthermore, availability of infrastructure is a necessary condition for take-up, but is far from being sufficient. Progress in mobile technologies and achievements of the DSM are likely to drive demand and supply for high-speed fixed connectivity indirectly. However, the uncertainty of adoption dynamics remains a key constraint to investment.

Despite the current array of interventions, and without it yet being possible to quantify the likely contribution of the European Fund for Strategic Investment (EFSI), it is apparent that the investment gap identified above in order to meet the 100 Mbps take-up target for 2020 is unlikely to be entirely filled from EU and national public sources – nor was that ever the Commission's intention. The incentives for private operators to do more must therefore be examined afresh.

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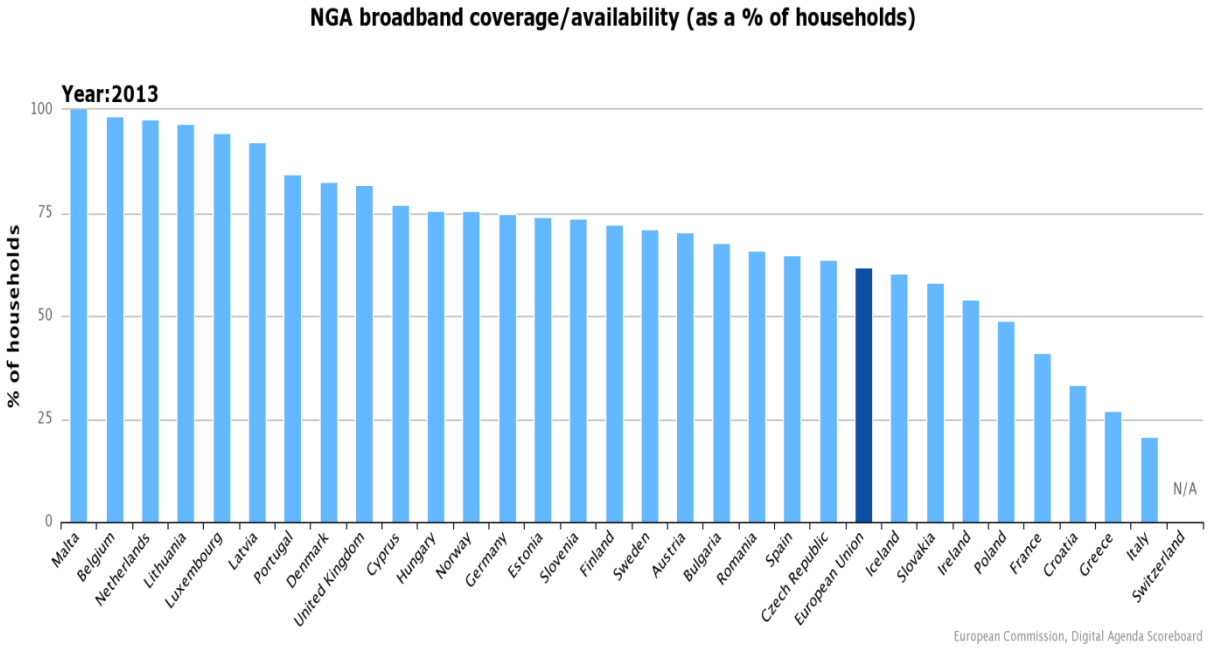
134 Lorenzani, D. and Varga, J., 'The Economic Impact of Digital Structural Reforms', *European Commission Economic Papers* No 529, 2014, p. 53 – increased take-up of high-speed fixed broadband is found to affect TFP by increased efficiency in the production process due to actual firms' use of these technologies. Simulating the effects of further reform efforts in this regard revealed rather similar GDP impacts across the EU, mainly differing in terms of their speed (between 0.18% and 0.32% of GDP relative to the baseline over a period of 10 years, and some 0.43% in the long-run).

135 European Commission on the basis of the study by Analysis Mason, *The socioeconomic impact of broadband*, 2013

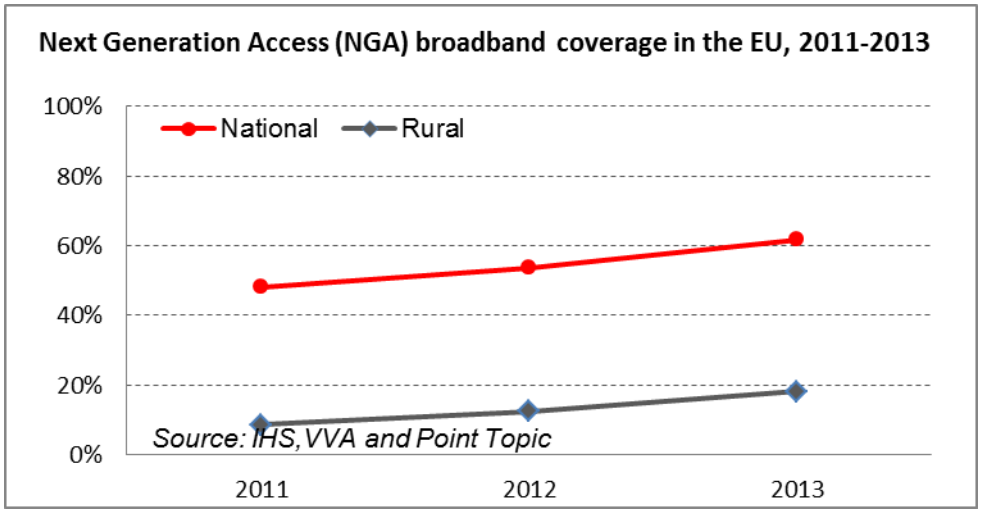
Nowadays fixed broadband is available to 97% of EU homes. Specifically, full broadband coverage has been achieved in Cyprus, Denmark, Luxembourg, Malta, the Netherlands and the UK. Progress can be traced also in terms of fast networks (at least 30 Mbps), increased from 48% of homes in 2011 to 61.8% today. Nevertheless, these improvements, mostly driven by cable upgrade, are fragmented across and within Member States – concentrated in some Member States and in urban areas while the actual take-up of fast broadband remains relatively low, with around 22.5% of all subscriptions being above 30 Mbps as of July 2014.

**Chart 9. NGA broadband coverage/availability (as a % of households)**




*Source: Broadband coverage in Europe, studies for the Commission by IHS and Valdani, Vicari & Associati*

**Chart 10. Next Generation Access broadband coverage**



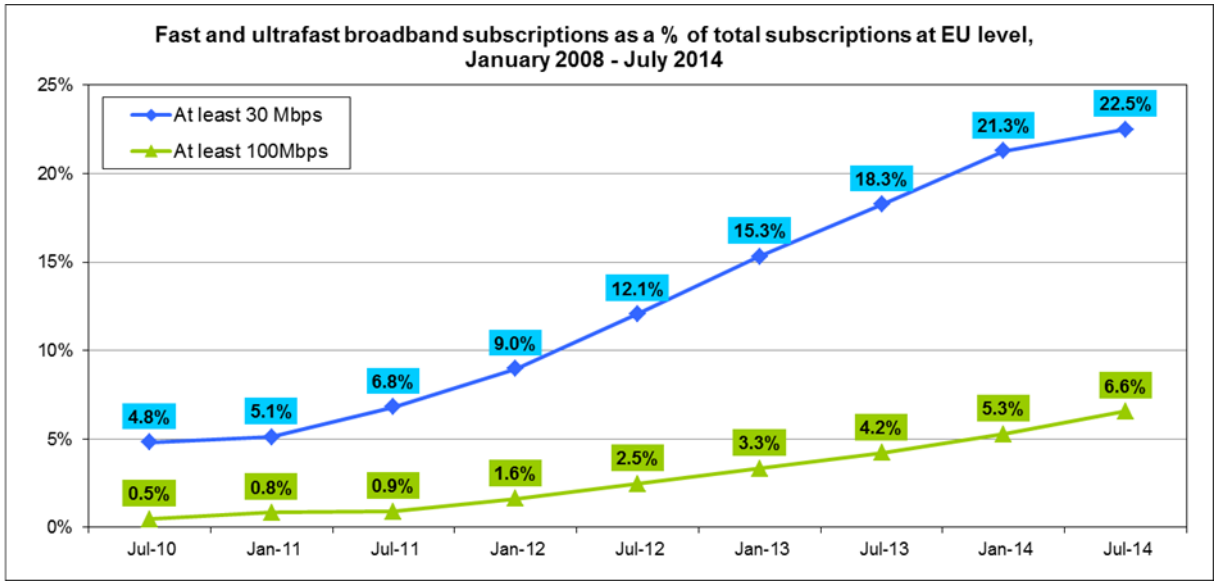

*Source: Broadband coverage in Europe, studies for the Commission by Point Topic (2011-2012 figures, SMART 2011/0027 and 2012/0035) and IHS and Valdani, Vicari & Associati*

A particular problem is identified in the rural areas of the large majority of Member States (the so-called "digital divide"), where broadband high-speed access is available only in less than 20% of those areas, compared to 62% on a nationwide basis. This is explained by the fact that the market often does not deliver high-speed broadband in rural areas, as demand may be

too small to ensure profitability and deployment costs are in some respects higher than in urban centres. In this regard, attention should be given to examining how schemes – including community based – can encourage Fibre to the Home solutions in rural areas. In this regard, wireless networks provide an important complement for deployment alongside fast fixed networks as they could deliver broadband to a small number of users in remote areas, with lower investment costs.

As for the take-up of NGA, the growth rate in fast broadband (at least 30Mbps) over the last four years was higher than in overall fixed broadband.

**Chart 11. Fast (at least 30Mbps) and ultrafast (at least 100Mbps) broadband subscriptions**




*Source: Communications Committee*

At the same time, as regards wireless connectivity, Europe has witnessed significant time lags and differences between Member States in the roll-out of the latest 4G technology, due in part at least to the non-availability of suitable spectrum such as the 800 MHz band. This is accompanied by often wide variations in national spectrum assignment conditions regarding factors of relevance to investment returns and decision-making, such as pricing, licence durations, territorial coverage, spectrum tradability, spectrum caps and reservations and regulated wholesale access to mobile networks.

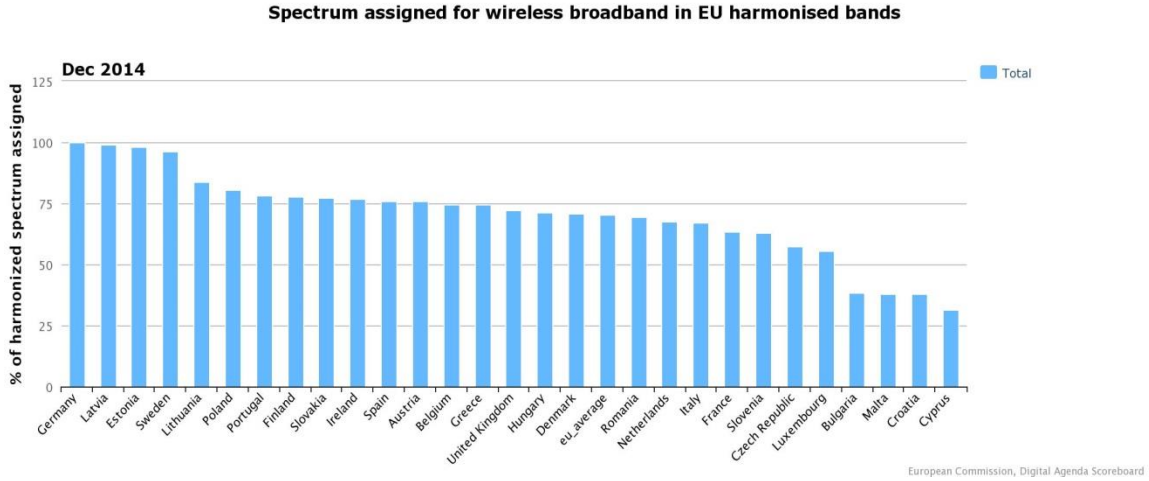
Spectrum reforms are found to decrease the retail prices of mobile services, including indirectly through decreased sectoral market concentration. Simulations based on the Quest III model suggest gradually increasing productivity enhancing effects over time with an EU-wide GDP increase relative to the baseline estimated to be between 0.11% and 0.16% (after 5 years) and between 0.23% and 0.34% in the long-run, which could be added to the further potential GDP growth over the baseline from the competition channel amounting to 0.04%[136].

In addition to evolving market trends and changing business models, data gathered through market monitoring indicate the lack of harmonisation and consistency in the implementation of regulatory approaches across Member States. Results from the EU consultation mechanism on market regulatory measures have also highlighted inconsistent practices by NRAs when

[136] Lorenzani, D. and Varga, J., 'The Economic Impact of Digital Structural Reforms', *European Commission Economic Papers* No 529, 2014, p. 28

regulating relevant electronic communications markets, which are not explicable solely by the acknowledged objective differences in market circumstances (e.g. presence or absence of cable, different levels of consumer demand) which are often as great within Member States as between them. In reaction, the Commission adopted in 2009, 2010 and 2013 three specific recommendations under Article 19 of the Framework Directive, to address such inconsistencies; the recommendations are, however, not binding and have not been systematically followed by NRAs. The follow-up of the implementation of the Radio Spectrum Policy Programme has revealed considerable lack of coherence across Member States with regard to the authorisation/assignment regimes as well as the availability and the opening and use of spectrum bands on a technology-neutral basis for the provision of wireless broadband connectivity[137].

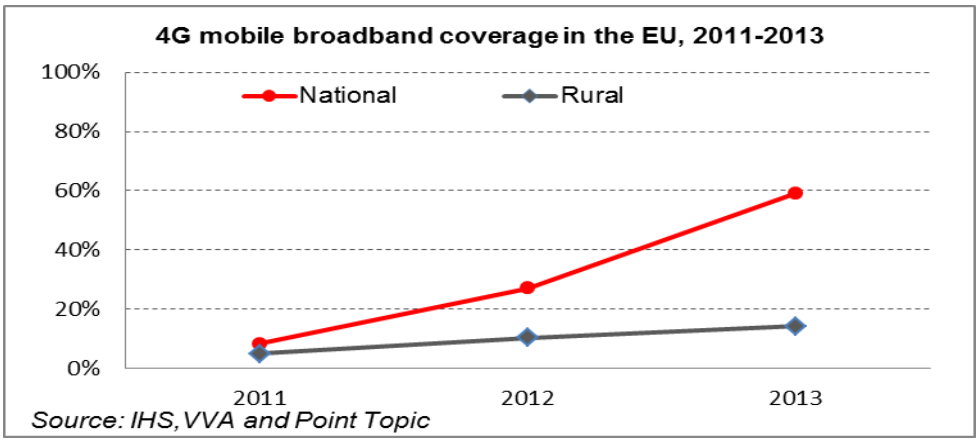
**Chart 12. Spectrum assigned for wireless broadband in EU harmonised bands**




4G mobile broadband availability increased from 27% of homes in 2012 to 59% by the end of 2013, but 4G coverage is still substantially below that of the US (over 90% ). Similarly to NGA, 4G deployments so far have also mainly concentrated on urban areas, with the exception of Sweden, Estonia, Germany, Luxembourg and Slovenia, where rural coverage is already higher than 50%.

[137] Under the Radio Spectrum Policy Programme established by Decision 243/2012/EU of 14 March 2012 in support of the Digital Agenda, the Commission is implementing an EU Radio Spectrum Inventory. Its objective is to allow identification of spectrum bands where efficiency of spectrum use could be improved to accommodate future demands of wireless services to promote innovation and growth. The spectrum inventory will provide harmonised mapping of diverse spectrum data on a geographical basis across the EU.

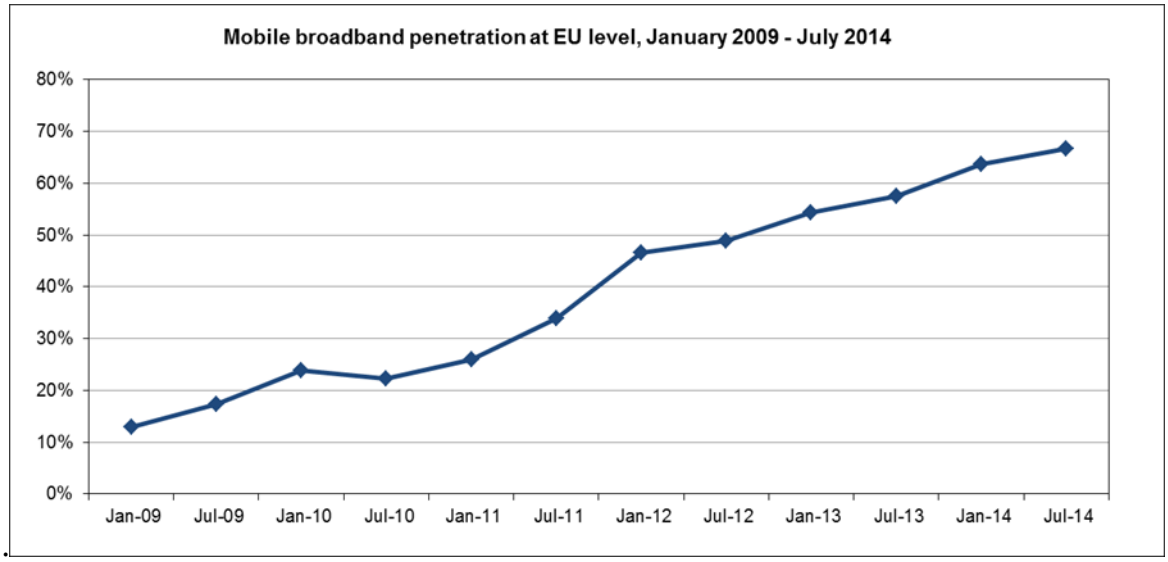
**Chart 13. 4G mobile broadband coverage**




*Source: Broadband coverage in Europe, studies for the Commission by Point Topic (2011-2012 figures, SMART 2011/0027 and 2012/0035) and IHS and Valdani, Vicari & Associati*

Mobile broadband represents the fastest growing segment of the broadband market, although the growth somewhat slowed down in the last twelve months in terms of active subscriptions. As of July 2014, there were 67 mobile broadband subscriptions per 100 inhabitants in the EU.

**Chart 14. Mobile broadband penetration**




*Source: Communications Committee*

Finally, Member States have stepped up their efforts to make broadband a political priority through national plans, but the level of ambition varies greatly. This is particularly evident in the variation amongst Member States on new regulatory initiatives to help increase broadband infrastructure capacity by promoting efficient use of spectrum such as spectrum sharing on an unlicensed or licence-shared basis.

The combined impact of technological developments and a more coherent regulatory framework will also have beneficial spill-overs to other sectors, improving productivity and ultimately the sustainability of their growth models. The same impact can be recognised in other relevant scenarios such as the developing Smart-House and Smart-City paradigms and the transportation sector (car-to-car and car-to-infrastructure services will strongly benefit from the development of broadband telecoms systems). For example, broadband can serve as a complementary investment to other infrastructures (buildings, roads, health and electricity

grids, transportation systems), allowing them to be 'smart' and, for instance, save energy or improve safety.

*Expected Impact*

When the Digital Agenda for Europe targets were set in 2010, they appeared extremely ambitious to many observers. Now mid-way to the targets, they are already insufficient and out of date in an increasing number of usage cases, in particular for industrial use by other sectors (for example, for connected cars) but also in telemedicine, cultural and creative industries, etc. The capacity of a 30 Mbps service is stretched by increasing levels of multiple device use at home or at work. Increasing emphasis is not only put on the need for download speed but also on other technical parameters which are key to the quality of experience (e.g. upload for cloud-based services, latency for financial transactions and gaming). Today, while it is difficult to anticipate our connectivity needs in the future, we do know from current trends (e.g. video in all its professional and private uses, multiple uses and connections, wireless and mobile uses by people and connected objects) that those needs will increase significantly. The Internet of Things, the data economy, the abundance of content and increasingly cheaper mobile devices are expected to accelerate this trend, and render the availability of bandwidth and the ease of upgrading networks a key enabler for the vibrant digital economy and society.

## 4.2. Audiovisual Media Services

*Problem and problem drivers*

The audiovisual media landscape is changing at a rapid pace. Viewers can increasingly access on-demand content. Various portable devices change viewing patterns. New business models are emerging. The Internet opens the doors to new services and players. Sometimes new players fall outside of European jurisdiction or new services fall outside the definition of audiovisual media services. All these new developments lead to questions about the protection of viewers, in particular minors, and about the level of regulatory burden for traditional and new services.

'Convergence' is the progressive merging of traditional broadcast services and the Internet. This results in viewing possibilities extending from TV sets with added Internet connectivity, through set-top boxes delivering video content OTT, to audiovisual media services provided via PCs, laptops or tablets and other mobile devices.

There are a number of clear indications about the reality of this convergence. Connected smart TVs in 21 EU markets[138] have moved from about 5 million installed devices at the end of 2011 to more than 39 million in 2014 and are foreseen to reach the level of almost 118 million in 2018[139].In the same markets, the overall number of connected devices increased from 590 million in 2011 to 935 million in 2014 and is expected to reach almost 1.3 billion in 2018[140]. Mobile video traffic grew to 55% by the end of 2014[141]. It is estimated that nearly three-fourths of the world's mobile data traffic will be video by 2019[142]. Presently, 300 hours of

[138] AT, BE, HR, CZ, DK, FI, FR, DE, EL, HU, IE, IT, LU, NL, PL, PT, SK, SI, ES, SE, and UK
[139] IHS technology database – data covering 21 Member States
[140] Ibidem
[141] Cisco, *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2014–2019*, 2015
[142] Idibem

video are uploaded to YouTube every minute and half of YouTube views are on mobile devices[143].

While the main TV screen in the living room remains an important venue to share audiovisual experiences, many viewers move to tablets or even smartphones to watch audiovisual content. Traditional TV content still accounts for a major share of the average daily viewing time. However, VOD and other Internet-based services increasingly gain importance. This indicates a shift from 'lean-back' consumption to active participation. Convergence has an important impact on viewing habits (including children), on advertising practices and revenues and on content offerings and financing.

Viewing habits vary from Member State to Member State but it is a common feature that younger viewers watch on average less traditional TV. Their average TV viewing in 2013 was 133 minutes per day, compared to 223 minutes per day for the whole population[144].

As regards the impact of convergence on advertising, in 2013, TV advertising in the EU lost more than EUR 300 million out of EUR 27,748 million overall investments (-1.1% vs. 2012) It remained the preferred media for advertising (32% of the market). However, Internet advertising is likely to become the main advertising platform within the next two years, given its rapid development (+8.4% vs. 2012) and the market share already captured in 2013 (27.4%)[145].

As regards content financing, in 2009 EU broadcasters invested around one third of their revenues in content. Out of the EUR 34.5 billion spent in the EU by broadcasters, approximately EUR 15.6 billion was spent on acquiring rights, EUR 5.8 billion on sports rights and EUR 9.8 billion on film and TV acquisitions. At the same time, VOD providers – in particular streaming services – are also becoming involved in content creation and financing.

*Policy steps taken so far*

The Audiovisual Media Services Directive (AVMSD) provides for a minimum harmonisation of certain aspects of national legislation related to audiovisual media services, with a view to facilitate the circulation of audiovisual services in the Internal Market on the basis of the country of origin principle. The Directive establishes a set of minimum standards to be met by Member States, covering aspects such as advertising, protection of minors and promotion of European audiovisual works. According to the country of origin principle, audiovisual media service providers have to abide only by the rules of the Member State with jurisdiction over them, but can operate in all Member States. This does not prevent Member States from establishing higher standards at national level. However, the receiving State with a higher level of standards cannot restrict the reception of services from another State with lower standards. There are exceptions in specific circumstances defined by the AVMSD.

The AVMSD thus allows media service providers to decide whether they want to transmit their content to other Member States, while only having to respect the rules of the Member State where they are established. On that basis, the geographical scope of transmission of

[143] http://www.youtube.com/yt/press/statistics.html in February 2015

[144] Eurodata TV worldwide report, *The development of the European market for on-demand audiovisual services*, p. 319 – the young age group is set at various levels between 13 years and 34 years depending on the country

[145] European Audiovisual Observatory/WARC

media service providers is often determined by contractual arrangements with content producers or advertisers or by other considerations, such as the remit of public service media.

The AVMSD has already envisaged the advent of on-demand audiovisual media services such as VOD and catch-up TV. Indeed, it covers both television broadcasts and on-demand audiovisual media services. All services have to comply with a set of minimum rules. For some aspects, it provides for a two-tier approach, with on the one hand, lighter touch regulation concerning on-demand services where the users have a higher degree of choice and control over the content and the time of viewing and on the other hand, stricter and more detailed rules on traditional (linear) broadcasting. However, since its adoption, the audiovisual sector has continued to undergo rapid change in technology and business practices.

This regulatory framework has facilitated the emergence of a vibrant market. Almost 9,000 TV channels were established in the EU at end 2013 and about 2,000 of them had a cross-border dimension[146]. In addition, there were over 2,500 VOD services in the EU at end of 2014, 195 of them being established in one Member State and targeting another Member State[147]. Between 2009 and 2013, EU broadcasters' net revenues grew by 2.9% (from 69.6 billion to 71.6 billion euros) whereas VOD online revenues (including taxes) grew from 248 million in 2009 to 1,526 million (up 515%)[148].

*Way forward*

The AVMSD will be subject to a regulatory fitness evaluation to assess whether it provides an adequate regulatory framework taking account of developments in the audiovisual sector and whether it is efficient in achieving its purposes. Indeed, there is a need to ensure that the regulatory framework still supports a competitive and open market in audiovisual content in this new and fast-evolving environment.

The evaluation exercise will focus on a number of key areas. It will assess the current material and geographical scope of the Directive as well as the system of graduated regulation, i.e. the difference in regulatory treatment between broadcast and on-demand services. It will examine whether changes to the current system of rules concerning traditional and on-demand services should be adapted (either towards a liberalisation of rules for traditional services or stricter rules for non-linear services). It will also consider whether its current scope should be broadened to encompass services that are outside of the definition of audiovisual media services given by the Directive and/or providers that fall outside its geographical scope.

In view of the new market realities, rules on protection of minors and on commercial communications will also be re-assessed to determine whether the current regulatory approach remains appropriate.

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146 European Audiovisual Observatory, Mavise database, 2014 – TV channels available (established in the EU) = 8,828 (12/2013); TV channels cross-border (established in the EU and targeting foreign markets) = 1,989 (12/2013)

147 Ibidem – VOD services established in the EU (on-demand audiovisual services including 408 branded channels on open platforms, 932 catch-up services, 97 video portals, 100 generalist services, 62 music services, 385 film services, 84 films and TV fiction services, 123 TV fiction services, 34 documentary services, 83 children/animation services, 25 TV archives services, 45 film trailers services, 50 sport services, 22 life-style services, 45 adult, 3 services of general interest and 65 classified as various) = 2,563 (12/2014); VOD services available cross-border (established in a Member State and targeting another Member State) = 195 (12/2014)

148 Ibidem

The country of origin principle is the cornerstone of the current legal framework. It creates legal certainty, saves costs and increases the number of potential viewers. It has facilitated the development of new trans-border business models. The AVMSD provides for derogation and cooperation mechanisms for cases of concern over incitement to hatred and protection of minors, and for situations where there might be circumvention of some Member States' stricter rules. The application of these procedures has sometimes given rise to concerns.

Moreover, several rules of the AVMSD are linked to freedom of information. Their functioning in a converging media landscape should also be assessed with a view to ensuring full respect for media freedom and pluralism. In this context, the evaluation will examine the question of regulatory independence. It will also cover the issue of accessibility to information of public interest, in particular in the context of convergence.

### 4.3. The protection of personal data

Trust in the digital environment is undermined by concerns about whether fundamental rights, in particular the protection of personal data, are being respected. These difficulties stem from the sheer volume of data collected every day, and the fact that individuals are often not adequately informed that their data are collected, what happens to their personal data, what it is used for and/or whether previously collected data is reused with a different aim, potentially by new users. Although many people consider that disclosure of personal data is increasingly a part of modern life[149], they feel they are not in control of their data. A large majority (74%) would like to give their specific approval before their personal data is collected and processed[150]. Moreover, trust in Internet companies is low: only 22% of individuals have full trust in service providers such as search engines, social networking sites and e-mail services[151]. This feeling is exacerbated by the large number of personal data breaches and frequent identity theft and usurpation incidents reported, but also by fear of discriminatory treatment of individuals following profiling based on collected personal data.

Results from the recent survey of online consumers about DSM obstacles show that concerns about personal data being misused and payment card details being stolen ranked amongst the most frequently reported by online users when it comes to purchasing products online domestically (30% and 25% respectively[152]). These concerns were relatively less prominent when it comes to purchasing cross-border in other EU Member States (where consumer concerns about various aspects of delivery predominate). Still the probability that the online consumer has shopped online cross-border within the last 12 months decreases by 8.5% when they are worried about personal data being misused[153]. Amongst respondents who reported on their most recent problem(s) experienced in purchases during the last 12 months, personal data misuse (3%), payment card details stolen (3%) and not getting data back after closing their accounts (6%, amongst those who purchased digital content and online services) were among the problems encountered [154].

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149 European Commission, Special Eurobarometer 359, 'Attitudes on Data Protection and Electronic Identity in the European Union', 2011, p. 23

150 Ibidem, p. 148

151 Ibidem, p. 2

152 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015 – the percentage of respondents who listed these items amongst up to 5 reasons from a list of 18 for domestic purchases and 23 for cross-border purchases

153 Cardona, M., Duch-Brown, N., and Martens, B, 'Consumer perceptions of (cross-border) e-commerce in the EU Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015

154 European Commission, Consumer survey identifying the main cross-border obstacles to the DSM and where they matter most, forthcoming 2015

Data protection worries are also relevant for firms. 30% of firms who are considering whether to make online purchases across borders see data protection concerns as a major problem. These data protection issues are more likely to be a problem when firms are dealing with other firms than when they deal with consumers.

The existing Data Protection Directive (95/46/EC) was adopted in 1995 and, even if it remains sound as far as its objectives and principles are concerned, it has not kept pace with rapid technological and social developments in the digital world which have brought new challenges for the protection of personal data. The interpretation, application and enforcement of data protection rules across the EU have not always been consistent. Moreover, it is not clear how an individual is protected when their personal data are being processed by a company or public authority which is not established in the EU. Businesses are also faced with varied and sometimes inconsistent data protection requirements, due to different national laws. The same applies in research and innovation where the current fragmentation and legal uncertainty risks hindering cross-border collaboration and data flows and reducing the effectiveness of the large research infrastructures funded by the EU and Member States.

Once adopted, the General Data Protection Regulation[155], currently going through the legislative process in European Parliament and Council, will put an end to the fragmented implementation of data protection rules across Member States and will provide a simplified, streamlined and directly applicable regulatory framework. It should equip individuals with a new set of rights fit for the digital age, such as the "right to be forgotten", the right to data portability and the right to be notified when the security of personal data is breached. New concepts should be introduced such as ‘data protection by design’ and ‘by default’, which means that the default settings should implement the principle of data minimisation so that only personal data which are necessary for the specific purpose would be processed. Furthermore, the future Regulation should in particular increase individuals' trust in digital services. It should protect individuals in respect of all companies that offer their services on the European market. Data controllers should also have an obligation to carry out data protection impact assessments for high risk processing.

The proposed Regulation also introduces a One Stop Shop mechanism for data protection in the EU, meaning that only one supervisory authority would enforce compliance by a business in cross-border cases, regardless of how many countries the business may be active in. In addition, through the risk based approach, it should pair flexibility with effective protection so that obligations of data controllers/processors would need to take into account in particular the likelihood and severity of risks for the rights and freedoms of individuals posed by specific processing. Furthermore, it should improve cooperation between the supervisory authorities across the EU and provide strengthened and harmonised powers for national supervisory authorities. Finally, the future Regulation should clarify and streamline rules on international transfers of personal data.

When the processing of personal data is necessary for achieving certain purposes of public interest such as scientific research, the future Regulation should allow exemptions from a number of provisions, subject to appropriate safeguards for the rights and freedoms of the data subjects. By establishing clear and uniform rules for the processing of personal data, the Regulation should allow the EU to stay in the race for scientific breakthroughs that can bring large economic returns, in particular in health research. One study[156] found that in the US

[155] COM(2012) 11 final

[156] Batelle Memorial Institute, *$3.8B Investment in Human Genome Project Drove $796B in Economic Impact Creating 310,000 Jobs and Launching the Genomic Revolution*, 2011

alone, for every dollar spent by the US federal government in the highly data-intensive Human Genome Project, USD 141 were generated in the economy as a result.

The adoption of the Data Protection Regulation by the co-legislator is therefore an urgent priority for the Commission.

The e-Privacy Directive[157] has long been a special case in the EU data protection legislative landscape, as it is the only legal instrument laying down specific data protection rules for the electronic communications sector. The main objective of the e-Privacy Directive was to complement Directive 95/46/EC by specifying the rules required to ensure protection of privacy and personal data when that data is processed through the use of publicly available communications networks. The adoption of the Data Protection Regulation, which will replace Directive 95/46/EC, will therefore have consequences also for the e-Privacy Directive. Once the Data Protection Regulation has been adopted, the e-Privacy Directive, which is *lex specialis* for the electronic communications sector, will need to be reviewed in order to ensure its coherence with the Regulation.

As well as addressing the coherence of the two instruments, the review could consider other issues of substance and scope. Because most of the articles of the current e-Privacy Directive apply only to providers of electronic communications services (i.e. traditional telecoms companies), information society service providers using the Internet to provide communication services which may compete with those of telecoms operators, are outside the main part of its scope. According to some stakeholders, the e-Privacy Directive has thus generated regulatory asymmetries between telecoms providers and service providers using other competing technologies. As a result of this restricted scope of application, it is claimed that the Directive does not ensure a level playing field and therefore acts as a constraint on the competitivess of the electronic communications sector. The review may therefore consider *inter alia* the level playing field concerns and whether the e-Privacy Directive has achieved its harmonisation objectives. Moreover, some of its provisions, such as those regarding online tracking and geo-location, may need to be evaluated in light of the constant evolution of technology.

Reinforcing trust in digital services is not only a matter of effective data protection and privacy laws. It also requires citizens and businesses to have confidence that their identity is secure when entering into transactions with third parties. The adoption of a Regulation on electronic identification and trust services for electronic transactions in the Internal Market[158] was a significant step in this direction. This Regulation seeks to enhance trust in electronic transactions in the Internal Market by providing a common foundation for secure electronic interaction between citizens, businesses and public authorities, thereby increasing the effectiveness of public and private online services, electronic business, data-driven science and electronic commerce in the EU. In particular, the regulation aims at ensuring the use of national electronic identification schemes (eIDs) to access public services in other EU Member States where eIDs are available.

### 4.4. Cybersecurity and the fight against cybercrime

*Problem and problem drivers*

While the digital world brings significant benefits, it is also vulnerable. A high level of network and information security and of public safety online across the EU is essential to

[157] Directive 2002/58/EC
[158] Regulation (EU) No 910/2014

ensure consumer confidence and to keep the online economy running. This will, in turn, preserve the functioning of the Internal Market and will boost growth and jobs.

Cybersecurity incidents, be they intentional or accidental, are increasing at an alarming pace and could disrupt the supply of essential services we take for granted such as water, healthcare, electricity, transport or mobile services. Threats can have different origins – including criminal, politically motivated, terrorist or state-sponsored attacks as well as natural disasters and unintentional mistakes. As far as cybercrime is concerned, trends suggest considerable increases in scope, sophistication, number and types of attacks, number of victims and economic damage[159].

Overall, financial damage resulting from all types of cyber-attacks is estimated to be considerable, with figures cited varying from hundreds to thousands of billions of dollars on a global scale[160]. In particular, a recent study[161] highlights how cyber-attacks cause economic and productivity losses and generate unpredictable additional costs related, for instance, to malware clean-up, investigation and post-incident management. Furthermore, companies may not recover from cyber-attacks: data loss or theft of trade secrets can prove fatal for industries that rely heavily on the quality and secrecy of their manufacturing processes. Indeed, intellectual property (IP) theft is nowadays a very salient concern in the online environment[162]. Many companies will also have to address their loss of credibility and market positioning.

From the consumer perspective, the fear of cybercrime is still holding many people from fully engaging in online activities, for example online payments and online banking. A Eurobarometer survey[163] on cybersecurity published in February 2015 shows that Internet users in the EU remain very concerned about cybercrime. Specifically, 85% of Internet users across the EU agree that the risk of becoming a victim of cybercrime is increasing (a 9% increase from a similar survey in 2013[164]). This can result in significant lost potential for the DSM and cybercrime has been identified as one of the priorities of the European Agenda on Security[165].

Cybercrime is also a threat to citizens' fundamental rights. Offences (for example data interception, child pornography, hate speech, online payment fraud, identity theft, trade secrets theft) involve unlawful processing of personal data and gross privacy violations. The importance of cybersecurity is also supported by the evidence of leading CEOs. According to a recent survey among CEOs[166], 61% say that cyber-threats, including lack of data security, has become a possible threat to the organisation's growth potential (up from 48% stating the same in 2014). Therefore increased cybersecurity may also be required as means to protect data security and safeguard privacy[167].

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159 Europol, *The Internet Organised Crime Threat Assessment (iOCTA)*, 2014

160 According to a recent survey by the World Economic Forum, if businesses and governments do not develop adequate defence policies, and if they do not do so quickly, economic losses caused by cyber-attacks could reach USD 3,000 billion by 2020

161 Zappa, F., *Cybercrime and the risks for the economy and enterprises at the European Union and Italian levels*, United Nations Inter-regional Crime and Justice Research Institute (UNICRI), 2014

162 PwC, *Global Economic Crime Survey*, 2014

163 European Commission, Special Eurobarometer 423, 'Cybersecurity', 2015

164 European Commission, Special Eurobarometer 404, 'Cybersecurity', 2013

165 COM(2015) 185

166 PwC, *18th Annual Global CEO Survey*, 2015

167 European Court of Human Rights, case K.U. v. Finland (Application no. 2872/02), of 02/03/2009

IP infringements on a commercial scale have progressively increased in recent years and discourage investments in innovation and creativity[168]. The OECD estimated the global cost of counterfeiting and piracy to be up to USD 250 billion in 2007[169]. Another study suggests the annual figure varies from USD 200 to 600 billion globally[170]. In addition EU businesses and consumers suffer from growing infiltration of illicit and IP-infringing products and services into legitimate supply chains and consumer markets. Innovators, in particular SMEs, are often dissuaded from defending their IP due to high costs (e.g. ranging from EUR 200,000 in Spain or France to EUR 1.5 million in the UK[171] per action) and complex/lengthy litigation proceedings. Despite acknowledging the general increase in cross-border IP rights infringements, the majority of stakeholders do not launch proceedings against such infringements when they occur in another Member State or in several Member States (only 6% of the respondents to the Commission's 2013 online consultation did so).

*Policy steps taken so far and need for the issue to be addressed at European level*

Given the development of threats to cybersecurity and cybercrime in recent years, the Commission has designed a coordinated policy in close cooperation with Member States and the other EU institutions, as well as with the industry and relevant stakeholders.

Adopted in 2013, the EU Cybersecurity Strategy[172] sets out five strategic priorities, which cover challenges that have both an EU-internal and an international dimension. Of direct relevance to the DSM are the priorities aiming to raise the level of protection and resilience of European networks, to step up the response to online criminal threats and to develop industrial and technological resources for cybersecurity.

On network and information security, the Commission proposed a Directive on Network and Information Security[173], which aims at strengthening preparedness, cross-border cooperation and information exchange amongst EU actors in important segments of the public and private sector, in order to better address and respond to cybersecurity incidents. Moreover, a public-private forum on network and information security ('NIS Platform') was set up under the EU Cybersecurity Strategy with the aim of identifying good practices that organisations, across the value chain, can follow in order to tackle cybersecurity risks. A special focus of the Platform is to help SMEs tackle such risks. Activities on network and information security are supported by the European Network and Information Security Agency (ENISA), as well as by the Computer Emergency Response Team for the EU institutions (CERT-EU).

From an industrial perspective, the supply of trustworthy ICT solutions in Europe remains fragmented and heterogeneous (global technology vendors, systems integrators, defence contractors, domestic technology vendors, etc.). Fragmentation tends to lead to duplication in research and innovation efforts and difficulties to find demand outside the country where solutions are developed. This is aggravated by the increase in the costs of developing reliable cybersecurity products and services. Furthermore only a few actors in the EU have significant industrial capacity in cybersecurity to compete and win in European and global markets.

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168 PwC, *Global Economic Crime Survey*, 2014

169 OECD, *Magnitude of counterfeiting and piracy of tangible products*, 2009

170 RAND Europe, *Measuring IPR infringements in the Internal Market – Development of a new approach to estimating the impact of infringements on sales*, 2012

171 WIPO Magazine, 2010

172 JOIN(2013) 1 final

173 COM(2013) 48 – this proposal was being examined by the European Parliament and the Council at the time of writing

In addition, in order to better address criminal threats online, a number of initiatives were taken with a view to strengthen the judicial response to cyber-attacks. First of all, a legislative framework was set up with the adoption of the Directive on Attacks against Information Systems[174] in 2013 (due to be transposed by Member States by 4 September 2015). It provides for common definitions and sanctions for illegal access, system interference and data interference, introduces new offences and improves cooperation among law enforcement agencies at EU level. To complement these measures, under the European Agenda on Security, the Commission will assess the level of implementation of the 2001 Framework Decision on combating fraud and counterfeiting of non-cash means of payment[175], consult relevant stakeholders, assess the impact of possible measures and, if required, table a proposal. In this context, due consideration will be given to the phenomenon of virtual currencies.

To boost law enforcement cooperation at operational level, the European Cybercrime Centre (EC3) was launched in 2013 within Europol. The Centre serves as the European cybercrime information focal point, pools European cybercrime expertise to support Member States and provides support to Member States' cybercrime investigations. Further functions of the Centre will include the strengthening of forensic law enforcement capabilities for cybercrime investigations and better cooperation between relevant agencies, including Europol, Eurojust, CEPOL and ENISA.

As far as IP infringements are concerned, the Directive on the enforcement of intellectual property rights (IPRED[176]) requires all Member States to apply effective, dissuasive and proportionate civil remedies against those engaged in IP rights infringing behaviour[177]. It seeks to ensure that all Member States have a similar set of civil measures, procedures and remedies available for right holders to defend their IP rights. This includes the possibility for injunctive relief by intermediaries whose services are being used by a third party to infringe the right holder's IP rights. However, and according to a 2010 report on the application of IPRED[178], fragmentation remains as regards certain aspects of the conditions and procedures relating to injunctions.

The proposed Directive on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure[179] seeks to ensure more effective civil redress against misappropriation of trade secrets. Since for a trade secret to be recognised its owner must have taken steps to keep it confidential, the implementation of this proposed Directive should also encourage companies to put in place internal security systems, including cybersecurity systems, which should again reduce the possibilities for economic cybercrime.

Current negotiations on a revised Payment Services Directive[180] should also increase security requirements for payments and enhance protection of consumers. Together with the inclusion

174 Directive 2013/40/EU

175 Council Framework Decision 2001/413/JHA

176 Directive 2004/48/EC

177 As regards the enforcement of injunctions, in case an injunction covering multiple territories is issued, such an injunction is automatically enforceable in all Member States based on Regulation 1215/2012 which has removed all intermediary measures for cross-border enforcement of judicial decisions, including injunctions, and which entered into application on 10 January 2015

178 COM(2010) 779 final, mandated by Article 18(1) of Directive 2004/48/EC

179 COM(2013) 813 final – this proposal was being examined by the European Parliament and the Council at the time of writing

180 COM(2013) 547 final – this proposal was being examined by the European Parliament and the Council at the time of writing

of new providers such as payment initiation and account information service providers under the scope of EU legislation which are major players in e-commerce, it should bring more confidence in online transactions.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

The DSM should offer EU citizens the same level of safety and the same expectations in online dealings that they have in their day-to-day offline life.

To achieve this goal, the EU has already adopted or proposed a number of legislative actions and attention is required to ensure that this framework is properly implemented and enforced, and that it remains sufficient and adapted to the evolution of the threat. This should be complemented by sufficient (human and financial) resources invested in enhancing cybersecurity and fighting cybercrime both at national and EU level. In particular, cybercrime investigations require very efficient cross-border cooperation and highly-skilled law enforcement staff. Future actions will also be determined on the basis of the priorities identified under the European Agenda on Security. A clear and consistent approach should be pursued in all initiatives related to data stored and accessed over the Internet, be it for data protection purposes or for accessing evidence, thereby enabling effective criminal investigations and prosecutions.

More coordinated action aimed at supporting the development of an industrial strategy for cybersecurity is still missing. Such action could stimulate the take-up and the supply of secure ICT solutions in Europe. Overall objectives would be to increase trust of citizens/consumers, enterprises and governments, foster the EU digital economy, boost Europe's competitiveness in a high-added value industrial sector and position Europe as a highly trustworthy area in the digital space.

A common EU approach to IT security certification, taking into account experience from existing national and voluntary schemes, would contribute to a high level of security and provide much needed scale to the market for secure digital products and services[181]. This common approach would ultimately help the EU lead in establishing global IT security certification policies and boost the competitiveness of EU industry in European and global markets.

With respect to commercial scale IP infringements, the Commission highlighted in its recently adopted Action Plan that it would seek with the Member States to re-orientate its policy for IP enforcement towards a better compliance with IP rights by all economic actors. Rather than penalising the citizen for infringing IP rights – often unknowingly –, the non-legislative actions set out in this Action Plan pave the way towards a "follow the money approach", seeking to deprive commercial scale infringers of the revenue flows that draw them into such activities. In its Conclusions adopted on 4 December 2014, the Competitiveness Council welcomed this approach, while also encouraging the Commission to address, and "consider all possible options", related to other aspects of IP rights enforcement, namely the use of tools available to identify IP rights infringers, the role of intermediaries in assisting the fight against IP rights infringement, and the allocation of damages in IP rights disputes.

[181] The World Semiconductor Council (WSC) has identified smart cars, energy efficiency and health care as areas for potential growth and innovation for the semiconductor industry; a large number of applications in these areas will need a security certification (Joint Statement of the 18th Meeting of the WSC 22 May 2014, Taipei)

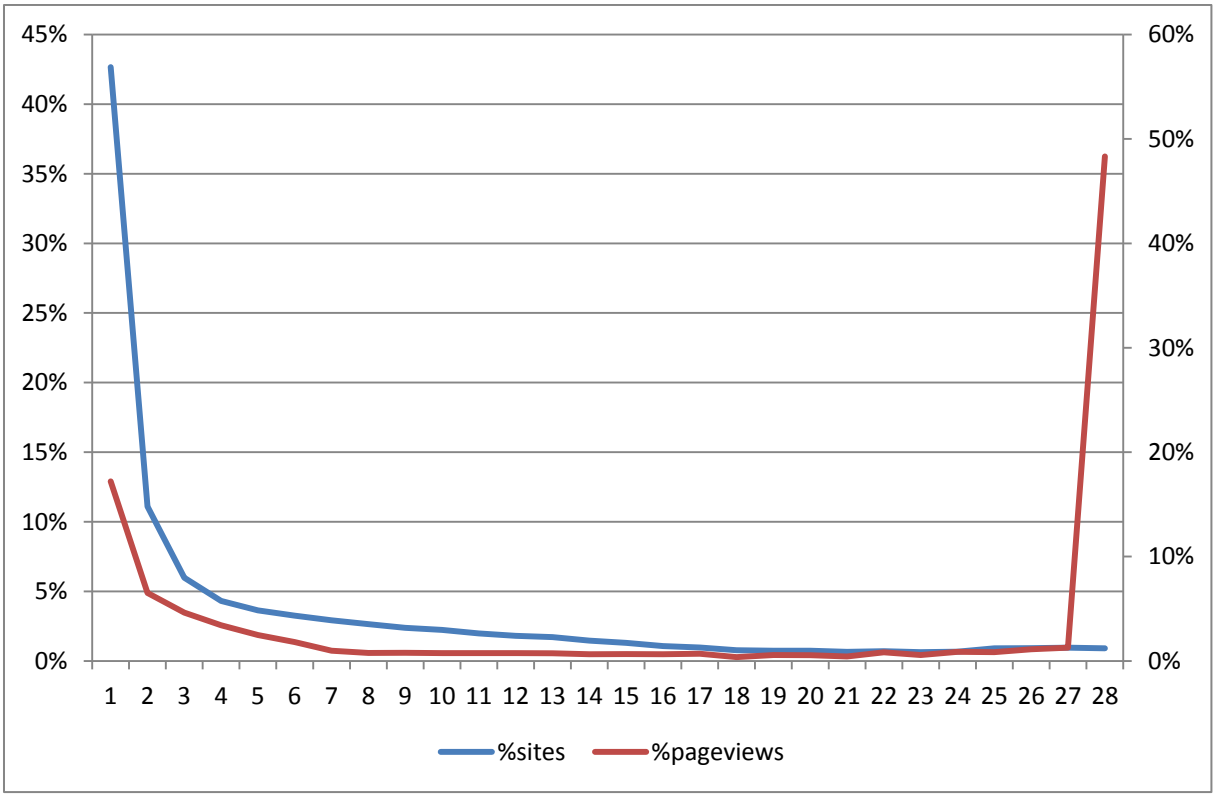
## 4.5. Online Platforms

*Problem and problem drivers*

Online platforms can be described as software-based facilities offering two-or even multi-sided markets where providers and users of content, goods and services can meet. As such, the term can cover a wide range of different types of platform, whose functions and characteristics can differ considerably. Examples of types of platforms include: communications and social media platforms; operating systems and app stores; audiovisual and music platforms; e-commerce platforms; content platforms, which may include content aggregators as well as software/hardware solutions; and search engines. Besides the taxonomy outlined above there are other types of platforms, such as payment systems or those related to the sharing economy.

The relationship between the different sides of the market meeting through the platform is organised by the platform provider, which in this way may accumulate large amounts of data. Since the value of these platforms to consumers increases with their size (network effects), they may in some cases become very large and act as key players for the wider Internet. Nearly half of Internet traffic goes to the only 1% of websites that are actively trading in all Member States[182].

**Chart 15. Internet traffic by origin, in number of Member States**




*Note: The blue line shows that nearly 45% of websites are active in just one country and that they represent around 10% of traffic (left hand side). On the other hand, less than 1% of websites are present in all Member States, but these represent nearly half of the traffic (right hand side).Source: JRC-IPTS based on Amazon Alexa*

[182] Alaveras and Martens, 'Online services trade in the EU Digital Single Market', *JRC/IPTS Digital Economy Working Paper*, forthcoming 2015

Platforms play a central role in the digital ecosystem. With more than one trillion webpages on the Internet and more appearing every day, platforms are an important means by which consumers find online information and online information finds consumers. Platforms can therefore be among the most influential of digital actors in helping to determine the structure of online activity. This intermediary role gives platforms economic power but also, in some cases, power to shape the online experience of its customers on a personalised basis and to filter what the customer sees, mostly through the application of data-driven algorithms.

Platforms provide a basis for SMEs in all sectors of the economy, from manufacturing to services, to innovate and to exploit the advantages of e-commerce. This is hugely beneficial to a great number of companies (in particular SMEs) and to the economy as a whole. Moreover, platforms have proven to be innovators in the digital economy and can be expected to be important drivers towards the further development of the sharing economy. New platforms in the fields of car transportation, music, finance, accommodation and online staffing have rapidly and profoundly changed the conditions for such activities and have grown exponentially (some sharing economy platforms are valued at over EUR 25 billion). In less than five years, these key sharing sectors have reached a global revenue level of around EUR 14 billion (5% of the total revenue generated by the five sectors), and could potentially reach EUR 300 billion by 2025 (or 50% of the total revenue of the five sectors). In the UK alone, the sharing economy is forecasted to reach EUR 12 billion by 2025[183]. Finally, the global nature of the Internet means that these opportunities are no longer limited to domestic markets, but extend far beyond.

For suppliers wishing to access potential customers via a platform, the key aim is to achieve the maximum possible visibility for its offering, which in turn depends on how the platform classifies and filters the available offerings. A simple change of the ranking mechanism can impact on the sales and business of the provider.

Furthermore, the ability to exercise strategic control over the presentation of information may assist some platforms to develop commercial interests in a downstream market served by the platform. If they do so, the platforms then enter into competition with their own customers[184]. The manner in which they may take advantage of this opportunity through the processes and practices used by platforms in delivering their service is not always apparent (the algorithms and strategies of platforms are a closely guarded commercial secret).

The accumulation and use of data by certain market players can contribute to their market power, in particular in their relationship with the data suppliers.

Some of the more specific issues that have been identified by stakeholders in relation to certain categories of platforms can be summarised as follows.

*Issues for consumers and SMEs*

Platforms aggregate large amounts of data. They filter, classify and present information to their users.

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183 Vaughan, R., *The Sharing economy:how will it disrupt your business?*, presentation by PwC, 2014

184 Where a platform is dominant in a given market, the favouring of its own services over those of its competitors in a downstream market may constitute an abuse of its dominant position – see, for example, Commission Press Release IP/15/4780, 2015, in which the Commission announced it had sent a Statement of Objections to Google alleging the company had abused its dominant position in the markets for general internet search services in the European Economic Area by systematically favouring its own comparison shopping product in its general search results pages

- *Lack of clarity on information inputs and outputs*: it is unclear for users how platforms collect and process data and present information. When using search engines, for example, consumers may not be able to distinguish between organic and paid-for search results or understand the approach taken to "rank" (order) results or to select pricing information, or how these relate to the underlying business model of the service provider. One study[185] concluded that 12% of the search results were personalised, mainly due to geo-location, prior search history or whether the user was logged in or out of the search engine.

  In addition, a study on comparison tools and third party verification schemes[186] shows that less than 40% of comparison websites describe their business model or explain their relationship with the suppliers/manufacturers whose offers they display. Only 18% indicate the frequency at which data on their website is updated, 17% indicate what their source of revenue is and 11% give an indication of the market they cover. Information on those aspects is almost never provided by apps.

  The algorithms and other tools used by online platforms are of course central to their competitiveness and ability to respond to market demands and are understandably considered to be business secrets. The issue is how to balance their need for confidentiality and commercial freedom against the need to enable their users to make informed decisions.

- *Lack of awareness of consumers about the value and use of their data*: consumers do not know what data about their online activities are being collected and how they are being used, which results in an asymmetry of information between the actors. This may interfere with their fundamental rights to privacy and protection of personal data (Articles 7 and 8 of the Charter of Fundamental Rights of the European Union) and may result in a violation of the right to non-discrimination (Article 21 of the Charter).

- *Lack of awareness of the other contracting party; loss of consumer law rights*: the only direct interface for users of e-commerce platforms is often in practice the platform itself and a user may consequently be under the false impression that the platform is the supplier, whereas in fact the user's real counterparty is a private individual. In such cases users will not have the benefit of protection under the EU consumer rules, as this legislation only applies to contracts between businesses and consumers, not to consumer-to-consumer relations.

- *Difficulties in establishing liability*: when buying from a business via online platforms, consumers may face difficulties in identifying who is responsible and in seeking redress. National consumer authorities also may face difficulties in determining who is responsible for practices occurring on online platforms which infringe consumer legislation. Under EU consumer *acquis*, both the platform and the supplier may be liable for breaches of consumer rights, such as misleading commercial practices. The Commission has already taken successful enforcement actions against major Internet platforms in the case of in-app purchases. The Commission will further address issues related to online platforms in the guidance and will continue to promote the effective and uniform application of the Unfair Commercial Practices Directive in this area.

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185 Hannak, Aniko, et al., 'Measuring personalization of web search', *Proceedings of the 22nd international conference on World Wide Web, International World Wide Web Conferences Steering Committee*, 2013

186 ECME Consortium and Deloitte, *Study on the coverage, functioning and consumer use of comparison tools and third-party verification schemes for such tools*, 2014

- *Terms and conditions of access to platforms*: there might be an asymmetry in bargaining power between big platforms and SMEs, also due to accumulation of data, which might be reflected in contractual clauses (determining price, quality, duration, delivery). SMEs may not be aware of their rights and find complaints too cumbersome.

*Issues also for larger businesses*

Issues falling under this category include:

- *Possible vertical integration/leverage*: Some platforms act as a marketplace and a retailer at the same time. These platforms may use the transactional data acquired from business users of the marketplace segment to enhance the performance of the platform's retail arm. This can lead to discrimination in listing between platforms' own services and third party services. Companies may also complain that they do not get access to the data collected through transactions linked to their "products".

- *High fees/non transparent pricing*: virtually all online platforms have a fee model based on a listing fee (applicable when a product is listed on the website) and a referral fee (a percentage of the final selling price for each product). Such referral fees can vary from 5% to 20% of the final selling price.

- *Restrictions on pricing*: some platforms simply forbid companies from selling more cheaply elsewhere (including the seller's own website, other platforms and all offline distribution channels). The issue has already been examined by various competition authorities.

Given the dynamics of the markets created and served by platforms, and the relatively short time that they have been in existence, more work is needed to gather comprehensive and reliable evidence on how different types of platform work and their effects on their customers and the economy as a whole. On the basis of such an evidence base, an assessment can be made of the nature of the problems that may arise from their pivotal role in the digital economy and whether existing regulatory tools are sufficient to tackle them, or whether new tools need to be developed.

### 4.6. Liability of Online Intermediaries

One of the key elements of the e-Commerce Directive, and one that has underpinned the development of the Internet in Europe, is the principle that intermediary service providers (ISPs) are not liable for the content of "illegal" information that they transmit, cache or host, subject to certain conditions. In cases of "caching" (automatic, intermediate and temporary storage of information) those conditions include that the service providers do not modify the information, whereas in cases of "hosting" (storage of information) the providers should not have actual knowledge of the illegality and should act expeditiously to remove or disable access on becoming aware of it.

These conditional exemptions from liability under the e-Commerce Directive are generally seen to have remained relevant despite technological and market developments since its adoption and as having provided the legal certainty needed to allow Internet-based services to evolve. However, conflicting jurisprudence at national level and the fragmentation of rules on notice-and-action procedures across the EU has a negative impact on legal certainty and

predictability, which can hamper innovation and growth[187]. Furthermore, the removal of illegal content can in some cases be slow and complicated, rendering the protection sought less effective. At the same time it is important to avoid unjustified take-downs, as this could adversely affect freedom of expression and the freedom to conduct a business online. There also appears to be a lack of transparency on individual intermediaries' procedures and practices when taking down content[188].

The EU legal framework on the liability of online intermediaries is complemented by the legislative framework for civil IP rights enforcement (IPR Enforcement Directive 2004/48 (IPRED)), which covers in principle all online and off-line intermediaries including ISPs, as well as the injunctive relief provisions provided in the Copyright Directive (Directive 2001/29) solely for online service providers. The differences in implementation of these provisions in Member States, with their differing national jurisprudence on tort and unfair commercial practices, do not always allow for effective enforcement of IP rights in cases of infringements committed on the Internet across the borders of the Internal Market. In the results of the public consultation on IPRED undertaken in July 2013[189], the lack of clarity of the role of intermediaries in assisting in enforcement of IP rights and the difficulties in getting injunctive relief from intermediaries across the EU against online commercial scale infringers were highlighted.

In particular, some stakeholders have expressed the view that the current fragmentation and legal uncertainty have rendered the protection of property rights inefficient and are having a detrimental effect on the fight against online crime, including in areas such as the fight against hate-speech and child pornography. Others have expressed concern that not only illegal but also legal content is often taken down since the ISPs, in cases of doubt as to the validity of a notice, tend to take down the information in order to ensure that they are not held liable for the content. Some also contend that it is increasingly difficult to identify clear parameters for the liability exemptions set out in the e-Commerce Directive, as the technical capabilities of online intermediaries develop and the commercial uses of the content they present become ever more sophisticated[190].

There are also calls from some public and law enforcement authorities and the IP rights/copyright community to re-balance the rights and obligations of online intermediaries and other actors as regards illegal or harmful content. One question is whether to enhance the overall level of protection from harmful material through harmonised implementation and enforcement of the conditions which allow online intermediaries to benefit from the liability exemption. Another is whether to ask intermediaries to exercise greater responsibility and due

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187 While the European Court of Justice has pronounced five times on Article 14 of the e-Commerce Directive, up to seven Member States have legislated notice-and-action procedures; colliding national case law on the interpretation of the relevant provision has developed, as regards the inclusion of different services (search engines, hyperlinks, online selling platforms, file sharing) under the "hosting" category or as regards the interpretation of terms like "actual awareness" or "acting expeditiously". See also Gasser, U. and Schulz,W., 'Governance of Online Intermediaries: Observations From a Series of National Case Studies', *Berkman Center Research Publication* No. 2015-5, 2015.

188 European Commission, Public consultation on e-commerce, 2010, and Public consultation on notice-and-action procedures, 2012 – respondents indicated that legal content is taken down on a regular basis; in the latter consultation, 77% of individuals, 57% of hosting service providers, 62% of right holders, 68% of civil society associations, 50% of public authorities and law enforcement bodies and 7% of hotlines agreed to the statement that hosting service providers "often take action against legal content". See also Nas, Sjoera and Bits of Freedom, *The Multatuli project*, SANE lecture on 1 October 2014.

189 European Commission, Civil enforcement of intellectual property rights: Public consultation on the efficiency of proceedings and accessibility of measures, 2013

190 See for example OECD, *The role of internet intermediaries in advancing public policy objectives*, 2011

diligence[191] in the way they manage their networks and systems, in a context of due process and legal oversight and in accordance with current best practice[192], so as to improve their resistance to the propagation of illegal content, increase transparency and thereby confidence in the online environment[193].

The European Agenda on Security also envisages concrete actions to help Member States identify and remove violent extremist content online, in cooperation with industry partners.

## 5. DIGITAL ECONOMY AND SOCIETY

### 5.1. Digital services in a data-based economy

*Current situation*

Industry is one of the pillars of the European economy – e.g. the manufacturing sector in the EU accounts for 2 million enterprises, 33 million jobs, a quarter of all EU added value and 60% of productivity growth. To serve the markets of the future, European industry needs to be at the forefront of developing and fully using the potential of ICT, automation, sustainable and clean as well as human-centred manufacturing and processing technologies. The digitisation of all industrial sectors will be key to keeping a strong European industrial base and will enable Europe to manage the transition to a smart industrial system (Industry 4.0). For example, digitalisation and the use of big data is essential to the development of precision farming, the development of new products in the agro-food sector or even the development of new services in general in the rural areas. This transformation process offers huge potential for increasing flexibility, efficiency and resource productivity in the production and service sectors, but also in our everyday lives.

The further development of connected physical things will lead the way to a steady growth of the European semiconductor industry. With the widespread adoption of smartphones and tablets, which created demand for mobile and wireless applications, this sector managed to retain an average annual growth rate of about 5% between 2010 and 2013[194]. The sales in May 2014 in the European semiconductor industry amounted to USD 3.125 billion, an increase of 10.1% compared to the same month one year ago, according to the World Semiconductor Trade Statistics (WSTS).

Demand for the first generation of Internet of Things products (fitness bands, smart watches, and smart thermostats, for instance) will increase as component technologies evolve and their costs decline. A similar dynamic occurred with the rise of smartphone usage. Consumer

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191 Article 15 of the e-Commerce Directive bans the imposition by Member States of a general obligation to monitor content. On the other hand, following its Recital 48, the e-Commerce Directive does not affect the possibility for Member States to require hosting service providers to apply duties of care, which can reasonably be expected from them and which are specified by national law, in order to detect and prevent certain types of illegal activities. Finally, Article 16 encourages the drawing up of codes of conduct at Community level (involving associations or organisations representing consumers) to contribute to the proper implementation of the Directive. At national level, some self-regulatory initiatives have taken place with diverging results, especially as regards protection of minors (hotlines), in the framework of Directive 2011/92/EU.

192 Internet Watch Foundation, *Annual Report 2014* – since 1996, 141,000 URLs were removed globally and over 500,000 reports of child sexual abuse were assessed; 41% of the traced content was hosted in Europe (including Eurasia) and 56% in North America

193 Hugenholtz, P. Bernt, 'Codes of Conduct and Copyright Enforcement in Cyberspace', in *Copyright Enforcement and the Internet*, ed. Irina A. Stamatoudi, 2010

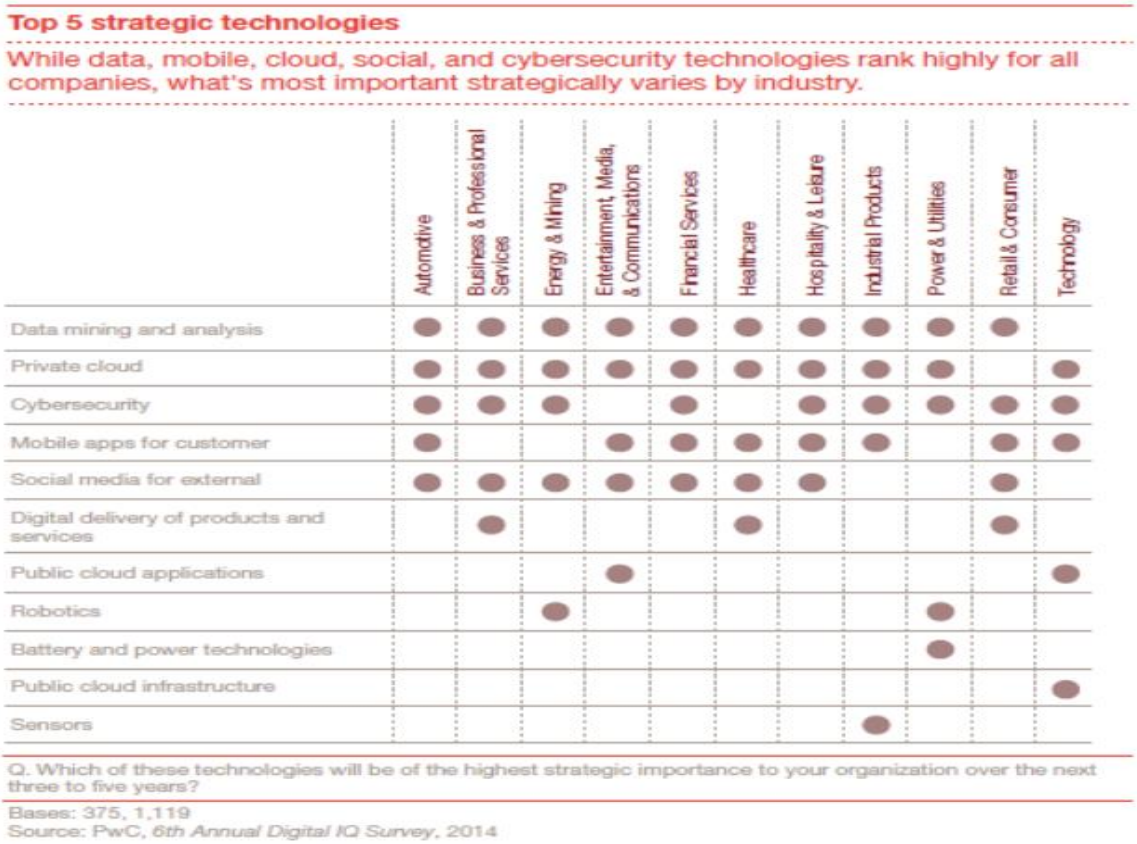
194 Bauer, Harald et al., *The Internet of Things: Sizing up the opportunity*, 2014

demand for smartphones jumped from about 170 million devices sold annually just four or five years ago to more than a billion devices in 2014[195]. Only about 10% of the financial value to be captured from the Internet of Things trend is likely to be come from the "things"; the rest is likely to be in how these things are connected to the Internet[196].

Driving this transformation process are digital services such as cloud computing, big data (including data-driven science and geo-spatial data) and the Internet of Things. They have become a central element of the EU's competitiveness, an enabler for innovation and a catalyst for economic growth and jobs. According to a recent study among CEOs[197], 80% of CEOs think that data mining and analyses are strategically important to their company, 65% say that the Internet of Things is strategically important, while 60% mention the strategic importance of cloud computing.

When it comes to what technology companies are betting on currently, a recent survey by PwC[198] shows that all companies agreed that mobile customer technology, private cloud, data mining and analysis, externally-focused social media, and cybersecurity will be the most strategic important issues in three to five years.

**Chart 16. Top 5 strategic technologies**




195 Ibidem
196 Patel, Mark and Veira, Jan, *Making connections: An industry perspective on the Internet of Things*, 2014
197 PwC, *18th Annual Global CEO Survey*, 2015
198 PwC, *6th Annual Digital IQ Survey*, 2014

The collection, storage and processing of data are central to the development and adoption of these digital services. The increase in volumes of data is exponential – 90% of data circulating worldwide did not exist two years ago. It is expected that by 2020 more than 16 zettabytes of useful data will exist[199], which implies an equivalent growth of 236% per year from 2013 to 2020. Data has become a new factor of production, an asset and in some transactions a new currency.

Nearly 1 in 3 of all enterprises in the EU[200] internally shares electronic information between different functional areas (e.g. accounting, planning, production, marketing) using an enterprise resource planning software package. The percentage of enterprises internally sharing electronic information is the highest in Belgium (47%), Austria (45%) and Sweden (43%). The lowest percentage of enterprises internally sharing electronic information can be found in Hungary (16%), the UK (12%) and Latvia (10%).

Big data use is low in the EU, with only 6.9% usage amongst companies with more than 10 employees and only 29% of European companies considering themselves ready for big data[201]. Only one in the top 20 big data companies worldwide is European. This is due to the absence of a functional European data ecosystem, the lack of venture capital and a solid skills base as well as the high compliance costs that businesses in Europe face. Moreover, neither the scientific community nor industry can systematically access and re-use the research data that is generated by public budgets, despite strong demand[202]. Only in a few (albeit important) manufacturing sub-sectors, such as computers and electronics, and automotive and aerospace, is there a relatively large share of early adopters of big data technologies, particularly among larger businesses. Only 1 in 5 companies use paid cloud services in the EU. This figure rises to 35% if SMEs are excluded[203]. 32% of EU companies that do not use cloud services at all reported that it is due to uncertainty about applicable law; 33% reported that it is due to uncertainty about the location of data; and 37% due to security-related risks[204]. According to the Digital Agenda Scoreboard, within the EU only 11% of enterprises employing 10 persons or more, excluding the financial sector, are purchasing cloud computing services of medium-high sophistication[205].

199 Turner, V. et al., *The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things*, IDC for EMC, 2014

200 European Commission, Eurostat, ICT survey of Enterprises, 2014; European Commission, Digital Agenda Scoreboard

201 IDC, *Business opportunities: Big Data*, 2013

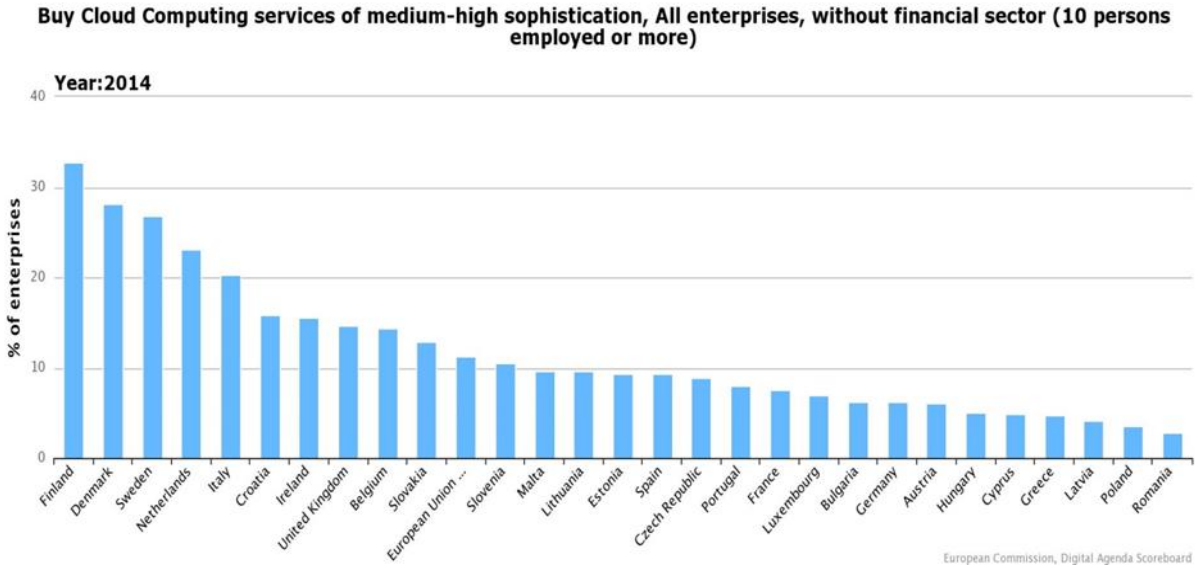
202 IDC and TRUST-IT, 2013 – EU Member States spend EUR 10 billion a year running capital-intensive, shared big science research facilities in the domains of bio/health, environment, physics (genome sequencers, synchrotrons, big telescopes); the Commission has invested over EUR 100 million in FP7 and EUR 48 million in Horizon 2020 to set up and coordinate Cloud for science and public authorities

203 European Commission, Eurostat, Cloud computing - statistics on the use by enterprises, 2014

204 European Commission, Eurostat, ICT survey of Enterprises, 2014

205 Cloud Computing services of medium-high sophistication refer to at least one of the following cloud computing services: hosting of the enterprise's database, accounting software applications, CRM software, computing power

**Chart 17. Enterprises buying cloud computing services**




Over a quarter of the population using the Internet is unaware of cloud services[206]. In 2014 only 21% of the EU population aged 16-74 used cloud-based internet storage space to save documents, pictures, music, videos or other files. Only 15% of individuals used cloud-based internet storage space for sharing files. Only 12% of the EU population used cloud services for editing text, spreadsheets or presentations[207]. Among individuals using the Internet and aware of cloud services, but not using them, security or privacy are the main reasons for not using them (44%), followed by the reliability of service providers (28%) and lack of skills (22%)[208].

As regards the use of public cloud services, public sector organisations were found to be lagging behind the private sector, with 10% difference in 2013, which is expected to grow to around 12% in 2015[209].

Business sensors are a key to ubiquitous, low-cost data collection and could provide a relatively low-cost way for companies to learn about their customers, employees, and operations – and then use that data to improve engagement, sales, productivity, safety, etc.

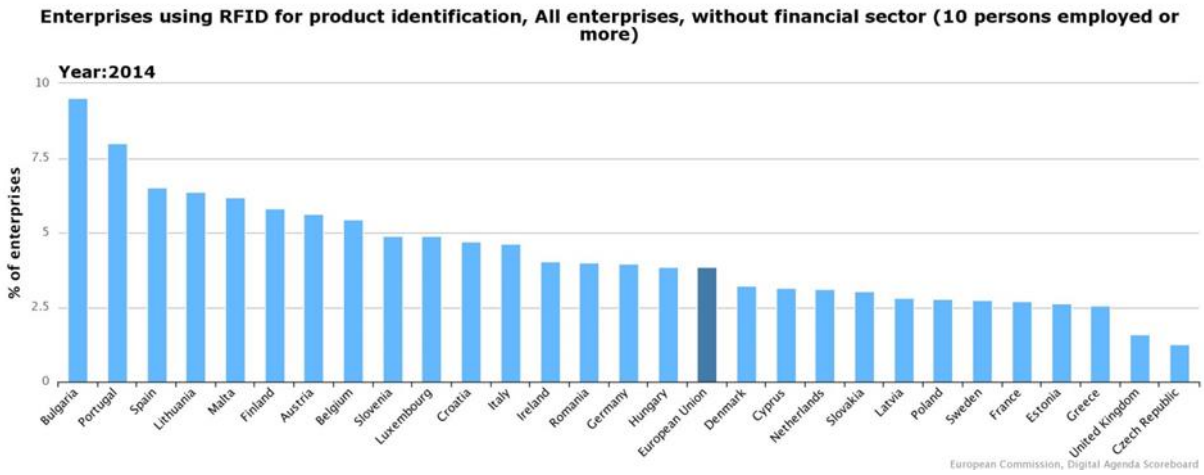
A recent survey[210] revealed that only 23% of companies are currently investing in business sensors. The top five industries to do so are retail and consumer (52%); industrial products (33%); hospitality and leisure (30%); energy, utilities and mining (27%); and automotive (25%).

One way to transmit data is to use radio-frequency identification (RFID) tags or transponders. RFID tags or transponders are devices that can be applied to or incorporated into a product or object and transmit data via radiowaves. According to the Digital Agenda Scoreboard 2014[211],

206 European Commission, Eurostat, 'Internet and cloud services - statistics on the use by individuals', 2014
207 Ibidem
208 Ibidem
209 IDC, *Uptake of Cloud in Europe: Follow-up of IDC Study on Quantitative estimates of the demand for Cloud Computing in Europe and the likely barriers to take-up*, 2015
210 PwC, *6th Annual Digital IQ Survey*, 2014
211 European Commission, Eurostat, ICT survey of Enterprises, 2014; European Commission, Digital Agenda Scoreboard

the uptake of RFID tags or transponders used for tracking of supply chains and inventory, or for after-sales product identification, remains low. In the EU, 4% of enterprises with 10 or more persons employed, excluding in the financial sector, do so. The uptake is highest among companies in Bulgaria (10%), Portugal (8%) and Spain (7%). While the uptake by companies in Greece (3%), the UK (2%) and Czech Republic (1%) remain the lowest.

**Chart 18. Enterprises using RFID for product identification**




*Problem drivers*

Currently, collecting, processing, accessing and protecting data is a major challenge. This includes issues such as ownership of data, treatment of personal and industrial data, availability, access and re-use, contractual terms and conditions, data security, quality of data (e.g. timely updates), authentication of users, cybercrime, acceptance of electronic documents, liability for incorrect information, standardisation of languages and formats.

Market fragmentation is notably linked to restrictions on storage and processing of data outside of national territories of Member States, lack of trust (security, localisation of data), uncertainty about applicable law, unbalanced off-the-shelf contracts, insufficient knowledge of cloud computing, lack of interoperability or portability (difficulties in changing provider or problems with access to data).

Data localisation requirements[212] can in fact limit the benefits offered by digital services such as cloud computing as they create barriers to EU cross-border data transfers, limiting the competitive choice between providers and raising costs by forcing organisations and companies to store data on servers physically located inside a particular Member State.

Moreover, user lock-in with cloud service providers affects the fluidity of data flows. According to Eurostat, almost 30% of European SMEs using cloud services find that

[212] European Cloud Partnership, *Establishing a Trusted Cloud Europe: A policy vision document by the Steering Board of the European Cloud Partnership*, 2014 – the European Cloud Partnership's Steering Board noted that "Member States' practices and in some instances national laws restrict the possibility of storage and processing of certain data (especially public sector data) outside their territory". Subsequently the issue of data location requirements was further explored in a Feburary 2015 workshop organised by the Commission – European Commission, *Outcome of the workshop: Facilitating cross border data flow in Europe – on data location restrictions*, 2015.

difficulties in unsubscribing or changing cloud service provider are a major limiting factor for the use of cloud services[213].

Unbalanced contractual conditions are an issue for consumers and SMEs in relation to cloud contracts. Although EU law already lays down uniform B2C information requirements and marketing rules, and consumer legislation on unfair contract terms (i.e. the Unfair Contract Terms Directive) provides some protection, no EU wide rules exist to cover conformity with the contract and remedies for defective digital products. Moreover, cloud computing contracts often lack clarity and transparency. SMEs as cloud users also face the issue of unbalanced contracts and liability.

Traditional businesses may also fear losing control of their own business analytics in favour of third party data service providers. The latter have the most advanced technologies, tools and capacity for analysing data and deriving information from it on market conditions, customer preferences, product errors and other business deficiencies. Building trust is therefore a key condition for ensuring the effective development of new digital businesses in this area.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

Optimistic estimates predict that big data could unleash EUR 12 trillion in market value. According to IDC, the Western European big data market will grow annually by 24.6%, and the use of big data by the top 100 EU manufacturers could lead to savings worth EUR 425 billion. The Warsaw Institute of Economic Studies estimated that by 2020, big data analytics could boost EU economic growth by an additional 1.9% i.e. a GDP increase of EUR 206 billion.

A recent study shows that the impact of restrictions in data localisation on economic activity is considerable and can lead to productivity losses, creation of additional trade barriers against data processing and cloud services and a lowering of the competitiveness of the economy due to the negative impact on investments[214].

On the opportunity to reduce manufacturing costs, it is estimated that if the top 100 European manufacturers could start from scratch by incorporating systematically the results of their big data analytics in their business processes, they would save EUR 160 billion[215]. By using advanced analytics to replace preventive maintenance systems with predictive ones, the IDC estimates that, on average, each manufacturing company could cut total equipment downtime by 50% and increase production by 20%. In terms of productivity, IDC considers that if just the top 100 European manufacturers could improve production efficiency by 10%, the whole industry would theoretically gain EUR 265 billion.

Cloud computing can potentially contribute a total of EUR 450 billion to the EU's GDP between 2015 and 2020, as well as lead to the creation of an additional 1 million jobs and 300,000 companies in the EU, throughout all sectors of the economy, according to IDC.

213 European Commission, Eurostat, Cloud computing - statistics on the use by enterprises, 2014

214 European Centre for International Political Economy, *The costs of data localisation: friendly fire on economic recovery*, 2014

215 IDC, *Manufacturing Insights*, 2014

Expenditure in Europe on cloud services is expected to reach between EUR 24.4 billion and EUR 59.6 billion in 2020, as part of EUR 439 billion of total IT spending[216].

The current structure of the European cloud computing market shows that the majority of public cloud providers are actually based in third countries, with only 1 out of the top 10 service providers being based in Europe.[217] A connected Digital Single Market that provides scale and the right framework conditions for digital technologies such as cloud services is likely to create a better environment for the development and growth of European based service providers.

Estimates of the cost of an incomplete DSM for cloud computing are between EUR 31.5 billion and EUR 63 billion per year[218].

## 5.2. Digitisation of research

*Problem and problem drivers*

Modern science is data-driven, as it generates and relies on unprecedented data in terms of sheer size, complexity and variety (e.g. relating to the genome, earth observation or global epidemics). Research data needs to be managed, shared and preserved in a way that optimises scientific discovery, innovation, trust and societal benefit.

Digital technologies and the exponential growth of data are key drivers to move research and science towards Open Science, which describes the ongoing transitions in the way research is performed, researchers collaborate, knowledge is shared and science is organised. Open Science is enabled by digital technologies and driven by the globalisation of the scientific community and the need to address the grand challenges of our time. It impacts the entire research cycle, from inception to the dissemination of results and evaluation of impact.

Stakeholders have expressed the wish to foster Open Science *inter alia* by establishing a Research Open Science Cloud which would unite existing and future data infrastructures, offering easy access to European researchers for storing, managing and processing data from different sources in a secure and seamless way, helping the development of (data-driven) science[219].

*Policy steps taken so far and need for the issue to be addressed at European level*

The policies currently in place concern mainly open access to publications and research data, which is narrower than Open Science. Almost all Member States have set up legal and administrative conditions in support of open access to publications, and some of them are also promoting open access to data[220]. A comprehensive policy package containing a series of measures and recommendations to improve access to scientific information produced in Europe was adopted at the end of 2012[221]. Furthermore, under the EU research and innovation funding programme Horizon 2020, open access to publications is now mandatory and a Pilot on Open Research Data has been launched.

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216 IDC, *Uptake of Cloud in Europe: Follow-up of IDC Study on Quantitative estimates of the demand for Cloud Computing in Europe and the likely barriers to take-up*, 2015

217 Ibidem

218 European Parliament Research Service, *Mapping the cost of Non-Europe, 2014-19*, 2015

219 European Commission, Public consultation on Open Science (Science 2.0): "Science in Transition", 2014

220 European Commission, ERA Facts and Figures 2013, p. 28

221 COM(2012) 392, COM(2012) 401, C(2012) 4890

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

Open Science has the potential to make science more efficient, reliable and responsive to societal challenges. Storing, sharing and re-use of scientific data on a massive scale, with the objective of making research data discoverable, accessible, useable and, wherever possible, interoperable in line with the G8 principles on research data[222], will indeed improve the reliability and efficiency of science. It will also stimulate new sources of wealth with new products and services, new companies and jobs. Producers and users of research data will benefit from more systematically opening them to broad access, depositing and accessing their data in reliable repositories. Possible EU action could include *inter alia* improving the framework conditions for data-driven science in terms of removing institutional and legal barriers; stepping-up existing Open Access policies across Europe; developing solutions to ensure that research data is findable, accessible, interoperable and re-usable ('FAIR'); developing a common framework for research data, including a dedicated Research Open Science Cloud (infrastructure and governance) and services that adhere to quality standards and are trustworthy and compliant with EU law on copyright and fundamental rights.

## 5.3. Interoperability and standards

*Problem and problem drivers*

The interoperability of new technologies implies effective interconnection between digital components like devices, networks or data repositories, in a mutually understood language. ICT standardisation has an essential role to play in increasing the interoperability of new technologies within the DSM. It can help steer the development of new technologies such as 5G wireless communications, digitalisation of manufacturing and construction processes, data-driven services, applications, cloud services, cybersecurity, e-business, e-health, Intelligent Transport Systems and the Internet of Things, to name but a few. By facilitating access to data and services in a secure and interoperable manner, it encourages fair competition and ensures respect for data protection.

In the industrial sector, the lack of standards across the spectrum of communication needs (from design, prototyping and testing to the production process and aftersales service) seriously undermines interoperability and so reduces the efficiency of the economic activity concerned. Interoperability is important for most of the technologies being rolled out as part of the digitisation of industry (see also section 5.1).

- Smart manufacturing

Manufacturing accounts for 80% of EU exports and has significant potential for increased competitiveness in the context of an industrial renewal. Such potential will only be fully leveraged if the use of available technologies is coordinated with other aspects such as smart and clean industry or e-skills and takes into account relevant initiatives launched by Member States (Industry 4.0, Smart Industry and others).

- 5G mobile telecommunications

The emergence of a single 5G wireless communications standard would support interoperability on a global level as well as the development of pan-European networks with competitive end-to-end service offerings.

[222] G8 Science Ministers Statement of 12 June 2013

- The Internet of Things

The Internet of Things has the potential to connect over 26 billion "things" by 2020[223] and to allow the development of new services providing higher levels of automation and intelligence. A large number of proprietary or semi-closed solutions have emerged, leading to non-interoperable concepts, architectures and protocols. Interoperability will offer significant opportunities in terms of solving global societal challenges like industrial renaissance, reducing pollution, resource shortage, and aging societies.

- Data-driven services

With the continuously growing volumes of data being created (including both Big and Open Data) and their increasing complexity, interoperability has become a key condition for leveraging data's potential value. To take full advantage of the growing opportunities of the data-driven economy, interoperability needs to be addressed at different levels, e.g. syntactic, semantic and linguistic, both within and across different sectors (economic sectors and public and private sectors).

- Cloud services

The portability of data between different cloud services and cloud service providers is important in order to avoid users and their data being locked into a particular provider. It is a prerequisite for trust in and adoption of cloud services as part of a viable and user-friendly DSM.

Interoperability is also needed to enable public services to work across borders. 1,500,000 citizens and 300,000 businesses are likely to use cross-border online services each year by 2020[224]. Digitisation of administrative formalities offers an opportunity to standardise the documents that businesses have to present to national authorities in different Member States, yielding additional cost savings.

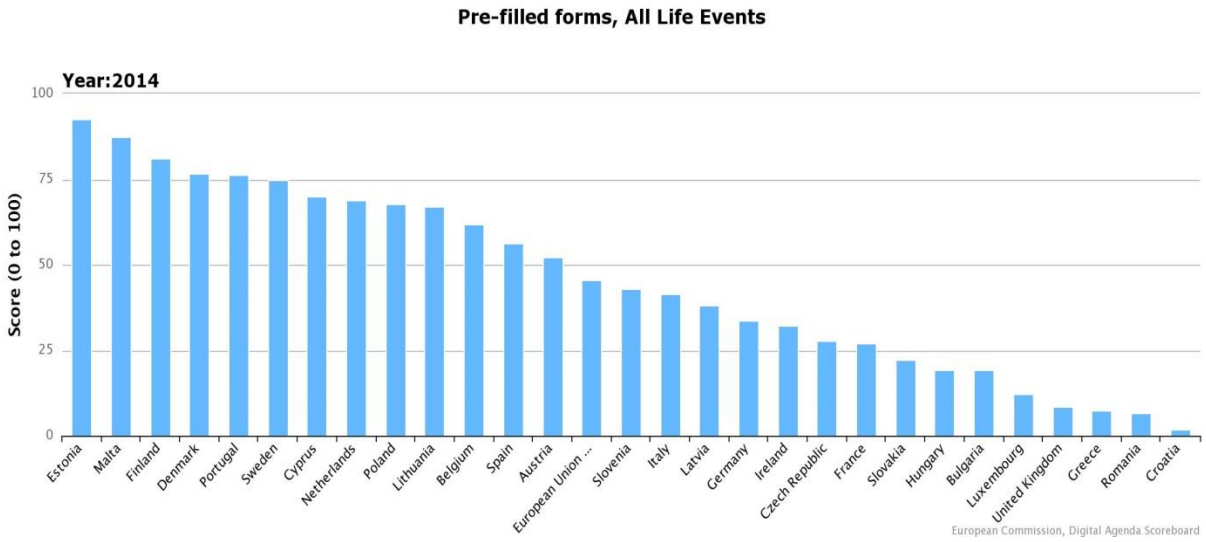
The amount of data that is pre-filled in Public Services' online forms varies to a great deal within the EU[225]. The following life events are included in the scope of measurement: Business Start Up; Losing and Finding a Job; Studying; Regular Business Operations; Moving (General Administration); Owning and Driving a Car; Starting a Small Claims Procedure. While in Estonia 92.7% of forms were pre-filled, in Malta 87.4 % and in Finland 81% in 2014, there were countries where pre-filled forms counted for less than 10% (including the UK, Greece, Romania and Croatia).

223 Gartner Inc., *Forecast: The Internet of Things, Worldwide, 2013*

224 Tinholt, D., et al., *Study on Analysis of the Needs for Cross-Border Services and Assessment of the Organisational, Legal, Technical and Semantic Barriers*, Capgemini et al. for the European Commission, 2012

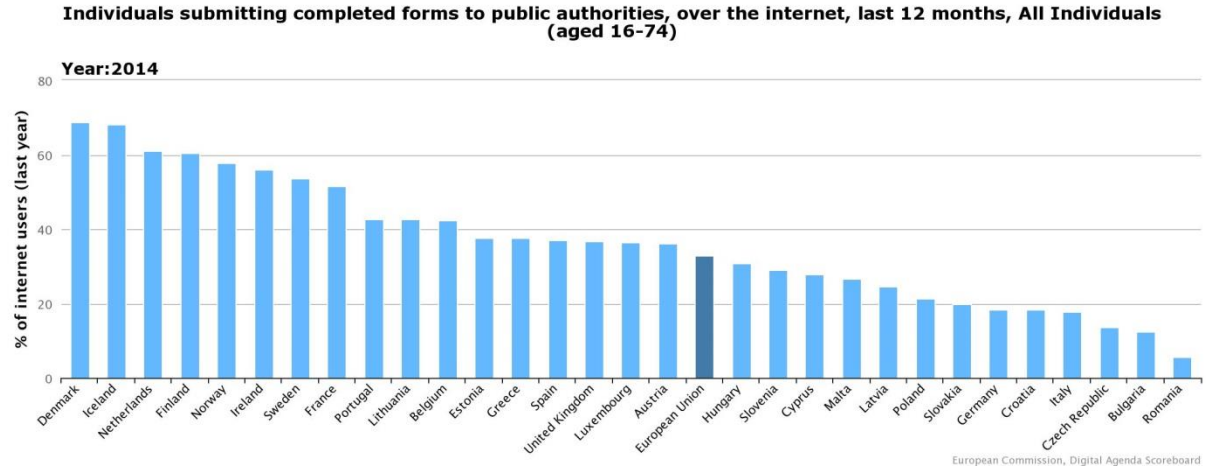
225 Tinholt, D. et al., *eGovernment Benchmark Framework 2012-2015*, Capgemini et al. for the European Commission, 2012

**Chart 19. Pre-filled forms**




The percentage of individuals who used the Internet to submit completed forms to public authorities was on average 33% within the EU[226].

**Chart 20. Individuals submitting completed forms to public authorities**




More generally, the lack of interoperability among public entities and private operators restricts the potential for digital end-to-end services, One Stop Shops, the once-only principle, the single data entry principle, the transparency of public services and the full exploitation of public open data.

There is a need also of a horizontal action at EU level, across sectors, to prevent Member States from opting for mutually incompatible solutions that will build new barriers to the delivery of European public services. Availability of standards is often not sufficient to ensure interoperability, if existing standards are not integrated by suppliers in their solution. Public procurement plays an important leverage factor for the diffusion of interoperability standards and Member States have created national catalogues of ICT-standards and interoperability specifications to guide public procurers and accelerate standards adoption on national

[226] European Commission, Eurostat, ICT survey of Households and Individuals, 2014; European Commission, Digital Agenda Scoreboard – the indicator has a 12-month reference period and concerns the use of web applications for uploading completed forms or transmitting web forms with details filled in directly

markets. Federating those catalogues into European catalogues would avoid market fragmentation at EU level. Public procurers would therefore be guided towards those technical specifications and standards that contribute to interoperability, in particular because of their wide market acceptance. Incentive schemes, i.e. through Horizon 2020 (Public Procurement for Innovation) and the structural funds, could be launched, per domain, to push for the adoption of the European catalogue and drive interoperability.

Moreover, further progress is needed to improve the interoperability of systems for cross-border delivery of goods and services, as well as the mobility of people and businesses and cooperation between public authorities, at national and EU level. 25% of firms in the EU state that interoperability issues are a problem for cross-border online sales, with 10% declaring it to be a major problem. Important differences exist between sectors in this respect, with interoperability concerns being most prevalent in the information and communication sector (30% of firms).

Standards are often closely linked to patents, and both patent holders and patent users have an interest in making sure these patents can be licensed with legal certainty and under fair conditions. Licensing is an important way for some EU industries to realise their investment in R&I. There is therefore a need for legal certainty as regards licence commitments made to standard setting organisations and for a fair balance as regards remuneration for R&I made available for standard-setting and access to standardised technology on fair terms. The development of a transparent standard setting framework in ETSI and ITU that will allow for reliable and fair licensing conditions is therefore important.

Achieving full interoperability in a connected DSM will provide consumers with a choice between different digital offers, businesses to expand their offers beyond national borders, industry to optimise its production systems by interconnecting equipment and exploiting diverse data sources, and public services to offer one-stop-shops and cross-border services to citizens.

*Policy steps taken so far and need for the issue to be addressed at European level*

The EU has recognised the critical role of standards over a number of years. In 2013, the EU put in place a reform of the EU Standardisation framework aimed at achieving better efficiency in the standardisation process and improving synergies and coordination between European stakeholders, namely the Commission, the European Standardisation Organisations (ESOs), Member States, European industry and businesses.

The Commission has also recognised the specific needs of the ICT sector by allowing for specific standardisation measures to be put in place. In particular, the EU Rolling Plan for ICT Standardisation[227] is today an essential planning instrument, which plays a key role in structuring governance of standardisation and pulling market forces towards convergent objectives. A European Multi-Stakeholder Platform on ICT Standardisation was also set up[228], which brings together the ESOs, the main international ICT fora and consortia, various standard setting organisations (SSOs), as well as industry, consumers and Member States in order to achieve more coordinated action.

[227] European Commission, *Rolling Plan for ICT standardisation*, 2015
[228] 2011/C 349/04

In the area of public services, the European Interoperability Framework, adopted by the Commission in 2010[229], promotes and supports the delivery of European public services by fostering cross-border and cross-sectoral interoperability. The great majority of the Member States have transposed this Framework nationally, which has brought a common understanding of the basic requirements for interoperability between public services. This common understanding should now be updated and extended with other concrete and practical instruments to be shared by national administrations such as the European Interoperability Reference Architecture (EIRA) and the European Interoperability Cartography (EUCart)[230].

On e-transport, a harmonisation effort is already under way in all transport modes in order to provide interoperability and continuity throughout the EU. In addition to seamless transport operations, this will also provide further economic and societal benefits. For instance, the cost for society of road accidents is approximately EUR 130 billion per year. 90% of these accidents involve human error. Much of these errors could be avoided with connected cars and communication between vehicles and infrastructure (so called cooperative ITS), and ultimately with automated driving. In addition to the harmonisation already going on in several transport modes, there is a need to address interoperability across transport modes.

The ongoing efforts to improve cross-sectoral and cross-border interoperability between maritime surveillance systems, by enhancing standardisation of data exchange, (i.e. CISE - Common Information Sharing Environment[231]) will help reducing monitoring costs and efficiency of response to incidents/ accidents at sea, as well as triggering new industry opportunities.

The recent standardisation efforts at CEN/CENELEC/ETSI level show the potential of more converged digital solutions in the energy sector. The interoperability of solutions will be key to motivating infrastructure upgrades in a traditionally prudent sector. The deployment of digital monitoring and control technologies will also help to mitigate the infrastructure investments required to achieve the EU's energy/climate objectives for 2030 and 2050.

The on-going deployment of smart metering systems in many EU countries can be seen as a necessary first step. However, the smart metering systems need to be fully interoperable and provide all data necessary for adjusting demand, either directly to the consumer or to a service provider who manages consumption for the consumer. In order to allow businesses to succeed on the new market, standards could be developed that help to realise the full benefits of home automation by enabling communication between smart metering systems and household appliances and between appliances. Given competing developments in countries such as the US, Japan and South Korea, the strong European energy technology manufacturers need to embrace these innovations and validate them in Europe to nurture their worldwide competitiveness.

Mobile payments and instant payments are also gaining attention with initiatives flourishing all across Member States that will need support at EU level in order for them to be completely interoperable.

With the instruments described above in place, Europe today is better organised to tackle global ICT challenges. However, an increased effort is needed to ensure that standardisation output keeps pace with changes in technologies. A strategic approach to ICT standardisation needs to be taken at EU level in order to better align it with EU policy interests and ensure that key European priorities for ICT standardisation are identified.

Standardisation governance should also be strengthened, notably by setting up a strategic group for Member States and ESOs to jointly discuss common priorities under the

229 COM(2010) 744 final

230 The Interoperability Solutions for European Public Administrations (ISA) programme (2010-2015) monitors and supports the EIF implementation in Europe; it will be followed by the ISA² programme (in interinstitutional procedure at the time of writing)

231 COM(2014)451 final

Commission's political guidance. This process will complement and enrich the technical discussions currently being held under the European multi-stakeholders platform on ICT standardisation.

### 5.4. Employment, digital skills and expertise

*Problem and problem drivers*

A digitally skilled workforce and digitally competent consumers will be a driving force for the achievement of a truly connected DSM and a precondition for Europeans' participation in the digital world of e-commerce, services, communication and other forms of interaction. However, we are witnessing digital skills mismatches and shortages in Europe which will significantly affect the functioning and performance of European labour markets in the near future**.**

To make sure that we have the necessary pool of digital skills in Europe, at basic, intermediate and advance levels, education and training opportunities, also within companies, need to be improved. Currently 39% of EU citizens have only low or no digital skills[232]. About one fifth (18%) of the EU population has never used the Internet, mainly older people, those with lower educational attainments and the inactive or retired. Learning and acquiring digital competences goes beyond pure ICT skills and involves the creative and collaborative and safe use of ICT[233]. Consumers need also to be educated and protected in relation to new disguised forms of marketing in social media, e-privacy and behavioural targeting of marketing through online tracking. Consumers should be aware of their online rights and have the means to enforce them. All citizens need to be sufficiently digitally competent to participate actively in society and the economy and to benefit from digital services such as online learning, e-health and e-government and e-commerce.

It is therefore essential to increase digital competences among the general population at all stages of life. Effective initial education and training requires well trained educators and modern and well-equipped educational institutions making best use of digital and other innovative tools[234]. While infrastructure provision in schools in Europe varies considerably between countries, highly digitally equipped schools are on average a reality for only 37% of grade 4 students, 24% of grade 8 students, 55% of grade 11 students and 50% of grade 11 vocational students. Between 20-25% of students are taught by digitally confident and supportive teachers having access to ICT and facing low obstacles to their use at school[235]. Only one in three teachers in the EU reports frequent use of practices involving ICT[236]. Only one in three students at all grades in the EU are taught by teachers who participate in online communities of practice[237]. The use of open educational resources is fragmented and general digital technologies are still used only sparsely in most EU countries' primary and secondary

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232 European Commission, Digital Agenda Scoreboard; European Commission, Eurostat, ICT survey of Households and Individuals, 2014

233 Ferrari, A., 'DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe', *JRC/IPTS Report*, 2013

234 Brečko, B. et al., 'Mainstreaming ICT-enabled Innovation in Education and Training in Europe: Policy actions for sustainability, scalability and impact at system level', *JRC-IPTS Study*, 2013

235 European Schoolnet and University of Liege for the European Commission, *Survey of schools: ICT in education, Benchmarking Access, Use and Attitudes to Technology in Europe's Schools*, 2013

236 Vuorikari, R. and Brecko, B, *How could teachers' professional collaboration in networks be better studied as part of digital competence?*, in proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2014 (p. 1821-1826), Association for the Advancement of Computing in Education (AACE)

237 Ibidem

education systems. Europe also lags behind in adopting new ways of learning, most visibly as regards Massive Open Online Course (MOOC) provision and uptake. Digital skills or ICT competences are sometimes a separate subject and sometimes taught across subjects; however they are so far not part of all educational curricula and learning outcomes.

Digital skills are currently mostly learned outside formal education, through personal internet and computer use, in the workplace, in experiential learning or in other informal settings. Mechanisms to identify, assess, recognise and validate these skills are rare and fragmented across Europe and often not recognised across borders. This impairs the further acquisition of digital skills as well as the matching of job seekers' and employers' needs.

The digitisation of the economy is transforming the European labour markets, changing the working conditions and boosting the demand for digital skills. The use of technologies in the workplace alters significantly the patterns and modes of work as well as the relationships between employers and employees.

Regarding the demand of digital skills, a recent study among CEOs[238] showed that concerns regarding the availability of key skills have grown significantly, reaching 73% of respondents claiming this in 2015, up from 63% in 2014. The number of workers in high-tech industries and services grew by 20% between 2000 and 2011 to reach around 22 million in Europe (10% of the EU workforce), and ICT professionals proved the strongest growing occupation over 2011-2013. While digital innovation has contributed to the growth of high-skill high-pay occupations across Europe during the crisis, it has also accentuated the polarisation of European job markets: mid- and low-skilled jobs declined by 2.5-3% between 2008 and 2011[239]. In the coming years, 90% of jobs will require some level of digital skills[240]. However, so far a third of the EU workforce has insufficient digital skills while 19% has a low level and 14% has no digital skills at all[241].

Over the period 2000-2012, employment of ICT specialists in the EU grew significantly. Based on a narrow definition[242], ICT skilled employment grew by 2 million over this period from 3.1 million in 2000 to 5.2 million in 2012[243]. Based on a broad definition[244], ICT skilled employment increased to 6.1 million, or 2.8% of total employment in 2012, up from 1.9% in 2004[245]. On average, ICT employment growth was 4.3% per year (narrow definition) over the period 2000-2012, more than 7 times higher than the total employment growth over this period. Under a broad definition, the rate of growth appears to be higher. Most EU countries have seen an increase in the level of ICT specialist employment. In 2012, the highest ICT

238 PwC, *18th Annual Global CEO Survey*, 2015

239 Goos, M. et al. Ian Hathaway, Jozef Konings, Marieke Vandeweyer, 'High-Technology Employment in the European Union', *Vives Discussion Paper* 41, 2013

240 Kolding, M. et al., *Post Crisis - e-Skills are Needed to drive Europe's Innovation Society*, White Paper, IDC for Microsoft, 2009

241 European Commission, Digital Agenda Scoreboard; European Commission, Eurostat, ICT survey of Households and Individuals, 2014

242 ISCO-88 codes 213, 312 and 313 for 2000-2010 and ISCO-08 codes 25 and 35 for 2011-2012

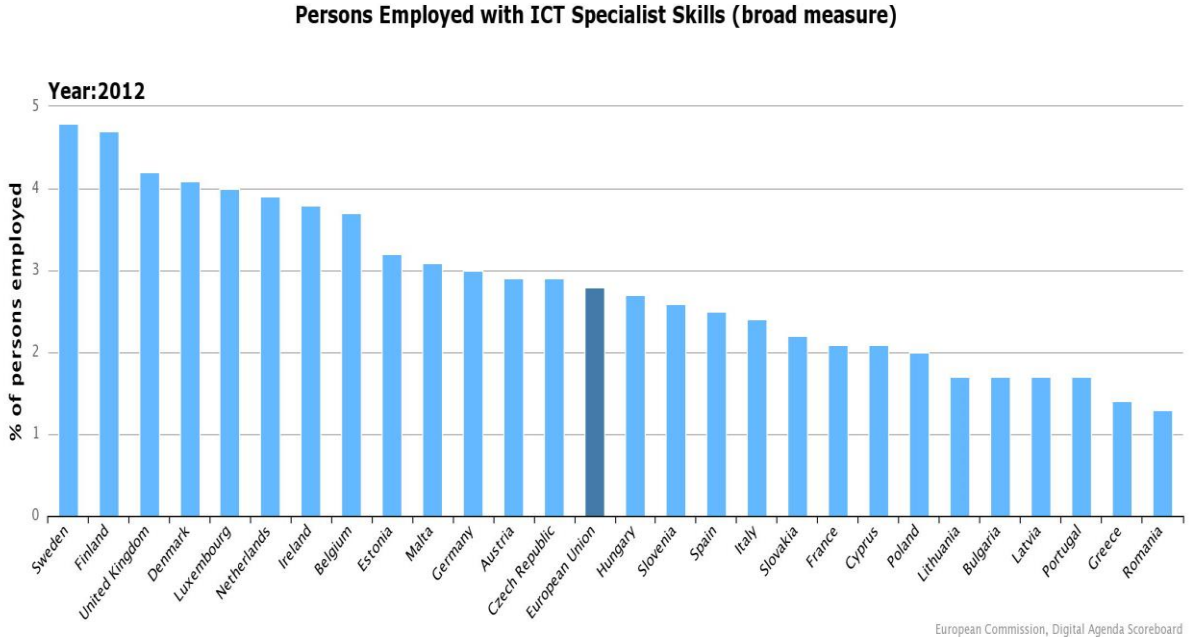
243 Sabadash, A., Employment of ICT specialists in the EU (2004-2012), *JRC/IPTS Digital Economy Working Paper* No 2014-01, 2014

244 ISCO-88 codes 213, 312, 313, 7243, 1236, 2144, 2359, 3114, 7242 and 8283 for 2004 and ISCO-08 codes 133, 2152, 2153, 2166, 2356, 2434, 25, 3114, 35, 7421, 7422 and 8212 for 2012

245 Sabadash, A., Employment of ICT specialists in the EU (2004-2012), *JRC/IPTS Digital Economy Working Paper* No 2014-01, 2014

shares were recorded in Sweden (4.8%), Finland (4.7%) and the UK (4.2%), the lowest in Romania (1.3%) and Greece (1.4%)[246].

**Chart 21. Persons employed with ICT specialist skills (broad measure)**



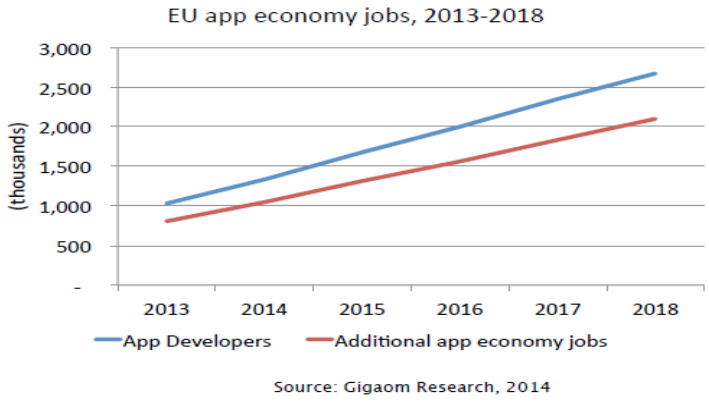

*Sabadash, A., Employment of ICT specialists in the EU (2004-2012), JRC/IPTS Digital Economy Working Paper No 2014-01, 2014*

Demand for digitally competent professionals across all economic sectors continues to grow[247] and is outstripping supply. Even though the number of ICT professionals is growing by more than 100,000 every year, almost 40% of enterprises trying to recruit ICT professionals have difficulty doing so[248].

Employment of ICT professionals is resistant to economic downturns[249] and ICT professionals contribute to increased productivity in firms. It has been estimated that by 2020 the shortage of ICT professionals will amount to up to 825,000 if no decisive action is taken[250]. This shortage particularly affects SMEs who have lesser means to attract ICT professionals than large companies. In the EU app industry alone, the app developer workforce will grow from 1 million in 2013 to 2.7 million in 2018[251]. A significant amount of additional associated jobs are generated by the EU app economy. Consequently, the total EU app market workforce was 1.8 million, including 0.8 million support jobs in addition to developer jobs. By 2018 the additional job figure will rise to 2.1 million, resulting in a total European app economy workforce of 4.8 million[252].

246 Ibidem
247 Pellizzari M. et al., 'E-skills mismatch: evidence from PIAAC', *JRC-IPTS Digital Economy Working Paper*, forthcoming 2015
248 European Commission, Eurostat, ICT survey of Enterprises, 2014
249 Ibidem
250 Hüsing, T. et al., *E-skills and e-leadership skills 2020: Trends and forecasts for the European ICT professional and digital leadership labour market*, empirica Working Paper, 2015
251 Mulligan, M. and Card, D., *Sizing the EU app economy*, GIGAOM Research, 2014
252 Ibidem

**Chart 22. EU app economy jobs, 2013-2018**

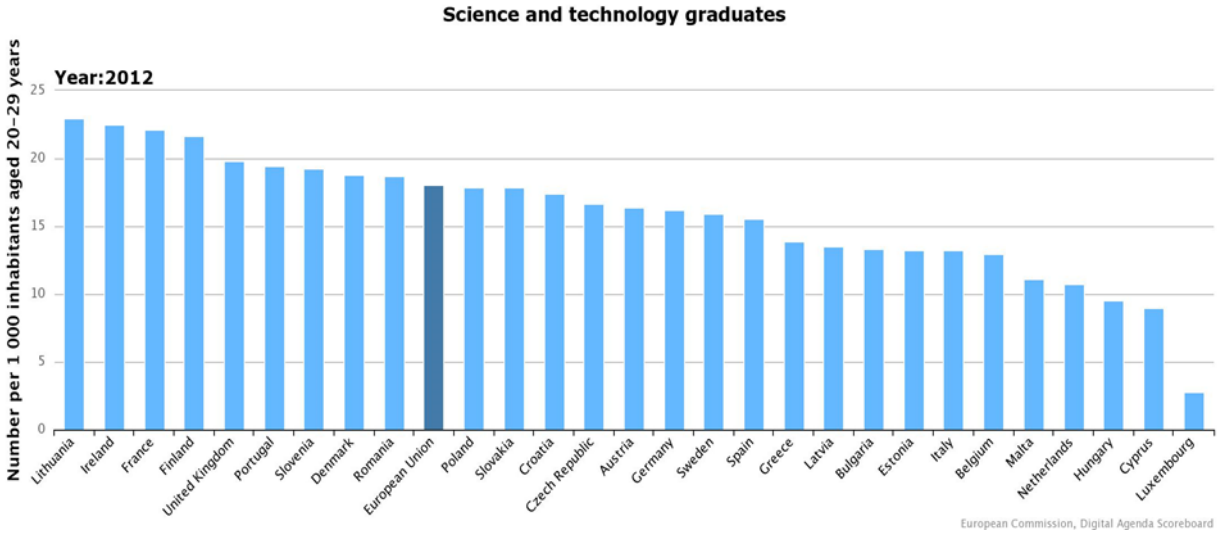



There is also a significant shortage of employees who combine specialised and soft skills such as entrepreneurship, business and management skills. It is estimated that about 215,000 additional e-leaders (managers or chief digital officers who can develop and roll out an integrated digital strategy for their entire business) will be needed in Europe by 2020, of which 70% will be for SMEs[253].

In the UK alone, the demand for big data specialists is expected to rise by 160% over the period from 2013 to 2020, whilst overall employment is forecast to increase only by 6% during same period[254].

Despite this shortage, the number of ICT graduates is not increasing. In 2012, the highest number of science and technology graduates was recorded in Lithuania (23 per 1,000 inhabitants), Ireland (22.5 per 1,000 inhabitants) and France (22.1 per 1,000 inhabitants), the lowest in Cyprus (9 per 1,000 inhabitants) and Luxembourg (2.8 per 1,000 inhabitants)[255].

**Chart 23. Science and technology graduates**




253 Hüsing, T. et al., *E-skills and e-leadership skills 2020: Trends and forecasts for the European ICT professional and digital leadership labour market*, empirica Working Paper, 2015

254 SAS, Tech Partnership, *Big Data Analytics. Assessment of Demand for Labour and Skills 2013–2020*, 2014

255 Ibidem

*Policy steps taken so far and need for the issue to be addressed at European level*

Education and employment are mainly Member State and regional competences. Nevertheless, with the recognition of a digital skills shortage and mismatches affecting Europe, EU intervention and support have a clear role to play. The joint labour market and the cross-border nature of digital and online offers imply that shortages in some countries or regions affect all others. At the same time, European focus and support are needed to assure that no regions are either left behind or 'brain-drained' as regards the provision of digital infrastructure, devices, skills in education or the skills and competences of the general population[256].

European Structural and Investment Funds already support the connectivity of schools as well as digital skills and competence training; this support might need to be widened to include provision of devices to educational organisations, skills training aimed at educators, as well as to increase support for digital skills and competence training of the general population and job seekers.

Several private and public initiatives have been implemented at national and European level. Noteworthy initiatives include "Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources"[257], the eSkills Campaign[258], the European e-competence Framework (version 3.0) that provides a reference of 40 competences as required and applied in the ICT workplace, using a common language for competences, skills and capability levels, the European Coding Initiative[259], and the EU Code Week[260]. Multi-stakeholder initiatives such as the Grand Coalition for Digital Jobs[261] and the European Alliance for Apprenticeships have shown their potential to increase the number of training courses and skills development opportunities, in particular work-based learning. It is however necessary to widen their membership to additional ICT-using companies and underrepresented stakeholders such as vocational education and training (VET) providers and social partners and to strengthen existing national skills alliances as well as develop new ones where they do not exist.

The EU is developing a framework and self-assessment tool for citizens' and consumers' digital competences to facilitate the recognition of digital skills and qualifications in an EU-wide online skills portfolio. Additionally, "Sector Skills Alliances" involving stakeholders

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256 The Commission has launched several studies to better understand the nature and scope of the problem and its implications for education as well as several projects and initiatives that aim to mitigate the identified digital skills problem and raise civil and political awareness of the topic, e.g. ICT for Work – Digital Skills in the Workplace, launched in 2014, and ICT in Schools study, 2012, of which an update will be launched in 2015

257 I.e. an action plan to facilitate schools and universities to deliver high quality education through ICT and digital content, as well as the digital skills which 90% of jobs will require by 2020. The initiative focuses, *inter alia*, on the uptake of ICT-based innovation in learning and teaching (in particular open learning environments, open educational resources and improvements in educational infrastructure), underpinning the delivering of skills for the 21st century, including digital skills. It calls for better ICT infrastructure and connectivity in schools, including actions to connect every school, every classroom to high speed broadband services by 2020.

258 Initiative based on COM(2007) 496 final

259 Initiative led by ICT-companies and European Schoolnet to bring coding skills to teachers, kids and adults

260 Other projects are e.g. the Open Knowledge Technologies - Mapping and validating knowledge; EP Pilot I and II; the Platform for Learning and Inclusion; the Safer Internet Programme; the Platform for ICT training & learning

261 I.e. a multi-stakeholder partnership that endeavours to facilitate collaboration among business and education providers, public and private actors to take action attracting young people into ICT education, and to retrain unemployed people

from different economic sectors will design curricula taking into account the digital skills needed in the respective economic sectors. The Commission will address these issues in future initiatives on skills and training.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

The DSM will not succeed unless European citizens have the highest possible level of competences and skills, in particular in the digital field; this is only possible through access to the best possible education and training systems and ongoing learning opportunities. Strong, modernised and innovative education systems will be able to provide the digitally skilled and competent workforce capable of continuously adapting to new needs and changes in the labour market. More opportunities to validate and recognise digital skills acquired outside the formal education systems will also raise the employability of European citizens in a DSM.

### 5.5. e-Government

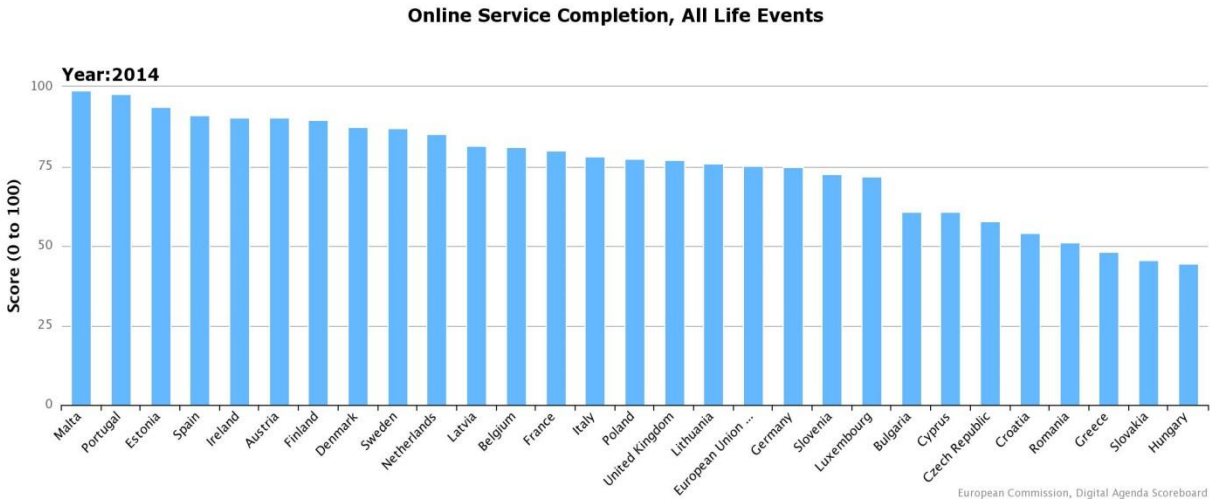
*Problem and problem drivers*

Citizens and companies have a legitimate expectation that digital access to public services should be as simple and efficient as e-commerce. In many EU countries the public sector is slow in implementing digital end-to-end services, let alone in achieving cross-border interoperability. Online public services are crucial to reducing business costs and increasing the efficiency and the quality of the services provided to citizens and companies. According to a recent study, if interactions with public authorities can be made as transparent, as fast and as cost-efficient as in the private sector, then the potential benefits will materialise[262].

One example of increased efficiency is the "Once Only" principle: only in 48% of cases do public administrations reuse information about the citizen that is already in their possession without asking for it again[263]. The extension of this principle, in compliance with data protection legislation, would likely generate an annual net saving at the EU level of around EUR 5 billion per year by 2017[264]. Implementing the Once Only principle across borders would further contribute towards the efficiency of the DSM. However, the proportion of the steps in a Public Service life event that can be completed online vary greatly between Member States (the following life events are included in the scope: Business Start Up; Losing and Finding a Job; Studying; Regular Business Operations; Moving (General Administration); Owning and Driving a Car; Starting a Small Claims Procedure), ranking the highest in Malta, Portugal and Estonia, and the lowest in Greece, Slovakia and Hungary[265].

[262] European Commission, *Study on eGovernment and the Reduction of Administrative Burden*, 2014
[263] European Commission, *Delivering the European Advantage? 'How European governments can and should benefit from innovative public services'*, 2014
[264] European Commission, *Study on eGovernment and the Reduction of Administrative Burden*, 2014
[265] Ibidem

**Chart 24. Online Service Completion, All Life Events**




Moreover, a "digital-by-default" strategy in the public sector (all services being provided digitally only) at EU level could result in annual saving of around EUR 10 billion[266]. The adoption of e-invoicing in public procurement across the EU could generate savings of up to EUR 2.3 billion[267]. The full exploitation of public sector data could also reduce government administrative costs; for Europe's 23 largest governments, some estimate potential savings of 15% to 20%[268], with a market value estimated at EUR 40 billion a year in the EU[269].

In general, existing rules under company law do not sufficiently integrate the benefits of digital technologies. Companies are still faced with paper-based formalities, whether for registration purposes or for filing and reporting. For example, online registration of companies is only possible in 16 Member States[270]. It is estimated that introducing online registration for setting-up a proposed new company form[271], the so-called SUP (*Societas Unius Personae*)[272], would generate potential savings for businesses between EUR 21 million and EUR 58 million per year[273].

Information gaps increase costs for business, in particular for SMEs[274]. According to the Citizenship Report 2013, only one in three citizens (36%) say they are well informed about their EU rights and just under a quarter (24%) feel fairly or very well informed about what they can do when their EU rights are not respected[275]. Contact points between public authorities and citizens/businesses are currently fragmented across Europe (thus less visible), often outdated and incomplete. The needs of businesses and citizens in their cross-border

266 Ibidem
267 COM(2013) 453 final
268 OECD Digital Economy Papers, *Exploring Data-Driven Innovation as a New Source of Growth: Mapping the Policy Issues Raised by "Big Data"*, 2013
269 COM(2011) 882 final
270 SWD(2014) 124 final, p. 27
271 COM(2014) 212 final
272 The SUP proposal is aimed making it easier and less costly to set up companies with one shareholder across the EU, through providing simple EU-wide rules for establishing companies in the form of a SUP
273 SWD(2014) 124 final, p. 45 et seq. (Annex) – taking account of the experience with national reforms, in a low scenario it is assumed that 22% of founders use the new form; in a high scenario, it is assumed that 60% of founders use the new form
274 European Parliament study, *A European Single Point of Contact*, 2013; European Commission, *High Level Group on Business Services - Final Report*, 2014
275 European Commission, Flash Eurobarometer 365, 'European Union citizenship', 2013

activities could be better met by streamlining and integrating existing portals, networks, services and systems (such as Your Europe, Points of Single Contact, Product Contact Points, Contact Points for Construction Products) under the "Single Digital Gateway"[276].

Recent policy evaluations of the PSI Directive[277] and the Infrastructure for Spatial Information in the EU (INSPIRE) Directive demonstrate the need for public authorities to improve the sharing and re-use of their data. The market size and growth of the geographic information sector, covered both by the PSI and INSPIRE Directives, shows the potential of public data as an engine for job creation. The German market for geo-information in 2007 was estimated at EUR 1.4 billion, a 50 % increase since 2000.[278] In the Netherlands, the geo-sector accounted for 15,000 full time employees in 2008. Other areas such as cadastres, meteorological data, legal information and business information also form the basis of steadily growing markets.

Public expenditure accounts for almost 50% of GDP and the public sector represents about 17% of total employment[279]. Furthermore, public administrations have the power to pull innovation; in the EU, the overall market for purchases of goods, services and works by the public sector accounts for almost 20% of GDP. Whilst e-procurement has a great potential to facilitate access to markets and stimulate competition across the Single Market, it also carries the risk of further Single Market fragmentation where there is a lack of interoperability between the various systems. This needs to be addressed with appropriate tools and measures. Contracting authorities that have already switched to e-procurement save between 5% and 20%[280]. Nevertheless, the public procurement market is far less integrated at European level. Whilst the average import penetration in the private sector is estimated at 19.1%, in the public sector it accounts for merely 7.5%[281]. The continued existence of barriers in the Single Market prevents European enterprises from taking full advantage of business opportunities in other Member States. Another example is the case of the medical technology industry for which 70% of outputs result from hospital procurers[282].

Translating One Stop Shop and Once Only concepts into reality, implementing transparency and open public data, all necessary ingredients of public sector modernisation, require underlying interoperability between public sector entities (see section 5.3 on interoperability and standards).

*Policy steps taken so far and need for the issue to be addressed at European level*

The Annual Growth Survey for 2015[283] indicates that 'improving efficiency in public administration' is an area for reform. The European Council Conclusions of October 2013 state that "EU legislation should be designed to facilitate digital interaction between citizens

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276 The Gateway is part of the European Commission's new web presence that is being developed and will provide relevant, coherent and cost-effective online information and services focused on user needs

277 Vickery, G., *Review of recent studies on PSI re-use and related market developments*, Information Economics for the European Commission, 2011

278 Fornefeld, M. et al., *Assessment of the Re-use of Public Sector Information (PSI) in the Geographical information, Meteorological Information and Legal Information Sectors*, MICUS Management Consulting GmbH for the European Commission, 2008

279 COM(2012) 750 final

280 COM(2012) 179 final

281 European Commission, *EU Public Procurement Legislation: Delivering Results - Summary of Evaluation Report*, 2011

282 The European market size of the medical technology industry was estimated at roughly EUR 100 billion in 2011 (representing 30% of the world medical technology market)

283 COM(2014) 902 final

and businesses and the public authorities. Efforts should be made to apply the principle that information is collected from citizens only once, in due respect of data protection rules."

There are a number of legislative initiatives with direct relevance for e-government, such as the Regulation on electronic identification and trust services for electronic transactions in the internal market (eIDAS); the Directive on Public Sector Information to maximise the impact and benefits of Open Data; the Infrastructure for Spatial Information in the EU (INSPIRE) Directive establishing the location framework for governmental and commercial services and data, the Services Directive and its requirement that any requests to establish a company in another Member State shall be done electronically via the Points of Single Contact; the Directive on interconnection of EU business registers; the SUP proposal which for the first time introduces EU wide online registration for companies, the revised Public Procurement Directives, the proposed Regulation on the circulation of public documents, etc.

European e-Justice[284] facilitates access to justice and cross-border judicial proceedings and makes it easier for citizens to find a lawyer/notary in the EU and for businesses to search for insolvent entities through interconnected insolvency registers. As of 2017, the e-Justice portal will also facilitate access to information on companies registered throughout the EU[285].

The current EU e-Government Action Plan 2011-2015[286] is the key policy instrument, steering Member State and Commission actions in four political priority areas: Strengthening the Single Market, enhancing efficiency and effectiveness of public administrations, empowering citizens and businesses, and developing the necessary preconditions.

The European Interoperability Framework promotes and supports the delivery of European public services by fostering cross-border and cross-sectoral interoperability.

The assessment of the Points of Single Contact carried out by the Commission[287] as well as business organisations[288] shows that the Points of Single Contact do not yet fulfil businesses' needs in terms of the scope of information that the Member States are required to provide, the availability of information in foreign languages or the possibility for interacting with the public authorities fully online, including for foreign businesses. The Point of Single Contact Charter[289] proposed by the Commission in 2012 encouraged Member States to work towards more ambitious Points of Single Contact to make life easier for businesses. This approach remains to a large extent voluntary and does not resolve the issues of the differences in the scope and quality of e-services offered to businesses.

Adapting the company law *acquis* to digital tools is another issue that should be addressed at EU level. Though a number of measures have been taken at national level, a national

284 The European e-Justice Portal is available at: https://e-justice.europa.eu/home.do

285 In line with Directive 2012/17/EU

286 COM(2010) 743

287 Deloitte for the European Commission, *The functioning and usability of the Points of Single Contact under the Services Directive – State of Play and Way Forward – Final Report*, 2012, ongoing assessment by Capgemini

288 Eurochambres, Services Directive implementation survey, *The Chambers' Perspective on the Points of Single Contact*, 2011; BusinessEurope, *Are the Points of Single Contact Truly Making Things Easier for European Companies?*, Services Directive Implementation Report, 2011; European Commission, *High Level Group on Business Services - Final Report*, 2014

289 European Commission, Charter for the Electronic Points of Single Contact under the Services Directive

approach does not remove the obstacles that companies face if they consider setting up or operating a company across borders[290].

In addition to the legislative and policy instruments, e-government is supported through a number of funding programmes: (i) Under the Connecting Europe Facility, Digital Services Infrastructures (CEF DSI) deploy digital public services that work across borders, an essential precondition for the DSM, (ii) The ISA programme (Interoperability solutions for European Public Administrations) provides a framework that allows Member States to work together to create efficient and effective electronic cross-border public services for the benefit of citizens and businesses, (iii) Horizon 2020's Societal Challenge 6 finances projects aimed at ICT-enabled open government, (iv) the Justice Programme provides dedicated calls for e-Justice projects and (v) finally, the European Structural and Investment Funds also provide investments in the field of e-government in less favoured regions, as this is seen as a strategic component of their economic and social development.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

Digitalisation of administrations should be designed in a cost-effective way. Digitalisation implies certain costs for the administration: initial costs (e.g. equipment, software, skills, etc.), maintenance costs, life-cycle of products. Reusing digital government solutions across countries and enabling reliable data exchange between systems are particularly important for cost-savings. The revised Better Regulation Commission Guidelines will include a strengthened assessment of the digital dimension to help deliver initiatives which are internet ready and fit for the digital world so that virtual or physical goods and processes are treated in the same way.

Economic assessment of the implementation of the Services Directive[291] estimated that further procedural streamlining via Points of Single Contact in Member States could generate up to 0.15% of GDP in the medium term (5-year horizon) and up to 0.21% of GDP in the long run. Extending the scope of the Points of Single Contact and making them comprehensive business portals integrated into the "Single Digital Gateway" could further contribute to simplification, savings for public administration and a more coherent approach in providing information and e-services to businesses. The 'Single Digital Gateway' could join up the numerous existing information services, portals and contact points, expand them and provide a seamless, user friendly system enabling citizens and businesses to better benefit from the Single Market.

A revised version of the European Interoperability Framework extended with concrete and practical tools for the implementation of interoperability by public administrations in Europe could contribute to full implementation of One Stop Shop and Once Only principles ("end-to-end services"), in a coherent manner, at European and national levels of public administration. It would facilitate public processes and data transparency and contribute to achieving a coherent means for different public entities to publish data, so that open public data across Europe can deliver its full potential contribution to the EU digital economy.

As regards online registration of companies, given that the SUP proposal only provides for this option for one type of company[292], savings could be considerably enlarged if online

[290] See examples of differing national reforms in company law in SWD(2014) 124 final, p. 21 et seq.

[291] Monteagudo, J. et al., 'The economic impact of the Services Directive: A first assessment following implementation', *European Commission Economic Papers* No 546, 2012

[292] Single-member companies which amount to 44 % of all private limited liability companies

registration was offered more broadly[293]. Overall, digitalisation of company law requirements would considerably facilitate interaction between companies and public authorities, in particular in a cross-border context, reduce costs, facilitate compliance for companies, and enhance transparency.

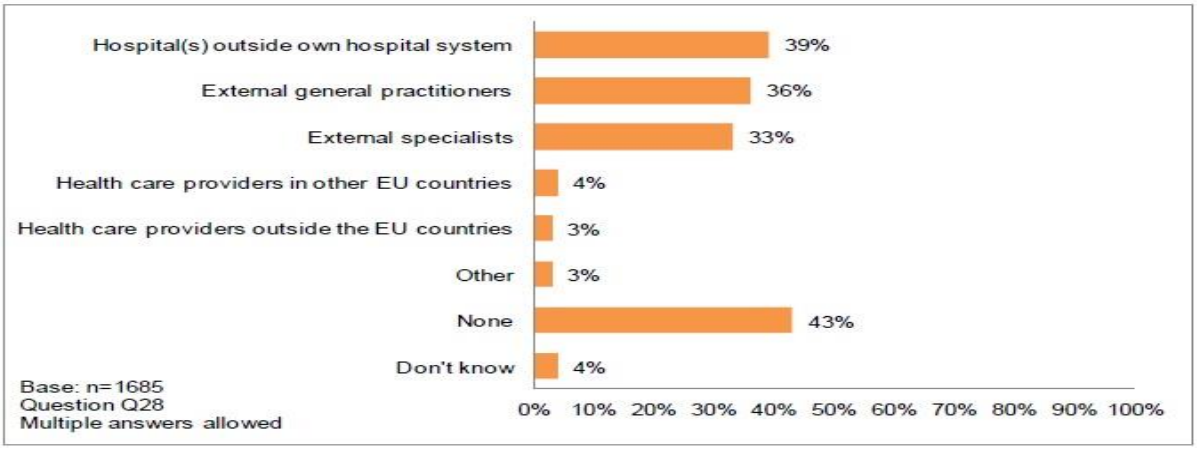
## 5.6. Digitisation in basic sectors

### e-Health and e-Care

Digital technologies for health and care offer opportunities for citizens, health and care providers and industry. Digital solutions can empower citizens to manage their health, while health and care systems can improve their efficiency and cope with the increasing demand from an ageing population[294]. For European industry, they constitute a promising market, serving the public sector and citizens, and creating high quality jobs and growth by combining the high-tech, ICT, smart homes, medical devices, pharmaceuticals, biotechnology and healthcare sectors. A strong European industry will have a global reach.

Most e-health and e-care solutions do not benefit from the large potential of the internal EU market. The deployment of digital health and care is hampered by barriers and borders[295]. Implementation is small scale, with proprietary designs due to the lack of interoperable ICT solutions and European standards. The percentage of hospitals[296] that exchange clinical care information about patients electronically is low, particularly across borders:

**Chart 25. The percentage of hospitals that exchange clinical care information about patients electronically**




The percentage of general practitioners (GPs) using electronic networks to exchange medical patient data with other healthcare providers and professionals varies greatly between Member States[297]. Denmark (91.8% of GPs), the Netherlands (76.2%) and Estonia (72%) are the countries ranking the highest, while in Slovenia only 5.4%, in Slovakia 7.45% and in Bulgaria 8.67% of GPs do so.

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293 The 2-3 March 2015 Competitiveness Council included "online registration of companies" in its conclusions on Single Market Policy as one of the issues to be addressed by the Commission in the DSM Package

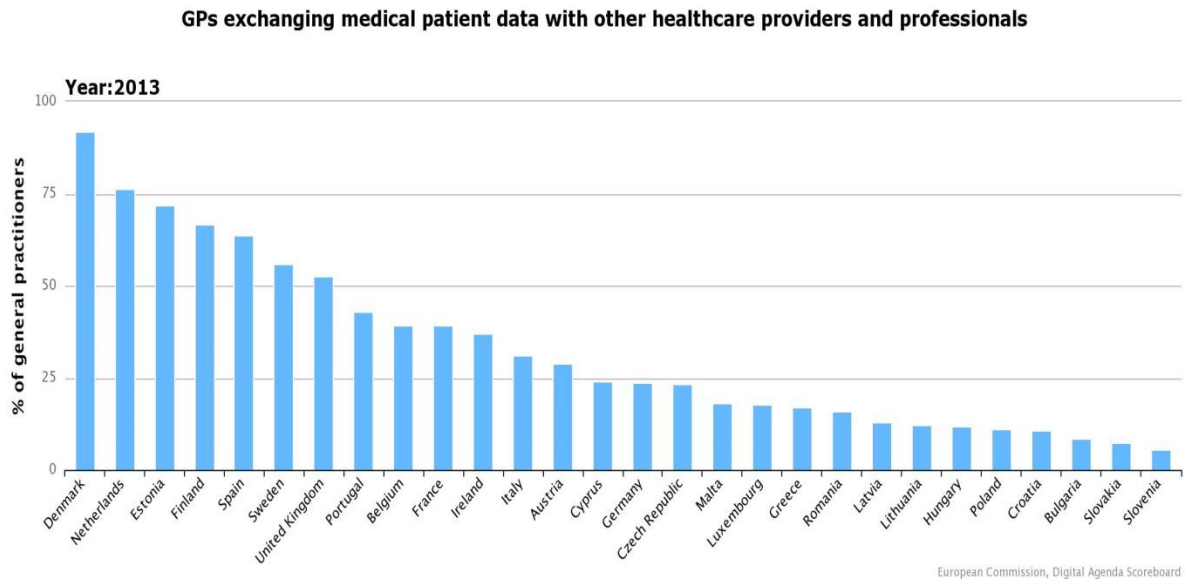
294 Dobrev, A. et al., *Report on The socio-economic impact of interoperable electronic health record (EHR) and ePrescribing systems in Europe and beyond*, EHR IMPACT for the European Commission, 2009

295 TimeLex for the European Commission, *Study on the Legal Framework for Interoperable eHealth in Europe - Final Report*, 2009

296 PwC for the European Commission, European Hospital Survey: Benchmarking Deployment of eHealth Services (2012–2013), *JRC Scientific and Policy Reports*, 2014

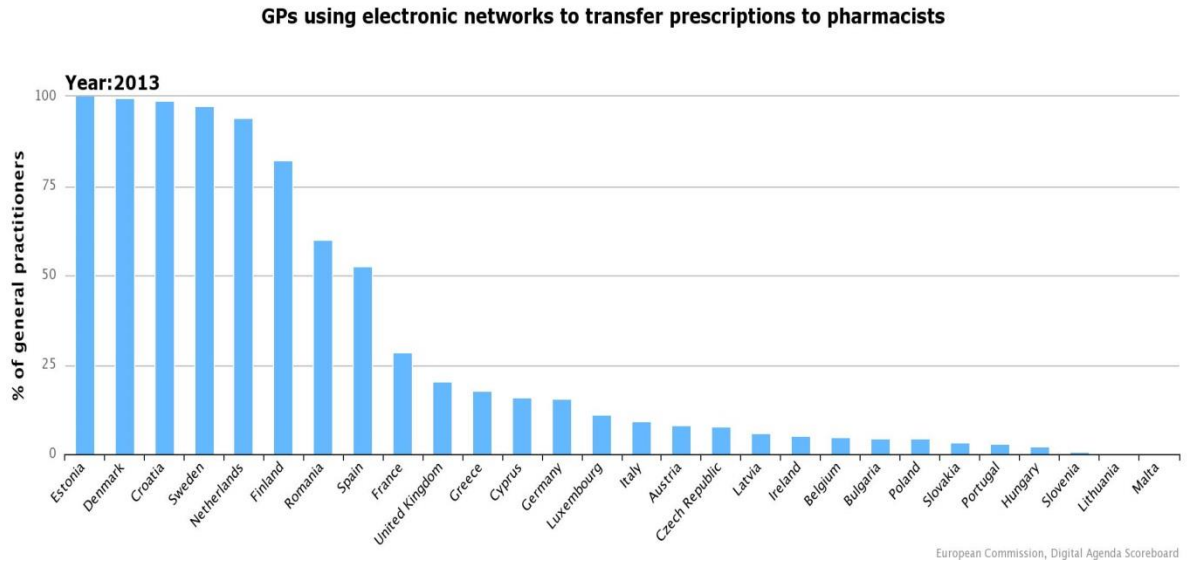
297 European Commission, Digital Agenda Scoreboard, 2014

**Chart 26. GPs exchanging medical patient data with other healthcare providers and professionals**




Similarly, the number of GPs using electronic networks to transfer prescriptions to pharmacists is non-existent in some countries[298]. However, in Estonia, all GPs do so.

**Chart 27. GPs using electronic networks to transfer prescriptions to pharmacists**




The market is fragmented, resulting in increased costs and slow uptake by public authorities and citizens[299]. The uncertain market makes industry risk-averse, while also public authorities are hesitant to invest and procure these solutions. As a consequence many citizens do not benefit from innovation in the field of digitally enabled health and care products and services.

298 Ibidem

299 European Commission, *Accelerating the Development of the eHealth Market in Europe*, e-Health Taskforce report 2007; European Commission, Synthesis report on the Public consultation on the European Innovation Partnership on Active and Healthy Ageing, 2011

Cross-border healthcare in the EU is growing. However, lack of technical and legal interoperability of information systems means that patient data cannot be easily transferred across borders. This acts as an obstacle to the free movement of patients for planned care and makes situations involving emergency care more difficult than they should be. The lack of an EU-wide legal framework for recognition of telemedicine services and providers means that cross-border market access for such providers is difficult: clarifying the rules would facilitate the provision of innovative and cost-effective health and care services.

*Policy steps taken so far and need for the issue to be addressed at European level*

The e-Health Action Plan 2012-2020[300] is guiding the current efforts in e-health.

Horizontal EU legislation in place or under review applicable to e-health includes Data Protection Directive, Regulation on electronic identification and trust services for electronic transactions in the Internal Market, Medical Devices Directives, General Product Safety Directive, the e-Commerce Directive and the Cybersecurity Strategy of the European Union.

Directive 2011/24/EU on the application of patients' rights clarified the legal framework for patients to be reimbursed for cross-border healthcare. Firstly, it established the principle that a telemedicine service is considered to be provided in the Member State where the service provider is established. Secondly, the e-Health Network established cooperation between Member State health systems. The Network[301] has adopted guidelines on patient summaries and e-prescriptions, and is working on the use of health data for public health and research. The IT system supporting the exchange of patient summaries and e-prescriptions is being built with funding from the Connecting Europe Facility.

Under Horizon 2020 (and previously in FP7) many research, innovation and development actions have been implemented to test solutions (e.g. ICT-based solutions for management of chronic diseases and independent living) for the European market.

The European Innovation Partnership on Active and Healthy Ageing (EIP AHA) has formed a community across many EU regions of over 3,000 stakeholders with considerable expertise in innovative solutions for ageing well, such as m-health, telehealth and integrated care. By sharing and replication of good practices, common interoperability specifications and joined-up procurement of digital solutions, the EIP AHA promotes stronger collaboration of national and regional authorities on the implementation of innovative products and services for health and social care under its Scaling-up Strategy[302].

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

Improvements in interoperable ICT solutions and European standards should lead to increased digital competences, both for health and care professionals and patients, increased patient safety through use of common standards and terminology in cross-border transfer of medical data, increased data security and integrity to underpin citizens' confidence and trust in using e-health and m-health solutions, more effective, resilient and sustainable health and care systems[303] and substantial acceleration in the availability of trusted, digitally enabled

300 COM(2012) 736 final

301 European Commission, *eHealth Network Multi-Annual Work Plan 2015-2018*, 2014

302 European Commission, *European Scaling-up Strategy in Active and Healthy Ageing*, 2014

303 Quotes from the evidence base:
- Inglis, S. C. et al., 'Structured telephone support or telemonitoring programmes for patients with chronic heart failure', *The Cochrane Database of Systematic Reviews (CDSR)* Issue 8, 2010 – results of this review indicate 34% reduction in all-cause mortality and 21% reduction in heart failure related hospitalisations;
- Steventon, A. et al. for the Whole System Demonstrator Evaluation Team, 'Effect of telehealth on use of secondary care and mortality: findings from the Whole System Demonstrator cluster randomised trial', *BMJ*,

healthcare and e-care products and services across Europe. This will contribute to the creation of a scalable Internal Market with new companies and more jobs in other health and care related industries[304]. More sustainable health and care systems mean that millions of EU citizens will benefit from improved health status and quality of life.

**e-Transport**

*Problem and problem drivers*

Transport is characterised by a broad range of actors and a mosaic of approaches to digitalisation, hindering the reuse of data from one mode to another and across countries, and hampering the development of new and reliable multimodal digital applications and services.

Traffic management systems provide information on traffic conditions in each transport mode; Internet of Things applications, particularly tracking and tracing, provide data on goods location and conditions; available transport services are listed in transport operators' proprietary systems; and shippers know what is inside the container. However, while these systems have brought many advantages on their respective terrains, they are at different stages of development and implementation.

Transport still suffers from non-interoperable legacy information systems, non-harmonised messages, missing technical standards and a limited legal framework for sharing information. Individual operators and administrations are collecting data on transport vehicles and cargo and their movements, without having the means to share it or to develop value added services. Even when initiatives on information exchange are being developed, these are taken at sectorial level and by different communities of stakeholders, without extended communication between them. As a result, standards and information systems are only usable for specific purposes, on a specific part of the transport chain, and in specific regions. This lack of data sharing between transport sectors and modes leads to inefficiencies in the overall transport system, particularly in areas such as cargo transport. It hampers future opportunities for Europe to lead in rapidly developing technologies such as connected cars and automation.

2012 – results from the Whole Systems Demonstration in the UK in 2012 indicate 18% reduction in hospital admissions and 46% reduction in mortality from the use of telehealth;
- Joint Improvement Team for the Scottish Government, *An Assessment of the Development of Telecare in Scotland 2006-2010*, 2010 and European Commission, *European Innovation Partnership on Active and Healthy Ageing Reference Sites: Excellent innovation for ageing - A European Guide*, 2013 – the Telecare Development Programme in Scotland brought cost efficiency gains of approximately EUR 92 million over a 5-year period (2006-2011) thanks to expedited hospital discharges, avoided hospital and care home admissions and bed days, and reduced home check visits;
- Darkins, A. for the US Department of Veterans Affairs, *Telehealth Services in the United States*, 2014 – the telehealth services of the Veterans Health Administration in the USA show 59% reduction of bed days of care, 35% reduction in hospital admissions, and savings of USD 1.999 per annum per patient.

304 Quotes from market forecasts studies:
- BCC Research, *Global Markets for Telemedicine Technologies*, 2014 – the global telemedicine tools market will likely reach USD 43.4 billion within five years; the market segment for telehome (telehealth) technologies is predicted to grow from USD 6.5 billion in 2013 to USD 24 billion by 2019;
- PwC, *Touching lives through mobile health: Assessment of the global market opportunity*, 2012 – this report forecasts that the global mobile health market will reach a value of EUR 17.5 billion in 2017, with Europe being the largest market segment (EUR 5.2 billion);
- Manyika, J. et al., *Disruptive technologies: Advances that will transform life, business, and the global economy*, McKinsey Global Institute, 2013 – estimates the potential economic impact of the Internet of Things across healthcare applications to be USD 1.1 trillion to USD 2.5 trillion per year by 2025.

As regards the potential for administrative simplification, electronic documents are not recognised by all stakeholders and authorities across the EU, which hinders actual use of electronic instead of paper documents by companies.

Different technical standards add to the complexity of the reuse of data: some of the existing standards hinder services integration, and the repeated submission of the same data creates unnecessary administrative burden for both administrations and the industry.

Therefore stakeholders call for One Stop Shops or "data exchange platforms" where shippers, transport operators, service providers and public authorities can easily share and access the information they need to optimise their operations while potentially creating new services.

*Policy steps taken so far and need for the issue to be addressed at European level*

EU legislation has supported the development of tools by public authorities and public-private partnerships to facilitate access to traffic and transport data within specific modes: SafeSeaNet[305] for maritime transport, River Information Services (RIS)[306] for inland waterways, TAP-TSI, TAF-TSI[307] and ERTMS[308] for rail transport, ITS specifications for road transport[309] and SESAR[310] in the air transport sector. Further legal instruments include a Directive on ships reporting formalities[311], Blue Belt[312], the ITS Directive and its delegated Regulations[313]. This legislation would need to keep pace with the current developments of the respective sectors and hence be adapted accordingly and further developed when needed (e.g. Master plan for the deployment of cooperative systems, Digital Single Railway Area Strategy, Digital Inland Waterway Area Strategy, Corridor Information Pipelines). Specific measures on access to transport data and recognition of electronic documents will also stimulate better mobility services and new business models.

*Expected Impact – what changes/opportunities do we expect from solving the issue?*

In transport, digitalisation and better integration of existing tools can significantly improve transport and traffic management and open up a wide range of opportunities. New generations of intelligent transport systems (i.e. cooperative systems) in all modes would bring more accurate information on traffic and infrastructure conditions and on the location of vehicles and/or goods. Better access to and sharing of digital transport (traffic, travel, vehicle, cargo etc.) data for both public and private stakeholders along the value chain can foster seamless information flows, with multiple benefits:

- Travellers would enjoy new types of mobility services, such as personalised journey planners, car sharing, park & ride, charging stations, improved maintenance services, personalised insurance schemes.

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305 Created by Directive 2002/59/EC

306 Created by Directive 2005/44/EC

307 Technical Specifications for Interoperability for the Telematics Application for Passengers/Freight – Commission Regulation 454/2011, Commission Regulation 62/2006 and Commission Regulation 328/2012

308 European Rail Traffic Management System – information available at: http://ec.europa.eu/transport/modes/rail/interoperability/ertms

309 Directive 2010/40/EU

310 Single European Sky Air Traffic Management Research – information available at: http://ec.europa.eu/transport/modes/air/sesar/index_en.htm

311 Directive 2010/65/EU

312 Information available at: http://ec.europa.eu/transport/modes/maritime/news/bluebelt_en.htm

313 Information available at: http://ec.europa.eu/transport/themes/its/road/action_plan/index_en.htm

- Shippers would benefit from more information on available transport services and possible cargo optimisation.

- Factories would rely on information on goods arrival time to optimise their inventory management and production.

- Transport operators would be able to optimise transport operations in real-time, making the entire logistics system more efficient, and could collaborate to develop pan-European multimodal information and planning systems supporting seamless door to door services.

- Public authorities could benefit from more accurate and reliable information on transport volumes and infrastructure use, thereby contributing to better efficiency and operational safety of networks. Moreover, they would be able to better link transport with other sectors (e.g. energy, security).

The development of information pipelines along the TEN-T Corridors (including their nodes) as supported through EU funding (i.e. the Connecting Europe Facility) would enable synchronisation of investments, and continuity and integration of services. They would provide shippers, transport operators and authorities active along a corridor with One Stop Shops where they could easily share and access the data they need.

**e-Energy**

*Problem and problem drivers*

The energy sector and the related infrastructure have started a radical change. In the new system, citizens, industries and commerce will engage in active management of their energy, first as consumers who adjust their consumption to the supply but also as producers of electricity from residential, industrial or community-based renewable sources. They will exploit the flexibility of their new electricity uses for transport, heating and cooling. Users and companies will be able to optimise their demand or supply of energy through different vectors and local storage, under a new energy market design as addressed in the Energy Union.

Widespread adoption of digital technologies including the ongoing deployment of smart meters and other elements of smart grids will generate massive amounts of data that will raise important questions in terms of the roles of incumbent and new players, particularly in the management of the e-energy data streams, and responsibilities in terms of access rights, data privacy and cybersecurity. It will raise issues in terms of domains, IP addresses, and big data handling, and in terms of compatibility between regulations and standards for energy, electronic communications and transport. Therefore, due attention needs to be paid to the successful completion of the two years test phase in the Commission Recommendation for the Data Protection Impact Assessment template[314] which aims to create a framework which guarantees data protection in the smart grid and smart metering systems. The digital energy system will also open up opportunities for new services and new actors, such as aggregators for renewable electricity sales and new energy services companies.

[314] Commission Recommendation 2014/724/EU

*Policy steps taken so far and need for the issue to be addressed at European level*

In October 2014, the Commission adopted a Recommendation on the Data Protection Impact Assessment Template (DPIA Template), which is in line with the forthcoming General Data Protection Regulation, anticipating the legal obligations arising therein. A two year test phase for the application of the template started at the beginning of March 2015 and the Template could be further fine-tuned to enhance its efficiency and user-friendliness at the end of 2016. The template is complemented by identification of Best Available Techniques (BAT) to mitigate security and privacy risks inherent to each of the smart meter functionalities in Recommendation 2012/148 on the roll-out of smart meters. This work is expected to generate a fully-fledged authoritative BAT Reference document by 2016 identifying the most suitable techniques for security in smart grids metering.

## 6. INVESTING IN THE DIGITAL SINGLE MARKET

The fully functioning DSM needs to rely on efficient ICT, including broadband infrastructure, to support digital growth and uptake in SMEs, e-society and the development and roll-out of ICT-based innovation. Given the large investments needed to roll out and upgrade the current connections to the next generation of digital networks – often based on fibre technology – there is a serious risk that market failure will rapidly increase the so-called digital divide across Europe. A gap analysis on the funding needed to meet the EU broadband targets by 2020 estimates that, in the most optimistic scenario, the coverage target (30 Mbps for all) will be reached if EUR 34 billion is invested, of which EUR 21 billion comes from public sources[315]. The estimate to reach the take-up target (half of the European households with 100 Mbps subscription) is EUR 92.4 billion[316]. Without an efficient ICT and broadband infrastructure the DSM project will fail and Europe will not achieve the digital transformation needed to ensure growth.

Europe lags behind its main competitors in ICT research and in digital innovation: according to the latest available data, it invests only 0.21% of its GDP in ICT, compared to 0.57% in Japan, 0.58% in the US and 1.47% in South Korea. The EU only represents 6% of the total number of patents related to "connected-everything" technologies, far behind the US, South Korea or Japan. The EU is thus at risk of losing competitiveness vis-à-vis the rest of the world if the development and uptake of digital technologies is not accelerated. There is a need for better transformation of research into innovation, increasing research and innovation funding by businesses and by governments and increased efficiency of public research and innovation support. Attracting more private investments and better financing instruments is also needed for starting and growing innovative companies.

The data below provides an overview of EU funding for investment in ICT and Broadband.

*European Structural and Investment Funds*

To support the public authorities in defining their strategy and to plan their administrative and investment effort, the 2014-2020 Common Provisions Regulation for all ESI Funds establishes that access to EU funds to support the investments in ICT requires a prior

315 European Commission on the basis of the study by Analysis Mason, *The socioeconomic impact of broadband,* 2013 – this estimate is based on Fibre-to-the-Cabinet (FTTC) coverage as a proxy for the achievement of universal coverage by 2020 in the EU28 (on top of FTTC already in place)

316 Ibidem – this calculation is performed for urban coverage of DOCSIS 3.1 and FTTH/B as a proxy for reaching the target of 50% take-up of 100 Mbps; this scenario reaches 85.1% population coverage with 100 Mbps technologies

fulfilment of two ex-ante conditionalities. The first requires the formulation of a digital growth strategy to stimulate affordable, good quality and interoperable ICT-enabled private and public services and increase uptake by citizens, businesses and public administrations. The second requires the development of a Next Generation Network (NGN) Plan for measures to support broadband networks. Cohesion policy will support the DSM legislative initiatives by stimulating their enforcement also in medium term.

Compared with the previous programming period (2007-2013), the European Structural and Investment Funds (ESI Funds) have stepped up efforts in the areas of ICT and digital networks roll-out. Overall, the ESI Funds are expected to programme around EUR 14.5 billion to *"Enhancing access to and use and quality of ICT"*[317]. This is in line with the previous programming period. However, ICT-related categories of expenditure are also present in all other thematic objectives, resulting in an estimated investment of EUR 21.4 billion, of which EUR 17.8 billion from ERDF, EUR 2.1 billion from ESF and EUR 1.5 billion from EAFRD[318].

Around 70% of this is expected to support digital growth in SMEs, e-government, e-inclusion, e-culture, e-health, e-justice and the development and roll-out of ICT-based innovations. The investments will bring concrete and visible benefits of the DSM to citizens and businesses, in particular SMEs. These investments will be instrumental for enabling all regions to seize the new DSM opportunities for growth and jobs, as they are tailored to the needs of each Member State/region and its needs and potentials.

The allocation of ESI funds for high speed broadband networks experienced a sharp increase from EUR 2.7 billion in 2007-2013 to around EUR 6.4 billion for 2014-2020 (about EUR 5 billion ERDF and an estimated EUR 1.5 billion EAFRD)[319]. However, most of this investment is expected to be made in the form of grants rather than financial instruments so the leverage effect on public (national and/or regional co-funding) and private co-funding will not reach more than EUR 9-10 billion – falling far short from the needs to reach the EU targets for broadband coverage and take-up.

The objective of the ESF is to improve employment and job opportunities, encourage a high level of employment and more and better jobs. The ESF may support projects for the development of digital skills if they are in line with the ESF thematic objectives and the investment priorities selected by the Member States. In their operational programmes Member States have declared that EUR 2.1 billion should be dedicated to these projects during the 2014-2020 programming period.

Beyond funding per se, the ESI Funds can make an important contribution to the DSM through the following mechanisms:

- Implementation policies, including ex-ante conditionalities, to increase the incentive of a speedy and complete implementation of EU Directives and policy guidelines.

317 Thematic Objective 2 allocation on the basis of the indicative financial tables of Partnership Agreements

318 Based on draft and approved Operational Programmes as of 11 March 2015; final numbers available on the Cohesion Policy Data platform at: https://cohesiondata.ec.europa.eu

319 An estimate as the Commission cannot differentiate between allocations foreseen in EAFRD for ICT and Broadband as this type of information is not requested by the regulation. However, additional information is requested and will be provided in the context of monitoring activities (in particular, monitoring will be done for "N° of operations", "Population benefiting from new or improved IT infrastructure" differentiating here between "Broadband" and "Other than broadband").

- Know-how to facilitate and improve the implementation of the new financial support opportunities and overcome the gaps in administrative capacities.

- Local intelligence in terms of having grass-roots level contacts with regional and local authorities to channel through EU level priorities, create synergies and links of EU initiatives with national and regional policies, and to provide a bottom-up reality check in terms of the feasibility and challenges on the ground.

*Connecting Europe Facility*

The Connecting Europe Facility (CEF) in the digital area is endowed with a limited budget of EUR 1 billion for the period 2014-2020 after the severe cuts it suffered in the Multiannual Financial Framework (MFF) negotiations from a proposed EUR 9.2 billion. The bulk of the budget will be disbursed (EUR 850 million) through grants in the area of Digital Service Infrastructure and will advance pan-European projects in areas such as e-government, e-procurement, e-health.

The remaining EUR 150 million will be allocated to broadband infrastructure, based on the provision of financial instruments via the European Investment Bank (EIB). Under this structure, the Commission and the EIB can finance loans, project bonds and guarantees for project financing in the area of telecoms. CEF debt instrument, which will also enable new project bond transactions, will be operational as of Q2 2015. The broadband part of CEF is expected to mobilise around EUR 1 billion[320].

The CEF will contribute to the DSM Strategy: EUR 150 million is earmarked for broadband and EUR 850 million is earmarked for Digital Services Infrastructure.

*Horizon 2020, COSME and Erasmus+*

Actions to be financed under Horizon 2020, the COSME programme and Erasmus+ are expected to contribute to the DSM Strategy. In the new programming period Horizon 2020 will devote approximately EUR 12.5 billion to ICT research. However, an important share of non-ICT industry investment in research and innovation is in fact in ICT research and innovation. A recent study by Roland Burger based on interviews and analysis done in major industrial sectors shows the share of ICT in research and innovation investments done by major industrial sectors worldwide.

EU investment will support the ICT research and innovation that can best deliver new business breakthroughs, often on the basis of emerging technologies. In particular, ICT in Horizon 2020 will support the development of ICT in Science, ICT in industrial leadership and ICT in societal challenges.

European Public Private Partnerships (PPPs) are central parts of EU innovation strategies and have a strong presence in Horizon 2020. PPPs enable to establish an open and transparent dialogue with a wide range of stakeholders (users, suppliers, SMEs and mid-caps[321], large companies and academia) in various sectors and develop a strategic research agenda. PPPs also help to ensure continuity and monitoring through KPIs (Key Performance Indicators) of

[320] Under the pilot phase of the Europe 2020 Project Bond Initiative, the EIB and the Commission closed in July 2014 the first deal on a broadband project bond (in France – Axione is the beneficiary). The leverage factor foreseen for the broadband part of CEF is around 7x, so it is expected to mobilise around EUR 1 billion. This leverage was exceeded by the Axione deal which had a leverage factor of 14x.

[321] Mid-caps referring to companies with between 250 and 3,000 employees

the strategy while allowing partners to anticipate and react swiftly to opportunities and challenges.

Within the Horizon 2020 framework there are the following PPPs in the digital sector:

Five "Contractual PPPs" (cPPP)[322] exist today in the areas of: (i) Robotics[323], (ii) Photonics[324], (iii) High Performance Computing, (iv) Advanced 5G Networks[325] and (v) Big Data[326]. A new one on Cybersecurity is in preparation. They focus on ICT supply and are strongly driven by Europe's ICT industries.

The "Institutional PPP" Electronic Components and Systems for European Leadership (ECSEL) with Member States and industry is a Joint Technology Initiative (JTI)[327] covering an important part of the electronics value chain from semiconductor components to embedded software.

The total EU funding planned for these cPPPs and JTI is around EUR 5 billion in 2014-2020. This should leverage at least an additional EUR 20 billion of private investment and EUR 1.2 billion of Member States' investment (ECSEL).

Horizon 2020 will also help companies and other types of organisation gain access to loans, guarantees and equity finance via two facilities.

- The debt facility that will provide loans to single beneficiaries for investment in research and innovation; guarantees to financial intermediaries making loans to beneficiaries; combinations of loans and guarantees, and guarantees or counter-guarantees for national, regional and local debt-financing schemes. It will include an SME window targeting research and innovation-driven SMEs with loan amounts that complement finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and SMEs (COSME). Corresponding estimations arrive to a total volume of EUR 534 million loans for SMEs in information and communication sector.

- The equity facility that will provide venture and/or mezzanine capital to individual enterprises in the early stage (start-up window). The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth under COSME, including in funds-of-funds. The total volume of equity funding to SMEs in the information and communication sector is estimated to be about EUR 600 million, thereof EUR 360 million under COSME and EUR 240 million under the Horizon 2020 InnoFin facility[328].

According to the legal base, the overall indicative budget for the seven-year period of COSME (2014-2020) is EUR 2.3 billion. It will start at EUR 275 million in 2014 and rise progressively to EUR 430 million in 2020. A large share of the budget, 60% minimum over the period, will be allocated to the financial instruments.

322 Information available at: http://ec.europa.eu/research/industrial_technologies/ppp-in-research_en.html
323 Information available at: http://www.eu-robotics.net/ppp/robotics-ppp
324 Information available at: http://www.photonics21.org/index.php
325 Information available at: http://www.networks-etp.eu/fileadmin/user_upload/Publications/SuccessStories/2013-EurTelecomInfrastructures.pdf
326 Information available at: http://ec.europa.eu/digital-agenda/en/data-public-private-partnership
327 Information available at: http://ec.europa.eu/research/jti/index_en.cfm?pg=home
328 Note that there is no predefined sectorial assignment of the total budget. The estimations of the volume of financial instruments as presented above are based on the sectorial shares of the total allocated budget in predecessor programmes. Note that these refer partly to different sector classifications/sectorial split.

Erasmus+, the EU funding programme for Education, Training, Youth and Sport, aims to support skills and employability as well as to modernise education, training and youth work. The EUR 14.7 billion funding programme is expected to reach hundreds of thousands of educators and trainers and around 125,000 educational institutions. As the programme considers digital technology uptake as a horizontal priority many of the supported projects aim to increase the uptake of digital technologies in education and training or to increase digital pedagogies, skills and competences.

*The investment plan for Europe*

The European Fund for Strategic Investment (EFSI) is currently being negotiated. It will have an infrastructure window (operating through debt and equity) as well as an SME window. Overall, the Investment Plan for Europe will be a package of measures aiming to unlock public and private investments in the real economy of at least EUR 315 billion - including EUR 75 billion for SMEs and mid-caps - over the next three years (2015-2017)[329].

There is no sectorial earmarking in EFSI, i.e. it is difficult to anticipate how much budget will be allocated to ICT, broadband or other initiatives in line with the DSM Strategy and its pillars. However, given the initial project-pipeline[330], the share of proposed projects which were classified as coming from "Knowledge, Innovation and the Digital Economy", and the anticipated pass rate of presented projects the order of magnitude of investments in the corresponding thematic areas can be assumed.

In the final report of the special task force and in the project pipeline submitted by the Member State, the EC and the EIB digital projects are well represented. Out of the EUR 447 billion in projects identified by the Task Force, EUR 81 billion are for the section related to knowledge creation and the digital economy, which is the third largest area after energy (EUR 136 billion in projects identified) and transport (EUR 123 billion). A significant part of EFSI support provided for SME and mid cap should concern innovative digital firms. Although the presence in the project list does not entail financing, this gives a good flavour of the role that knowledge and digital economy will play. More in detail, the EUR 81 billion pipeline for the knowledge and digital economy is divided as follows: broadband (EUR 26 billion), private research and innovation (EUR 40 billion), and public research and innovation (EUR 15 billion).

*Other EIB and EIF funding*

The EIB stated in its Annual Report 2013 (most recent available), that it has provided financing for the "Knowledge Economy" within the EU totalling EUR 15.1 billion. For the subsector "PSTN" [transmission and broadcasting networks], overall EUR 4 billion of funding have been allocated during the period 2009 - 2013 (EUR 0.8 billion in 2013). In fact, the EIB is providing financing to telecoms operators as part of its core business. This is typically channelled as corporate financing, with limited project financing. Large European operators are the main recipients of EIB funding, with PPP becoming more and more common. In 2014, the EIB disbursed loans for EUR 2.27 billion in the area of telecoms, showing however a downward trend from 2013 when EUR 3.02 billion had been disbursed.

329 The EU guarantee will be backed up by existing margins of the EU budget (EUR 2 billion), the CEF (EUR 3.3 billion) and the Horizon 2020 programme (EUR 2.7 billion) to a total amount of EUR 8 billion; in general, digital plays a prominent role in the announcement of the package, which includes several digital references and examples

330 For the project-pipeline, potential projects for EFSI support have been reported by the Member States and as a result, projects that could be realised in the next 3 years were identified

The amount disbursed also represents a small fraction of the EUR 76.9 billion disbursed by the EIB in 2014. In 2014, the largest deal signed by the EIB was a loan to TDC in Denmark for EUR 500 million.

The European Investment Fund (EIF) is the leading European investor in venture and growth capital funds, and a critical provider of capital for start-ups and SMEs, stimulating entrepreneurship and innovation. In 2013, the EIF committed EUR 1.47 billion (up from EUR 1.35 billion in 2012 and EUR 1.12 billion in 2011) to 68 seed, venture and growth capital funds, helping them to reach a critical mass and achieve closing. Throughout 2013, the EIF catalysed EUR 7.15 billion of capital for the benefit of SMEs. It is estimated that more than 40% of these concern ICT. The EIF also manages resources (own resources and on behalf of the Commission or Member States), facilitating the granting of loans and leases to SMEs through financial intermediaries. In 2013, new transactions amounting to EUR 1.84 billion were signed across a large number of European countries, catalysing EUR 8.61 billion.

**Chart 28. Overview of funding presented above**

| | Total Digital Funding | | Of which broadband | |
|---|---|---|---|---|
| **ESIF** | ERDF<br>ESF<br>EAFRD | EUR 17.8 bn<br>EUR 2.1 bn<br>EUR 1.5 bn | ERDF<br><br>EAFRD | EUR 5.0 bn<br><br>EUR 1.4 bn |
| **CEF** | CEF | EUR 1.0 bn | CEF/BB | EUR 0.15 bn |
| **Horizon 2020 and COSME** | H2020<br>COSME | EUR 12.7 bn[331]<br>EUR 0.894 bn[332] | | |
| **EFSI** | *No sector allocation* | | *No sector allocation* | |
| **Other EIB and EIF** | EIB<br>EIF | EUR 16.1 bn[333]<br>EUR 9.2 bn[334] | EIB | EUR 16.1 bn |
| **Total (2014-2020)** | Digital/ICT | EUR 61.3 bn | Broadband | EUR 22.65 bn |

All these instruments and funding possibilities have a high potential to stimulate investments towards the achievement of the EU 2020 objectives to fully cover the EU territory by ultra-fast broadband, including the rural and most remote EU areas. More generally, they will contribute to growth and job creation. This potential should be fully exploited by enhancing synergies and complementarities between the instruments and the Funds, including also in the programming of the regional, cohesion and rural development funds. A One Stop Shop for broadband should help to reach ESIF beneficiaries most effectively.

331 Including InnoFin
332 Debt + Equity platform, excluding InnoFin
333 Estimated by multiplying the average lending of the last 3 years (EUR 2.3 billion) in telecoms for 7 years
334 Estimated by multiplying the average lending to SMEs for the last 3 years (EUR 1.3 billion) for 7 years

## ANNEXES

## I. Access to finance for digital entrepreneurs

For many firms, especially newly created companies, the lack of risk capital and innovative financing schemes in Europe remains a major problem. For example, 41% of innovators participating in ICT FP7 projects consider the lack of financing as a major external bottleneck that could compromise the exploitation of innovations[335]. European SMEs are largely dependent on traditional bank financing. Data collected between April and September 2014, shows that for 62% of European SMEs bank loans remain the favourite form of external financing to realise their growth ambitions. However, access to bank financing is not adequate for the financial needs of digital entrepreneurs.

Non-bank forms of finance may constitute an alternative, complementary source of finance for SMEs, although some of them are not fully accessible for SMEs, as compared to bigger enterprises. For instance, only few SMEs are accessing corporate bonds, private placement, IPOs for various reasons, including high administrative costs. Alternative sources of finance, such as crowdfunding, are emerging, although their availability is still at an early stage and not fully developed in all Member States.

The problem of access to finance is most acute for Start-up companies. These high-risk enterprises need access to a capital source which is willing to take high risks in exchange for potentially high rewards, i.e. venture capital. However, the supply of venture capital in Europe is very limited. In 2013, VC investments in Europe amounted to just 0.024% of GDP, compared to 0.175% in US[336], lagging by a factor of seven. Ability of investors to withdraw their investment from a given company in order to release the associated profits remains problematic in Europe[337].

Moreover, different regulatory regimes across Member States make the cross-border flow of investment capital difficult. The amount of European cross-border venture capital investments is estimated to be less than 17%[338]. Partly as a result of this fragmentation many EU companies which are successful on the Internet find it difficult to reach critical mass for creating digital businesses across Europe. Some of the most successful ones are bought by US or Asian companies or settle in the US.

The European Venture Capital Regulation introduced in 2013 makes it easier for venture capitalists to raise funds across Europe for the benefit of start-ups, through the introduction of a single rulebook. The 2014 Communications on long-term financing and on crowdfunding provided a frame for the Commission's work to support the development of alternative sources of finance for SMEs.

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335 'Innovation Radar: Identifying high potential innovations and innovators in FP7 projects', *JRC/IPTS Working Paper*, forthcoming 2015

336 European Private Equity and Venture Capital Association (EVCA), *2013 European Private Equity Activity: Statistics on Fundraising, Investments & Divestments*, 2014, p. 45

337 There is a clear link to the Capital Markets Union in both entrepreneurship and the digitalisation of financial services

338 European Private Equity and Venture Capital Association (EVCA), *2013 European Private Equity Activity: Statistics on Fundraising, Investments & Divestments*, 2014, p. 39

## II. The challenge for direct tax systems

*Problem and Problem drivers*

There is broad and rising public and political concern over the fact that some multinationals currently succeed in paying very little corporate income tax in the EU. Several of the high profile public examples concern digital companies such as Apple, Google or Amazon. Aggressive tax planning strategies concern all industries. Increased mobility through digitalisation merely exacerbates the scale of it for purely digital companies.

Beyond the general issue of aggressive tax planning which is being addressed by both EU and OECD initiatives, there is a second issue regarding the fact that enterprises which mainly or exclusively operate on the web, by their nature have no or limited need for physical presence in the countries of their users. The growing importance of the service component of the economy, and of digital products that often can be delivered over the Internet, has made it possible for businesses to locate many productive activities in locations that are distant from the physical location of their customers.

As a result, such enterprises often have no taxable presence in the EU to which any profit could theoretically be allocated. This is referred to as "the broader issue" of taxation of digital enterprises.

Both issues were identified in the May 2014 Commission Expert Group Report on Taxation of the Digital Economy[339]. They were also identified in the September 2014 OECD report on Taxation of the Digital Economy[340], which was part of the first package of measures/recommendations to tackle international corporate tax avoidance in the context of the OECD's Action Plan on Base Erosion and Profit Shifting (BEPS).

Such issues challenge direct tax systems as well as Member States' tax revenues. They may also lead to unfair tax competition and a lack of level playing field between economic operators (EU v. non-EU, and within the EU). In addition, they may entail the risk of Member States taking unilateral action by introducing special taxes on digital activities or requiring fiscal representatives which can act as a barrier to the development of the DSM.

*Need for the broader issue to be addressed at European level*

With respect to direct taxation, the Commission Expert Group Report on Taxation of the Digital Economy recognises that the increased mobility associated with digital technologies exacerbates challenges faced by current direct tax systems. However, it concludes that there should not be a special tax regime for digital companies. At the same time, it finds that it is also important to investigate more profound changes in international corporation tax.

In particular, for the medium and long term, the group also commends the CCCTB (Common Consolidated Corporate Tax Base – see hereinafter) as a more fundamental solution to many of the corporate tax avoidance issues while also ensuring simplification and reduce administrative burden.

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339 European Commission, Report from the Commission Expert Group on Taxation of the Digital Economy, 2014

340 OECD, *Addressing the Tax Challenges of the Digital Economy*, OECD/G20 Base Erosion and Profit Shifting Project, 2014

Finally, the Expert Group report underlines that tax incentives should be approached with caution and be carefully assessed both ex ante and ex post. At the same time, it concludes that expenditure based research and innovation tax incentives, provided they are designed well and are evaluated regularly, could address some constraints faced by young innovative companies, including digital.

Although the Commission has already delivered significant progress in the fight against tax avoidance and tax fraud through the implementation of its 2012 Action Plan to Strengthen the Fight against Tax Fraud and Tax Evasion[341], the political context has moved on since its publication. The earlier focus on improving tax compliance and administrative cooperation has now expanded to encompass an analysis of those features of tax systems which contribute to aggressive tax planning.

This is why the Commission Work Programme for 2015 stated that, in the light of global developments the Commission will present an Action Plan on a renewed approach for corporate taxation in the Single Market, where profits are taxed where the value is generated, including in the digital economy.

The Action Plan will also reinvigorate discussions on the CCCTB, as a tool to make the Internal Market more competitive and to limit the opportunities for companies to manipulate their tax position. It is expected that the Commission will adopt this Action Plan in the summer.

*Expected Impact*

The objective of the EU initiative is to ensure that profits are taxed where the economic activities are taking place and value is created. The implementation of this principle will significantly reduce opportunities for tax planning. It will also help create a fairer, less complex and less distortive corporation tax environment in Europe and improve the operation of the Single Market, including the digital economy.

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