STUDY

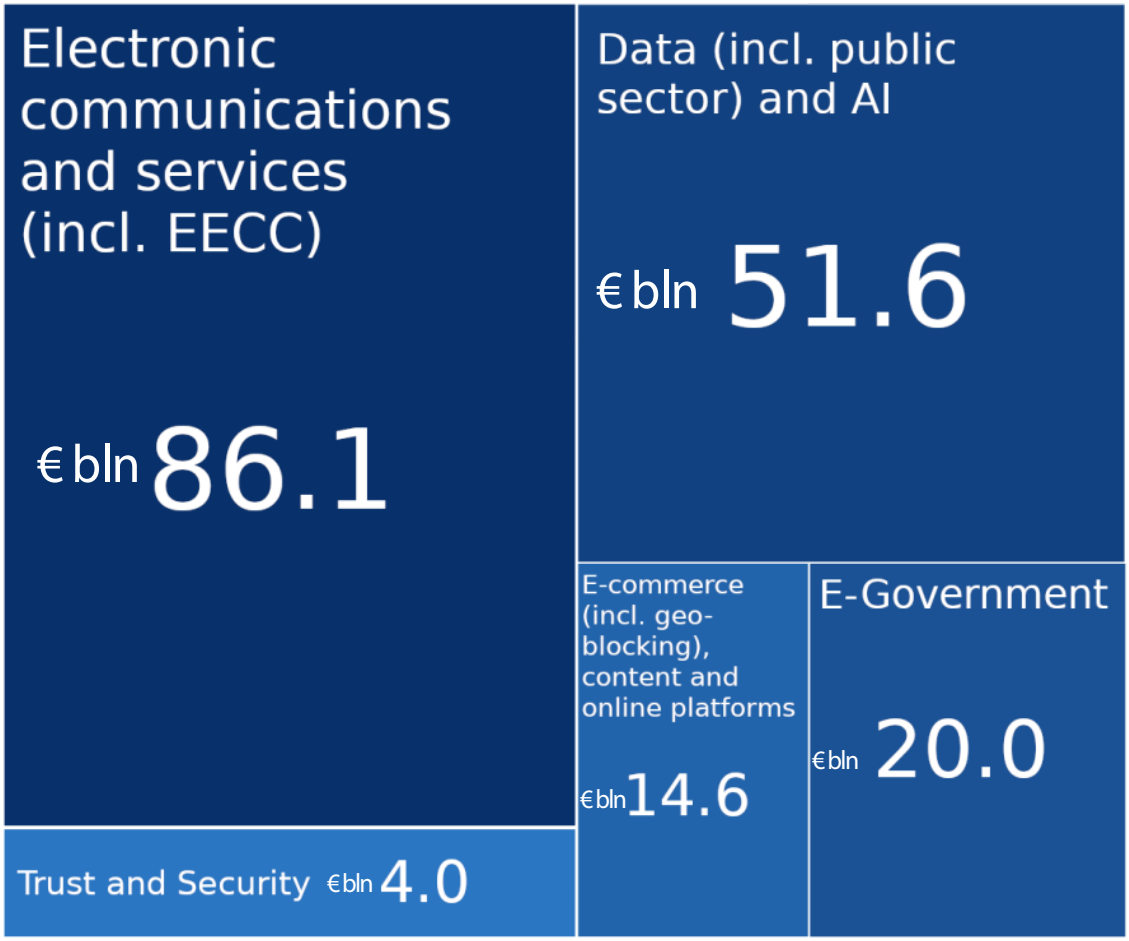
Requested by the IMCO Committee

European Parliament

Contribution to Growth:

The European Digital Single Market

Delivering economic benefits for citizens and businesses



Policy Department for Economic, Scientific and Quality of Life Policies
Authors: J. Scott Marcus, Dr Georgios Petropoulos, Dr Timothy Yeung
Directorate-General for Internal Policies
PE 631.044 - January 2019

EN

Contribution to Growth:

The European Digital Single Market

Delivering economic benefits for citizens and businesses

Abstract

Numerous legislative measures have been initiated or enacted in support of the overall achievement of a Digital Single Market (DSM). This study provides a brief stock-taking of what has been achieved in economic terms, of what remains to be done, and of candidate initiatives for the next legislative term.

This document was prepared by Policy Department A: Economic and Scientific Policy, at the request of the Committee for the Internal Market and Consumer Protection.

This document was requested by the European Parliament's Committee on the Internal Market and Consumer Protection

AUTHORS
J. Scott MARCUS, Bruegel
Dr Georgios PETROPOULOS, Bruegel
Dr Timothy YEUNG, Bruegel

ADMINISTRATOR RESPONSIBLE
Mariusz MACIEJEWSKI
Frédéric GOUARDÈRES

EDITORIAL ASSISTANT
Irene VERNACOTOLA

LINGUISTIC VERSIONS
Original: EN

ABOUT THE EDITOR
Policy departments provide in-house and external expertise to support EP committees and other parliamentary bodies in shaping legislation and exercising democratic scrutiny over EU internal policies.

To contact the Policy Department or to subscribe for updates, please write to:
Policy Department for Economic, Scientific and Quality of Life Policies
European Parliament
B-1047 Brussels
Email: Poldep-Economy-Science@ep.europa.eu

Manuscript completed: December 2018
Date of publication: January 2019

This document is available on the internet at:
http://www.europarl.europa.eu/supporting-analyses

DISCLAIMER AND COPYRIGHT

For citation purposes, the study should be referenced as: Scott e al., M., *Contribution to growth: The European Digital Single Market. Delivering economic benefits to citizens and businesses,* Study for the Committee on the Internal Market and Consumer Protection, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2018.

CONTENTS

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
BEREC	Body of European Regulators for Electronic Communications
CGE	Computable General Equilibrium
CRD	Capital Requirements Directive
CS	Consumer surplus
DESI	Digital Economy and Society Index
DSM	Digital Single Market
EEEC	European Electronic Communications Code
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
ICT	Information and Communications Technology
IMCO	Internal Market and Consumer Protection Committee
IMR	International mobile roaming
MHz	MegaHertz
MTR	Mobile termination rate
NPOs	National postal operators
OLS	Ordinary least squares
PS	Producer surplus
PPP	Purchasing power parity
RFEC	Regulatory Framework for Electronic Communications
TFP	Total Factor Productivity

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

This study evaluates the benefits of a Digital Single Market for Europe, and quantifies the Commission's *Digital Single Market (DSM) Strategy* (2015) from an economic perspective. The DSM Strategy seeks to tackle a wide range of issues related to the digitisation of European society, but an over-arching theme is the *facilitation of cross-border electronic commerce* within the EU. It is broadly in line with long-standing European Parliament initiatives to achieve a "… digital single market that is essentially about removing national barriers to transactions that take place online."[1]

We consider first the effects of the legislative measures that comprise the DSM Strategy, and then discuss their relationship to the overall EU objectives of completion of the Single Market and of the digitisation of European society.

Benefits of specific DSM Strategy initiatives

It is much too soon to measure the actual economic benefits of the DSM Strategy *ex post*; however, it is possible to summarise the results that the Commission anticipated. We have identified some **€ 177 billion in potential annual economic gains (in current euro)** from full implementation of the legislative measures enacted or expected to be enacted, corresponding to 1.2% of current (2017) GDP, based on Commission estimates.

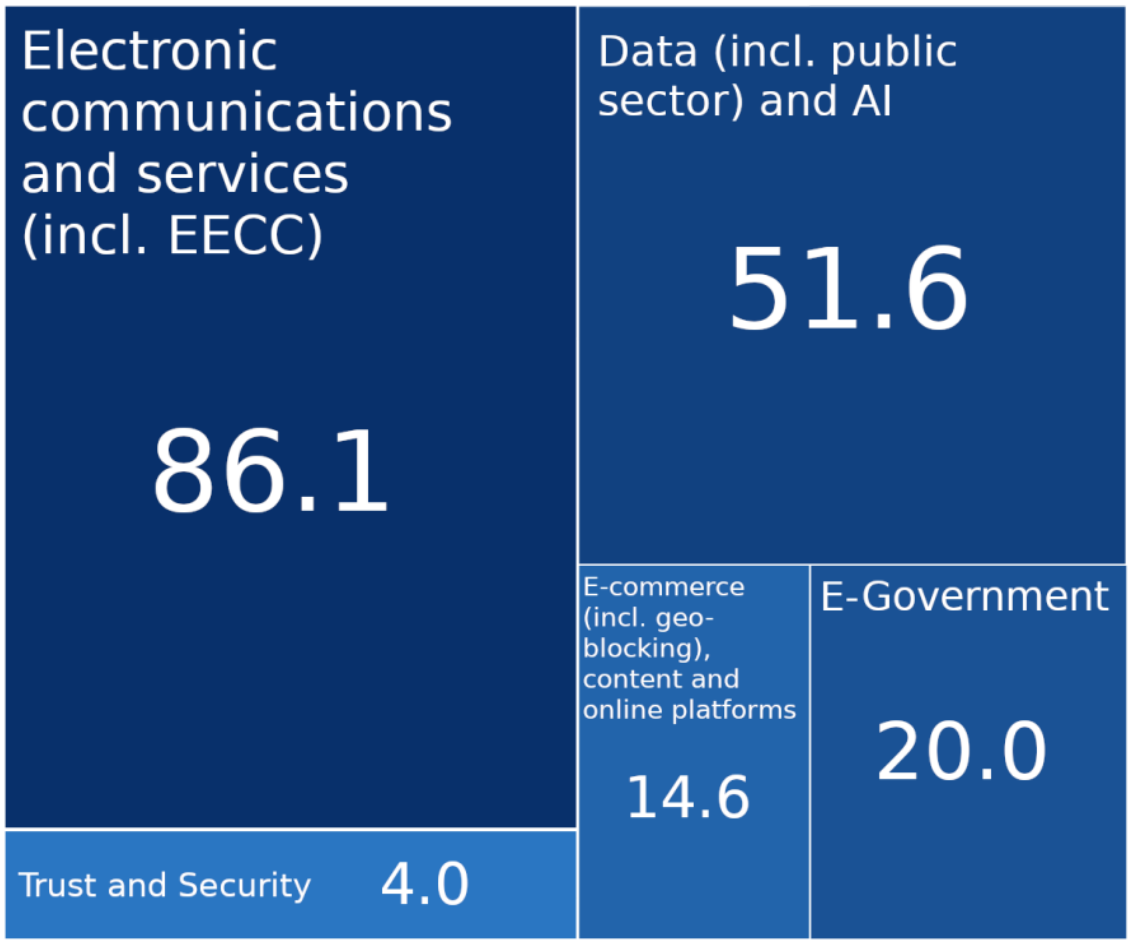
Most of these anticipated annual gains can be attributed to the European Electronic Communications Code (the *EECC*) (€ 81 billion), amendments to the Directive on re-use of public sector information (PSI) (€ 45 billion), the Single Digital Gateway (assuming it is well implemented and well used) (€ 20 billion), and the Geo-Blocking Regulation (€ 10 billion). The large benefits attributed to the EECC reflect various spill-overs into the overall digitisation of European society, enabled by measures that promote the deployment of fibre-based fixed broadband and of 5G mobile services. Rough estimates of the annual benefits achievable thanks to each legislative measure (in billions of current euro once the measures have taken full effect, and subject to a range of limitations) are summarised in Figure 1 and Table 1.

The estimates are, however, highly uncertain for many different reasons. They are largely based on Commission Impact Assessments and other publicly available documents, but the Impact Assessments are quite mixed in the information and in the quality of analysis that they provide. We have made adjustments where we identified problems, but our figures necessarily reflect the assumptions and any errors in the Commission estimates. Furthermore, it is much too early to check these forecast gains against actual gains. There is also uncertainty as to the counterfactuals – in the absence of a DSM Strategy at EU level, what initiatives would the Member States have undertaken to promote the digitisation of society at Member State level, and to ameliorate barriers to cross-border e-commerce? Even where Commission Impact Assessment documents provide seemingly sensible estimates, the results are not cross-comparable across different Impact Assessments.

Further limitations are noted in Chapter 1 of the text.

[1] European Parliament (2018a).

Figure 1. Annual benefits achievable based on measures already finished or in progress (in billions of current euro once the measures have taken full effect)



Source: Bruegel based primarily on European Commission Impact Assessment reports

Table 1. Estimated annual benefits of selected legal instruments adopted or proposed during the 8th Legislature (2014-2019) (billions of 2018 euro) when fully implemented.

Measure	Annual benefits achievable based on measures already finished or in progress	Annual benefits achievable with new measures
E-commerce, content and online platforms	14.6	36.4
Regulation addressing unjustified geo-blocking (2018)	10.3	31.4
Council Regulation and Directive VAT for e-Commerce (2018)	2.3	-
Regulation on cross-border parcel delivery services (2018)	1.0	5.0
Directive Audio-Visual and Media Services (2018)	1.0	-
Data and AI	51.6	-
Directive on the re-use of public sector information (recast) P2018	45.0	-
Regulation on Free flow of non-personal data (2018)	4.3	-
General Data Protection Regulation (2016)	2.3	-
Trust and security	4.0	-
Directive on Network Information Security (2016)	4.0	-
E-Government	20.0	-
Regulation establishing a Single Digital Gateway (2018)	20.0	-
Consumer protection	0.3	5.9
Directive on contracts for the supply of digital content - P2015	0.3	5.9
Electronic communications networks and services	86.1	41.0
Directive on European Electronic Communications Code (2018)	81.1	41.0
Regulation Open Internet/TSM (2015)	5.0	-
Total:	**176.6**	**83.7**

S

Source: Bruegel estimates based on European Commission Impact Assessment reports and other sources identified in the text.

We have also identified an additional € 83.7 billion in annual gains that might be realised by filling in current gaps in the DSM Strategy (as shown in Table 1); however, most of these involve complex and challenging policy interventions that would extend beyond the digital sector.

Long-term benefits from the digitisation of the EU (based on artificial intelligence, big data, machine learning, the Internet of Things and more) may be much greater. This study presents a few current estimates of the magnitude of these gains, but does not attempt a detailed quantification of EU gains. The degree to which measures are needed at EU level, Member State level, or not needed at all in order to realise these gains is in most cases not yet clear.

The DSM Strategy and the benefits of fully achieving a Digital Single Market

The DSM Strategy seeks to strengthen the EU in many ways, all of which relate to the fostering of a Digital Single Market; however, it cannot be said to fully achieve all of the potential benefits of a Digital Single Market. It provides many important steps along the way, but more work remains.

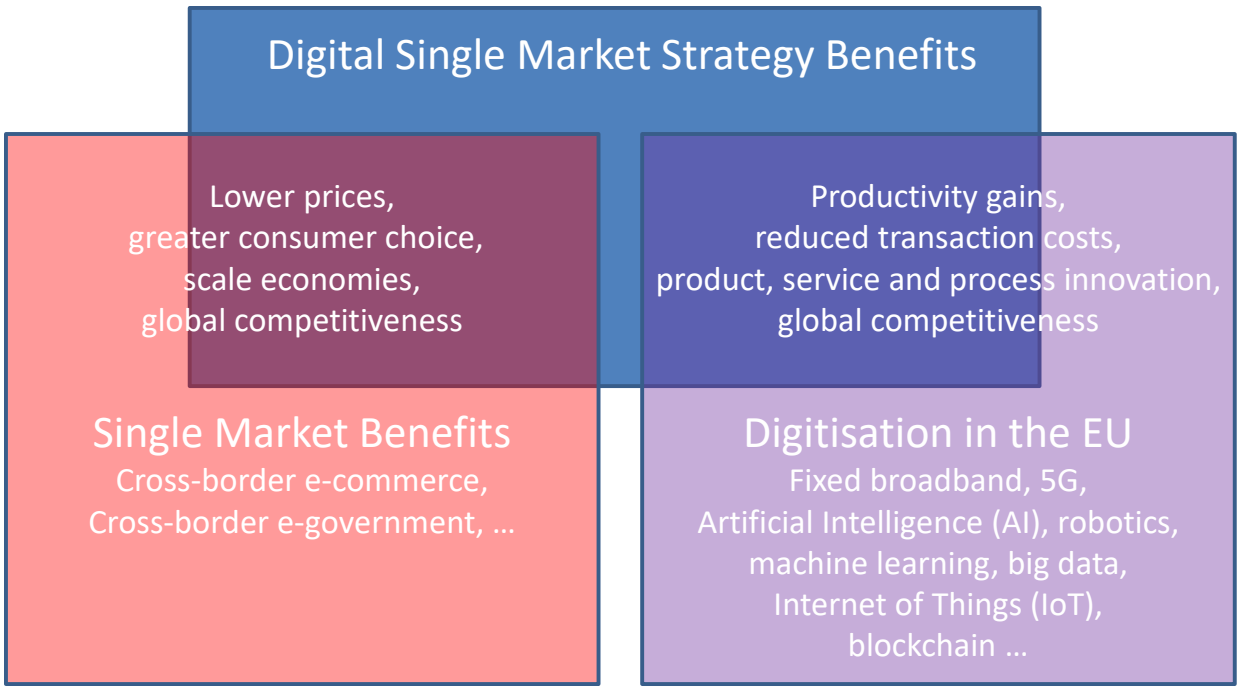
Most but not all of the benefits of the DSM Strategy flow either from: (1) furthering the Single Market in the digital domain, or (2) further promotion of the digitisation of the EU. Figure 2 shows the relationship between these two, and how they relate to the distribution of benefits.

In a true Digital Single Market, the electronic ordering of both physical and virtual goods and services would be as easy and cost-effective cross-border as domestically. Many e-government services including health services and the establishment of a business would likewise be as easy and cost-effective cross-border as domestically. The resulting Single Market gains could be expected to result in lower prices, greater choice and enhanced convenience for consumers, scale economies, and enhanced competitiveness of the EU in comparison with its global trading partners.

A true Digital Single Market would make far greater use of digital technology than is the case in the EU today. Fast broadband, mobile (5G) services, artificial intelligence, robotics, big data, machine learning, the Internet of Things (IoT), cloud computing and possibly blockchain are likely to play transformative roles in the EU's economy and society. The comprehensive digitisation of the EU is expected to result in productivity gains, reduced transaction costs, product, service and process innovation, and enhanced EU competitiveness in comparison to the EU's global trading partners.

In sum, the benefits of the legislation proposed under the DSM Strategy flow from two distinct dimensions: Single Market gains and digitisation gains; however, the overlap of benefits is not complete in any dimension, as is shown in Figure 2.

Figure 2. How the benefits of the Digital Single Market Strategy relate to underlying drivers.



Source: Bruegel

Overall benefits of the Single Market for offline and online commerce

Numerous estimates have been made of the overall gains generated by the Single Market, using a range of methodologies and assumptions, and arriving at a range of conclusions.

Based on an extensive literature review, Dahlberg (2015) found that the "single market has been a significant enabler for economic growth in Europe. … [C]omparisons are not easily done, but 2-4 per cent seems to be in the ballpark. … This effect primarily seems to have run through the free movement of goods and capital – the intra-EU trade and investment flows have experienced significant increases since the implementation of the single market."

The same study suggests that Single Market gains arising from the free movement of services have been limited and uneven. Indeed, there are some indications that price mark-ups in the services sector have actually increased. Given that services represent some 70% of European GDP and employment, this is worrisome.

Duch-Brown and Martens (2016) found that if it were as easy to make business-to-consumer (B2C) purchases of goods cross-border as it is domestically, price convergence would lead to prices that are lower by 1.0% for goods purchased online and 0.5% for goods purchased offline. Consumer and producer surpluses would each increase by more than 1%.

Beyond these findings, numerous studies show that broadband deployment and adoption make a positive contribution to societal welfare. This explains the large gains that the Commission IA attributes to the European Electronic Communications Code (EECC).

Overall benefits of the digitisation of the EU

The DSM Strategy has recognised the need "to exploit innovations such as Cloud computing, Big Data tools or the Internet of Things". Concretely, much has been done to promote the deployment of fast fixed broadband and of mobile services based on 5G, primarily in the EECC.

The transformation of the EU through digitisation appears to depend on the adoption of a range of technologies such as artificial intelligence, robotics, big data, machine learning, the Internet of Things and possibly blockchain. Different analysts provide different estimates, but most of their estimates for future global benefits are in the trillions of euro per year. The EU potentially stands on the threshold of a truly transformative change.

In most of these areas, the European Commission has prepared strategy papers, funded research and studies, and in some cases created public private partnerships (PPPs) or observatories. Few of the current DSM Strategy legislative proposals touch on these technologies. The degree to which legislation is needed to deal with issues in any of these technologies is likely to become clearer during the next legislative term. This study identifies areas that are likely to require attention.

Limitations of our assessment

As noted, it is much too early for *ex-post* evaluations. Some of the measures have not even been adopted yet. Even for measures that have taken effect, it is too soon to judge effects empirically.

We have consequently relied on *ex-ante* estimates, primarily derived from the European Commission Impact Assessments that accompany legislative proposals. These reports often neglect to provide a quantitative estimate of benefits or costs, and even where they do, there is little consistency in the estimates made. Process improvements should be considered in the Better Regulation process that drives these Impact Assessments.

Possible initiatives to realise more of the Digital Single Market's potential

We see opportunities for a number of further interventions in the coming legislative term. They fall in three categories: (1) re-thinking the overall approach to the Digital Single Market going forward, (2) rounding out and completing the measures enacted during the current legislative term, and (3) launching new initiatives to foster the digitisation of European business, government and society.

As far as a re-thinking of the approach, we offer the following reflections:

- For Single Market issues, a holistic view that integrates digital and pre-digital aspects may be in order; however, promoting the adoption and innovation based on digital technology continues to require a special focus of its own.
- The ultimate goal is the achievement of a dynamic EU economy that delivers a high standard of living to all, and that provides attractive prices and choices to consumers. The Single Market, the competitiveness of the EU, and the productivity gains achieved by digitisation are a means to achieving this end.
- Despite the growing difficulty in distinguishing between products and services, more focus on Single Market gains relating to services is needed during the next legislative term.
- A more integrated view across the EU's full range of policy tools is needed, including industrial, regulatory, competition, and trade policy. However, we cannot compromise the independence, the integrity and the credibility of regulatory and competition policy.

Beyond this, we have identified candidate legislative measures to deal with the "unfinished business" from the current legislative term, and to promote the digitisation of the EU using technologies such as Artificial Intelligence, machine learning, big data, the collaborative economy, and cloud services. These measures differ from one another in many dimensions – not only in the magnitude of costs and benefits, but also in the degree to which the Union has competence to act. Some appear to us to be more politically fraught than others.

In a few cases, we have identified complex issues where solutions probably cannot even be put forward until the problem has been studied in greater depth. In others, the problem is well understood but potential solutions would require careful assessment through the Better Regulation process.

With this in mind, we have categorised the various initiatives put forward in this chapter along each of these dimensions in Table 2, and have clustered them into groups. The assessments reflect our subjective view of the benefits, costs, and difficulty of each of the candidate policy measure along each of the relevant dimensions.

To summarise, the measures that we have put forward in this chapter and assessed in Table 2 are:

- **Public funding for AI and robotics.** More public investment is needed in these potentially transformative technologies, and especially in AI and robotics, in order to maintain EU competitiveness.
- **Private funding for start-ups and scale-ups.** The Capital Markets Union (CMU), which included some measures in this direction, is stalled. EU start-ups and scale-ups continue to suffer from a lack of venture capital, challenges in conducting IPOs, and problematic and inconsistent insolvency regimes. A re-doubling of efforts is in order.
- **Corporate taxation.** Online platforms need to pay their fair share of taxes, and there is general agreement (in line with the OECD's BEPS process) that taxation should occur where the service is used. Beyond that broad assertion, however, it will be hard to find consensus between the EU and our trading partners, and for that matter among the Member States of the EU itself.

- **Training.** Training and retaining skilled IT professionals in the EU is increasingly difficult. The limited EU competence in this area poses a challenge.
- **Employment and social protection.** The combined impact of AI, machine learning, and big data on employment is potentially substantial. This implies significant societal dislocations that will need to be addressed. Furthermore, there are implications for social protection of workers (including self-employed workers) as digitisation contributes to increasing labour flexibility – a trend with both positive and negative implications. Again, the limited EU competence in this area poses a challenge.
- **E-government.** Progress has been slow in the area of e-government. It is time to reinvigorate EU efforts on cross-border e-government service.
- **Network and information security.** Progress has been made in the current legislative term when it comes to strengthening the role of ENISA, and establishing a certification programme at EU level. Nonetheless, the level of investment at EU level is ludicrously small in comparison to the rate at which threats are growing, not only from commercial hackers but also from states and from state sponsored hackers. A more muscular approach to cybersecurity at EU level appears to be needed.
- **Cross-border sales of goods that require delivery.** This would be a necessary prerequisite to expanding the Geo-Blocking Regulation to include goods that require cross-border delivery. For this to be workable, it would be necessary to first address non-harmonised requirements related to product safety, labelling and more. Existing legislation that mandates mutual recognition of goods sold in another Member State would need to be made fully effective in practice.
- **Re-think the structure of the EU audio-visual sector.** This would be a necessary prerequisite to expanding the Geo-Blocking Regulation to include services that primarily deliver copyrighted audiovisual content. Expanding the Geo-Blocking Regulation without first addressing structural problems in the audiovisual sector would risk undermining the funding model for the production of audiovisual content.
- **Expand the scope of consumer protection.** Inclusion of commercial guarantees, consumer credit and gambling could generate welfare gains. Further extension could be considered to fully cover financial services, passenger travel, healthcare and real estate.
- **Further improve access regulation.** Further work is likely to be needed to fully realise the broadband investment that the EECC sought.
- **Lower cross-border parcel delivery NPO prices.** The Regulation as enacted does little to bring prices down to levels reflective of costs. Expanding the Regulation to mandate more competitive pricing, mainly on the part of National Postal Operators, would generate net gains, and would encourage a second round of enhancements.
- **Liability and new technologies.** New legislation is likely to be needed to address issues of product and service liability where AI and machine learning come into play.
- **Fake news and inappropriate content.** Issues with inappropriate or misleading content are growing. A more muscular and comprehensive policy approach is likely to eventually be needed than the voluntary programmes currently in place to deal with "fake news". Automated tools based on AI, machine learning and big data techniques show promise in detecting inappropriate content, and "fake news".
- **Detecting collusion.** Automated platforms may have a tendency to collude, with or without malicious intent, but automated tools may also prove crucial in detecting collusion.

Table 2. A comparative perspective on possible initiatives to realise more of the potential of the Digital Single Market.

Thematic area	Potential magnitude of gains	Implementation difficulty	Measures needed have been identified	Political difficulty	Subsidiarity difficulty	More public resources needed	Action needed
High payback areas where prompt action is feasible							
Public funding for AI and robotics	H	L	Y	M	L	Y	Further increase funding
Private funding for start-ups and scale-ups (CMU)	H	M	Y	H	H	N	Political resolution needed
Corporate taxation	M	L	Y	H	H	N	Political resolution needed
High payback areas where more study is needed to formulate plans							
Training and re-training	H	M	N	M	H	Y	Study and funding needed
Employment and social protection	H	H	Y	H	H	Y	Many needs are understood
E-government	M	H	Y	M	H	Y	Study barriers, then push ahead
Network and information security	H	H	N	M	H	Y	More EU activism needed
High payback areas where the way forward is not clear							
Cross-border sales of goods that require delivery	H	H	N	H	H	N	Study, better mutual recognition
Re-think the structure of the EU audio-visual sector	H	H	N	H	H	N	Comprehensive study
Medium payback areas where more study is needed to formulate plans							
Expand scope of consumer protection	M	M	N	M	M	N	Study of promising sectors
Further improve access regulation	M	M	N	M	M	N	Study
Lower cross-border parcel delivery NPO prices	M	L	Y	H	H	Y	Political resolution needed
Areas where both study and research are needed							
Liability and new technologies	L	L	N	M	M	N	Study
Fake news and inappropriate content	H*	H	N	M	M	N	Study and technical progress
Identifying collusion	M	M	N	L	L	Y	Study and technical progress

H=high, M=medium, L=low, Y=yes, N=no

* The societal gains are not mainly economic.

1. INTRODUCTION

Numerous legislative measures have been initiated or enacted in support of the Commission's *Digital Single Market Strategy* (European Commission, 2015a). This report provides a stock-taking of what has been achieved in economic terms, of what remains to be done, and of opportunities for the coming legislative term.

The study (IP/A/IMCO/IC/2018-012) has been undertaken for Policy Department A of the European Parliament, on behalf of the Internal Market and Consumer Protection Committee (IMCO). Preliminary results were presented at the IMCO Workshop on 10 July 2018.

1.1. Objectives

The study "Contribution of the Internal Market and Consumer Protection to Growth" (hereinafter Alleweldt at al. (2014)) was prepared for the IMCO Committee in 2014. That study called for an ambitious revision of European policy objectives in order to more fully realise the potential of the Internal Market as a growth engine and an anti-crisis mechanism. The current European Commission followed this path by means of a new set of strategies, including the DSM Strategy for Europe [2] and A Single Market Strategy.[3]

The IMCO Committee has requested a workshop and an update of the 2014 study. The update is comprised of a series of in-depth analyses. This study, which focuses on the Digital Single Market, is one component of that series.

The aims of the current update are (1) to provide background information and advice for the Members of the IMCO Committee on benefits brought in the past and to be realised in the foreseeable future for EU businesses and citizens by legislation established in the field of Internal Market and Consumer Protection, and (2) to reflect on priority measures and actions that could be undertaken in this field going forward.

1.2. Background

The *Digital Single Market (DSM) Strategy* was intended to tackle a wide range of issues related to the digitisation of European society. A key over-arching theme is the *facilitation of cross-border electronic commerce* within the EU. The DSM sought to do this with a barrage of legislative measures, each aimed at addressing one or more of the barriers to cross-border e-commerce that have been identified by e-merchants or consumers (and evidenced in surveys).

The DSM Strategy is broadly in line with numerous initiatives undertaken by the Parliament over the years. For the Parliament, the "… Digital Single Market is essentially about removing national barriers to transactions that take place online. It builds on the concept of the common market, intended to eliminate trade barriers between Member States with the aim of increasing economic prosperity …

[2] European Commission (2015a), Digital Single Market Strategy, COM(2015) 192 final.

[3] European Commission (2015d), Single Market Strategy, COM(2015) 550 final.

Market and government services developed within the Digital Single Market are evolving from fixed to mobile platforms and becoming increasingly ubiquitous, offering access to information and content anytime and on any device (ubiquitous commerce and ubiquitous government).These advances call for a regulatory framework that is conducive to the development of cloud computing, borderless mobile data connectivity and simplified access to information and content, while safeguarding privacy, personal data, cybersecurity and net neutrality."[4]

Pursuant to the DSM Strategy, the Commission has introduced dozens of legislative measures, some of which have been enacted, some of which have been politically agreed by the co-legislators but not yet finalised, and some of which are still in the pipeline (see Section 4.1).

For each measure, it will be important at some point in time to reflect (consistent with *Better Regulation* principles) on the degree to which it achieves its goals. Was the measure as proposed effective, efficient and coherent in addressing the problem identified? Is that still the case for the measure as enacted? Will transposition (where needed) and implementation at Member State level be effective and efficient?

For the most part, it is too early for that. Few measures are yet in force.

1.3. Methodology

This study seeks to quantify the economic benefits of the Digital Single Market Strategy. The DSM Strategy seeks to move Europe in the direction of the achievement of a Digital Single Market, but it is not synonymous with it. In its DSM Strategy, the Commission defines a Digital Single Market as "one in which the free movement of goods, persons, services and capital is ensured and where 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." (European Commission, 2015a)

Our task here is to quantify the benefits of the DSM Strategy based on existing data. This differs from the potential benefits of full achievement of a Digital Single Market, first because the Strategy does not take us all the way to a Digital Single Market, and second because the legislative measures generate a range of benefits, not all of which should necessarily be viewed as Single Market benefits.

The DSM Strategy seeks to strengthen the EU in many ways, all of which relate to the fostering of a Digital Single Market; however, it cannot be said to fully achieve all of the potential benefits of a Digital Single Market. It provides many important steps along the way, but more work remains.

The gains from DSM Strategy legislative measures can be assumed to derive from a number of large-scale effects, including:

- Elimination of barriers to cross-border commerce, especially e-commerce, which enhances the efficiency of the Single Market for goods and for services.
    - Resultant reduction in prices paid (i.e. reduced mark-ups).
    - Increased variety of products and services available to consumers.
    - Increased competitiveness.
- Increased consumer willingness to use online services due to increased trust.

[4] European Parliament (2018a). See also European Parliament (2018b) and van Veenstra et al. (2013).

- Improved efficiency thanks to digitisation

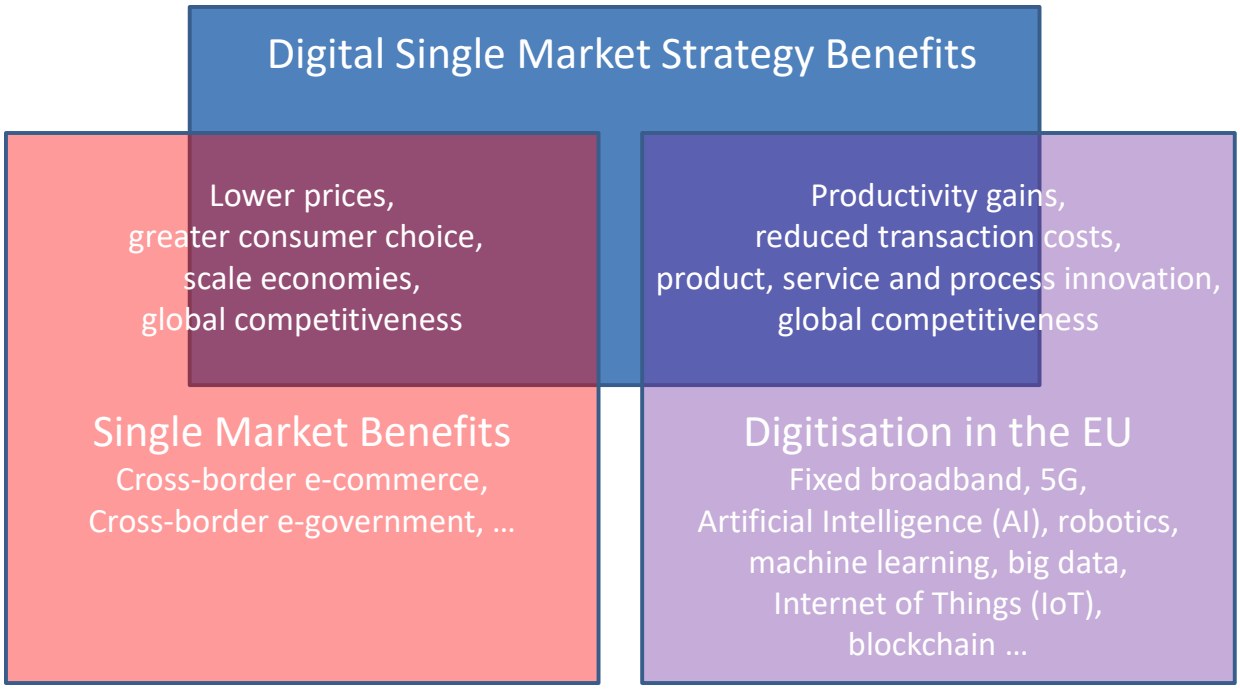
More generally, most but not all of the benefits of the DSM Strategy flow either from (1) furthering the Single Market in the digital domain, or from (2) further promotion of the digitisation of the EU. Figure 3 shows the relationship among these two, and how they relate to the distribution of benefits.

In a true Digital Single Market, the electronic ordering of both physical and online goods and services would be as easy and as cost-effective cross-border as domestically. Many e-government services including health services and the establishment of a business would likewise be as easy and as cost-effective cross-border as domestically. The resultant Single Market gains could be expected to result in lower prices, greater choice and enhanced convenience for consumers, scale economies, and enhanced competitiveness of the EU in comparison with our global trading partners.

A true Digital Single Market would make far greater use of digital technology than is the case in the EU today. Fast broadband, mobile (5G) services, artificial intelligence, big data, machine learning, the Internet of Things (IoT), and possibly blockchain are likely to play a transformative role in the EU's economy and society. The comprehensive digitisation of the EU could be expected to result in productivity gains; in reduced transaction costs; in product, service and process innovation; and again in enhanced competitiveness of the EU in comparison with our global trading partners.

These benefits intersect with those of the Digital Single Market Strategy, but the overlap is not complete in any dimension, as shown in Figure 3.

Figure 3. How the benefits of the Digital Single Market Strategy relate to underlying drivers.



Source: Bruegel

Our terms of reference call on us to review existing data (including ex ante impact assessments, ex post evaluations, and publicly available studies) in order to:

- critically assess the benefits of the Digital Single Market (DSM) Strategy in the context of other policies, taking into account both e-commerce and e-government;
- assess the extent to which previously anticipated achievements in the area of the DSM have materialised and have contributed to the achievement of EU objectives;

- explore the potential contribution of current initiatives in the foreseeable future; and
- formulate a list of gaps where further improvement of policy-making on European level is possible.

The source documents are subject to numerous limitations, as further elaborated in Section 1.5. Few of the *ex ante* impact assessments contain rigorous estimates of benefits, and those that do are by no means cross-comparable. They tend to provide optimistic estimates of what might possibly be achieved if all proposed measures were adopted, in conjunction with other measures (that are not necessarily identified). At best, they reflect the legislation that was proposed, not the legislation that was ultimately adopted.

Furthermore, it is much too early for *ex post* evaluations. Some of the measures have not even been adopted yet. For most of those measures that have taken effect, it is too soon to judge effects empirically.

For these reasons and more (refer again to Section 1.5), simply adding up the benefits estimated in each of the previous ex ante Impact Assessments needs to be done with care in order to avoid biased results. With that in mind, we have introduced several control mechanisms.

First, in order to inject some realism into the process, we have critically assessed each of the Impact Assessment estimates of economic benefits.

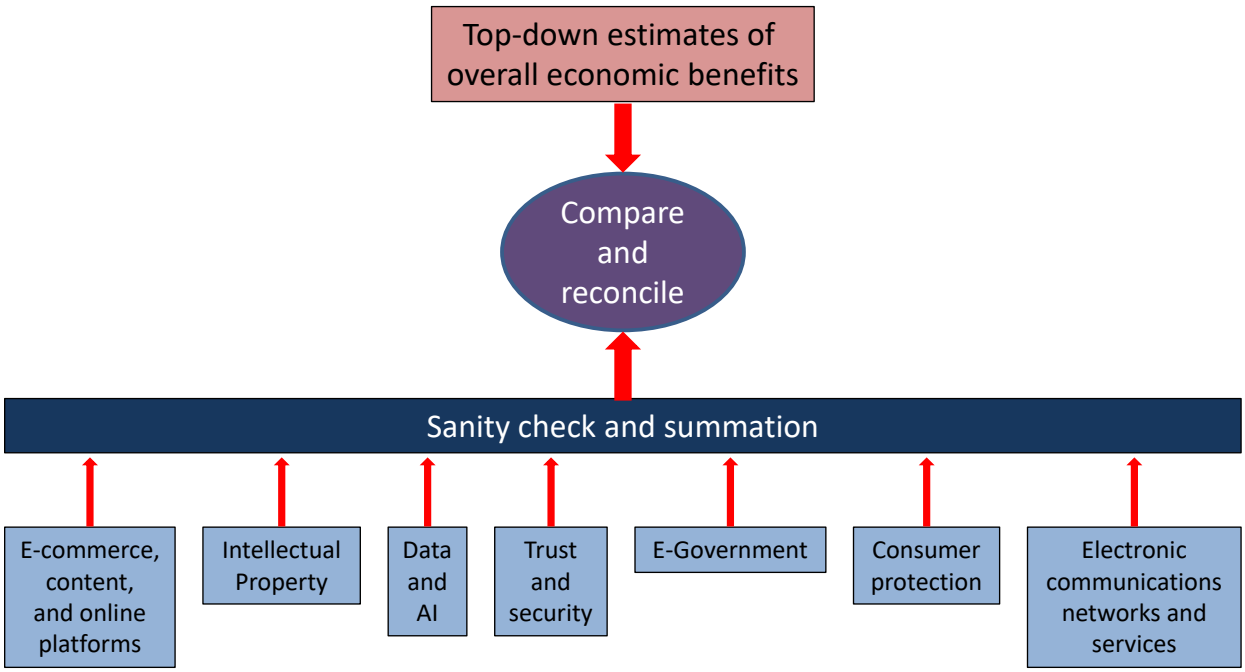
Second, we have attempted to correct for possible double-counting during the initial analysis.

Finally, we have reviewed any publicly available studies of the overall economic benefits of the Single Market, beginning with Cecchini (1988),[5] and including the comprehensive survey in Dahlberg (2015).[6] With this done, we compared top-down estimates of overall benefits with bottom-up estimates of the gains from individual legislative measures. If the bottom-up sum had exceeded the top-down estimates of overall benefits, we would have assumed that double-counting had taken place. As it happens, the bottom-up summation appears to be reasonable based on the top-down check.

[5] Cecchini, P., Catinat, M. and Jacquemin, A. (1988), Europe 1992: The Overall Challenge [summary of the Cecchini report]. SEC (88) 524 final, European Commission.

[6] Dahlberg, E. (2015), Economic Effects of the European Single Market: Review of the empirical literature. National Board of Trade of Sweden.

Figure 4. Methodology followed for this study.



Source: Bruegel

1.4. Relation to other studies

As previously noted, this study represents an updated reflection on the 2014 study "Contribution of the Internal Market and Consumer Protection to Growth". (Alleweldt et al., 2014)

The Parliament's Policy Department A launched a number of small studies in parallel with this one in order to update the 2014 results. This study is closely linked to a study of the legal aspects of measures attempted or taken as part of the DSM,[7] conducted by Prof Alexandre de Streel and his colleagues at the University of Namur.

Meanwhile, several other studies are ongoing, each covering legal or economic aspects of a different element of the legislation relevant to IMCO that was attempted or enacted over the current team.

1.5. Limitations

We would like to acknowledge at the outset a number of limitations as to what it was feasible for us to do. Some of these reflect limitations in available data, others reflect limited time and resources for the analysis.

The terms of reference call on us to summarise what is known about economic benefits of the DSM, largely based on Commission Impact Assessments and other publicly available research. The Impact Assessments, however, are quite mixed in the information that they provide. Some estimate benefits, but not costs. A few estimate costs, but not benefits. Some make no attempt to estimate either.

[7] In-depth analysis on "Benefits of European Digital Single Market", IP/A/IMCO/IC/2018-014.

Our figures are based in most cases on Commission estimates as reported in Impact Assessment reports where available. We have made adjustments where we identified problems; however, since we have not gone back to primary data to do our own econometric assessments, our figures necessarily reflect the assumptions and any errors in the Commission estimates.

Another cause of uncertainty relates to the *counter-factuals*. In the absence of a DSM Strategy at EU level, would things truly have followed a "business as usual" course? What initiatives would the Member States have undertaken to promote the digitisation of society at Member State level? What would they have done bilaterally or multi-laterally to ameliorate barriers to cross-border e-commerce?

Even where Commission Impact Assessment documents provide seemingly sensible estimates, the assumptions are not consistent across different Impact Assessment documents for different legislative instruments – the results are not cross comparable. The source Impact Assessment documents were each constructed individually, with no assurance that they collectively provide a coherent picture. In many cases, the Impact Assessment documents are identifying legitimate gains for which the corresponding legislative measures are perhaps a *necessary* condition, but by no means a *sufficient* condition. Our sense is that many of the Impact Assessments are in effect describing the benefits of a fully digitalised, fully integrated Single Market for digital services (the full-fledged Digital Single Market), which is to say that *some of the Impact Assessments are measuring substantially the same benefits. This potentially leads to double counting or multiply counting the same benefits.*

In order to correct somewhat for this, we have checked each estimate for reasonableness, have avoided double-counting wherever we identified a risk, and as a final cross-check have compared the individual Impact Assessment estimates with overall estimates of the gains from the DSM in order to be able to back out any inappropriate estimates.

Finally, we note that the Parliament has launched multiple studies in the same series of in-depth analyses, all of which were conducted in parallel. We have extensively harmonised this *economic* analysis of the DSM with the *legal* analysis of the DSM that Prof de Streel and his colleagues are conducting (project IP/A/IMCO/IC/2018-012);[8] however, it was not practical to fully harmonise this study with all of the other parallel economic studies. For that reason, it seems likely that there will be some double-counting of benefits across the studies.

1.6. Implications for the evolution of the Better Regulation process

The challenges identified in Section 1.5 make clear that there is room for improvement in the overall *Better Regulation* process.

On the positive side, it is worth noting that we did not identify any gaps in the coverage of legislative proposals by Impact Assessment reports.

[8] In-depth analysis on "Benefits of European Digital Single Market".

On the minus side, it is striking to note the number of Impact Assessment reports that made no attempt to quantify overall benefits. Likewise, few of the Impact Assessment reports sought to quantify administrative costs, transaction costs, or any other costs.[9]

It is probably unrealistic to hope for a full harmonisation of the estimation of costs and benefits across all Impact Assessment reports, but there is probably more that can be done to ensure that estimates are made when feasible, and that the assumptions used are somewhat consistent (at least within families of inter-related measures). For example, a worksheet could be included by default in the Impact Assessment report that either provides estimates of a standardised set of costs and benefits for the Preferred Option, or else a brief explanation as to why an estimate is impractical. As for methodology, more could be done to ensure consistency in estimation.

Where a group of inter-related legislative measures collectively seeks to achieve some objective (as has been the case with the DSM Strategy), it might be most appropriate to provide a combined economic assessment rather than to analyse the measures one by one. The Better Regulation Guidelines (2017) provide for *fitness checks* that constitute a collective *ex post* "evaluation of a group of interventions which have some relationship with each other (normally a common set of objectives), justifying a joint analysis"; however, there does not appear to be any equivalent *ex ante* mechanism at the time when forward strategic planning is initiated (and thus in advance of the Impact Assessment).

This suggestion is very much in line with Muller et al. (2015), which proposes enhancements to the Better Regulation process so as to create an "enhanced performance-based policy cycle which includes the *strategic programming phase* of policy development".

1.7. Structure of this report

Chapter 2 focuses on the two main pillars of the Digital Single Market: the facilitation of cross-border e-commerce, and the digitisation of EU society. The chapter provides an overview of e-commerce in general, and of cross-border e-commerce in particular, since this was an over-arching theme for most of the DSM legislative proposals. It also provides an overview of the magnitude of economic benefits potentially available with key technologies such as artificial intelligence, robotics, machine learning, big data, and enhanced fixed broadband and mobile (5G) services. Chapter 3 concerns itself with estimates of benefits of achievement of the single market for goods and services overall, while Chapter 4 deals with estimated or measured benefits associated with the specific legislative measures put forward during the current legislative term. Chapter 5 concerns itself with the need to re-think the overall approach to the Digital Single Market going forward, the unfinished DSM business of the current legislative term, and the opportunities to launch new forward-looking initiatives in the coming legislative term.

[9] Muller et al. (2015) likewise identified a lack of quantitative substantiation in numerous Impact Assessment reports. Per the Better Regulation Guidelines (2017), "All relevant impacts should be assessed qualitatively and quantitatively whenever possible."

2. THE DSM STRATEGY AND DIGITISATION OF EUROPE

KEY FINDINGS

- Many of the DSM Strategy legislative initiatives have to do, in way or another, with the promotion of cross-border e-commerce. Others generate benefits by furthering the digitisation of the EU.
- E-commerce revenues in the EU are growing at some 14% per year; however, cross-border sales lag substantially behind domestic, suggesting a substantial opportunity to do better.
- The measures in the DSM appropriately target the areas where e-commerce merchants or consumers have identified challenges in purchasing cross-border, based on survey results.
- The transformation of the EU through digitisation appears to depend on the adoption of a range of technologies such as artificial intelligence, robotics, big data, machine learning, the Internet of Things, and possibly blockchain.
- Different analysts provide different estimates, but most of their estimates of potential global future collective benefits from these technologies are in trillions of euro per year.
- The Commission has been active in promoting these technologies, but the DSM Strategy provides few legislative measures that specifically address them. The activities in the next legislative term as regards the promotion of digitisation are likely to focus on needs that were not yet obvious in 2015, many of which are not entirely clear today.

In this chapter, we provide context for the Digital Single Market Strategy, and more broadly for the Digital Single Market aspirations that have been visible in the Parliament as well over many years (see Section 1.2).

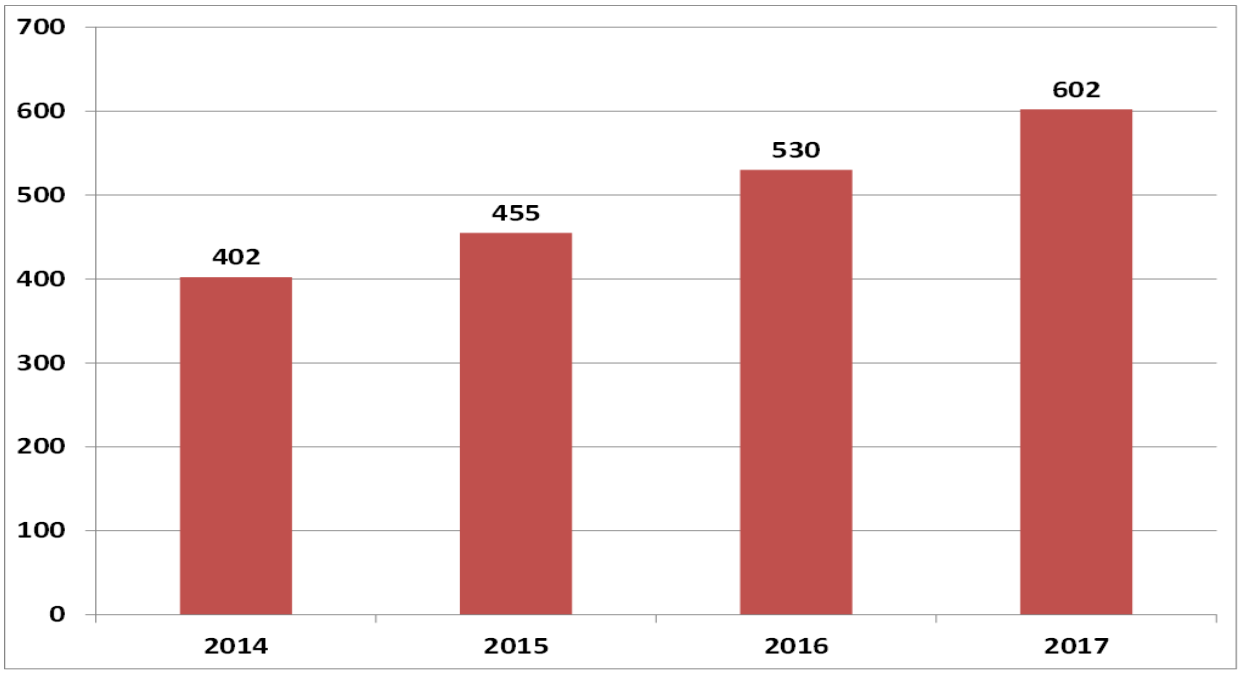
As conceived in 2015, and in line with Parliament's desire to "to boost the economy through e-commerce, while at the same time facilitating administrative and financial compliance for businesses and empowering customers through e-government." (European Parliament, 2018a), the DSM Strategy sought primarily to ameliorate barriers to cross-border e-commerce. At the same time, it sought to strengthen emerging digital services (as we discuss in Section 2.1), including in particular the deployment of fixed and wireless broadband internet access services. The evolution of these new services has moved on (as we explain in Section 2.2), raising new issues that in turn provide opportunities for further public policy interventions during the coming legislative term.

2.1. The DSM strategy and cross-border e-commerce

Most of the relevant DSM legislative initiatives have to do, in way or another, with the promotion of cross-border e-commerce. The EU is doing well in terms of the use of e-commerce, even though the EU is not a major provider of e-commerce platforms. Even so, cross-border sales lag substantially behind domestic, suggesting a substantial opportunity to do better.

European e-commerce is growing at a healthy 14% per annum, and represents nearly 3% of GDP (see Figure 5).[10] Expressed differently, e-commerce represented 8.1% of total 2016 retail sales in the EU-28.[11]

Figure 5. Overall e-commerce revenues in Europe.



Source: Bruegel based on Ecommerce Europe.[12]

In 2017, 20% of EU-28 enterprises reported that they sold online to customers in their own country, but only 9% sold online to customers in other EU countries.[13] In 2017, 87% made domestic e-commerce purchases, but only 33% from other Member States.[14]

Producers identify a range of problems, as depicted in Figure 6.

[10] E-commerce Europe.

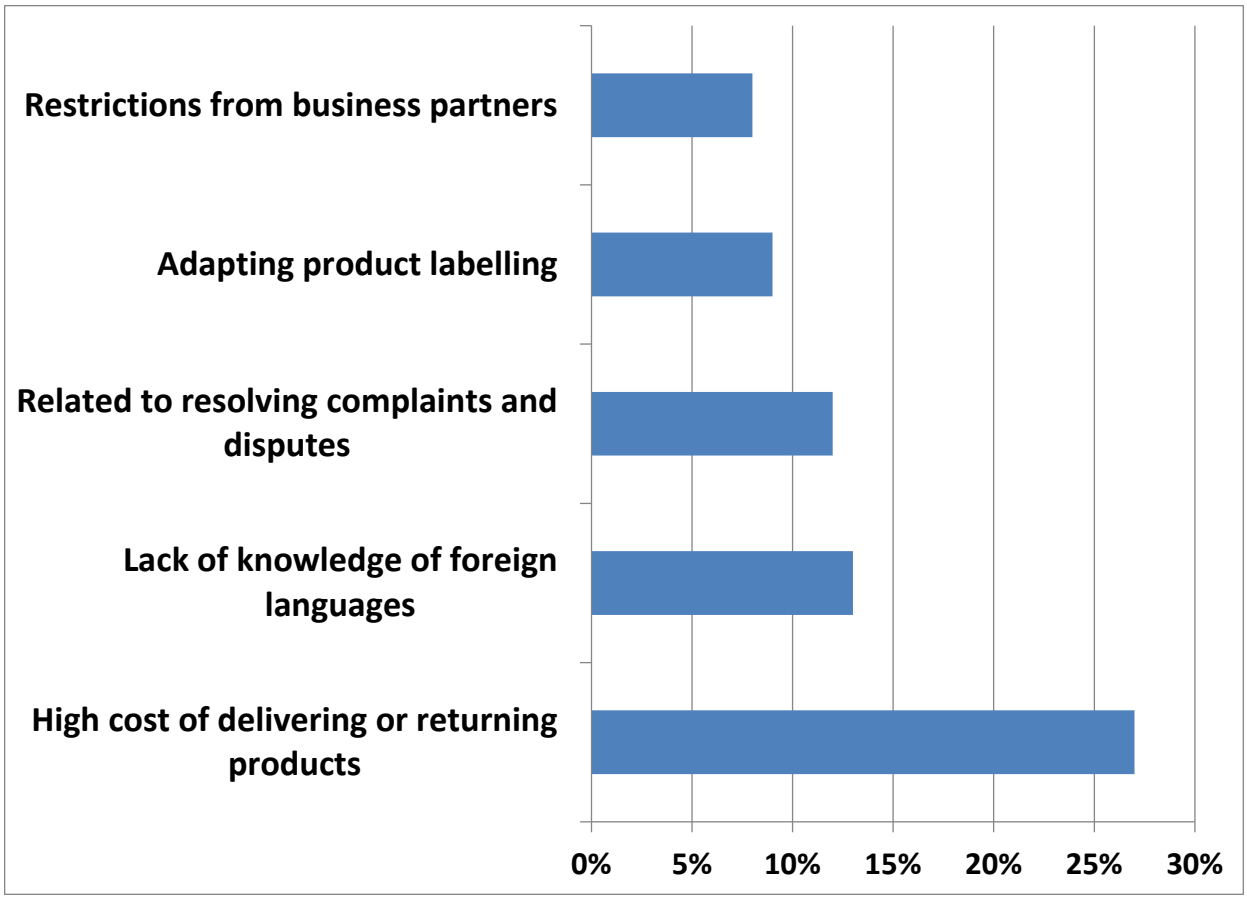
[11] E-commerce Europe.

[12] Note that this reflects a broad definition of Europe, including for instance Russia and Turkey.

[13] Eurostat, at https://ec.europa.eu/eurostat/statistics-explained/index.php/E-commerce_statistics viewed 5 October 2018.

[14] Eurostat, at https://ec.europa.eu/eurostat/statistics-explained/index.php/E-commerce_statistics_for_individuals#undefined viewed 5 October 2018.

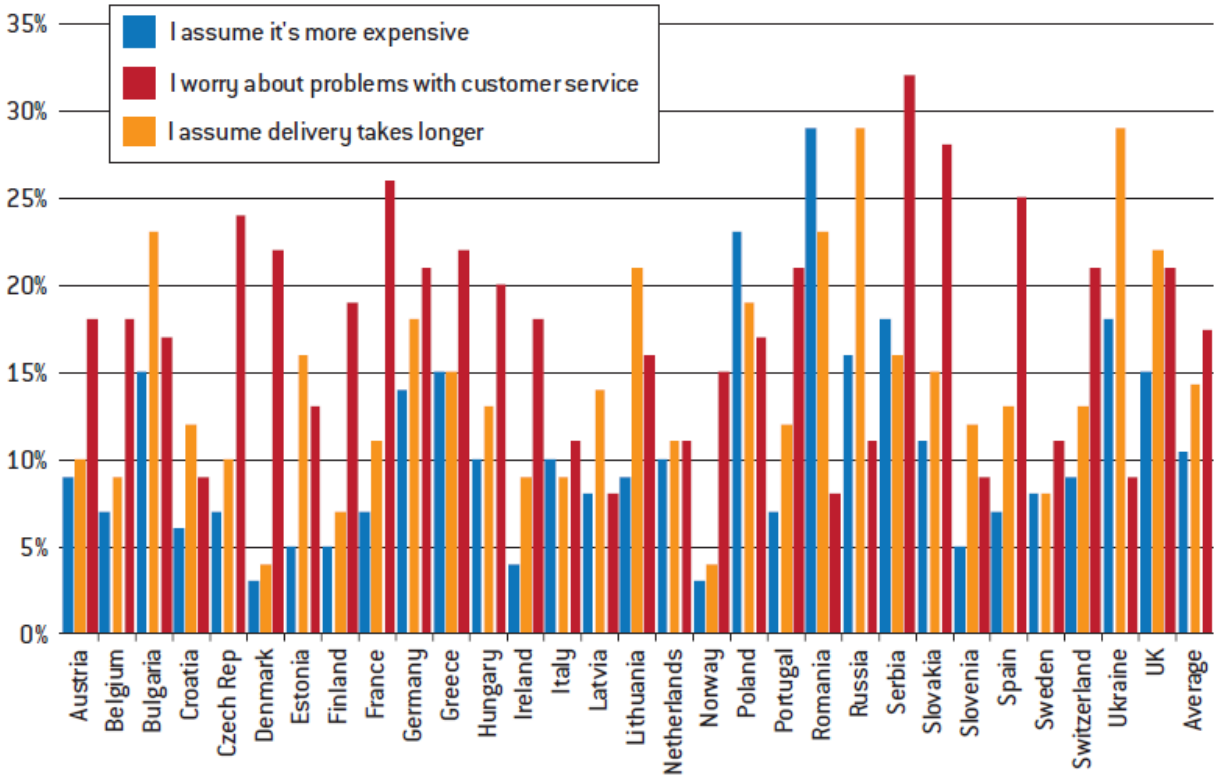
Figure 6. Difficulties experienced when selling to other EU countries (percent of enterprises with web sales to other EU countries, EU-28, 2016).



Source: Bruegel based on Eurostat data.

Consumers identify a slight different range of problems.

Figure 7. Reasons for not purchasing a product online from abroad (2014-15).



Source: Bruegel based on the 'Consumer Barometer' survey conducted on behalf of Google, at www.consumerbarometer.com, viewed 21 February 2017. The question asked was: "Why have you never purchased a product online from abroad?" [15]

The DSM sought to deal with many of the problems as perceived by merchants and consumers, notably including:

- Lower cross-border parcel delivery prices.
- Simplified and more coherent VAT procedures.
- Better coverage of consumer protection, but with less "gold plating".
- Prevention of unjustified geo-blocking (where feasible).
- Better protection of consumer privacy.

This is broadly in line with Parliament interests over a period of many years (European Parliament, 2018a), and is also in line with the recommendations of Godel et al. (2017).

A full list of measures attempted or enacted appears in Chapter 4, together with a discussion of the degree to which we anticipate that they will generate economic benefits.

[15] J. Scott Marcus, John Morales and Georgios Petropoulos (2017), "Strengthening cross-border e-commerce in the European Union", in *Remaking Europe: The New Manufacturing as an Engine for Growth*, ed. Reinhilde Veugelers, Bruegel, at http://bruegel.org/2017/09/remaking-europe/.

2.2. The continuing evolution of the digitisation of European society

The transformation of the EU through digitisation appears to depend on the adoption of a range of technologies such as artificial intelligence, robotics, big data, machine learning, the Internet of Things, 5G, possibly blockchain, and more. The DSM Strategy recognised the need "to exploit innovations such as Cloud computing, Big Data tools or the Internet of Things",[16] but the 2015 document provides few concrete measures to support these emerging technologies. Instead, the DSM Strategy focuses on the problems that were perceived as urgent and immediate in 2015: broadband deployment and spectrum management, media policy, competition issues posed by online platforms, and consumer privacy and security. These issues are still very much with us and will surely remain so for many years, but the activities in the next legislative term as regards the promotion of digitisation are likely to focus on needs that were not yet obvious in 2015, many of which are not entirely clear today.

The European Parliament has been actively engaged in the fostering of these technologies, and exploration of the policy issues that flow from them (European Parliament 2017 and 2018c). The Commission has also been active, most recently with European Commission (2018k).

We list below a few of the technologies that are now hitting their stride, and the potential economic opportunity associated with each. Many of the estimates are drawn from McKinsey (2013), which provides a consistent scaling in US dollars. Different analysts provide different estimates, but all of these numbers are enormous. We potentially stand on the threshold of a transformative change.

- **Artificial intelligence (AI) and machine learning:** The collective potential value of these technologies in conjunction with the use of big data is enormous. For instance, McKinsey (2013) estimates "that knowledge work automation tools and systems could take on tasks that would be equal to the output of 110 million to 140 million full-time equivalents (FTEs). It is possible that this incremental productivity … could have as much as $5.2 trillion to $6.7 trillion in economic impact annually by 2025."
- **The data economy:** IDC Italia and the Lisbon Council (2018) estimates the direct value of the data market in the EU28 as representing € 50 billion in 2017, with the potential to grow to € 77 billion in 2020 and € 110 billion in 2025.[17] Spill-overs into the broader EU28 economy based on the *use* of the data are much larger, representing € 787 billion in 2025.[18] Under more optimistic assumptions, the direct value of the data market could be as much as € 146 billion in 2025.[19]

[16] Page 14.

[17] IDC Italia and the Lisbon Council (2018), page 100. This is the value of "the marketplace where digital data is exchanged as 'products' or 'services' as a result of the elaboration of raw data" under a Baseline scenario that is characterised by "a healthy growth of data innovation, a moderate concentration of power by dominant data owners with a data governance model protecting personal data rights, and an uneven but rather wide distribution of data innovation benefits in the society".

[18] IDC Italia and the Lisbon Council (2018), page 20.

[19] IDC Italia and the Lisbon Council (2018), page 100. This is under a High Growth scenario characterised by "a high level of data innovation, low data power concentration, an open and transparent data governance model with high data sharing, and a wide distribution of the benefits of data innovation in the society".

- **Robotics:** Take-up in Europe is substantial, especially in Germany. "Advanced robotics … has the potential to affect $6.3 trillion in labor costs globally." (McKinsey, 2013).
- **The Internet of Things (IoT):** In the past, most internet users were human beings. Today, most "users" are intelligent devices. Cisco (2013) estimates that 200 million devices were already connected to the internet in 2013, but that this number will increase to 50 billion in 2020. They estimate $14.4 trillion in the combination of increased revenues and lower costs that is created or will migrate among companies and industries from 2013 to 2022. Per McKinsey (2013), "The Internet of Things has the potential to create economic impact of $2.7 trillion to $6.2 trillion annually by 2025".
- **Cloud computing:** The time for cloud computing is ripe thanks to widespread deployment of fixed and mobile broadband together with progressive Moore's Law improvements in the price/performance of servers. Cloud computing can offer substantial economic benefits in comparison with local deployment of dedicated hardware and software. "Cloud technology has the potential to improve productivity across $3 trillion in global enterprise IT spending, as well as enabling the creation of new online products and services for billions of consumers and millions of businesses alike." (McKinsey, 2013)
- **Collaborative economy:** Vaughan and Hawksworth (2014) calculated that the collaborative economy was contributing $15 billion annually worldwide in ten sectors[20] and could reach $335 billion by 2025. Goudin (2016) approximated the potential economic gain from better use of resources through the collaborative economy to be €572 billion in annual consumption across in the EU if substantial associated regulatory barriers were removed; otherwise, those barriers could reduce the annual value of potential increased use by up to €18 billion in the shorter term and by up to €134 billion in the medium and longer term. In a more recent study using a new empirical methodology, Eljas-Taal et al. (2018) estimate annual revenues of the collaborative economy in four sectors to represent 0.17% of EU GDP. They estimate that the collaborative economy provides work for approximately 395,000 people active across the EU, representing about 0.15% of EU employment.[21]
- **5G wireless networks:** The ability to simultaneously support multiple use cases from a single network, including (1) high bandwidth mobile broadband services, (2) factory automation, and (3) widespread Internet of Things deployments has substantial upside potential. Estimates vary, but all imply large gains from mobile networks that will primarily be 5G. Per McKinsey (2013), "mobile Internet usage could generate global economic impact of $3.7 trillion to $10.8 trillion per year by 2025". Per IHS Markit (2017), "In 2035, 5G will enable $12.3 trillion of global economic output. That is nearly equivalent to US consumer spending in 2016 and more than the combined spending by consumers in China, Japan, Germany, the United Kingdom, and France in 2016."

[20] P2P finance, online staffing, P2P accommodation, car sharing, equipment rental, B&B and hostels, car rental, book rental and DVD rental.

[21] Codagnone et al. (2016) cautions that many of these estimates are highly uncertain due to lack of reliable data, lack of empirical evidence, or questionable assumptions.

The GSMA (2018) estimates that mobile will contribute $4.6 trillion to the global economy by 2022 (5% of GDP), up from $3.6 trillion in 2017 (4.5% of GDP). Most of this value-added increase will be due to productivity gains. In the developed world, the adoption of M2M and IoT solutions will drive increased productivity.

3. OVERALL SINGLE MARKET BENEFITS

KEY FINDINGS

Numerous estimates of the gains produced by the Single Market have been made over the years, using a range of methodologies and assumptions, and arriving at a range of conclusions.

We concur with the key findings of the comprehensive literature survey provided by Dahlberg (2015), which was based on most of the same studies that appear in Sections 3.1 and 3.2 of this in-depth analysis:

- "The single market has been a significant enabler for economic growth in Europe. Comparisons are not easily done, but 2-4 per cent seems to be in the ballpark."
- "This effect primarily seems to have run through the free movement of goods and capital –the intra-EU trade and investment flows have experienced significant increases since the implementation of the single market."
- "The single market does not seem to have affected the flows of services and people to a significant extent."
- We have not identified any definitive ex post findings on the impact of free movement of services.
- Single Market gains due to free movement of services appear to have been limited and uneven, and there are some indications that price mark-ups in the services sector have actually increased. Given that services represent some 70% of European GDP and employment, this is worrisome.

Dahlberg's estimate of gains of 2-4% of GDP implies that the Single Market currently generates between € 340 and € 680 billion per year in benefits for the EU.

If it were as easy to purchase goods cross-border as domestically, price convergence would lead to prices that are lower by 1.0% for goods purchased online and 0.5% for good purchase offline. Consumer and producer surplus would increase by 1.2% and 1.4% each. The DSM Strategy as enacted to date realises only a fraction of this gain. We estimate that some € 36 billion per year in additional consumer gains alone remain to be realised.

Beyond this, broadband deployment and adoption clearly contribute to societal welfare.

In Sections 3.1 and 3.2 of this chapter, respectively, we consider a range of current and previous studies that assessed either *ex ante* or *ex post* the benefits of strengthening the European Single Market. The assessments in these sections do not limit themselves to digital aspects. We then close with a review in Section 3.3 of assessments of benefits specific to the Digital Single Market.

The EU's Single Market is characterised by the so-called Four Freedoms: freedom of movement of goods, services, capital, and individuals. For this study, our primary concern is with measures to promote the free flow of goods and services.

3.1. *Ex ante* estimates of the benefits of the Single Market

The study "Contribution of the Internal Market and Consumer Protection to Growth" (Alleweldt at al. (2014)) provided a concise summary of research conducted to date on the benefits of the Single Market. Inasmuch as this report represents in large part an update of that study, we provide here an updated summary in Table 3 of research conducted, drawing on the survey of empirical work in Dahlberg (2015). For each of the studies, we identify the primary channel by means of which European GDP or other aspects of the European economy are influenced.

As explained in Section 1.3, the Single Market, the Digital Single Market, and the DSM Strategy are three different things in terms of their economic benefits. In this section and also in Section 3.2, we are speaking only of the Single Market. We return to the Digital Single Market in Section 3.3, and to the legislative measures that comprise the DSM Strategy in Chapter 4.

All of these studies seek to address the EU as a whole, but they are not directly cross-comparable. For example, different studies are based on different numbers of Member States.

Table 3. Overview of research on ex ante impacts on growth.

Driver of impact measured	Estimation of increase in EU GDP / Economic Effects	Methodology	Source
Single Market Integration	4.25-6.5% in GDP in the long run; Price level drops by 6 %; Creation of 2 million jobs	EU-12. Partial equilibrium model	Cecchini et al. (1988)
	0.5% in GDP for immediate static effects; 1.2-2.6% for dynamic long-run effects.	General Equilibrium Model	Harrison et al. (1994)
	4% in GDP	Calibrated model to data on 10 industries	Smith and Venables (1988)
	0.25-1% in annual GDP growth	Calibration with macroeconomic growth model	Baldwin (1989)
Elimination of intra-EU goods and services barriers	10% in the long run	General equilibrium model. Estimation based on long-run steady state accounting for dynamic effects. Applies to goods and services.	Straathof et al. (2008)
	14% by 2020	Based on the MIRAGE computable general equilibrium (CGE) model, simulations applied to scenarios covering 2011-2020, accounting for dynamic effects.	Aussilloux et al. (2011)
	Trade in services increases by 7.2%; FDI increases by 3.8%; productivity increases by 4.7%; GDP increases by 0.8%	Gravity model	Monteagudo et al. (2012)

Driver of impact measured	Estimation of increase in EU GDP / Economic Effects	Methodology	Source
A 50% reduction of intra-EU goods and services barriers	An increase in the EU's GDP by around USD 1 trillion in 2025 (in 2007 prices), or equivalent to around 4.7% of the EU's GDP	Based on the MIRAGE computable general equilibrium (CGE), model simulations covering the period 2012-2025. Covers EU-27.	Decreux (2012)
Overcoming market fragmentation in six economic sectors	An increase in the EU27 economy by 1.6% in the long run	Based on an analysis of productivity gaps in six sectors (retail trade; business services; accommodation; logistics; wholesale trade; construction), which account for 20.2% of the total EU labour productivity gap. Covers EU-27.	London Economics / PwC (2013)

Source: Bruegel based in large part on Alleweldt (2014) and Dahlberg (2015).

3.2. Ex post estimates of the benefits of the Single Market

Alleweldt at al. (2014) also provided a concise summary[22] of *ex post* analysis conducted to date on the benefits of the Single Market. Once again, we provide an updated summary of research conducted in Table 4, drawing on the survey of empirical work in Dahlberg (2015). Following the approach taken in Dahlberg (2015), we categorise the studies depending on which of the Four Freedoms is of primary interest – freedom of movement of goods, services, capital, or individuals.

[22] Table 7 on page 29.

Table 4. Overview of research on ex post impacts on growth.

Driver of impact measured	Estimation of increase in EU GDP / Economic Effects	Methodology	Source
Single market integration	About 1% over 1992-1994	Aggregation of 38 studies and one business survey. Covers EU-12	Monti and Buchan (1997)
	1.8% over 1992-2002	Using Commission's QUEST general equilibrium model. Covers EU-25.	European Commission (2003)
	2.2% over 1992-2006	Using Commission's QUEST general equilibrium model. Without the 2004 enlargement, the impact on EU GDP would be below 2%. Covers EU-25.	Ilzkovitz et al. (2007)
	4.8-5.7% since 1987	Unidentified	European Commission (2010)
	2.13% over 1992-2008	Unidentified	European Commission (2012)
	EU membership raises on average GDP growth per worker by 1.4 to 1.6 percent, compared to non-members.	Fixed-effect and instrumental-variation estimations	König (2015)
European integration process	2-3% over 1958-2005	Gravity equation model accounting for trade diversion effects.	Straathof et al. (2008)
	5% over 1950-2008	Counterfactual assessment based on each individual step of European integration. Covers EU-25.	Boltho and Eichengreen (2008)
	12% over 1973-2004	Counterfactual assessment based on enlargement Member States	Campos et al. (2014)

Driver of impact measured	Estimation of increase in EU GDP / Economic Effects	Methodology	Source
	A one-point increase of the EU integration index is associated with a rise in the growth rate of the real GDP per capita of 0.08 percentage points, over 1992-2012	Based on a counterfactual assessment applying a composite index of EU integration for 14 EU Member States	Petersen et al. (2014)
	Rationalization, human capital, and the use of ICT are the main drivers of TFP in the EU.	Long-panel analysis (augmented mean group estimator and dynamic OLS), 17 EU countries, 13 sectors over 1995-2007.	Gehringer et al. (2015)
Free movement of goods	18% increase in intra-EU trade in the immediate years following the launch of the single market	Gravity model	Straathof et al. (2008)
	2% increase in EU GDP; 38% increase in intra-EU trade.	Gravity model	HM Treasury (2005)
	A significant decrease in home bias from 1995 to 2007	Gravity model	Cafiso (2009) and Pacchioli (2011)
	1.24% increase in GDP for smaller EU15 members due to increase in import variety	Structural model using disaggregated trade data from 1999 to 2008	Mohler and Seitz (2010)
	Price mark-ups fall by 32% in the manufacturing sector	Competition measured by Lerner index	Badinger (2007)
	Increase in innovation but effects vary across sectors	Two-stage instrumental variable regression	Griffith et al. (2010)
	Schengen Agreement boosted trade by 3% on average. More robust in goods than in services.	Structural gravity model, taking Schengen agreement as a count variable measuring the number of Schengen border crossings.	Felbermayr et al. (2018)

Driver of impact measured	Estimation of increase in EU GDP / Economic Effects	Methodology	Source
Free movement of services	Trade in service was barely integrated	Comparative analysis based on descriptive statistics	Ilzkovitz et al. (2007)
	5% increase in intra-EU trade in services from 1999 to 2005	Gravity model	Straathof et al. (2008)
	Price mark-ups increased in service sector	Panel estimation, 10 EU countries from 1981-99	Badinger (2007)
	Poor integration in the ICT market	Using price disparity as a measure of market integration	Pelkmans and Renda (2011)
Free movement of capital	Ratio of intra-EU FDI to total increased from 53% to 78% for inflows and from 50% to 66% for outflows	Comparative analysis based on descriptive statistics	Ilzkovitz et al. (2007)
	FDI between EU countries 28% higher than non-EU	Gravity model, using data from 1981 to 2005	Straathof et al. (2008)
Free movement of persons	No significant effects on wages and employment rates	Multilevel comparative analysis based on descriptive statistics	Kahanec and Zimmermann (2009)

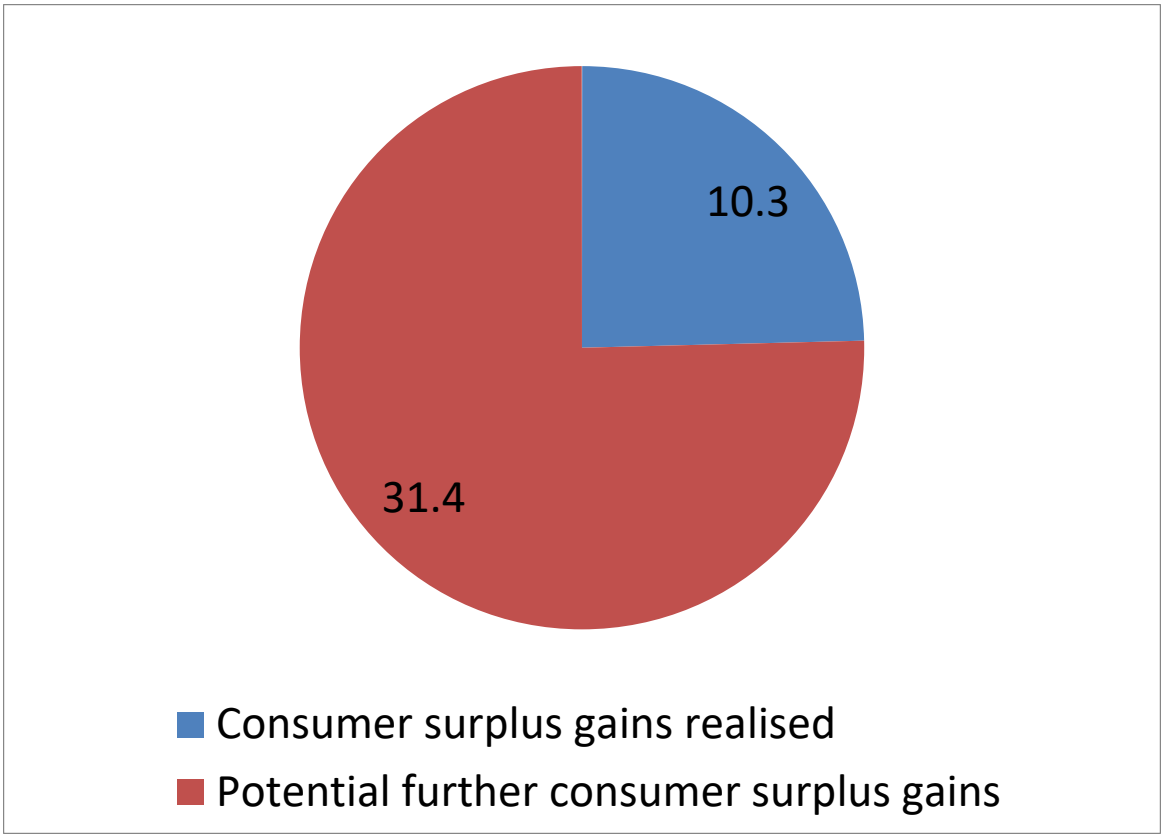
Source: Bruegel based in large part on Alleweldt (2014) and Dahlberg (2015).

3.3. Ex ante estimates of the benefits of the Digital Single Market (DSM)

Numerous studies have assessed the benefits of the Single Market. Fewer have specifically addressed the benefits of the Digital Single Market (DSM), as embodied in the Commission's 2015 *Digital Single Market Strategy*. Many of the initiatives in the DSM sought to ameliorate or eliminate barriers to e-commerce, for instance by simplifying VAT arrangements, harmonising consumer protection rules, or reducing the cost of cross-border parcel delivery. Others sought to promote consumer trust in e-commerce by ensuring privacy and network and information security. Still others sought to promote e-government, or to facilitate the deployment of high capacity broadband network infrastructure in order to ensure that Europeans have good access to the Digital Single Market.

A noteworthy recent study[23] using state-of-the-art analytic techniques found that if e-commerce sales of goods within the European Union were as easy and cost-effective as domestic sales, retail prices would decrease in all countries, both online (1 percent on average) and offline (0.5 percent on average). Consumer surplus (CS) in the EU would increase by 1.2 percent, primarily based on the reduction of the price paid for goods and to a lesser degree on the ability of consumers to choose from a wider range of goods. The study also found an increase of producer surplus (PS) of 1.4 percent, not only by reason of increased consumption resulting from price elasticity of demand, but also because of the reduced costs of supply – many purchases that are made from 'bricks and mortar' retailers today would instead be made online. The cost of producing the goods would be unchanged, but the cost of making the sale online would be less than the cost of making the equivalent sale offline. The DSM Strategy as enacted to date realises only about a quarter of this gain, as shown in Figure 8. We estimate that some € 31 billion per year in additional consumer gains alone remain to be realised.

Figure 8. Approximate consumer surplus gains per year realised by DSM Strategy measures already agreed or in place versus further potentially realisable gains (billion euro).



Source: Bruegel based on Duch-Brown and Martens (2016).

[23] N. Duch-Brown and B. Martens (2016) 'The economic impact of lifting geoblocking restrictions in the EU Digital single Market', Digital Economy Working Paper 2016/02, Institute for Prospective Technological Studies, European Commission.

We know of no comparable study for services. Indeed, there is a dearth in general of definitive studies on the impact of the free movement of services.

In seeking to identify the indices of digitisation that might be most relevant to the gains provided by the DSM, we conducted our own fixed-effect regression of income on the indicators of digital readiness, as expressed by the Commission's *Digital Economy and Society Index (DESI)*, on GDP (see the Annex to this report). These indices address (1) Connectivity (reflecting broadband deployment and quality), (2) Human Capital/Digital Skills, (3) Use of Internet Services by Citizens, (4) Integration of Digital Technology by Businesses, and (5) Digital Public Services (with a focus on e-Government and e-Health). We found that broadband and e-Government play a statistically significant role in explaining GDP growth in the EU. The relationship does not prove causality, but in the case of broadband infrastructure there is good reason to believe that there is a causal relationship.

Indeed, a great many studies have attempted to identify the societal benefits to GDP associated with the deployment and adoption of high speed broadband internet access services. These studies clearly demonstrate the benefits of broadband deployment and adoption. Whether they conclusively demonstrate the incremental benefits of ultra-fast broadband as compared to basic broadband is, however, debatable. The concise summary that appears in Cambini (2018) notes:

- Röller and Waverman (2001, AER): An increase of 10% in the broadband penetration rate leads on average to an increase of 2.8% of GDP growth (21 OECD countries).
- Koutroumpis (2009, JTPO): the average impact of broadband infrastructure on GDP is 0.63% (for the EU-15, in the period 2002–2007).
- Czernich et al. (2011, EJ): a 10% increase in the broadband penetration rate results in 1-1.5% increase in annual GDP per-capita. Faster broadband = higher GDP growth.
- Work commissioned by DCMS (2013): fast broadband can add £17bn to UK's annual GDP.

4. BENEFITS OF SPECIFIC DSM STRATEGY INITIATIVES

KEY FINDINGS

We identify some **€ 176.6 billion in annual gains (in current euro) resulting from legislative measures enacted (or expected to be enacted) in the current legislative term once the measures are fully effective, corresponding to 1.2% of current (2017) GDP**. This estimate is based on Commission Impact Assessments and other publicly available sources.

The largest gains achieved flow from (1) electronic communications networks and services, based mainly on the EECC and secondarily on increased roaming due to RLAH, (2) data and AI, based mainly on the Directive on the re-use of public sector information, and secondarily on free flow of non/personal data and on GDPR; (3) e-commerce, content and online platforms, based on the Geo-Blocking Regulation, the VAT modernisation programme, and the Regulation on Cross-Border Parcel Delivery; and (4) e-Government, provided that the Single Digital Gateway is implemented well and widely used.

The large benefits attributed to the EECC reflect various spill-overs into the overall digitisation of European society enabled by measures that promote the deployment of fibre-based fixed broadband and of 5G mobile services.

We have also identified an additional € 87.9 billion in annual gains that might be realised by filling in gaps in the DSM Strategy as presently enacted. These are addressed in Chapter 5.

In this chapter, we evaluate the various legislative measures that have been proposed or enacted pursuant to the Digital Single Market (DSM) strategy, including measures related to consumer protection.

We begin by reviewing the taxonomy of legislative measures developed in a companion study to this one that addresses legal, as distinct from economic, aspects of DSM legislation (Section 4.1). This enables us to group the measures into seven broad categories. In addition, we consider a few pre-2014 electronic communications measures for which estimates of societal benefits are readily available.

We then follow in Section 4.2 with an explanation, category by category and legislative measure by legislative measure, of the benefits that can be assumed to be associated with each measure. We conclude in Section 4.3 with a tabular summary of these results, together with a simple summation of estimated benefits. As already explained in Chapter 1, this simple summation greatly overestimates the probable real benefits. In Chapter 4.4, we use broader measures to detect and to partially correct for estimation errors in the simple summation.

4.1. A taxonomy of DSM measures

We follow a taxonomy of legislative measures derived from that used in the companion study by de Streel and Hocepied (2019). The shadings (green or yellow) in Table 5 denote whether the measure in question is either enacted or has been substantially agreed (green), versus whether it is still being negotiated (yellow).

The groupings of measures taken are carried forward into the economic analysis in Section 4.2.

Table 5. Digital Single Market (DSM): Legal instruments adopted or proposed during the 8th Legislature (2014-2019).

E-commerce, Content and online platforms	Intellectual Property	Data and AI[24]	Trust and security	Consumer protection	E-Government	Electronic communications networks and services
Regulation on cross-border portability of online content services (2017)	Directive Trade Secret (2016)	Regulation General Data Protection (2016)	Reg. eIDAS (2014)	Regulation on Consumer Protection Cooperation (2017)	Regulation establishing a Single Digital Gateway (2018)	Regulation Open Internet / roaming / TSM (2015)
Regulation addressing unjustified geo-blocking (2018)	Regulation and Directive permitted uses in copyright for print-disabled persons (2017)	Regulation on Free flow of non-personal data (2018)	Directive on Network Information Security (2016)	Directive on contracts for the supply of digital content - P2015	Directive on the re-use of public sector information (recast) P2018	Decision on use of 470-790 MHz frequency band (2017)
Council Regulation and Directive VAT for e-Commerce (2018)	Council Directive on VAT for e-publications (2018)	Council Regulation establishing the European High-Performance Computing Joint Undertaking (2018)	Regulation on the EU Cybersecurity Act – P2017	Directive on contracts for sales of goods - P2015, M2017		Regulation on wholesale roaming (2017)

[24] Also, Regulation on protection of personal data by the Union institutions and bodies – P2017.

E-commerce, Content and online platforms	Intellectual Property	Data and AI[25]	Trust and security	Consumer protection	E-Government	Electronic communications networks and services
Regulation on cross-border parcel delivery services (2018)	Regulation on Copyright and broadcasting organisations – P2016	Regulation e-privacy – P2017	Directive on the combatting fraud and counterfeiting of non-cash means of payment – P2017	Directive Better enforcement and modernisation of EU consumer protection rules – P2018		Regulation to promote Internet Connectivity in local communities (Wi-Fi4EU) (2017)
Directive Audio-Visual and Media Services (2018)	Directive on copyright in the Digital Single Market – P2016		Regulation e-evidence (P2018)	Directive Collective redress – P2018		Directive on European Electronic Communications Code (2018)
Payment Services Directive 2 (PDS2) (2015)			Regulation EU Cybersecurity Centers (P2018)			Regulation BEREC (2018)

[25] Also, Regulation on protection of personal data by the Union institutions and bodies – P2017

E-commerce, Content and online platforms	Intellectual Property	Data and AI[26]	Trust and security	Consumer protection	E-Government	Electronic communications networks and services
Regulation on promoting fairness and transparency for business users of online intermediation services – P2018						
Regulation on the implementation and functioning of the .eu Top Level Domain name – P2018						
Directive on the re-use of public sector information (recast) P2018						

Source: Bruegel based on de Streel and Hocepied (2019), "Benefits of European Digital Single Market"

Green: Legislative acts enacted or agreed by the EU co-legislators Yellow: Legislative acts proposed by the Commission and under negotiation among the EU co-legislators

[26] Also, Regulation on protection of personal data by the Union institutions and bodies – P2017

4.2. Benefits of the DSM Strategy measures enacted or proposed

As noted in Section 1.3, we have attempted to sum the benefits associated with the DSM Strategy, consistent with Commission Impact Assessment reports, whether the benefits derive from Single Market considerations or have some other basis.

In this section, we briefly review what is known about the likely benefits from each measure. In each case, we have reviewed the Commission's ex ante Impact Assessment that the Commission submitted together with the legislative proposal. *Unless otherwise indicated, the Impact Assessment did not provide a meaningful estimate of economic benefits*.

We have made adjustments to Commission estimates where we identified problems; however, since we have not gone back to primary data to do our own econometric assessments, our figures necessarily reflect the assumptions and any errors in the Commission estimates.

Rather than quantifying benefits to date, we have attempted to provide a reasonable estimate of long term steady state benefits once the measure is fully and correctly implemented. Many of the measures have not yet been enacted. Even for those measures that have been enacted, they have not been in place long enough to enable meaningful ex post assessment.

The estimates of benefits are relative to a "business as usual" scenario as might have been expected at the time the Commission made the initial legislative proposal, which provides a consistent counter-factual that is in line with the Commission's *Better Regulation* principles and thus with the *ex ante* Impact Assessments that the Commission submitted.

In light of the roughness of the underlying estimates in Impact Assessment reports and in the literature, we have not made explicit adjustments to take into account (1) inflation (which has been low in recent years) or (2) PPP adjustments that were not already present in estimates from Commission Impact Assessments.

We have also made no adjustments to allow for Brexit, since as of this date there is no clarity as to what form (if any) Brexit will take. All estimates are thus EU28 estimates.

Where a measure has been agreed or enacted, and where feasible, we have made rough adjustments to take into account the likely impact of any conspicuous differences between the measure that the Commission proposed (whose impacts are visible in the Impact Assessment) and the measure actually enacted.

We do not attempt to assess the benefits of measures where political agreement has not yet been reached (except in cases where the impact is clearly *de minimis*). The uncertainty over what will be enacted is too great.

The Commission's Impact Assessments (referred to throughout this section as *IA* reports) and, where appropriate, legislative proposals are listed among the references at the end of this report. In the interest of brevity, they generally do not appear in footnotes in this section.

In the subsequent sections of this study , estimated yearly gains that are reflected in our estimates of steady state gains due to measures already enacted or agreed (and thus reflected in Table 6 and Figure 9) are highlighted by being placed in **bold text**.

4.2.1. E-commerce, content and online platforms

In this section, we consider benefits directly associated with e-commerce, measures associated with content and copyright, and measures that deal with online platforms.

- **Regulation on cross-border portability of online content services (2017):** The gain to European consumers is clear, but macroeconomic benefits are probably quite small.
- **Regulation addressing unjustified geo-blocking (2018):** Duch-Brown and Martens (2016)[27] have estimated that eliminating all barriers to cross-border e-commerce would result in lower consumer retail prices of 1% for goods sold online and 0.5% for goods sold offline. In the absence of quantitative data, we assume (as does the Commission's Impact Assessment) that the same holds true for services. We assume that the Geo-blocking Regulation covers only 40% of all goods and services due to the exclusion from the non-discrimination provisions of (1) copyrighted content and (2) goods that must be shipped cross-border. **Annual benefits** of € 2.4 billion euro could be expected for online sales of goods and services in 2018 based on current e-commerce volumes, **growing to as much as € 6.8 billion in 2025** based on the expected increase in the volume of e-commerce.[28] **Gains of € 3.4 billion can be expected in 2018 from sales of offline goods**, but growth is likely to be offset by the increasing fraction of total retail sales that online sales represent.[29] Gains could be 2.5 times as great if it were possible to include copyrighted content (especially audiovisual content) and goods that require shipment, but doing so would require substantial new regulation with complicated consequences (see Section 5). We project total gains of **€ 10.3 billion.**
- **Council Regulation and Directive VAT for e-Commerce (2018):** The legislative proposal claims that the measure is "**expected to reduce VAT compliance costs for businesses by EUR 2.3 billion a year** from 2021 while at the same time increasing VAT revenues for Member States by EUR 7 billion." Compliance costs as estimated in the IA were based on a Standard Cost Model, while macroeconomic impacts were estimated using a Computable General Equilibrium (CGE) model. The IA estimated somewhat greater savings of between 14% and 18% of the € 68 billion in annual VAT compliance costs incurred by SMEs.
- **Regulation on cross-border parcel delivery services (2018):** Alleweldt et al. (2014) predicted "savings of EUR 2.23 to EUR 5.57 billion per year due to lower prices". The Commission's legislative proposal included measures to open up the cross-border parcel delivery services of national postal operators (NPOs) to commercial competitors, and to strengthen both powers and obligations for national postal regulatory authorities; however, these measures are omitted from the measure as adopted. The Regulation makes a positive contribution to price transparency, but is unlikely to have significant macroeconomic effect. We assume **annual benefits of not more than € 1.0 billion**.

---

[27] Duch-Brown, N. and Martens, B. (2016), The Welfare effects of lifting geoblocking restrictions in the EU Digital single Market, JRC/IPTS Digital Economy Working Paper.

[28] This does not take into account the likely increase in the total volume of retail sales, nor inflation, nor the expected departure of the UK from the EU28.

[29] This is based on € 7,400 billion in retail sales per annum, and the assumption that the current Geo-Blocking Regulation applies to only 10% of them due to the exclusion of goods that require shipment.

- **Directive Audio-Visual and Media Services (2018):** The IA contains no significant economic analysis of societal welfare impacts. It has a bit about administration and implementation costs, which are *de minimis*. We assume **annual gains of € 1.0 billion.**
- **Regulation on promoting fairness and transparency for business users of online intermediation services:** Per the legislative proposal (which was introduced in April 2018), the Commission's preferred approach is "estimated to be capable of reversing a dampening effect on the online platform economy resulting from a lack of trust of business users amounting to at least between EUR 0.81 billion and EUR 4.05 billion". Since the proposal is only at the beginning of the legislative process, we do not include it in the estimated total gain.
- **Regulation on the implementation and functioning of the .eu Top Level Domain name:** The .eu domain name has value, and modernisation is appropriate. The Commission's legislative proposal notes that "problem currently is not dramatic". Macroeconomic benefits are probably quite small.
- **Payment Services Directive 2 (PSD2):** This has never been identified as a DSM Strategy initiative, but it has a clear linkage to online e-commerce. First, it reduces the limit on consumer liability for unauthorised use of credit cards to €50 from the previous €150. Second, and probably even more important, it eliminates surcharges for the use of a consumer credit or debit card. It is complemented by complemented by Regulation (EU) 2015/751, which puts a cap on wholesale interchange fees (MIFs) charged between banks for card-based transactions (a necessary prerequisite to the elimination of retail surcharges).

In sum, we estimate aggregate annual steady state gains once the measures take full effect as being comprised of € 5.8 billion for the Geo-Blocking Regulation with likely growth to at least € 10.2 billion in 2025 due to the growth in online sales, € 2.3 billion for the VAT measures, € 1.0 billion for the Regulation on cross-border parcel delivery, and € 1.0 billion for the revised AVMS Directive, for a sum of **€ 14.6 billion per year** once the measures have taken full effect (computed in current euro). As for the impacts of other measures in this group, they are either small enough to ignore, or else too new (and thus too uncertain) to estimate.

4.2.2. Intellectual Property

In this section, we deal with measures related to intellectual property including copyright.

- **Directive Trade Secrets (2016):** Consistent handling makes economic sense. There are gains, to be sure, but the IA contains no analysis of impacts.
- **Regulation and Directive on permitted uses in copyright for print-disabled persons (2017):** This is meritorious, but the economic impact is unlikely to be large.
- **Directive on copyright in the Digital Single Market:** The measure provides for simplified acquisition of multi-country rights, but does not deal with vertical restrictions. The overall effects are difficult to assess without knowing what will be enacted by the co-legislators in the end. The Parliament has reached consensus, but portions continue to be hotly debated.
- **Regulation on copyright and broadcasting organisations:** For purposes of this analysis, the impacts of this measure are included with those of the analysis of the Directive on Copyright.
- **Council Directive on VAT for e-publications:** We treat the benefits of this measure as being covered under the Council Regulation and Directive VAT for e-Commerce (2018).

The Directive on Trade Secrets (2016) may possibly prove to be economically significant, but we have not located any quantitative assessment.

For the Directive on Copyright, it is too soon to make an assessment. The other measures in this group either are covered together with other measures under other headings.

4.2.3. Data and AI

This topic considers data aspects, especially including data protection. Various topics such as artificial intelligence, the Internet of Things, and cloud computing also fall within this group; however, action to date has generally consisted of strategic thinking and Horizon 2020 projects rather than full blown legislative measures.

- **General Data Protection Regulation (2016):** The GDPR is unquestionably one of the most significant items of legislation during the current legislative term. In terms of protection of consumer privacy rights, it represents a landmark. The IA (2012) for the GDPR presents very little analysis of the economic impact, and claims **annual savings of a mere € 2.3 billion in administrative costs** for EU businesses. Meanwhile, Deloitte (2013) claims that GDPR could potentially *reduce* EU GDP by € 173 billion, or 1.3% of EU GDP. We have not specifically taken this claim into account in our estimates.
- **Regulation on the free flow of non-personal data (2018):** The IA anticipates substantial benefits to European business and consumers, but does not compute their value in euro. "Based on the approximate number of Open Data jobs in 2016 and assuming their increase at a rate of 7.3%, it is expected that additional 25,000 direct Open Data jobs could be created in the period 2016-2020. … [A]pplying Open Data in transport services can save 629 million hours of unnecessary waiting time on the road in the EU and possibly lead to saving 1,425 lives a year (i.e. 5.5% of the European road fatalities)." Applying Okun's Law to the number of full time jobs in the EU and the GDP of the EU (both based on Eurostat data for 2016), the jobs added correspond to an **increase in GDP of some € 4.3 billion per annum**.
- **Directive on the re-use of public sector information:** The proposed amendments would address significant gaps. The scope would be expanded to cover a wide range of public or publicly funded data in the utilities and transport sectors, as well as publicly funded research. The scope for derogations from cost-based charges for data would be clarified and reduced. Recognising the growing importance of real time access to dynamic public data, the creation of Application Programming Interfaces (APIs) would be mandated. **The IA credibly estimates savings of € 45 billion per year in 2028 through the creation of new lines of business, and the reduction of costs for public agencies themselves.**[30] We make the optimistic assumption that these measures will either be enacted during the current legislative term or else shortly thereafter.
- **Regulation e-privacy:** The revised e-privacy Directive is not assessed because it is still subject to intense debate.
- **Council Regulation establishing the European High-Performance Computing Joint Undertaking:** The *direct* effects of this initiative are small compared to other initiatives discussed here, since HPC is essentially a niche market. Spill-overs might conceivably be significant, but the IA makes no attempt to quantify benefits, and in any case the spill-overs

[30] A preparatory study for the IA sees the potential for still greater gains. (Barbero et al., 2018)

could for the most part be achieved by spending more on supercomputers manufactured in the US, China or Japan. The main advantages are probably geopolitical, not economic.

- **Artificial Intelligence:** Proposals have been made, but it is far too early to estimate effects.

The quantifiable gains consist primarily of annual gains of € 45 billion due to the creation of new lines of business and to savings on the part of public agencies thanks to amendments to the Directive on the re-use of public sector information, an annual cost reduction of € 2.3 billion in administrative costs, and an increase in GDP of € 4.3 billion per annum thanks to new jobs created through the Regulation on the free flow of non-personal data, for a total of **€ 51.6 billion per annum**.

4.2.4. Trust and security

As with privacy, enhanced network and information security seeks to increase trust in electronic applications, and thus to increase societal welfare.

- **Regulation on electronic identification and trust services (eIDAS) (2014):** The Regulation seeks to ensure mutual recognition of electronic signatures, timestamps, and seals, thus making electronic documents legally valid across Member State borders. The programme addresses requirements that have been identified as being crucial for electronic services in general, and for e-government in particular; (Marcus et al., 2013) however, it has not produced much to date. (ENISA, 2017) Many of the Member States operate eID systems, but only eleven have pre-notified or notified eID schemes under eIDAS.[31] Once critical mass has been reached, benefits of this potentially important programme may be more visible. In any case, the IA provides no estimate of economic benefits. eIDAS has the potential to contribute to cross-border e-commerce and e-government, the gains from which are already recognised in conjunction with other measures.
- **Directive on Network Information Security (2016):** Per the IA, "a reinforced instrument supporting capabilities, prevention, cooperation and awareness at EU level, and therefore designed to increase overall EU cyber resilience, will have a positive economic impact by helping to reduce the costs of cybersecurity/cybercrime incidents, for which the estimated economic impact in the Union stands at 0.41% of EU GDP (i.e. around EUR 55 billion)." What is not expressed is the degree to which these measures are likely to reduce the cost of cybersecurity/cybercrime incidents; moreover, this would be hard to measure ex post, since the counter-factual is highly speculative. ENISA plays an important role in EU cybersecurity, but the **actual reduction in losses directly attributable to ENISA is unlikely to exceed € 4 billion per annum**. Its role to date has largely entailed coordination, multi-national exercises, and exchange of best practice.
- **Regulation on the EU Cybersecurity Act:** This act, which seeks to strengthen ENISA and to give it responsibility in regard to certification of cybersecurity offerings, represents an important and positive step. The certification programme is likely to pose a range of challenges.

[31] See Marina Kirova and Marie Eichholtzer (2018), Overview of pre-notified and notified eID Schemes under eIDAS at: http://ec.europa.eu/cefdigital/wiki/display/EIDCOMMUNITY/Overview+of+pre-notified+and+notified+eID+schemes+under+eIDAS

- **Directive on the combatting of fraud and counterfeiting of non-cash means of payment:** The issue is important, but it is not necessarily a Single Market issue. In any event, the measure has not yet been enacted or politically agreed.

In the absence of hard data, we somewhat arbitrarily assume an overall net reduction in losses due to cybersecurity of some **€ 4 billion per annum**.

4.2.5. E-Government

The relationship between e-Government and GDP was noted in Section 3.3.

- **Regulation establishing a Single Digital Gateway (2018):** "… businesses could save between EUR 11 and 55 billion annually for researching just nine business topics. The preferred option would reduce by 60% the 1.5 million hours that citizens currently spend on researching online seven essential topics before going abroad."

We somewhat arbitrarily assume that the **potential benefits for the identified e-government initiatives are some € 20 billion per annum** thanks to the benefits of the Single Digital Gateway;[32] however, this estimate is highly sensitive both to the quality of implementation of the gateway, and to the degree to which it is actually used.

4.2.6. Consumer protection

Europe benefits from a nominally harmonised set of horizontal, sector-independent consumer protection measures. These measures fail, however, to establish full harmonisation. Member States can and do go beyond the requirements of the horizontal instruments now in place."Gold plating" of rules on the part of the Member States raises compliance costs for cross-border e-merchants.

- **Regulation on Consumer Protection Cooperation (2017):** The cooperation is clearly in order, but the macroeconomic gains are probably limited. In the absence of data, **we assume the gains to be in the range of € 0.3 billion per annum**.
- **Directive on contracts for the supply of digital content:** This is one of the key measures that seeks to implement maximum harmonisation for consumer protection; however, it is not yet in force. GHK (2014) identifies three enhancements to the Consumer Rights Directive (CRD) that could potentially generate € 5.9 billion per year in consumer benefits (see Section 5.2.1), with extension to cover gambling providing the lion's share. Alleweldt et al. (2014) cites GHK (2014) in claiming that further extending EU consumer protection to cover financial services, passenger travel, healthcare and real estate could bring additional gains of € 52 billion annually, but these claims are unsubstantiated and inconsistent. The potential to achieve gains in this way may be substantial, but considerable work would be required, as we explain in Section 5.2.1.

[32] See also part 3 of the IA: European Commission (2017), Completing the Better Regulation Agenda: Better solutions for better results, COM(2017) 651 final; and the legislative proposal.

- **Directive on contracts for sales of goods:** This is another key measure that seeks to implement maximum harmonisation for consumer protection. It is likewise not yet in force.
- **Directive Better enforcement and modernisation of EU consumer protection rules:** This proposed measure would update and modernise two existing consumer protection Directives, and would update penalties in two more to ensure that they have sufficient dissuasive effect. The enhancements appear to be fully appropriate, but the economic gain compared to the existing legislative is likely to be small.
- **Directive Collective redress:** This legislative proposal strengthens consumer rights. Its deterrent effect against corporate misconduct might prove to be substantial in practice, but is difficult to quantify.

The consumer protection measures are important, but the economic impact of the measures proposed to date is not likely to be large – we somewhat arbitrarily assign a value of **€ 0.3 billion per annum**.

On the other hand, GHK (2014) identified potential savings of up to € 5.9 billion per annum if the Consumer Rights Directive (CRD) or its successors were enhanced to cover gambling and to fill other gaps, and Alleweldt et al. (2014) conjectures that substantially greater gains might be achieved by covering financial services, healthcare, real estate and passenger travel.

4.2.7. Electronic communications networks and services

Numerous measures comprise this group. The TSM (which builds on previous Roaming Regulations) and the EECC (which builds on and replaces the Directives that comprised the Regulatory Framework for Electronic Communications (RFEC)) are likely to have greatest economic impact.

- **Regulation Open Internet/TSM (2015):** The measure actually enacted contained only two elements from a much larger Commission proposal: (1) network neutrality and (2) Roam Like at Home mobile roaming. The net neutrality aspects helped to provide legal certainty and to mitigate potential fragmentation, but probably produce negligible economic benefits because incidents prior to enactment were already rare to non-existent, and little enforcement has been required subsequent to enactment. Roam Like at Home has been welcomed by the public, and simplifies arrangements for consumers, but much of the potential economic benefit had already been achieved with the roaming regulations of 2007, 2009, and 2012 (as explained later in this section). The large increase in consumption of roaming data[33] suggests a gain in societal welfare; however, there is no solid basis on which to estimate its magnitude, since BEREC no longer collects data on the price of roaming services, and since the incremental cost to network operators of carrying the data is known to only a limited degree. We assume benefits of **€ 5 billion per annum**, which is roughly in line with benefits achieved by the Roaming Regulation of 2009 (as explained later in this section).

[33] Total roaming traffic for the EEA (28 Member States plus Norway and Liechtenstein) jumped from 2142 million minutes of calls made and 1794 minutes of calls received in 2Q2017 (before RLAH took effect) to 5514 million minutes of calls made and 4326 million minutes of calls received in 3Q2017. The jump in consumption of data services was even more dramatic – they increased from 26 million GB in 2Q2017 to 95 million GB in 3Q2017. BEREC (2018), "International Roaming: BEREC Benchmark Data Report, April 2017 - September 2017", BoR (18) 31.

- **Decision on use of 470-790 MHz frequency band (2017):** The IA estimates the value of 700 MHz spectrum to MNOs to be some € 11 billion, which must be taken net of costs to consumers to up DVB-T2 compliant televisions or set-top boxes of € 0.6 to € 1.3 billion plus various other transition costs and then annualised based on an average lease duration of some 15 years.[34] These gains are subsumed within those estimated for the European Electronic Communications Code.
- **Regulation on wholesale roaming (2017):** The net benefits are subsumed within the overall benefits for the Regulation Open Internet/TSM (2015).
- **Regulation to promote Internet Connectivity in local communities (Wi-Fi4EU) (2017):** The societal benefits are clear, but in light of the small volume of public investment foreseen (€ 120 million for 2017 through 2020), we assume that the macroeconomic impact is minor.
- **Directive on European Electronic Communications Code (2018):** The IA (especially Chapter 4 and Annex 5) identifies the following:
    - A potential 0.54% increase in GDP compared with the status quo by 2025 based on improved fixed broadband connectivity thanks to facilitation of co-investment and wholesale-only business models, plus a range of procedural improvements.
    - Benefits of € 146.5 billion per annum from the introduction of 5G capabilities, of which € 95.9 billion will arise from first order benefits in the four key vertical segments that depend on 5G: automotive, healthcare, transport and utilities. They estimate an uplift of 0.16% of 2025 GDP. Our belief is that these benefits flow not only from timely release of spectrum to the market, but also from measures to facilitate the deployment of small cells and to address stringent limits on radiation (EMF) that may not be scientifically justified.
    - Improvements in service efficiency that will result in an uplift of 0.74% to 2025 GDP. This estimate is based on Haidar (2012),[35] and is in our judgment highly suspect to the extent that it estimates societal gains solely on the basis of the number of reforms undertaken, and not on their substance.

In estimating benefits, we assume (1) that only half of the projected broadband access benefits will be achieved as a direct consequence of the EECC, while the rest will depend on follow-up actions based on gaps that will be identified once the EECC is in place; (2) that the gains from spectrum policy will be achieved in full; and (3) that any direct gains that the EECC realises from service efficiency improvements other than fixed and mobile deployment are unlikely to exceed 0.10% of GDP.

If one were to take into account indirect gains in productivity, the benefits might perhaps be substantially larger.

[34] The IA also notes that revenue from connected cars revenue in the EU28 is expected to reach around € 25 billion in 2020, mainly based on driver assistance and safety applications. Deployment and uptake of connected cars services is clearly dependent on the availability of ubiquitous connectivity and could benefit from the introduction of 5G IoT components for connected cars by 2020. mHealth could save € 99 billion in healthcare costs in the EU and could add € 93 billion to the EU GDP in 2017 alongside an improvement in patient welfare.

[35] Haidar J. I. (2012) "The impact of business regulatory reforms on economic growth", *Journal of the Japanese and International Economies*, 26 (2012), pp. 285-307.

Based on 2017 EU28 GDP of € 15,300 billion (Eurostat),[36] this implies **gains of € 81 billion per year** once the measures have taken full effect, with the potential for an additional € 41 billion through further improvements in fixed access regulation.

- **Regulation BEREC (2018):** Provides procedural enhancements but does not directly impact societal welfare.

In addition, benefits from various measures already in place in 2013 have previously been estimated, and are included here to provide context:[37]

- **Reduction in Mobile Termination Rates (MTRs):** The gains in consumer surplus due to regulation of mobile call termination rates under the Regulatory Framework for Electronic Communications (2002) and the Recommendation of 2009 have been estimated to reflect an annual reduction in deadweight loss of € 6.1 billion from 2005 through 2010, and a welfare transfer from MNOs to consumers of € 34.2 billion.[38]
- **Reduction in International Mobile Roaming (IMR) prices:** The impact of the Roaming Regulations of 2007 and 2009 were estimated in the IA for the Roaming Regulation[39] to represent an annual gain in consumer welfare of some € 6.2 billion, comprised of an annual reduction in deadweight loss of € 4.5 billion and an annual welfare transfer from network operators to consumers of € 1.7 billion.

The gains from the EECC play the largest role here, and indeed play the largest role of any single DSM measure. We assume increases of € 81 billion per year once the measures have taken full effect, with the potential for an additional € 41 billion through further improvements in fixed access regulation (in 2018 euro and subject to the same assumptions used throughout). We assume an additional € 5 billion per annum in benefits from the roaming aspects of the TSM Regulation, for a total of **€ 86.1 billion**.

4.3. Summary of overall benefits

In this section, we summarise the benefits from each of the measures that comprise the DSM, limiting ourselves however to measures that have already been enacted or that we expect to be enacted during the current term.

For each DSM Strategy legislative measure for which it is possible to compute benefits on this basis, the estimated net annual benefits, by category and by measure, appear in Table 6. The rationale for each of the values that appear in the table appears in the corresponding bulleted text in Section 4.2, highlighted in **bold**.

[36] Note that this ignores growth in GDP over time, inflation, and the expected departure of the UK from the EU28.

[37] J. Scott Marcus, Ilsa Godlovitch, Pieter Nooren, Bram van den Ende, Jonathan Cave and Werner Neu (2013), How to Build a Ubiquitous EU Digital Society, study for the European Parliament: http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/518736/IPOL-ITRE_ET(2013)518736_EN.pdf.

[38] J. Scott Marcus, Ilsa Godlovitch, Pieter Nooren, Bram van den Ende, Jonathan Cave and Werner Neu (2013), How to Build a Ubiquitous EU Digital Society, study for the European Parliament: http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/518736/IPOL-ITRE_ET(2013)518736_EN.pdf.

[39] European Commission (2011), 'Impact Assessment of Policy Options in Relation to the Commission's Review of the Functioning of Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 on Roaming on Public Mobile Telephone Networks within the Community', SEC(2011) 870 final. Analysis conducted by Steffen Hörnig.

Table 6: Estimated annual benefits of selected legal instruments adopted or proposed during the 8th Legislature (2014-2019) (billions of 2018 euro) when fully implemented.

Measure	Annual benefits achievable based on measures already finished or in progress	Annual benefits achievable with new measures
E-commerce, content and online platforms	14.6	36.4
Regulation addressing unjustified geo-blocking (2018)	10.3	31.4
Council Regulation and Directive VAT for e-Commerce (2018)	2.3	-
Regulation on cross-border parcel delivery services (2018)	1.0	5.0
Directive Audio-Visual and Media Services (2018)	1.0	-
Data and AI	51.6	-
Directive on the re-use of public sector information (recast) P2018	45.0	-
Regulation on Free flow of non-personal data (2018)	4.3	-
General Data Protection Regulation (2016)	2.3	-
Trust and security	4.0	-
Directive on Network Information Security (2016)	4.0	-
E-Government	20.0	-
Regulation establishing a Single Digital Gateway (2018)	20.0	-
Consumer protection	0.3	5.9
Directive on contracts for the supply of digital content - P2015	0.3	5.9
Electronic communications networks and services	86.1	41.0
Directive on European Electronic Communications Code (2018)	81.1	41.0
Regulation Open Internet/TSM (2015)	5.0	-
Total:	**176.6**	**83.7**

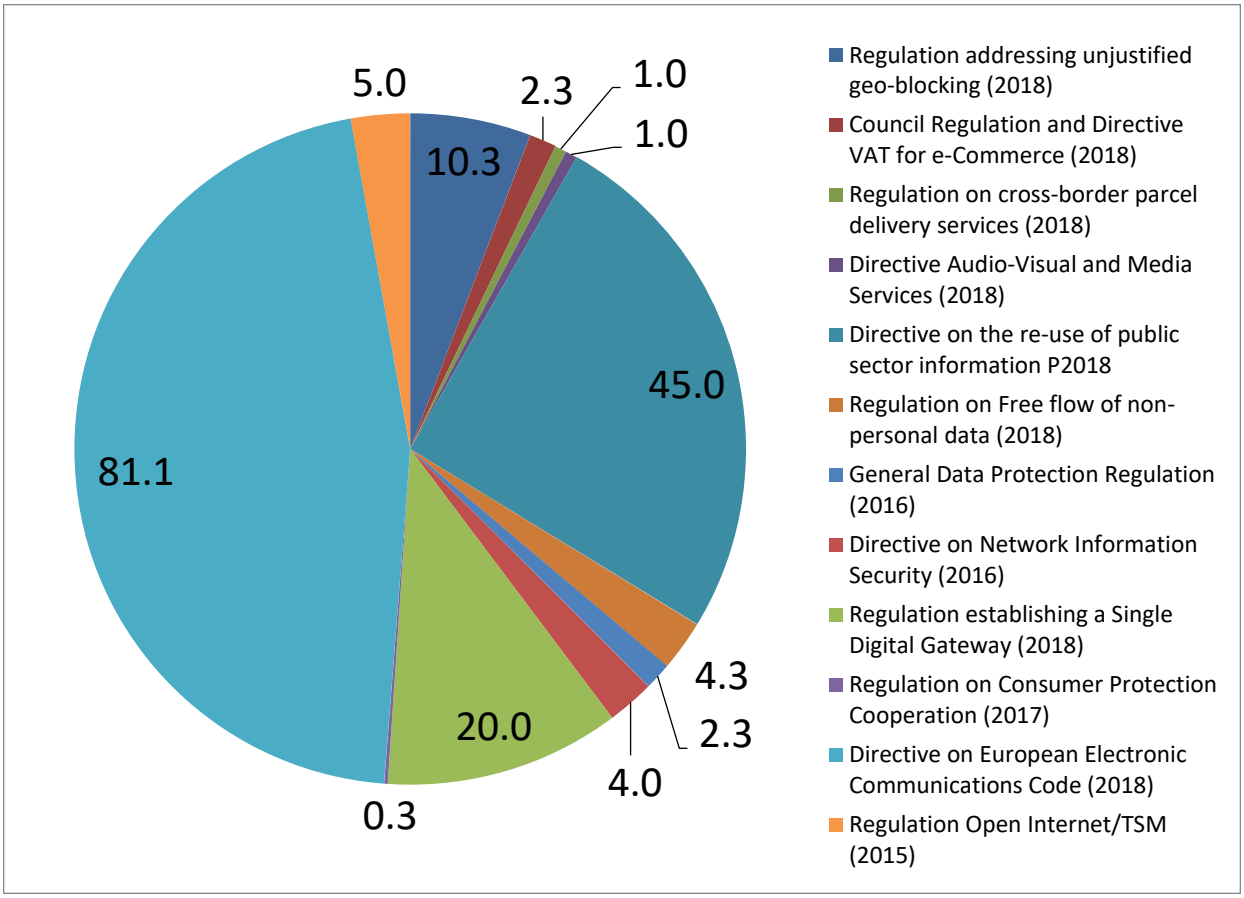
Source: Bruegel estimates based on European Commission Impact Assessment reports and other sources identified in Section 4.2.

There are substantial uncertainties in all of these figures, but it nonetheless seems fairly clear that the largest gains achieved flow from (1) the electronic communications networks and services groups, based mainly on the EECC and secondarily on increased roaming due to RLAH, (2) the data and AI group, based mainly on the Directive on the re-use of public sector information, and secondarily on free flow of non/personal data and on GDPR; (3) the e-commerce, content and online platforms group based on the Geo-Blocking Regulation, the VAT modernisation programme, and the Regulation on Cross-Border Parcel Delivery; and (4) the e-Government group, provided that the Single Digital Gateway is implemented well and widely used. The large benefits attributed to the EECC reflect various spill-overs into the overall digitisation of European society enabled by measures that promote the deployment of fibre-based fixed broadband and of 5G mobile services.

We find **overall annual benefits of € 176.6 billion from the measures enacted** once the measures have taken full effect, based on the assumptions used throughout.

Some legislative measures are likely to contribute far more than others to gains. Our estimates, grouped by the thematic area with the measure is associated, appear in Figure 9. We note once again that there is considerable uncertainty in each of these estimates.

Figure 9. Annual benefits achievable based on measures already finished or in progress (in billions of current euro once the measures have taken full effect).



Source: Bruegel based on European Commission Impact Assessment reports and other sources identified in Section 4.2.

We see the potential to expand these gains further by filling gaps in the legislative measures enacted in the current term, and additional opportunities at EU level to further the digitisation of Europe (see Section 5).

4.4. Reconciliation of the estimates

A simple summation of the benefits of each of the measures that collectively comprise the DSM risks over-stating the actual gains. Each of the measures appears to contribute to overall societal gains; however, the gains that have been estimated in ex ante Impact Assessment reports and elsewhere generally assume that the other measures are also in force, and working as intended. In other words, *each measure may be a necessary but not a sufficient condition for the realisation of the hoped-for gain. This implies that the same gains might be counted many times.*

As noted in Section 1.3, we have attempted to address this concern (1) by applying our own sanity checks to each of the estimates made in IA documents and elsewhere, (2) by correcting for double-counting as we ran the sums of individual programmes, and (3) by checking the reasonableness of the bottom-up sum against other measures. The last of these is the task of this section of the report.

As previously noted, the gains from all DSM Strategy measures collectively can be assumed to derive from a limited number of large-scale effects, including:

- Elimination of barriers to cross-border commerce, especially e-commerce, which enhances the efficiency of the Single Market for goods and for services.
    - Resultant reduction in prices paid (i.e. reduced mark-ups).
    - Increased variety of products and services available to consumers.
    - Increased competitiveness.
- Increased consumer willingness to use online services due to increased trust.
- Improved efficiency thanks to digitisation.

The combined effects of all DSM measures cannot exceed the expected combined effects through these channels of influence. Indeed, comparison of ex ante expectations of the gains from the Single Market as predicted in the Cecchini (1988) report with subsequent ex post estimates suggests that actual achieved gains, even after many years, often are substantially less than the maximum potential gains.

In a number of cases, we have overall estimates of the gains that could potentially be achieved.

The benefits from increased e-commerce operate through increased consumer choice and lower prices, not only for goods and services purchased online, but also for goods and services purchased offline. In the case of goods, Duch-Brown and Martens (2016) provide a reasonable estimate of the maximum magnitude of gains if cross-border purchases were as easy as domestic as a function of the total retail sale of goods. For services, we know of no corresponding quantitative assessment, so we follow the practice of the Commission (in the Impact Assessment for the Geo-Blocking Regulation) in assuming that the magnitude of savings for services is similar to that for goods. Since these gains were based on past data, the reductions can be assumed to represent gains since that time, which thus correspond roughly to gains in the current term and extrapolated forward.

The gains from digitisation are presumably already partially achieved, since industries have been digitised to some degree. These gains can be assumed to be included in all estimates of gains in Total Factor Productivity (TFP) to date, and those anticipated going forward.

The gains from increased trust in online commerce and elsewhere are presumably included in the first two categories.

In Section 4.3, we identified ***overall annual benefits of € 176.6 billion*** from the measures enacted once the measures have taken full effect. This ex ante prediction is expressed in current euro, with no adjustment for inflation. Where IA estimates were expressed as a percentage of GDP, we used 2017 GDP (the latest historically available from Eurostat) of € 15,300 billion.

Most of the top down estimates in the literature are expressed as a fraction of GDP. The bottom-up estimate represents ***1.2% of current (i.e. 2017) GDP***. Given that any conversions from GDP to euro that were made in computing this number were based on current GDP, this is the appropriate figure to use.

It appears that this bottom-up estimate, in conjunction with the corrections made in conducting the bottom-up analysis, falls within a plausible range when checked against various top-down estimates of Single Market benefits.

Cecchini (1988), for instance, predicted growth of 4.25-6.5% in GDP in the long run, with the upper end of the range dependent on additional supporting measures; ex post analysis suggests that less has been achieved, which implies that there is room to grow.

In any event, the gains from these measures go beyond those that could have been foreseen in 1988. The estimate of 1.2% of GDP does not appear to be unreasonable.

Straathof et al. (2008)[40] identified a long-run effect on EU GDP of the increased openness attributable to the common market ranging from 2.5% to 10%, of which two thirds are yet to be realised. This again suggests that the overall estimate of 1.2% is in a range that is not implausible.

Finally, to the extent that societal welfare benefits (e.g. from enhanced broadband) manifest as gains in Total Factor Productivity (TFP), gains of 1.2% of GDP again seem reasonable.

Based on this thought process, there is no need to apply further corrections to the bottom-up estimate of € 140.1 billion once the measures have taken full effect.

[40] As summarised in Dahlberg (2015).

5. POSSIBLE INITIATIVES TO REALISE MORE OF THE POTENTIAL OF THE DIGITAL SINGLE MARKET

KEY FINDINGS

We see opportunities for a number of further interventions in the coming legislative term. They fall in three categories: (1) re-thinking the overall approach to the Digital Single Market going forward, (2) rounding out and completing the measures enacted during the current legislative term, and (3) launching new initiatives to foster the digitisation of European business, government and society.

As far as a re-thinking of the approach, we offer the following reflections:

- For Single Market issues, a holistic view that integrates digital and pre-digital aspects may be in order; however, promoting the adoption and innovation based on digital technology continues to require a special focus of its own.
- The ultimate goal is the achievement of a dynamic EU economy that delivers a high standard of living to all, and that provides attractive prices and choices to consumers. The Single Market, the competitiveness of the EU, and the productivity gains achieved by digitisation are a means to achieving this end.
- Despite the growing difficulty in distinguishing between products and services, more focus on Single Market gains relating to services is needed during the next legislative term.
- A more integrated view across the EU's full range of policy tools is needed, including industrial, regulatory, competition, and trade policy. However, we cannot compromise the independence, the integrity and the credibility of regulatory and competition policy.

We have provided a rough subjective assessment of how the candidate initiatives that we have identified for the next legislative term differ from one another in terms of costs and benefits, subsidiarity challenges, and more. We also distinguish between those that could be acted on now, versus those where extensive study is needed to identify a way forward. The initiatives are:

- Public funding for AI and robotics;
- Private funding for start-ups and scale-ups;
- Corporate taxation;
- Training;
- Employment and social protection;
- E-government;
- Network and information security;
- Cross-border sales of goods that require delivery;
- Re-think the structure of the EU audio-visual sector;
- Expand the scope of consumer protection;
- Further improve access regulation;
- Lower cross-border parcel delivery NPO prices;
- Liability and new technologies;
- Fake news and inappropriate content; and
- Detecting collusion.

In considering possible initiatives to realise more of the potential of the digital single market, we reflect first on the overall approach going forward to the Digital Single Market (Section 5.1), then on steps to round out or complete the measures enacted during the current legislative term (Section 5.2), and finally on new initiatives to foster the digitisation of European business, government and society (Section 5.3). In Section 5.4, we close with a comparative assessment of the candidate measures that we have put forward.

5.1. The overall approach to the Digital Single Market going forward

The pace of technological and market evolution in Europe has been rapid over the past five years. As we approach the next legislative term, it is natural to consider to what extent the EU's overall approach to the DSM is ripe for re-thinking.

A 2018 Presidency discussion paper on the Future of the Single Market (Council of the European Union, 2018b, also 2018c) provides a useful starting point for this discussion, but it surely will not represent the end of the discussion (nor was it intended to). If anything, the discussion paper demonstrates that it is easier to make broad pronouncements than it is to reduce them to practical policy measures.

Perhaps the most useful proposition put forward in the discussion paper is that "there is no need for a Digital Single Market but rather for a digitised Single Market." They go on to float the idea of the "appointment of a European Commission vice-president in charge of the Single Market in order to guarantee a cross-cutting approach." (see also Lisbon Council, 2018) In support of this thought, we would observe that referring to a Digital Single Market implies that there is a *non-Digital Single Market*. Is this really the case today? All Single Market issues are to some degree digital, or ought to be.

The boundaries of the Digital Single Market have never been altogether clear, but we have argued throughout that two main threads are visible in the actions undertaken in the current legislative term: (1) improved realisation of the benefits of the Single Market, and (2) the fostering of further digitisation in the EU. For the former, the suggestion that it is no longer helpful to think of a *Digital* Single Market seems to be timely. For the latter, however, its very essence is the need to promote innovation based on digital technologies – as the discussion paper itself argues, it "will be crucial to address the EU productivity challenge by fully exploiting the opportunities of the next digital tech wave".

In other words, **for Single Market issues, a more holistic view that integrates digital and pre-digital aspects may be in order; however, promoting the adoption and innovation based on digital technology continues to require a special focus of its own**.

The Single Market has taken on symbolic significance for EU policymakers, but it should not be viewed as a goal in and of itself; rather it is a means to an end. The discussion paper speaks of shifting the focus to EU competitiveness, but this is likewise a means to an end. The ultimate goal is the achievement of a dynamic EU economy that delivers a high standard of living to all, and that provides attractive prices and choices to consumers. The Single Market seeks to contribute to this goal by means of scale economies and reduced transaction costs. The focus on digitisation contributes to the same goal by driving increases in productivity, thereby enhancing EU competitiveness that contributes to EU exports.

The discussion papers (Council of the European Union, 2018b and 2018c) also reflect on the distinction between products and services, rightly noting that they are increasingly intertwined.

It then calls for an increased focus on services (and also on data). There is an obvious tension between these two claims, and yet both are clearly in order. The difficulty in distinguishing between products and services notwithstanding, it is nonetheless fairly clear that the Single Market has been much more effective as regards goods than services. (Dahlberg et al., 2015) Given that services represent roughly 70% of the EU marketplace in terms of value added and employment, **more focus is needed on Single Market gains relating to services during the next legislative term**.

The discussion papers (Council of the European Union, 2018b and 2018c) argue that a holistic approach is needed that integrates all policies, and that all policies must be fit for the digital age. The need for joined up policies is in order, but it is already recognised in Better Regulation principles in the form of *coherence*. Where concretely are current policies not sufficiently integrated, and what can be done to better integrate them?

We suggest that the overall relationship between industrial policy, regulatory policy, competition policy and trade policy needs some re-thinking during the coming legislative term. There has always been some tendency or at least risk of our trading partners using or abusing nominally objective policy instruments for their own gain, and to the detriment of the EU. With the multilateral economic order under threat on all sides today, the EU will need better tools with which to defend its interests going forward. This likely **requires a more integrated view across the full range of policy tools: industrial policy, regulatory policy, competition policy and trade policy**. How to achieve an integrated approach without compromising the independence, the integrity and the credibility of regulatory and competition policy, however, will require careful consideration (which is touched on in Section 5.3.2).

5.2. Rounding out the measures enacted during the current legislative term

As noted in Section 4.3, we see the potential to further expand the gains from the DSM Strategy measures enacted, or expected to be enacted, by means of:

- expanding the scope of consumer protection to include financial services, passenger travel, healthcare and real estate;
- enhancements in access regulation to more fully realise the broadband investment that the EECC attempted;
- revising a range of legal instruments so as to make it possible to expand the Geo-Blocking Regulation so as to include goods that require delivery;
- initiating wide-ranging industrial policy measures to strengthen the global competitiveness of the European audiovisual sector, which would be a necessary prerequisite to expanding the Geo-Blocking Regulation to include services that primarily deliver copyrighted audiovisual content; and
- enhancing the Regulation of Cross-Border Parcel Delivery to mandate more competitive pricing, mainly on the part of National Postal Operators.

All of these are aspects of the DSM Strategy that could not be addressed by the current set of legislative measures, often because prerequisites were not yet in place.

Most of these changes are hard. Some require deep analysis before it would be appropriate to attempt to propose legislative measures.

Some of the suggestions in this section are fairly radical, but they are firmly grounded. Many of the opportunities identified here are likely to be politically sensitive and challenging, which likely is the reason why they have not already been implemented.

At the same time, we have intentionally stopped short of providing detailed proposals. If a decision were taken to seriously explore any of these opportunities, a detailed Impact Assessment would be warranted.

In addition to the candidate enhancements explicitly identified here, one should expect that there will be further opportunities to address gaps or shortcomings in the legislation that has already been tabled but not yet enacted.

5.2.1. Expanding the scope of consumer protection

In an annex to Alleweldt et al. (2014), GHK (2014) claims a very substantial potential gain of € 5.9 billion in societal welfare by addressing certain gaps in consumer protection. The gaps that they identify are:

- Gaps concerning commercial guarantees;
- Gaps concerning reverse type transactions;
- Gaps concerning consumer-to-consumer (C2C) transactions;
- Gaps in the Consumer Rights Directive (CRD);
- Gaps in the Consumer Credit Directive (CCD);
- Gaps concerning gambling activities;
- Problems concerning the limited scope of the E-commerce Directive; and
- Problems relating to digital content.

They identify three measures for which they quantified potential gains:

- Commercial guarantees € 36
- Limited scope of the Consumer Credit Directive (CCD) € 285
- Lack of a single market for gambling € 5,560
  - Total € 5,881

GHK (2014) goes on to claim additional potential gains of € 52 billion by further extension of the EU consumer protection *acquis*, but they provide no substantiation. Alleweldt (2014) conjectures that this gain might be achieved by extending the Consumer Rights Directive to also cover the financial services, passenger travel, healthcare and real estate sectors.

Extension of consumer protection to cover financial services, passenger travel, healthcare and real estate might indeed bring benefits, but the magnitude would need to be studied, and there are significant complexities in each of these sectors. Regulation of services is generally more complex than regulation of goods. For a discussion of the Commission's thinking as regards consumer protection for financial services, for instance, see European Commission (2015c).[41]

[41] European Commission (2015), Green Paper on retail financial services: Better products, more choice, and greater opportunities for consumers and businesses, COM(2015) 630 final.

5.2.2. Further enhancing broadband deployment, adoption and usage

The European Electronic Communications Code (EECC) represents the latest in a sequence of attempts to strengthen industry investment into fixed and mobile broadband deployment in the EU. It needs to be understood in conjunction with other measures, including the Cost Reduction Directive (2014) (which sought to lower the cost of deployment) and with the Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013) (which sought to strengthen the incentives of network operators to deploy).

The EECC includes a number of provisions that seek either to strengthen investment incentives or to reduce deployment costs for fixed or mobile network infrastructure. These include:

- Article 74: Co-investment
- Article 77: Wholesale-only undertakings
- Article 53: Coordinated timing of assignments
- Article 53a: Coordinated timing of assignments for specific 5G bands
- Article 56: Deployment and operation of small-area wireless access points
- Article 56a: Technical regulations on electromagnetic fields

The first two of these are primarily relevant to fixed broadband networks, while the remaining four are primarily relevant to wireless networks and especially to wireless mobile networks.

These EECC measures are likely to provide improvements, but they will not necessarily lead to an ideal level of network operator investment. It is likely that *ex post* assessment will reveal an ongoing need for further refinement of the EU's broadband deployment strategy.

Meanwhile, these measures operate solely on the supply side. Numerous studies have found that demand side stimulus can be more effective than supply side measures once basic broadband is sufficiently broadly available.[42] Those studies suggest in effect that operating solely on the supply side is a bit like pushing on a rope – at some point, it is necessary to *pull*.

It might well be, then, that the most productive steps for the next legislative term would represent a significant departure from the approach taken to date. Demand side approaches need not wait for experience with the EECC measures.

[42] J. Scott Marcus, Ilsa Godlovitch, Pieter Nooren, Dieter Eilxmann and Bram van den Ende with the support of Prof Jonathan Cave: „Entertainment x.0 to boost Broadband Deployment", study on behalf of the European Parliament's Committee on Industry, Research and Energy (ITRE), October 2013 available at:

http://www.europarl.europa.eu/document/activities/cont/201310/20131017ATT72946/20131017ATT72946EN.pdf; J. Scott Marcus, Francesco Caio and Gérard Pogorel (2014), "Achieving the Objectives of the Digital Agenda for Europe (DAE) in Italy: Prospects and Challenges", a study on behalf of Prime Minister Enrico Letta; • Parcu, P. L. et al. (2011), Study on Broadband Diffusion: Drivers and Policies. Study for the Independent Regulators Group, Florence School of Regulation; available at: http://www.irg.eu/streaming/CN%20%2811%29%2081_FSR_Study_on_BB_Promotion_FINAL.pdf?contentId=547201&field=ATTACHED_FILE; Belloc, F., Nicita, A. and M. A. Rossi (2011), The Nature, Timing and Impact of Broadband Policies: a Panel Analysis of 30 OECD Countries, University of Siena.

5.2.3. Addressing barriers to cross-border shipment of goods in order to enable expansion of the Geo-Blocking Regulation

The Geo-Blocking Regulation applies overall to goods sold online, but the crucial non-discrimination provisions of Article 4 do not apply to orders that would oblige the merchant to deliver goods, or to enable collection of goods, at a location in a Member State to which the merchant does not routinely offer delivery or collection.

The exclusion is appropriate. The merchant would otherwise be obliged to be aware of and in compliance with rules in the country of use.

One might not expect this to be the case. As Dahlberg (2015) observes, "The EU has, in addition, harmonised the regulation on a number of goods categories to ensure that national product regulation does not discriminate against foreign products. For products that have not been subject to harmonisation (for various reasons), the principle of mutual recognition states that a product that is lawfully marketed in one member state should have the right to be marketed in all member states."

There seems, however, to be a significant gulf between theory and practice.

Merchants selling and shipping goods cross-border typically have to comply with a daunting variety of packaging and safety regulations at Member State level. Many Member States have strict requirements as regards packaging and labelling of food and of medication. Alcohol and tobacco products may also be subject to national restrictions. A range of safety obligations could also be relevant, ranging from toy safety to characteristics of gas pipelines. Since these relate in important ways to consumer safety, they cannot simply be ignored. Packaging and labelling requirements clearly impose additional costs on merchants who might otherwise hope to sell goods cross-border; moreover, Member States might in some cases be tempted to use these requirements to protect domestic industries.[43]

For large e-merchants, these divergences are merely a costly nuisance. For SMEs, and especially for the smallest of SMEs, the associated transaction costs could represent a blocking problem (see Dahlberg (2015)).

These challenges could potentially be addressed, but it would take a significant amount of hard work. A thorough analysis of practical impediments would need to be undertaken, justifiable national exceptions would need to be identified, and measures would need to be carefully crafted so as to make the principle of mutual recognition fully predictable and as close as possible to being fully applicable.

There are many other impediments to cross-border sales of goods that require shipment, but most of these either have already been addressed, or could be addressed in other ways.

The reform to VAT arrangements, for instance, including the Mini-One Stop Shop (MOSS), presumably addresses one set of problems. The pending legislative measures that seek to impose maximum harmonisation on horizontal consumer protection rules potentially address another.

[43] J. Scott Marcus and Georgios Petropoulos (2017), "Geo-Blocking of Goods That Require Cross-Border Delivery: A Preliminary View on EU Policy Considerations", presented at the Rutgers/EUI FSR conference on postal economics in Barcelona, at: https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3007578_code333755.pdf?abstractid=3007578&mirid=1.

Further reform of cross-border parcel delivery would also be beneficial (see Section 5.2.5), but is not a prerequisite to this reform. It seems clear that the e-merchant will need to be able to recover the extra cost of shipping goods cross-border if he or she is mandated to do so, but a fairly simple rule could suffice. For example, the merchant might have to ensure that the price charged to cross-border customers does not exceed the price charged to domestic customers by a sum greater than that by which the National Postal Operator's published price for shipment of goods with the characteristics of the shipment in question (e.g. weight and volume) from the merchant's Member State of establishment to the Member State to which shipment is requested exceeds the National Postal Operator's published price for shipment of the same goods within the merchant's Member State of establishment.[44]

It is clear that a geo-blocking prohibition should not be imposed on e-merchants for goods that require shipment until all or nearly all of the attendant issues have been addressed, not only at EU legislative level but also in terms of practical transposition and enforcement at Member State level.

5.2.4. Fundamentally re-thinking the European audiovisual sector in order to strengthen global competitiveness and cross-border consumption

Services concerned primarily with the distribution of copyrighted audiovisual content are completely excluded from the Geo-blocking Regulation as enacted. Many consumers lament this omission, but it was prudent in our view – the problems with cross-border distribution of audiovisual content are complex, and are not amenable to a quick fix solely through a prohibition on geo-blocking. (Marcus and Petropoulos, 2017)

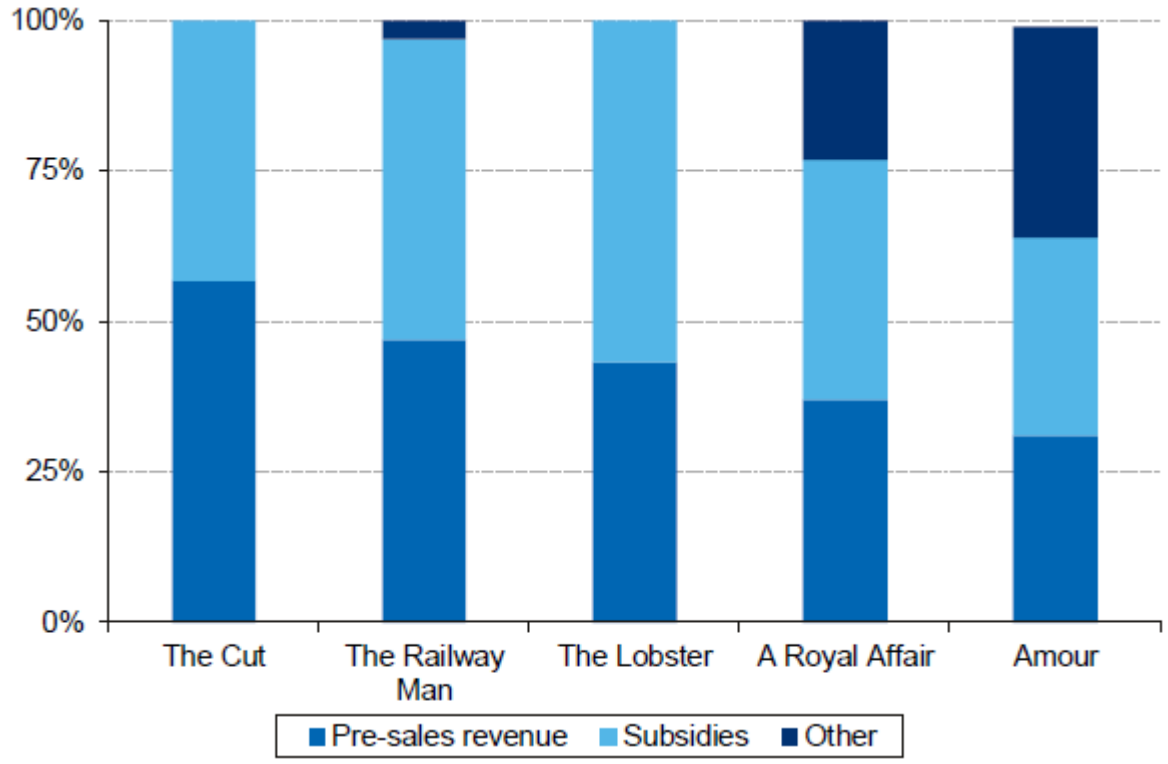
What is needed instead is a comprehensive re-thinking of the audiovisual sector so as to strengthen the ability and incentives of sector market players to actively market their high quality output throughout Europe and throughout the world (while still respecting the cultural and linguistic diversity that we cherish as Europeans).

A key argument against a geo-blocking prohibition from the audiovisual sector has been that geographical segmentation is essential to the funding of their projects. Under current arrangements, this argument appears to be well founded. The producer of an audiovisual work is responsible for securing financing and can obtain it from various sources: in-house financing (cash investment from a single production company or pooling of resources of several production companies through co-production mechanisms), pre-sales of distribution and communication to the public rights (contract which exchanges an upfront payment from a downstream player for an exploitation right from the producer, usually on an exclusive basis), debt financing (loan provided by a lender with a fixed repayment date), or private investments (cash investment from a private investor in exchange for a participation in the future film's revenue). Figure 10 illustrates examples of the ways in which several films were financed in recent years. In the audiovisual sector, pre-sales through licencing and state subsidies are the most important sources of financing.

[44] J. Scott Marcus and Georgios Petropoulos (2017), "Geo-Blocking of Goods That Require Cross-Border Delivery: A Preliminary View on EU Policy Considerations", presented at the Rutgers/EUI FSR conference on postal economics in Barcelona, at: https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3007578_code333755.pdf?abstractid=3007578&mirid=1.

The pre-sales arrangements depend heavily on geographic restrictions, coupled with a complex system of release windows. Without a substantial reorientation of the sector, a geo-blocking prohibition would risk interfering with these pre-funding mechanisms, thus depressing production of content.

Figure 10. Examples of sources of financing for independent films.



Source: Oxera (2016)

In a 2016 study prepared for firms in the sector, Oxera estimated that imposing a geoblocking regulation on audiovisual content would cause consumers to lose up to €9.3 billion per year, while producers would lose up to €8.2 billion per year. A 2014 study by CRA for the Commission arrived at similar conclusions. As things stand today, we believe that the concern is valid.

A key concern here is that relatively little European audio-visual content is produced or distributed with international distribution in mind. In a typical year, non-national European films account for only 12% of cinema admission market share. (By contrast, international distribution is a key part of Hollywood planning.) As a result, few European works get much circulation outside of their country (or language) of origin.

Language is an issue, but it need not be decisive. Films can be dubbed, sub-titled, or voiced over. Hollywood faces the same issues with productions that are originally recorded in English.

The European audio-visual sector has historically had a prodigious output, having produced 1,142 feature films in 2008 compared to 520 in the USA. US films nonetheless consistently account for more than 60% of cinema admissions within the EU, twice as much as European films (see Table 7).

US enterprises also account for the majority of fictional content on European television screens. This should clearly be viewed as a problem.

Table 7. European cinema admissions, by origin of film (2007 - 2012).

Region	2007	2008	2009	2010	2011	2012
U.S.	62.6%	65.6%	67.1%	68.0%	60.1%	61.1%
European films	28.1%	28.2%	26.7%	25.3%	28.5%	35.2%
Europe / U.S. inc14	7.5%	4.4%	4.2%	7.9%	9.7%	2%
Others	1.8%	1.8%	2.0%	1.3%	1.6%	1.6%

Source: European Commission (2013), Impact Assessment Report, communication on State Aid for Films and other Audiovisual Works

These issues seem to be clear enough, but to the best of our knowledge they have never been studied in detail. Perhaps we have too great a tendency to take the structure of the sector for granted. The full dimensions of the problem do not appear to be well understood, and consequently the policy interventions that might be useful have never been put forward. Only with a deeper analysis would it be possible to assess whether options are available that are proportionate and not overly disruptive to the sector.

If the global competitiveness of the European audiovisual sector were substantially greater, the dependence on pre-funding based on geographic partitioning at Member State level would be reduced. Once that were firmly in place, a prohibition on geo-blocking could be considered (or perhaps would become unnecessary because of the altered incentives of rights-holders).

Whether this is feasible is not altogether clear today, but the challenge is fairly clear, and it is worth looking at.

5.2.5. Further measures to address over-pricing of cross-border parcel delivery by National Postal Operators (NPOs)

The growth of e-commerce represents a substantial growth opportunity for Europe. The ability of Europe to fully capitalise on this opportunity appears however to be limited by the high prices paid for the shipment of goods across national boundaries within the European Union. Concerns over the high cost of parcel delivery cross-border by National Postal Operators (NPOs) led to the Commission to put forward a legislative proposal in May 2016.[45]

The concern has been with basic cross-border delivery services, not with express or courier services; with business-to-consumer (B2C) shipments rather than business-to-business (B2B); and primarily with shipments by consumers, micro-enterprises, and small and medium enterprises (SMEs) than rather than those by large shippers. The NPOs continue to play a major role in cross-border shipments for SMEs.[46]

[45] European Commission (2016), Proposal for a Regulation of the European Parliament and of the Council on cross-border parcel delivery services, COM(2016) 285 final.

[46] J. Scott Marcus and Georgios Petropoulos (2017), "E-Commerce in Europe: Parcel Delivery Prices in a Digital Single Market", in *The Changing Postal and Delivery Sector: Towards a Renaissance*, Springer, ed. Michael Crew, Pier Luigi Parcu, and Timothy Brennan. An earlier version appear as Bruegel Policy Contribution 2016/09, at http://bruegel.org/wp-content/uploads/2016/05/pc_2016_09.pdf, and a derivative work was presented at the ITS Europe conference in Cambridge, UK.

Member State postal regulatory authorities were already obliged to ensure that retail prices were cost-based, presumably including cross-border prices, but implementation has historically been weak and uneven. In practice, many postal regulatory authorities had little statutory authority to collect even the most basic data, such as retail prices. Their role relative to cross-border parcel delivery was often ambiguous, especially in cases where the NPO was not subject to a universal service obligation. Finally, given that NPOs tend to face challenges in maintaining their universal service obligations in the face of falling domestic letter traffic, the national postal regulatory authorities may be tempted to overlook possible over-pricing in one of the few areas where NPO revenues are exhibiting healthy growth.

In economic terms, parcel delivery arrangements among the NPOs are complicated, and there is no external visibility at all into many aspects of the system (including the level of wholesale Terminal Dues and Inward Land Rates, and the degree of discounting provided to large shippers). That these commercially sensitive arrangements are not publicly visible is appropriate, but it is difficult to see how national postal regulatory authorities could possibly assess the appropriateness of prices when they are missing key data about costs.

The Commission's legislative proposal sought (1) to increase the transparency of retail prices for consumers, (2) to increase the information gathering powers of national postal regulatory authorities to collect both wholesale and retail data, (3) to oblige postal regulatory authorities to assess cross-border pricing, and (4) to open up the wholesale parcel delivery networks of the NPOs (which some allege to be priced substantially below cost) to competitive non-NPO parcel delivery services. The legislation as enacted weakened these measures considerably, and dropped the wholesale access obligation altogether.

Our belief is that the Regulation as enacted will enhance transparency, but will have little or no effect on cross-border parcel delivery prices. Given the limited information gathering powers and the dearth of information available to the public and to postal regulatory authorities, it is likely to be some time before this is fully visible. In any case, a second round of legislation specifically aimed at the pricing issues is likely to merit consideration in the coming years.

5.3. Promoting the digitisation of European business, government and society

The remaining opportunities would be new initiatives, but many are foreshadowed by initiatives that are already under way.

- dealing with emerging technologies including Artificial Intelligence, machine learning, big data and the Internet of Things and harmonising their treatment where needed among the Member States;
- addressing competition, taxation and content issues regarding digital services, including platforms;
- reinvigorating interest in cross-border e-government services; and
- adopting a more vigorous approach at EU level to cybersecurity.

The need to address competition, taxation and content issues for platforms and other digital services is needed in order to complete the Digital Single Market, going beyond the DSM Strategy as proposed in 2015. Recall that the Commission defined a Digital Single Market as "one in which the free movement of goods, persons, services and capital is ensured and where 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." (European Commission, 2015a) When it comes to seamlessly accessing online activities under conditions of fair competition, it is clear that there is more work to be done, and surely more than the suggestions offered in this study.

The reinvigoration of efforts to enable cross-border e-government services likewise seeks to address a set of impediments to the Digital Single Market. Harmonisation tends to be challenging because the underlying delivery systems in the Member States are so diverse. (van Veenstra et al., 2013)

5.3.1. Measures to promote and deal with a range of emerging technologies

As noted in Section 2.2, the transformation of the EU through digitisation appears to depend on the adoption of a range of technologies such as artificial intelligence, robotics, big data, machine learning, the Internet of Things, and possibly blockchain. These technologies show tremendous promise, with some analysts projecting potential global benefits measured in trillions of euro per year (for a quantification of potential benefits, see Section 2.2). Many of these technologies have been known for decades, but price/performance is now reaching levels that favour large-scale deployment. Fast fixed broadband and mobile services (soon to include 5G) have become sufficiently widespread to make them fully accessible (see Section 5.2.2).

Europe has aspirations not only to use these technologies, but also to design and develop them.

Our focus here is on new legislative initiatives, not on business as usual. The Commission has for instance already been active in funding research, launching studies to consider policy issues, and where appropriate forming public private partnerships (PPPs) to facilitate dialogue between government and market players.

At the same time, **one can question whether the level of investment is adequate to maintain EU competitiveness in these potentially transformative technologies, and especially in AI**.

- China has launched a comprehensive initiative[47] to lead the world in AI development, and intends to invest massively in AI research and development.[48] The magnitude of the investment is difficult to estimate, but is large.
- The United States, its historic scepticism about industrial policy notwithstanding, is deeply concerned about the Chinese programme. The US had already been investing roughly one billion Euro per year in 2016.[49] Expanded countermeasures to the Chinese programme can be expected, with the risk that Europe suffers "collateral damage".

---

47 China (2017), A Next Generation Artificial Intelligence Development Plan (translated), at https://chinacopyrightandmedia.wordpress.com/2017/07/20/a-next-generation-artificial-intelligence-development-plan/ viewed 4 July 2018.

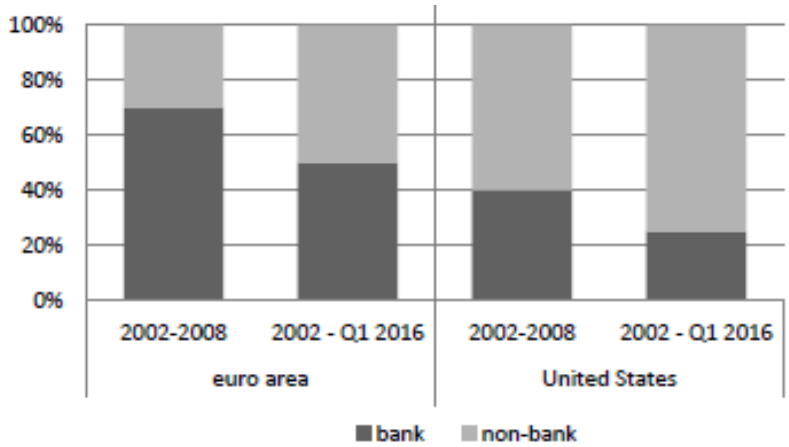
48 Yujia He (2017), "How China is preparing for an AI-powered Future", Wilson Center, https://www.wilsoncenter.org/sites/default/files/how_china_is_preparing_for_ai_powered_future.pdf viewed 4 July 2018. See also New America Foundation (2017), "China's Plan to 'Lead' in AI: Purpose, Prospects, and Problems", at https://www.newamerica.org/cybersecurity-initiative/blog/chinas-plan-lead-ai-purpose-prospects-and-problems/ viewed 4 July 2018.

49 European Commission (2018), "Artificial Intelligence for Europe", op. cit. page 5. See also US National Science and Technology Council (2016), The National Artificial Intelligence Research and Development Strategic Plan, at https://www.nitrd.gov/PUBS/national_ai_rd_strategic_plan.pdf viewed 4 July 2018.

- According to the Commission's Artificial Intelligence for Europe Communication, "Europe is behind in private investments in AI which totalled around EUR 2.4-3.2 billion in 2016, compared with EUR 6.5-9.7 billion in Asia and EUR 12.1-18.6 billion in North America."[50]

Funding is crucial, but the bulk of funding for high tech start-ups and even more so for *scale-ups* (firms seeking to grow from start-ups into the next phase) ought to come from venture capital or from engaging in *Initial Public Offerings (IPOs)*, not from the public treasury at EU or Member State level. Unfortunately, a long-standing challenge in the EU has been excessive reliance on banks, and insufficient access of start-ups and especially of scale-ups to access venture capital. Other advanced economies such as the US and Japan do a better job. "EU firms are typically known for their overreliance on bank lending, especially for SMEs. In the period from 2002-2008, banking lending accounted for 70% of total financing in the euro area, compared to only 40% in the US", as is visible in Figure 11. Over the full period from 2002 through Q1 of 2016, the disparity between the EU and the US was roughly 50% versus 25%. (European Commission, 2017f).

Figure 11. Share of bank to non-bank financing of non-financial companies in the euro area and the US (cumulated transactions).



Source: European Commission (2017f), based on ECB and US Federal Reserve System data.

The Commission has been pursuing a *Capital Markets Union (CMU)* strategy to seeks (1) to improve access of entrepreneurs to venture capital, and (2) to modernise insolvency rules so as to give a second chance to honest entrepreneurs whose enterprises fail. Both of these were identified in a previous study for the Parliament, van Veenstra et al (2013), as being essential to the future success of EU start-ups and scale-ups.[51] The CMU is important, but bringing it to fruition has been slow going.[52] **Re-doubled efforts are in order.**

[50] European Commission (2018), "Artificial Intelligence for Europe", op. cit. page 5.

[51] See also Jim Brunsden (2018), EU plan for capital markets union faces delay, warns Brussels, Financial Times. Commissioner Dombrovskis is quoted as saying, "If you look at reasons why many companies in Europe, capital markets companies, fintech companies, why they are not scaling up in Europe, it is exactly this fragmented regulatory and supervisory landscape where they are faced with different requirements in each member state. That's the issue we need to address — this scaling up."

[52] Ibid.

Ensuring a sufficient pool of trained professionals for these emerging technologies (and retaining their services in Europe once they have been trained) represents yet another substantial challenge, but primary responsibility here appears to rest with the Member States. There is likely to nonetheless be a role for the European institutions in supporting and coordinating Member State policies, and in encouraging best practice.

It is important not to prematurely regulate these innovative services, thereby stifling their development or distorting their evolution; at the same time, it seems likely that some issues will emerge that eventually require legislative solutions, and indeed some of these are already visible.

The Parliament has been actively engaged in issues related to Artificial Intelligence and robotics, both with workshops (see for instance European Parliament, 2018) and with a 2017 resolution "with recommendations to the Commission on Civil Law Rules on Robotics". The resolution addresses a wide range of issues, includes a Charter on Robotics with a Code of Conduct for Robotics Engineers, and calls on the Commission to submit "a proposal for a legislative instrument on legal questions related to the development and use of robotics and AI foreseeable in the next 10 to 15 years, combined with non-legislative instruments such as guidelines and codes of conduct". (European Parliament, 2017a)

One of the issues specifically flagged in the resolution is the issue of liability, and indeed, issues of product and service liability are emblematic of the areas where new legislation is likely to be needed. Two key groups of EU policy instruments are in place today: (1) product safety regulation, which establishes standards to which goods must conform; and (2) liability regulation, which enables consumers to recover their costs if they are harmed or injured due to a malfunctioning product (or potentially a defective service). Product liability is handled quite differently from service liability, with products subject to a strict liability regime at EU level (where the burden of proof on the consumer is minimised), but not services. (European Commission, 2018a)

In recent work (Marcus, 2019), we suggested that further study was needed in several areas:

- It is going to become increasingly difficult to draw a sharp line between *products* and *services* for emerging IoT/AI/ML services. In the medium to long term, either a common liability regime will have to be adopted for both, or else some crisp, new definitional criteria will need to be developed.
- Relative to the consumer, a strict liability regime seems to be the most appropriate way to ensure compensation; otherwise, the burden of proof will be too great. For commercial parties along complex IoT/AI/ML value chains, however, determining where the liability lies is likely to entail challenging, case-specific assessments. In particular, guidance is likely to be needed where liability lies at least in part with conclusions autonomously reached by algorithms.
- For consumers and suppliers, horizontal approaches that apply to all sectors are simpler and thus easier to deal with than sector-specific approaches. This property of EU liability regulation (but not of EU safety regulation) should be retained going forward.

5.3.2. Competition, taxation, content and social protection issues regarding digital services

Digital platforms such as Google, Facebook, and Uber, not to mention Apple and Amazon, have been repeatedly in the news in recent years as regards competitive concerns, fair treatment of taxation, and related state aid concerns. Content concerns as with "fake news" and its implications for the political process are also visible.

The answers to the questions raised are not yet altogether clear, but they will surely continue to be part of the debate during the next legislative term.

In a number of instances, the emerging technologies noted in Section 5.3 are not only part of the problem, but potentially part of the solution. Consider competition policy, for example. Automated online pricing algorithms may spontaneously collude with one another, but automated tools based on AI, machine learning and big data techniques might prove effective in detecting collusion (and in distinguishing between permissible price convergence and impermissible collusion). These same technologies show promise in detecting inappropriate content, as well as "fake news".

Competition issues are sure to arise, but whether they require new legislative measures is not entirely clear. Existing competition law already provides a good arsenal of tools. Whether they are sufficient for the brave new world that we are entering remains to be seen.[53]

In Section 5.1, we noted the importance of achieving a more integrated view across the full range of policy tools, including industrial policy, regulatory policy, competition policy and trade policy. Similar ideas appear to already be taking root among many of the Member States. Nineteen of the Member States[54] recently issued a joint statement announcing their intention to press the incoming Commission for a "new political impetus" to maintain the EU's global competitiveness. Key elements include (1) the identification of European strategic value chains "prioritising those most directly linked to improving global productivity, fighting climate change, and enhancing technological development', and (2) "the identification of possible evolutions of the antitrust rules to better take into account international markets and competition in merger analysis". For each of the strategic value chains, a dedicated action plan would be developed, backed by EU funding and supported by policy instruments to include competition, innovation, digital, energy, trade, and taxation policy.[55]

This is likely to require particular care in regard to competition policy. In a world where multilateralism and win-win approaches enjoy less support than in the recent past, it will be important to protect EU interests from encroachment by third countries who might be willing to use the policy instruments at hand indiscriminately. This is likely to require the EU to take a hard look at how we choose to use, or not to use, the policy levers available to us. Competition law is surely an important piece of this puzzle, but must be used with care. First and foremost, our approach should always be to promote the competitiveness of EU industry, not to target global competitors. Secondly and relatedly, if Europe were to be seen to be applying tools in a self-serving way, rather than objectively and fairly, it could undermine the integrity and creditability of the EU's process, and thereby undermine global confidence in the liberal economic order. That would be counter-productive – EU prosperity depends on global acceptance of a liberal economic order that is now under threat.

Taxation of digital platforms is likely to be a contentious topic for the coming legislative term. It is clear that online platforms need to pay their fair share of taxes, and there is general agreement (in line with the OECD's BEPS process) that taxation should occur where the service is used. Beyond that

[53] There are many examples. For a recent study for the Parliament that demonstrates the emerging challenges, but also makes clear the risks in premature or heavy-handed regulation, see Monti and Augenhofer (2018).

[54] Jorge Valero (2018), 19 EU countries call for new antitrust rules to create 'European champions', *EurActiv*. The Member States are France, Austria, Croatia, Czech Republic, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Luxembourg, Malta, Netherlands, Poland, Romania, Slovakia and Spain.

[55] Ibid.

broad assertion, however, it will be hard to find consensus between the EU and our trading partners, and for that matter among the Member States of the EU itself. What constitutes "fairness"?

A range of content related issues are also likely to be with us, some of which will need to be addressed at legislative level. Achieving fair compensation for rights-holders in the digital world has been contentious, but may possibly be resolved by the still-contentious Directive on Copyright in the Digital Single Market 2016/0280(COD). Policing inappropriate content, and addressing "fake news", appear to pose even more challenging problems.

What constitutes "fake news" is to some extent debatable; moreover, there is the risk that an overly stringent regime, especially if implemented by a government body, might intentionally or unintentionally turn into a censorship regime. Suppressing "fake news" cannot be at the expense of freedom of expression.

The Commission has engaged in a systematic programme to counter disinformation, including setting up an expert group, conducting a public consultation, and issuing a number of reports and communications. Most recently, the Commission announced an "Action Plan against Disinformation", based on a range of voluntary measures.

Whether this will prove to be sufficient remains to be seen. A recent study for the Parliament argues that a more muscular and comprehensive policy approach will eventually be needed. (Renda, 2018; see also Turk, 2018)

More broadly**, the combined impact of AI, machine learning, and big data on employment is potentially substantial. This implies significant societal dislocations that will need to be addressed. Furthermore, there are implications for social protection of workers as digitisation contributes to increasing labour flexibility – a trend with both positive and negative implications.** With the shift away from traditional employment, and the increasing tendency for workers to combine traditional and non-traditional forms of work with self employment, how are workers to be protected? The European Pillar of Social Rights (European Union, 2018) provides a useful framework for discussion, and the Commission's Proposal for a Council Recommendation on access to social protection for workers and the self-employed (European Commission, 2018j) represents a forward-looking approach to many of the challenges raised. Once again, this can be expected to be a recurrent theme during the next legislative term.

5.3.3. Reinvigoration of emphasis on cross-border e-government service

As we noted in previous work for the Parliament,[56] Europe is not an intrinsically weak player as regards the implementation of ubiquitous e-government services. Indeed, the performance of front-runner European Member States in terms of development and deployment of ubiquitous e-governments ranks among the best in the world. What has conspicuously languished is the development of cross-border interoperable e-government services.

[56] Anne Fleur van Veenstra, J. Scott Marcus, Jonathan Cave, Noor Huijboom, Dieter Elixmann, Annette Hillebrand, Rebecca Schindler and Veronica Horvath (2013) "Ubiquitous Developments of the Digital Single Market", study on behalf of the European Parliament's Committee on Internal Market and Consumer Protection, available at:
http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507481/IPOL-IMCO_ET(2013)507481_EN.pdf.

We observed that the action lines in place individually and collectively did not appear to be having much effect on the problem. At the time, we identified opportunities in (1) Identification (e-ID), authentication, and authorisation schemes; (2) The European Interoperability Framework (EIF) and related activities; (3) eHealth, including exchange of patient data and ePharmacy; (4) e-VAT; and (5) e-Customs.

A review of progress made subsequently is well beyond the scope of the current study, but we anticipate that a great deal of work remains to be done.

With that said, what should be done? Godel et al. (2018) make some modest proposals: "European initiatives can help by pioneering good practice, making 'digital by design' a reality throughout the European institutions, adhering to and promoting open standards; supporting research and development in relevant fields and supporting the creation and adoption of a e-trust/e-ID framework for the EU."

In its EU eGovernment Action Plan 2016-2020 (European Commission, 2016i), the Commission puts forward 20 concrete actions. (See also European Parliament, 2017b) Most of these are e-government initiatives that the Commission would undertake relative to its own services, which is in line with the recommendations of Godel et al. (2018). A few represent legislative proposals addressed to the Member States, and at least two of these have been enacted. The first of these relates to electronic identification and trust services for electronic transactions in the internal market (eIDAS services), an area that has been identified in numerous studies as being potentially a high payoff initiative. The other seeks to establish a single window for reporting purposes in maritime transport and to digitalise transport e-documents – largely a fix to inefficiencies introduced through a 2010 Directive.

It is safe to assume that there is far more work to be done in this area.

5.3.4. Cybersecurity and trust

Progress has been made in the current legislative term when it comes to strengthening the role of ENISA, and establishing a certification programme at EU level.

Nonetheless, the level of investment at EU level is ludicrously small in comparison to the rate at which threats are growing, not only from commercial hackers but also from states and from state sponsored hackers. This risk is growing, particularly for some of the Member States in the east of the EU. **A more muscular approach to cybersecurity at EU level appears to be needed.**

It has historically been difficult to achieve consensus at EU level, in part because larger Member States with well established cybersecurity programmes feared that EU capabilities might get in their way. At the same time, smaller Member States or those with less robust capabilities of their own would have welcomed an operational role for ENISA. (Marcus et al, 2012) The proposed Regulation on Cybersecurity is a step in the right direction, but only a small step. It is time to break this deadlock.

The need for a cooperative, joined up approach to cybersecurity was highlighted in thoughtful remarks by Brad Smith, the CEO of Microsoft, to the RSA Conference in 2017: "We should start by acknowledging that no single step by itself will be sufficient to address this problem. … The time has arrived to call on the world's governments to implement international rules to protect the civilian use

of the internet. … The time has come to call on the world's governments to come together, affirm international cybersecurity norms that have emerged in recent years, adopt new and binding rules and get to work implementing them."[57]

Along these lines, the "Paris call for trust and security in cyberspace"[58] issued under the sponsorship of French President Macron represents a welcome "call to arms". In a succinct but wide-ranging statement, it invites it signatories to work together in order to "Prevent and recover from malicious cyber activities that threaten or cause significant, indiscriminate or systemic harm to individuals and critical infrastructure; … Develop ways to prevent the proliferation of malicious ICT tools and practices intended to cause harm; Strengthen the security of digital processes, products and services, throughout their lifecycle and supply chain; Support efforts to strengthen an advanced cyber hygiene for all actors; Promote the widespread acceptance and implementation of international norms of responsible behavior as well as confidence-building measures in cyberspace," and more.

The Paris Call represents an excellent statement of principles and objectives, but it will be effective only if it is backed by sufficient resources and implementation actions.

5.4. Putting the candidate initiatives into perspective

In order to provide a comparative perspective on the various candidate initiatives, it is important to bear in mind that they differ from one another in many dimensions – not only in the magnitude of costs and benefits, but also in the degree to which the Union has competence to act. Some appear to us to be more politically fraught than others.

In a few cases, we have identified complex issues where solutions probably cannot even be put forward until the problem has been studied in greater depth. In others, the problem is well understood but potential solutions would require careful assessment through the Better Regulation process.

With this in mind, we have categorised the various initiatives put forward in this chapter along each of these dimensions in Table 8, and have clustered them into groups. The assessments reflect our subjective view of the benefits, costs, and difficulty of each of the candidate policy measure along each of the relevant dimensions.

[57] https://blogs.microsoft.com/on-the-issues/2017/02/14/need-digital-geneva-convention/ viewed 26 December 2018.

[58] French Ministry of Foreign Affairs (2018), Paris call for trust and security in cyberspace.

To summarise, the measures that we have put forward in this chapter and assessed in Table 8 are:

- **Public funding for AI and robotics.** More public investment is needed in these potentially transformative technologies, and especially in AI and robotics, in order to maintain EU competitiveness.
- **Private funding for start-ups and scale-ups.** The Capital Markets Union (CMU), which included some measures in this direction, is stalled. EU start-ups and scale-ups continue to suffer from a lack of venture capital, challenges in conducting IPOs, and problematic and inconsistent insolvency regimes. A re-doubling of efforts is in order.
- **Corporate taxation.** Online platforms need to pay their fair share of taxes, and there is general agreement (in line with the OECD's BEPS process) that taxation should occur where the service is used.
  Beyond that broad assertion, however, it will be hard to find consensus between the EU and our trading partners, and for that matter among the Member States of the EU itself.
- **Training.** Training and retaining skilled IT professionals in the EU is increasingly difficult. The limited EU competence in this area poses a challenge.
- **Employment and social protection.** The combined impact of AI, machine learning, and big data on employment is potentially substantial. This implies significant societal dislocations that will need to be addressed. Furthermore, there are implications for social protection of workers (including self-employed workers) as digitisation contributes to increasing labour flexibility – a trend with both positive and negative implications. Again, the limited EU competence in this area poses a challenge.
- **E-government.** Progress has been slow in the area of e-government. It is time to reinvigorate EU efforts on cross-border e-government service.
- **Network and information security.** Progress has been made in the current legislative term when it comes to strengthening the role of ENISA, and establishing a certification programme at EU level. Nonetheless, the level of investment at EU level is ludicrously small in comparison to the rate at which threats are growing, not only from commercial hackers but also from states and from state sponsored hackers. A more muscular approach to cybersecurity at EU level appears to be needed.
- **Cross-border sales of goods that require delivery.** This would be a necessary prerequisite to expanding the Geo-Blocking Regulation to include goods that require cross-border delivery. For this to be workable, it would be necessary to first address non-harmonised requirements related to product safety, labelling and more. Existing legislation that mandates mutual recognition of goods sold in another Member State would need to be made fully effective in practice.
- **Re-think the structure of the EU audio-visual sector.** This would be a necessary prerequisite to expanding the Geo-Blocking Regulation to include services that primarily deliver copyrighted audiovisual content. Expanding the Geo-Blocking Regulation without first addressing structural problems in the audiovisual sector would risk undermining the funding model for the production of audiovisual content.
- **Expand the scope of consumer protection.** Inclusion of commercial guarantees, consumer credit and gambling could generate welfare gains. Further extension could be considered to fully cover financial services, passenger travel, healthcare and real estate.
- **Further improve access regulation.** Further work is likely to be needed to fully realise the broadband investment that the EECC sought.
- **Lower cross-border parcel delivery NPO prices.** The Regulation as enacted does little to bring prices down to levels reflective of costs.

Expanding the Regulation to mandate more competitive pricing, mainly on the part of National Postal Operators, would generate net gains, and would encourage a second round of enhancements.

- **Liability and new technologies.** New legislation is likely to be needed to address issues of product and service liability where AI and machine learning come into play.
- **Fake news and inappropriate content.** Issues with inappropriate or misleading content are growing. A more muscular and comprehensive policy approach is likely to eventually be needed than the voluntary programmes currently in place to deal with "fake news". Automated tools based on AI, machine learning and big data techniques show promise in detecting inappropriate content, and "fake news".
- **Detecting collusion.** Automated platforms may have a tendency to collude, with or without malicious intent, but automated tools may also prove crucial in detecting collusion.

Table 8. A comparative perspective on possible initiatives to realise more of the potential of the Digital Single Market.

Thematic area	Potential magnitude of gains	Implementation difficulty	Measures needed have been identified	Political difficulty	Subsidiarity difficulty	More public resources needed	Action needed
High payback areas where prompt action is feasible							
Public funding for AI and robotics	H	L	Y	M	L	Y	Further increase funding
Private funding for start-ups and scale-ups (CMU)	H	M	Y	H	H	N	Political resolution needed
Corporate taxation	M	L	Y	H	H	N	Political resolution needed
High payback areas where more study is needed to formulate plans							
Training and re-training	H	M	N	M	H	Y	Study and funding needed
Employment and social protection	H	H	Y	H	H	Y	Many needs are understood
E-government	M	H	Y	M	H	Y	Study barriers, then push ahead
Network and information security	H	H	N	M	H	Y	More EU activism needed
High payback areas where the way forward is not clear							
Cross-border sales of goods that require delivery	H	H	N	H	H	N	Study, better mutual recognition
Re-think the structure of the EU audio-visual sector	H	H	N	H	H	N	Comprehensive study
Medium payback areas where more study is needed to formulate plans							
Expand scope of consumer protection	M	M	N	M	M	N	Study of promising sectors
Further improve access regulation	M	M	N	M	M	N	Study
Lower cross-border parcel delivery NPO prices	M	L	Y	H	H	Y	Political resolution needed
Areas where both study and research are needed							
Liability and new technologies	L	L	N	M	M	N	Study
Fake news and inappropriate content	H*	H	N	M	M	N	Study and technical progress
Identifying collusion	M	M	N	L	L	Y	Study and technical progress

H=high, M=medium, L=low, Y=yes, N=no

* - societal gains are not mainly economic

REFERENCES

- Alleweldt, F., Kara, S., Mcspedden-Brown, N., Fielder, A., Zuleeg, F., And Osinski, A. (2014), "Contribution of the Internal Market and Consumer Protection to Growth", study for the IMCO Committee of the European Parliament.
- Aussilloux, V., Boumellassa, H., Emlinger, C. and Fontagne, L. (2011), The economic consequences for the EU and the EU of completing the Single Market. BIS Economics Paper No. 11.
- Badinger, H. (2007), Has the EU's Single Market Programme Fostered Competition? Testing for a Decrease in Markup Ratios in EU Industries. Oesterreichische Nationalbank Working Paper 135.
- Baldwin, R. (1989), On the Growth Effects of 1992. NBER Working Paper No. 3119.
- Barbero, M., Bartz, K., Linz, F., Mauritz, S., Wauters, P., Chrzanowski, P., Graux, H., Hillebrand A., de Vries, M., Innesti, A., Ypma, P., Tenge, E., Jakimowicz, K., and Osimo, D. (2018), Study to support the review of Directive 2003/98/EC on the re-use of public sector information.
- Belloc, F., Nicita, A. and M. A. Rossi (2011), The Nature, Timing and Impact of Broadband Policies: a Panel Analysis of 30 OECD Countries, University of Siena.
- BEREC (2018), International Roaming: BEREC Benchmark Data Report, April 2017 - September 2017, BoR (18) 31.
- Boltho, A. and Eichengreen, B. (2008), The Economic Impact of European Integration, Centre for Economic Policy Research Discussion Paper NO. 6820.
- Cafiso, G. (2009), Sectorial Border Effects in the European Single Market: An Explanation through Industrial Concentration. European Central Bank Working Paper Series No. 1116.
- Cambini, C. (2018), Broadband and regulation – How can better research help?, presentation at the ITS Europe Conference in Trento, Italy.
- Campos N., Coricelli F. and Moretti L. (2014), "Economic Growth and Political Integration: Estimating the Benefits from Membership in the European Union using the Synthetic Counterfactuals Method", IZA Discussion Paper No 8162.
- Cecchini, P., Catinat, M. and Jacquemin, A. (1988), Europe 1992: The Overall Challenge [summary of the Cecchini report]. SEC (88) 524 final, European Commission.
- Council of the European Union (2017), Proposal for a Regulation of the European Parliament and of the Council on establishing a single digital gateway to provide information, procedures, assistance and problem solving services and amending Regulation (EU) No 1024/2012, 10069/18.
- Council of the European Union (2018a), Proposal for a Directive of the European Parliament and of the Council establishing the European Electronic Communications Code (Recast) - Outcome of proceedings, 10692/18.Dahlberg, E. (2015), Economic Effects of the European Single Market: Review of the empirical literature. National Board of Trade of Sweden.
- Council of the European Union (2018b), Preparation of the Competitiveness Council on 29 November 2018: Presidency discussion paper - Future of the Single Market, 14003/18.
- Council of the European Union (2018c), The future of the Single Market, 13512/18.
- de Streel, A., and Hocepied, C. (2019, forthcoming), Contributing to Growth: European Digital Single Market: Legal Analysis.

- Decreux, Y. (2012), Completing Single Market II, Twenty Years On: The UK and the Future of the Single Market, Centre for Economic Policy Research.
- Deloitte (2013), Economic impact assessment of the proposed European General Data Protection Regulation.
- Duch-Brown, N. and Martens, B. (2016), The Welfare effects of lifting geoblocking restrictions in the EU Digital single Market, JRC/IPTS Digital Economy Working Paper.
- Eljas-Taal, K., Kay, N., Prosch, L., and Svatikova, K. (2018), A methodology for measuring the collaborative economy.
- ENISA (2017), eIDAS: Overview on the implementation and uptake of Trust Services: One year after the switch over.
- European Commission (2003), The Internal Market – Ten Years without Frontiers.
- European Commission (2006), Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market.
- European Commission (2010), Quantifying the potential macroeconomic impact of the Single Market, Note for the LIME working group.
- European Commission (2011), Impact Assessment of Policy Options in Relation to the Commission's Review of the Functioning of Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 on Roaming on Public Mobile Telephone Networks within the Community, SEC(2011) 870 final.
- European Commission. (2012a), 20 Years of the European Single Market - Together for New Growth – Main Achievements.
- European Commission. (2012b), Impact Assessment accompanying the document Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation) and Directive of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by competent authorities for the purposes of prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and the free movement of such data, COM(2012) 72 final.
- European Commission. (2012c), Impact Assessment accompanying the document Regulation of the European Parliament and of the Council on electronic identification and trust services for electronic transactions in the internal market (eIDAS), SWD(2012) 135 final.
- European Commission (2013a), Impact Assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure, SWD(2013) 471 final.
- European Commission (2013b), Commission Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU).
- European Commission (2013c), Impact Assessment accompanying the document Proposal for a Regulation of the European Parliament and of the Council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent,

and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC and Regulations (EC) No 1211/2009 and (EU) No 531/2012, SWD(2013) 331 final.

- European Commission (2015a), A Digital Single Market Strategy for Europe, COM(2015) 192 final.
- European Commission (2015b), Digital Single Market – Analysis and Evidence, SWD(2015) 100 final.
- European Commission (2015c), Green Paper on retail financial services: Better products, more choice, and greater opportunities for consumers and businesses, COM(2015) 630 final.
- European Commission (2015d), Single Market Strategy, COM(2015) 550 final.
- European Commission (2015e), Inception Impact Assessment: Proposal on contract rules for online purchase of digital content and tangible goods.
- European Commission (2015f), Impact Assessment accompanying the document Proposal for a Regulation of the European Parliament and of the Council to ensure the cross-border portability of online content services in the internal market, SWD(2015) 270 final.
- European Commission (2015h), Upgrading the Single Market: more opportunities for people and business, COM(2015) 550 final.
- European Commission (2015i), Impact Assessment accompanying the document Proposal for a Decision of the European Parliament and of the Council on the use of the 470-790 MHz frequency band in the Union.
- European Commission (2016a), Executive Summary Sheet: Impact assessment on Proposal for a Regulation of the European Parliament and of the Council replacing Regulation (EC) No 2006/2004 of the European Parliament and of the Council of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (the Regulation on consumer protection cooperation- CPC Regulation), COM(2016) 283 final.
- European Commission (2016b), Proposal for a Regulation of the European Parliament and of the Council laying down rules on the exercise of copyright and related rights applicable to certain online transmissions of broadcasting organisations and retransmissions of television and radio programmes, COM(2016) 594 final.
- European Commission (2016c), Executive Summary of the Impact Assessment on the modernisation of EU copyright rules Accompanying the document Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market and Proposal for a Regulation of the European Parliament and of the Council laying down rules on the exercise of copyright and related rights applicable to certain online transmissions of broadcasting organisations and retransmissions of television and radio programmes, SWD(2016) 302 final.
- European Commission (2016d), Impact assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/13/EU on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services in view of changing market realities, SWD(2016) 168 final.
- European Commission (2016e), Inception Impact Assessment: Achieving more and better mutual recognition for the single market for goods.

- European Commission (2016f), Executive Summary of the Impact Assessment accompanying the document Proposal for a Regulation of the European Parliament and the Council on cross-border parcel delivery services, SWD(2016) 167 final.
- European Commission (2016g), Modernising VAT for cross-border B2C e-commerce: Proposal for a Council Directive amending Directive 2006/112/EC and Directive 2009/132/EC as regards certain value added tax obligations for supplies of services and distance sales of goods, COM(2016) 757 final.
- European Commission (2016g), Impact assessment accompanying the document Proposals for a Directive of the European Parliament and of the Council establishing the European Electronic Communications Code (Recast) and a Regulation of the European Parliament and of the Council establishing the Body of European Regulators for Electronic Communications, SWD(2016) 303 final.
- European Commission (2016h), Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) No 1316/2013 and (EU) No 283/2014 as regards the promotion of Internet connectivity in local communities, COM(2016) 589 final.
- European Commission (2016i), EU eGovernment Action Plan 2016-2020: Accelerating the digital transformation of government, COM(2016) 179 final.
- European Commission (2017a), Amended proposal for a Directive of the European Parliament and of the Council on certain aspects concerning contracts for the online and other distance sales of goods, amending Regulation (EC) No 2006/2004 of the European Parliament and of the Council and Directive 2009/22/EC of the European Parliament and of the Council and repealing Directive 1999/44/EC of the European Parliament and of the Council, COM(2017) 637 final.
- European Commission (2017b), Impact Assessment accompanying the document Proposal for a Regulation of the European Parliament and of the Council on ENISA, the "EU Cybersecurity Agency", and repealing Regulation 526/2013, and on Information and Communication Technology cybersecurity certification ("Cybersecurity Act"), SWD(2017) 500 final.
- European Commission (2017c), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Mid-Term Review on the implementation of the Digital Single Market Strategy, COM(2017) 228 final.
- European Commission (2017d), Impact Assessment accompanying the document Proposal for a regulation of the European parliament and of the Council on establishing a single digital gateway to provide information, procedures, assistance and problem solving services and amending Regulation (EU) No 1024/2012, SWD(2017) 213 final.
- European Commission (2017e), Completing the Better Regulation Agenda: Better solutions for better results, COM(2017) 651 final.
- European Commission (2017f), Economic Analysis accompanying the document Communication … on the Mid-Term Review of the Capital Markets Union Action Plan, SWD(2017) 224 final.
- European Commission (2018a), "Liability for emerging digital technologies Accompanying the document 'Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: Artificial intelligence for Europe'", COM(2018) 237 final.

- European Commission (2018b), Proposal for a Directive of the European Parliament and of the Council amending Council Directive 93/13/EEC of 5 April 1993, Directive 98/6/EC of the European Parliament and of the Council, Directive 2005/29/EC of the European Parliament and of the Council and Directive 2011/83/EU of the European Parliament and of the Council as regards better enforcement and modernisation of EU consumer protection rules, COM(2018) 185 final.
- European Commission (2018c), Proposal for a Regulation of the European Parliament and of the Council on the implementation and functioning of the .eu Top Level Domain name and repealing Regulation (EC) No 733/2002 and Commission Regulation (EC) No 874/2004, COM(2018) 231 final.
- European Commission (2018d), Proposal for a Directive of the European Parliament and of the Council on representative actions for the protection of the collective interests of consumers, and repealing Directive 2009/22/EC, COM(2018) 184 final.
- European Commission (2018e), Proposal for a Regulation of the European Parliament and of the Council on promoting fairness and transparency for business users of online intermediation services, COM(2018) 238 final.
- European Commission (2018f), Impact Assessment accompanying the document Proposal for a Council Directive amending Directive 2006/112/EC on the common system of value added tax as regards the special scheme for small enterprises, SWD(2018) 9 final.
- European Commission (2018g), Completing a trusted Digital Single Market for all, COM(2018) 320 final.
- European Commission (2018h), Impact Assessment accompanying the document Proposal for a Council Regulation on establishing the European High Performance Computing Joint Undertaking, COM(2018) 8 final.
- European Commission (2018i), Impact Assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council on the re-use of public sector information, COM(2018) 234 final.
- European Commission (2018j), Proposal for a Council Recommendation on access to social protection for workers and the self-employed, COM(2018) 132 final.
- European Commission (2018k), Coordinated Plan on Artificial Intelligence, COM(2018) 795 final.
- European Parliament (2017a), Civil Law Rules on Robotics: European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)).
- European Parliament (2017b), European Parliament resolution of 16 May 2017 on the EU eGovernment Action Plan 2016-2020, 2016/2273(INI).
- European Parliament (2018a), The ubiquitous digital single market, Fact Sheet, http://www.europarl.europa.eu/factsheets/en/sheet/43/the-ubiquitous-digital-single-market.
- European Parliament (2018b), Digital Agenda for Europe, http://www.europarl.europa.eu/factsheets/en/sheet/64/digital-agenda-for-europe.
- European Parliament (2018c), EP-EUI Roundtable on Strategy for Artificial Intelligence in Europe: Proceedings, PE 626.073.
- European Parliament EPRS (2017), Contracts for supply of digital content.

- European Parliament and Council (2016),Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).
- European Union (2017) "European Pillar of Social Rights", EU Publications Office.
- Felbermayr, G., Gröschl, J. and Steinwachs, T. (2018), "The trade effects of border controls: Evidence from the European Schengen Agreement." JCMS: Journal of Common Market Studies 56.2, pp. 335-351.
- French Ministry of Foreign Affairs (2018), Paris call for trust and security in cyberspace.
- Gehringer, A., Martínez-Zarzoso, I. and Danzinger, F. N-L. (2016), "What are the drivers of total factor productivity in the European Union?", Economics of Innovation and New Technology, 25:4, pp. 406-434.
- GHK (2014), The Cost of Non-Europe in the Single Market: Annex V - Consumer Acquis, http://www.europarl.europa.eu/RegData/etudes/STUD/2014/536357/EPRS_STU(2014)536357_REV1_EN.pdf viewed 6 October 2018.
- Godel, M., Harms, A., Jones, S., and Mantovani, I. (2016), Reducing Costs and Barriers for Businesses in the Single Market, study for the European Parliament, PE 578.966.
- Goudin (2016), The Cost of Non-Europe in the Sharing Economy: Economic, Social and Legal Challenges and Opportunities.
- Griffith, R., Harrison, R. and Simpson, H. (2010), Product Market Reform and Innovation in the EU. *Scandinavian Journal of Economics*, 112(2), p. 389-415.
- GSMA (2018), The mobile economy.
- Harrison, G., Rutherford, T. and Tarr D. (1994), Product Standards, Imperfect Competition, and Completion of the Market in the European Union. Policy Research Working Paper 1293, The World Bank.
- HM Treasury, (2005), EU Membership and Trade. Unclassified. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220968/foi_eumembership_trade.pdf.
- IDC Italia and the Lisbon Council (2018), First Report on Facts & Figures (Deliverable D2.1 of the Update of the European Data Market Study, SMART 2016/0063).
- IHS Markit (2017), The 5G economy - How 5G technology will contribute to the global economy.
- Ilzkovitz, F., Dierx, A., Kovacs, V. and Sousa, N. (2007), Steps towards a deeper economic integration: the Internal Market in the 21st century - A contribution to the Single Market Review. European Economy No. 271, European Commission, Brussels.
- Kahanec, M. and Zimmermann, K. F. (2009), Migration in an enlarged EU: A challenging solution? Economic Papers 363, European Commission, Brussels.
- König, J. (2015), "European integration and the effects of country size on growth". Journal of Economic Integration, 501-531.

- London Economics / PWC. (2013), The Cost of Non-Europe: The Untapped Potential of the European Single Market
- Marcus, J.S., Klaver, M., Bodea, G., Hillebrand, A., and Stamm, P. (2012), The role of ENISA in contributing to a coherent and enhanced structure of network and information security in the EU and internationally.
- Marcus, J.S., Godlovitch, I., Nooren, P., van den Ende, B., Cave, J., and Neu, W. (2013),How to Build a Ubiquitous EU Digital Society, study for the European Parliament: http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/518736/IPOL-ITRE_ET(2013)518736_EN.pdf.
- Marcus, J.S. and Petropoulos (2017), "Extending the scope of the geo-blocking prohibition: An economic assessment", study for the IMCO Committee of the European Parliament, PE 595.364: http://bruegel.org/wp-content/uploads/2017/02/IPOL_IDA2017595364_EN.pdf.
- Marcus, J.S. (2019), Liability when things go wrong in an increasingly interconnected and autonomous world: A European View, *forthcoming*.
- McKinsey Global Institute (2013), Disruptive technologies: Advances that will transform life, business, and the global economy, authors James Manyika, Michael Chui, Jacques Bughin, Richard Dobbs, Peter Bisson, and Alex Marrs.
- Mohler, L. and Seitz, M. (2010), The Gains from Variety in the European Union. Munich Discussion Paper No. 2010-24, University of Munich.
- Monti, M. and Buchan D. (1996), Monti, Mario, and David Buchan. The single market and tomorrow's Europe: a progress report from the European Commission.
- Monteagudo, J., Rutkowski, A. and Lorenzani, D. (2012), The economic impact of the Services Directive: A first assessment following implementation. Economic Papers 456, European Commission, Brussels.
- Monti, G., and Augenhofer, S. (2018), Consumer Choice and Fair Competition on the Digital Single Market in the Areas of Air Transportation and Accommodation, PE 626.082.
- Muller, Patrice, Jones, Siôn, and Koch, Laura (2015), Smart Single Market Regulation, study for the IMCO Committee, PE 563.442.
- Pacchioli, C. (2011), Is the EU internal market suffering from an integration deficit? Estimating the 'home-bias effect'. CEPS Working Document No. 348, CEPS, Brussels.
- Parcu, P. L. et al. (2011), Study on Broadband Diffusion: Drivers and Policies. Study for the Independent Regulators Group, Florence School of Regulation; available at: http://www.irg.eu/streaming/CN%20%2811%29%2081_FSR_Study_on_BB_Promotion_FINAL.pdf?contentId=547201&field=ATTACHED_FILE.
- Pelkmans, J. and Renda, A. (2011), Single eComms Market? No Such Thing.... Bruges European Economic Policy Briefings No. 22, Bruges, Belgium.
- Petersen, T., Böhmer, M. and Weisser, J. (2014), 20 Years of the European Single Market: Growth Effects of EU Integration, Bertelsmann Stiftung Policy Brief #2014/02
- Renda, A. (2018), "The legal framework to address "fake news": possible policy actions at the EU level", PE 619.013.

- Smith, A. and Venables A. J. (1988), Completing the internal market in the European Community: Some industry simulations. European Economic Review, 32:7, p. 1501-1525.
- Straathof B., Linders G. J., Lejour, A. and Mo hlmann, J. (2008), The Internal Market and the Dutch Economy: Implications for trade and economic growth. CPB Document No. 168, the Hague.
- Turk, Z. (2018), Technology as Enabler of Fake News and a Potential Tool to Combat It, PE 619.008.
- van Veenstra, A-F., Marcus, J.S., Cave, J., et al. (2014), "Ubiquitous Developments of the Digital Single Market", study on behalf of the European Parliament's Committee on Internal Market and Consumer Protection, http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507481/IPOL-IMCO_ET(2013)507481_EN.pdf.
- Vaughan, R., and Hawksworth, J. (2014), The Cost of Non-Europe in the Sharing Economy: Economic, Social and Legal Challenges and Opportunities, PWC.

ANNEX

In this annex, we present a preliminary top-down estimation of the impact of elements of digital readiness, as expressed by the *Digital Economy and Society Index (DESI)*, on GDP. We rely on a simple reduced-form model in which Gross Domestic Product (GDP) per capita is regressed on DESI by a fixed-effect model using ordinary least squares (OLS). Reduced form regression is preferred because it is easy to understand and compare. The inclusion of several proxy variables in a single equation enables us to control for different factors at the same time. The objective is to estimate the historical contribution of improvements in the digital economy and society to national income, and to give a rough prediction of expected further gains if the trend continues.

The *Digital Economy and Society Index (DESI)* is a composite index that summarises indicators of digital performance of Member States in five dimensions: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology, and Digital Public Services. The advantage of using DESI is its high level of aggregation that consistently groups various indicators into five, but its main disadvantage is its short history.[59] Our analysis utilises the five main categories of DESI from 2014 to 2017 across 28 Member States. The five categories are listed below:

- Connectivity (DESI1) measures the deployment of broadband infrastructure and its quality.
- Human Capital/Digital Skills (DESI2) measures the skills needed to take advantage of the possibilities offered by the digital economy.
- Use of Internet Services by Citizens (DESI3) accounts for a variety of online activities, such as consumption of online content, online shopping and banking.
- Integration of Digital Technology by Businesses (DESI4) measures the digitisation of businesses and e-commerce.
- Digital Public Services (DESI5) measures the digitisation of public services, focusing on eGovernment and eHealth.

The regression seeks to explain (the natural logarithm of) GDP per capita using these five DESI indicators as explanatory variables in a fixed-effect regression of 112 observations.[60] Only Connectivity can significantly explain per capita income, as detailed in column 1 of Table 9.

If we discard Connectivity from the equation and re-estimate the coefficients of other indicators as shown in column 2, only the Digital Public Services indicator is significant at the 0.05 level. This second specification may be preferable because it explains more of the between-country variations in GDP per capita (i.e. provides for a greater R-squared).

[59] See https://ec.europa.eu/digital-single-market/en/desi.

[60] GDP (chain linked volumes, index 2010=100) and population are based on Eurostat.

Table 9. Explaining GDP per capita by means of DESI indicators.

Dependent Variable: ln GDP per capita	(1)	(2)
Connectivity	1.8916***	
	(0.4039)	
Human Capital/Digital Skills	-0.4867	1.9519*
	(1.0884)	(1.0737)
Use of Internet Services by Citizens	0.2140	1.4742
	(0.9094)	(0.9758)
Integration of Digital Technology by Businesses	0.4228	0.9772*
	(0.4877)	(0.5314)
Digital Public Services	0.4197	1.7783**
	(0.6963)	(0.7110)
Country Fixed Effects	YES	YES
Within R-Sq	0.7063	0.6248
Between R-Sq	0.3078	0.4849
Overall R-Sq	0.2314	0.4667
No. of Country	28	28
No. of Observations	112	112
Standard errors are given in the parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level		

Numerous legislative measures have been initiated or enacted in support of the overall achievement of a Digital Single Market (DSM). This in-depth analysis provides a brief stock-taking of what has been achieved in economic terms, of what remains to be done, and of candidate initiatives for the next legislative term.

The work was undertaken for Policy Department A of the European Parliament, on behalf of the Internal Market and Consumer Protection Committee (IMCO). Preliminary results were presented at the IMCO Plenary on 10 July 2018.

PE 631.044
IP/A/IMCO/2018-12

Print ISBN 978-92-846-4513-8 | doi: 10.2861/582055 | QA-02-19-062-EN-C
PDF ISBN 978-92-846-4514-5 | doi: 10.2861/100108 | QA-02-19-062-EN-N