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Special Report

Digitising European Industry: an ambitious initiative whose success depends on the continued commitment of the EU, governments and businesses

CURIA RATIONUM

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Contents

Executive summary

I Digitalisation is associated with better business performance across productivity, management practices, innovation, growth and higher-paying jobs. Embracing the digital transformation is therefore essential for many EU businesses to remain competitive. EU businesses are not taking full advantage of advanced technologies to innovate. As 99 % of EU's businesses are SMEs, it is particularly important to get this sector to address digitalisation.

II In this context, in 2016, the Commission launched the Digitising European Industry (DEI) initiative. This soft-law initiative had the aim of reinforcing the EU's competitiveness in digital technologies and ensuring that every business in Europe, in whichever sector, wherever situated, and no matter of what size can fully benefit from digital innovations. The DEI initiative proposed to mobilise close to €50 billion of public and private investment in the 5 years after its launch. Digital Innovation Hubs (DIHs), providing services such as expertise on technologies, testing, and networking to businesses, is one of the key concepts for implementing the DEI initiative. As well as providing EU citizens and decision-makers with an assessment of the effectiveness of EU actions since the launch of the DEI, our report should help ensure that the right conditions are put in place for the 2021-2027 programme period.

III We examined the extent to which the EU was effective in supporting national strategies on digitalising industry and the Digital Innovation Hubs by focusing on three out of the five pillars of the DEI initiative. In particular, we assessed whether the Commission supported Member States effectively in developing and implementing their strategies on digitising industry, and, together with Member States, was assessing the implementation of those strategies. In addition, we reviewed the Commission's and Member States' support for the establishment and operation of DIHs; whether the Commission was identifying and addressing regulatory barriers that could affect the implementation of the DEI initiative; and whether it was taking action to ensure appropriate connectivity.

IV We found that the Commission strategy for supporting the digitisation of European industry was soundly based and supported by Member States, but lacked information on intended outcomes, result indicators and targets. This makes it more difficult for the Commission and the Member States to take better-informed decision and to better direct their activities. The Commission carried out several activities to provide guidance to Member States, but did not encourage Member States to allocate European Structural and Investment (ESI) funding to the initiative. The total funding

needed to create and maintain a framework for supporting EU industry digitalisation is not known. In most of the Member States we visited, the Commission's support activities had had limited influence.

V Horizon 2020 supports the initiative and in the ERDF programmes we reviewed, we identified measures potentially supporting the implementation of the DEI initiative. However, for the ESI funds, since the DEI initiative was launched mid-way through the 2014-2020 programme period, there was no legal requirement for Member States to monitor projects relevant to the DEI initiative. Therefore, data collection arrangements in most Member States do not capture information about the DEI initiative, preventing monitoring at Member State and EU level. According to the Commission, a more structured approach by the Member States is required to precisely determine the investments made. This means that it is difficult for the Commission to obtain this information to assess how the volume of investments compares to the plans set out in the original DEI initiative communication.

VI Since the launch of the initiative, the Commission has carried out several activities designed to support DIHs in their set-up and operations. However, activities in the Member States we visited have been limited. Four years since the DEI initiative started, DIHs still have limited access to funding, we found examples of uncoordinated deployment, and, except for activities financed by Horizon 2020, there is not yet a detailed monitoring framework in place at EU level for DIHs. For the period 2021-2027, the Commission proposed a new Digital Europe programme, which outlines criteria for Member States selecting 'European DIHs' and for monitoring their activities when receiving support under such programme. As at June 2020, this proposed programme is still in the process of being discussed.

VII The Commission has continued to take appropriate action to ensure a suitable legal framework, addressing all the legislation identified in the DEI initiative communication. Good levels of broadband connectivity (the subject of an earlier ECA special report, 12/2018) are also essential for the initiative, particularly following the coronavirus pandemic of 2020. Business can benefit from a steady increase in fast and ultrafast broadband coverage in recent years. However, not all Member States are likely to meet all of the EU 2020 targets and reaching the EU 2025 Gigabit Society target appears even more challenging. In addition to coverage, take-up of connectivity by business is key for the successful digitalisation of industry in the EU. However, the take-up rate of fast broadband varies greatly between companies of different sizes and, as of 2019, only 46 % of small businesses subscribe to fast broadband speeds.

VIII On the basis of these conclusions, we recommend that the Commission, together with Member States:

o   offer support to Member States in identifying their funding gaps and draw their attention to the EU funding available;

o   improve monitoring of the DEI initiative by setting appropriate result indicators and tracking spending;

o   define, coordinate and adopt the framework for a network of European DIHs covering all regions in Europe; and

o   take further action to support the achievement of appropriate levels of broadband connectivity.

Introduction

From Industry 1.0 to 4.0 – Digitalising European Industry

01 Industry advances through technological developments. *Figure 1* illustrates how industry has moved in the last 250 years from mechanisation and steam engines, through assembly line production to the introduction of industrial robotics and automated production in the early 1970s.

Figure 1 – Phases of industrial revolution
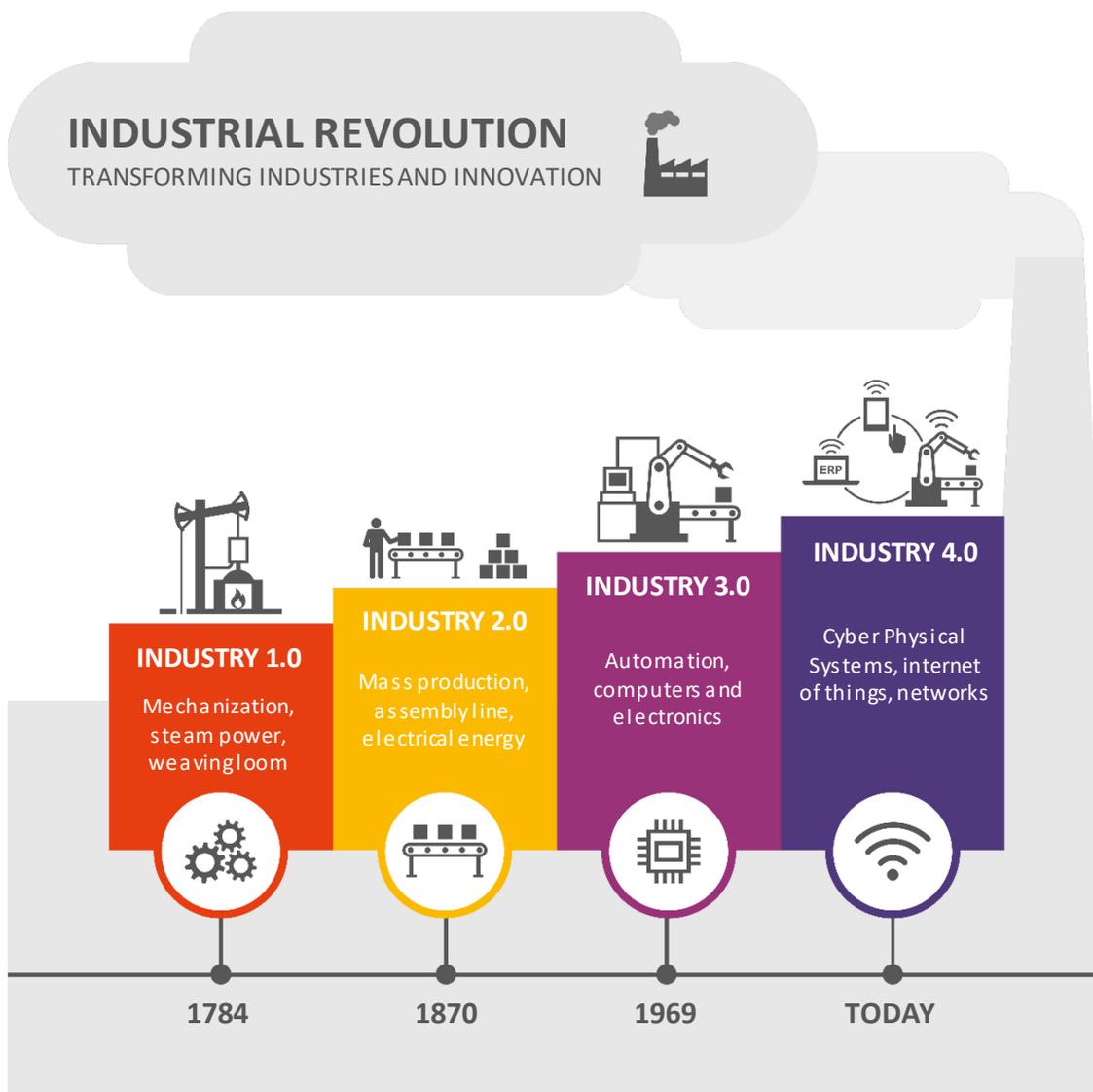
© Shutterstock / By elenabsl.

02 The fourth wave of industrial evolution (often referred to as Industry 4.0) encompasses all kinds of industries and economic sectors. It has the potential to give

companies much more control over their products: for example, it gives them greater ability to gear products towards increasingly individualised customer requirements. This greater control potentially covers the whole product lifecycle, from conception, through development and production, to delivery to the end customer, aftersales customer service, and concluding with recycling.

03 The basis for this fourth industrial revolution is the availability of all relevant information in real time, on all the elements of production. This potentially gives companies the ability to adjust and optimise their processes according to different criteria such as cost, availability and resource consumption. Good levels of broadband connectivity are therefore an essential prerequisite for allowing information to flow in real time and for companies to benefit from this latest industrial revolution.

04 *Figure 2* presents the main components of Industry 4.0, ranging from cloud computing and big data and analytics, to robotics and the Internet of Things[1].

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[1] For more information about the different components of Industry 4.0, please refer to the glossary.

Figure 2 – Examples of the different components of Industry 4.0

Internet of Things
Cyber-physical systems
Cloud computing & High performance computing
Additive Manufacturing
Robotics
Industry 4.0
Cyber Security
Artificial intelligence
Big Data and Analytics
5G
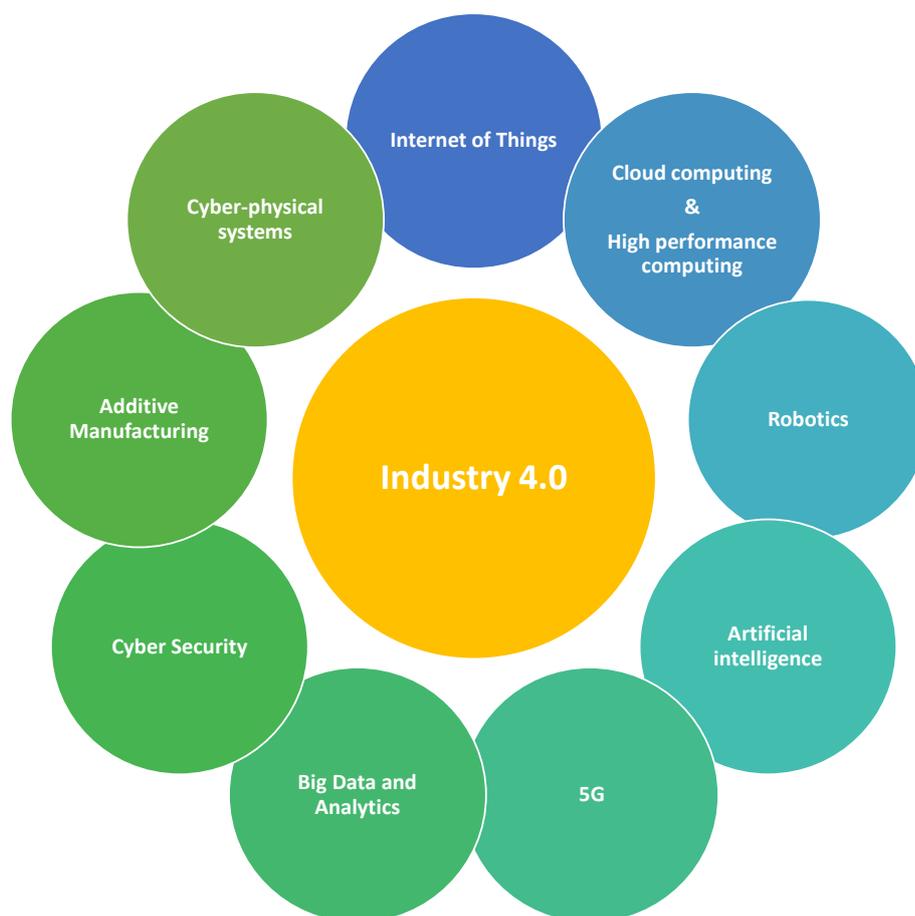
Source: ECA.

05 The digital transformation of industry, or digitalisation, is more than just acquiring new IT equipment and systems. It involves using the possibilities afforded by new technologies to rethink all aspects of the business process. Being open to digital transformation is essential for many EU businesses if they are to remain competitive. Studies estimate that the digitalisation of products and services will add more than €110 billion of revenue for industry per year in Europe[2]. According to a European investment Bank (EIB) study, digitalisation is associated with better business performance, across productivity, management practices, innovation, growth and higher-paying jobs[3].

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[2] For example, PwC: Opportunities and Challenges of the industrial internet (2015), and Boston Consulting Group: the future of productivity and growth in manufacturing industries (2015).

[3] European Investment Bank – Who is prepared for the new digital age? – Evidence from the EUB Investment Survey, February 2020.

06 EU businesses are not taking full advantage of advanced technologies to innovate, and the uptake of advanced technologies by industry varies across sectors and between EU countries and regions[4]. There are also large disparities between large companies and small and medium-sized enterprises (SMEs). For example, 54 % of large enterprises are highly digitised, against only 17 % of SMEs[5].

07 As 99 % of EU's businesses are SMEs[6], it is particularly important to get SMEs to address the digitalisation challenge. According to an EIB study[7], European SMEs' spending on digitalisation in 2018 was some €57 billion, representing 30 % of the total annual European information and communications technology (ICT) spending[8]. SMEs' spending on digitalisation is expected to grow rapidly, reaching €65 billion by 2022 (see *Figure 3*), although the coronavirus outbreak may well affect these figures[9].

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[4] https://ec.europa.eu/growth/industry/policy/advanced-technologies_en

[5] European Commission (2017), Roundtable on Digitising European Industry: Working Group 1 - Digital Innovation Hubs, p. 4.

[6] https://ec.europa.eu/growth/smes_en

[7] European Investment Bank, Financing the digitalisation of small and medium-sized enterprises: The enabling role of digital innovation hubs. 14 November 2019.

[8] The EIB distinguishes two kinds of ICT spending: traditional spending on equipment and connectivity, etc.; and spending on digital 'optimisation and transformation' projects.

[9] IDC Market Perspective Report "COVID-19 Impact on European ICT Markets – Mid-March 2020 View"

Figure 3 – Estimated increase in SMEs' annual spending on digitalisation
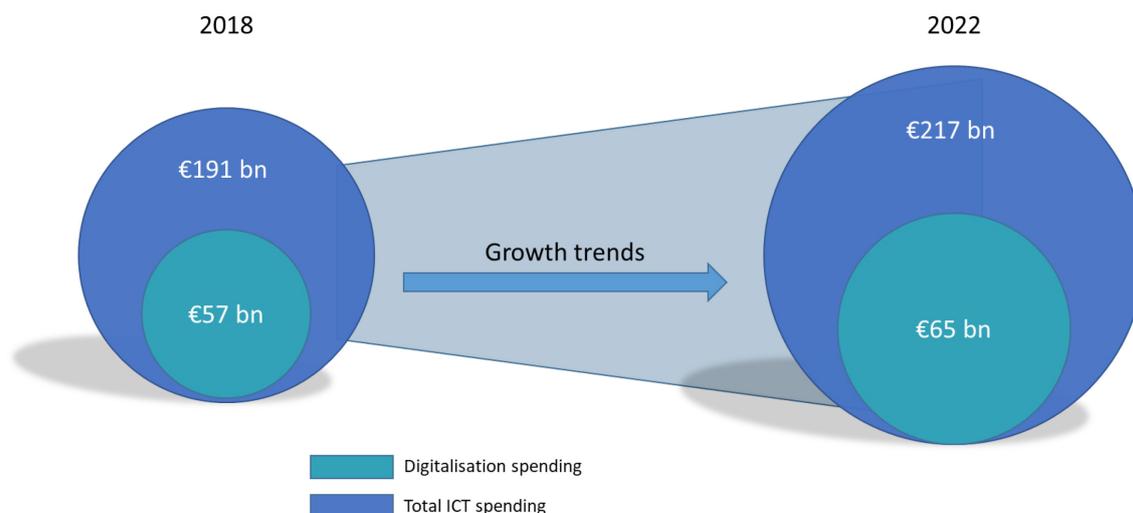
Source: ECA, adapted from EIB – Data collected by Gartner.

EU policy and initiatives relating to the digitalisation of industry

08 Europe 2020 is the EU's strategy for 2010-2020. One of Europe 2020's 'flagship initiatives' is "A digital agenda for Europe"[10], designed to deliver sustainable economic and social benefits from a digital single market. In this context, in 2015, the Commission launched the EU Digital Single Market strategy[11].

09 As part of the Digital Single Market strategy, and with encouragement from the Council[12], in April 2016 the Commission launched the 'Digitising European Industry' (DEI) initiative[13]. Industry is an area where the EU's role is limited to supporting the actions of Member States[14]. The initiative is therefore based on a Commission 'communication', rather than on an EU regulation: the Commission's aim is to support Member States in developing and implementing their own digitalisation strategies.

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[10] European Commission, COM(2010) 245 final/2 of 26.8.2010, A Digital Agenda for Europe, Brussels.

[11] European Commission, COM(2015) 192 final of 6.5.2015, A Digital Single Market Strategy for Europe, Brussels.

[12] Council of the European Union (2015), 9340/15, Conclusions on the digital transformation of European industry, 29.5.2015.

[13] European Commission (2016), COM(2016) 180 final of 19.4.2016, Digitising European Industry Reaping the full benefits of a Digital Single Market, Brussels.

[14] TFEU, Article 6.

According to the Commission, choosing a communication allowed it to engage swiftly with Member States and the private sector, although it does not give the Commission any regulatory powers. The aim of this soft-law initiative is 'to reinforce the EU's competitiveness in digital technologies and ensure that every business in Europe, in whichever sector, wherever situated, and no matter of what size can fully benefit from digital innovations'. According to the communication, the DEI initiative is expected to mobilise up to €50 billion of public and private investment at EU, national and regional level in the 5 years from its 2016 launch. The amount of EU funding under direct management is explicitly mentioned, but the communication does not specify the amounts of the other EU funding.

10 Building on and complementing national initiatives for digitising industry, the DEI initiative is structured around five main pillars (see *Figure 4*; fuller descriptions of each pillar are in *Annex I*).

Figure 4 – Pillars of the DEI initiative
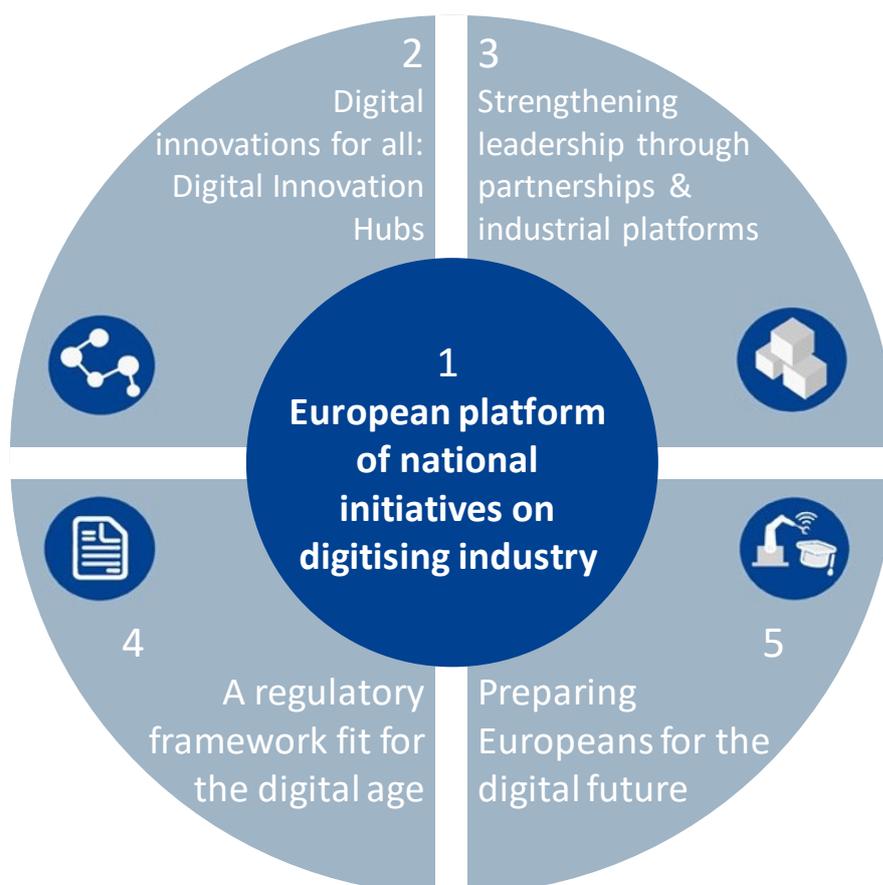
Source: ECA, adapted from European Commission.

11 At the EU level, the main Commission directorates-general involved in digitalisation and industrial policy are:

o Directorate-General for Communications Networks, Content and Technology (DG CNECT), which leads and coordinates the DEI initiative. It deals with policy and provides some financial support through the EU's research and innovation programme, Horizon 2020, which is directly managed by the Commission;

o Directorate-General for Competition (DG COMP), which is responsible for establishing and implementing competition policy for the EU;

o Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL), which is responsible for EU policy on employment, social affairs, skills, labour mobility and the related EU funding programmes implemented by Member States and supported through the ESF under shared management;

o Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW), which is responsible for completing the internal market for goods and services;

o Directorate-General for Regional and Urban Policy (DG REGIO) is responsible for strengthening the EU's economic, social and territorial cohesion through ERDF and Cohesion Fund programmes implemented by the Member States under shared management; and

o Directorate-General for Research and Innovation (DG RTD), which is the principal DG for the Horizon 2020 programme.

12 In 2018, the Commission proposed for the 2021-2027 period the first Digital Europe programme[15], a regulation with a budget of €9.2 billion, managed by the Commission, with the aim of contributing to the DEI initiative. This will be in addition to the other funding available for digitalising industry for the 2021-2027 period, such as Horizon Europe and the ESI funds. The programme will focus on five areas: high performance computing; artificial intelligence; cybersecurity and trust; advanced digital skills; and deployment, best use of digital capacity and interoperability. Under the proposal, the Commission plans to allocate about 10 % of the funding to European digital innovation hubs (DIHs) with the aim of building capacity across the EU. These

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[15] COM(2018) 434, Proposal for a Regulation of the European Parliament and of the Council establishing the Digital Europe programme for the period 2021-2027.

DIHs will be co-financed with Member States as centres of expertise designed to help local business develop digitally.

13 In April 2020, the Council and the Commission jointly presented a 'Roadmap for recovery' from the coronavirus outbreak to the Parliament, with the ultimate objective of building a more resilient, sustainable and fair Europe[16]. This plan cites digital transformation, alongside the Green transition, as having 'a central and priority role in relaunching and modernising our economy.'

The extent of industry digitalisation in the EU

14 In order to monitor the digital progress of Member States, in 2014, the Commission introduced the Digital Economy and Society Index (DESI), a composite index that summarises relevant indicators on Europe's digital performance and tracks the progress of Member States in digital competitiveness.

15 The DESI comprises indicators across five main 'dimensions'[17]:

> (1)   Connectivity;
>
> (2)   Human Capital;
>
> (3)   Use of internet services;
>
> (4)   Integration of Digital Technology; and
>
> (5)   Digital Public Services.

16 We consider that the most relevant dimensions for digitalising European industry are 'Connectivity', 'Human Capital' and the 'Integration of Digital Technologies'. *Figure 5* shows that the level of digitalisation varies between Member States.

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[16]   https://www.consilium.europa.eu/media/43384/roadmap-for-recovery-final-21-04-2020.pdf

[17]   Details on the methodology used to produce the index are at https://ec.europa.eu/digital-single-market/en/desi

Figure 5 – DESI 2020
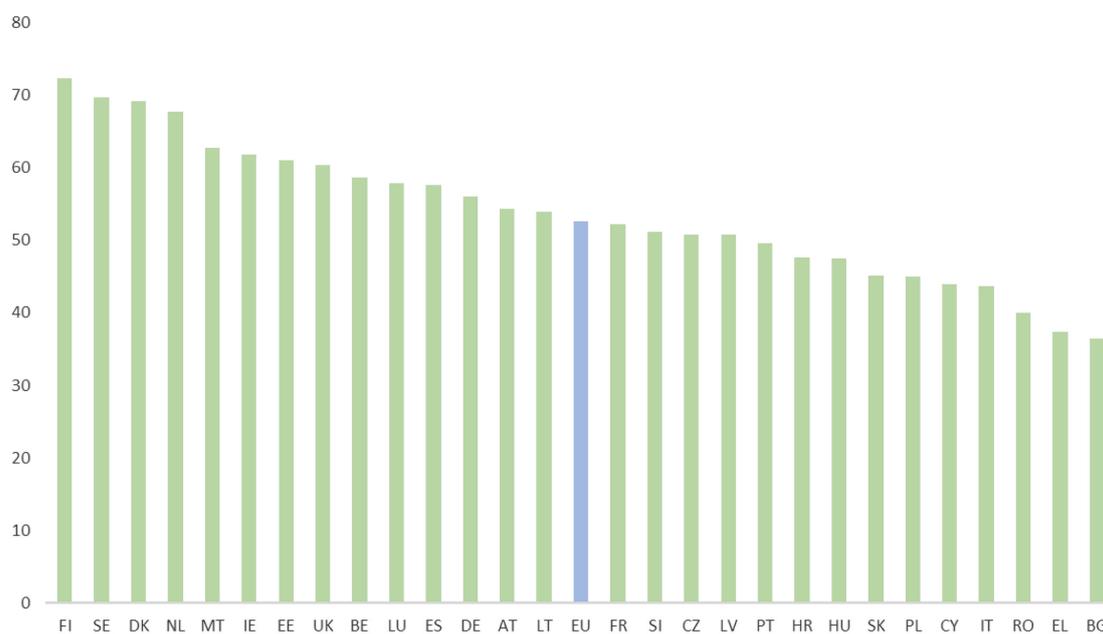
Source: ECA, based on DESI.

17 The international version of the DESI (I-DESI)[18] provides an overall assessment of where the EU stands against 17 non-EU economies (see *Figure 6*).

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[18] International Digital Economy and Society Index 2018, SMART 2017/0052 final report. ISBN 978-92-79-85699-0.

Figure 6 – I-DESI 2018

Country	Value
South Korea	75.2
EU Top 4	74.0
Norway	73.0
Iceland	72.7
Switzerland	70.8
Japan	68.5
Australia	67.8
Canada	67.0
USA	66.7
New Zealand	65.8
EU Average	58.9
Israel	55.6
Serbia	49.6
Russia	47.5
EU Bottom 4	47.0
China	45.3
Chile	44.9
Mexico	43.1
Turkey	41.5
Brazil	39.7
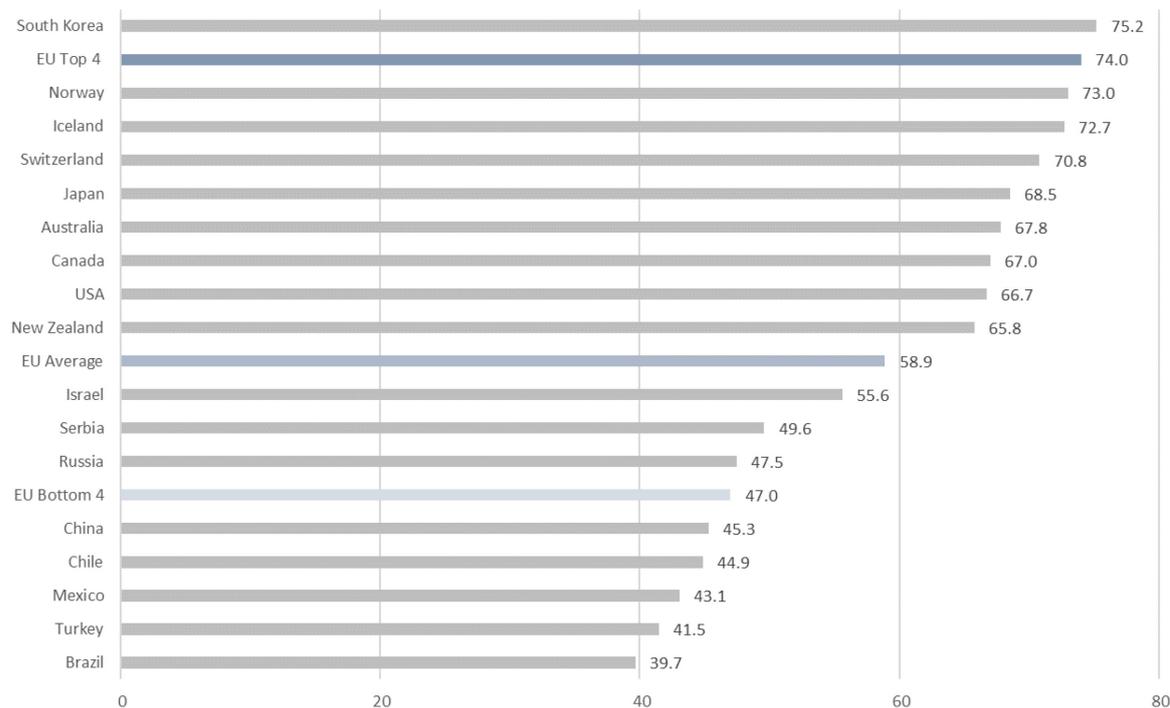
Note: The values are not directly comparable with those in the DESI because it was not possible to collect all the indicators across all the countries.

Source: European Commission.

18 The DESI is complemented by country profiles, published annually by the Commission, which combine quantitative evidence from the DESI indicators with country-specific policy insights and best practice[19]. Separate analysis specific to the DEI initiative is available in a series of country reports commissioned by the Commission and published in October/November 2017[20] and in July 2019[21].

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[19] https://ec.europa.eu/digital-single-market/en/countries-performance-digitisation

[20] https://ec.europa.eu/futurium/en/implementing-digitising-european-industry-actions/national-initiatives-digitising-industry

[21] https://ec.europa.eu/digital-single-market/en/news/workshop-monitoring-progress-national-initiatives-digitising-industry

Audit scope and approach

19 We examined the effectiveness of EU actions in supporting the national strategies on digitising industry and the DIHs. In this context, the audit focused on three of the five DEI initiative pillars (see *Figure 4* and *Annex I*): pillar 1 – 'European platform of national initiatives on digitising industry'; pillar 2 – 'digital innovations for all: Digital Innovation Hubs'; and pillar 4 – 'the regulatory framework fit for the digital age'. Thus, we analysed whether:

o   the Commission supported Member States effectively in developing and implementing their strategies on digitising industry;

o   the Commission, together with Member States, assessed the implementation of national strategies;

o   the Commission's and Member States' support for the set-up and operation of DIHs was effective; and

o   the Commission had contributed effectively to putting in place a framework conducive to industry digitalisation, by addressing potential regulatory barriers and helping Member States to provide appropriate connectivity.

20 Our audit work included examination of documents relevant to the DEI initiative, and structured interviews with the Commission and with national/regional authorities, DIHs and stakeholders in the Member States. We visited four Member States: Germany, Hungary, Poland and Portugal, and collected information from 28 DIHs within these Member States. We selected these Member States to provide a balanced view in terms of progress in digitalising their industry and in terms of geographical spread.

21 In addition, we reviewed eight 2014-2020 operational programmes (programmes), and discussed with the Commission and the relevant managing authorities how they support the DEI initiative. We also reviewed nine projects, selected from these programmes, in order to understand how EU funds were being used to advance the digitalisation of industry in the Member States (see *Figure 7* and *Annex II*).

Figure 7 – Reviewed projects

Country: Germany
Objective: Develop and provide demand-oriented services for innovation in industry and production through the digitisation and networking of value creation processes.
Total cost: €1 399 986

Country: Germany
Objective: Construction of a technology and knowhow centre in order to better serve their future market.
Total cost: €6 972 959

Country: Poland
Objective: Scale-up of start-ups.
Total cost: €2 783 371 (planned)

Country: Poland
Objective: Research on innovative solution to digitise products and manufacturing processes of a medium enterprise.
Total cost: €78 149

County: Portugal
Objective: Creation of a new industrial establishment incorporating industry 4.0 principles.
Total cost: €879 818

Country: Germany
Objective: Providing consultation to SMEs.
Total cost: €2 568 848

Country: Hungary
Objective: Introduction of an integrated business and artificial intelligence system to improve the automation of the processes and the quality of the final products.
Total cost: €749 376 (planned)

Country: Hungary
Objective: Develop and apply tools or services for transnational innovation management and technology transfer to foster cooperation in Central Europe.
Total cost: €1 705 012

County: Portugal
Objective: Investment in automation / robotization to improve production.
Total cost: €2 947 841

Source: ECA.

22 The EU is investing substantial amounts to support businesses, especially SMEs, in their digital development to help them remain competitive in the global marketplace. This goal has become all the more important as a consequence of the coronavirus outbreak and the need to rebuild economies. As well as providing EU citizens and decision-makers with an assessment of the effectiveness of EU actions since the launch of the DEI, our report should help ensure that the right conditions are put in place for the 2021-2027 programme period.

Observations

The DEI is soundly based and supported by Member States, but the Commission's actions had limited influence on the strategies of most Member States we visited

23 We examined whether the Commission:

o   had developed a sound initiative for digitalising EU industry, including appropriate objectives and indications of funding, which had gained the support of Member States, industry and other stakeholders;

o   had provided advice and guidance to Member States on relevant issues, including skills, funding and technological developments such as artificial intelligence, big data, 5G, block chain, cloud computing, and cybersecurity.

The DEI initiative is soundly based, but lacks details about intended outcomes and funding

24 The Commission's DEI initiative builds on various national and regional initiatives for digitising industry, and on a range of different studies and stakeholder consultations. For example, for the November 2015 External Stakeholders Group Meeting, in preparation for the DEI communication, several industry representatives provided contributions, confirming that the DEI initiative was relevant and supporting the proposals put forward, such as the DIHs.

25 In our visits to Member States, the authorities, representatives from the industry and stakeholders we interviewed supported the DEI initiative, and considered that the DIH concept represented an effective response to the digitalisation needs of enterprises, in particular SMEs.

26 The DEI is a high-level initiative, that shows the need for public intervention and how the various policy measures relate to each other. However, the initiative did not set out the intended outcomes (results and impacts), together with appropriate result indicators and targets. In addition, neither the DEI initiative communication nor associated documents gave guidance to Member States on how the DEI initiative might be deployed in the Member States and their regions.

27 One of the main objectives for the DEI initiative relates to inputs: the aim to mobilise close to €50 billion of public and private investment in the 5 years from 2016 for the activities of the DEI initiative (see paragraph *09*). The total funding needed to create and maintain a framework for supporting EU industry digitalisation is not known.

28 Other than the Horizon 2020 commitment to focus €500 million on DIHs and €5 billion to public private partnerships (PPPs)[22], digital industrial platforms and ecosystems in areas such as AI, robotics, photonics, 5G and high-performance computing and IoT, only limited details were given about the breakdown of funding between public and private investments. The communication states that the ESI funds and the European Fund for Strategic investment (EFSI) could be used to support the initiative. However, in terms of the amounts available, it provides detailed figures only for Horizon 2020, and did not highlight the availability of over €20 billion in the ESI funds, particularly the ERDF, for digital investments in the 2014-2020 period. The Member State authorities we interviewed expressed concerns about how they would finance activities related to the DEI initiative from both public and private sources.

29 In a previous special report, we drew attention to the risks of high-level policy announcements raising expectations beyond what could be delivered[23]. According to the Commission, all Member States are investing in the digital transformation of industry. However, the Commission considers that a more structured approach by the Member States is required to precisely determine the investments made.

Commission activities supporting Member States in developing and implementing their digitalisation strategies had limited influence in the Member States we visited

Commission guidance to Member States

30 The DESI and its country profiles (see paragraph *18*) are the main tool used by the Commission to monitor progress and identify gaps in Member States' strategies for digitalising their industry. In these reports, the Commission identifies the main differences between the top performing Member States and/or regions and those

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[22] For our examination of PPPs, please refer to our special report 09/2018 - Public Private Partnerships in the EU: Widespread shortcomings and limited benefits.

[23] ECA special report 05/2017, Youth unemployment – have EU policies made a difference? Paragraphs 78 and 159.

performing below average. The reports also suggest to Member States actions designed to boost digital transformation.

31 The Commission is also making increasing use of the European Semester process to encourage Member States to tackle digitalisation challenges, mainly through country specific recommendations (CSRs). The number of CSRs directly relevant to the DEI initiative has been increasing over time, extending to all Member States in 2020 (see *Annex III*).

32 In addition to the CSR process, the Commission has carried out a range of activities designed to help Member States develop and implement the DEI initiative (see *Box 1*).

Box 1

Commission guidance to Member States for their development of a national strategy for industry digitalisation

The Commission undertook a number of activities in support of the Member States efforts to development a strategy for their industry. The most significant activities were:

o   Set-up and subsequent meetings of Working Groups on DEI related aspects:

    o   Working Group 1: Digital Innovation Hubs, investments and skills;

    o   Working Group 2: Public-Private Partnerships; and

    o   Working Group 3: Digital industrial platforms and standardisation.

o   Digitising industry stakeholder forums in 2017 in Essen, in 2018 in Paris and in 2019 in Madrid ;

o   Digital Innovation Hubs Annual Event 2018 in Warsaw;

o   Analysis of national initiatives on digitising industry carried out in 2017, and the 2019 country reports on monitoring progress in national initiatives on digitising industry;

o   Guidance provided through the Public Private Partnerships (PPPs), related to emerging technologies such as 5G, cybersecurity, robotics, etc. There are currently ten contractual PPPs with strategic importance for European industry; and

o   Reports and studies concerning emerging technologies such as artificial intelligence, big data, 5G, block chain, cloud computing, and cybersecurity, published on the Commission's website dedicated to the digital single market (https://ec.europa.eu/digital-single-market/).

33 Member States have been exchanging their experiences and good practice mainly through events such as the European stakeholder fora, roundtables and high-level governance meetings. We noted, however, that neither the Commission nor the Member States we visited are sharing their experiences with approaches to the digital transformation of industry that proved unsuccessful. This might have been beneficial to other Member States developing and implementing their strategies, preventing them from repeating the same mistakes.

Scope for ESI fund support for the initiative

34 Despite the potential availability of €20 billion from the ESI funds (see paragraph *28*), the Commission had not contacted any of the eight managing authorities we interviewed to offer guidance on using this source of funding to support the initiative. Two managing authorities told us that they had not been aware of the DEI initiative before we contacted them as part of our audit.

35 In the 2014-2020 period, the ESI funds support 11 thematic objectives. We consider that thematic objective 11, "Enhancing institutional capacity of public authorities and stakeholders and efficient public administration", could have formed the basis for ESI fund support to Member States in developing strategies for industry digitalisation, or for building institutional capacity for designing DEI-related actions. However, the Commission has not drawn Member States' attention to this possibility.

Commission influence on Member States' digitalisation strategies

36 The Commission provided general guidance to Member States (paragraphs *30* to *33*). However, with the exception of responding to the request form one Member State (see following paragraph), it has not proposed any measures specifically to improve the performance of Member States scoring lower in the DESI.

37 One of the few tools with which the Commission can provide tailor-made support to Member States is its Structural Reform Support Service. This Service can provide targeted support to any Member State for its institutional, administrative and growth-enhancing reforms, in response to a Member State request. By the end of 2019, Lithuania was the only Member State that had requested this kind of support in relation to the DEI initiative. Lithuania is ranked just below the EU average, according to DESI for 2019 (see *Figure 5*).

38 The national authorities we interviewed considered that the Commission's activities had some effect on their own national strategies, but that overall had limited influence in the development and implementation of their strategies (see *Box 2*). This is partly a consequence of the different stages of digitalisation development of Member States. For example, as Germany is well advanced, the Commission was able to draw on the German strategy 'Industrie 4.0' as a source for the DEI initiative.

Box 2

Delays in the development of Member States' strategies

At the time of our audit, two out of the four visited Member States (Hungary and Poland) did not have a comprehensive strategy on digitalising industry in place, more than 3 years after the launch of the DEI initiative:

o   In Hungary, at the time of the audit, there were seven sectorial digital strategies (with no action plans), and others were under preparation. However, none of the sectorial strategies that had been adopted focused on the sectors that were lagging behind in terms of digitalisation (tourism, construction industry, food industry, and logistics).

o   In Poland, the key strategic document including aspects relevant to digitalising the Polish economy and industry was the *Polish Strategy for Responsible Development*, which was adopted in 2017. In this regard, this strategy defined only one relevant strategic project – the creation of the *Polish Platform for Industry*, with the aim of executing the digital transformation of Polish industry. The launch of this platform was initially scheduled for October 2017, but because of delays, it was formally launched only in the second quarter of 2019. At the time of our audit, the Polish authorities were working on a national *Productivity strategy* aiming at putting the digitisation of Polish industry within the wider context of productivity factors.

39 The picture is similar as regards the use of good practice: in the visited Member States, we found no clear evidence of them applying the good practice that had been disseminated, such as modifying their strategies as a result of events organised by the Commission.

40 Within the country reports on monitoring progress in national initiatives on digitising industry, we found cases where the Commission had pointed to the need for improvement if national strategies were to be implemented effectively (see *Box 3*). However, in these cases the Commission had not proposed any corrective measures, nor did the Member State in question subsequently take action to address the issue raised by the Commission.

Box 3

Need for improvements highlighted in the country reports for the four Member States we visited

— The main challenges in Germany are the digital infrastructure (in particular the relatively low coverage of fixed very high capacity network) and the need to further clarify how specific technological developments, such as AI, can be used in different sectors;

— In Hungary, many companies, especially SMEs, are not aware of strategic documents related to digitalisation, and one of the main challenges for the government in the future will be to promote the measures and to inform SMEs about how they can benefit from digitalising;

— In Poland, complicated public procurement processes, rigid and unclear regulations in general and limited incentives for innovators are the main regulatory barriers that impede the ability of businesses to innovate and make use of digital technologies;

— In Portugal, the main challenge to overcome is the lack of digital skills in the workforce and the population in general, which is a barrier, not only to the adoption of digital technology but also to modernisation as a whole.

Source: Monitoring progress in National initiative on digitising industry – 2019 Country reports for Germany, Hungary, Poland, and Portugal.

The Commission and Member States cannot fully assess the progress of the DEI initiative

41 To assess the extent to which the Commission and the Member States were able to track progress in the implementation of national strategies on digitalising industry, we examined whether the Commission:

o ensured that Horizon 2020 was supporting the implementation of the DEI initiative; and

o together with Member States, had defined common indicators to track the ESI funds support to the implementation of the DEI initiative, and whether the programmes we reviewed facilitated support for projects which contribute to the digitalisation of industry.

42 To monitor the implementation of Member States' digitalisation strategies, the Commission relies mainly on the country reports on monitoring progress in national initiatives on digitalising industry (see paragraph *18*). These reports provide some financial information on the level of both EU and national funding. Nevertheless, as recognised in the EU level study accompanying these country reports[24], there were challenges in identifying the funding amounts related to the different national initiatives, due to a lack of transparency and consistent reporting structures across the majority of the Member States. At national level, the monitoring of their national initiatives varies significantly between Member States (see *Box 4*).

Box 4

Member States' own monitoring of national initiatives on digitalising industry

o   The German authorities told us that there is a monitoring system in place to provide information related to the implementation of the German strategy on digitalising industry, and that a monitoring report for the meeting of the Chancellor's Cabinet is produced every 6 months. The authorities also told us that they plan to make available a comprehensive overview of the implementation of German strategy to digitalise industry, on the internet[25].As of March 2020, this project was still ongoing.

o   The Hungarian authorities reported that there is no overall monitoring system that can provide information on the implementation of strategies for digitalising industry. The only insights are provided by the monitoring of the *National Infocommunication strategy*, which contains elements relevant for the digitalisation of Hungarian industry. However, the only monitoring report was published in 2016.

o   In Poland, at the time of our audit there was no monitoring of activities supporting the digitalisation of Polish industry. The authorities told us that such monitoring will be implemented only when the national *Productivity strategy* is adopted.

o   In Portugal, there is a regular monitoring and reporting on the implementation of the national strategy on digitalising industry. A Portuguese business association has been commissioned to collect information from the entities responsible for implementing the measures included in the national

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[24]   Study on Monitoring Progress in National Initiatives on Digitising Industry, Contract SMART 2018/0002

[25]   https://www.bundesregierung.de/breg-en/issues/umsetzungsstrategie-digital-1679944

> strategy (such as ministries, public agencies, managing authorities, and also private companies), and to report the monitoring results every two months to the strategic committee overseeing the strategy on digitalising industry.

Horizon 2020 supports the DEI initiative

43 One of the main objectives of the DEI initiative is the mobilisation of about €50 billion of public and private investments over the 5 years from its launch in 2016 (see paragraph *27*). In terms of the EU contribution to this sum, the DEI initiative communication identified resources from Horizon 2020: €500 million to support DIHs and €5 billion through public private partnerships (PPPs) in areas such as robotics, photonics, 5G and high-performance computing. Published and planned Horizon 2020 calls since 2016 are consistent with these figures, as set out in *Table 1*.

Table 1 – Horizon 2020 funding to DIHs and PPPs for the DEI initiative

Support element	Origin of support	€ million
(1)	Support to DIHs, Horizon 2020, from 2016 to 2018	266
(2)	Support to DIHs, Horizon 2020, from 2019 to 2020	236
	Total support to DIHs	**502**
(3)	Contractual public-private partnerships for targeted areas and ECSEL Joint Undertaking*, 2016-2017 and 2018-2020 Horizon 2020 work programmes	4 357
(4)	Contractual public-private partnerships for targeted areas and ECSEL Joint Undertaking, 2014-2015 Horizon 2020 work programme (i.e. before the adoption and publication of the DEI initiative)	980
	Total support through PPPs	**5 337**
	Total support from Horizon 2020 to DIHs and PPPs	**5 839**

* The ECSEL Joint Undertaking - the Public-Private Partnership for Electronic Components and Systems – funds research, development and innovation projects in these key enabling technologies. https://www.ecsel.eu/.

Note: The €5 billion target support for PPPs is only achieved if support granted prior to the adoption and publication of the DEI is taken into account (support element 4).

Source: ECA based on Commission data.

44 Although Horizon 2020 had already been funding DEI-related activities during the period 2016-2017, a more direct link with the initiative was put in place for 2018-2020.

In this period, rules for funding DIHs require that proposed projects are aligned with the national or regional digitalisation of industry initiative. However, there is no equivalent requirement, in either the work programme or the evaluation rules, for funding other areas of the DEI initiative – those not related to DIHs – such as for the contractual public-private partnerships for targeted areas.

For the ESI funds, data collection arrangements mean that there is currently limited information about the DEI initiative

45 The programmes we reviewed in all four Member States were able to support DEI-related projects. From these programmes, we examined nine projects. While some experienced delays in their approval and implementation (see an example in *Box 5*), all the reviewed projects were relevant to the DEI initiative.

<div>

Box 5

Delays in a project approval and implementation

This project was about the design and introduction of an industrial automation system, which would connect the existing machines into the system and use their data for artificial intelligence analyses and process automation.

One of the selection criterion of the call was whether the project was technically feasible and the proposed deadline was realistic. The project application was submitted in March 2018 and the grant agreement was signed only a year later, in March 2019. It was immediately amended in April 2019, setting the deadline for implementation to February 2020. About 25 % of the grant allocation had already been transferred to the beneficiary in May 2019 as an advanced payment.

Following our audit visit in October 2019, we included in our standard letter to the managing authority the risk that the project might not be finalised by the deadline set in the already modified grant agreement.

In February 2020, the beneficiary was granted a second postponement of the deadline for implementation, to February 2021.

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46 Member State authorities did not modify programmes directly in response to the DEI initiative to increase their focus on it. However, in Poland, in the programme 'Smart Growth', the main programme designed to boost the innovativeness and competitiveness of the Polish economy, modifications were made in 2018 and 2019 to provide additional possibilities to support the digitalisation of industry (see *Box 6*). In Portugal, the programmes we reviewed did not include any measures directly

dedicated to digitalisation. However, the authorities considered that the programmes had the necessary flexibility to integrate additional thematic priorities defined over the period of the programme implementation. From 2017, thematic calls for projects specific to Industry 4.0 have been published.

Box 6

Example of a programme modification enabling co-financing of projects relevant for the DEI initiative

In Poland, we examined a project related to the research into digitalising a production plant.

The 'Smart Growth' programme funded the research project but had no measures to support the subsequent implementation of the research.

Consequently, implementation was broken up and scattered across a number of smaller projects, financed by another regional programme, which was not able to finance a single project of the required scale. According to the project beneficiary, this is likely to result in doubling the expected time for implementation, and to reduce the overall extent of the planned digitalisation.

In January 2019, the managing authority modified the criteria for one of the measures, so that financing the implementation of digitalisation solutions of a similar scale became possible.

47 Since the DEI initiative was launched mid-way through the 2014-2020 programme period, there was no legal requirement for Member States to monitor projects relevant to the DEI initiative. In the Member States we visited, while Portugal had put a system in place to monitor the implementation of ERDF funding contributing to the initiative (see *Box 7*), six of the remaining seven managing authorities we interviewed did not have an equivalent.

> **Box 7**
>
> **Monitoring of ERDF co-financed projects supporting Industry 4.0**
>
> Since 2017, the Portuguese authorities have been monitoring the implementation of ERDF co-financed projects supporting Industry 4.0.
>
> It provides an overview of all Industry 4.0-specific calls, including information on the number of grant applications received and their overall investment amount for all these projects. It also provides information, for each call, on the number of projects that received a grant, overall investment, eligible amount and grant provided.

48 Without information on spending from the Member States for the 2014-2020 period, it is difficult for the Commission to establish the extent of ESI fund support to the DEI initiative. ERDF support to the DEI initiative, for example, is recorded in ways which differ between Member States and/or programmes. Monitoring and reporting arrangements were set at the start of programme periods, and were not designed to take account of policy initiatives introduced later in the period, such as the DEI initiative. We consider that a flexible monitoring system could have allowed the Commission to collect information on the financial support to projects supporting the DEI initiative[26]. Such a system could potentially have been useful for the other significant initiatives introduced after the start of the programme period.

49 In its proposal for the ESI funds regulation for the 2021-2027 period, the Commission introduced dedicated codes for recording measures supporting digitalisation[27]. If this provision is included in the adopted regulation, it will help determine the extent to which the ESI funds contribute to the DEI initiative.

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[26] A similar concept was introduced for rural development programmes in 2016: Commission Implementing Regulation (EU) 2016/1997 of 15 November 2016 amending Implementing Regulation (EU) No 808/2014 as regards the amendment of rural development programmes and monitoring of actions to support integration of third-country nationals, and correcting that Regulation. The system enabled the Commission to identify operations with a potential contribution to the integration of third-country nationals.

[27] COM(2018) 375 final. Proposal for a regulation of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, and the European Maritime and Fisheries Fund and financial rules for those and for the Asylum and Migration Fund, the Internal Security Fund and the Border Management and Visa Instrument.

The Commission promoted the concept of Digital Innovation Hubs, but activities in the Member States have been limited

50 Digital Innovation Hubs (DIHs) have the objective of helping companies (especially SMEs) to take advantage of digital opportunities. DIHs should offer expertise on technologies, testing, skills, business models, finance, market intelligence and networking. DIHs should act as a one-stop-shop, serving companies within their region and beyond to digitalise their business.

51 To assess whether the Commission's and Member States' support for the set-up and operations of DIHs was effective, we examined whether the Commission, together with the Member States:

o   had provided guidance and criteria for the set-up of DIHs, and developed a mechanism to ensure that DIHs fulfil those criteria; and

o   had defined and promoted good practice for the operation of DIHs, and established an effective monitoring framework to assess progress, including DIHs use of funds to assist businesses in their digitalisation process.

The Commission has made efforts to support DIHs since the launch of the DEI initiative, but with little progress in some Member States

Criteria for DIHs

52 In October 2017, the Commission created an online catalogue for DIHs catalogue, intended as a "yellow pages" for DIHs. The purpose of this catalogue is to provide an overview of the landscape of DIHs in Europe and support their networking, in collaboration with regional, national and European initiatives for the digitalisation of industry. According to this catalogue, at the end of 2019, there were 498 registered DIHs in the EU, of which 309 were registered as in operation and 189 as in preparation (see *Annex IV*).

53 The Commission defined some general characteristics and criteria to be fulfilled by an organisation intending to register as a hub in the DIH catalogue (see *Box 8*).

Box 8

General characteristics and criteria for registering as a hub in the DIH catalogue

— Be part of a regional, national or European policy initiative to digitalise industry;

— Be a non-profit organisation;

— Have a physical presence in the region and present an updated website clearly explaining the DIH's activities and services provided related to the digital transformation of SMEs/Midcaps or industrial sectors currently insufficiently taking up digital technologies; and

— Have at least three examples of how the DIH has helped a company with their digital transformation, referring to publicly available information, identifying for each:

   o Client profile;

   o Client needs; and

   o Provided solution to meet the needs.

Source: DIH catalogue website.

54 Organisations seeking to register as hubs on the DIH catalogue are required to self-declare that they comply with the set of criteria. To ensure that registered DIHs fulfilled these criteria, the Commission contracted out verification to consultants who carried out a desk evaluation of the information provided by the DIHs. According to the national authorities we interviewed in the Member States we visited, they were not involved in this verification.

55 In the context of its preparations for the 2021-2027 Digital Europe Programme, in November 2019 the Commission issued a proposal for how the programme could contribute to the establishment of a network of DIHs covering all regions in Europe[28]. This document proposes a new two-step selection process for DIHs: national authorities from the Member States will designate potential DIHs, which will then be invited to respond to restricted calls for proposals run by the Commission. The new proposed criteria for Member States selecting DIHs (that will then be called 'European

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[28] European Digital Innovation Hubs in Digital Europe Programme, Draft working document, 12.11.2019

DIH') are more specific than those in place in the DIH catalogue. In March 2020, an updated proposal set out a minimum and a maximum number of DIHs for each Member State, as part of a European network financed by the Digital Europe Programme. The overall number will be then between 128 and 260, significantly fewer than is currently the case (see *Annex V*). However, as at June 2020, this new procedure had not been formalised.

Guidelines for DIHs

56 The Commission carries out a range of activity designed to support the DIHs. These include working group meetings, training and coaching, and specific initiatives directly managed by the Commission, such as I4MS and SAE (which provide opportunities for SMEs to make use of the DIH projects), and Smart Factories, and DIHELP, which also received funding from the European Parliament.

57 The Working Group on DIHs, set-up by the Commission (see *Box 1*), regularly discusses good practice for the operations of DIHs. The Working Group concluded in 2017 that all DIHs should provide a minimum set of services:

— raising awareness about the business potential of digital technologies;

— gathering information about innovation (innovation scouting);

— support for developing strategies (visioning and strategy development);

— working with companies to assess their digital maturity and develop appropriate plans;

— brokering relationships with potential service providers;

— mentoring and training; and

— providing cost-effective access to specialist experimentation, testing and production facilities.

58 In addition, this Working Group developed a guide for bodies wishing to establish or develop a DIH (see *Box 9*). This guide has been further developed during subsequent Working group meetings and through training programmes for DIHs (see paragraph *56*).

Box 9

Working Group guide for bodies wishing to establish or develop a DIH

(1) Identify regional needs, characteristics and specialisms and define the model that best fits regional circumstances.

(2) Develop a vision for digital transformation within the region and the role the Digital Innovation Hub will play, together with a viable business model.

(3) Look at what is already available in the region as a basis for a Digital Innovation Hub.

(4) Define the services the hub should offer.

(5) Build links with other Hubs in order to access additional facilities, fill missing competences, and collaboratively develop new services and tools.

(6) Start engaging with companies and deliver services 'on the ground', using either dedicated funding or by bringing together existing initiatives or projects.

Source: Working Group 1 on DIHs: Mainstreaming Digital Innovation Across All Sectors, June 2017.

59 Despite the Commission's activities, by the end of 2019, almost 4 years since the launch of the DEI initiative and the concept of DIHs, none of the national authorities in the four Member States we visited reported that they had developed good practice for DIHs, either in collaboration with the Commission or alone. According to the DIHs we interviewed, this is hindering their ability to deploy their services to businesses in an effective manner.

The Commission and Member States' approaches to DIHs are not fully developed and coordinated

EU funding for DIHs

60 The Working Group on DIHs identified Horizon 2020 and the ERDF as the main sources of financing for DIHs. Of the 28 DIHs we collected data from, 16 reported that they had been able to access Horizon 2020 funding for supporting DIH-related activities. Within this sample of DIHs, support received from the ERDF was more limited, with only four of the 28 DIHs confirming that they had received funding from it.

61 In 2018, the Commission assessed that there were insufficient DIHs in 13 Member States, mainly the central and eastern EU countries that joined the EU in or after 2004[29]. Accordingly, in November 2018, the Commission wrote to the governments of these countries to encourage the further support of DIHs, possibly by using the ERDF.

Establishment and monitoring of DIHs

62 We identified examples of uncoordinated approach between the Commission and the Member States regarding the establishment and activities of DIHs. In Poland and Germany, the authorities in charge of the national digitalisation strategies were supporting the development of their own network of national DIHs. These national networks do not always include the organisations that have registered on the DIH catalogue created by the Commission.

o   As of the end of 2019, there were 55 German organisations registered on the Commission catalogue. Germany is supporting directly two networks of DIHs or similar: a network of competence centres[30], and a network of digital hubs[31]. Out of these, only nine out of the 26 competence centres and five out of the 12 digital hubs had registered on the Commission catalogue.

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[29] Bulgaria, Czech Republic, Estonia, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovakia.

[30] https://www.mittelstand-digital.de/

[31] https://www.de-hub.de/

o   In August 2019, the Ministry of Entrepreneurship and Technology in Poland launched the first call for Polish DIHs[32]. At that time, 13 organisations were registered in the Commission catalogue as DIHs and had participated in various EU co-financed projects, but only two of these were among the five organisations successful in this call.

63 Another example of the lack of coordination between the Commission and the Member States regards the development of digital maturity assessment (DMA) tools. These are used by DIHs to provide a first assessment on the level of digitalisation of the businesses they intend to support. In both Poland and Hungary, we found examples of multiple DMA tools developed to serve the same purposes. In Poland, we identified one methodology developed under the Commission's directly-management European Advanced Manufacturing Support Centre project (ADMA)[33] and three different national methodologies (including two developed in cooperation with the ministry in charge of the national digitalisation strategy). In Hungary, two DIHs used the methodology developed under the ADMA project, two DIHs used their own methodology, and three other organisations use their own separate DMA developed through an EU co-financed project.

64 According to the Commission's monitoring, by the end of 2019, DIHs had supported about 2 000 SMEs in testing digital innovations through the support of Horizon 2020. This represents a very small proportion, less than 0.01 %, of the total number of SMEs in the EU. Except for the monitoring of DIHs' activities financed by Horizon 2020, currently there is no monitoring framework in place at EU level for DIHs. The Commission is therefore not able to judge whether DIHs are operating effectively. Neither did the Member States we visited have monitoring systems to assess DIHs' operations. Nevertheless, the Commission's proposal for the next period (paragraph *55*) includes a provisional list of mandatory Key Performance Indicators on which the DIHs receiving support under the Digital Europe programme will be required to report. In addition, the Commission is developing guidelines on how to monitor and evaluate DIHs and their contribution to the digital transformation of companies, regions and Member States. The Commission intends to publish these guidelines before the end of 2020.

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[32]   https://www.gov.pl/web/rozwoj/przemysl-4-0

[33]   http://www.adma.ec/

A suitable legal framework is being put in place, but there are delays in achieving an appropriate level of broadband connectivity for industry digitalisation

65 For its industries to be able to develop digitally, the EU needs to ensure that a suitable environment is in place. This includes the legislative framework, and good levels of broadband connectivity, both of which are pre-requisites in terms of successful business digitalisation. We therefore examined whether the Commission had taken action to ensure that the legislative framework was conducive to digitalisation of European industry, and whether Member States were providing better levels of broadband across Europe. For the latter aspect, we drew on our June 2018 special report on this subject[34].

The Commission is taking action to ensure a suitable legal framework for the DEI initiative

66 With the DEI initiative communication in 2016, the Commission committed itself to examine, by 2020, the regulatory framework for digital innovations in order to:

o   Propose an initiative on free flow of data within the EU and to examine in greater detail the emerging issues of data ownership, access and re-use rules, including as regards data in an industrial context and especially data generated by sensors;

o   Explore the legal frameworks for autonomous systems and IoT applications in particular safety and liability rules and the legal conditions to allow large scale testing in real life environments; and

o   Initiate work on the safety of application and other non-embedded software not covered by sectoral legislation, assessing a possible need for further action at the EU level.

67 As part of this commitment, the Commission carried out studies, an impact assessment and a public consultation[35] on the free flow of data that resulted in

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[34] ECA special report 12/2018, 'Broadband in the EU Member States: despite progress, not all the Europe 2020 targets will be met'.

[35] Details about these activities are available on the Commission's website: https://ec.europa.eu/digital-single-market/en/free-flow-non-personal-data

adoption of a new Regulation in 2018[36]. In addition, the Commission has also taken action on data ownership, facilitating the re-use of publicly funded data for both commercial and non-commercial purposes, through a Directive[37]. In February 2020, the Commission published a communication on the European strategy for data[38] and it plans to adopt in 2021 an implementing Regulation including a list of datasets, which will be made available for re-use free of charge.

68 Regarding the legal frameworks covering safety and liability rules of autonomous systems and IoT applications, in June 2018, the Commission established an expert group on liability and emerging digital technologies[39]. The group issued its report in May 2019[40]. In February 2020, the Commission published a report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics[41].

69 Finally, in line with the commitments it made in the DEI initiative communication, the Commission also initiated work on the safety of applications and other non-embedded software. The Commission launched a public consultation in 2016 on this issue[42] and in 2017 engaged consultants to analyse the legal and business landscape,

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[36] Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free flow of non-personal data in the European Union.

[37] Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information 2019/1024/EU (Open Data Directive).

[38] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A European strategy for data. COM(2020) 66 final, 19.2.2020.

[39] Expert group on liability and new technologies (June 2018)

[40] Liability for Artificial Intelligence and other emerging digital technologies, ISBN 978-92-76-12959-2.

[41] Report from the Commission to the European Parliament, the Council and the European Economic and Social Committee – Report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics. COM(2020) 64 final, 19.2.2020.

[42] https://ec.europa.eu/digital-single-market/en/news/public-consultation-safety-apps-and-other-non-embedded-software

as well as the challenges and opportunities related to the new technologies. The resulting report was published in April 2019[43].

Appropriate levels of broadband connectivity not yet achieved

70 The availability of fast and reliable broadband connection is an essential pre-requisite for the digitalisation of industry. It is needed to allow information flow in real time and to interconnect all elements of the business process. In addition, having good quality broadband, is one way to mitigate the impacts on businesses of exceptional situations, such as the coronavirus pandemic of 2020.

71 In 2010, as part of the Europe 2020 strategy, the Commission set three objectives for the provision of broadband[44]; and in 2016 it adopted a strategy on connectivity for the 'European Gigabit Society[45] that introduced three additional strategic objectives to be achieved by 2025 (see *Box 10*).

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[43] Study on Safety of non-embedded software; Service, data access, and legal issues of advanced robots, autonomous, connected, and AI-based vehicles and systems. ISBN 978-92-79-99495-1 and ISBN 978-92-79-99496-8.

[44] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: "A Digital Agenda for Europe", COM(2010) 245 final/2, 26.8.2010) confirmed in 2012 by Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: "The Digital Agenda for Europe - Driving European growth digitally", COM(2012) 784, 18.12.2012.

[45] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society - COM(2016) 587 and Staff Working Document - SWD(2016) 300.

Box 10

EU broadband objectives introduced by the Commission in 2010

Target 1: Basic broadband for all citizens by 2013: this target has been met, as satellite broadband is available (coverage 100 %) in every Member State

Target 2: Coverage of Next Generation Networks (NGN): 30 Mbps or more for all citizens by 2020, and

Target 3: Use of Next Generation Networks (NGN): 100 Mbps or more by 50 % of households by 2020

2025 strategic EU broadband objectives introduced by the Commission in 2016

Target 4: Access to 1 Gbps for all schools, transport hubs and main providers of public services and digitally intensive enterprises

Target 5: Access to download speeds of at least 100 Mbps to be upgraded to 1 Gbps for all European households, and

Target 6: Uninterrupted 5G wireless broadband coverage for all urban areas and major roads and railways

Source: European Commission, *https://ec.europa.eu/digital-single-market/en/broadband-strategy-policy*.

**72** The Commission put forward multiple policy and regulatory measures, as well as financial programmes and instruments to encourage private and public investments in fast and ultra-fast networks. In our 2018 special report referred to above, we noted that in the period 2014-2020, the Commission made around €15 billion available to Member States, including €5.6 billion in loans from the European Investment Bank (EIB), for the purposes of broadband. In that report, we concluded that all Member States achieved the basic broadband coverage (target 1) by 2016, but we highlighted issues in meeting the two outstanding EU 2020 targets (target 2 and 3).

Europe 2020 connectivity targets

73 According to the DESI, by mid-2019, 86 % of European households had access to broadband connection above 30 Mbps, against the 100 % target (target 2), up from 67 % in 2014 (see *Figure 8*). The take-up of 100 Mbps or more broadband connection among European households in 2019 was only 26 % against the 50 % target for 2020 (target 3), although this is much higher than the level of 3 % in 2014 (see *Figure 9*).

While data show that the availability and use of broadband continues to improve across the EU, few Member States are likely to achieve all the 2020 targets.

Figure 8 – Target 2: 30 Mbps household coverage (mid: 2014 and 2019)
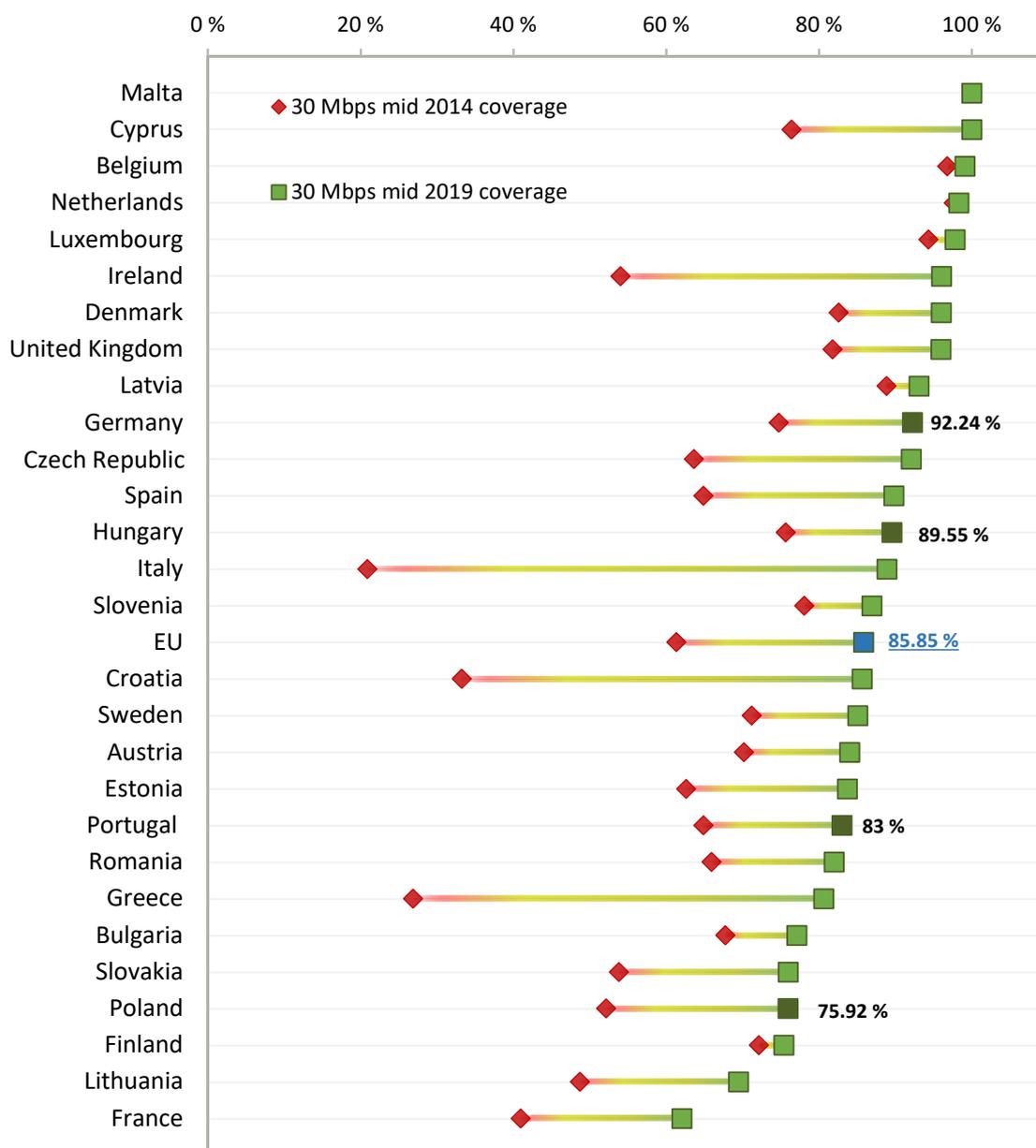
Source: ECA analysis based on 2019 DESI indicator '1c1 Fast broadband (NGA) coverage' as of 28.2.2020.

Figure 9 – Target 3: 100 Mbps household take-up (mid: 2014-2019)
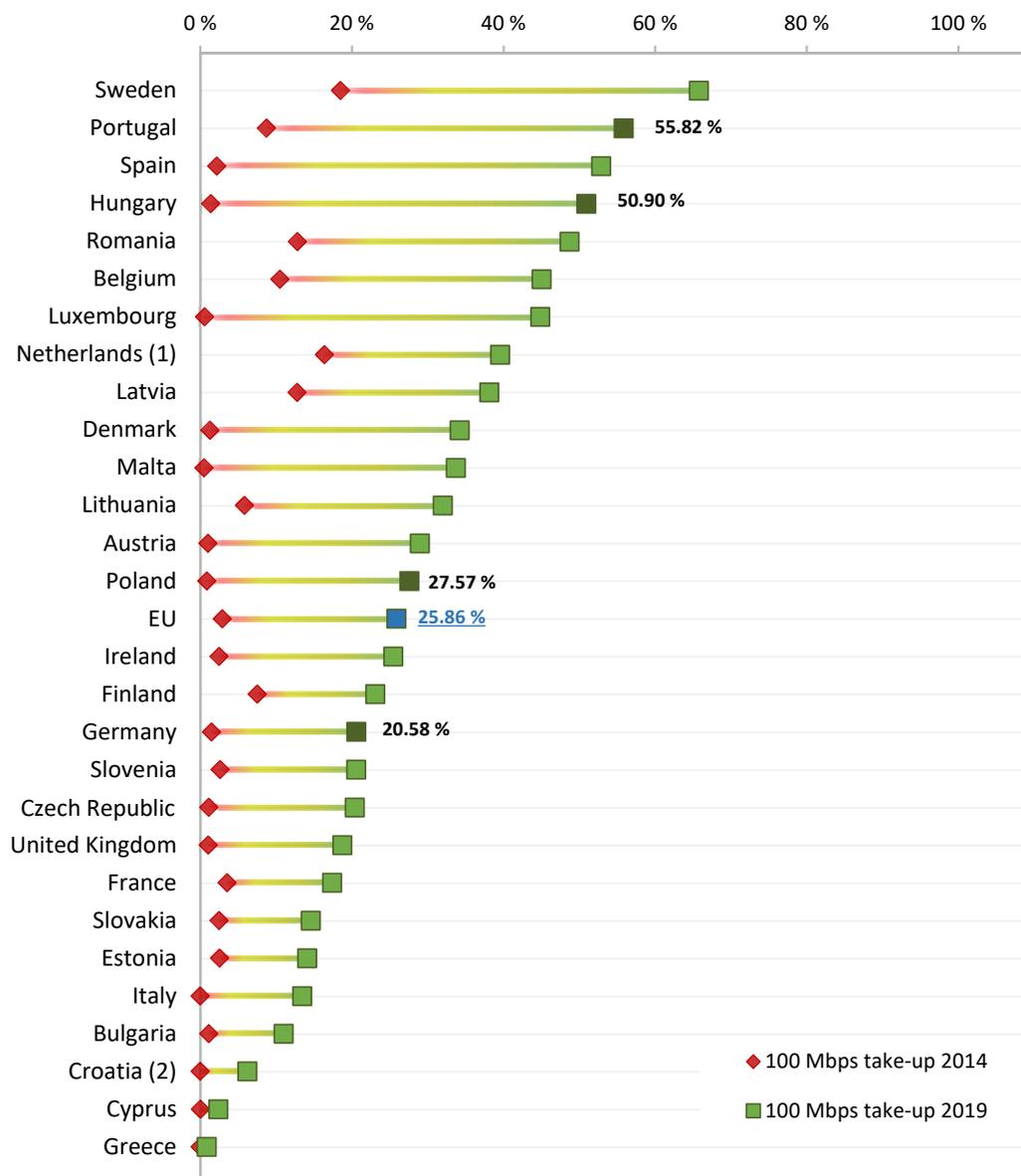
(1) For the Netherlands, instead of 2014, the first available take-up data were for 2016

(2) For Croatia, instead of 2014, the first available take-up data were for 2015

Source: ECA analysis based on 2020 DESI indicator '1a2 At least 100 Mbps fixed BB take-up' as of 15.6.2020.

2025 Gigabit Society targets

74 In 2019, the Commission launched a survey on Member States' National Broadband Plans (NBPs) and the 2025 Gigabit Society broadband targets (*Box 10*, targets 4, 5 and 6). The survey found that less than half of the Member States had updated their NBPs to refer to the 2025 Gigabit Society targets. The remaining Member States were planning to update their NBPs by the end of 2020, but further

details were not available at the time of the audit. Given the delays in achieving the EU 2020 targets, and Member States' slow progress addressing the Gigabit Society targets in their NBPs, achieving the 2025 Gigabit Society targets will be a challenge.

75 The Commission has updated the DESI (see paragraph *14*) to take account of the importance of good connectivity and the Europe 2020 targets. In 2019, for example, it added an element relating to ultra-fast broadband, target 3, and on '5G readiness'. In addition, the DESI 2020 introduced reporting on networks providing 100Mbps upgradable to Gigabit speed (target 5). However, the DESI does not yet reflect the other two EU 2025 targets.

State aid rules relating to broadband

76 In our 2018 report, we recommended that the Commission clarify for Member States the application of the State aid guidelines with regard to the 100 Mbps and the Gigabit society targets, as some Member States were interpreting the guidelines in a way which may limit the public funding they make available for broadband in areas where the coverage is already at 30 Mbps[46]. The Commission agreed to clarify this issue for Member States by the end of 2018, by updating its 'Guide to High-Speed Broadband Investment', intending to include further information on granting aid in areas where private providers are active, especially with regard to the 100 Mbps and the Gigabit Society targets. As of June 2020, this Guide had not been issued.

77 The Member State authorities we interviewed still considered that state aid rules were unclear and would need to be updated to take account of rapid digitalisation and the need for considerable public investment to achieve the 2025 Gigabit Society objectives.

**The take up of faster broadband connections by businesses**

78 The Europe 2020 targets described in *Box 10*, relate to households. For the successful outcome of the DEI initiative, the connectivity of businesses is key, yet there are no EU coverage targets relating specifically to businesses. Since 2014, the take up of fast and ultra-fast broadband by EU businesses has constantly increased. However, at the end of 2019, 50 % of businesses still had a broadband speed lower than 30 Mbps (see *Figure 10*). In 2019, while 80 % of large companies benefited from broadband speeds of at least 30 Mbps, only 46 % of small enterprises did so[47]. As shown in

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[46] ECA special report 12/2018, paragraph 85 and recommendation 5.

[47] Eurostat (isoc_ci_it_en2)

Figure 11, the average take-up rate of ultrafast broadband (> 100 Mbps) of EU businesses is similar to that of households, but with a slower rate of increase.

Figure 10 – EU businesses' take-up of broadband
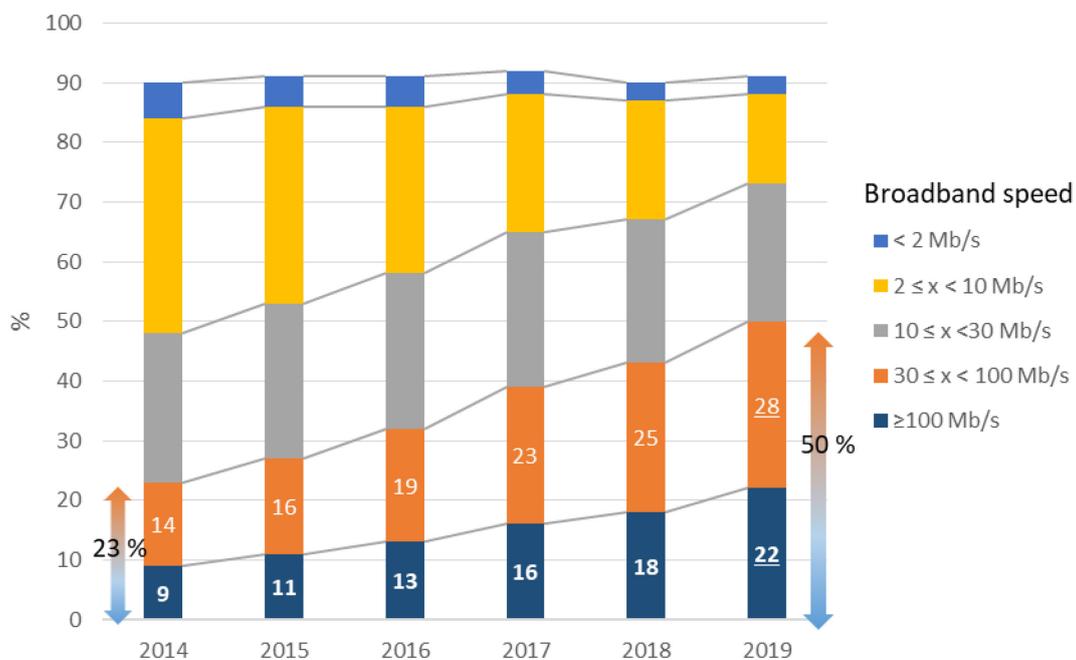
Source: ECA, based on Eurostat data.

Figure 11 – Take-up of ultra-fast broadband internet connection by EU households and businesses
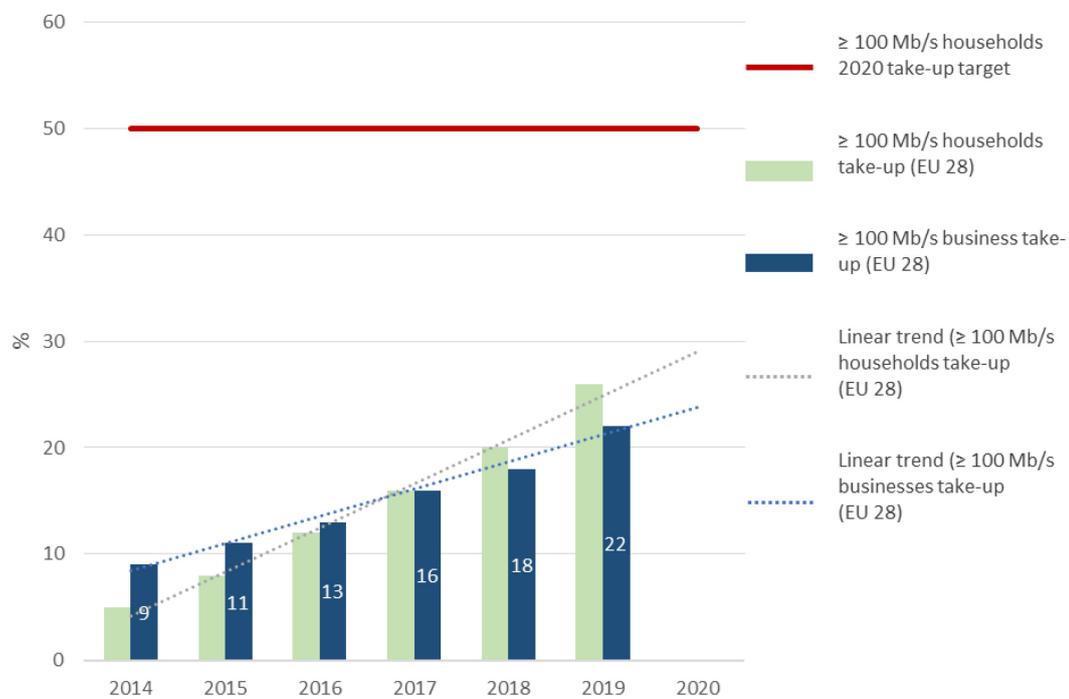
Source: ECA, based on data from EUROSTAT and DESI 2020 (for the take-up of households).

Conclusions and recommendations

79 The DEI initiative was based on soft law, with the aim of reinforcing the competitiveness of EU industry through digital innovation. Despite the Commission's efforts to support national authorities and DIHs as part of implementing the DEI, in some Member States there has been limited progress in the development and implementation of national digitalisation strategies and in the establishment of DIHs.

80 The Commission strategy for supporting the digitisation of European industry was soundly based and supported by Member States, but the initiative did not set out the intended outcomes, together with appropriate result indicators and targets. This makes it more difficult for the Commission and the Member States to take informed decisions and to better direct their activities. The Commission carried out several activities to provide guidance to Member States, but did not encourage Member States to allocate ESI funding to the initiative. The total funding needed to create and maintain a framework for supporting EU industry digitalisation is not known. In most of the Member States we visited, the Commission's support activities had had limited influence (paragraphs *24* to *40*).

Recommendations 1 and 2 - Offer support to Member States in identifying their funding gaps and draw their attention to the EU funding available

(1) The Commission should offer support to Member States in identifying their funding gaps in relation to industry digitalisation, for example as part of the relevant enabling condition on smart specialisation strategies for 2021-2027.

Timeframe: For the programme period 2021-2027.

(2) The Commission should better communicate to the relevant authorities the key EU funds available for implementing the DEI initiative, together with the potential co-financing requirements.

Timeframe: 30 June 2021.

81 The Commission and Member States cannot fully assess the progress of the DEI initiative. Horizon 2020 supports the initiative; and the published and planned Horizon 2020 calls since 2016 are consistent with the amounts identified in the DEI initiative communication. In all the ERDF programmes we reviewed, we identified measures

potentially supporting the implementation of the DEI initiative. However, for the ESI funds, there was no legal requirement for Member States to monitor projects linked to the DEI initiative. Therefore, data collection arrangements in most Member States do not capture information about the DEI initiative, preventing monitoring at Member State and EU level. According to the Commission, a more structured approach by the Member States is required to precisely determine the investments made. This means that it is difficult for the Commission to obtain this information to assess how the volume of investments compares to the plans set out in the original DEI initiative communication (paragraphs *42* to *49*).

Recommendations 3 and 4 - Improve monitoring of the DEI initiative by setting appropriate result indicators and tracking spending

(3)   The Commission, in collaboration with Member States, should ensure that a system is in place to track the spending of EU funds under shared management for significant initiatives that are not in place at the beginning of the programming period when the Commission assesses that such adjustment is required.

Timeframe: 31 December 2021.

(4)   The Commission, in collaboration with Member States, should clarify the intended outcomes of the DEI initiative by determining common result indicators and target values to assess implementation in the Member States and at EU level.

Timeframe: 30 June 2021.

82 DIHs are a key concept of the DEI initiative, and, since its launch, the Commission has carried out several activities designed to support DIHs in their set-up and operations. However, activities in the Member States have been limited. In the Member States we visited, four years since the DEI initiative started, DIHs have made limited use of EU funding and we identified examples of uncoordinated approaches. Except for activities financed by Horizon 2020, there is not yet a detailed monitoring framework in place at EU level for DIHs. Based on the available information, support to digitalisation of businesses was limited. For the period 2021-2027, the Commission proposed a new Digital Europe programme, which outlines criteria for Member States selecting 'European DIHs' and for monitoring their activities when receiving support under this programme. As at June 2020, this proposed programme is still in the process of being discussed (paragraphs *52* to *64*).

Recommendations 5 to 7 - Define, coordinate and adopt the framework for a network of European Digital Innovation Hubs covering all regions in Europe

The Commission, in coordination with Member States, should:

(5) Adopt the selection criteria for organisations appointed by national authorities that are going to be recognized as European DIHs.

Timeframe: 31 December 2020.

(6) Define the minimum services that all European DIHs should offer, including outputs and results.

Timeframe: 31 December 2020.

(7) Develop a consistent framework for monitoring the outputs and results of European DIHs' activities, which should be compulsory when they are beneficiaries of any EU funds.

Timeframe: 30 June 2021.

83 The Commission has continued to take appropriate action to ensure a suitable legal framework, addressing all the legislation identified in the DEI initiative communication. Good levels of broadband connectivity are also essential for industry digitalisation, particularly following the coronavirus pandemic of 2020. The Europe 2020 targets will only be met in few Member States, and achieving the EU 2025 Gigabit Society targets will be even more challenging. For the digitalisation of industry in the EU, the connectivity of businesses is key. In 2019, while 80 % of large companies benefited from broadband speeds of at least 30 Mbps, only 46 % of small businesses did so (paragraphs *66* to *78*).

Recommendations 8 and 9 - Take further action to support the achievement of appropriate levels of broadband connectivity

(8)   The Commission should finalise and publish its 'Guide to High-Speed Broadband Investment', including further information on granting aid in areas where private providers are active, especially with regard to the 100 Mbps and the Gigabit Society targets, and promote its awareness in Member States.

Timeframe: 31 December 2020, depending on the date of finalisation of MFF discussions.

(9)   The Commission, in agreement with the Member States, should adapt and consolidate its framework for monitoring and reporting on the achievement of the Gigabit 2025 targets.

Timeframe: 31 December 2021.

This Report was adopted by Chamber II, headed by Mrs Iliana Ivanova, Member of the Court of Auditors, in Luxembourg at its meeting of 15 July 2020.

For the Court of Auditors

Klaus-Heiner Lehne
President

Annexes

Annex I — Digitising European Industry initiative pillars

01 The first pillar (European platform of national initiatives on digitising industry) aims at the co-ordination of the various national and regional initiatives for digitising industry across Europe. In March 2017, the Commission launched a governance framework to (i) facilitate the coordination of EU and national initiatives on digitisation, (ii) mobilise stakeholders, and resources across the value chain, on actions towards the achievement of a Digital Single Market, building upon existing multi-stakeholders dialogues, and (iii) exchange best practices.

02 Boosting digital innovations in all sectors covers pillar 2 and 3 as follows:

o   The second pillar (Digital innovations for all: Digital Innovation Hubs (DIHs)) is designed to help companies to take advantage of digital opportunities. Digital Innovation Hubs (DIHs) can assist companies (especially smaller ones and start-ups) to improve their business, production processes, products and services through digital innovations. The Commission intention was to create DIHs around existing private or public competence centres[48] (e.g. university department) across Europe. The third pillar (Digital innovations for all: Strengthening leadership through partnerships and industrial platforms) is about ensuring the supply of digital innovations and standardisation. The Commission intended to support Public-Private Partnerships (PPPs) and industrial platforms for developing future digital technology building blocks. For this purpose, the Commission has established PPPs and Joint Undertakings under the EU's Horizon 2020 programme in key digital technologies such as 5G, Big Data, High Performance Computing, cybersecurity, photonics, robotics and electronic components and systems.

03 Under the fourth pillar (A regulatory framework fit for the digital age), the Commission planned to assess the need for a modernisation of the regulatory framework, whether it is fit for the digital age. Stakeholders expressed the need for further clarification of the aspect of (i) the ownership and use of data generated in an industrial context; (ii) autonomously acting systems; and (iii) non-embedded software.

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[48]   Competence Centres are collaborative entities staffed with highly-qualified researchers. They provide focused strategic research for the benefit of industry.

04 The fifth pillar (Preparing Europeans for the digital future) relates to the Commission's initiatives that support digital education and skills, preparing Europeans for the digital future. This includes:

o the Digital Skills and Jobs Coalition[49], launched on 1 December 2016 as one key action of the Commission's new Skills Agenda for Europe[50];

o the "Digital Opportunity traineeship initiative"[51], funded with €10 million from Horizon 2020; and

o the adoption of the Digital Education Action Plan[52] in order to support the development of digital competences needed for life and work in an age of rapid digital change.

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[49] https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition

[50] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'A New Skills Agenda for Europe - Working together to strengthen human capital, employability and competitiveness'. COM(2016) 381 final.

[51] https://ec.europa.eu/digital-single-market/en/digital-opportunity-traineeships-boosting-digital-skills-job

[52] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Digital Education Action Plan. COM(2018) 22 final.

Annex II — Reviewed projects

Member State	Funding source	Project description	Total amount		EU contribution	
			Planned (€)	Actual (€)	Planned (€)	Actual (€)
Germany	OP 2014DE16RFOP003	The project, implemented by a Digital Networking Centre, aimed at developing and providing demand-oriented services for innovation in industry and production through the digitisation and networking of value creation processes.	1 405 010	1 399 986	702 505	699 993
Germany	OP 2014DE16RFOP007	The project consisted in the construction of a technology and knowhow centre to better serve their future market. This centre aims at allowing the manufacture of new products and shorten the time for planning and production, in particular for the automotive industry, but also for global innovations such as Industry 4.0 or collaborating robotics.	6 506 100	6 972 959	650 600	650 600
Germany	OP 2014DE16RFOP007	The general objective of the beneficiary was to support SMEs according to the concept of "supervised consultation". The objectives of the project were to provide 2 484 consultancy days for a total of 339 SMEs.	2 504 182	2 568 848	1 252 090	1 074 982 Declared as of 31.12.2019

Hungary	OP 2014HU16M0OP001	The project was about the introduction of an integrated business and artificial intelligence system that uses sensors in the production tools and machines, and stores the collected data, which can be used for various analyses. The aim was to improve the automation of the processes and the quality of the final products.	749 376[53]	Project not completed at the time of the audit visit.	299 750	74 937 Declared as of 31.12.2019
Hungary	OP 2014TC16RFTN003	Within this project, 11 partner organizations from 6 countries developed and applied tools or services for transnational innovation management and technology transfer to foster cooperation in Central Europe. One indirect outcome of this project is the creation of a DIH.	1 713 132	1 705 012	No information (the co-financing rate differs between the project partners (80-85 %)	No information (the co-financing rate differs between the project partners (80-85 %)
Poland	2014PL16RFOP001	The project aimed at supporting the development of innovative start-ups in cooperation with experienced undertakings (medium and large enterprises) – the recipients of the technological innovations (in fields that included "Industry 4.0", e.g. IoT, AR, and AI). The objective was to scale-up 38 start-up companies (in three rounds) and by 2022 to develop eight ready to deploy technological innovations.	2 783 371[54]	Project not completed at the time of the audit visit.	2 469 717	17 434 Declared as of May 2019

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[53] ECB euro reference exchange rate of 8 November 2019.

[54] ECB euro reference exchange rate of 27 June 2019 (4.2515).

Poland	2014PL16RFOP001	This project was a research on innovative solution to digitalise products and manufacturing processes of a medium size enterprise.	78 149[55]	78 149	44 475	33 356
Portugal	OP 2014PT16M3OP001	With this investment project, the beneficiary aimed at changing the company's facilities and acquiring new equipment in order to increase its production capacity and improve its overall production process through investment in automation / robotisation.	3 767 500	2 947 841	2 810 625	1 973 875
Portugal	OP 2014PT16M2OP001	The objective of this project was the creation of a new and modern industrial establishment, which incorporates industry 4.0 principles and creates infrastructure for the production of contemporary furniture of innovative design for the new national consumer profile and for the Spanish and North African markets.	975 926	879 818	471 252	424 843

Source: Managing authorities.

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[55] ECB euro reference exchange rate of 28 June 2019 (4.2496).

Annex III — Country specific recommendations relevant to the DEI initiative

EU Member States as of 31.12.2019	2016	2017	2018	2019	2020
Belgium	✓	✓	-	✓	✓
Bulgaria	-	-	✓	✓	✓
Czech Republic	-	-	✓	✓	✓
Denmark	✓	-	✓	✓	✓
Germany	✓	✓	✓	✓	✓
Estonia	✓	✓	✓	✓	✓
Ireland	-	✓	✓	✓	✓
Greece[1]	-	-	-	✓	✓
Spain	✓	✓	✓	✓	✓
France	✓	✓	✓	✓	✓
Croatia	-	-	-	✓	✓
Italy	-	-	✓	✓	✓
Cyprus	-		-	✓	✓
Latvia	✓	-	-	✓	✓
Lithuania	✓	✓	✓	✓	✓
Luxembourg	✓	✓	✓	✓	✓
Hungary	-	-	-	✓	✓
Malta	-	-	-	✓	✓
Netherlands	-	-	✓	✓	✓
Austria	-	✓	✓	✓	✓
Poland	-	-	✓	✓	✓
Portugal	-	✓	✓	✓	✓
Romania	-	-	✓	✓	✓
Slovenia	-	-	-	✓	✓
Slovakia	-	-	✓	✓	✓
Finland	-	-	-	✓	✓
Sweden	-	-	-	✓	✓
United Kingdom	-	-	-	✓	✓

[1] Greece did not receive CSRs from 2016 to 2018 because it was under an economic adjustment programme.

✔	CSR directly related to the DEI initiative (e.g. referring to the digitalisation of industry, digital skills, and/or digital infrastructures)	
✔	CSR indirectly related to the DEI initiative (e.g. referring to innovation)	
-	CSR not related to the DEI initiative	

Source: ECA analysis based on Country Specific Recommendations.

Annex IV — DIHs registered in the catalogue

Member State	Fully operational	In preparation	Total
Belgium	15	14	29
Bulgaria		4	4
Czech Republic	7	3	10
Denmark	6	3	9
Germany	29	26	55
Estonia	4	2	6
Ireland	6	6	12
Greece	9	5	14
Spain	51	18	69
France	24	22	46
Croatia	7	4	11
Italy	38	16	54
Cyprus	1	2	3
Latvia	3	1	4
Lithuania	14	1	15
Luxembourg	1	4	5
Hungary	7	2	9
Malta		2	2
Netherlands	23	18	41
Austria	7	5	12
Poland	6	7	13
Portugal	5	2	7
Romania	4	2	6
Slovenia	9		9
Slovakia		3	3
Finland	13	4	17
Sweden	7	6	13
United Kingdom	13	7	20
EU-28	**309**	**189**	**498**

Source: DIHs catalogue as of end 2019.

Annex V — Proposed number of DIHs that Member States should designate

Member States as of March 2020	Min # of DIHs	Max recommended # of DIHs
Belgium	4	8
Bulgaria	3	6
Czech Republic	4	8
Denmark	3	5
Germany	18	35
Estonia	1	3
Ireland	2	5
Greece	4	8
Spain	11	22
France	14	29
Croatia	2	4
Italy	14	28
Cyprus	1	2
Latvia	1	3
Lithuania	2	4
Luxembourg	1	2
Hungary	4	8
Malta	1	2
Netherlands	5	11
Austria	3	7
Poland	9	19
Portugal	4	8
Romania	6	12
Slovenia	1	3
Slovakia	3	5
Finland	3	5
Sweden	4	8
Total EU	**128**	**260**

Source: European Digital Innovation Hubs in Digital Europe Programme - Draft working document 30-03-2020.

In the EU, there are about 23 million SMEs[56]. This means that theoretically, if all the Member States designate the maximum number of DIHs to be financed by the Digital Europe Programme, on average there is one DIH for about 88 000 SMEs. This average hides however significant disparities between Member States.

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[56] Annual report on SMEs 2018/2019. ISBN 978-92-9202-641-7.

Ratio SMEs / Maximum recommended number of DIHs
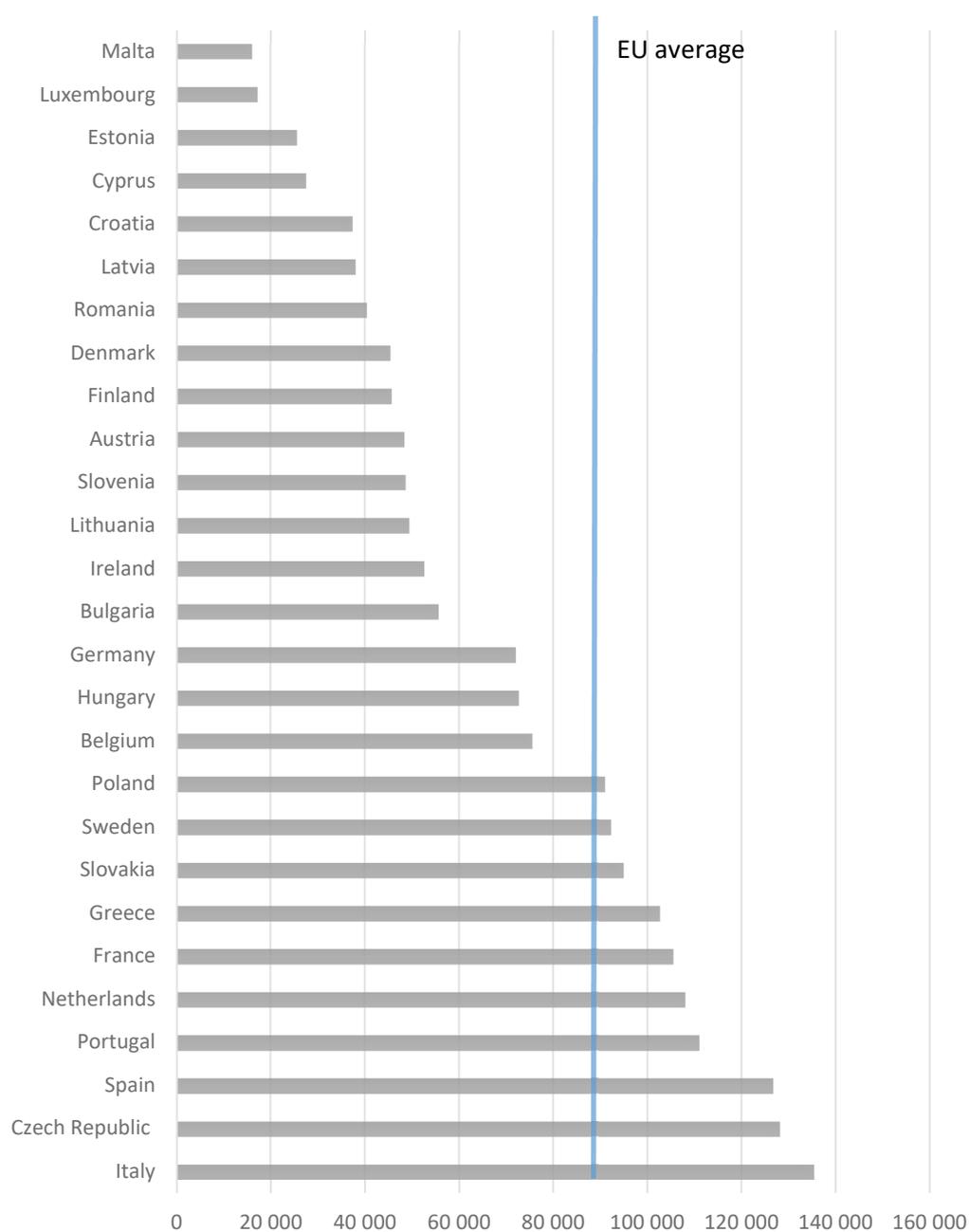
Source: ECA, based on data from Small Business Act factsheets 2019 and Commission Work Document on DIHs of 30.3.2020.

Glossary, acronyms and abbreviations

5G: 5G networks' means a set of all relevant network infrastructure elements for mobile and wireless communications technology used for connectivity and value-added services with advanced performance characteristics such as very high data rates and capacity, low latency communications, ultra-high reliability, or supporting a high number of connected devices. These may include legacy network elements based on previous generations of mobile and wireless communications technology such 4G or 3G. 5G networks should be understood to include all relevant parts of the network.

Additive manufacturing: Also known as 3D printing, a computer controlled process that creates three dimensional objects by depositing materials, usually in layers.

Artificial intelligence: Artificial intelligence (AI) refers to the simulation of human intelligence in machines.

Big data and analytics: Big data refers to large amounts of data produced very quickly by a high number of diverse sources. This 'big data' can be transmitted, collected, aggregated and analysed to provide insights into processes and human behaviours. Big data and analytics have the potential to identify efficiencies that can be made in a wide range of sectors, and to lead to innovative new products and services, greater competitiveness and economic growth.

Cloud computing: Cloud computing refers to storing and accessing data and programs over the internet instead of an individual's computer or a company's network. This means that users do not need to invest in their own infrastructures. Storage and processing take place in the cloud rather than at the user's premises or on the user's devices.

Country specific recommendations (CSRs): These are documents prepared by the European Commission for each country analysing its economic situation and providing recommendations on measures it should adopt over a period of 12 to 18 months.

Cyber-physical systems: It refers to a system featuring a tight combination of, and coordination between, the system's computational and physical element. It is also referred to as "industrial Internet of Things" in the literature.

Cyber Security: Cybersecurity refers to security of cyberspace, where cyberspace itself refers to the set of links and relationships between objects that are accessible through a generalised telecommunications network, and to the set of objects themselves where they present interfaces allowing their remote control, remote access to data, or their participation in control actions within that Cyberspace.

DEI initiative: Digitising European Industry initiative.

DIHELP: The Digital Innovation Hub Enhanced-Learning Programme (DIHELP) was a mentoring and coaching programme that supported 30 Digital Innovation Hubs to develop and/or scale-up their activities for 9 months.

DIHs: Digital Innovation Hubs.

European Structural and Investment Funds (ESI funds): ESIF are five separate funds that aim to reduce regional imbalances across the European Union, with policy frameworks set for the 7-year MFF budgetary period. The funds include: the European Regional Development Fund (ERDF); the European Social Fund (ESF); the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD); and the European Maritime and Fisheries Fund (EMFF).

European Fund for Strategic Investments (EFSI): An investment support mechanism launched by the European Investment Bank (EIB) and the Commission, as part of the Investment Plan for Europe, to mobilise private investment in projects of strategic importance for the EU.

High performance computing (HPC): It refers to high speed computing implemented as a cluster of multiple processors harnessed together via fast communications pipelines and cluster software. Supercomputing e-Infrastructures enable tackling the data-intensive and complex challenges of modern science and industry with new computing and simulation capabilities.

I4MS: ICT Innovation for Manufacturing SMEs (I4MS) is a program promoted by the European Commission to expand the digital innovation of manufacturing SMEs in Europe.

Internet of Things (IoT): IoT refers to a distributed network connecting physical objects that are capable of sensing or acting on their environment and able to communicate with each other, other machines or computers.

Operational programme (programme): A programme sets out a Member State's priorities and specific objectives and describes how funding (EU and national public and private co-financing) will be used during a given period (generally 7 years) to finance projects. The projects within a programme must contribute to a certain number of objectives specified at the EU level of the programmes priority axis. Programme funding may come from the ERDF, CF and/or ESF. A programme is prepared by the Member State and has to be approved by the Commission before any payments from the EU budget can be made. Programmes can only be modified during the programme period if both parties agree.

Outcome: Change that arises from the implementation of an intervention and which normally relates to the objectives of this intervention. Outcomes include results and impacts. Outcomes may be expected or unexpected, positive or negative (e.g. a new motorway attracting investors to a region but causing unacceptable levels of pollution in the areas through which it passes).

Robotics: Robotics deals with the design, construction, operation, and use of robots, as well as computer systems for their control. Robotics is a fast developing market increasingly driven by the development of novel and improved products in areas as diverse as manufacturing, search and rescue and retrieval, inspection and monitoring, surgery and healthcare, homes and cars, transport and logistics, agriculture, and many more.

SAE: The goal of Smart Anything Everywhere (SAE) is to let SMEs, start-ups and mid-caps enhance their products and services through the inclusion of innovative digital technologies.

Small and medium-sized enterprises (SMEs): A size definition applied to companies and other organisations, based on the number of staff employed and certain financial criteria. Small enterprises have fewer than 50 staff, and turnover or a balance sheet total not exceeding €10 million. Medium-sized enterprises employ fewer than 250 staff, and have turnover up to €50 million or a balance sheet total up to €43 million.

Smart Factories: The project "Smart Factories in new EU Member States", managed by the EC – DG Connect for the European Parliament, was launched in May 2017. In the context of "Digitising European Industry" initiative, it aims to contribute to the efforts to build a Digital Innovation Hubs (DIHs) network in Europe.

System Integration: It refers to a process or phase concerned with joining different subsystems or components as one large system.

FINAL REPLIES OF THE EUROPEAN COMMISSION TO THE EUROPEAN COURT OF AUDITORS SPECIAL REPORT

"THE DIGITISING EUROPEAN INDUSTRY: AN AMBITIOUS INITIATIVE WHOSE SUCCESS DEPENDS ON THE CONTINUED COMMITMENT OF THE EU, GOVERNMENTS AND BUSINESSES"

EXECUTIVE SUMMARY

I. President U. Von der Leyen clearly outlined priorities to turn Europe into a digital, technological and industrial leader, in order to ensure Europe's technological sovereignty and to strengthen its Single Market. Competitiveness of European industry depends on its ability to manage the transition towards digitalisation and innovation, as well as sustainability.

Digital transformation is therefore at the core of ongoing policy actions of the European Commission. With the recent crisis, digitalisation of the economy has demonstrated its importance even more by ensuring a new normal, through digitalised ways of working.

Even before this crisis, the Commission proposed several actions for digital leadership, notably with the Digitising European Industry initiative.

II. The third pillar of the Digital Single Market strategy, adopted in 2015, aims at "maximising the growth potential of the digital economy". In less than one year later, The Commission proposed the Digitising European Industry initiative to reap the benefits of the additional value creation from digital innovations in products, processes and business models of enterprises across all sectors, referred to in the rest of the text as "industry".

These actions outline significant investments and foster digital research and innovation, uptake of digitalised way of working by any businesses across the EU, by launching Digital Innovation Hubs projects in Horizon 2020 as well as digital skills and adaptation of the regulatory framework for a European digital single market.

Digital industrial leadership can only be achieved jointly, by developing cooperation around strategic technologies and value chains of many actors. The DEI initiative Communication allowed the Commission to engage swiftly with Member States and the private sector to address digitalisation of the EU economy. The DEI initiative builds on other Commission initiatives that aim at world-class network infrastructures, such as the Gigabit Society.

The proposed Programmes for 2021-2027 such as Horizon Europe or Digital Europe, as well as the Commission Work Programme 2020 clearly outline that these efforts will be duly pursued, together with Member States, industry and academia. Indeed, the approach retained in 2016 was based on the ability of the all stakeholders to swiftly engage with the Commission in a positive and trustworthy manner.

IV. The global objective of the DEI initiative, *reinforcing the EU's competitiveness in digital technologies and ensuring that every business in Europe of any size, in any sector, and wherever situated, can fully benefit from digital innovations to create higher value products, improve its processes and adapt its business models,* is giving the overarching framework. Specific objectives and actions were also proposed, with the target to mobilise close to €50 billion of public and private investment in the next 5 years, explore and adapt when needed the legislative framework and reinforce coordination of efforts on skills and quality jobs in the digital age.

EN   **EN**

The Commission proposed these investments as a stepping-stone for an impact on the development and uptake of digital innovations across the EU. These have supported to raise awareness for digital leadership in Europe and have been instrumental since to reinforce digital priorities, notably in several Programmes. It also specifically proposed a Digital Europe Programme to build a European digital capacity.

To encourage Member States to invest in their digitalisation, the Commission also performed specific efforts, notably information portals and technical assistance and shared guidance documents with Member States at various levels. This was notably the case for the functioning of Digital Innovation Hubs (DIHs) or the mobilisation of regions with no DIH to join and invest through mentoring programmes supported by the European Parliament. Specifically on ESI Funds, several objectives for the digitalisation of society and the economy are included in the investment priorities of the basic acts, for 2014-2020 and reinforced in the proposals for 2021-2027.

The Commission also estimates that the support activities have had an increasing effect on Member States launching national digitalisation initiatives or measures as well as preparing candidate European DIHs, despite the limitations of a soft-law approach.

V. The Commission launched dedicated monitoring surveys to assess progress of the national digitalisation initiatives in close collaboration with Member States, in addition to the existing Digital Economy and Society Index in place since 2014. Although the current monitoring system does not provide complete and full precision monitoring, the Commission has been able to have an estimate of achieved relevant public and private investments across the EU, despite not having the legal basis to mandate national reporting.

The Commission considers the regulatory framework for the European Structural and Investment (ESI) funds to be with a strong and balanced monitoring. Indeed, the monitoring and reporting requirements for the ESI funds are set out in the relevant basic acts and implemented accordingly. This framework does capture information related to ESI funds support for digitalisation, through various input, output, and result indicators.

VI. Since 2016, the DEI initiative has stimulated the organic, bottom-up, development of Digital Innovation Hubs with some effects. By prioritising innovation actions within Horizon 2020 to support the development of DIH projects, the Commission paved the way, together with Member States to the proposed Digital Europe Programme to improve the alignment and coordination of the European DIH development across the EU. The European Commission, Parliament and Council reached a general partial agreement on the DEP regulation.

The approach retained by the Commission in the DEI initiative is for DIHs projects financed under Horizon 2020 to support highly innovative experiments, which have the potential to be replicated through market uptake after the end of the project. In this context, the Commission does not consider that the outcome of Horizon 2020 DIH projects is representative of the digitalisation activities financed by public and private investments overall.

Regarding the DIH financed in part or in total by Member States and regions, the DEI initiative does not have the regulatory power to mandate Member States to report in a comparable manner on the achievements of the national/regional DIHs. Some Member States have however put in place a monitoring system, even if these specific numbers are not further aggregated at the EU level. Such a reporting is, however, foreseen in the proposed DEP regulation.

The proposed DEP regulation is in this regard a major shift in the deployment of European DIHs and their networking across the EU, therefore clearly focussing on building the capacity of digitalisation of businesses across the EU. The proposed DEP regulation mandates indeed instruments, selection criteria, monitoring and indicators with co-financing requirements.

The Commission notes that the uptake of the concept of DIHs has accelerated in Member States, notably since the proposed Digital Europe Programme, as witnessed by the participation of Member States in the regular coordination meetings, as well as the preparation of national actions.

VII. The Commission not only addressed all the legislation identified in the DEI initiative communication but also further reinforced the DEI initiative in disruptive key digital technologies such as Artificial Intelligence, of critical importance to the EU autonomy.

Following the Gigabit Society Communication, the Commission strengthened its efforts on connectivity: Since the adoption of the Court 2018 Special Broadband Report, the Commission has continued working on new policy and regulatory measures, as well as financial programmes and instruments to encourage private and public investments in very high capacity networks.

Fast and ultrafast broadband coverage continues to grow rapidly in the EU.

The EU connectivity targets for 2020 relate to households, and household coverage indicators monitored by the Commission are considered a good proxy of the availability of connectivity for SMEs i.e. the vast majority of companies.

VIII. First indent: The Commission **accepts the recommendation** to offer support to Member States and to better communicate on key EU funds available for implementing the DEI initiative.

Indeed, the approach of the DEI initiative has been to politically incentivise Member States, and by exchanging information and discussing good practices through a governance framework, among others. The Commission plans to raise further awareness for possible support, and, if formally requested, to continue to provide support to Member States through the Structural Reform support services.

Second indent: The Commission **accepts the recommendation** of the ECA to define common result indicators, in order to assess the implementation in the Member States and at EU level. It will do so by refining the common methodology and indicators agreed specifically within the framework of monitoring and reporting the digitalisation of Member States.

The Commission accepts the recommendation of the ECA to ensure that a system is in place to track the spending of EU funds under shared management for significant initiatives that are not in place at the beginning of the programming period, when the Commission assesses that such adjustment is required.

For the 2021-2027 programming period, the monitoring system for the structural funds will include relevant indicators for financial allocations, outputs and results for all activities relative to the DEI initiative that can be supported under Cohesion Policy.

Third indent: The Commission **accepts the recommendation** of a framework for a network of European DIHs as from 2021, as defined in article 16(2)-(3) of the Digital Europe Programme. Together with the Member States, the Commission is indeed developing such framework within the Digital Europe Programme regulation.

Fourth indent: The Commission **accepts the recommendation** and plans a range of actions to support Member States in their efforts to achieve appropriate levels of broadband connectivity, such as:

- the update of the Guide to broadband investment due for completion soon after the adoption of the MFF 2021-2027;
- the animation of the Broadband competence office network including the annual EU Broadband Awards competition aimed at sharing good practices;
- the continuous upgrade of the DESI monitoring framework gradually including new key indicators reflecting relevant EU initiatives and objectives. The upgrade of DESI will engage

the Commission into a discussion with BEREC, COCOM, DSM strategic group and Eurostat with a view to make gradual progress starting with the main providers of public services such as schools and hospitals.

INTRODUCTION

From Industry 1.0 to 4.0 – Digitalising European Industry

Common reply to paragraphs § 1-18.

The third pillar of the Digital Single Market strategy, adopted in 2015, aims at "maximising the growth potential of the digital economy", and contains all the major levers for improving industry digitalisation. Although the manufacturing industry was the starting point for the initiative with a clear case for digitalisation, the Digitising European Industry initiative considers the need for digitalisation of businesses across all sectors, including the tourism and creative industry, referred to in the rest of the text as "industry".

The Commission, in less than one year since the adoption of the DSM Strategy, proposed concrete actions and significant investments to reinforce the industrial and innovation pillar of the DSM strategy. Such a Communication allowed the Commission to engage swiftly with Member States and the private sector to address digitalisation of the EU economy, whereas a regulation on the same would have been slower.

The Digitising European Industry initiative introduced policy measures to reap the benefits of the additional value creation from digital innovations in products, processes and business models. The DEI initiative also proposes a number of key technologies in which the EU has to invest for leadership, together with an approach based on partnerships, platforms and ecosystems.

The DEI initiative builds on other Commission initiatives that foster world-class network infrastructures, such as the Gigabit Society. Gigabit connectivity is what enables data to flow, people to collaborate and access services and goods wherever they are, and to connect more objects to the Internet.

The initiative details EU funding in direct management to be prioritised[1] and the order of magnitude of the efforts required from the private side as well of the national and regional levels as a leverage factor of direct EU investments, without however mandating a specific financing source.

OBSERVATIONS

26. The global objective of the DEI initiative is giving the vision and providing the overall framework. The Commission set out, in the DEI Communication, actions to be performed by 2020, with targets and measurement provisions, notably on R&I support. Specifically within the framework of monitoring the digitalisation of Member States along the objectives of the DEI initiative, the Commission established a common methodology and indicators for country monitoring and its reporting.

28. In encouraging Member States, regions and the private side to invest, the Commission indicated the order of magnitude of the efforts required as a leverage factor of direct EU investments, without mandating a specific financing source. The use of ESI funds was also encouraged. In this context, the Commission notes that operational programmes had sufficient flexibility and investments for the

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[1] €500m for Digital Innovation Hubs as well as an investment of ~€5 billion for digital technologies leadership from Horizon 2020, through partnerships, platform building and focus areas.

functions of a DIH as well as the digital transformation of, and innovate uptake of digital technologies by SMEs. For the 2021-2027 programming period of the ESI funds, the role of digitalisation will be reinforced notably through a dedicated specific objective "Reaping the benefits of digitisation for citizens, companies and governments" 2. Digitalisation will also be integral part of smart specialisation, enabling condition for the effective and efficient implementation of this specific objective, and will be part of a broad monitoring framework.

30. The DESI and its country reports are a tool used by the Commission to monitor the digital progress of Member States. These reports are of factual nature.

The DESI and its country reports feed into the European Semester process, which includes country-specific recommendations. These recommendations are proposing a number of measures for Member States to implement.

33. The Commission undertook a number of activities in support of the Member States efforts to development a strategy for their industry, including sharing of practices and experiences, despite the limitation of a soft-law approach. In this framework, the Commission has focused on the sharing of positive experiences between Member States. Although negative experiences were not explicitly excluded, none of the Member States presented one to share with others in the dedicated frameworks made available by the Commission.

34. The Commission has addressed Member States as the primary interlocutors in DEI, according to the agreed governance. In two occasions, the Commission has even notified the Member States about using ESI funds: for example, with a report with country specific information about ESI Funds (https://ec.europa.eu/futurium/en/content/digitising-european-industry-catalogue-initiatives) or when Commissioner Gabriel wrote to the respective ministers of 13 countries to encourage the further support of DIHs in their country and regions, possibly by using the ERDF.

The Commission has also been organising technical assistance and seminars within the European Week of Regions and Cities to raise awareness of Managing Authorities to the Digitising European Industry initiative priorities, and stressing the possibility to use technical assistance within ESI funds.

35. The Commission considers that several thematic objectives (TOs) of the ESI funds, TO11 are relevant to digitalisation of the EU businesses, such as Enhancing access to, and use and quality of, information and communication technologies (TO2), Strengthening research, technological development and innovation (TO1), Enhancing the competitiveness of SMEs (TO3), energy and mobility (TO4 and 7).[3]

Thematic objective 11 can support institutional capacity of public authorities and stakeholders and public administration reforms in a wide range of areas, thereby also contributing to different Commission initiatives and notably the challenges linked to public administration reform identified in the Country Specific Recommendations (CSR) of the European Semester exercise. For the programming for 2014-2020, the 2013 CSRs and specific investment priorities related to administrative reform identified in the Commission services' Position Papers played an important role.

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[2] Ref. COM(2018) 375 final, in particular Articles 4 and 11; COM(2018) 372 final, in particular Article 2

[3] See for example, https://ec.europa.eu/regional_policy/en/policy/how/priorities/digital-age and https://s3platform.jrc.ec.europa.eu/-/mapping-eu-investments-in-ict-description-of-an-online-tool-and-initial-observations?inheritRedirect=true&redirect=%2Fdigital-agenda-and-ict

36. The European Semester and the Country Specific Recommendations are the main instrument to propose recommendations to Member States, including regarding their digital competitiveness on the basis of the DESI.

However, from an analytical point of view, it would be difficult to identify clearly the exact underlying causes and reasons for performance gaps from the data collected for the DESI and therefore suggest relevant measures for improvements.

Furthermore, the DEI initiative has put in place a governance framework to facilitate the exchange and assistance opportunities, among Member States, and with the Commission, as a whole and in bilateral. This also included presentations of the Strategic Reform Support services.

The Commission also has been providing Member States with specific supporting documents and discussion opportunities regarding the Digital Innovation Hubs.

38. The DEI initiative has influenced to varying degrees the digitalisation strategies of Member States as well as Norway and Switzerland. There are several examples of reinforcement of organisations to become European Digital Innovation Hubs or Cybersecurity centres within the Digital Europe Programme. Within the DEI initiative governance, Member States have also strengthened their AI strategies, one of the key digital technologies for EU technological autonomy.

42. The Commission and Member States assess progress of the DEI initiative through DESI and dedicated monitoring surveys, with varying levels of detailed national and regional investments.

The overall monitoring of digitalisation initiatives is carried out with close support of the Member States. Such a monitoring provides so far adequate estimates of the digitalisation progress across the EU for policy-making.

44. The Commission prioritised Horizon 2020 funding towards the DEI initiative notably by grouping specific DIH, platform and pilot developments in a focus area on Digitising and Transforming European Industry and Services in the Work Programme 2018-2020, as well as ensuring converging developments in other parts of the WP towards "Artificial Intelligence and Technologies for Digitising European Industry and Economy". The Horizon 2020 programme is based on criteria of excellence and impact, among others, and the Commission stressed the dimension of the regional anchor to achieve greater relevance for the DIH projects, while stressing the overall industrial innovation context for the other actions[4].

45. The Commission notes that all projects reviewed by the ECA were relevant to the DEI initiative.

48. The Commission observes that while a system of monitoring was in place to follow digitalisation expenditure related to the DEI in the ESI funds from the start of the 2014-2020 period, there was potentially scope for improvement.

49. For the 2021-2027 programming period of the ESI funds, the Commission proposed to introduce a dedicated specific objective "Reaping the benefits of digitisation for citizens, companies and governments". The monitoring system for the structural funds will include relevant indicators for financial allocations, outputs and results for all activities relative to the DEI that can be supported under Cohesion Policy.

In conclusion, in view of the major simplification exercise undertaken by the Commission for the 2021-27 cohesion policy framework, the Commission considers that the currently proposed monitoring system is appropriate.

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[4] WP2018-2020, https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-leit-ict_en.pdf, notably p. 10 *et seq*.

50. The Commission launched, with the DEI initiative, the concept of Digital Innovation Hubs, one-stop-shop for businesses to take advantage of innovative digital opportunities. Since 2016, the Commission has been promoting and implementing the concept of Digital Innovation Hubs, and take-up is accelerating in Member States, notably under the impulse of the proposed Digital Europe Programme.

54. In addition to self-declaration of DIH and external verification of the criteria to appear on the Catalogue, the Commission has held several workshops with MS representatives to identify possible DIHs as well as to, at a later stage, check for accuracy of the DIHs in the catalogue from their country in addition to identifying missing Digital Innovation Hubs.

55. Since 2016, the DEI initiative has stimulated the organic development of DIH through innovation projects under H2020 and further support actions.

The Commission proposed the Digital Europe Programme as a Regulation in order to mandate instruments, criteria and indicators for a systematic deployment of the network of European DIHs, in which the Commission would co-invest together with Member States and regions.

59. Regarding the sharing of best practices for DIH, the Commission wants to stress that it has targeted such promotion mostly towards DIHs themselves. Workshops organised by the Commission were very popular, including during the Week of Regions and Cities largely attended by managing authorities. Many of the hubs wanted to present how they were carrying out the functions of a DIH. However, not all policy makers involved in designing DIH programmes were aware about these workshops.

The Commission is therefore now developing a practical handbook and good practices for regional, national and RIS3 implementation policy makers. A draft is available https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=66604 and has been shared with Member States to get their comments to make the final version as useful for them as possible. Member States have been requested to share this guide with policy makers, and it will also be promoted during the Week of Regions and Cities.

62. Among the range of activities designed to support the DIHs, the Commission would stress the role of Innovation Actions supported by Horizon 2020 for an organic development of the network of DIHs. The experience with DIHs gained since 2016 has led to the concept of European Digital Innovation Hubs in Digital Europe Programme, which will align and coordinate the DIH development across the EU, building on the national support to DIHs.

The catalogue was set up as an overview of DIHs for Member States and other DIHs, without links to any kind of funding, on the basis of self-declaration. In this context, the Commission notes that the catalogue served its purpose.

63. Several digital maturity assessment (DMA) tools have been developed across the EU, both by the private and public sectors, often with different purposes, such as attracting prospects or raising awareness of SME to digital opportunities or address particular issues of digital maturity.

Diversity of tools and methodology is healthy for the digital ecosystems. For the Digital Europe Programme regulations, the Commission plans, however, to develop and use a common digital maturity assessment methodology, based on experience with digital maturity measurements of the current DIHs. This will ensure a harmonious compliance towards the Programme objectives set in the regulation, although it will not prevent other organisations to develop customised DMA tools outside of the DEP.

64. The DIHs projects financed under Horizon 2020 support highly innovative experiments, which have the potential to be replicated through market uptake after the end of the project. In this context,

the Commission does not consider that the outcome of 2000 very innovative SMEs, having benefited from services of Horizon 2020 DIH projects and serving as trailblazers, is representative of the outcome of public and private investments (such as ICT expenditure) in the digitalisation of the whole economy.

Regarding the DIH financed in part or in total by Member States and regions, the Commission reminds that the DEI initiative does not have the regulatory power to mandate Member States to report in a comparable manner on the achievements of the national/regional DIHs. Some Member States have however put in place a monitoring system, even if these specific numbers are not further aggregated at the EU level.

However, such a reporting is foreseen in the DEP regulation. This Commission's proposal for the next programming period includes a provisional list of mandatory Key Performance Indicators on which the DIHs receiving support under the Digital Europe programme will be required to report. In addition, the Commission is developing guidelines on how to monitor and evaluate DIHs and their contribution to the digital transformation of companies, regions and Member States.

65. The Commission not only addressed all the legislation identified in the DEI initiative communication, in line with the Digital Single Market strategy adopted the year before the DEI initiative, but also further reinforced the DEI initiative in disruptive key digital technologies such as Artificial Intelligence, of critical importance to the EU autonomy. In 2018, the Commission indeed put forward an ambitious strategy on AI, and opened a consultation with a White Paper on AI in February 2020. These may be the first step towards a dedicated legal work to ensure a human-centric and ethical AI made in EU, taking account of the various publications of the high-level expert group on AI since 2018.

Whereas availability of world-class digital infrastructures was acknowledged as a prerequisite in the DEI initiative, the Commission had launched dedicated initiatives aimed at providing these, such as the Gigabit Society communication.

73. The Commission would like to underline that the rapid progression of availability and use of broadband is expected to continue as the percentage of households covered by ultrafast networks is also increasing (already more than 68%) and service offers emerge. New take-up support measures in a number of Member States are also expected to contribute to this trend.

In addition, DESI data from 2019 also reveal that 19 Member States were above the EU average with some already above 90% and a few at 100% providing access to fast broadband services based on fixed technologies (VDSL, VDSL2 vectoring, FTTP, DOCSIS 3.0, DOCSIS 3.1). The DESI connectivity report also reveals that 99.4% of the European territory is covered by 4G services. The EC also point out that both coverage and penetration of NGA services are being reinforced with additional measures as a result of the much increased need for connectivity resulting from the COVID-19 crisis and that this in turn is expected to provide a boost of the ranking of most, if not all, member states by the end of 2020.

75. The Commission is already reporting in its European 5G Observatory on 5G network deployment and other related information. As 5G launches are intensifying in Europe, the Commission reporting will evolve to a reporting increasingly focused on actual 5G services availability and network infrastructure deployment.

77. The Commission notes that it continues to provide regular guidance on State aid rules to public authorities involved in the design and implementation of broadband support actions through the Broadband Competence Offices Network. Furthermore, the Commission continues to provide detailed guidance to Member States in the context of pre-notifications under State aid rules.

In addition, DG COMP created a dedicated platform, eState aid Wiki where all Member States can ask questions on the application of the General Block Exemption Regulation (GBER) and the State aid Grids.

Moreover, the Commission provides guidance though its State aid case practice. That said, the Commission formally launched in June 2020 the evaluation of State Aid rules for broadband infrastructure deployment, in order to analyse how the Broadband Guidelines have functioned to date. This evaluation will inform any further steps that the Commission may decide to take regarding whether a potential revision of the current State aid rules for broadband infrastructure deployment may be considered necessary.

78. The EU connectivity targets for 2020 described in Box 10, relate to households. However, the household coverage indicators monitored by the Commission are considered a good proxy of the availability of connectivity for of SMEs.

CONCLUSIONS AND RECOMMENDATIONS

79. The Commission acknowledges that the time necessary by Member States to develop an adequately budgeted national strategy on digitalisation should be taken into account.

The Commission also estimates that it achieved a number of objectives, based on national initiatives, despite the limitations of a soft-law approach. In its country monitoring, the Commission acknowledged varying degrees of progress in the country digitalisation across MS.

The Commission considers that there is an acceleration of national digitalisation initiatives since the proposal of the Digital Europe Programme regulation: all Member States are now preparing their national selection of candidate European Digital Innovation Hubs.

80. The global objective of the DEI initiative, *reinforcing the EU's competitiveness in digital technologies and ensuring that every business in Europe of any size, in any sector, and wherever situated, can fully benefit from digital innovations to create higher value products, improve its processes and adapt its business models,* is giving the overarching framework. Specific objectives and concrete actions were also proposed, with the target to mobilise close to €50 billion of public and private investment in the next 5 years, explore and adapt when needed the legislative framework and reinforce coordination of efforts on skills and quality jobs in the digital age.

The Commission proposed these investments as a stepping stone for an impact on the development and uptake of digital innovations across the EU. These have supported to raise awareness for digital leadership in Europe and have been instrumental since to reinforce digital priorities, notably in several Programmes. It also specifically proposed a Digital Europe Programme to build a European digital capacity.

The Commission further considers to have encouraged the allocation ESI Funds to the digitalisation of society and economy, as can also be witnessed by the presence of several relevant objectives included in the legal basis, both for 2014-2020 and the proposal for 2021-2027.

Specific efforts have been done, notably information portals and technical assistance are available to managing authorities, and various workshops, specifically in the Week of the Regions of Cities attended by Managing Authorities, and dedicated meetings have taken place. Several guidance documents have also been shared with Member States at various levels, the expectations, and notably about the functioning of a DIH or the mobilisation of regions with no Digital Innovation Hub to join and invest through mentoring programmes

The Commission also estimates that the support activities have had an increasing effect on Member States launching national digitalisation initiatives or measures as well as preparing candidate European DIHs, despite the limitations of a soft-law approach.

<u>Recommendations 1 and 2 – Funding</u>

1) The Commission **accepts the recommendation** to offer support to Member States.

Indeed, the approach of the DEI initiative has been to politically incentivise Member States, and by exchanging information and discussing good practices through a governance framework, among others. The Commission plans to raise further awareness for possible support, and, if formally requested, to continue to provide support to Member States through the Structural Reform support services.

2) The Commission **accepts the recommendation** to better communicate on key EU funds available for implementing the DEI initiative, notably by providing information outlining the key funding opportunities.

81. The Commission supports the need for more detailed monitoring of digital across the EU, and quality data collection, a longstanding research priority of economists for several decades already.

The Commission launched dedicated monitoring surveys to assess progress of the national digitalisation initiatives in close collaboration with Member States, in addition to the DESI.

In this context, the Commission has been able to assess the order of magnitude of achieved investments across the EU, for example, notably that Member States are investing close to €3 billion in 2019[5], in line with the DEI Communication.

Although the current monitoring system does not provide complete and full precision monitoring, it offers evidence that the €50 billion target is being met.

Furthermore, as mentioned before, there has also been a reinforcement of the digitalisation focus post 2020, with the introduction of a robust indicators system in the forthcoming cohesion policy funds. These indicators will provide solid numbers on which it will be possible to communicate and to clearly identify projects.

<u>Recommendations 3 and 4 – Monitoring</u>

3) The Commission **accepts the recommendation.**

For the DEI initiative, adopted in 2016, there has been a reinforcement of the digitalisation focus in the legislative framework for Cohesion Policy post 2020. This system includes a dedicated specific objective, intervention categories for digitisation (010, 011, 012, 013) as well as dedicated output and result indicators (RCO 12, 13, 14 and RCR 11, 12, 13, 14). These indicators will provide a robust basis to monitor the contribution of Cohesion Policy to EU digitalisation objectives.

The Commission considers that a fixed framework of intervention categories and indicators for the entire programme period provides legal certainty, contributes to simplification objectives and reduces administrative burden for programme managers and beneficiaries. However, the Commission recognises that where there is a significant change in the scope of activities that can be supported

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[5] According to the dedicated monitoring study to be published in 2020, the indicative total amount of funding for DEI initiatives across the member states is approximately EUR 3.26 billion in 2019. This figure does not contain exclusively financial support mechanisms like tax incentives and amortisation schemes due to a lack of comparability and transparency. The EUR 3.26 billion also excludes the smallest initiatives and those which include in their scope projects other than digitisation, as data was not broken down in a manner that would allow us to separate the digitisation budget in these cases.

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under Cohesion Policy or the political priorities of the Union, there may be a need to adjust the intervention categories. The Commission proposal for a Common Provisions Regulation foresees the possibility to adjust its annex 1 (which lists the intervention categories) by delegated act, when the Commission assesses that such an adjustment is necessary.

4) The **Commission accepts** the recommendation of the ECA to define common result indicators and target values for the intended outcomes, in order to assess the implementation in the Member States and at EU level. It will do so by refining the common methodology and indicators agreed specifically within the framework of monitoring and reporting the digitalisation of Member States.

82. Since 2016, the DEI initiative has stimulated the organic, bottom-up, development of Digital Innovation Hubs with some effects. By prioritising innovation actions within Horizon 2020 to support the development of DIH projects, the Commission paved the way, together with Member States to the proposed Digital Europe Programme to improve the alignment and coordination of the European DIH development across the EU.

The Commission notes that the uptake of the concept of DIHs has accelerated in Member States, notably since the proposed Digital Europe Programme, as witnessed by the participation of Member States in the regular coordination meetings, as well as the preparation of national actions.

The approach retained by the Commission in the DEI initiative is for DIHs projects financed under Horizon 2020 to support highly innovative experiments, which have the potential to be replicated through market uptake after the end of the project. In this context, the Commission does not consider that the outcome of Horizon 2020 DIH projects is representative of the digitalisation activities financed by public and private investments overall.

Regarding the DIH financed in part or in total by Member States and regions, the Commission reminds that the DEI initiative does not have the regulatory power to mandate Member States to report in a comparable manner on the achievements of the national/regional DIHs. Some Member States have however put in place a monitoring system, even if these specific numbers are not further aggregated at the EU level. Such a reporting is, however, foreseen in the DEP regulation.

The DEP regulation is in this regard a major shift in the deployment of European DIHs and their networking across the EU, therefore clearly focussing on building the capacity of digitalisation of businesses across the EU. The DEP regulation mandates indeed instruments, selection criteria, monitoring and indicators with co-financing requirements.

Recommendations 5 to 7 - Digital Innovation Hubs

5) The Commission **accepts the recommendation** to adopt selection criteria for the European DIHs as from 2021.

Together with the Member States, the Commission is indeed developing these selection criteria and process within the Digital Europe Programme regulation, as has also been recognised by the ECA.

6) The Commission **accepts the recommendation** to define minimum European DIH services as from 2021.

The proposed Digital Europe Programme regulation defines such minimum services. Result and output indicators are being developed to monitor the effectiveness and efficiency of the programme.

7) The Commission **accepts the recommendation** to develop a consistent framework for monitoring the outputs and results of European DIHs' activities, within the proposed Digital Europe Programme.

The DEP regulation proposal for the next programming period includes indeed a provisional list of mandatory Key Performance Indicators on which the European DIHs receiving support under the Digital Europe programme will be required to report. In addition, the Commission is developing

guidelines on how to monitor and evaluate European DIHs and their contribution to the digital transformation of companies, regions and Member States. The Commission intends to publish these guidelines before the end of 2020.

83. The Commission wants to stress not only its work to ensure a suitable legal framework but also its work on further reinforcing the DEI initiative in disruptive key digital technologies such as Artificial Intelligence, of critical importance to the EU technological autonomy.

Following the Gigabit Society Communication, the Commission notes that, although not all Member States will reach the Europe 2020 targets, quite a few will be very close and many Member States are already making substantial progress towards the 2025 objectives. The COVID-19 crisis has also prompted new initiatives in many Member States aimed at speeding up deployment and take-up.

The Commission monitors and reports specifically on the take-up by enterprises of broadband (92%) and fast broadband (44%) and the degree of satisfaction of enterprises with their broadband connection.

Recommendations 8 and 9 - Broadband

8) The Commission **accepts the recommendation** to publish a guide to high-speed broadband investments and will implement it as follows:

The publication of a new Guide on Broadband Investment and State Aid will provide guidance on the set-up and implementation of projects supporting broadband deployment in line with EU 2025 objectives including access to 100Mbps. The Guide will include a reference to all EU funding programmes and instruments available in the new MFF, as well as a summary of the main developments in the State Aid field.

As soon as complete, the Guide will be object of several presentations and discussions with the BCO Network members with a view to assist planning and implementation of broadband measures and facilitate the spread of good practices.

In the meantime, the Commission has already published a new Guide "Facing the challenges of broadband deployment in rural and remote areas" (https://ec.europa.eu/digital-single-market/en/news/broadband-handbook-facing-challenges-broadband-deployment-rural-and-remote-areas) designed to complement the European Guide to High-Speed Broadband Investment with a document written in a non-technical language and a selection of good practices

On 7 January 2019 the Commission launched in line with the Commission's Better Regulation Guidelines the evaluation of the rules. However any modification of the State Aid framework resulting from the ongoing "fitness check" or the abovementioned evaluation of the Broadband Sate Aid Guidelines will not be covered by the Guide if the Guide is published as expected before their completion.

In addition, the Commission will continue to provide regular guidance on State aid rules to public authorities involved in the Broadband Competence Offices Network as described in the Special report n°12/2018 "Broadband in the EU Member States".

9) The Commission **accepts the recommendation** to adapt and consolidate its monitoring and reporting on the achievements of the Gigabit Society 2025 targets.

The Commission has a comprehensive monitoring framework and reports every year in the Digital Economy and Society Index reports on the progress of member states towards a digital economy and society.

For broadband coverage indicators, the key source in the Broadband coverage in Europe study, which is based on an annual survey of telecom operators, regulators and relevant ministries.

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Regarding **target 4**, the Commission has been reporting on FTTP coverage of homes since 2011, which is a good proxy for the overall coverage of socio economic drivers. There is currently no reporting of gigabit connectivity for each socio economic driver separately. The Commission will engage into a discussion with BEREC, COCOM, DSM strategic group and Eurostat with a view to make gradual progress starting with the main providers of public services such as schools and hospitals.

The Commission started to report on fixed very high capacity broadband network coverage (**target 5**) in 2020, which was included in the DESI 2020 report, too.

As for **target 6**, the Commission reported on 5G readiness in DESI 2019 and 2020. In the next broadband coverage survey to be conducted in Q4 2020, data will be collected on 5G coverage, which will be reported in the DESI 2021 report.

Furthermore, the Commission continues to provide detailed guidance to Member States in the context of pre-notifications under State aid rules, its dedicated platform, eState aid Wiki and DG COMP's website.

Audit team

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber II Investment for cohesion, growth and inclusion spending areas, headed by ECA Member Iliana Ivanova. The audit was led by ECA Member Iliana Ivanova, supported by Mihail Stefanov, Head of Private Office and James Verity, Private Office Attaché; Niels-Erik Brokopp, Principal Manager; Paolo Pesce, Head of Task; Rafal Gorajski, Deputy Head of Task; Dieter Böckem, Mariya Byalkova, Francisco Carretero Llorente, Zuzana Gullova, Kristina Maksinen, Janka Nagy-Babos, Rene Reiterer and Nikolaos Zompolas, auditors.

As a consequence of the COVID-19 pandemic and the strict confinement conditions, no picture of the audit team could be provided

Timeline

Event	Date
Adoption of Audit Planning memorandum (APM) / Start of the audit	30.4.2019
Official sending of draft report to Commission (or other auditee)	20.5.2020
Adoption of the final report after the adversarial procedure	15.7.2020
Commission's (or other auditee's) official replies received in all languages	11.8.2020

Digitalisation is associated with better business performance, but EU businesses are not taking full advantage of advanced technologies to innovate. In 2016, the Commission launched the Digitising European Industry initiative, which had the aim of reinforcing the EU's competitiveness in digital technologies and ensuring that every business in Europe can fully benefit from digital innovations.

We found that the Commission strategy for supporting the digitalisation of European industry was soundly based and supported by Member States, but had limited influence on the strategies of most of the Member States we visited, and lacked information on intended outcomes. The Commission has carried out several activities to support the establishment and operation of Digital Innovation Hubs (DIHs) in Member States. However, DIHs received limited support from most of the Member States we visited.

Good levels of broadband connectivity are a pre-requisite for digitalisation. Progress has been made in recent years, but not all Member States are likely to meet the EU's 2020 targets for broadband, and achieving the targets for 2025 will be even more challenging.

We recommend that the Commission, together with Member States, take further action regarding funding, monitoring, DIHs and broadband connectivity.

ECA special report pursuant to Article 287(4), second subparagraph, TFEU.