COMMISSION STAFF WORKING DOCUMENT

DESI 2023 methodological note

Accompanying the document

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

Report on the state of the Digital Decade 2023

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Table of Contents

Table of Tables

1 The new DESI 2023

The Decision establishing the Digital Decade Policy Programme 2030 (the Decision), adopted by the Council and the Parliament in December 2022[1], assigns DESI a new and important role for monitoring the progress made by the EU in the context of the Digital Decade. According to the Decision, "*DESI should be integrated into the report on the state of the Digital Decade (the 'Report on the Digital Decade'), and should be used to monitor progress towards the digital targets*" (the Decision, Recital 24). DESI is defined as "*an annual set of analyses and measurement indicators on the basis of which the Commission monitors the Union's and the Member States' overall digital performance across several policy dimensions, including their progress towards the digital targets set out in Article 4*" (the Decision, Art. 2(1)).

The implementation of the DDPP is causing a transition from a strategy primarily centered on assessing a country's comparative performance each year in pursuit of identifying the best practices, to an approach that evaluates the combined countries' effort aimed at closing the gap towards achieving the 2030 Digital Decade targets and general objectives. In this common project, each country should contribute to the best of its abilities, taking into account "*different potential, and the different starting points, of individual Member States*", and its contribution should be "*reflected in the national projected trajectories*" (the Decision, recital 30).

To implement the Digital Decade Policy Programme, Member States should prepare and submit to the Commission their national strategic roadmaps covering the period up to 2030 including, where possible and measurable at national level, national projected trajectories and all the instruments planned, adopted or implemented to contribute to the achievement of the targets and objectives of the Decision. The national projected trajectories are the key element of the common programme helping to assess the progress over time at the Union and national level.

With the establishment of the trajectories, the Decision introduces the need of assessing progress over time at the Union and national level, with particular emphasis on the progress estimated until 2030.

In line with Art. 2(1), DESI 2023 is based on a set of indicators providing a multi-dimensional, detailed picture of the collective, annual progress made by the EU towards the 2030 goals.

Therefore, the DESI 2023 consists of a dashboard of indicators that have been further aligned with the digital targets set out in the Decision and, for each digital target, all the key performance indicators (KPIs) set out in the Commission Implementing Decision[2], for which national level values are available, are included.

DESI 2023 includes relevant indicators providing a comprehensive assessment of the level of the country's digital performance. In absence of national level roadmaps and trajectories, DESI 2023 can be seen as setting the scene for the next years of cooperation between the Commission and Member States towards the digital transformation of the Union.

The DESI 2023 indicators dashboard includes a total of 32 indicators, eleven of which are Digital Decade KPIs (Table 1). To allow for a clear connection between indicators and associated targets, indicators are grouped into *dimensions*, related to the Digital Decade targets, and *sub-dimensions*, populated by KPIs and auxiliary related indicators.

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[1] Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030 (Text with EEA relevance), OJ L 323, 19.12.2022, p. 4–26
[2] Commission Implementing Decision (EU) 2023/1353 of 30 June 2023 setting out key performance indicators to measure the progress towards the digital targets established by Article 4(1) of Decision (EU) 2022/2481 of the European Parliament and of the Council.

Most of the indicators are collected by the relevant authorities of the Member States and by the Commission (Directorate-General for Communications Networks, Content and Technology and Eurostat) and, in few cases, by ad hoc studies launched by the Commission.

Table 1 DESI 2023 dashboard

Dimension	Sub-dimension	Indicator
1 Digital skills	1a Internet user skills	1a1 Internet use
		1a2 At least basic digital skills
		1a3 Above basic digital skills
		1a4 At least basic digital content creation skills
		1a5 Enterprises providing ICT training
	1b Advanced skills and development	1b1 ICT specialists
		1b2 ICT graduates
2 Digital infrastructures	2a Fixed broadband	2a1 At least 100 Mbps broadband take-up
		2a2 At least 1 Gbps broadband take-up
		2a3 Fixed Very High Capacity Network (VHCN) coverage
		2a4 Fibre to the Premises (FTTP) coverage
	2b Mobile broadband	2b1 Mobile broadband take-up
		2b2 Overall 5G coverage
		2b3 5G spectrum
3 Digital transformation of businesses	3a Digital intensity	3a1 SMEs with at least a basic level of digital intensity
	3b Digital technologies for businesses	3b1 Electronic information sharing
		3b2 Social media
		3b3 Big data
		3b4 Cloud
		3b5 AI
		3b6 e-Invoices
	3b e-Commerce	3c1 SMEs selling online
		3c2 e-Commerce turnover
		3c3 Selling online cross-border
4 Digitalisation of public services	4a e-Government	4a1 e-Government users[3]
		4a2 Digital public services for citizens
		4a3 Digital public services for businesses
		4a4 Pre-filled forms
		4a5 Transparency of service delivery, design and personal data
		4a6 User support
		4a7 Mobile friendliness
	4b e-Health	4b1 Access to e-health records

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[3] The eGoverment users indicator included in DESI 2023 is defined as "Internet use: website or app of public authorities (last 12 months)". It replaces the previous one that included website of public authorities only and was discontinued by Eurostat.

1.1.1 Digital skills

Table 2 Digital skills indicators

Indicator	Description	Unit	Source	Reference year (latest available year with comparable values across the EU)
1a1 Internet use	Individuals who use the internet at least once a week	% individuals	Eurostat – European Union survey on the use of ICT in Households and by individuals (ISOC_CI_IFP_FU [I_IUSE])	2022
1a2 At least basic digital skills	Individuals with 'basic' or 'above basic' digital skills in each of the following five dimensions: information, and data literacy, communication and collaboration, problem solving, digital content creation and safety	% individuals	Eurostat – European Union survey on the use of ICT in Households and by Individuals (ISOC_SK_DSKL_I21 [I_DSK2_BAB])	2021
1a3 Above basic digital skills	Individuals with 'above basic' digital skills in each of the following five dimensions: information, and data literacy, communication and collaboration, problem solving, digital content creation and safety	% individuals	Eurostat – European Union survey on the use of ICT in Households and by Individuals (ISOC_SK_DSKL_I21 [I_DSK2_AB])	2021
1a4 At least basic digital content creation skills	Individuals with at a basic level of skills in using software for digital content creation	% individuals	Eurostat – European Union survey on the use of ICT in Households and by Individuals (ISOC_SK_DSKL_I21 [I_DSK2_DCC_BAB])	2021
1a5 Enterprises providing ICT training	Enterprises who provided training in ICT to their personnel	% enterprises	Eurostat – European Union survey on ICT usage and eCommerce in Enterprises (ISOC_SKE_ITTN2 [E_ITT2])	2022
1b1 ICT specialists	Employed ICT specialists. Broad definition based on the ISCO-08 classification and including jobs like ICT service managers, ICT professionals, ICT technicians, ICT installers and servicers.	% of total employment	Eurostat – Labour force survey (isoc_sks_itspt)	2022
1b2 ICT graduates	Persons with a degree in ICT	% graduates	Eurostat (table educ_uoe_grad03, using selection [ISCED11=ED5-8] and [ISCEDF_13=F06 Information and Communication Technologies]	2021

The digital skills group of indicators assesses both internet user skills of citizens and the number of specialists with advanced digital skills. At least basic digital skills and ICT specialists measure targets of the Digital Decade Policy Programme.

1.1.2   Digital infrastructures

Table 3 Digital infrastructures indicators[4]

Indicator	Description	Unit	Source	Reference year (latest available year with comparable values across the EU)
2a1 At least 100 Mbps broadband take-up	% of households subscribing to fixed broadband of at least 100 Mbps, calculated as overall broadband take-up multiplied with the percentage of fixed broadband lines of at least 100 Mbps (source: COCOM)	% households	European Commission through the Communications Committee (COCOM) and Eurostat – European Union survey on the use of ICT in households and by individuals	2022
2a2 At least 1 Gbps broadband take-up	% of households subscribing to fixed broadband of at least 1 Gbps, calculated as overall broadband take-up multiplied with the percentage of fixed broadband lines of at least 1 Gbps (source: COCOM)	% households	European Commission through the Communications Committee (COCOM) and Eurostat – European Union survey on the use of ICT in households and by individuals	2022
2a3 Fixed Very High Capacity Network (VHCN) coverage	% of households covered by any fixed VHCN. The technologies considered are FTTH and FTTB for 2017-2018 and FTTH, FTTB and Cable DOCSIS 3.1 for 2019 onwards (source: EUROSTAT ISOC_CBT)	% households	Broadband coverage in Europe studies for the European Commission by Omdia and Point Topic	2022
2a4 Fibre to the Premises (FTTP) coverage	% of households covered by FTTH and FTTB (source: EUROSTAT ISOC_CBT)	% households	Broadband coverage in Europe studies for the European Commission by Omdia and Point Topic	2022
2b1 Mobile broadband take-up	Individuals who used the internet on a mobile device	% individuals	Eurostat – European Union survey on the use of ICT in households and by individuals (ISOC_CI_DEV_I [I_IUG_MD])	2021
2b2 Overall 5G coverage	% of populated areas with coverage by at least one 5G mobile network (source: EUROSTAT ISOC_CBT)	% populated areas	Broadband coverage in Europe studies for the European Commission by Omdia and Point Topic	2022
2b3 5G spectrum	The amount of spectrum assigned and ready for 5G use within the so-called 5G pioneer bands.	Assigned spectrum as a	European Commission services, through the Communications Committee (COCOM)	2023

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[4] Please note that indicator's values from both COCOM and Omdia/Point Topic can be slightly revised backwards at the request of the MS's National Regulatory Authorities. For this reason, time series included in previous versions of the DESI may not fully match with the ones reported in DESI 2023.

	These bands are 700 MHz (703-733 MHz and 758-788 MHz), 3.6 GHz (3400-3800 MHz) and 26 GHz (1000 MHz within 24250-27500 MHz). All three spectrum bands have an equal weight[5]	% of total harmonised 5G spectrum	

Under this group of indicators, both fixed and mobile broadband are analysed with indicators measuring the supply and the demand side. Fixed VHCN and 5G coverage measure targets of the Digital Decade Policy Programme.

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[5] Data on 5G spectrum are not published by Eurostat.

1.1.3   Digital transformation of businesses

Table 4 Digital transformation of businesses indicators

Indicator	Description	Unit	Source	Reference year (latest available year with comparable values across the EU)
3a1 SMEs with at least a basic level of digital intensity	The digital intensity score is based on counting how many out of 12 selected technologies are used by enterprises. A basic level requires usage of at least 4 technologies.	% SMEs	Eurostat - European Union survey on ICT usage and e-commerce in Enterprises (ISOC_E_DII [E_DI4_LO + E_DI4_HI + E_DI4_VHI])	2022
3b1 Electronic information sharing	Enterprises who have in use an ERP (enterprise resource planning) software package to share information between different functional areas (e.g. accounting, planning, production, marketing)	% enterprises	Eurostat - European Union survey on ICT usage and e-commerce in Enterprises (ISOC_EB_IIPN2 [E_ERP1])	2021
3b2 Social media	Enterprises using two or more of the following social media: social networks, enterprise's blog or microblog, multimedia content sharing websites, wiki-based knowledge sharing tools. Using social media means that the enterprise has a user profile, an account or a user license depending on the requirements and the type of the social media.	% enterprises	Eurostat – European Union survey on ICT usage and e-commerce in Enterprises (ISOC_CISMT [E_SM1_GE2])	2021
3b3 Big data	Enterprises analysing big data from any data source	% enterprises	Eurostat - European Union survey on ICT usage and e-commerce in Enterprises (ISOC_EB_BD [E_BDA])	2020
3b4 Cloud	Enterprises buying sophisticated or intermediate cloud computing services	% enterprises	Eurostat - European Union survey on ICT usage and e-commerce in enterprises (ISOC_CICCE_USE [E_CC1_SI])	2021
3b5 AI	Enterprises using any AI technology	% enterprises	Eurostat - European Union survey on ICT usage and e-commerce in enterprises (ISOC_EB_AI [E_AI_TANY])	2021

3b6 e-Invoices	Enterprises sending e-invoices, suitable for automated processing	% enterprises	Eurostat - European Union survey on ICT usage and e-commerce in Enterprises (ISOC_EB_ICSN2 [E_INV4S_AP])	2020
3c1 SMEs selling online	SMEs selling online (at least 1% of turnover)[6]	% SMEs	Eurostat – European Union survey on ICT usage and e-commerce in Enterprises (ISOC_EC_ESELS [E_ESELL])	2022
3c2 e-Commerce turnover	SMEs' total turnover from e-commerce[7]	% SME turnover	Eurostat – European Union survey on ICT usage and e-commerce in Enterprises (ISOC_EC_EVALS[E_ETURN])	2022
3c3 Selling online cross-border	SMEs that carried out electronic sales to other EU countries[8]	% SMEs	Eurostat – European Union survey on ICT usage and e-commerce in Enterprises (ISOC_EC_ESELS[E_AESEU])	2021

The Digital transformation of businesses group of indicators is made up of 3 sub-groups: digital intensity, take-up of selected technologies by enterprises and e-commerce. SMEs with at least a basic level of digital intensity, take-up of Big data, Cloud and AI are targets of the Digital Decade Policy Programme.

1.1.4   Digitalisation of public services

Table 5 Digitalisation of public services indicators

Indicator	Description	Unit	Source[9]	Reference year (latest available year with comparable values across the EU)
4a1 e-Government users	Individuals who used the Internet, in the last 12 months, for interaction with public authorities on websites or on mobile applications	% internet users	Eurostat – European Union survey on the use of ICT in households and by individuals (ISOC_CIEGI_AC [I_IGOVANYS])	2022
4a2 Digital public services for citizens	The share of administrative steps that can be done online for major life events (birth of a child, new residence, etc.) for citizens	Score (0 to 100)	e-Government Benchmark 2023	2022
4a3 Digital public services for businesses	The indicator broadly reflects the share of public services needed for starting a business and conducting regular business operations that are	Score (0 to 100)	e-Government Benchmark 2023	2022

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[6] Data for e-commerce refer to the calendar year prior to the survey, e.g. 2022 data refer to 2021 e-commerce.
[7] Data for e-commerce refer to the calendar year prior to the survey, e.g. 2022 data refer to 2021 e-commerce.
[8] Data for e-commerce refer to the calendar year prior to the survey, e.g. 2021 data refer to 2020 e-commerce.
[9] Eurostat dataset code in brackets with indicator filter in squared brackets.

	available online for domestic as well as foreign users. Services provided through a portal receive a higher score, services which provide only information (but have to be completed offline) receive a more limited score.			
4a4 Pre-filled forms	Amount of data that is pre-filled in public service online forms	Score (0 to 100)	e-Government Benchmark 2023	2022
4a5 Transparency of service delivery, design and personal data	The extent to which service processes are transparent, services are designed with user involvement and users can manage their personal data	Score (0 to 100)	e-Government Benchmark 2023	2022
4a6 User support	The extent to which online support, help features, and feedback mechanisms are available incl. cross-border	Score (0 to 100)	e-Government Benchmark 2023	2022
4a7 Mobile friendliness	The extent to which services are provided through a mobile friendly interface, an interface that is responsive to the mobile device	Score (0 to 100)	e-Government Benchmark 2023	2022
4b1 Citizens' online access to electronic health records (short name = Access to e-Health records)	Measured as: (i) the nationwide availability of online access services for citizens to their electronic health records data (via a patient portal, or a patient mobile app) with additional measures in place that enable certain categories of people (e.g. guardians for children, people with disabilities, elderly) to also access their data, and (ii) the percentage of individuals that have the ability to obtain or make use of their own minimum set of health-related data currently stored in public and private electronic health-record (EHR) systems.	Score (0 to 100)	Service contract for the European Commission by: Empirica GmbH and PredictBy	2022

The digitalisation of public services group of indicators describes the demand and supply of e-government as well as e-health. The Digital public services for citizens and businesses and the access to e-health records are indicators assessing targets of the Digital Decade Policy Programme.

1.1.5 Data sources

Most of the data in the DESI 2023 have been collected directly by national authorities, like the National Statistical Institutes coordinated by Eurostat or National Regulatory Authorities. Table 6 presents the data sources and the role of national authorities in data collection and validation.

Table 6 Data sources

Data source	Data collection process
Eurostat	Data collected by National Statistical Authorities and verified by the National Statistical Authorities and Eurostat.
Communications Committee (COCOM)	Data collected and verified by the national regulatory authorities (by data experts appointed by the members of the Communications Committee in every Member State).
Broadband coverage studies	Data collected by IHS Markit, Omdia and Point Topic and verified by the national regulatory authorities (by data experts appointed by the members of the Communications Committee in every Member State).
e-Government benchmark	Data collected by Capgemini and verified by relevant ministries in every Member State.
Study for Digital Decade e-Health Indicators Development	Data collected by Empirica from representatives appointed by the relevant ministries in every Member State.

1.1.6 Data flags

A limited number of data points include explanatory notes (data flags), which can be consulted directly on the website of Eurostat at https://ec.europa.eu/eurostat/web/digital-economy-and-society. In particular, there is break in the series for the ICT specialists and Female ICT specialists indicators.

1.2 Methodological considerations

1.2.1 Indicator requirements

To be included in the DESI dashboard, indicators shall comply with the following requirements:

- *Must be collected on a regular basis*. In order to fulfil the monitoring function, the indicators used in the dashboard must be collected ideally on a yearly basis (or at least with a pre-defined regularity[10]).

- *Must be relevant for a policy area of interest*. All indicators in the dashboard must be accepted as relevant metrics in their specific policy areas.

1.2.2 Data updates and corrections

Updates and corrections are part of the lifecycle and nature of statistical data especially in the digital sector that is a rapidly moving environment. This is the case of several DESI indicators. There can be several reasons for such restatements. For example, it is typical that the values for one indicator

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[10] For the data sources mentioned under 1.1.7, annual data collection exercises are foreseen, except some of the data collected and verified by the national statistical offices or by Eurostat which may collected with a lower frequency.

undergo small amendments and only stabilise completely even long after the indicator was originally computed. Member States can also update their own methodology to collect the data for the indicators on which they report, for example to Eurostat, and revise backward the figures. Such revisions may impact country rankings based on individual indicators.

The present report considers updates that were reported to the European Commission prior to May 15, 2023, for all indicators that had updated data or were new with respect to the DESI 2022 edition[11]. Any changes made after this date are not considered in the current version of DESI. For indicators where no new data was provided by the respective data source in 2023, the values published in DESI 2022 are utilized.

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[11] With the only exception on the indicator Access to e-Health records for which a revision has been transmitted in July 2023.