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ANNEX 2

ANNEX

to the

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

State of the Digital Decade 2024

Annex 2: Update of the EU-level projected trajectories for the digital targets

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1. INTRODUCTION

This Communication accompanies and complements the Commission's second report on the state of the Digital Decade. It updates the 2023 Communication of the Commission establishing the EU-level projected trajectories for the digital targets C (2023) 7500 [1], '2023 Communication on EU-level trajectories') by taking into account the most recent data available for the key performance indicators (KPIs) set out in the Commission Implementing Decision[2], adopted by the Commission on 30 June 2023 ('KPI Implementing Decision').

The availability of new data, collected in 2023, enabled the Commission to update the baseline trajectories, which are projections of the KPI yearly values estimated by extrapolating available historical data.

The baseline trajectories describe the 'business as usual' scenario because, being estimated on the basis of past observed data, they only capture past investments and interventions, both private and public. For each KPI, baseline trajectories are based on the longest, available set of comparable historical data and their starting point (baseline value) is always the most recent data point for that KPI.

The Commission uses baseline trajectories for illustrative purposes to assess and regularly monitor the gap between the estimated trend and the ideal trend for each KPI defined in the 'KPI Implementing Decision'.

The baseline trajectory extrapolates historical trends towards a plausible future while considering solely the impact of all funding instruments, interventions, and investments – both private and public – put in place during and before the period that spans the KPI's time series. For this reason, the 2030 value estimated along the baseline trajectory should be considered the conservative lower bound. The first year and value of the baseline trajectory always coincides with the year and value of the most recent data point available, which in this revision is 2023 for all the KPIs.

This Annex presents the baseline trajectories updated based on the latest observed data and trends. By including most recent data, the EU-level baseline trajectories dynamically capture the actual KPI path towards its 2030 target. In so doing, the baseline trajectories dynamically consider the impact of new investments, including the Recovery and Resilience Facility and cohesion policy funds, on the different KPIs.

The updated baseline trajectories are developed using the same methodology as the one adopted for the 2023 Communication establishing the EU-level projected trajectories for the digital targets.

[1] https://digital-strategy.ec.europa.eu/en/library/communication-establishing-EU-level-projected-trajectories-digital-targets.

[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.

The Digital Decade (DD) trajectories presented in this Annex are instead those established by the ‘2023 Communication on EU-level trajectories. They describe the theoretical path of progression of each KPI value from the last available historical data at the start of the DD monitoring process up to its 2030 target value. However, there are two exceptions: the DD trajectory for the level of digital intensity of businesses and the newly established trajectory for the combined KPI on take-up of cloud computing services or data analytics or artificial intelligence (AI) by enterprises, now available for the first time. These cases will be discussed in the remainder of this document.

Table *1* presents data on the current level and disparity (gap) between the estimated and ideal values of those KPIs for which historical data are available and trajectories are based on mathematical modelling rather than expert's estimations. It includes information on the KPI's value in 2023, and an analysis of progress from 2023 to 2030. Specifically, the table includes: the current value of the KPI (the year of reference is 2023 for all the KPIs); the most recent annual progress rate, computed as the average annual progress between 2023 and the previous observed data point (the compound annual growth rate); the ideal annual progress rate necessary to reach the EU target; the difference between the observed and ideal annual progress rate; the 2023 estimated value along the baseline trajectory, which is the value the EU will reach without new policy interventions and associated investments; the gap between the estimated value along the baseline trajectory and the ideal value along the DD trajectory, measured as percentage of the ideal value, both in 2023 and 2030; and the gap between the estimated value along the baseline trajectory and the ideal one along the DD trajectory, measured as difference between the two, in 2023 and 2030.

The following sections provide a detailed explanation of the revision of the EU-level trajectories using the latest available data points for each KPI.

Table 1: Summary table on state of play, progress, and gap analysis

		Progress analysis until 2030			2023 level gap analysis			2030 level gap analysis			
	2023 value (2024 SDDR)	recent annual average progress CAGR (%)	ideal annual progress from baseline value to 2030 target (%)	progress gap (percentage points)	2023 estimated value along the DD trajectory	2023 value gap (% with respect to ideal value)	2023 value gap (difference)	2030 estimated value along the baseline trajectory	2030 target value	2030 value gap (% with respect to ideal value)	2030 value gap (difference)
AT LEAST BASIC SKILLS (%)	55.6	1.51	4.48	-3.0	59.7	6.9	-4.1	59.8	80.0	25.3	-20.2
ICT SPECIALISTS (million)	9.8	4.47	9.94	-5.5	10.7	8.5	-0.9	12.2	20.0	39.0	-7.8
GIGABIT (%)	78.8	7.36	3.94	3.4	85.2	7.5	-6.4	94.7	100.0	5.3	-5.3
FTTP (%)	64.0	13.50	7.40	6.1	74.8	14.4	-10.8	89.5	100.0	10.5	-10.5
5G (%) *	89.3	9.84	2.60	7.2	N/A			100	100.0	0.0	0.0
SEMICONDUCTORS (% of world production value)	11.0	12.20			N/A			11.7 **	20.0		
EDGE NODES (all values based on estimations)	687	38			1186	42.1	-499		10000		
QUANTUM (number of operational quantum computers or quantum simulators)	0								3		
AI (%)	8.0	2.60	29.00	-26.4	11.7	31.7	-3.7	16.8	75.0	77.7	-58.2
CLOUD (%)	38.9	6.96	9.19	-2.2	47.3	17.8	-8.4	64.4	75.0	14.1	-10.6
DATA ANALYTICS - DA (%)	33.2	N/A	12.35		N/A			50.3	75.0	32.9	-24.7
AI or CLOUD or DA (%)	54.6	N/A	4.64		N/A			72.3	75.0	3.6	-2.7
DIGITAL INTENSITY INDEX - DII ver. III (%)	57.7	2.52	5.65	-3.1	62.7	8.0	-5.0	67.5	90.0	25.0	-22.5
UNICORNS (number) ***	263.0	28.50	9.10	19.4	N/A			> 500	500.0		
DIGITAL PUBLIC SERVICES CITIZENS (score 0-100)	79.4	3.17	3.31	-0.1	87.2	8.9	-7.8	90.9	100.0	9.1	-9.1
DIGITAL PUBLIC SERVICES BUSINESSES (score 0-100)	85.4	2.05	2.25	-0.2	90.8	5.9	-5.4	93.8	100.0	6.2	-6.2
e-HEALTH (0-100)	79.0	9.70	4.20	5.5	75.5	-4.6	3.5	100	100.0		
e-ID	N/A										

* DD trajectory non computed in the 5G case as the 2030 target is estimated to be reached before 2030

** Values are estimated by International Data Corporation. No baseline trajectory available

*** Given the specificity of COVID years (2021 and 2022), the average annual progress for Unicorns is computed comparing 2023 value with 2020 one (number if unicorns in the EU in 2020 = 124)

1.1. EU projected trajectories by digital target

The following subsections describe the construction of the revised EU-level baseline trajectories for each KPI in relation to each target. The KPI and target definitions are aligned with the 'KPI Implementing Decision' and the 'Decision' respectively, more details in the 'DESI 2024 Methodological Note – State of the Digital Decade Report 2024'[3].

[3] https://digital-strategy.ec.europa.eu/en/news-redirect/833329.

The trajectory estimation methodology is aligned with the one in the '2023 Communication on EU-level trajectories' [4].

1.1.1. Basic digital skills

Target: A digitally skilled population and highly skilled digital professionals, with the aim of achieving gender balance, where (a) **at least 80% of those aged 16-74 have at least basic digital skills;** […]

KPI definition (referring to part (a) of the target): At least basic digital skills, measured as percentage of individuals aged between 16 and 74 years old disaggregated by sex with 'basic' or 'above basic' digital skills in each of the following five dimensions: information, communication, problem solving, digital content creation and safety skills. It is measured based on the activities that individuals carried out during the previous 3 months[5]; and gender convergence, measured as the percentage of women and men among those individuals with 'basic' or 'above basic' digital skills.

Source: Eurostat, European Union survey on ICT usage in households and by individuals.

Available data points: 2015, 2016, 2017, 2019, 2021, 2023 (with a break in series in 2021).

2023 data values: 55.6%

Latest developments

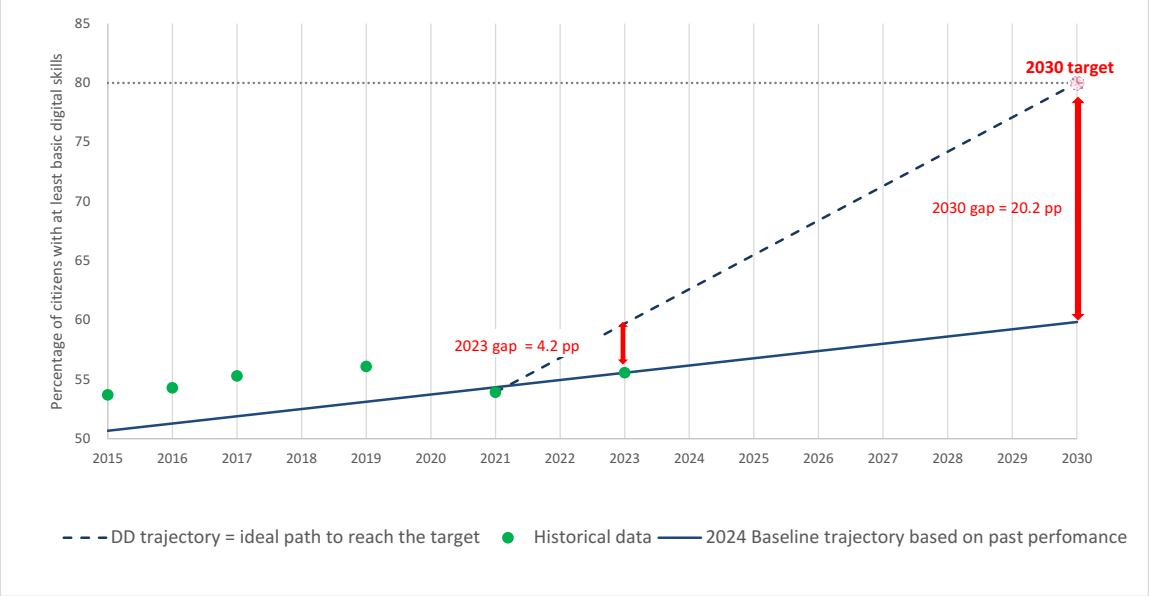
The baseline trajectory is based on the linear functional form. The assumption is that the indicator will follow a linear trend, with a constant growth rate until 2030. Between 2019 and 2021, a revision of the methodology to measure this indicator caused a break in the series. As in the '2023 Communication on EU-level trajectories ', the baseline trajectory is first estimated based on the historical time series until 2019 (included) and then adjusted to correct for the break in series. The adjustment for the break in series consists of computing the regression line's intercept by imposing that the starting value of the baseline trajectory coincides with the latest observed data point.

Figure 1 shows the available historical data, and the Digital Decade and baseline trajectories of the KPI indicator. The recent trend shows that in 2023 the gap between the latest observed value and the ideal one along the Digital Decade trajectory is already at more than 4 percentage points. This indicates that the target will not be met without new policy interventions and associated investments as the 2030 forecast projected along the baseline trajectory is that 59.8% of people aged 16-74 would have at least basic digital skills, falling short by more than 20 points from the target.

[4] The 2023 methodology is based on this study: Joint Research Centre, Methodology to project Digital Decade trajectories towards 2030, https://publications.jrc.ec.europa.eu/repository/handle/JRC133748.

[5] Defined based on the Eurostat methodology reflecting the revised Digital Competence Framework (DIGCOMP 2.0), as also set out in Commission Implementing Regulation (EU) 2022/1399 of 1 August 2022 specifying the technical items of the data set, establishing the technical formats for transmission of information and specifying the arrangements and content of the quality reports on the organisation of a sample survey in the use of information and communication technologies domain for the reference year 2023 in accordance with Regulation (EU) 2019/1700 of the European Parliament and of the Council.

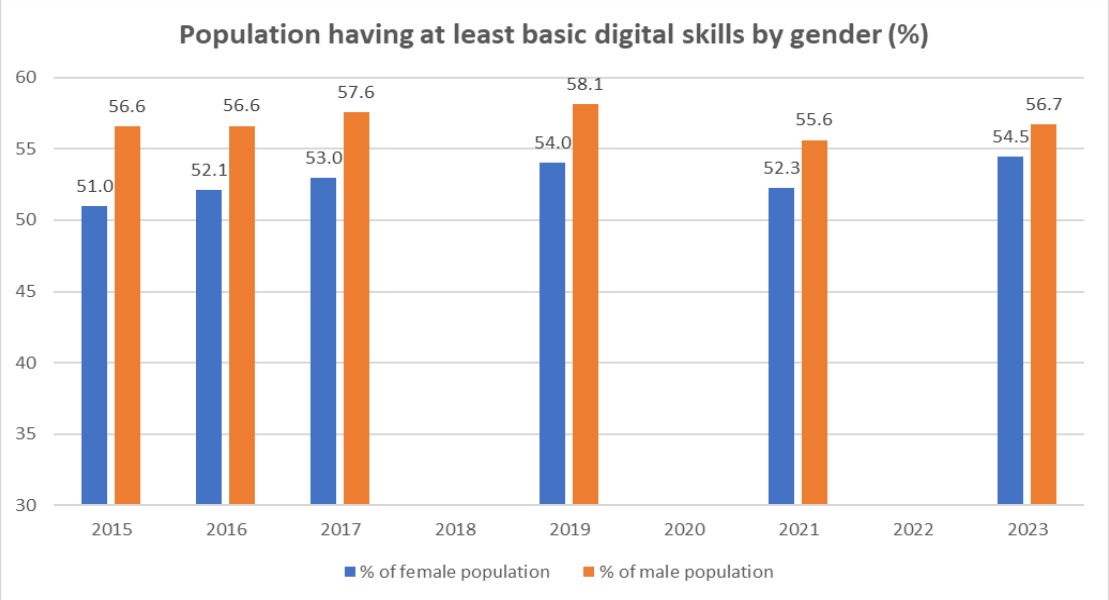
Figure 1: At least basic digital skills in the EU. Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030



In 2023, only 55.6% of EU citizens had at least basic digital skills, up from 53.9% in 2021. In a couple of years, the EU has experienced a mere 1.5% annual progression, far below the necessary average annual growth of over 4.5% over a decade to meet the target. Recent trends underscore the urgent need for significant and immediate efforts to bridge the gap towards the 2030 target on at least basic digital skills.

There is no significant difference between sexes as regards share of people with at least basic digital skills but on average men tend to have better digital skills than women (see Figure 2). The gap between men and women (as a percentage) has been decreasing in recent years, with the difference between men and women having at least basic skills dropping from 5.6 points in 2015 to 2.2 points in 2023.

Figure 2: Percentage of individuals aged 16-74 with at least basic skills in the EU by sex (from 2015 to 2023).



1.1.2. ICT specialists (and gender gap in ICT)

Target (same as previous): A digitally skilled population and highly skilled digital professionals, with the aim of achieving gender balance, where […] (b) **at least 20 million ICT specialists are employed within the Union, while promoting the access of women to this field and increasing the number of ICT graduates.**

KPI definition (referring to part (b) of the target): ICT specialists, measured as the number of individuals aged 15-74 who are employed as ICT specialists; and gender convergence, measured as the percentage of women and men among those individuals employed as ICT specialists. In accordance with the ISCO-08 [6] code classification, ICT specialists are workers who have the ability to develop, operate and maintain ICT systems, and for whom ICT constitutes the main part of their job, including but not limited to ICT service managers, ICT professionals, ICT technicians, ICT installers and servicers.

The gender gap in ICT specialists in employment is computed as the share of female ICT specialists in the total ICT specialists in employment. While the promotion of women's access to this field is mentioned in the target, the Decision does not establish a specific and quantitative target for gender convergence. As a result, this part of the target is not treated as a separate KPI.

Source: Eurostat – Labour Force Survey.

Available data points: from 2011 to 2023.

2023 data values: Total ICT specialists = 9.79 million; share of female ICT specialists = 19.4%.

[6] International Standard Classification of Occupations 2008.

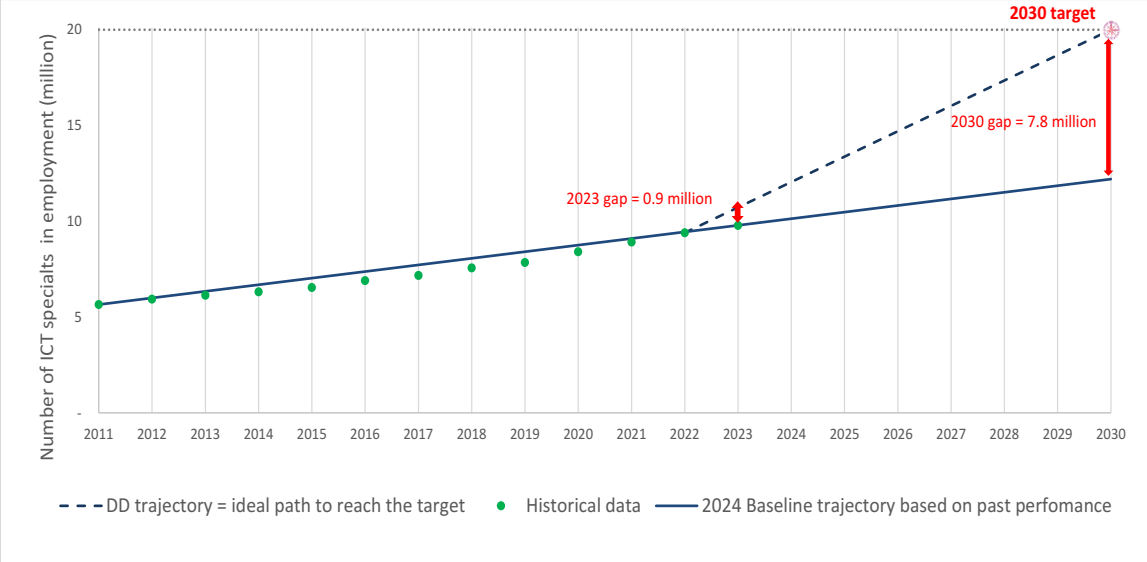
Context, assumptions, model functional form and latest developments

The indicator to monitor this target refers to ICT specialists as 'workers who have the ability to develop, operate and maintain ICT systems, and for whom ICT constitutes the main part of their job [7].'

The Digital Decade trajectory is the same as that published in the '2023 Communication on EU-level trajectories' and is based on a linear functional form, assuming that the KPI follows an increasing trend with a constant rate over the whole period. Figure 3 illustrates the updated baseline trajectory that incorporates the 2023 data point. As anticipated in 2023, the EU remains significantly distant from achieving the target under the 'business as usual' scenario. In 2023, the EU employed just under 10 million ICT specialists, accounting for merely 4.8% of total employment. This already created a shortfall of 900 000 specialists compared to the value predicted in 2023 along the Digital Decade trajectory, with an expected deficit of 7.8 million by 2030 if no further investments are made.

The projected number of ICT specialists by 2030 along the baseline trajectory is 12.2 million, representing approximately 6% of total employment. Over the past year, the number of employed ICT specialists increased by 4.1%, rising from 9.40 to 9.79 million. However, this progress rate falls significantly short of the required annual increase of nearly 10% to achieve the target.

Figure 3: ICT specialists in the EU. Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030

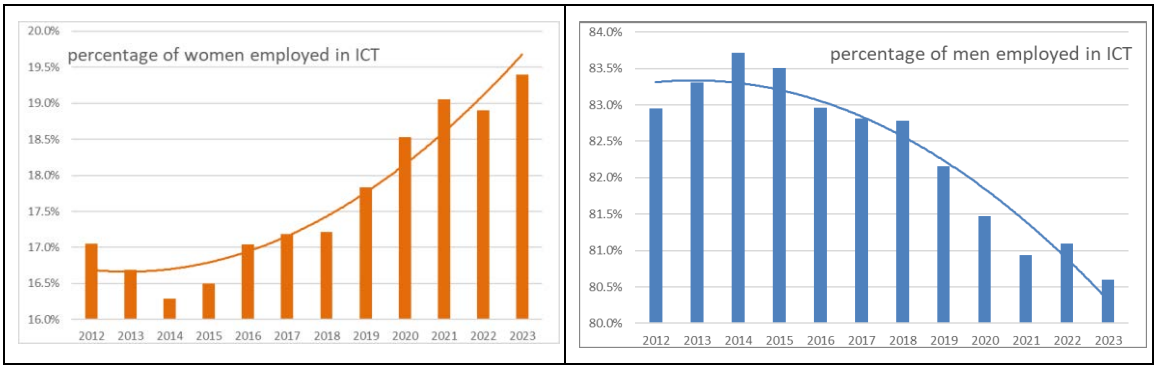


In 2023, 19.4% of the total ICT specialists in employment was made up of women. In the past decade, the percentage of men steadily remained some 60 percentage points above the percentage of women, with the women's percentage between 16.3% and 19.4% and the men's between 80.6% and 83.7% (Figure 4). Despite a small dip between 2013 and 2015, the percentage of women employed as ICT specialists has risen steadily albeit at a slow pace since 2012 (Figure 4, left). By contrast, the percentage of men employed as ICT

[7] Eurostat definition operationalised through the International Standard Classification of Occupations (ISCO).

specialists has decreased since its peak in 2014-2015 but remains significantly higher than the percentage of women in ICT occupations, more than four times higher (Figure 4, right).

Figure 4: Percentage of individuals employed in ICT specialists' occupations in the EU by sex (2012-2023). The solid line shows the time trend since 2012. Left-hand side: percentage of women in total ICT specialists; right-hand side: percentage of men in total ICT specialists. The range of values is different in the two charts.



1.1.3. Connectivity

Target: Secure, resilient, performant and sustainable digital infrastructures where all end users at a fixed location are covered by a gigabit network up to the network termination point, and all populated areas are covered by next-generation wireless high-speed networks with performance at least equivalent to that of 5G, in accordance with the principle of technological neutrality.

KPI definition:

- Gigabit connectivity, measured by the percentage of households covered by fixed Very High-Capacity Networks (VHCN). The technologies considered are those currently able to deliver gigabit connectivity, namely Fibre to the Premises (FTTP) and Cable DOCSIS [8] 3.1. The evolution of the FTTP coverage will also be monitored separately and taken into consideration when interpreting VHCN coverage data.
- 5G coverage, measured as the percentage of populated areas covered by at least one 5G network regardless of the spectrum band used.

Source: Broadband coverage in Europe studies for the European Commission by Omdia and Point Topic [9].

Available data points: Gigabit: from 2013 to 2023; 5G: from 2020 to 2023

2023 data values: VHCN = 78.8% in 2023; 5G coverage = 89.3% in 2023 [10]

[8] Data Over Cable Service Interface Specification.

[9] Broadband coverage in Europe 2023, Omdia and Point Topic for the European Commission: https://digital-strategy.ec.europa.eu/en/news-redirect/833345.

[10] Note that figures are constantly updated and revised by the National Regulatory Agencies even retroactively. This may cause slight changes of past values with respect to those reported in the '2023 Communication on EU-level trajectories'.

Context, assumptions, model functional form and latest trends

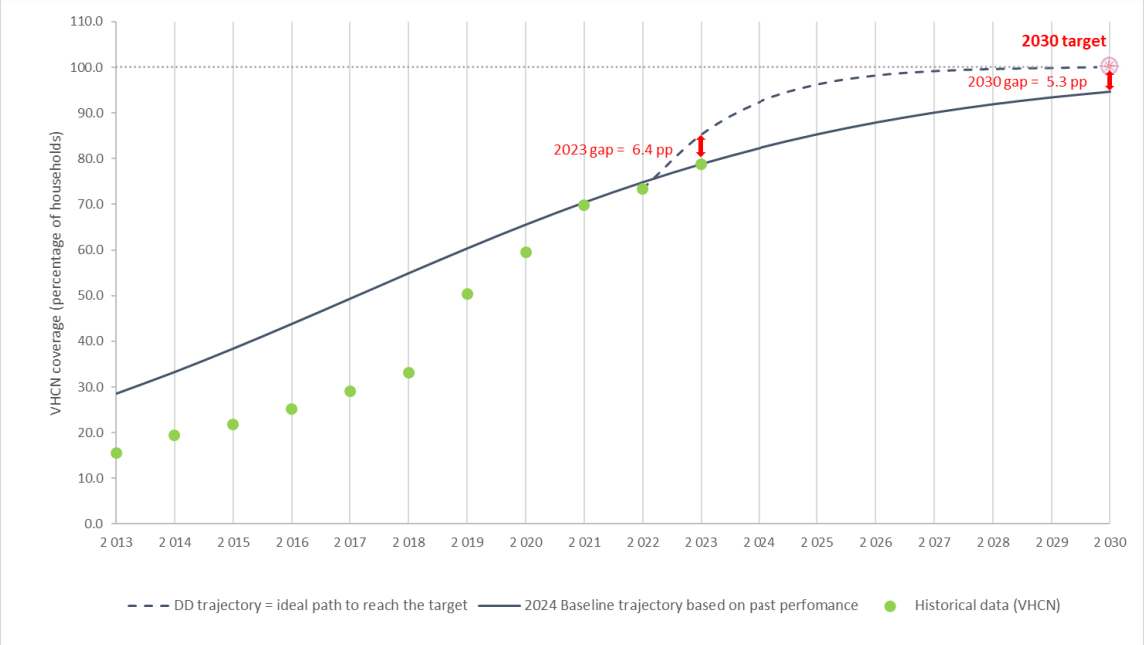
The availability of gigabit connectivity services and 5G mobile coverage are essential enablers of the digital transformation. Household behaviours and the uptake of new technologies such as virtual and augmented reality, AI applications, automated driving, logistics and manufacturing processes will further drive demand.

This target is related to two KPIs:

- Availability to all European households of fixed connections able to deliver very high-speed and reliable connectivity services (measured with the VHCN indicator).
- Availability in all populated areas of a 5G mobile network regardless of the spectrum band used.

Gigabit: The VHCN trajectory is the reference one for tracking the gigabit target. Based on the 'KPI Implementing Decision', the VHCN trajectory is complemented by the FTTP one. In line with the '2023 Communication on EU-level trajectories', the S-shaped trend is adopted for this KPI for both the Digital Decade and the baseline trajectory (Figure 5), with the speed of diffusion of the VHCN baseline trajectory based on the FTTP historical data. Figure 5 shows the Digital Decade and the revised baseline trajectory for the fixed VHCN indicator.

Figure 5: Fixed VHCN coverage in the EU. Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030

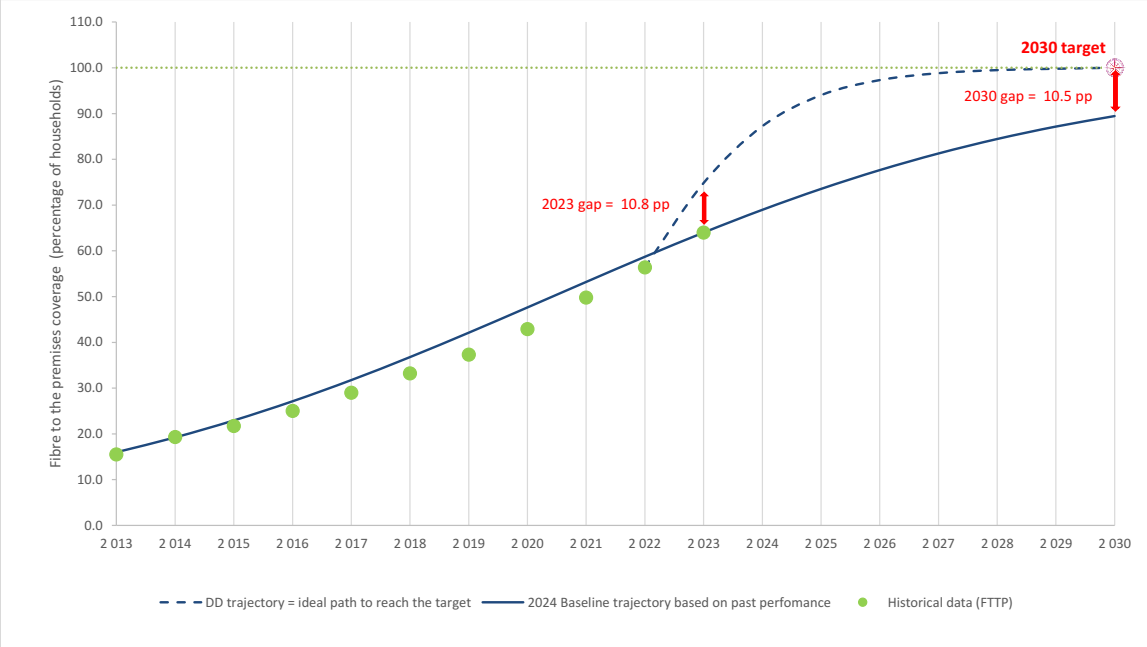


Based on the current VHCN definition and available data, fixed VHCN having the capability of offering gigabit connectivity covered 78.8% of EU households in 2023, up from 73.4% a year earlier, and is expected to reach 94.7% by the end of the projection period. The gap with respect to the ideal, Digital Decade trajectory amounts to 6.4 percentage points in 2023 and is forecast to slightly decrease to 5.3 points along the 'business as usual' scenario by 2030 if no additional investments are made (94.7% is the 2030 forecast projected along the baseline trajectory). Since 2022, the percentage of

households reached by fixed VHCN has increased by 7.4%. The recent development of this KPI has been driven by the deployment of optical fibre networks (FTTP), which covered 64% of EU households in 2023. The remaining 21% of households still not covered by VHCN will be reached mainly through further FTTP deployments, which will require sustained efforts considering that households still not reached by the network are likely to live in the more cost-intensive suburban, semi-rural and rural areas.

To track the progress of FTTP coverage, as outlined in the 'KPI Implementing Decision', and to better interpret VHCN coverage data, an EU-level trajectory is also established and monitored for this indicator (Figure 6). Fibre covered 64.0% of EU households in 2023 and is expected to reach 89.5% by the end of the projection period along the 'business as usual' scenario. In one year, the percentage of households reached by fibre increased by 13.5%, from 56.4% in 2022 to 64% in 2023. The gap with respect to the ideal, Digital Decade trajectory was 10.8 percentage points in 2023 and is forecast to remain substantially stable by 2030 if no additional investments are made.

Figure 6: FTTP coverage in the EU. Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030



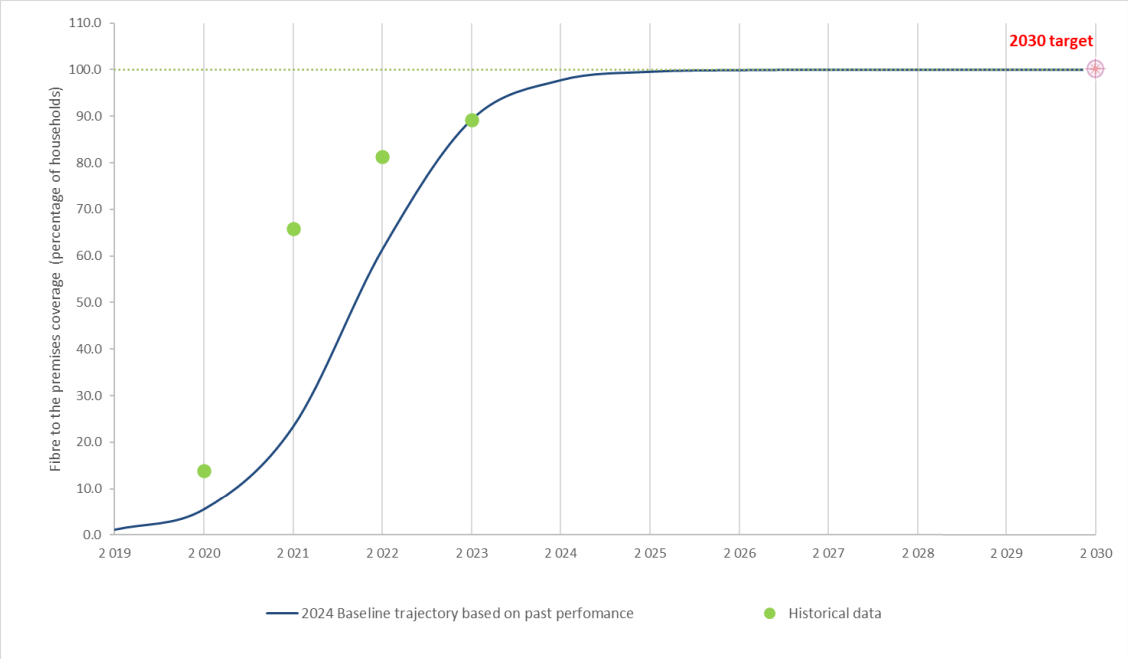
Overall 5G coverage: The mobile network connectivity target set out in Article 4(1), point (2)(a) of the Decision aims to ensure that all populated areas are covered by a next-generation wireless high-speed network with at least 5G equivalent performance in accordance with the principle of technology neutrality. The corresponding KPI included in the 'KPI Implementing Decision' measures the percentage of populated areas covered by at least one 5G network regardless of the spectrum band used (overall 5G coverage).

Based on the available data, 5G coverage progressed rapidly in the EU, reaching 89.3% in 2023, with four Member States reaching 100% and a few others being very close to it. The forecast along the revised baseline trajectory predicts that by 2025, close to 100% of populated areas in the EU will be covered by 5G networks overall. Since 2022, the 5G

coverage has increased by almost 10% at the EU level (9.84%), growing from 81.3 to 89.3. No Digital Decade trajectory is displayed in Figure 7.

However, it should be noted that the current KPI for the 5G target has methodological limits, as it does not take into account the quality of service provided under peak time conditions. In October 2023, the Commission proposed an update to the DD KPIs to members of the Digital Decade Group focusing specifically on connectivity and 5G. The update involves a two-stage approach. The first stage concentrates on the short term, to be used for the 2024 State of the Digital Decade report, and maintains the existing 5G indicator, which is based on population coverage across all available bands. The second stage, currently underway, entails the development of a methodology to map Quality of Service (QoS) coverage for wireless fixed and mobile broadband services, with a particular emphasis on 5G. This methodology draws from the Guidelines on Geographical surveys of network deployments by the Body of European Regulators for Electronic Communications (BEREC), as outlined in Article 22 of the European Electronic Communications Code, and the Mapping Annex of the EU Guidelines on State aid for Broadband. The overarching objective is to close any remaining gap and achieve a common and fully harmonised approach applicable to both policy (the Digital Decade Policy Programme), regulatory (the European Electronic Communications Code), and State aid contexts. This initiative aims to assist Member States in overcoming potential barriers faced by data collectors. The development of the methodology is expected to be concluded by the end of 2024 and will involve consultations with all the relevant authorities, as well as with representatives from the telecommunication industry.

Figure 7: Overall 5G roll-out in the EU, historical data and revised baseline trajectory towards 2030



1.1.4. Semiconductors

Target: Secure, resilient, performant and sustainable digital infrastructures where the production, in accordance with Union law on environmental sustainability, of cutting-edge semiconductors in the Union is at least 20% of world production in value.

KPI definition: Semiconductors, measured as value generated, in terms of revenues, by semiconductor activities in the Union, in all stages of the value chain, with respect to the global market value. For the first year, reporting will be done on the basis of those activities in Europe.

Source: Study in progress by the International Data Corporation.

Available data points: from 2019 to 2022

2023 data value (estimate): 11% of the global market share by value

Semiconductors are at the centre of strong geostrategic interests and the global technology race. They are essential building blocks of digital and digitised products. From smartphones and cars through to critical applications and infrastructure for healthcare, energy, defence, communications and industrial automation, chips are central to the modern digital economy.

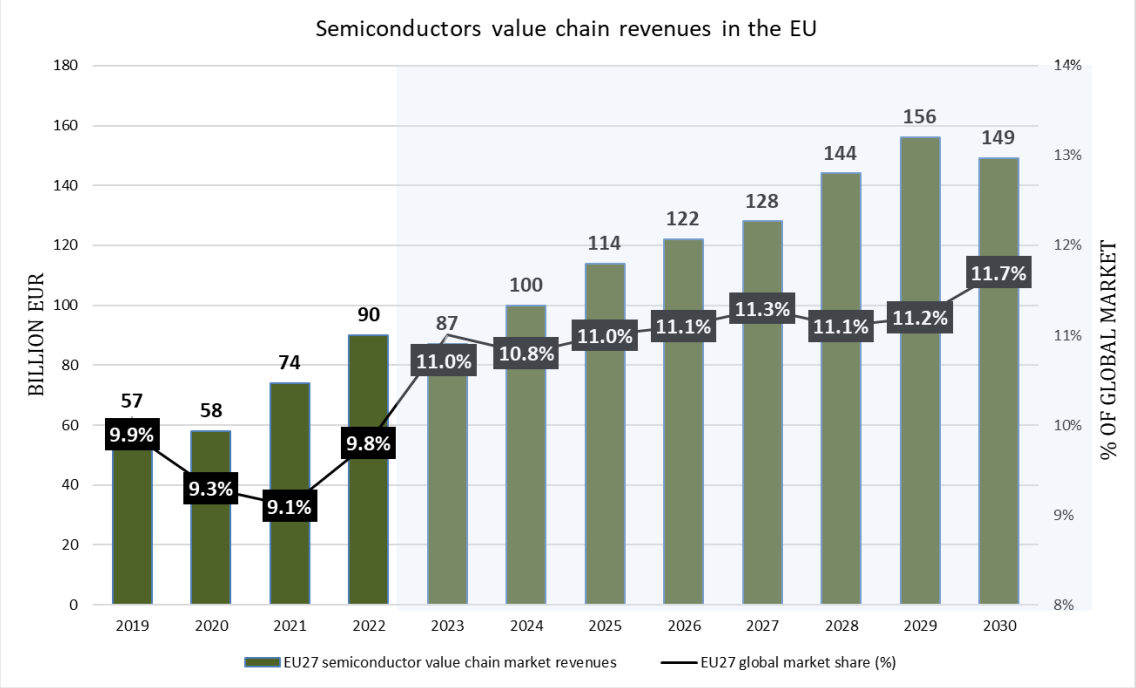
The Digital Decade sets the target that the EU's market share for cutting-edge semiconductors should reach 20% of the global revenue by 2030.

Figure 8 shows the historical observed values from 2019 to 2022 and the forecast values from 2023 up to 2030, provided by the IDC's study [11]. Green bars indicate the EU semiconductor value chain revenue, and the black line indicates the relevant share versus the global market. The EU27 semiconductor value chain market share in 2022 was EUR 90 billion or 9.8% of global value chain revenues. From 2022 to 2023, revenues in the EU declined by 3% (from 90 to 87 billion euros), while global revenues fell by 14% (from 918 to 791 billion euros). This indicates that the EU market demonstrated relatively greater resilience.

The IDC estimates that the EU share will grow to 11.7% in 2030. The IDC considers the effect of existing policy interventions and investments, such as the investments triggered by the European Chips Act. However, their estimates are still subject to uncertainty in an evolving context of geopolitical and market context. Moreover, at this stage, cutting-edge semiconductors within the meaning of the relevant Digital Decade target are still not available on the market and significant investments are planned in the EU which will boost the manufacturing capability in Europe in the coming few years. Further data and analysis are therefore needed to estimate the EU trajectory.

[11] Observed and estimated values are provided at the EU global level only.

Figure 8: EU semiconductor value chain revenue and share versus the global market. Values are estimated as of 2023 (source International Data Corporation)



As the digital transition accelerates, worldwide demand for chips will grow rapidly and is expected to exceed USD 1 trillion by 2030, essentially doubling its value over this decade. This means that the EU's revenues in semiconductors should quadruple by 2030.

Thanks to the European Chips Act and the new relevant investments within the EU such as the Important Projects of Common European Interest, the EU aims to reach its target of doubling its current global market share to 20% in 2030.

1.1.5. Edge nodes

Target: Secure, resilient, performant and sustainable digital infrastructures where at least 10 000 climate-neutral highly secure edge nodes are deployed in the Union, distributed in a way that guarantees access to data services with low latency (i.e., a few milliseconds) wherever businesses are located.

KPI definition: Edge nodes, measured as the number of compute nodes providing latencies below 20 milliseconds; such as an individual server or other set of connected computing resources, operated as part of an edge computing infrastructure, typically residing within an edge data centre operating at the infrastructure edge, and therefore physically closer to its intended users than a cloud node in a centralised data centre.

Source: Edge Observatory[12]

No available data points

2023 data value (estimate): 1186 in 2023.

[12] https://digital-strategy.ec.europa.eu/en/policies/edge-observatory.

Context, assumptions, model functional form and latest trends

Edge computing enables the supply of data processing services from decentralised compute nodes and infrastructures at the network's edge, minimising the transmission of unnecessary data over the network and improving cloud computing's overall performance. The deployment of edge nodes supports the development of low-latency data processing services. When combined with a variety of technologies such as AI, machine learning, 5G deployment, sensors and the Internet of Things, data, virtual reality and robotics, the deployment of edge nodes has the potential to produce significant benefits to businesses and to support the advancement of the digital transformation of multiple sectors of the economy.

The deployment of highly secure and climate-neutral edge nodes is estimated to evolve into an S-curve of technology and innovation adoption, based on budget allocation and expenditure trends observed by the Edge Observatory for the market for edge IT infrastructure [13].

The Edge Observatory for Digital Decade Monitoring Methodology [14] estimated that the edge node deployment baseline in 2022 was 499 units across the EU [15]. This assessment resulted from projections based on private budget allocation and spending for edge IT infrastructure rather than unit numbers, serving to estimate the deployment of edge nodes in future years. Concretely, the edge nodes baseline estimates are based on IDC assumptions and best knowledge about the potential number of public and private edge facilities in Europe, including existing edge infrastructure, devices and edge nodes that provide local computing and storage resources closer to where the data are generated.

The Edge Observatory for the Digital Decade 2023 Data Report completed its first data-gathering report in the summer of 2023. As part of this process, 300 respondents from European firms with over 50 employees in 10 Member States were interviewed: Czechia, Estonia, France, Germany, Italy, Netherlands, Poland, Romania, Spain, and Sweden, accounting a total of 30 respondents per surveyed Member State. The organisations surveyed comprised a wide range of company typologies, from 14% of organisations with 250 to 499 workers to 5% of companies with more than 1000 employees. The participants represent 37 different economic sectors of the EU economy.

The findings evidenced that edge computing is increasingly an investment area for European organisations. The growing need for edge computing installations has created a substantial market opportunity for technology suppliers, who are increasingly forming partnerships and alliances to deliver solutions. This is particularly the case for Industry 4.0[16], making the most of the benefits edge offers in smart manufacturing settings.

[13] Edge Observatory for Digital Decade_Monitoring Methodology: https://ec.europa.eu/newsroom/dae/redirection/document/100201.

[14] Edge Observatory for Digital Decade_Monitoring Methodology, https://ec.europa.eu/newsroom/dae/redirection/document/100201.

[15] Please note that this estimate varies from the one published in the 2023 State of Digital Decade Report, which was for 0 nodes in anticipation that forthcoming phases of Edge observatory study will yield the necessary empirical data to inform future projections accurately. The Edge observatory released its findings in November 2023, after the publication of the 2023 State of Digital Decade Report.

[16] McKinsey, What are Industry 4.0, the Fourth Industrial Revolution, and 4IR?, https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are-industry-4-0-the-fourth-industrial-revolution-and-4ir.

In line with this trend, the Netherlands and the Czechia have made significant investments in edge computing cutting-edge technology, devoting 33% and 41% of their respective budgets to edge hardware. Spain, the Netherlands, and Italy are the three countries spending the most on edge software—32%, 37%, and 34% of their total investments, respectively. The noteworthy allocation of financial resources towards edge services in Estonia (71%) and Poland (66%) underscores the importance of services such as administration, maintenance, and support in the setup and functioning of edge nodes. Sweden and Romania offer a complete strategy that gives hardware, software, and services priority when allocating resources. This balanced investment plan shows that successful edge nodes deployment is complex, requiring the coordinated development and integration of all three components.

On edge node deployment, the Edge Observatory's report indicates that, while there is widespread interest in edge computing, the transition from theoretical knowledge to actual implementation is gradual and country specific.

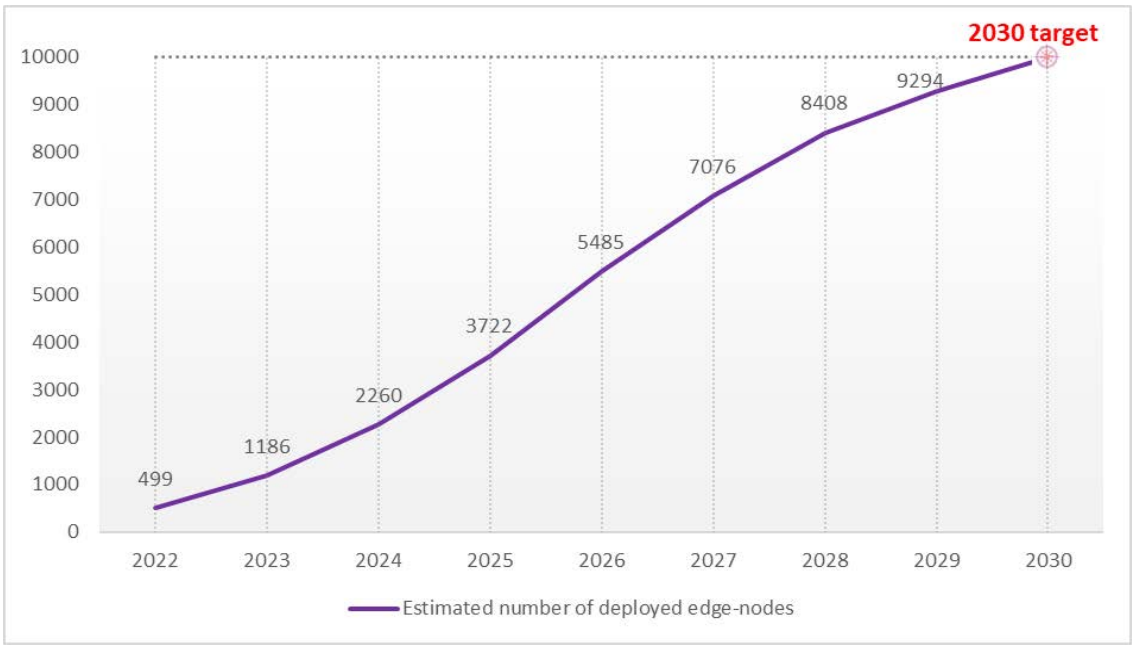
According to the Edge Observatory Data Report analysis, while there is general interest in edge computing, the move from theoretical understanding to practical implementation is gradual and varies by country. Organisations are tentatively exploring edge computing potential benefits through investigations and pilots but are seeking more clarity on business impacts and sustainability before proceeding to widespread deployment. The disparities in engagement levels may reflect regional differences in technological maturity, market readiness, and confidence in the edge computing model integration into existing and future business strategies. Only 12% of businesses have implemented edge deployment in production environments. It is important to note that all the analyses presented relate to the deployment of edge node technology in general and do not account for the nodes' high level of security and climate neutrality, which are specified as part of the Digital Decade target for edge nodes. Regarding these two domains, the Edge Observatory's findings indicate that there is a notable focus across enterprises in the area of data privacy and security, with a total of 67% acknowledging concerns. In contrast, just 5% of the organisations surveyed indicated that sustainability was part of edge node deployment priorities.

Furthermore, the Edge Observatory for the Digital Decade[17] has further refined the trajectory and distribution of edge nodes by Member State taking into account Member State surface area and factoring in several direct and indirect parameters to provide the projected estimation of edge node deployment until 2023. As direct parameters, it includes population, GDP, and Member State total technology spend [18]. In terms of indirect parameters, it considers GDP per capita, population density and the Member State edge propensity. This parameter is the result of the surveys conducted by this study and reflects the propensity of the surveyed industries in the Member State to invest in its own distributed edge computing infrastructures.

[17] Edge Observatory for the Digital Decade, Edge Deployment Data report 1, https://ec.europa.eu/newsroom/dae/redirection/document/100264 .

[18] Total Technology Spend in billion USD (constant annual 2022) originated from the IDC Spending Guide - Worldwide Black Book Live Edition.

Figure 9: Edge node deployment (EU projection to 2030). The edge node trajectory is based on findings of the Edge Observatory study (https://digital-strategy.ec.europa.eu/en/policies/edge-observatory)



The second Edge Deployment Data Report[19] provides an international perspective by comparing the edge deployment status with other geographical areas outside the EU, including the United States, China, Japan, and South Korea, as well as a comparative assessment of their developments in the field of edge computing.

Following this, the edge deployment data monitoring process will continue to track the EU edge deployment progress by collecting data from a further 10 Member States in a continuous process until 2030.

1.1.6. Quantum computing

Target: Secure, resilient, performant and sustainable digital infrastructures where the Union has, by 2025, its first computer with quantum acceleration, paving the way for the Union to be at the cutting edge of quantum capabilities by 2030.

KPI definition: Quantum computing, measured as the number of operational quantum computers or quantum simulators, including accelerators of High Performance Computing supercomputers, deployed and accessible to the user communities.

Source: Quantum Flagship study [20]

Available data points: 2022 and 2023

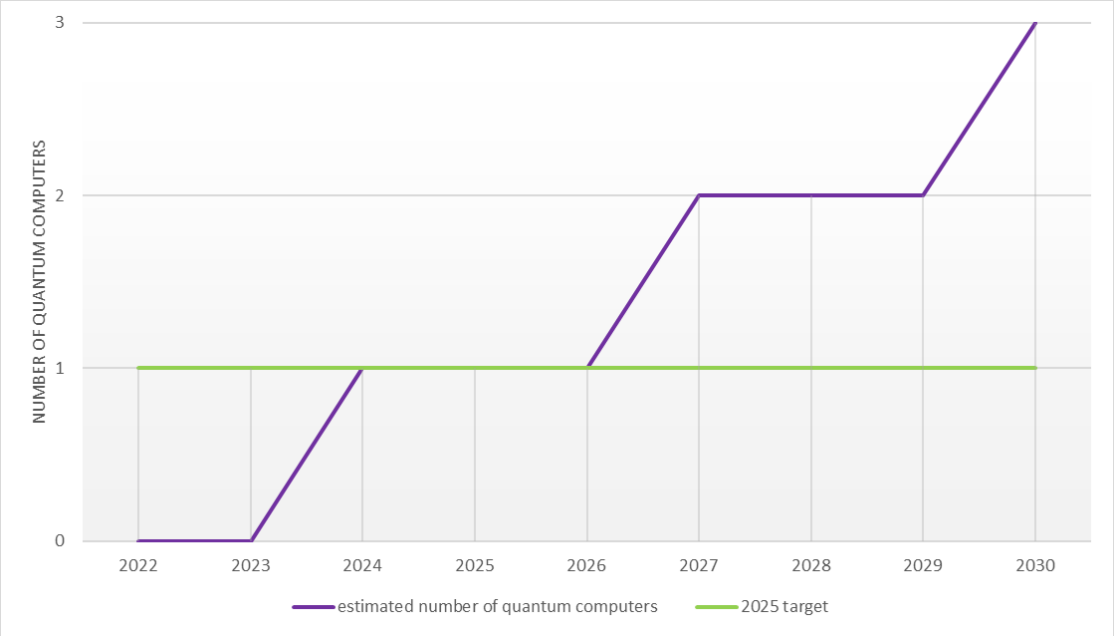
2023 data point: 0

The starting value for this KPI is 0 in 2022 and remained the same in 2023, as the trajectory (Figure 10). It is expected that at least one operational quantum computer will be deployed

[19] https://ec.europa.eu/newsroom/dae/redirection/document/105371.
[20] https://digital-strategy.ec.europa.eu/en/policies/quantum-technologies-flagship.

by 2024, ahead of the target timeline, followed by a second in 2027 and at least three by 2030. Due to the specificity of this target, no baseline trajectory is established.

Figure 10: Number of quantum computers in the EU. Trajectory towards 2030



Note: The quantum computing trajectory is based solely on an assessment by experts (same as in the '2023 Communication on EU-level trajectories').

1.1.7. Take-up of digital technologies

Target: The digital transformation of businesses, where at least 75% of Union enterprises have taken up one or more of the following, in line with their business operations: (i) cloud computing services; (ii) big data; (iii) artificial intelligence.

KPI definition [21]:

(i) Cloud computing, measured as the percentage of enterprises using at least one of the following cloud computing services: finance or accounting software applications, enterprise resource planning (ERP) software applications, customer relationship management (CRM) software applications, security software applications, hosting the enterprise's database(s), and computing platform providing a hosted environment for application development, testing or deployment.

(ii) Big data, measured as the percentage of enterprises analysing big data from any data source (internal or external). As of the 2024 report, big data will be measured by the percentage of enterprises performing data analytics (internally or externally).

[21] Further details on these KPI's definition are set out in the 'KPI Implementing Decision': https://digital-strategy.ec.europa.eu/en/news-redirect/833345.

(iii) Artificial intelligence, measured as the percentage of enterprises using at least one artificial intelligence technology.

Source: Eurostat – European Union survey on ICT usage and e-commerce in enterprises.

Available data points: Cloud: 2014, 2016, 2018, 2020, 2021 and 2023 (break in series in 2021); Data analytics (Big data before 2023): 2016, 2018, 2020 and 2023 (break in series in 2023); AI: 2021 and 2023.

2023 data values: Cloud computing = 38.9%; Data analytics = 33.2%; AI = 8%, AI or Cloud or Data analytics = 54.6%

Latest developments

This target refers to the uptake by EU enterprises of three different digital technologies that play a key role in supporting competitiveness, improving the ability to store, extract and process data, improving services and products or creating new ones. The measurement of the target is supported by four indicators that look at the share of EU enterprises which:

- Use sophisticated or intermediate cloud computing services.
- Use Data analytics, which refers to the use of technologies, techniques or software tools for analysing data to extract patterns, trends and insights to make conclusions, and predictions and ensure better decision-making with the aim of improving performance (e.g., increase production, reduce costs). Data may be extracted from your own enterprise' data source or from external sources (e.g., suppliers, customers, government).
- Use at least one artificial intelligence (AI) technology, such as (1) text mining, (2) speech recognition, (3) natural language generation, (4) image recognition and processing, (5) machine learning (e.g., deep learning) for data analysis, (6) AI based software robotic process automation, (7) autonomous robots, self-driving vehicles, autonomous drones.
- Use Artificial Intelligence or Cloud computing services or Data analytics. This indicator, calculated in 2023, is line with the take-up of digital technologies target.

The corresponding trajectories are described below.

Cloud:

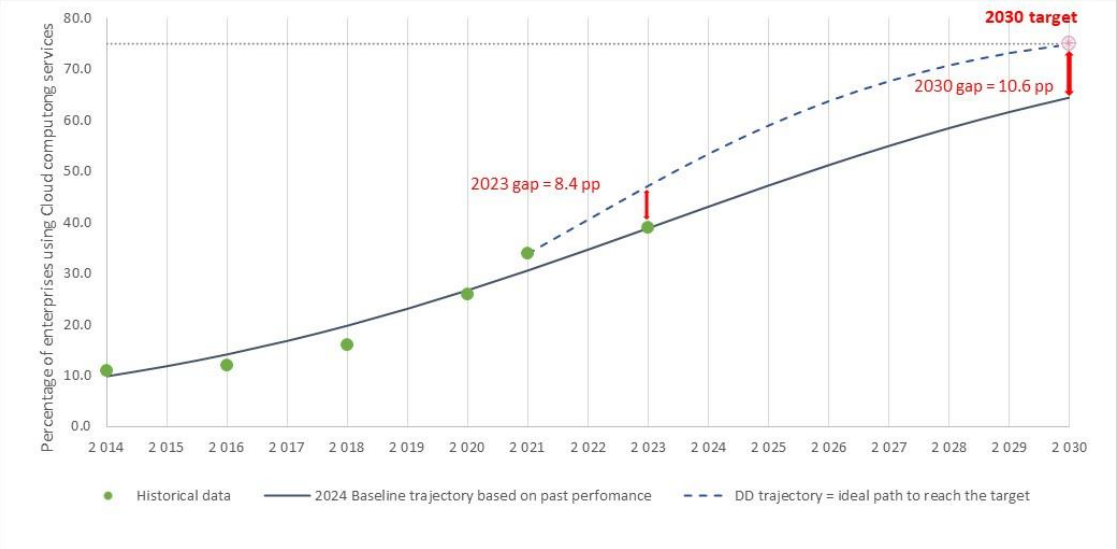
Figure 11 shows the Digital Decade trajectory and the revised baseline trajectory for the percentage of enterprises using sophisticated or intermediate cloud services. In 2023 slightly less than 40% of enterprises used cloud computing services, with a gap of 8.4 percentage points with respect to the ideal, Digital Decade trajectory. This gap is forecast to slightly increase to more than 10 points along the 'business as usual' scenario by 2030 if no additional investments are implemented (64.4% is the 2030 forecast projected along the baseline trajectory).

Since 2021, the percentage of enterprises using cloud computing services progressed by 4.9 percentage points, from 34.0% to 38.9%, corresponding to an annual progress of almost

7%. Such a rate of progress remains slightly below the necessary annual progress of over 9% over a decade to meet the target.

The 2030 forecast projected value along the baseline trajectory is 64.4%.

Figure 11: Percentage of enterprises using cloud services in the EU. Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030 [22]



Data analytics (former Big data):

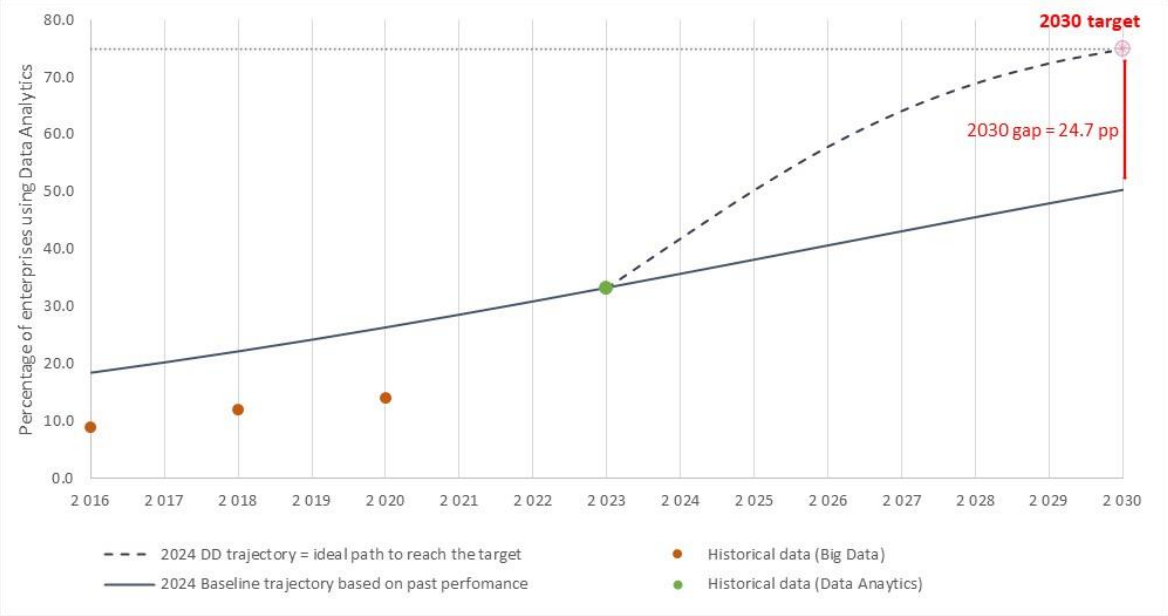
Figure 12 shows the newly established Digital Decade and baseline trajectories for the percentage of enterprises using data analytics. The change in the indicator in 2023, from use of big data to use of data analytics [23], implied that a new digital decade trajectory was established for data analytics with baseline value 33.2% in 2023 (Figure 12). The speed of diffusion of the baseline trajectory is estimated on the basis of the historical data points available for the big data indicator, indicated by the red dots in Figure 12. The timing of diffusion depends on the 2023 baseline value of the data analytics indicator.

The estimated 2030 value in the 'business as usual' scenario the 2030 forecast projected along the baseline trajectory is 50.3%, 25 points below the 2030 target.

[22] Eurostat's indicator 'Enterprises purchasing at least one of the following cloud computing (CC) services: hosting of the enterprise's database, accounting software applications, customer relationship management software, computing power' (code E_CC_GE_ME) is used for the period 2014-2020. A break in series occurred in 2021 when the indicator 'Enterprises buying sophisticated or intermediate CC Services' was used. This indicator includes different CC services: Accounting software (CC_PFACC); ERP software (CC_PERP); CRM software (CC_PCRM); Security software (CC_PSEC); Database hosting (CC_PDB) and Hosting environment for application development (CC_PDEV).

[23] In 2023, Eurostat in cooperation with all the EU National Statistical Institutes replaced the Big Data indicator with the Data Analytics one. Data analytics refers to the use of technologies, techniques or software tools for analysing data to extract patterns, trends and insights to make conclusions, predictions and better decision-making with the aim of improving performance (e.g., increase production, reduce costs). Data may be extracted from your own enterprise' data source or from external sources (e.g., suppliers, customers, government) (source Eurostat). Data Analytics includes a broader set of technologies than the former Big Data.

Figure 12: Share of enterprises using Data analytics in the EU. Historical data, Digital Decade (DD) trajectory and baseline trajectory towards 2030



Artificial intelligence: With only two available data points for AI adoption, the baseline trajectory for AI uses the same speed of diffusion parameter as that estimated for the big data baseline trajectory established in the Communication on EU-level trajectories. As for all the other KPIs, the timing of diffusion is instead computed by imposing that the baseline trajectory starting point coincides with the 2023 observed data point.

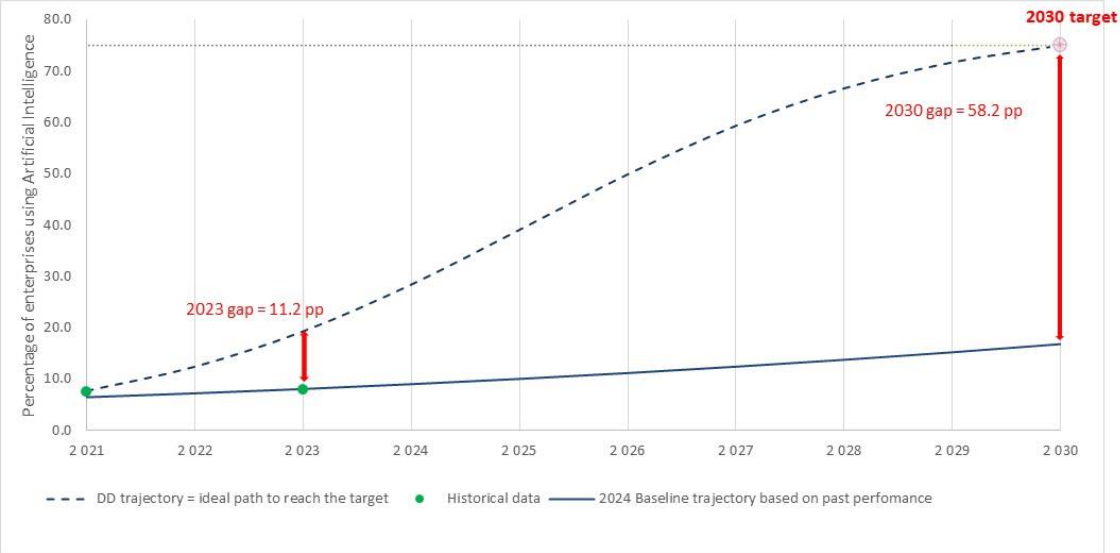
Figure 13 shows the Digital Decade and revised baseline trajectories for the percentage of firms using AI. The percentage of enterprises using AI increased by a mere 0.4 percentage point in 2 years, from 7.6% in 2021[24] to 8.0% in 2023. The gap between the observed and ideal value is above 11 percentage points in 2023 and is estimated to increase to almost 60 points by 2030 in the 'business as usual' scenario. Less than 17% of enterprises are expected to take-up AI by 2030 if no further action is taken (16.8% is the 2030 forecast projected along the baseline trajectory).

From 2021 to 2023, the percentage of enterprises utilising AI saw little change, increasing slightly to 8% in 2023 from 7.6% in 2021 [25]. This corresponds to a modest annual advancement of merely 2.6%. This pace of growth falls significantly short of the nearly 30% annual progress required to reach the 2030 target. The 2030 forecast projected value along the baseline trajectory is 16.8%.

[24] At the end of 2023, Eurostat published a backward revision of the 2021 figures on AI take-up. The EU average was revised as well, from 7.9% before the revision to 7.6% after it.

[25] The most recent figures available on AI take-up by enterprises were collected in 2023 and cannot take into account the possible effect of the innovation package to support Artificial Intelligence startups and SMEs that was launched by the European Commission in January 2024 (https://ec.europa.eu/commission/presscorner/detail/en/ip_24_383).

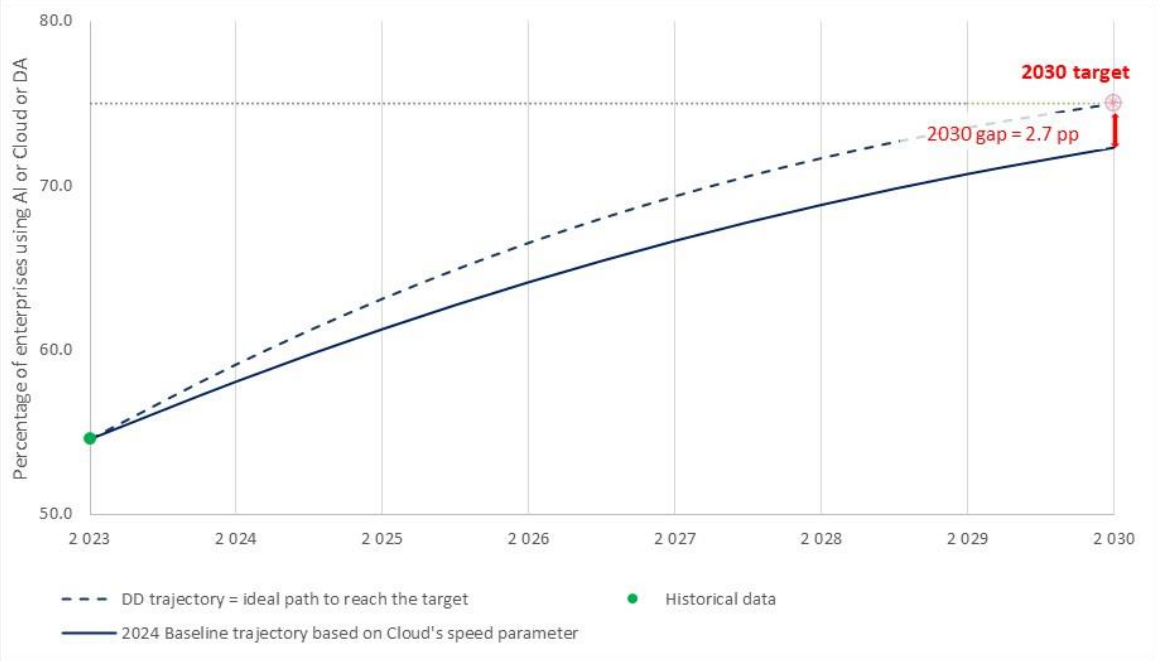
Figure 13: Percentage of enterprises using AI in the EU. Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030 (same speed of diffusion parameter as in the big data baseline trajectory established in the 2023 Communication on EU-level trajectories)



Artificial intelligence or Cloud computing services or Data analytics: In 2023, all three indicators artificial intelligence, cloud computing services or data analytics were collected. It was therefore possible to measure the take-up of the digital technologies target as the percentage of enterprises having taken up one or more of the three technologies. In 2023, 54.6% of enterprises in the EU used at least one of the technologies. By definition, a higher number of enterprises fulfil the requirement of this KPI's definition than in the separate take-up of digital technologies KPIs.

The S-shaped functional form is employed for this KPI as well. In the absence of historical data for this KPI, the speed of diffusion of cloud technology take-up is used here, while the timing of diffusion depends on the 2023 observed value for this KPI. The forecast 2030 value along the 'business as usual' trajectory is 72.3%, not far from the 75% EU target.

Figure 14: Percentage of enterprises using AI or cloud computing or data analytics in the EU. Historical data, Digital Decade (DD) trajectory and baseline trajectory towards 2030 (same speed of diffusion parameter as in cloud baseline trajectory)



Overall, it can be observed that the adoption of digital technologies by enterprises remains uneven. It varies depending on the technology used, with sharp differences among Member States and economic sectors. The use of cloud computing services experienced some progress in recent years, reaching almost 39% of enterprises in the EU in 2023. The uptake of data analytics is also relatively high, at 33.2% in 2023. The uptake of AI technologies remains much more limited, used by only 8% of EU enterprises and stable in the past couple of years.

The new indicator take-up of AI or cloud or data analytics, that was available for the first time in 2023 and reflects the KPI of this target, had a higher value that the indicators referring to the three separate technologies, almost 55%. The lack of historical data does not allow for a precise estimate of the level of progress for the next few years to 2030. Assuming similar progress as for cloud computing, one can deduce that the EU as a whole will not be far from the 2030 target. However, the cloud indicator is the one showing the highest rate of progress in the past while the evolution of data analytics and especially AI is much slower and could also slow down the evolution of the combined indicator (AI or cloud or data analytics).

Reaching the Digital Decade targets will require substantial efforts by Member States through comprehensive and integrated policies aimed at boosting uptake and addressing obstacles that hinder progress (including the lack of specialised skills and technical expertise, obstacles to the use of data). Without additional targeted actions, the uptake of data analytics and AI in particular will fall significantly short of the 2030 targets.

1.1.8. Basic level of digital intensity

Target: The digital transformation of businesses, where more than 90% of the Union SMEs reach at least a basic level of digital intensity [26].

KPI definition: SMEs with at least a basic level of digital intensity, measured as the percentage of SMEs using at least 4 of 12 selected digital technologies.

Source: Eurostat – European Union survey on ICT usage and e-commerce in enterprises (code: ISOC_E_DII [27]. As from 2021, two different versions of this indicator are measured every second year: DII ver. III measured on 2021 and 2023; DII ver. IV measured in 2022. It is aimed to keep the DII ver. III stable from 2026 onwards.

Available data points: from 2015 to 2023. Break in series every year except 2023 and 2021.

2023 data value: 57.7%

Context, assumptions, model functional form and latest developments

'Digital intensity' is an aggregate value based on the number of technologies a business uses, against a scoreboard of various technologies, in line with the Digital Economy and Society Index. This target refers to a wide uptake of digital technologies among the EU's SMEs [28], the businesses that employed almost two thirds of the active population in the EU's non-financial economy in 2020.

Digital Intensity is measured via the Digital Intensity Index (DII), which measures how many of 12 selected technologies are used by firms. A basic level of digital intensity means that an enterprise uses at least 4 of the 12 selected digital technologies.

Every year, the index covers a broad range of technologies, from basic to more sophisticated ones, and aims to measure the level of digitalisation of SMEs in the EU. The 2023 survey included the following 12 technologies and/or criteria (source Eurostat): '*Enterprises where more than 50% of the persons employed used computers with access to the internet for business purposes; Have ERP software package to share information between different functional areas; The maximum contracted download speed of the fastest fixed line internet connection is at least 30 Mb/s; Enterprises where web sales were more than 1% of the total turnover and B2C web sales more than 10% of the web sales; Data analytics for the enterprise is performed by the enterprise's own employees or by an external provider; Use any social media; Have customer relationship management (CRM) software; Buy sophisticated or intermediate cloud computing services; Use any AI*

[26] As defined in Commission Implementing Regulation (EU) 2021/1190 of 15 July 2021 laying down the technical specifications of data requirements for the topic 'ICT usage and e-commerce' for the reference year 2022, and subsequent implementing regulations pursuant to Regulation (EU) 2019/2152 of the European Parliament and of the Council (Text with EEA relevance), in particular Article 7(1) and Article 17(6).

[27] The KPI is computed as the complement to 100 of the percentage of SMEs with a very low digital intensity index (sub-category E_DI4_VLO).

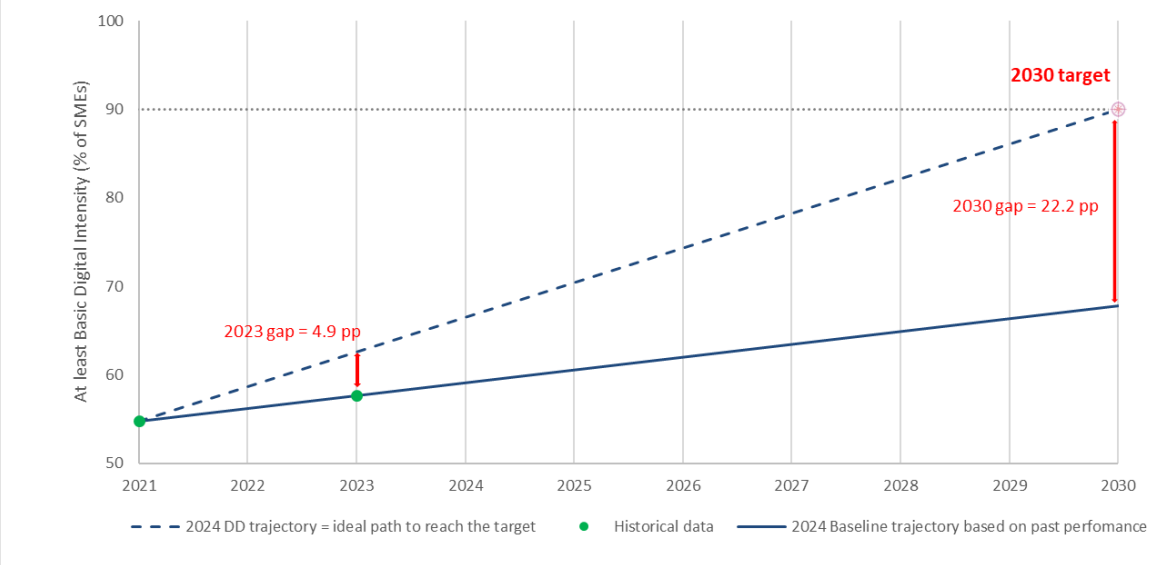
[28] Enterprises having between 10 and 249 number of employees and self-employed persons are considered for the DII estimation (data for micro enterprises missing for almost all the MSs).

technology; Buy cloud computing services used over the internet; Used any computer networks for sales (at least 1%); Use two or more social media [29]*'.*

Having a flexible definition enables the indicator to be adapted to technological change and develop, as skills or technologies that are considered advanced today might become basic in the future.

The availability of two comparable data points, 2021 and 2023, allowed the Commission to estimate a new Digital Decade trajectory with baseline value in 2021 and a baseline trajectory based on DII ver. III.
The Digital Decade trajectory is based on a linear functional form as the assumption is that the KPI will follow an increasing trend from 2021, reaching the target in 2030 (Figure 14).

Figure 15: Digital Intensity Index ver. III. Historical comparable data and the Digital Decade (DD) trajectory towards 2030 based on DII ver III



From 2021 to 2023, the percentage of enterprises with at least basic levels of digital intensity slightly increased to 57.7% from 54.8% in 2021. This corresponds to a modest annual advancement of 2.6%, that is less than half the pace of growth required to reach the 2030 target (5.7% in the decade 2021-2030). The 2030 forecast's value along the baseline trajectory is 67.9%.

1.1.9. Innovative businesses/scale-ups (unicorns)

Target: The digital transformation of businesses, where the Union facilitates the growth of its innovative scale-ups and improves their access to finance, leading to at least doubling the number of unicorns.

KPI definition: Unicorns are measured as the sum of unicorns referred to in Article 2, point (11)(a), of the Decision and those referred to in Article 2, point (11)(b), of that Decision.

[29] The Enterprise survey questions used for the definition of the Digital Intensity Index vary every year but in 2023 most of the technologies are the same as those of the 2021survey. The list used by year is provided by Eurostat.

Source: Dealroom platform[30].

Available data points: from 2008 to 2023.

2023 data value[31]: 263

The 2030 target for this KPI requires a definition of the reference data point. This Communication takes the number of unicorns recorded in 2022 in the EU (249) as the reference point and considers 500 as the 2030 target. Assuming an equally spread effort, the country-level 2030 target should be at least twice the total number of unicorns that were present in the country at the end of 2022 and published in 2023 DESI.

Newly released data shows that fewer unicorns were created in the EU in 2023 than any year since 2017 as valuations soften on start-ups. In 2023 there was a net increase of 14 start-ups with a valuation above USD 1 billion across the whole EU, down 82% from 2021's high-water mark of +79 (Table 2). The valuation boom that characterised COVID times in 2021 and 2022 has clearly come to a halt. The annual rate of progress in 2023 compared to 2022 is 5.6%, from 249 to 263, the lowest recorded since 2009. This slowdown is aligned with the global squeeze in private capital markets experienced throughout 2023 and is confirmed by the most recent quarterly EU data.

Data for Q1-2024 [32] indicates that the increase in unicorns in the EU was relatively low in the first months of 2024, with only 6 new units recorded. This is in line with the growth seen in Q1-2023 (with 4 new unicorns) suggesting that the corner has not yet been turned. It also is in stark contrast with the growth in the corresponding periods of Q1 2021 and Q1 2022 (17 and 19 new unicorns in the EU respectively). In conclusion, the 'birth rate' of unicorns in the EU has significantly declined to pre-COVID levels.

Table 2: Number of unicorns in the EU by year: annual net increase (births-deaths) and relative annual progress since 2009

year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Net yearly increase, number (EU)	3	4	2	3	7	7	11	8	8	21	22	26	79	46	14
Annual progression, % (EU)	150.0%	80.0%	22.2%	27.3%	50.0%	33.3%	39.3%	20.5%	17.0%	38.2%	28.9%	26.5%	63.7%	22.7%	5.6%

The baseline trajectory relies on the historical data of unicorns covering the period 2008-2023. The functional form chosen in this case is the exponential one [33] and fits well with the historical data (Figure 16). In line with the '2023 Communication on EU-level trajectories', no Digital Decade trajectory is shown in this case.

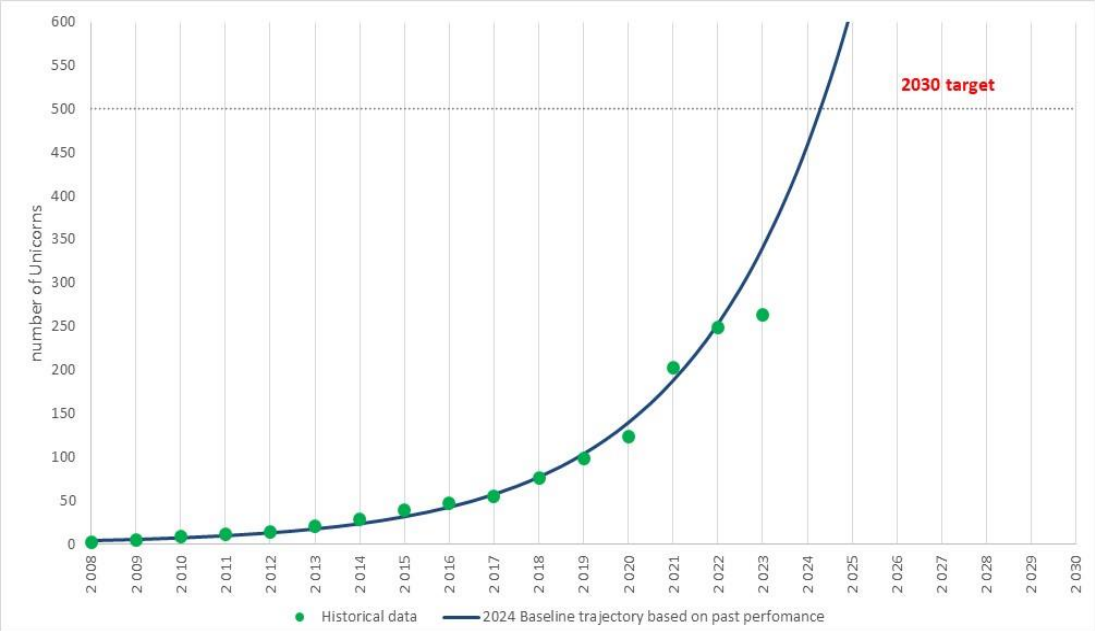
[30] https://dealroom.co/guides/guide-to-unicorns.

[31] The Dealroom platform regularly updates the number of unicorns. The number of unicorns in the EU on 29.01.2024 was 263, as downloaded from Dealroom. The UK is excluded from the statistics.

[32] Dealroom, https://tinyurl.com/EU-unicorns-Q1-2023, last accessed on 05.04.2024.

[33] The functional form is linear in the logarithm of the number of unicorns.

Figure 16: Number of unicorns in the EU. Historical data and baseline trajectory



Despite the clear slow-down in 2023, the exponential trend is still the most appropriate in capturing the historical trend, however, we do note that the most recent data point to a future trend that is more linear than exponential. According to the estimated baseline curve shown in Figure 16, it is expected that 500 unicorns will be reached well before 2030, i.e. by the end of 2025. The scenario excluding COVID years 2021 and 2022 from the estimation lead to very similar results. The effects of the slow-down in the creation of new unicorns both at the EU and global level are likely to be become evident in the next few years.

1.1.10. Digitalisation of public services

Target: The digitalisation of public services, where there is 100% online accessible provision of key public services and, where relevant, it is possible for citizens and businesses in the Union to interact online with public administrations.

KPI definition:

- **Citizens**: Online provision of key public services for citizens, measured as the share of administrative steps that can be done fully online for major life events. The following life events are considered: moving; transport; starting a small claims procedure; family; career; studying; and health.
- **Businesses**: Online provision of key public services for businesses, measured as the share of administrative steps needed to start a business and conduct regular business operations, which can be done fully online.

Source: e-Government benchmark[34].

Available data points: from 2013 to 2023 (break in series as of 2020).

2023 data value: Citizens = 79.4 (score 0-100); Businesses = 85.4 (score 0-100).

Latest developments

The two KPIs used for trajectory estimations are:

- For citizens, the target is monitored via the share of administrative steps that can be carried out online for major life events (moving; transport; starting a small claims procedure; family; career; studying; health) for citizens.
- For businesses, the target is monitored via the share of public services needed for starting a business and for conducting regular business operations that are available online for domestic as well as for foreign users.

The methodology used by the eGovernment benchmark was revised in 2020, leading to a break in the series for both indicators [35]. The availability of three, comparable data points after the break in series, allowed for estimation of the revised baseline trajectories fully on post-break in series data (2021, 2022 and 2023).

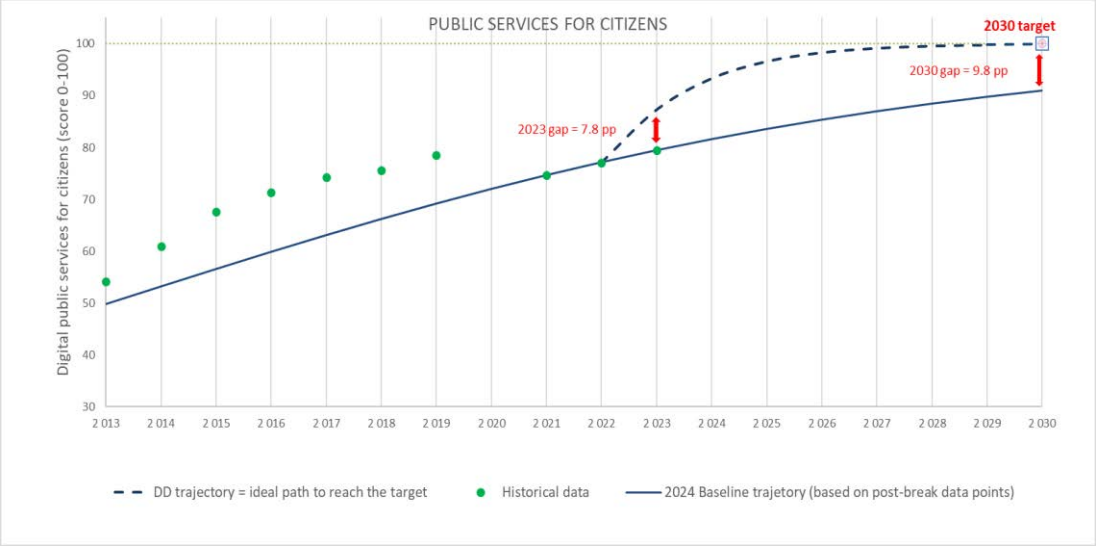
Historical data, the Digital Decade trajectory and the revised baseline trajectory are shown in Figure 17 (a) for the citizen KPI and Figure 17 (b) for the business KPI.

[34] The eGovernment Benchmark Report 2024: https://digital-strategy.ec.europa.eu/en/news-redirect/833346.

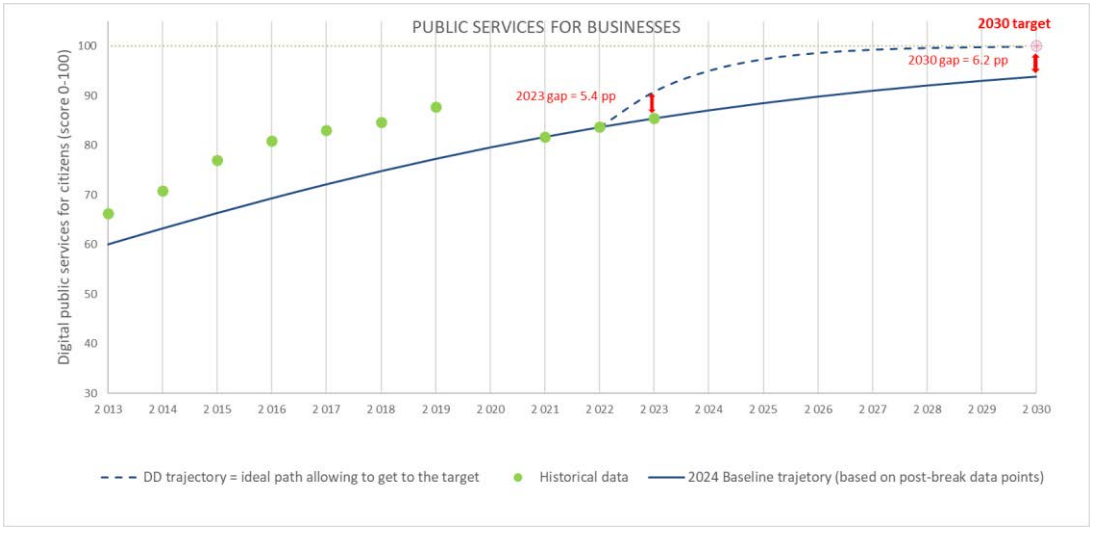
[35] As part of the methodology update, the number of services per life event was reduced and the Transparency of Public Organisations indicator was replaced with the Transparency of Service Design indicator. Full details on the revision and the new method in the eGovernment Benchmark Method Paper 2020-2023.

Figure 17: Online service provision for citizens (top chart) and businesses (bottom chart). Historical data, Digital Decade (DD) trajectory and revised baseline trajectory towards 2030

(a) Share of administrative steps that can be done online for major life events for citizens nationals and foreigners (0 = no steps can be done online; 100 = the whole process can be done online). Historical data, Digital Decade and baseline trajectory



(b) Share of public services needed to start a business and conduct regular business operations that are available online for national and for foreign users (0 = no steps can be done online; 100 = the whole process can be done online). Historical data, Digital Decade and baseline trajectory



The score on the provision of key digital public services to citizens increased in one year by 3.2%, from 77.0/100 to 79.4/100. The recent rate of progress is slightly below the necessary average annual growth of 3.3% over a decade to meet the target assuming a linear trend. In 2023 the gap between the latest observed value and the ideal value along the Digital Decade trajectory is 7.8 points and it is forecast to increase to 9.8 points in 2030. This indicates that the current trend will fall short of the target.

A similar pattern is observed for the provision of key public services for businesses that increased by 2% in one year, from 83.7/100 to 85.4/100. The estimated gaps from the ideal

path in 2023 and 2030 are more limited than in the services for citizens case, respectively at 5.4 and 6.2 percentage points.

It should be noted that these KPIs are both at the upper end of the 'technology deployment' curve, at least at the EU level. This describes a situation where public services websites become more mature and of better quality, while incremental improvements become more and more challenging.

The 2030 forecast projected value along the baseline trajectory is 90.9/100 for the citizen indicator and 93.8/100 for the business indicator.

1.1.11. Electronic health record

Target: The digitalisation of public services, where 100% of Union citizens have access to their electronic health records.

KPI definition: 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.

Source: Capgemini Invent[36]

Available data points: 2022 and 2023

2023 data value: 2023 = 79 (score 0-100)

The conceptual framework of the e-Health indicator is focused on the availability of electronic health data for European citizens and does not measure actual usage of online health data access services. The framework consists of four thematic dimensions, each including indicators that measure key aspects of the availability of online access to electronic health record data. There are 12 indicators in total at country level that describe:

1. the nationwide availability of online access to electronic health data;
2. the categories of accessible health data;
3. the availability of authentication schemes, type of front-end solutions and coverage;
4. accessibility for certain categories of people, like vulnerable groups.

The e-Health indicator is an aggregate measure of the scores of each thematic dimension.

The Digital Decade trajectory is the same as that published in the '2023 Communication on EU-level trajectories' and is based on a linear functional form, assuming that the KPI follows an increasing trend with a constant rate over the whole period. With only two

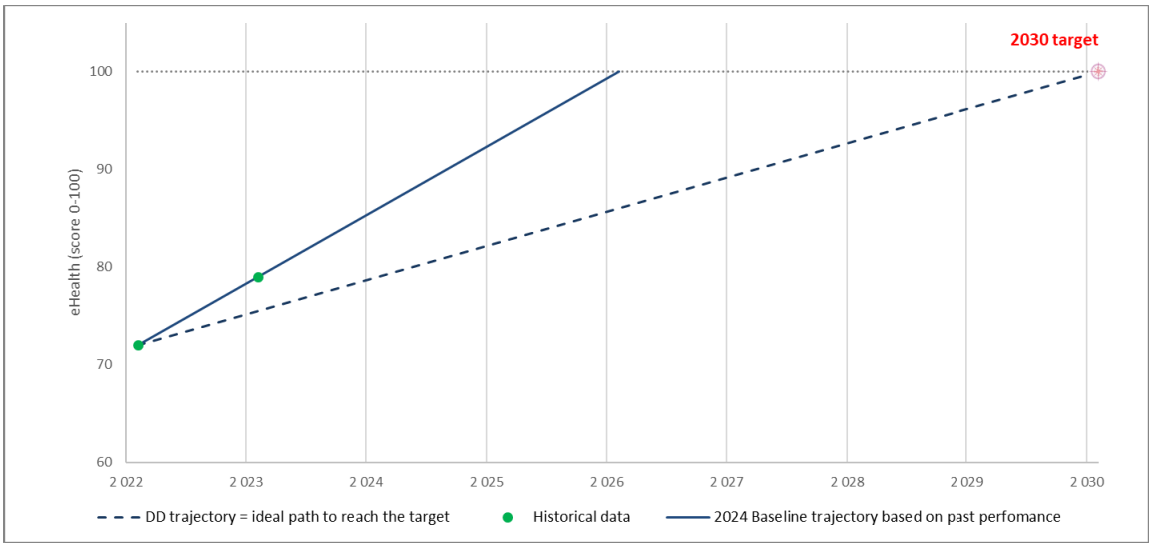
[36] Study 'Digital Decade eHealth Indicator Study': https://digital-strategy.ec.europa.eu/en/news-redirect/833348.

available data points, 2022 and 2023, the baseline trajectory is assumed to be the line passing through these two points (Figure 18).

In 2023, the EU scored 79/100, up from 72/100 in 2022, corresponding to an annual growth rate of 9.7%. At this pace, the 2030 target will be reached in 2026.

However, it is important to acknowledge that the linear functional form might not be the most suitable for predicting the evolution of the eHealth indicator. With the majority of electronic health record systems reaching the maturity phase, it is probable that the curve will plateau. This could be due to factors such as the increasing complexity of providing access to remaining categories of health data, connecting all applicable types of healthcare providers, and ensuring sufficient support for vulnerable groups. Consequently, keeping the pace of the growth recently observed may become challenging. In the future, as more data points become accessible, it is plausible that an S-shaped curve might be adopted.

Figure 18: e-Health composite indicator. Historical data and DD trajectory



1.1.12. Electronic identification (eID)

Target: The digitalisation of public services where 100% of Union citizens have access to secure electronic identification (eID) means that are recognised throughout the Union, enabling them to have full control over identity transactions and shared personal data.

KPI definition: Access to eID is measured by two KPIs: (1) the number of Member States that have notified at least one national eID scheme in accordance with Regulation (EU) No 910/2014; and (2) the number of Member States that have provided access to secure privacy-enhancing eID via the European Digital Identity Wallet in accordance with the Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 910/2014 as regards establishing a framework for a European Digital Identity[37].

Source: The European Digital Identity Framework.

[37] The Digital Identity Regulation - (EU) 2024/1183 - entered into force on 20.05.2024. It amends the previous Regulation (EU) No 910/2014 as regards establishing the European Digital Identity Framework.

2023 data values: 22 out of 27 national eID scheme notified in accordance with Regulation (EU) No 910/2014.

The Digital Decade target on electronic identification provides for 100% of citizens having access to secure, privacy-enhancing eID by 2030.

The target is tracked by two KPIs. The first one is the number of Member States that have notified at least one national eID scheme to the Commission in accordance with Regulation (EU) No 910/2014.

In 2024, notified eIDs are available in 22 EU Member States, being available to slightly more than 93% of the EU population. This figure represents slight progress compared to 2023, when 21 Member States notified their eID schemes. However, the advancement has been remarkable over the last 3 years: in 2021, at the time of adoption of the regulation introducing the European Digital Identity Framework, only 14 Member States had notified an eID scheme, available to almost 60% of the EU population. This figure increased to 18 Member States with notified eID schemes in 2022. The need to make progress in this area had been highlighted by the 2023 State of the Digital Decade Report [38] which invited Member States to notify the eID scheme.

The second KPI uses as a benchmark the proposal enshrined in the new European Digital Identity Framework, revising the existing European electronic identification and trust services initiative (eIDAS Regulation). Proposed in 2021[39], the new framework aims to ensure that by 2030, in line with the target set in the Digital Decade Policy Programme, 100% of EU citizens have access to a secure eID scheme recognised throughout the EU, giving users full control over identity transactions and shared personal data. The new framework includes a personal digital wallet to allow people to prove their identity and share identity-related attributes and electronic documents in a secure and convenient way. The European Digital Identity wallets will enable people to choose which aspects of their identity, data and certificates they share with third parties and keep track of sharing. User control ensures that only information that needs to be shared will be shared. Use of the European Digital Identity Wallet will always be at the choice of the user. The new framework, that entered into force on 20 May 2024, requires EU Member States to provide access to a digital wallet built on common technical standards.

The evolution of this target is conditioned by the implementation of the European Digital Identity Framework by the Member States. The trajectories of this target will be established based on the deadline set by the co-legislators for the provision of the European Digital Identity Wallet by Member States.

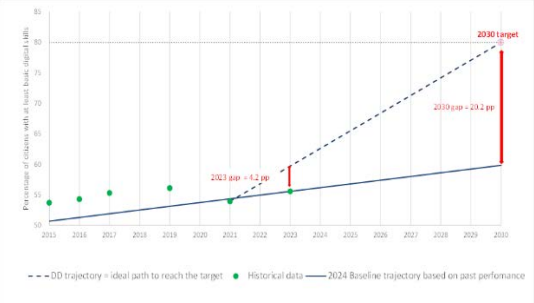
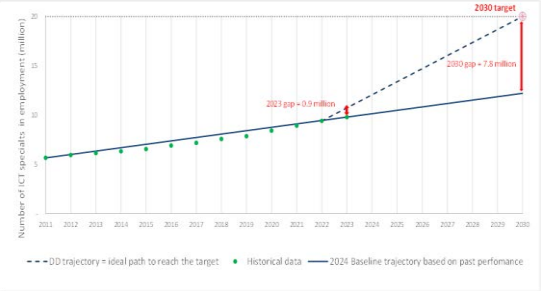
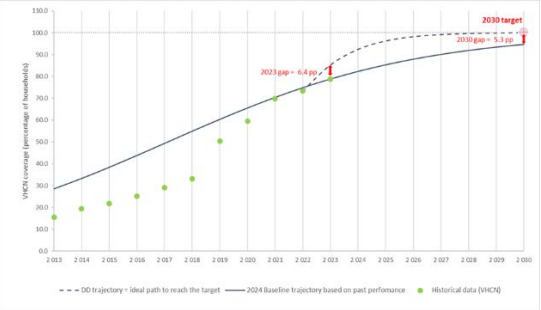
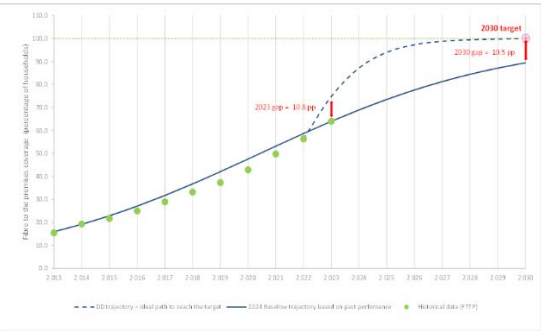
In the context of the review of the digital targets that the Commission should undertake by June 2026 where necessary, pursuant to Article 4(2) of Decision (EU) 2022/2481, the 2030

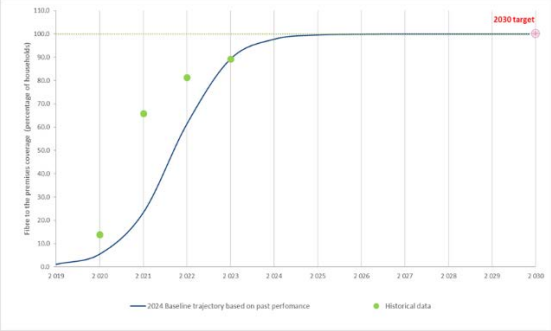
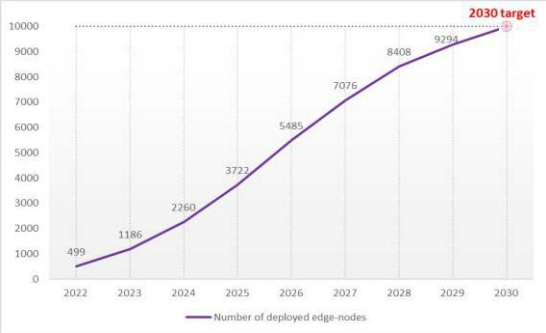
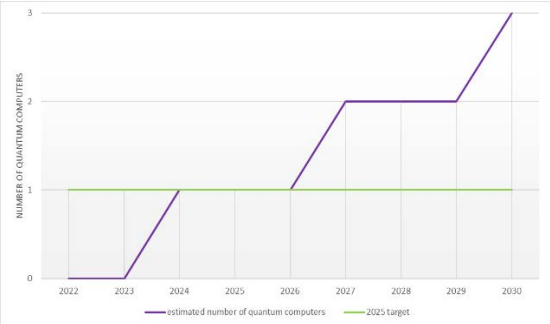
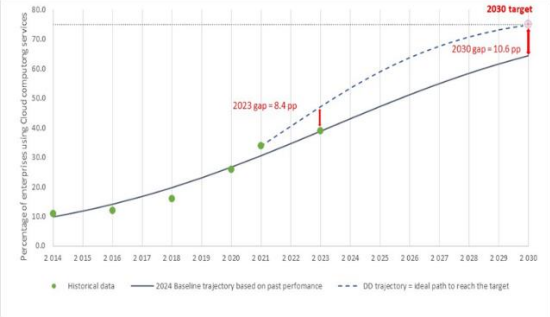
[38] The 2023 Report on the state of the Digital Decade: https://digital-strategy.ec.europa.eu/en/library/2023-report-state-digital-decade.

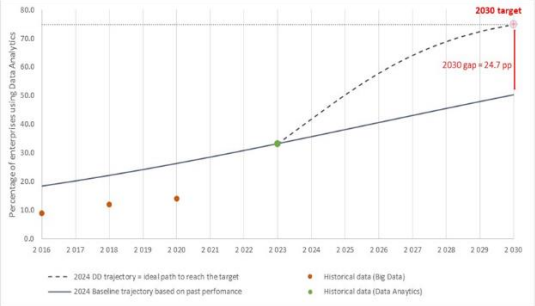
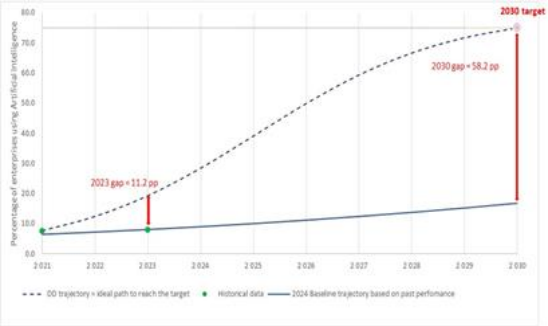
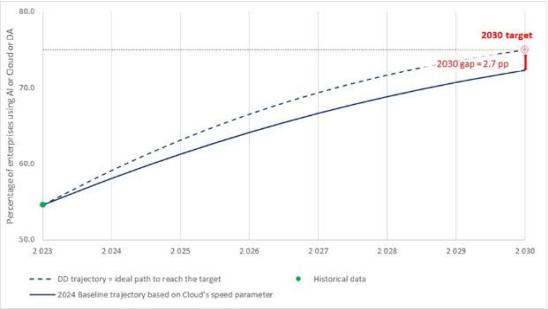
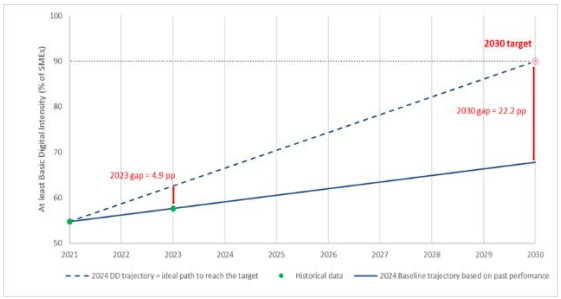
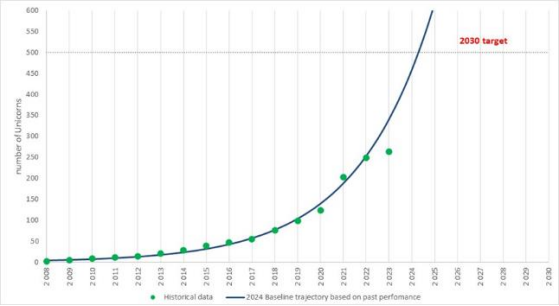
[39] To set up the necessary technical architecture, speed up implementation of the revised regulation, provide guidelines to Member States and avoid fragmentation, the proposal was accompanied by a recommendation for the development of a common EU toolbox defining harmonised technical specifications for the wallet.

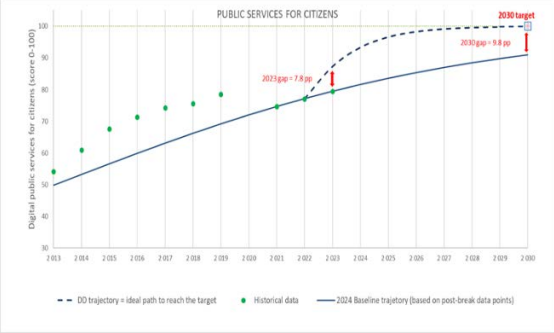
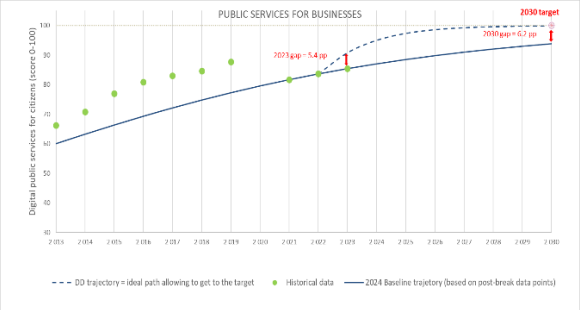
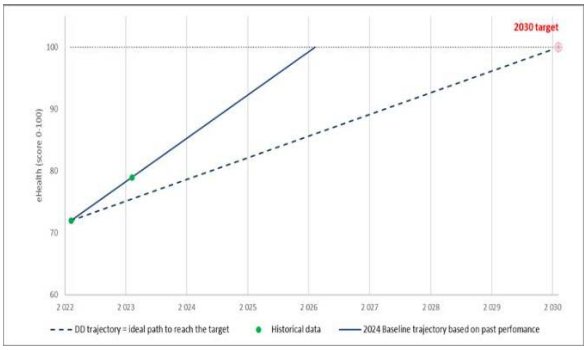
target for access to secure, privacy-enhancing eID may be reviewed taking into account the adoption and implementation stages of the European Digital Identity Framework.

2. ANNEX: BIRD'S EYE VIEW OF THE 2024 TRAJECTORIES OF THE DIGITAL DECADE POLICY PROGRAMME

At least basic digital skills 2023 value: 55.6% 2030 value: • target: 80% • projected: 59.8%	
ICT specialists in employment 2023 value: 9.79 million 2030 value: • target: 20 million • projected: 12.2 million	
Fixed Very High-Capacity Network (gigabit) 2023 value: 78.8% 2030 value: • target: 100% • projected: 94.7%	
Fibre To the Premises (FTTP) 2023 value: 64.0% 2030 value: • target: 100% • projected: 89.5%	

Overall 5G coverage 2023 value: 89.3% 2030 value: • target: 100% • projected: 100%	
Semiconductors 2023 value (estimate): 11% 2030 value: • target: 20% • projected: NA	n/a
Edge nodes 2023 value (estimate): 687 2030 value: • target: 10 000 • projected: n/a	
Number of quantum computers 2023 value: 0 2030 value: • target: 'the cutting edge of quantum capabilities' • projected: 3	
Take-up of cloud computing services by businesses 2023 value: 38.9% 2030 value: • target: 75% • projected: 64.4%	

Take-up of Data Analytics by businesses 2023 value: 33.2% 2030 value: • target: 75% • projected: 50.3%	
Take-up of AI by businesses 2023 value: 8.0% 2030 value: • target: 75% • projected: 16.8%	
Take-up of AI or Cloud computing services or Data Analytics 2023 value: 54.6% 2030 value: • target: 75% • projected: 72.3%	
SMEs with at least basic digital intensity 2023 value: 57.7% 2030 value: • target: 90% • projected: 67.9	
Number of unicorns 2023 value: 263 (number) 2030 value: • target: 500 • projected: >500	

Digitalisation of public services for citizens 2023: 79.4/100 2030 value: • target: 100/100 • projected: 90.9/100	
Digitalisation of public services for businesses 2023: 85.4/100 2030 value: • target: 100/100 • projected: 93.8/100	
e-Health composite indicator on the availability of electronic medical data 2023: 79 (score 0-100) 2030 value: • target: 100/100 • projected: 100	
eID 2023: 22 countries with eID schemes notified **eWallet** The KPI follows the European Digital Identity Framework.	n/a