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08

Special report

EU Artificial intelligence ambition

Stronger governance and increased, more focused investment essential going forward

EUROPEAN
COURT
OF AUDITORS

Contents

Executive summary

I Artificial intelligence (AI) is a technology that comes with a promise to transform economies, boost growth and address societal challenges, but it also carries inherent safety risks and significant potential for economic and societal disruption. The Commission designed the EU's path to become a leader in AI in 2018 in the "Coordinated Plan on the Development and Use of Artificial Intelligence Made in Europe" and its second plan in 2021. The main goal was to develop an AI ecosystem of excellence and trust in the EU. The two AI plans included coordinated measures to be taken by the Commission or member states in order to scale up investment in AI and adapt the regulatory environment.

II The EU's targets for private and public investment in AI were €20 billion in total over the 2018-2020 period and €20 billion per year over the following decade. The Commission committed to increasing EU-funded investment in research and innovation to €1.5 billion in 2018-2020 and €1 billion per year in 2021-2027.

III This audit is the first to assess the effectiveness of the Commission's contribution to the development of the EU's AI ecosystem. We examined the Commission's actions to coordinate the measures of EU AI plans of 2018 and 2021, and to adopt a common legal framework for data sharing and trustworthy AI. We also assessed the implementation of EU-funded infrastructure that facilitates access for small and medium-sized enterprises (SMEs) to innovation in, and uptake of, AI technologies (through the Digital Europe programme), and the implementation of EU funds for research in AI over the 2014-2022 period (through Horizon 2020 and the Horizon Europe programmes). The audit provides insights into the performance of the EU's plans for AI, which could be instrumental in any future debate about their revision or other EU-wide measures supporting AI.

IV We conclude that the Commission and national measures were not effectively coordinated due to the few governance tools available, their partial implementation, and outdated targets. Furthermore, EU AI investment did not keep pace with global leaders. The implementation of infrastructure and capital support for SMEs to embrace AI technologies took time, and so did not yield significant results by the time of the audit. The Commission generally managed to scale up spending from the EU budget for research projects in the AI field, but did not monitor their contribution to the development of an EU AI ecosystem. The Commission's efforts to ensure that research results translated into innovation were partially effective.

V The EU's AI plans were comprehensive when compared with similar AI plans in the US and the UK, and with the recommendations of the Organisation for Economic Co-operation and Development. However, the targets for AI investment were not specific about the expected results. The Commission did not update the investment targets that had been set in 2018. No comprehensive monitoring framework was in place to check the performance of the EU's ecosystem on a regular basis, nor did the AI plans contain any specific performance targets. National involvement was critical in mobilising AI investment. However, it was not clear how the member states would contribute to overall EU investment targets.

VI The EU plans aimed to remove obstacles to trustworthy AI development by means of two key regulatory reforms. Although the legal framework for the single market for data is already in place, it still needs to be implemented in the member states. The creation of a predictable framework for trustworthy AI across the EU has progressed as a result of the general agreement on the AI Act in December 2023. The legislative process was ongoing at the time of the audit.

VII The EU's measures in support of SMEs are at various stages of implementation. Dedicated capital funding schemes initially triggered modest capital support for AI innovators. EU-funded AI infrastructure was slow to get off the ground, and some of the projects launched are not yet fully operational, partly due to late adoption of the Digital Europe programme.

VIII In 2018-2020, the Commission increased spending from the EU budget on AI research in line with targets, but did not significantly boost private co-financing. The Commission did not track or set up a performance monitoring system for AI investment, and had only partial checks in place to ensure that the results of EU-funded AI projects were fully commercialised or otherwise exploited.

IX Based on these findings, we recommend that the Commission should:

- re-assess the EU investment target for AI, and agree with the member states on how they might contribute to it;
- evaluate the need for an EU-funded capital support instrument focused on AI-innovative SMEs;
- ensure that EU-funded AI infrastructure operates in a coordinated way;

- tag research and innovation spending on AI across the EU budget, set out performance targets and indicators, and regularly monitor their progress;
- step up its action to support the exploitation of EU-funded AI research results.

Introduction

Opportunities for the EU to develop and adopt AI technologies

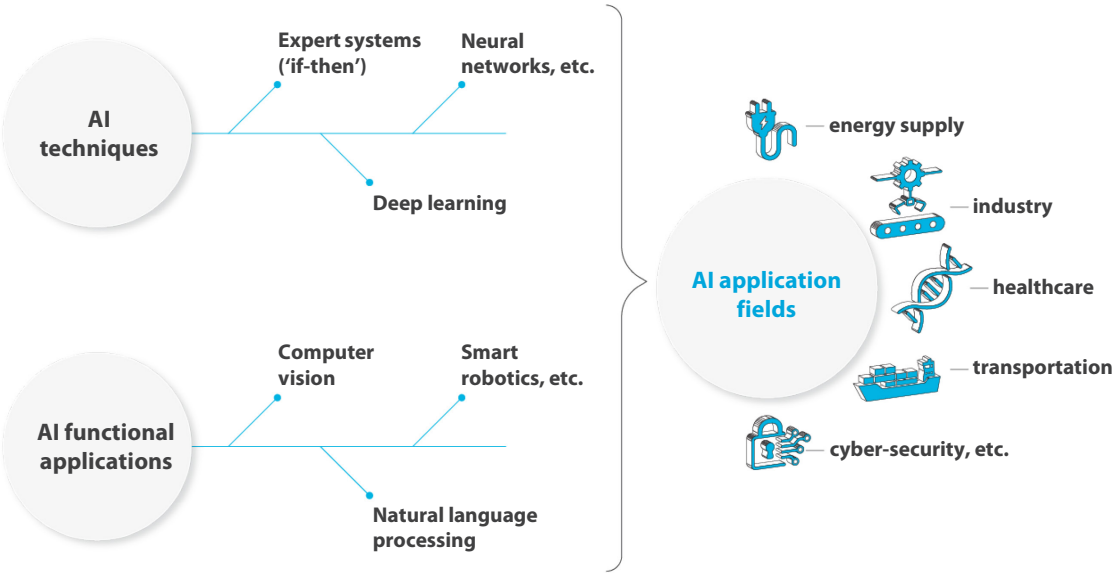
01 While there is no globally established definition of artificial intelligence (AI), the Commission refers to systems that display intelligent behaviours by analysing their environment and taking actions to achieve specific goals, with some degree of autonomy[1]. The term AI encompasses various and evolving technologies that develop synergies with other emerging trends (e.g. in robotics, big data and cloud computing, high-performance computing, photonics, and neuroscience). A major breakthrough was achieved with the development of machine-learning algorithms able not only to learn from large volumes of data by using specialised processors but also to improve their accuracy over time.

02 The global AI market is projected to grow annually by 15.8 % over the 2024-2030 period to $739 (€680) billion in 2030[2]. The adoption of AI technologies by firms and the public sector can lead to productivity gains in the whole value chain (from research to marketing) in various EU economic sectors, and could help to solve societal challenges (see ***Figure 1***). As AI is a breakthrough technology, efficient investment in this area is likely to be a key factor in determining the speed of economic growth in the years to come. Several countries worldwide have set themselves the strategic objective of becoming leaders in the development and deployment of AI.

[1] Artificial Intelligence for Europe, COM(2018) 237.

[2] Artificial Intelligence market size, Statista.com (August 2023).

Figure 1 – AI techniques and applications



Source: ECA, based on World Intellectual Property Organization.

03 Upscaling the EU's research and innovation (R&I) in AI could incentivise the use of such technologies and boost the digital sector. AI investment has the potential to open up new opportunities for EU firms to reach international markets and increase the EU's technological autonomy and competitiveness. AI ecosystems (i.e. systems of interdependencies between public and private players involved in the research, innovation, production and consumption of AI) are key to fostering R&I in this field. The main stakeholders are the AI research community (universities and research centres), public administration (mainly AI users), and large firms and SMEs (AI innovators and users).

04 Public policy makers have an important role in organising the AI ecosystem. The recommendation of the Organisation for Economic Co-operation and Development (OECD) on AI promotes principles for responsible stewardship of trustworthy AI, and identifies five dimensions of public action to encourage AI innovation and uptake:

(1) investing in AI research and development and in open datasets, and encouraging private investment;

(2) fostering a digital ecosystem for AI, including the development of and access to appropriate digital infrastructure and AI knowledge sharing;

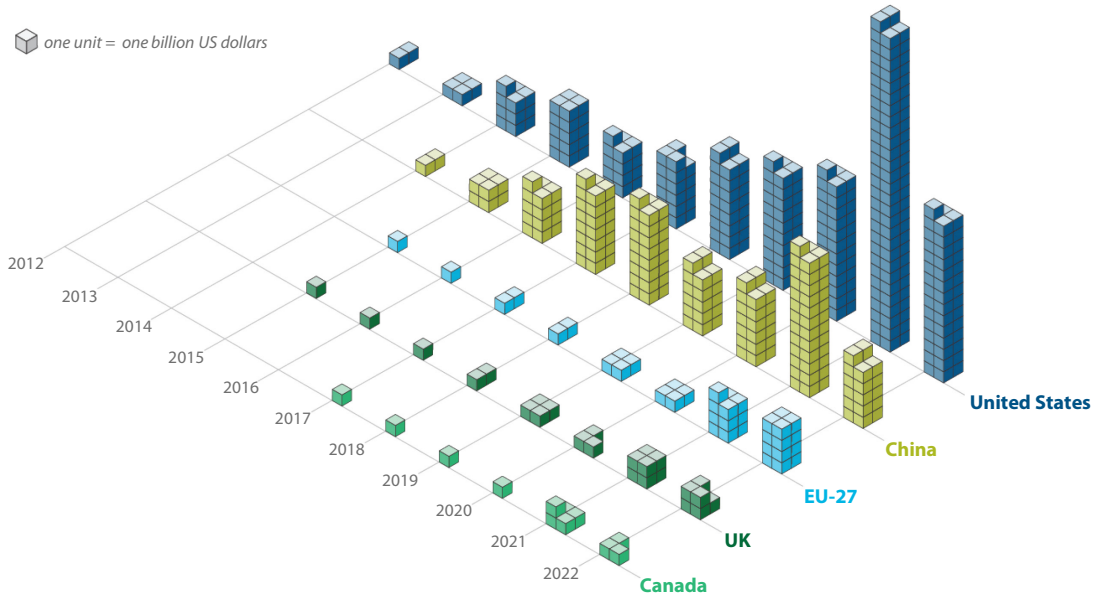
(3) shaping an enabling policy environment that encourages innovation and competition for trustworthy AI and supports the transition from research to deployment;

(4) building human capacity and preparing for labour-market transformation; and

(5) encouraging international cooperation for trustworthy AI.

05 Despite the EU having a strong AI public research community (the highest number of peer-reviewed scientific publications on AI in the world in 2022[3]), it faces challenges in the global race for AI investment. Private investment in AI has been lower than in other AI-leading regions of the world (the US and China) since 2015 (see ***Figure 2***).

Figure 2 – Venture capital investments in AI and data sector by geographic area (billions of dollars)



Source: OECD data (November 2023).

06 Although the EU has strong capacity in research, this is not sufficiently translated into research outputs in the economy and European industry[4]. Despite the global growth of AI patents, in 2021 Europe and Central Asia were responsible for 4 % of worldwide patent applications[5], compared with around 17 % for North America and 62 % for the East Asia and Pacific region.

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[3] OECD data on AI research publications by country.

[4] JRC Report from 2021 on Shaping and securing the EU's Open Strategic Autonomy by 2040 and beyond, page 24.

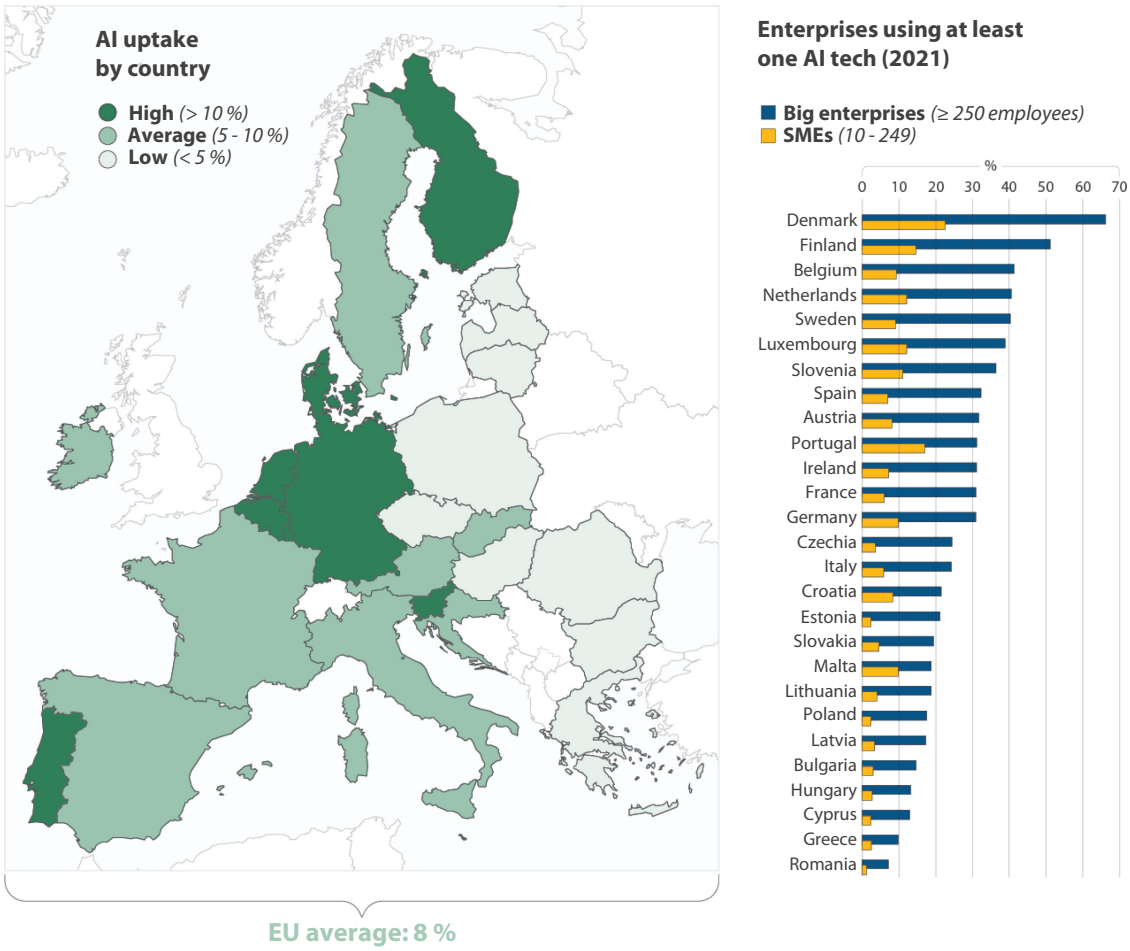
[5] Stanford University AI Index Report 2022, Figure 1.1.22 and 1.1.24a.

07 The US has long been a frontrunner in the AI race, with Silicon Valley serving as a global hub for AI innovation. American tech giants such as Google, Microsoft and IBM are at the forefront of R&I in this field, investing in start-ups and co-financing government research programmes. The US government has also recognised the strategic importance of AI, with initiatives and funding through various federal agencies and three cross-agency AI research plans (adopted in 2016, 2019 and 2023) aimed at maintaining leadership. Government spending on AI hit $3.3 billion in 2022[6]. China drew up an AI development plan in 2017 to invest public funds in AI and become the global leader in AI by 2030. China also relies on private investment by tech giants such as Alibaba, Baidu and Tencent.

08 In 2021, the use of AI technologies by businesses varied between EU countries (see ***Figure 3***). This may indicate their economies' different degrees of dependence on automation, but also the different stages in the development of AI ecosystems. In all member states, SMEs use AI less intensively as they face more challenges in adopting the technology due to financial constraints and limited access to expertise.

[6] Stanford University AI Index Report 2023, Figure 6.3.3.

Figure 3 – Share of businesses using AI in the EU by country (2021)



Source: ECA, based on latest Eurostat data.

Main public actions to build the European AI ecosystem and corresponding roles

09 In the EU, member states have primary responsibility for fostering AI innovation and uptake. In terms of national public financing, the largest investment was announced in the French and German AI strategies. France adopted an AI strategy in 2018 outlining investment of €1.5 billion for 2018-2022, and updated it in 2021 with an additional €1.5 billion for 2022-2025. Germany initially earmarked €3 billion for 2019-2025, and increased the amount by €2 billion in 2020.

10 The EU's competence in the areas of industrial policy, research and technological development and digital skills is to coordinate or support member state action where necessary[7]. The EU also implements a multiannual research programme[8]. The Commission may take any useful initiative to promote such coordination, in particular by establishing guidelines and indicators, organising exchanges of best practice, and preparing the necessary elements for periodic monitoring and evaluation.

11 Following up on the Tallinn Digital Summit (2017), the European Council recognised the need for digital innovation in the EU[9], and so invited the Commission to devise a European approach to artificial intelligence. The Commission proposed an AI strategy in April 2018 that had to be implemented via a plan[10]. The strategy's objective was for the EU to be "ahead of technological developments of AI and ensure they are swiftly taken up across its economy".

12 The Commission adopted a "Coordinated Plan on the Development and Use of Artificial Intelligence Made in Europe" in December 2018[11], whose overall goal was for the EU to become the world-leading region for cutting-edge, ethical and secure AI. The Plan included 60 policy measures to be taken by the Commission, or recommended to member states, regarding AI R&I and uptake. It encouraged all member states to adopt national AI strategies and to coordinate their action through the Commission to maximise the impact at EU level. The Commission adopted a second plan in 2021[12]

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7 Articles 173, 175 and 179-181 of the Treaty on the Functioning of the EU (TFEU).

8 Article 182 TFEU.

9 Conclusions of the European Council meeting of 19 October 2017.

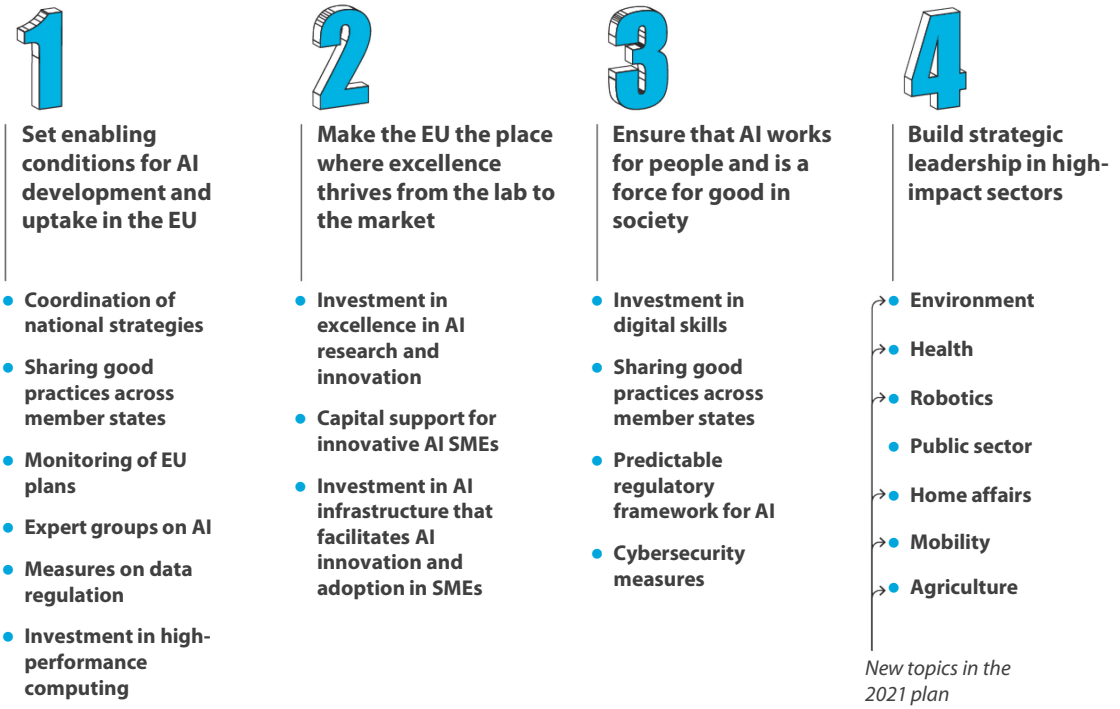
10 Artificial Intelligence for Europe, COM(2018) 237.

11 Coordinated Plan on Artificial Intelligence, COM(2018) 795.

12 Coordinated Plan on Artificial Intelligence, 2021 review, COM(2021) 205.

with new measures grouped around four main objectives and a vision to develop a European AI ecosystem of trust and excellence. The update also announced seven priority sectors for AI investment (see ***Figure 4***, pillar 4).

Figure 4 – Objectives and main topics of the EU's 2021 AI Plan



Source: ECA, based on EU AI plans (2018, 2021).

13 The Digital Decade Policy Programme[13] that was adopted in 2022 further strengthens the coordination of digital transformation and investment in the member states by setting out EU digital targets. The EU has an ambitious target of reaching 75 % of firms using AI by 2030. The EU average was 8 % in 2021 (see ***Figure 3***). Another EU digital target is 500 European unicorns (valued at over $1 billion) by 2030[14]. The growth of AI technology firms can contribute to this target and boost private financing of digital R&I. Member states are required to adopt national roadmaps to ensure that EU digital targets are met.

[13] Decision (EU) 2022/2481 establishing the Digital Decade Policy Programme 2030.

[14] Commission communication on Union-level digital targets, C(2023) 7500.

14 The Commission aimed to support the AI ecosystem financially, mainly through the EU's research and digital programmes (see ***Figure 5***). The Commission directly and indirectly manages these programmes by selecting grant proposals and monitoring the implementation of projects by beneficiaries. In the 2018 Plan, the Commission envisaged allocating €2.5 billion to AI R&I in 2014-2020 (€1.5 billion in 2018-2020) from the Horizon 2020 research programme[15]. The 2021 Plan aimed to allocate €7 billion to AI in 2021-2027 via the following programmes:

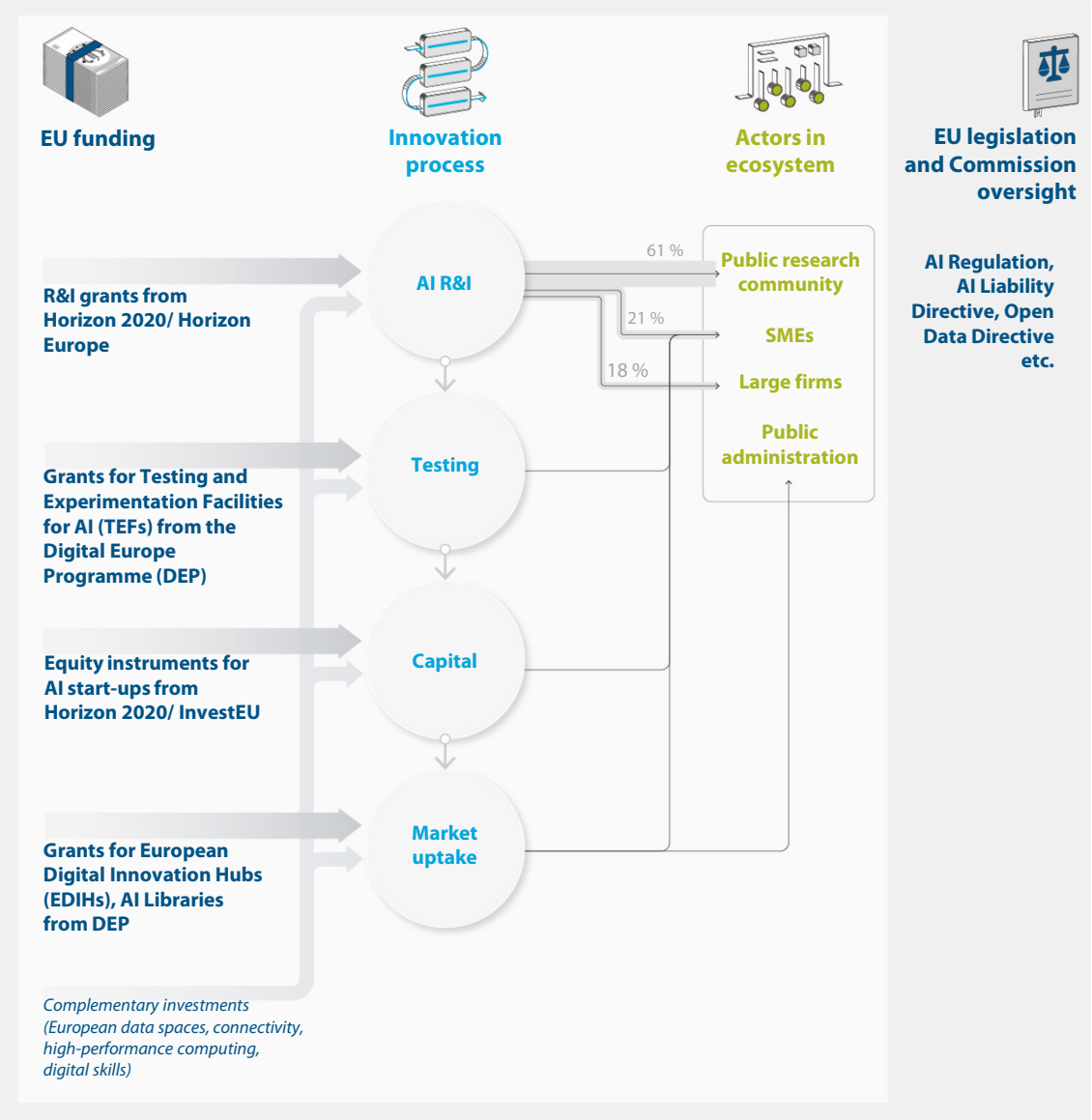
- the Digital Europe Programme (DEP)[16], including the funding of AI infrastructure such as European data spaces, libraries of AI algorithms (i.e. an AI-on-demand platform), super-computers, and testing and experimentation facilities for AI innovation;
- the Horizon Europe research programme[17] for the funding of basic AI research and applications.

[15] Regulation (EU) No 1291/2013 establishing Horizon 2020.

[16] Regulation (EU) 2021/694 establishing the Digital Europe Programme.

[17] Regulation (EU) 2021/695 establishing Horizon Europe.

Figure 5 – Main topics of EU AI plans and corresponding AI product lifecycle stage



Source: ECA, based on EU AI plans (2018, 2021).

Note: The ECA's calculation of percentages is based on AI grants financed from Horizon 2020, which was the main EU's action completed in the AI field within the 2014-2020 financial framework.

15 The EU's AI plans also indicated other EU programmes that should finance AI R&I and uptake without any specific investment target (e.g. the European Structural and Investment Funds [ESIFs], the Recovery and Resilience Facility [RRF], and EU4Health). In addition, the Commission adopted other EU strategies that interact with EU AI plans (e.g. the data strategy and the digital education plan).

16 The EU also plays a role in removing regulatory obstacles to AI investment and fostering digital consumer trust by harmonising national rules on digital aspects such as AI regulation and data sharing. The European Parliament and the Council reached general agreement on a cross-sector regulation of AI in December 2023. The legislation aims to ensure that AI systems placed on the European markets and used in the EU are safe, and respect fundamental rights and EU values. The Regulation also specifies indicators for monitoring implementation. The Council's presidency will submit the compromise text to the member states' representatives for endorsement once agreement on technical details has been reached.

Audit scope and approach

17 This special report assesses the Commission's existing role in contributing to the development of an European AI ecosystem. To do so, we assessed the effectiveness of the following Commission actions:

- the Commission's actions to coordinate EU AI plans (2018, 2021) and regulatory reforms to stimulate EU investment in data and trustworthy AI over the 2018-2023 period;
- the implementation of EU-funded measures to stimulate the deployment and scaling-up of AI innovations following the adoption of the 2018 EU AI Plan;
- the implementation of EU-funded AI R&I over the 2014-2022 period (Horizon 2020 and Horizon Europe).

18 We did not address EU action to develop the AI talents and skills mentioned in the EU AI plans because they were more limited in scope than national measures. Also, we did not analyse the text of the AI Act agreed by the co-legislators in December 2023.

19 Both the European Parliament and the Council have stressed the importance of EU action to support the development of trustworthy European AI. The audit aims to provide insights into the performance of the Commissions actions set out in the EU's plans for AI. The observations and recommendations resulting from our audit should help to increase the consistency, effectiveness and monitoring of the Commission's action to maximise the impact of European investment in AI, and could be instrumental in any future debate about the design of EU-wide measures in the field of AI innovation and uptake.

20 For this audit, we reviewed the Commission's internal and public documentation and data on policies and projects, and conducted several interviews with relevant policy or project officers at the Directorates-General for Communications Networks, Content and Technology (DG CNECT) and for Research & Innovation (DG RTD), the European Innovation Council (EIC), the Joint Research Centre (JRC), and the European Investment Fund (EIF).

21 We conducted a survey of 27 national authorities in charge of coordinating AI policies (20 replies), and interviewed three national authorities (Belgium, Finland and Spain) to gather feedback on the design and implementation of the EU AI plans. We also discussed international benchmarks with representatives of the OECD (AI Observatory) and the US General Accountability Office (the Science, Technology Assessment, and Analytics team).

22 We sampled 10 completed research projects in AI financed by Horizon 2020 in the areas of environment, smart mobility and industrial robotics, which are priority sectors in the EU's 2021 Plan. The aim was to review the Commission's approach to the dissemination and exploitation of results. We also carried out on-the-spot visits to the beneficiaries of four projects. We interviewed representatives of relevant Public-Private Partnerships (Big Data, Robotics, and AI, data and robotics) set up by the Commission to obtain feedback on private-sector involvement in Horizon programmes.

Observations

The EU framework for coordinating and regulating EU investment in AI is a work in progress

23 We examined the effectiveness of the Commission's coordination of national measures after the adoption of EU AI plans by looking at the design of the plans, the coordination tools in place, and the measures taken to harmonise the regulatory frameworks for promoting trustworthy AI investment and data sharing.

The design of EU AI plans was broadly in line with international best practices, but investment targets were too vague and not updated

24 The Commission should design the AI plans in accordance with Better Regulation principles and guidelines[18], requiring it to carry out impact assessments for major initiatives, set out specific and measurable objectives, and monitor the performance of such initiatives. We assessed the preparation and content of the EU AI plans (2018 and 2021) and their monitoring against these criteria, as well as international benchmarks using the OECD recommendation (see paragraph ***04***). We also used comparisons with US and UK AI plans.

25 Both of the EU's AI plans were consistent with the OECD's five recommendations on AI and comprehensively covered their scope. We also found that the types of measures were similar to the AI plans adopted in the US and the UK, which are leading AI nations in the OECD (see ***Annex I***).

26 We identified some actions in the EU plans which were not specific. In general, the EU plans included actions to be implemented by the Commission that are more granular than those to be undertaken by the member states (43 and 17 measures respectively in the 2018 Plan). However, the measures aiming to increase investment in research were not specific, either for the Commission or for the member states, as they did not include **research priorities**. The Commission intends to stimulate the coordination of national research agendas only through the networks of AI excellence research centres which were mentioned in the EU AI plans and which the EU started financing in 2020 (see ***Annex II***). By way of comparison, the three US plans on AI

[18] Commission's Better Regulation Guidelines, SWD(2017) 350.

investment (2016, 2019 and 2023) are detailed on research priorities in AI techniques, as a result of several consultation rounds with stakeholders.

27 In line with the OECD recommendation to invest in long-term AI R&I and the expectation that the economic benefits of AI may only be clearly visible in the longer term[19], the EU plans set only **long-term EU targets** for AI investment: €20 billion in total over the 2018-2020 period, and €20 billion per year over the next decade for AI research and uptake. No other performance targets for measuring outcomes and impacts were set in the plans.

28 The Commission did not carry out any documented assessment to justify the targets set or the public and private contributions to these targets. Furthermore, the Commission did not specify how to measure the targets. One of the reasons was that the Commission did not collect data on the characteristics and needs of national AI ecosystems for the preparation of the 2018 Plan. However, the Commission consulted the member states' representatives about the draft (see paragraph ***34***).

29 Challenges with data collection persisted during the implementation of the EU AI plans, even though the Commission set up an AI observatory ('AI Watch') for this purpose. Eurostat has only collected data on the level of AI uptake by firms since 2021. Moreover, the Commission did not manage to establish a set of regularly updated input/output key performance indicators and benchmarks for the EU AI plans (e.g. AI investment, number of start-ups, jobs, patents, and innovations created), even though this had been planned[20]. The JRC drafted a one-off report on the EU AI index in 2022. The JRC was mandated to deliver methodologies and data only for the 2019-2021 period. Thus, the Commission did not have any comparable data for 2022 or 2023.

30 Although envisaged in the 2021 Plan, at the time of the audit the Commission had not stipulated any timeline or methodology for the next review of the EU plan, or for increasing the monitoring of AI developments[21]. However, in 2024 the Commission aims to carry out a study in cooperation with the OECD on assessing the progress made on implementing the 2021 Plan.

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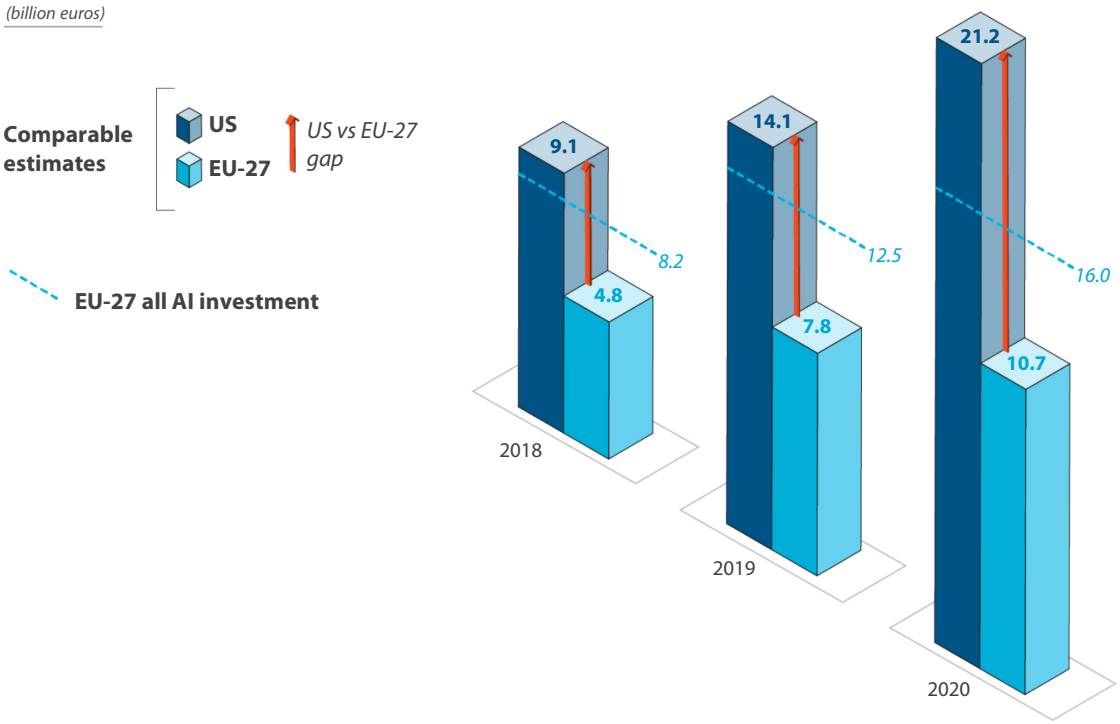
[19] Artificial intelligence: A European perspective, JRC, 2018, page 81.

[20] Coordinated Plan on Artificial Intelligence, COM(2018) 795, page 5 of Annex.

[21] Coordinated Plan on Artificial Intelligence, 2021 review, COM(2021) 205, page 10 of Annex.

31 The 2018 Plan aimed to accelerate AI investment. An external study estimated such investment at €12.1-18.6 billion in North America, versus €2.4-3.2 billion in Europe in 2016. However, the Commission did not update the EU's targets in the 2021 Plan or later in order to address its most recent estimates of developments in AI investment worldwide. The EU's AI investment grew steadily over the 2018-2020 period and exceeded the EU AI targets, but the AI investment gap between the US and the EU more than doubled between 2018 and 2020 (see ***Figure 6***). The gap concerns both the public and private sectors. In addition, in 2022 the EU adopted an AI uptake target for businesses (see paragraph ***13***), but the plans were not updated accordingly.

Figure 6 – Estimates of AI investment over the 2018-2020 period in the EU27 and the US



Source: ECA, based on latest data from "AI Watch: Estimating AI Investments in the European Union" (JRC, 2022).

32 The lack of ambition for AI investment targets contrasts with the overarching objective of the EU AI plans to build a globally competitive AI ecosystem. Moreover, the Commission did not adequately define and justify the targets, and did not set out a comprehensive performance monitoring system for the EU's AI investment. These shortcomings weakened the credibility and accountability of the plans.

The Commission's coordination with member states had limited effects

33 The Commission should coordinate measures to help align and step up AI investment with member states by using the following coordination tools envisaged in the EU's AI plans:

- the Commission's consultation of the expert group of member state authorities with a view to ensuring the governance of EU AI plans;
- the Commission's recommendation to member states to adopt national AI strategies;
- the Commission's framework for coordinating EU and national actions and the way they are monitored.

We looked at the implementation of these tools and their effectiveness.

34 The 20 national authorities that responded to our survey confirmed the importance of coordinating national AI investment. The member states' **expert group** was the only coordination body for the EU plans. However, it lacked a comprehensive high-level mandate, terms of reference, and follow-up of its work by the Council. The Commission consulted the group mainly for the preparation of EU AI plans and its own subsequent actions.

35 Our review of the expert group's work in 2018-2022 shows that it did not coordinate or discuss the research agenda for the plans (except for certain strategic initiatives on AI infrastructure), even though research was the most financially significant part of public support for AI development. At the same time, another Commission expert group worked on the digital research strategy for the Horizon Europe programme, but there was no co-ordination between these groups. By comparison, the initial US AI plan envisaged a more comprehensive governance framework. As part of the plan, the National Science and Technology Council (NSTC) established a permanent committee[22] in 2018 with specific terms of reference. It worked on coordinating the AI research agendas of US agencies, and was supported by the technical analyses of two other committees.

[22] US National AI R&D Strategic Plan (2019 Update).

36 Despite the involvement of the expert group in ensuring national ownership of EU plans, by the deadline set in the 2018 EU Plan (i.e. June 2019), only 10 member states[23] had published **national AI strategies** (five were published before the EU plan)[24]. By mid-2023, four member states had still not adopted such strategies (Bulgaria, Croatia, Greece and Romania). This staggered launch of national strategies therefore led to different stages in enhancing public support for national AI ecosystems.

37 The Commission did not establish a **framework** to ensure that EU plans were aligned with national strategies and measures. It was therefore unclear which amounts member states would use to contribute to EU AI investment targets. Such a framework does exist, for example, for the EU's climate objectives, and is not excluded by the open method of coordination that was applied to EU AI plans. Only nine member states (out of 20 survey replies) set multi-annual AI public spending targets. It was also unclear how member states would contribute to the EU's AI uptake targets (see paragraph ***13***).

38 However, with the newly introduced Digital Decade Policy Programme, member states will have the opportunity to set out national digital roadmaps. These may be instrumental in clarifying national AI investment and uptake targets, thereby improving the member states' ownership of the EU AI plan.

39 Neither the expert group nor the Commission carried out annual **reviews** of the implementation of the EU AI plans as initially envisaged[25]. The Commission drafted one internal report on the implementation of the 2021 Plan in 2022. This was incomplete, as it covered only some of the Commission's actions (e.g. the Commission's AI investment amounts were not checked), and did not monitor any recommendations to member states (e.g. national measures to encourage AI uptake by SMEs). Nonetheless, the review was useful, as it detected several delays in implementation (see ***Annex III***).

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[23] Czechia, Denmark, Germany, France, Lithuania, Luxembourg, Portugal, Finland, Sweden and the UK.

[24] AI Watch – National strategies on Artificial Intelligence: A European perspective in 2019, JRC, 2020.

[25] Coordinated Plan on Artificial Intelligence, COM(2018) 795, page 5 of Annex.

40 The Commission triggered a process to monitor **national best practices** in AI investment: the JRC issued three reports on monitoring and comparisons between national AI strategies over the 2020-2022 period. However, neither the expert group nor the Commission carried out any follow-up to identify best practices and recommendations to member states. For example, the Commission identified partial misalignment between the seven sectors prioritised in the 2021 EU Plan (see ***Figure 4***) and those identified in national strategies[26], but this finding was not followed up. No JRC report was published in 2023, as the Commission discontinued the monitoring process.

41 Overall, the Commission implemented the coordination tools envisaged in the EU plans, but only partially. These tools were particularly important, as the EU AI plans did not contain binding obligations for member states. The upshot was that the Commission could not identify national contributions to the EU's investment targets, and could not obtain evidence of commitment to contributing to EU plans at national level.

Recent EU measures to achieve a single market for data are at the inception phase

42 In the EU, stricter data privacy rules[27] and data cloud services that are less developed than in the US place more constraints on firms' data collection, storage and sharing. According to the Commission's data strategy (2018) that was updated in 2020 and mentioned in the EU AI plans, the Commission should take action to create a single market for data. This would allow data to flow freely within the EU and across sectors for the benefit of businesses, researchers and public administrations. We checked the implementation of the Commission's key measures.

43 The Commission adopted three legislative proposals to create a single market for data (see ***Figure 7***). As the proposals were enacted only recently, the corresponding implementing actions are not at an advanced stage.

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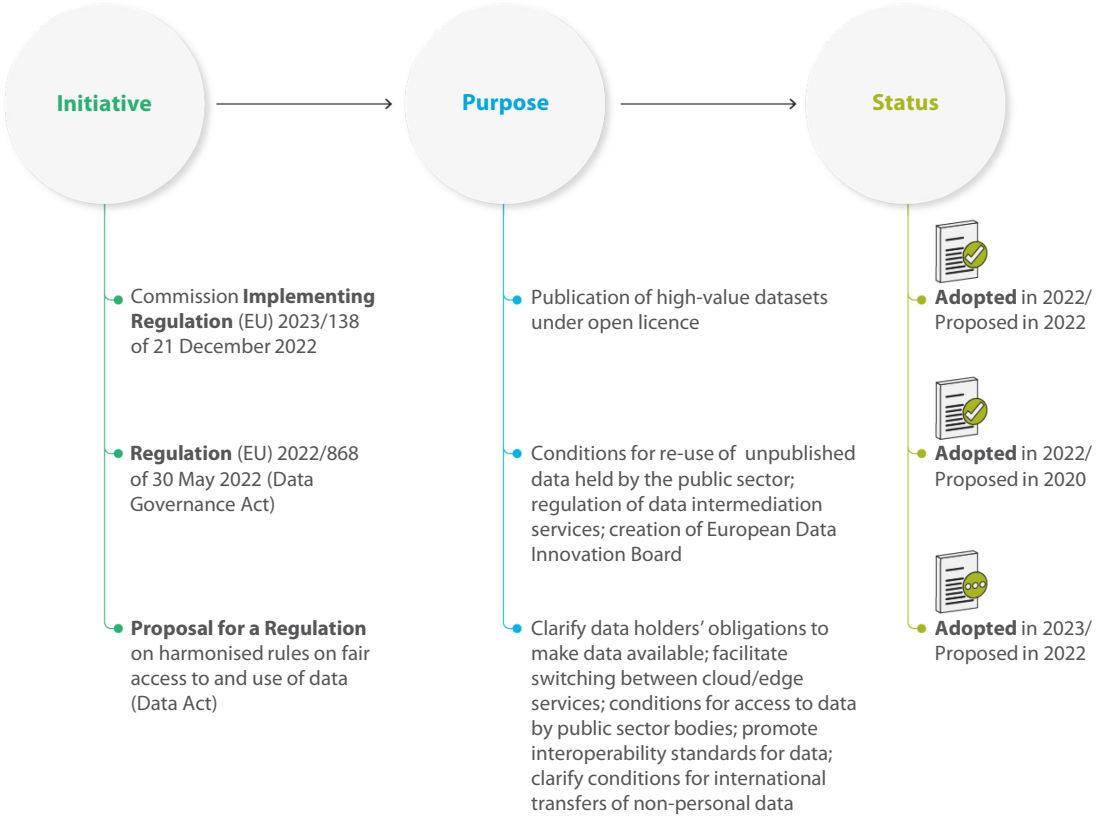
[26] AI Watch – National strategies on Artificial Intelligence: A European perspective in 2022, JRC, 2022, page 78.

[27] Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

Figure 7 – Commission initiatives to foster data flows within the EU



Source: ECA, based on EU AI plans and Commission information.

44 The implementation of the "Data Governance Act" will require time to clarify certain legal notions (e.g. definitions of data altruism and general interest[28]). Moreover, the governance of data sharing is not yet in place, as some relevant national authorities have not yet been designated. The implementation of the "Data Act" (in force since February 2024, and applicable as of September 2025) requires implementation rules, e.g. the Commission's adoption of interoperability specifications for European data spaces.

45 New AI technologies also raise questions about the implementation of some current EU legislation on online data (e.g. on copyright or data protection). In the case of AI technologies that train language models with large volumes of online personal and non-personal data, it is unclear how data owners' consent is obtained. The European Data Protection Board launched a task force to coordinate the data protection authorities' enforcement regarding ChatGPT.

[28] See the European Consumer Organisation's position paper and open letter.

46 The Commission also aimed to set up a Support Centre for Data Sharing to propose model contracts and provide best practices for data sharing[29]. However, only the blog to discuss data-sharing issues is currently available. The blog was not active at the time of the audit[30]. A new website was under construction by the Data Spaces Support Centre (dssc.eu) at the time of the audit. This EU-financed project was launched in October 2022 and aims not only to foster the creation of European data spaces but also to support the European Data Innovation Board in proposing guidelines for them.

47 Thus, despite emerging types of AI technologies such as machine learning that require growing volumes of data, the EU measures to foster data sharing within the EU are in the early stages of implementation, and so cannot immediately boost AI investment.

The EU has gradually taken steps since 2018 to develop a framework for regulating AI

48 The European Council of October 2017 stated that the EU needs a sense of urgency to address emerging trends such as AI, "while at the same time ensuring a high level of data protection, digital rights and ethical standards". A predictable regulatory framework that applies to the single market as a whole was an objective of the EU AI plans, as it should prevent fragmentation of AI supervision between member states and thus stimulate AI innovation and consumer trust. We assessed the Commission's progress in achieving this objective.

49 The Commission envisaged several measures to promote ethical AI in the 2018 EU AI Plan, and has implemented most of them (see ***Figure 8***). This included AI ethical guidelines, although these were not binding either on the member states or on the Commission's management of EU funds. Furthermore, no institutional mechanism was in place to ensure that the guidelines were applied uniformly across the EU. As a result, it could not be ensured that the 2018 Plan had actually succeeded in promoting trustworthy AI.

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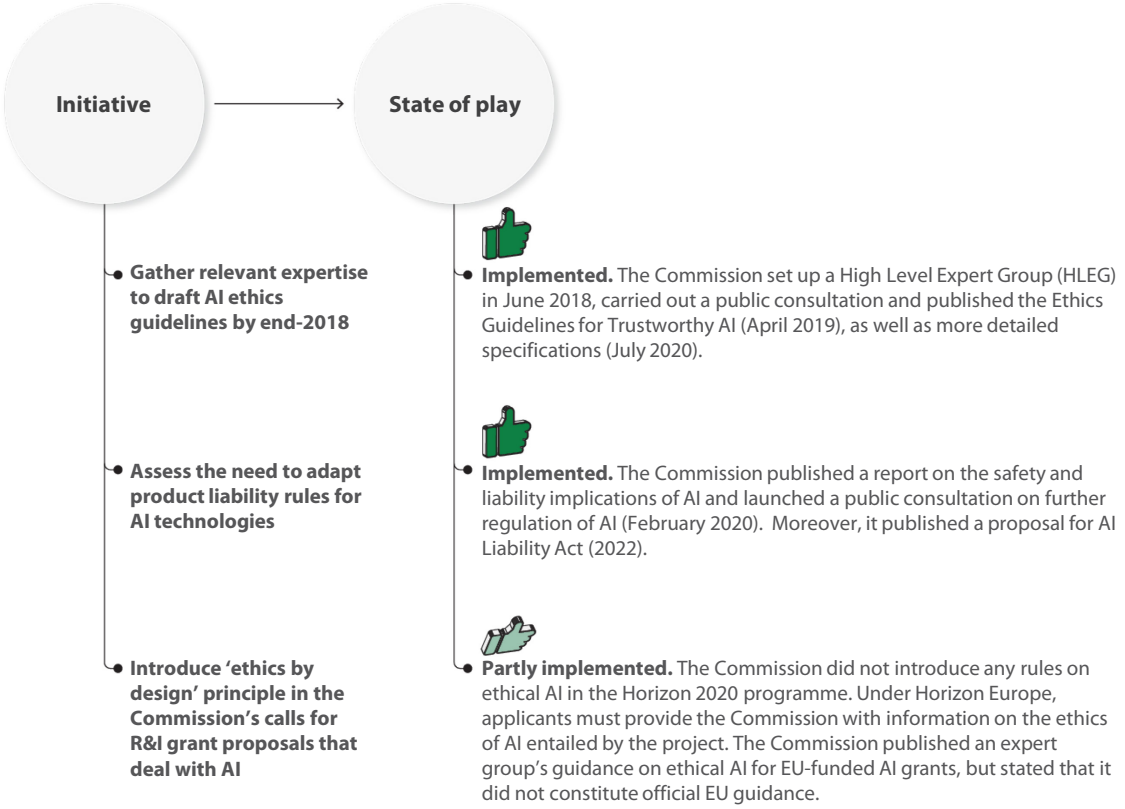
[29] Coordinated Plan on Artificial Intelligence, COM(2018) 795, page 17 of Annex.

[30] Support Centre for Data Sharing.

Figure 8 – Commission initiatives to ensure a predictable and ethical framework for AI



Source: ECA, based on the 2018 EU AI Plan and Commission information.

50 Given the cross-sectoral nature of AI risks, in June 2019 the High-Level Expert Group recommended creating a strategy for member states to enforce existing AI regulations in a coordinated way. The 2021 AI Plan also mentioned this point. The Commission did not implement this action, but some focused initiatives did take place, e.g. the EU network of consumer protection authorities began a coordinated investigation of ChatGPT in 2023.

51 In contrast to earlier initiatives, in 2021 and 2022 and for the first time anywhere in the world, the Commission proposed a general regulation covering AI products (an 'AI Act') and civil liability rules for AI products (an 'AI Liability Act'), partly building on previous consultation work. By December 2023, the AI Act had been agreed by the co-legislators, but not yet finalised and adopted (see paragraph ***16***). The AI Liability Act is still under discussion. The implementation of some provisions of the AI Act requires further time after adoption. Thus, seven years on from the Council conclusions underlying the urgency of AI standards, work on a regulatory framework for AI continues.

52 The Commission's impact assessment of the AI Act did not provide evidence of how attractive the proposed rules would make the EU for investors in AI. This would have been particularly relevant given the absence of harmonised AI legislation across the world or in OECD countries. The actual regulatory costs of the AI Act that were borne by investors and the EU's competitive position will also depend on the implementation rules and alignment with future standards in AI-leading countries outside the EU. The Commission will therefore have a key role in monitoring the impacts of the AI Act on the EU's AI ecosystem.

The EU envisaged enablers for AI innovation, but implementation is ongoing

53 Member states may face challenges in scaling up the expertise and infrastructure needed to enable AI ecosystems to develop. SMEs naturally face financial obstacles to investing in costly testing infrastructure or scaling up innovative projects. The EU AI plans aimed to address such obstacles through two new types of intervention:

- equity financing of SMEs mainly through Horizon 2020 (a financial enabler);
- the recent setting-up of initial European AI technology infrastructure through the DEP (a technical enabler).

54 In addition to equity financing through Horizon 2020 (which was the focus of our audit), the EU may also make capital support available for SMEs innovating in the AI field through other financial instruments and schemes managed by various Commission departments and the European Investment Bank Group (e.g. the RRF, ESIFs, the European Fund for Strategic Investments [EFSI], and InvestEU). However, the Commission did not have an overview of their contribution to the development of AI, and they were not monitored as part of the EU AI plans.

AI plans initially triggered modest EU capital support for innovators

55 The EU AI plans envisaged the Commission implementing two dedicated EU financial instruments of the Horizon 2020 programme[31]. These aimed to provide specific capital support for innovative AI SMEs and encourage other publicly financed equity support in the AI field:

- a pilot initiative on AI and Blockchain Technology (AI/BT), which was launched in 2020 as part of InnovFin scheme financed under the Horizon 2020 programme and EFSI. To assess the AI focus of the initiative, we examined a sample of 20 investments;

- an investment fund incorporated in 2020, managed by the European Innovation Council (EIC) and financed through Horizon 2020 and Horizon Europe.

We looked at the implementation of these instruments.

Pilot initiative on AI and Blockchain Technology

56 The objective of the AI/BT initiative was to finance the development of highly innovative AI and blockchain companies in their early stages or during the scaling-up phase. It had an EU guarantee of €100 million (with €50 million provided by the Commission and €50 million by the EIF). The EIF has managed the scheme on behalf of the Commission. Together with co-investment by private funds, the overall capital invested in firms was expected to be about €1.3 billion over 10 years. By the end of 2022, the initiative disbursed around €394 million, i.e. 30 % of the total commitment of the initiative. This represented only 1 % of the venture capital investments in AI in the EU in 2020-2022 (see ***Figure 2***).

57 In the AI/BT initiative, we found weak targeting of European breakthrough AI innovators. The Commission's investment guidelines for fund managers were unclear about what counts as AI activity. Our analysis of a sample of 20 final beneficiaries confirmed this issue: 60 % of sampled final recipients did not demonstrate their breakthrough AI innovation. Moreover, around 50 % of beneficiaries were established outside the EU (see ***Annex IV***).

58 The initiative was not fully in line with the 2018 Plan: its scope excluded large AI scale-ups (with needs over €100 million). The need for such funding was highlighted in a survey by Digital Europe. Support for scaling up AI firms is important, as it should

[31] Coordinated Plan on Artificial Intelligence, COM(2018) 795, page 7 of Annex.

help to achieve the Digital Compass target for the number of unicorns (see paragraph ***13***), and reinforce the private ecosystem that invests in AI R&I. The 2022 DESI Report shows that the EU had only 222 unicorns in 2022, compared to 1 243 in the US, 530 in Asia, and 119 in the UK.

59 According to the 2018 Plan, one of the expected impacts of the initiative was that the member states actively supported the initiative through the involvement of nationally financed capital-support schemes. However, the Commission did not monitor the extent to which this had been achieved. Also, the Commission did not have an overview of the public and private equity financing of AI innovators in the EU. This could also have been useful for regularly assessing the adequacy of EU equity support for AI.

60 The pilot was not followed up by similarly targeted equity schemes under the InvestEU programme, even though this was envisaged in the EU AI plans. In addition, there was only one AI investment (€1.5 million disbursed to a SME) through InvestEU by the end of 2022 due to delays in launching the overall programme[32]. By the end of 2022, the EIF had signed agreements with seven financial intermediaries under InvestEU for a total EU guarantee of €159 million, including the financing of the thematic strategy "Digital, Cultural and Creative Sectors".

EIC

61 The Commission set up a fund in 2020 as part of the European Innovation Council pilot (the EIC Fund) financed from the Horizon 2020 programme. The EIC was established as a fully-fledged part of the Horizon Europe programme with a total budget of €10 billion. One of the objectives was to support market entry and the scaling-up of breakthrough high-reward deep-tech companies. Contrary to the arrangements for the AI/BT initiative, the EIC applies strict selection criteria, and the EIC Fund invests directly in companies. The EIC usually provides both equity and grants (blended finance) to investee SMEs.

62 The EIC did not have any budget specifically allocated to AI, given its bottom-up approach to funding. As of end-2022, the AI equity operations financed by the EIC Fund were limited in number and the amount invested, and did not make a significant contribution to enriching the EU AI investment ecosystem. The funds disbursed to all types of innovations with AI totalled €43.8 million by end-2022, i.e. 2.5 % of the budgets (see ***Table 1***). In 2023, preliminary data show that the AI investments that

[32] See the EIF Operational Plan 2023-2025, page 6.

were disbursed increased by €51million. The Commission stated that the total amount that it had committed was €259.2 million by the end of 2023. Given the time needed for due diligence prior to each investment decision made by the Fund, this exceeds the amount of AI equity support that was disbursed.

Table 1 – EIC Fund – total and AI investments as of end-2022

	EIC Fund (Horizon 2020)	EIC Fund (2021-2022, Horizon Europe)
Data from financial statements		
Total budget (m€) (a)	600	1 160
Total disbursements (m€) (b)	290	25
Overall budget implementation rate (=b/a)	48 %	2 %
AI investments tagged by EISMEA (as in March 2024)		
AI equity support approved		
- number of firms	23	1
- total amount (m€)	42.5	5
AI equity support disbursed		
- number of firms	23	1
- total amount (m€) (c)	38.8	5
- share in total budgets (=c/a)	6.5 %	0.4 %

Source: EISMEA data and financial statements from the EIC Fund as of end-2022.

63 This situation is mainly due to the slow start of the EIC Fund. Based on the financial statements, we found that at the end of 2022, only 2 % of the EIC's Horizon Europe budgets for 2021 and 2022 had been invested in companies, and only 48 % of the Horizon 2020 budgets under the EIC Pilot Fund. The restructuring of the EIC Fund under Horizon Europe contributed to the significant delays. In 2023, work picked up pace, and so the implementation rates increased to 14 % and 61 %, respectively.

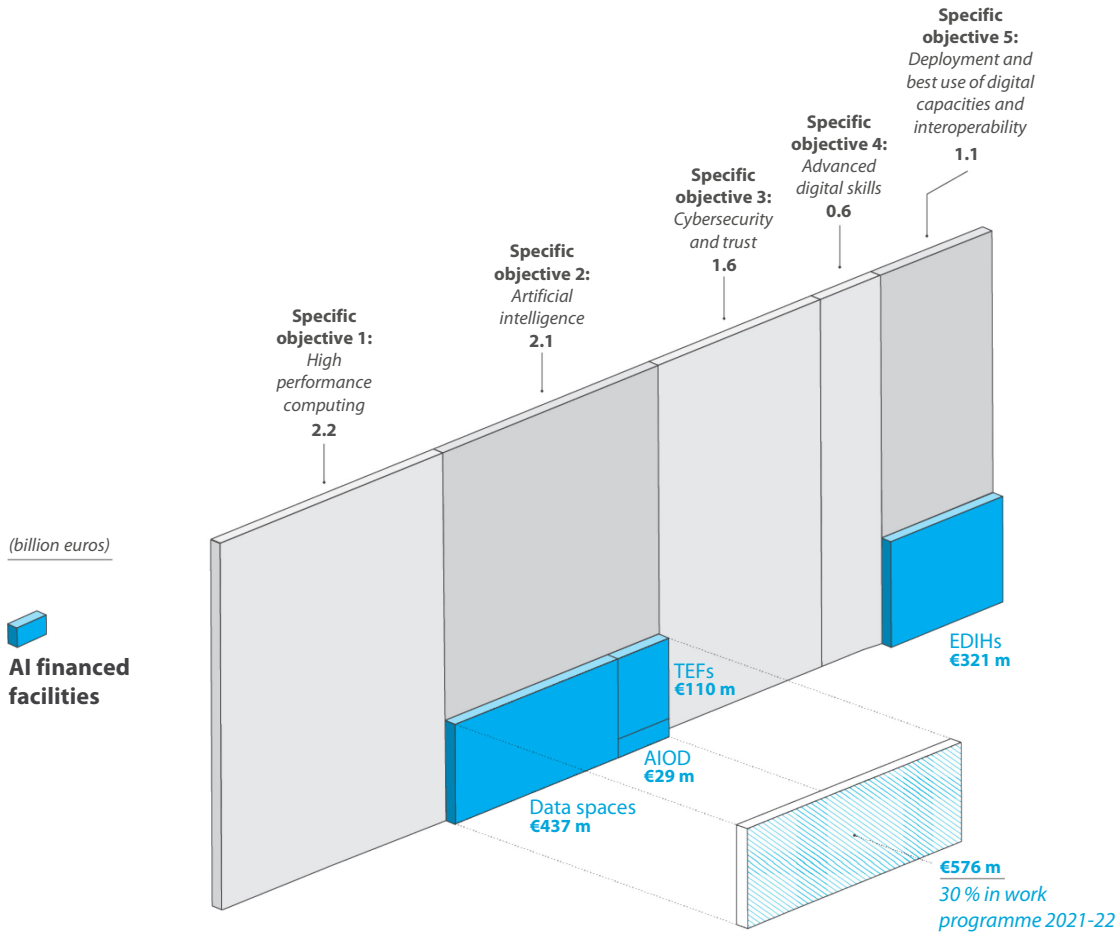
64 Although the EU is lagging behind in the global race for AI capital (see paragraph ***05***), these two specific measures of the EU AI plans had not yet triggered the expected scale effect in the provision of capital support for European AI start-ups and scale-ups by the end of 2022. We found these schemes to be weak at targeting AI innovators. Moreover, capital support for large scale-ups was not available.

EU-funded AI infrastructure for SMEs addresses important needs but faces delays, and the interplay of support measures is yet to be demonstrated

65 In a fast-evolving global technological race for AI, the Digital Europe Programme introduced in 2021 aimed to set up pan-European digital facilities to boost the development and uptake of AI, especially in SMEs. These facilities are managed by private consortia and co-financed by participating member states. We looked at the timeliness of the Commission's implementation of three such facilities, which reflect the most advanced or specific AI facilities planned in the DEP (see also ***Figure 9***):

- Testing and Experimentation Facilities for AI (TEFs) to allow innovators to test their AI solutions in real-world environments;
- common European libraries of AI algorithms to facilitate transfers of knowledge from AI researchers and developers to businesses and public administration (also known as the AI-on-demand platform, or AIOD);
- a network of European Digital Innovation Hubs (EDIHs) to provide businesses (especially SMEs) and the public sector, at their request, with expertise and testing options for the adoption of innovative digital (including AI) technologies. At least one hub in every member state is required to have AI expertise.

Figure 9 – AI facilities financed by the DEP budget for 2021-2027



Source: ECA, based on DEP Regulation and 2021-2022 work programme.

66 The Commission implements the DEP on the basis of several work programmes. By end-June 2023, the Commission had launched the following AI-related projects, as planned in the 2021-2022 work programmes: 151 digital hubs and four sectoral TEFs.

67 However, the Commission had published calls for projects on AI infrastructure for only 30 % of the budget for AI (i.e. specific objective 2), partly due to the late adoption of the DEP Regulation and the first work programmes. This may indicate a low implementation rate of the budget so far, resulting in delays in launching further AI facilities that could have supported AI innovators sooner. For example, the Commission launched four TEFs stipulated in the DEP Regulation[33]: there were no calls on TEFs for finance, transport, earth monitoring, and security, and no other areas of public interest have been explored as suggested in the Regulation.

[33] Annex I of Regulation (EU) 2021/694 (DEP).

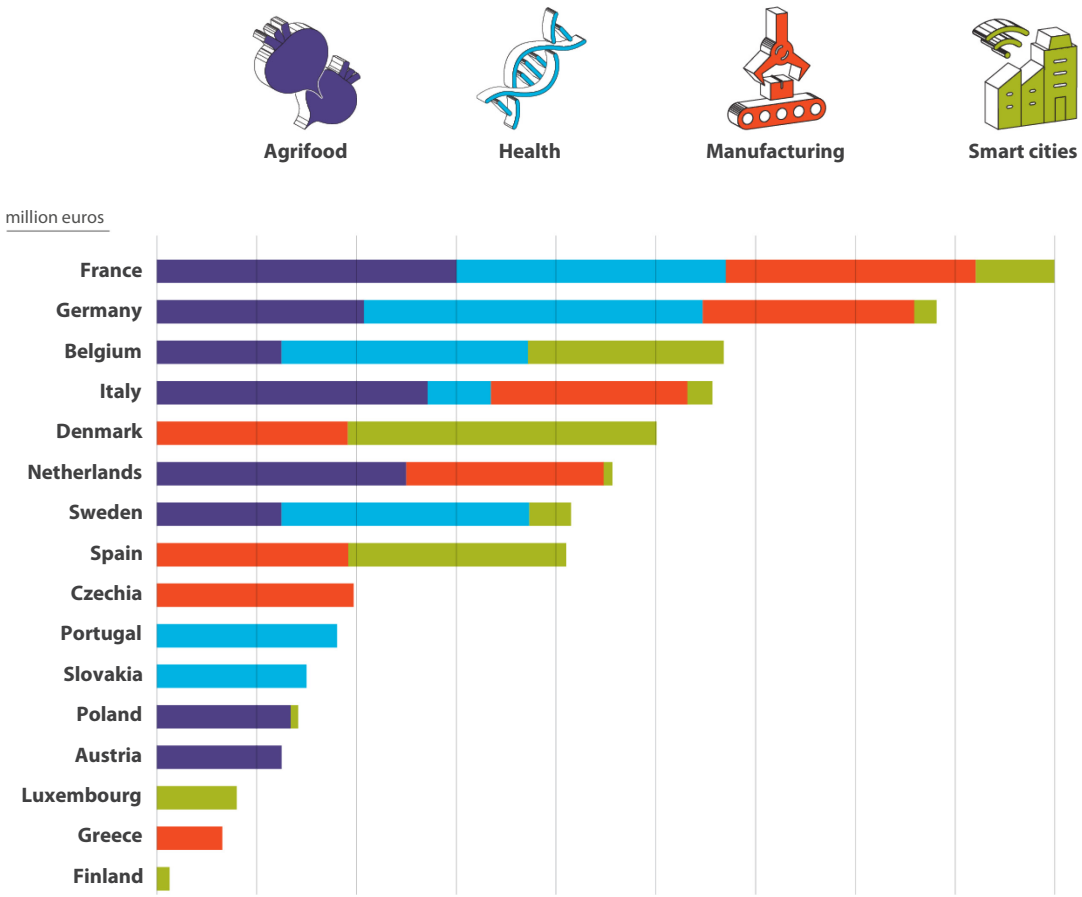
The EU budget for TEFs envisaged in the 2018 AI Plan was €1.5 billion, and €110.8 million has been committed for the four TEFs so far.

68 Some AI facilities were launched late or are not yet fully operational, thus potentially hampering their capacity to provide services in a fast-evolving AI market:

- The Commission did not establish the network of EDIHs by April 2022, as required by the DEP Regulation[34]. Most of the initially selected 136 projects started in January 2023, while the last 15 EDIHs were not operational by end-June 2023.
- EDIHs aimed to facilitate European AI uptake in the public sector, also through the EU "Adopt AI" programme that was supposed to be launched in 2021. However, the Commission had not initiated the programme, but launched a study instead.
- The four TEFs launched in 2023 were not immediately operational, as the construction of platforms will take more than a year. For example, the TEF on manufacturing, which has a project duration of five years, is planned to be fully operational for only three years.
- The Commission had not chosen the consortium for the AIOD project by the time of the audit. The adoption of the programme was delayed, meaning that the first call was launched late. The delay was also due to the call for projects being re-issued and the extra time needed to assess AIOD users' needs, as the Commission had not performed such an assessment when doing the preparatory work for the DEP.
- Not all marketing arrangements for AI facilities were in place at the time of the audit. EDIHs – but not TEFs – provided potential users with a common online catalogue of services. In addition, the AI service types included in the catalogue or on EDIHs' websites were not explained. The testing facilities were established in a limited number of countries (see ***Figure 10***), and so may not be visible for SMEs established in the other member states without adequate communication about their services.

[34] Regulation (EU) 2021/694 (DEP), Article 16(1).

Figure 10 – EU funding of TEFs by beneficiaries' country



Source: ECA, based on Commission data.

69 The DEP Regulation and EDIHs work programme[35] require there to be synergies between EDIHs and AI facilities such as TEFs, AIOD and supercomputers in order to maximise their outreach. However, several factors hampered such synergies. The AI facilities were set up by different consortia at different moments in time (some of them very recently), and had no clear specifications from the Commission about how to cooperate. Moreover, no coordination body was envisaged. For example, the Commission's calls for proposals require general coordination between the EDIHs and AIOD service providers, but no procedure is specified. The Commission is financing a consortium to share information between EDIHs ("Digital Transformation Accelerator"), and intends to finance another one to coordinate TEFs.

70 By comparison, the US plan for a National AI Research Resource (NAIRR) includes similar AI infrastructure for researchers and SMEs (testing tools, data spaces, AI libraries, and compute capacity), with a total budget of $2.6 billion over six years

[35] C(2021) 7911, EDIHs – Work Programme 2021-2023, page 10.

(see ***Annex V***). However, it requires coordinated operation of resources, including a single government agency that serves as the administrative home for NAIRR operations, while a steering board drives the strategic direction of the NAIRR, supported by a user committee.

71 The US plan also envisaged a single access portal to provide catalogues and search-and-discovery tools in order to facilitate visibility and access to the whole range of elements of the NAIRR. This is not the case for EU AI facilities, even though it would enhance their usability.

72 Although EU-funded AI facilities aim to offer useful and free-of-charge AI expertise to SMEs in all member states, we found that there have been delays in implementation and shortcomings in coordination, thereby reducing or delaying accessibility for potential AI innovators and adopters.

The Commission boosted the funding of R&I in AI, but did not have an overview of the results

73 In order to assess the impacts and outcomes of the Commission's financing in the field of AI R&I, we looked at the following Commission objectives of R&I spending derived from the EU AI plans and EU research programmes:

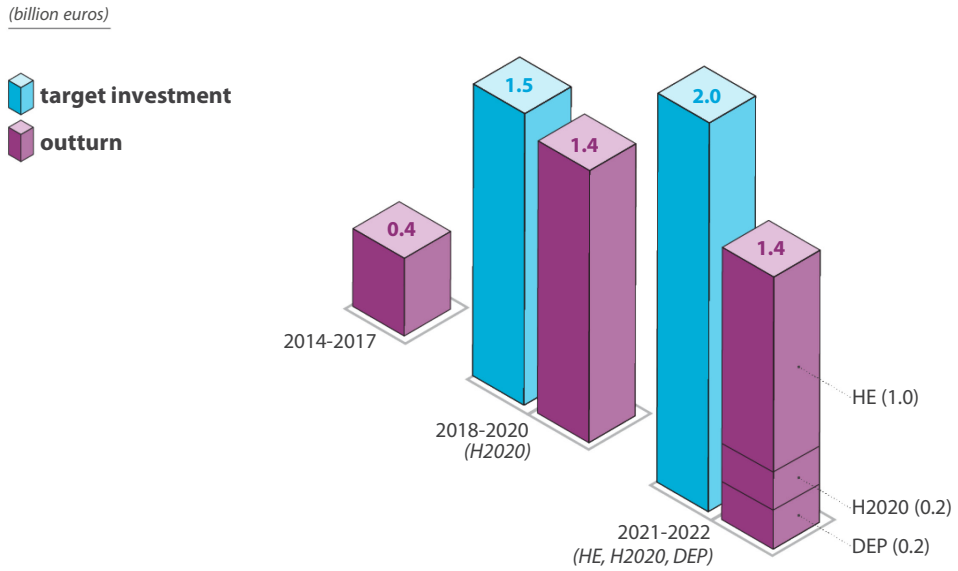
- scaling up EU-funded AI investment;
- contributing to an AI ecosystem of excellence;
- accelerating private and national leveraging of EU-funded AI investment;
- helping the AI ecosystem to exploit AI R&I results in the EU.

The Commission increased R&I investment in AI in 2018-2020, but did not keep pace with the Horizon Europe programme

74 The Commission committed to increasing EU-funded investment in R&I in line with its targets (see paragraph ***14***). We checked whether the Commission did so through Horizon Europe, Horizon 2020 and the DEP. We identified the AI grants on the basis of data extracted from the Commission's management systems for the three programmes, filtered with relevant key terms applied to project titles (such as 'artificial intelligence', 'machine learning', and 'deep learning').

75 The AI spending target was nearly achieved over the **2018-2020** period with €1.4 billion in investment (see ***Figure 11***), including grants to third countries totalling €0.2 billion. In the **2021-2022** period, actual spending (€1.4 billion) was €0.6 billion lower than the target. This is mainly due to the fact that Horizon Europe was adopted in April 2021, and the first work programme in June 2021. This resulted in very few AI grants being signed in 2021.

Figure 11 – EU targets and actual outturns of AI investment



Source: ECA estimates, based on EU contribution to grants signed for Horizon programmes and the DEP.

76 Although the 2021 Plan identified priority sectors for AI investment (see paragraph ***12***), only three out of seven sectors had material spending, with at least 10 % of total AI grants under Horizon Europe: health, robotics, and smart mobility.

77 The funds contributed to trans-national cooperation on AI R&I beyond the general trend of the Horizon 2020 programme: 42 % of AI grants had beneficiaries from at least three member states, compared with 28 % for the programme as a whole. Cooperation on AI projects was widespread across member states, but occurred more frequently between countries with a larger GDP (see also ***Annex VI***).

78 The Horizon 2020 programme directed most of the AI funding to public entities such as research centres and universities, but also funded the for-profit sector (0.8 billion, including €0.4 billion for SMEs). The share of AI funding directed towards the for-profit sector and SMEs was comparable to the share of all Horizon 2020 funding (see ***Table 2***).

Table 2 – Indicators of absorption of Horizon 2020 grants by the for-profit sector

	For-profit sector (including SMEs)	SMEs only
AI grants from Horizon 2020	43.9 %	22.9 %
Horizon 2020	43 %	22.1 %

Note: Grant amounts compiled for pillars II and III of Horizon 2020. Indicators are calculated on the basis of the Horizon 2020 monitoring framework.

Source: ECA, based on Commission budget data for 2014-2020.

79 Overall, EU-funded AI investment in 2018-2020 was in line with targets (see ***Figure 11***), and the projects contributed to the development of AI ecosystems by involving international partners and the private sector. In 2021-2022, the amounts invested were below target due to administrative issues with phasing in the new EU programmes, and were not as high as expected for all high-impact sectors listed in the EU's 2021 AI plan.

R&I investment in AI lacked coordination and evaluation frameworks

80 Effective AI policy implementation and monitoring requires co-ordination across government[36]. The EU AI plans envisaged annual performance monitoring of their measures.[37] The Commission should also monitor the performance of Horizon programmes.[38] We checked whether the Commission did so appropriately.

81 The information available on the H2020 Programme and other EU programmes shows a high level of fragmentation of AI funding and management. Several EU bodies managed funds supporting AI investment (Commission departments such as DG CNECT, DG RTD, the JRC, several Commission executive agencies and joint undertakings, and the EIT), sometimes in cooperation with European partnerships on R&I. Besides Horizon 2020, other EU programmes can also finance projects in AI research, innovation and uptake (see paragraph ***16***).

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[36] State of implementation of the OECD AI Principles (OECD, 2021), page 10.

[37] Coordinated Plan on Artificial Intelligence, COM(2018) 795, page 5 of Annex.

[38] Regulation (EU) No 1291/2013, establishing Horizon 2020, Articles 31 and 32; Regulation (EU) 2021/695, establishing Horizon Europe, Articles 50 and 52.

82 However, there was no EU body or committee to coordinate the projects at the planning, implementation or evaluation stages. This could improve monitoring of the performance of actions and the efficiency of AI planning and funding (e.g. to avoid double funding or to identify investment gaps). For example, the EU financed research on three separate AI taxonomies (i.e. classifications of AI types) without there being any coordination between them: project VISION (Horizon 2020 grant no 952070), an EIT project[39], and a JRC project[40].

83 There were also no tools available to enable such coordination and evaluation across AI R&I:

- Firstly, the Commission did not have an accurate overview of AI projects. There was no systematic tagging of projects funded in the area of AI across the EU programmes over the 2014-2020 period. However, the Commission set up an AI tagging system only for Horizon Europe.

- Secondly, the Commission did not have any performance indicators or targets for AI grants, or monitor their contributions to the development of a European AI ecosystem of excellence, even though some relevant data were available from the Horizon 2020 dashboard. Such information could not only contribute to the accountability of the EU AI plans, but could also allow for timely Commission intervention and adjustments to address any R&I shortcomings in AI planning/implementation. For example, our review of the Commission data on patents triggered by R&I grants for AI showed weaknesses in their performance (see ***Box 1***).

- Thirdly, the Commission did not collect such data after the end of the projects under Horizon 2020. As a result, the Commission did not have an up-to-date overview of project outputs, even though this would be useful for policy evaluations. Under Horizon Europe, the Commission intends to collect data from beneficiaries on results after the project ends.

84 The Commission therefore allocated funds to numerous projects with no common framework for monitoring or evaluating project performance. This approach did not ensure that EU spending contributes effectively to the development and integration of the EU's AI ecosystem.

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[39] Creation of a taxonomy for the European AI Ecosystem (EIT, 2021).

[40] Defining Artificial Intelligence (JRC, 2020) and Defining Artificial Intelligence 2.0. (JRC, 2021).

Box 1

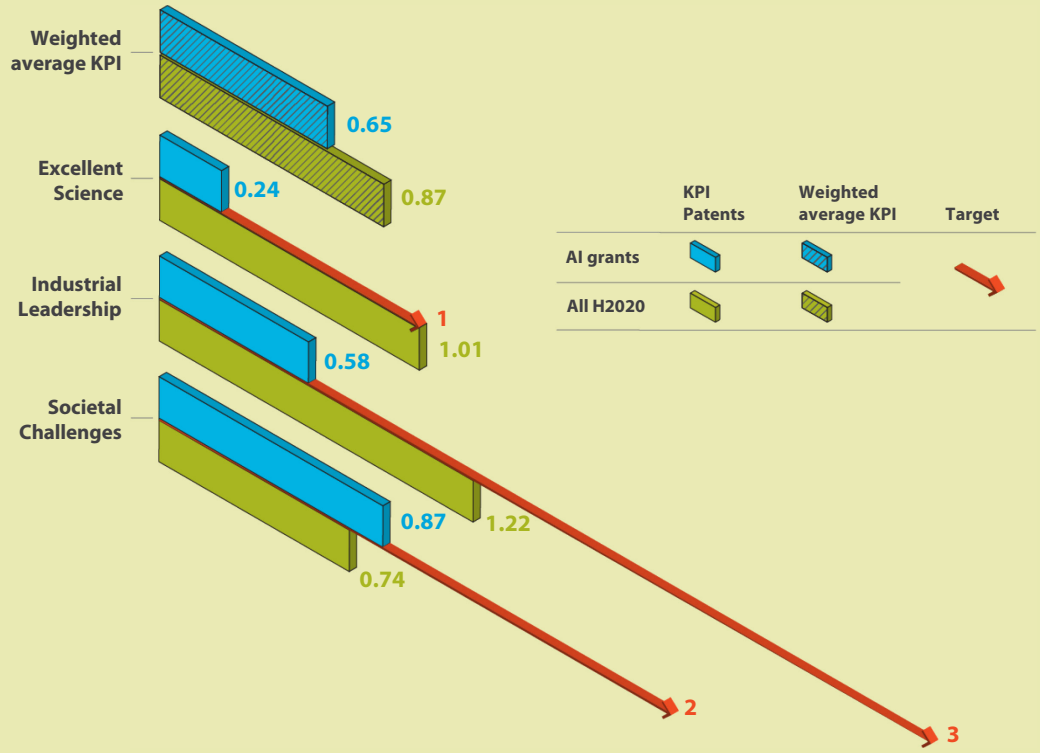
No patent-related targets for Horizon 2020 AI grants

In the AI field, innovative algorithms and methods that solve a technical problem and are susceptible to industrial applications can be patented. There has been a global race for AI patenting: from 2002 to 2018, annual AI patent applications increased by more than 100 % in the US[41]. The number of patents filed throughout the world in 2021 was more than 30 times higher than in 2015[42].

The number of patent applications generated from R&I grants is a key indicator enabling the Commission to regularly assess the results of the Horizon 2020 programme. The most ambitious target is three patent applications per €10 million of EU funding, for pillar 2 (industrial leadership).

Based on the ECA's calculation, the number of patents per €10 million generated by the AI population of Horizon 2020 grants was lower than the overall programme performance over the 2014-2020 period. This figure was also below the targets originally set (see ***Figure 12***).

Figure 12 – Number of patent applications per €10 million invested in Horizon 2020 (closed projects)



Source: ECA, based on Commission data.

Private co-financing of EU AI projects was generally at the same level as other Horizon 2020 projects

85 One of the objectives of the EU's AI plans was to boost national and private-sector co-financing in EU-funded AI R&I. We therefore analysed the performance of AI grants financed under Horizon 2020. We paid particular attention to the AI grants co-programmed within the Public-Private Partnerships (PPPs) set up by the Commission.

86 We found that the EU co-financing rate (defined as the ratio between the EU contribution and the total financing of R&I projects) for AI projects under Horizon 2020 as of the end of 2022 (74 %) was lower (i.e. higher private-sector co-financing) than overall programme spending (78 %), but did not significantly outperform it. The Commission introduced a pilot scheme in 2023 with a reduced funding rate of 60 % for some innovation grants co-programmed with the partnerships.

87 The EU AI plans envisaged three main EU PPPs to involve business associations in designing the Commission's calls for AI grant proposals (i.e. "co-programming"): two PPPs for the Horizon 2020 programme (on Robotics and Big Data), and the newly established European AI, Data and Robotics (ADR) partnership, which replaced them for the Horizon Europe programme. PPPs can boost the financing of R&I in AI by:

- providing an additional private contribution to the co-programmed EU grants (direct co-financing); and
- funding private-sector projects triggered by the PPP's research agenda (indirect co-financing).

88 Each PPP had quantitative targets for Commission and indirect private co-financing. For the newly established ADR partnership, the target for the private sector was only a third of the targets established for the two previous PPPs, and envisaged a higher EU co-financing rate (see ***Table 3***). These targets contradict the aim of the EU AI plans to boost AI private co-financing of public investment. The Commission had not performed ex post assessments of the two PPPs by the time of the audit. Both the Commission and the private sector reported that the two PPPs that ended in 2020 had achieved their targets (see ***Table 3***), but we could not determine the reliability of estimated investment by associations, which was based on an

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[41] Inventing AI – Tracing the diffusion of artificial intelligence with US patents (USPTO, 2020).

[42] Artificial Intelligence Index Report 2022 (Stanford University).

anonymised survey. For the ADR partnership, no data were available at the time of the audit.

Table 3 – Co-investment of PPPs (billion euros): targets and outcomes

Funding source	PPP Robotics (2014-2020)	PPP Big Data Value (BDV) (2015-2020)	European partnership AI, Data and Robotics (ADR) (2021-2027)
Horizon 2020 (a)	0.7 (0.7)	0.5 (0.4)	
Horizon Europe (b)			1.3
Indirect private investment (c)	2.1 (2.5)	2 (2.3)	1.3
EU indirect co-financing rate ((a+b)/d)	25 % (22 %)	25 % (15 %)	50 %
EU direct co-financing rate achieved for Horizon 2020 projects	91 %	85 %	
Total (d=a+b+c)	2.8 (3.2)	2.5 (2.7)	2.6

Note: Outcomes are in brackets.

Source: Commission documents and PPPs' monitoring reports compiled by the ECA.

89 In addition, despite stakeholder involvement in the Commission planning of grant proposals, direct EU co-financing was generally higher than for the entire Horizon programme (i.e. 85 % for Big Data, and 91 % for Robotics, compared with 78 % for Horizon 2020).

90 The Commission involved the three PPPs in co-programming AI R&I projects in the "Digital, Industry and Space" cluster of Horizon programmes. This meant that the grants co-programmed with the PPPs accounted for only 14 % of total AI grants under Horizon 2020 and 15 % under Horizon Europe at the end of 2022. In addition, the EU-funded AI excellence networks (see paragraph ***26***) lay within the scope of the cluster, but were not co-programmed or co-financed by the private sector. In the US, the private sector has been co-financing AI research institutes[43] set up by federal

[43] The US National Science Foundation – Artificial Intelligence.

agencies since 2020. The institutes generally had a specific sectoral focus to increase their relevance for the private sector. The EU-funded networks of excellence centres have not yet had sectoral specialisation.

91 Although the Commission set up partnerships with businesses involved in AI innovation, the rate of direct co-financing of EU-funded projects did not outperform when compared with the overall research programme. Moreover, the private financing target for PPPs has recently been revised downwards. There is therefore little indication that the EU AI plans have boosted the private financing of AI R&I.

The Commission's contribution to the exploitation and dissemination of AI R&I results had programme-related shortcomings

92 Increasing the exploitation of AI research results is key to boosting innovation and thus the development of AI ecosystems. The Horizon 2020 and Horizon Europe programmes require grant beneficiaries to exploit and disseminate the results of their R&I projects, mainly in the EU[44]. This could be done by using the results in further research activities, creating a commercial product or process, providing a final service, or using them in standardisation activities. The Horizon 2020 projects must have a plan for exploiting and disseminating results, which the Commission is required to monitor[45]. Similar requirements exist in the new Horizon Europe programme.

93 We sampled 10 closed AI R&I projects financed by Horizon 2020 in the areas of the environment, smart mobility and industrial robotics, which are priority sectors in the EU's 2021 AI plan (see paragraph ***12***). We found that the Commission monitored beneficiaries' obligations to exploit and disseminate research results throughout the course of the project. However, the Commission did not check the implementation of the project exploitation plans after the projects had ended, i.e. when all the results are generally available, and it had no systematic information on the final success of the projects, as this was not required in the grant agreements. The rules for the Horizon Europe programme require beneficiaries to update the plan for exploiting and disseminating the results during and after the end of the action. The Commission plans to collect data from beneficiaries on the actual implementation of the plans after the project ends.

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[44] Article 43 of Regulation (EU) 1290/2013 and Article 39 of Regulation (EU) 2021/695.

[45] Article 13 of Regulation (EU) 1290/2013, H2020 annotated grant agreement and Online Manual.

94 By their very nature, exploitation plans do not necessarily lead to actual commercialisation or exploitation results, even when they are complex and lengthy (see ***Box 2***). By comparison, the US National Science Foundation (NSF) requires grantees to draft only a short plan for the dissemination of research results attached to their grant proposal[46].

Box 2

Example of complex exploitation planning and a weak outcome

One project in the field of cybersecurity (implemented over the 2019-2022 period) developed solutions for autonomous cars. The Commission's call for projects was aimed at innovation actions (i.e. technologies with high readiness levels). The documentation of exploitation planning was detailed and regularly updated. The studies increased in length from around eight pages in the project proposal to 47 pages for the intermediary plan and 117 pages for the final plan. However, the project did not result in any commercialisation of results, and the Commission did not have evidence of any continuation of the project at the time of the audit.

95 The beneficiaries of Horizon programmes are also required to carry out dissemination activities to increase the social impact of their project by sharing information on their research results with the scientific community, commercial parties, civil society, and policymakers. The Commission publishes the research results on two main platforms[47] (CORDIS and Innovation Radar). We found that the platforms had technical and design-related shortcomings which make them less useful for users searching for information about AI projects and their results (see ***Annex VII***).

96 An important mechanism that can facilitate the commercialisation of the results of AI innovations created in universities is spin-off firms set up by students or researchers. However, public evidence (including articles[48] and studies[49]) shows that there are still significant hurdles in the EU that discourage would-be entrepreneurs from creating new spin-offs. These hurdles include complex administrative procedures and difficult financial negotiations on sharing research results, which may be unfavourable to founders. Despite some action to enhance the value of scientific

[46] US National Science Foundation – Preparing Your Data Management Plan.

[47] Article 43(3) of Regulation (EU) 1290/2013 and Article 39(7) of Regulation (EU) 2021/695.

[48] University tech transfer system overhaul (Sifted.eu), Universities in the UK and Europe have a start-up problem (FT.com), Database on spinouts (spinout.fyi).

[49] Donner un sens à l'intelligence artificielle (French Parliament report, 2018), page 92.

knowledge[50], the Commission did not study how such value could be enhanced and harmonised across member states. In the UK, the government launched a review of the spinout landscape.

97 Another EU measure to ensure the European exploitation of EU-funded research results is the EU funding body's right to object to transfers of ownership and exclusive licensing of such results (e.g. intellectual property rights) to third parties established in a country not associated with Horizon programmes[51]. However, the objection can be exercised if the grant agreement includes such a clause. The clause was not systematically included in the grant agreements for AI projects financed from the Horizon 2020 programme (e.g. only half of the projects in our sample had one). There was no Commission policy on this aspect.

98 During the audit, the Commission adopted a guidance note on how to handle beneficiaries' notifications of planned transfers of ownership or exclusive licensing. However, the Commission did not stipulate guidelines for assessing the legal criteria that project officers have to apply to AI grants, thus potentially leading to inconsistent checks. We identified one project (out of ten sampled) where the funding body had to assess the application of the objection clause. We found that the assessment by the project officer was not comprehensive (see ***Box 3***).

[50] EU valorisation policy.

[51] For Horizon 2020: Article 44(3) of Regulation (EU) 1290/2013 and Article 30(1) of the H2020 annotated grant agreement.

Box 3

A Horizon 2020 AI project – Intellectual property transfer to a third country

A project developed by a German company received funding from the EIC. It involved upgrading the software suite that optimises the behaviour of applications running on complex hardware platforms. The upgrade introduced better support for the requirements of emerging AI technologies. The value of its products was confirmed when the company was acquired by a US company in 2021. The company notified the EIC of its intention to transfer all intellectual property rights (IPRs) to the parent company. EISMEA had to assess whether the transfer was consistent with the interests of developing the competitiveness of the EU economy and with ethical principles or security considerations. EISMEA did not object to the transfer, but we found that the underlying assessment was not comprehensive, and that there was no specific guideline on assessing the objection criteria at that time.

99 The Commission had limited checks to ensure that results of EU-funded AI R&I are commercialised or otherwise exploited. The missing elements include post-project monitoring of AI R&I results, policies to stimulate university spin-offs, and consistent screening of transfers of IPRs outside the EU. These reduced the Commission's ability to maximise the development of an EU AI ecosystem, especially in priority sectors.

Conclusions and recommendations

100 Overall, we found that the Commission's actions covered key dimensions that are important for the development of an EU ecosystem for artificial intelligence (AI). This includes regulation and coordination, putting technological and financial enablers of innovation and uptake in place, and direct investment in AI research projects. However, the multiple actions (many of which are still ongoing) had a limited effect in developing the EU AI ecosystem by the time of the audit, and did not accelerate AI investment in line with global leaders.

101 The Commission designed comprehensive plans for coordinating the scaling-up of AI investment across member states. However, the Commission and national measures were not effectively coordinated, as the Commission lacked the necessary governance tools and information. The Commission managed to increase spending on AI from EU research programmes as planned, but did not have AI-specific performance targets or a corresponding monitoring system. Moreover, the Commission was slow to implement new facilities for bringing AI innovation into the market, partly due to the late adoption of the Digital Europe Programme, meaning that significant results were not achieved by the time of the audit.

102 In terms of policy design, the scope of the two EU AI coordinated plans was comprehensive, in line with similar plans in leading AI countries and the Organisation for Economic Co-operation and Development's recommendation. The plans were instrumental in triggering national AI strategies and updates, albeit with some delays. However, the plans lacked impact assessments based on sound justification of EU investment targets, and a monitoring framework. Investment targets were not updated despite increasing gaps between the US and the EU. In addition, the Commission had few governance tools available to coordinate national actions effectively. For example, it was unclear how member states should contribute to achieving EU investment targets (see paragraphs ***24-41***).

Recommendation 1 – Reinforced planning and coordination of AI investment

The Commission should:

(a) re-assess and justify investment targets, based on adequate data, considering international and technological developments and the national investment needs of both the public and private sectors;

(b) strengthen the EU AI Plan's coordination tools by agreeing on national AI investment targets in the next revision of the EU AI Plan. In doing so, the Commission should use the tools available under the Digital Decade Policy Programme where appropriate;

(c) regularly monitor the progress of the EU AI Plan.

Target implementation date: 1a) and c) from-2025, 1b) end of 2024

103 An important pre-requisite for the AI industry to achieve EU-wide synergies is a single market for data. However, recent EU measures to increase data-sharing across the EU are at an early stage of implementation (see paragraphs ***42***-***47***).

104 The Commission took important steps to create a harmonised EU legal framework for developing and using trustworthy AI. The recent agreement on the AI Act is a key milestone. However, work on the regulatory framework for AI that started several years ago is still ongoing (see paragraphs ***48***-***52***).

105 The Commission took action to put financial and infrastructure enabling conditions in place for the development of AI. From the financial angle, the Commission aimed to boost capital support for AI innovators. However, AI plans triggered modest capital support for innovators through Horizon 2020. An InnovFin pilot scheme launched in 2020 has not yet been successful at targeting breakthrough AI innovation in the EU. Although AI projects are eligible under InvestEU, no new AI-targeted schemes have followed the pilot scheme to date. The EIC Fund did not provide significant amounts for AI projects in 2020-2022 (see paragraphs ***55***-***64***).

106 With the new Digital Europe Programme, the EU planned to invest in infrastructure to facilitate the development and uptake of AI technologies by small and medium enterprises (testing and experimentation facilities, AI libraries, digital innovation hubs, and data spaces). So far, the Commission has launched infrastructure for less than a third of the budget. Such a slow start means that upcoming AI facilities can be implemented only towards the end of the programme, and could have supported AI innovators sooner. Even among the projects that were launched, some do not yet provide services. These projects have not benefited from a coherent EU AI coordination framework to facilitate easier access for firms (see paragraphs ***65***-***72***).

Recommendation 2 – Capital support for AI innovators

To enhance the accessibility and scale of EU capital support for AI-innovative SMEs established in the EU, the Commission should evaluate the need for a targeted financing scheme within the current programmes.

Target implementation date: mid-2025

Recommendation 3 – Access to AI innovation infrastructure

With a view to facilitating SME access to AI facilities across the EU, the Commission should ensure that EU-funded AI innovation infrastructure operates in a coordinated way with a single access point.

Target implementation date: mid-2026

107 As regards direct EU investment in AI research and innovation projects, we found that spending in 2018-2020 increased in accordance with the Commission's targets. However, implementation for 2021 and 2022 was not on track due to delays in adopting the Horizon Europe programme, which is the main source of AI project financing in the EU (see paragraphs ***74***-***79***).

108 The Commission allocated funds to numerous AI projects, but did not tag them consistently across the EU budget and did not monitor their contribution to the development of an EU AI ecosystem. We found that the share of AI projects with patent filings was lower than for Horizon 2020 grants overall, thus highlighting the need for more applied AI research that can be commercialised. Despite the Commission's objective, there is no indication that EU AI R&I triggered significantly

higher private financing than in the overall Horizon 2020 programme (see paragraphs ***80-91***).

Recommendation 4 – Reinforced monitoring of EU funding for AI research and innovation

To improve the monitoring and reach the critical mass of EU-funded AI R&I, and to ensure that investment targets are achieved, the Commission should:

(a) design a framework for tagging financial support for AI development and uptake in the EU in the planning and implementation phases with consistent criteria applied across all EU spending, building on the tagging procedure launched for Horizon Europe;

(b) set out AI-specific and measurable performance targets and indicators, and start to monitor performance across the EU budget on a regular basis.

Target implementation date: end of 2025

109 The Commission had only partially effective controls to ensure that the AI R&I results funded by the EU budget are commercialised or otherwise exploited. There were no arrangements for post-project monitoring of results, even for priority AI sectors. Furthermore, when implementing Horizon 2020, the Commission did not stipulate guidelines for objecting to transfers of R&I results outside the EU. The Commission online platforms collect useful information on the results of EU-funded R&I (e.g. CORDIS and Innovation Radar). However, the platforms do not allow users to identify results in the area of AI in a consistent manner (see paragraphs ***92-99***).

Recommendation 5 – Exploitation of research and innovation results for AI

The Commission should strengthen its action to support the exploitation of Horizon Europe R&I results in the AI field in the EU, e.g. by setting up post-project monitoring of results, and clarifying the application of the EU framework for transfers or exclusive licensing of results ownership outside the EU.

Target implementation date: end of 2025

This report was adopted by Chamber IV, headed by Mr Mihails Kozlovs, Member of the Court of Auditors, in Luxembourg at its meeting of 16 April 2024.

For the Court of Auditors

Tony Murphy
President

Annexes

Annex I – Main components of the most recent US, UK and EU AI plans

	US plan (2023)	UK plan (2021)	EU plan (2021)
Investment in R&I	Yes	Yes	Yes
Core research centres	Yes	Yes	Yes
Build shared hardware resources	Yes	Yes	Yes
Improve availability of data	Yes	Yes	Yes
Environments for AI testing	Yes	Yes	Yes
Develop AI skills	Yes	Yes	Yes
Set up public-private partnerships	Yes	No	Yes
Public programme for AI uptake	No	Yes	Yes
Venture capital	No	Yes	Yes
Boost AI uptake	No	Yes	Yes
Build safe and ethical AI (standards, regulations)	Yes	Yes	Yes
Internal cooperation on R&I and standards	Yes	Yes	Yes

Source: ECA, based on respective AI plans.

Annex II – Overview of European networks of AI centres of excellence

Financed by Horizon 2020

Project	Topics covered	Duration	Grant amount (m€)
AI4Media	Media and fake news	2020-2024	12
ELISE	Machine learning	2020-2023	12
HumanE-AI-Net	Human-centric AI	2020-2023	12
TAILOR	Trustworthy AI	2020-2024	12
VISION	Coordination of the EU-financed AI excellence networks	2020-2023	2

Financed by Horizon Europe

Project	Topics covered	Duration	Grant amount (m€)
ENFIELD	European Lighthouse to Manifest Trustworthy and Green AI	2023-2026	11.3
ELIAS	European Lighthouse of AI for Sustainability	2023-2027	11
dAIEDGE	A network of excellence for distributed, trustworthy, efficient and scalable AI at the edge	2023-2026	10.7
ELSA	European Lighthouse on Secure and Safe AI	2022-2025	7.4

Source: ECA, based on Commission data.

Annex III – Progress reporting on the Commission's actions (2021 Plan)

In 2022, the Commission assessed its implementation of 41 key actions listed in the 2021 EU AI Plan. In this table, we provide the state of play for 38 actions with a deadline in 2021 or 2022.

Number of measures of 2021 Plan by pillar	Delayed	On time	Total
2021	**11**	**8**	**19**
I Set enabling conditions for AI development and uptake in the EU	3	1	4
II Make the EU the place where excellence thrives from the lab to the market	1	2	3
III Ensure that AI works for people and is a force for good in society	2	1	3
IV Build strategic leadership in high-impact sectors	5	4	9
2022	**9**	**10**	**19**
I Set enabling conditions for AI development and uptake in the EU	1	3	4
II Make the EU the place where excellence thrives from the lab to the market	2		2
III Ensure that AI works for people and is a force for good in society		6	6
IV Build strategic leadership in high-impact sectors	6	1	7
Grand total	**20**	**18**	**38**

Source: ECA, based on Commission information.

Annex IV – Analysis of AI funding through the InnovFin AI/BT initiative

01 According to InnovFin Equity rules, potential beneficiaries cannot apply directly to the EIF or the Commission, but must be selected by financial intermediaries, who make their decisions based on commercial criteria[52]. The EIF appointed 13 financial intermediaries for the initiative. The EIF selected the intermediaries from proposals received after publication of a call for proposals, based on the respective investment guidelines of the funds proposed. Fund managers did not have to demonstrate their expertise in assessing AI/BT projects.

02 The targeted beneficiaries of the scheme were SMEs developing or operating in the field of AI or blockchain in the early or growth stages, but the investment guidelines were not fully clear about the definition of activities within the scope of AI. There are known risks of unjustified self-designation of firms as AI innovators[53]. The selection criteria were:

— being active in research, development or operation of AI/BT;

— having exploited AI/BT in order to research, develop or manufacture products or services;

— having transferred AI/BT across industries or sectors;

— having otherwise exploited AI/BT-based products or services.

03 We observe that this broad scope encompasses not only innovation but also the uptake of AI/BT technologies, and so may not target only AI/BT innovators in the EU as initially envisaged in the 2018 EU AI Plan. The Commission/EIF has no overview of how many recipients fall into each of the four categories mentioned above, or under the two categories defined in the selection criteria (AI versus BT).

04 The application to be submitted by fund managers for the EIF's investment decision requires comprehensive company data, but no description of the funded AI activities. There was also no requirement for fund managers to report regularly to the EIF/Commission on the progress of beneficiaries' AI activities, innovation results or risks. The EIF focused on financial compliance checks in line with the general monitoring framework of InnovFin Equity, but there were no data on performance

[52] InnovFin equity FAQ, section 8.

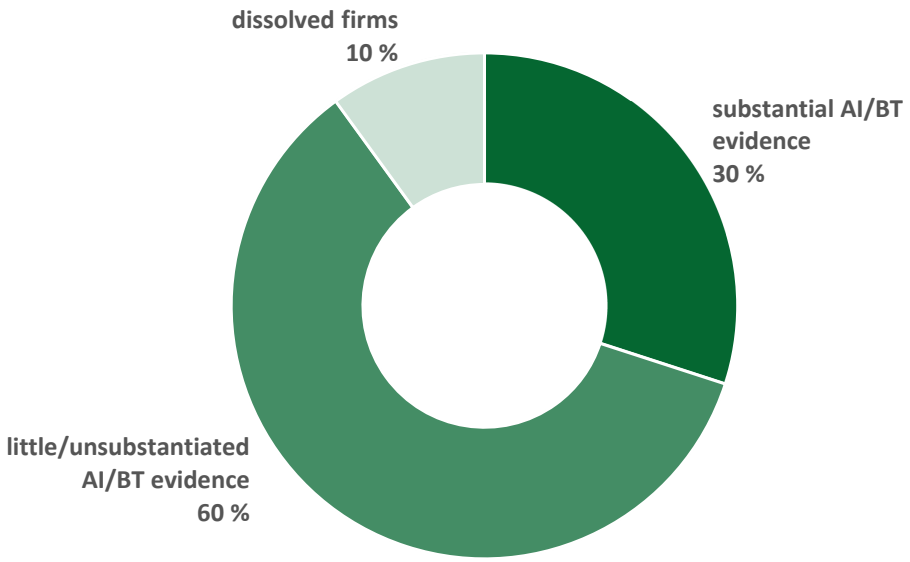
[53] Use of AI in European "AI Startups".

(e.g. the number of innovations, patents, publications, market shares, or products launched).

05 Applicants for taxpayers' money therefore depended fully on decisions made by private undertakings whose relevant expertise was not assured, and had no legal recourse if they were not selected. Furthermore, the Commission had no assurance that the final recipients would generate a breakthrough and ethical AI innovation, or contribute to the EU AI ecosystem, as this is not assessed.

06 We found little evidence that recipients are active in AI/BT innovation activities. Our review of the information available online about 20 final recipients of the initiative (selected randomly out of 155 in total, representing about 10 % of the total AI/BT initiative invested) showed that only six were innovators in AI/BT. In most cases, it is difficult to see what could make the beneficiaries AI/BT innovators (see ***Figure 13***). It is unclear how these activities qualify as contributions to the EU goal of reaching leadership in breakthrough and ethical AI innovation.

Figure 13 – Review of sampled beneficiaries' AI/BT activities

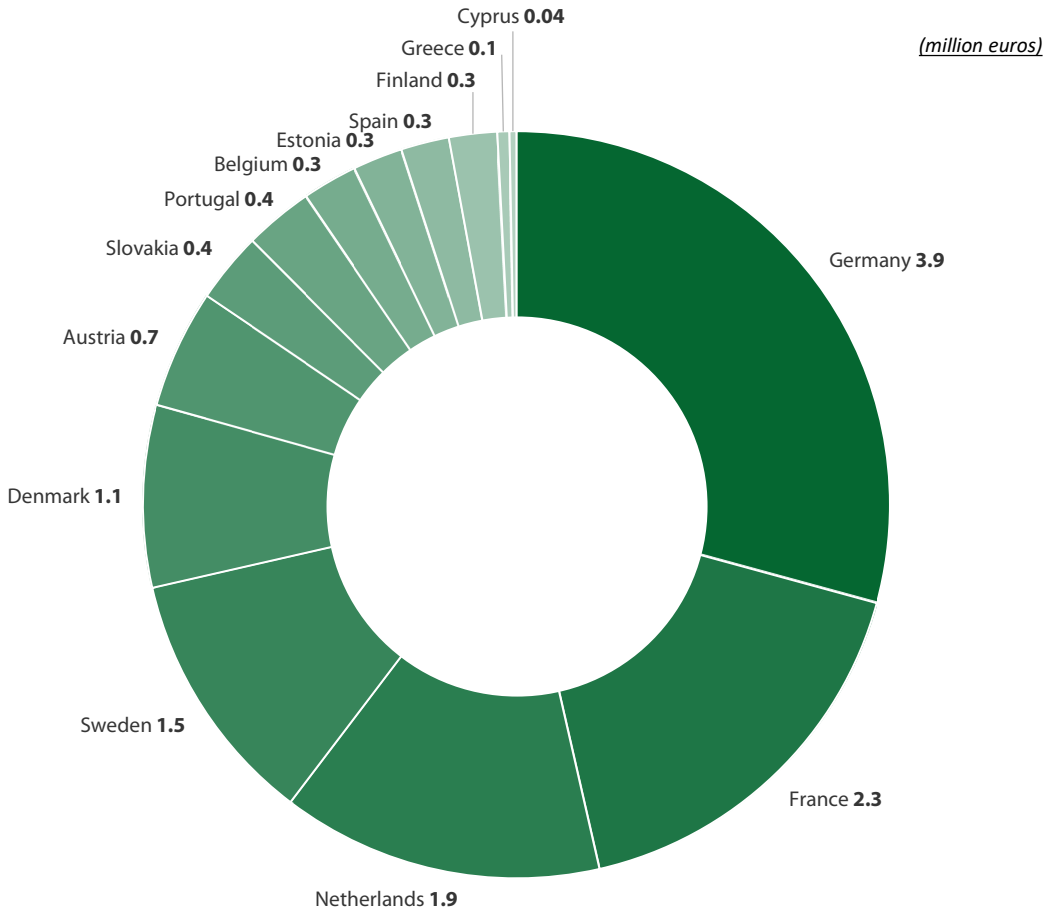


Source: ECA, based on the sampled beneficiaries' websites

07 Beneficiaries had to be established or operating in the EU at the time of first investment. However, there are no safeguards preventing recipients from relocating or transferring technologies to third countries, in particular when such technologies are successful. Moreover, looking at the recipients' countries of origin as reported by the EIF, 52.3 % of EU funding went to companies outside the EU (e.g. the UK and the US). There is therefore no guarantee that the investments actually contribute to establishing an EU AI ecosystem and reducing the EU funding gap.

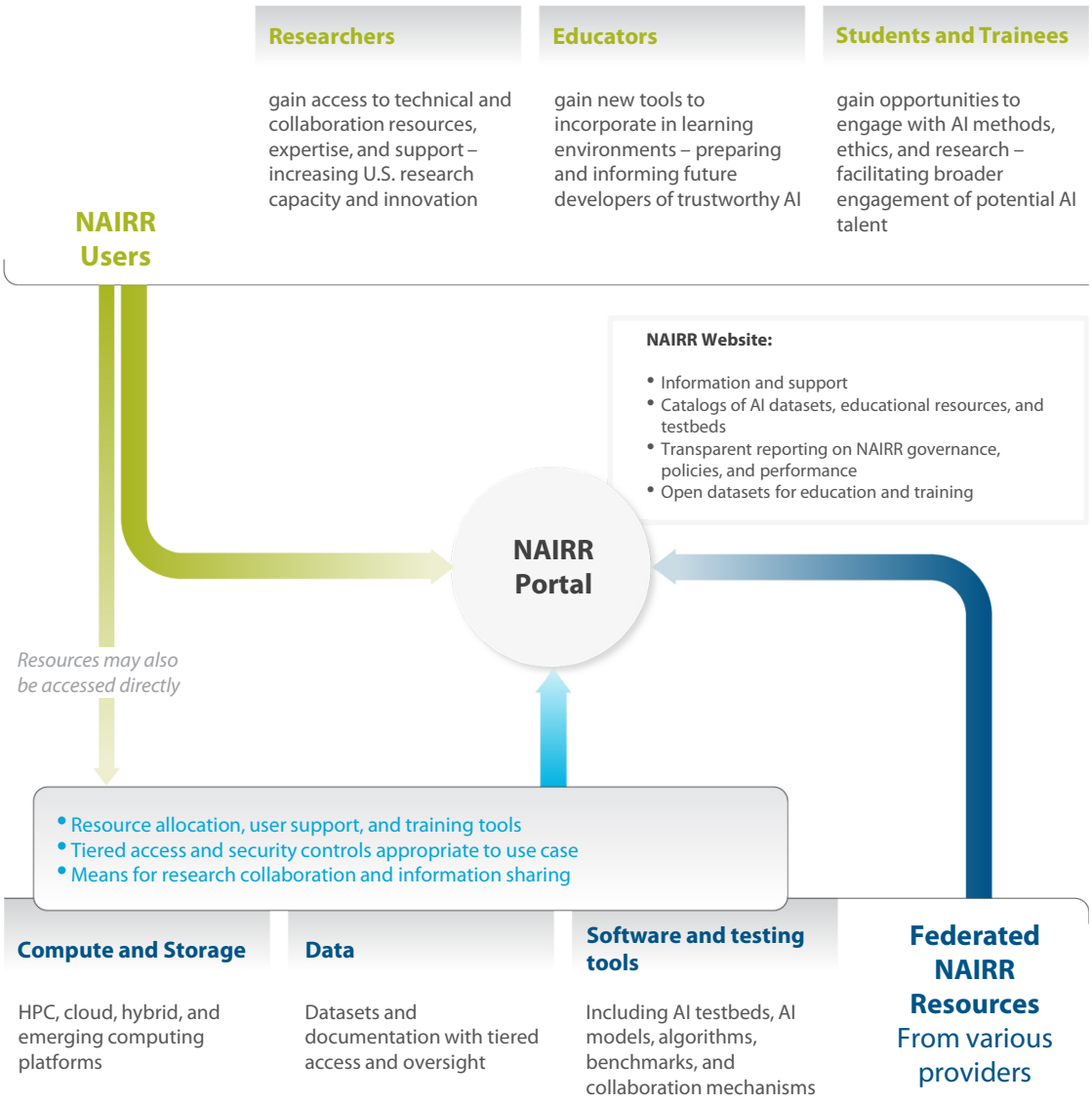
08 Furthermore, the amounts paid out were far from being evenly distributed across the EU: most companies were from Germany, France, the Netherlands and Sweden (representing 75 % of European beneficiaries' equity; see ***Figure 14***). This means that regions with lower capital availability are less supported by the initiative.

Figure 14 – Amounts invested in EU firms



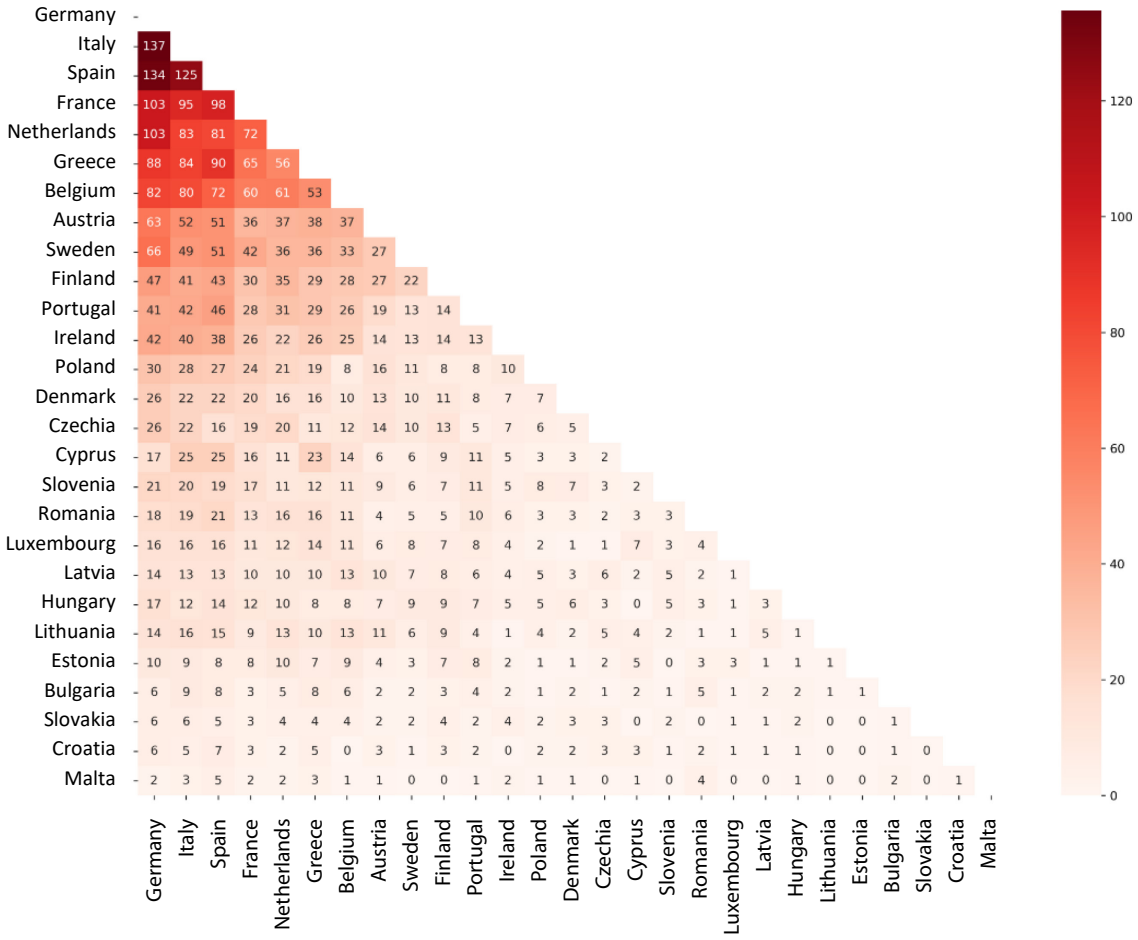
Source: ECA, based on EIF monitoring report as of end-2022.

Annex V – Planned coordination of US National AI Research Resource



Source: Final implementation plan of US NAIRR Task Force (2023).

Annex VI – Overview of transnational cooperation on EU-funded R&I projects in the AI field



Note: The triangle shows the number of projects which included cooperation by beneficiaries from at least two different member states.

Source: ECA, based on Commission data on Horizon 2020 grants.

Annex VII – Weaknesses in the Commission's platforms for disseminating AI research results

System and purpose	General shortcomings	AI specific shortcomings
CORDIS The Commission's public repository of research outputs such as reports, deliverables and links to scientific publications, resulting from all projects funded by EU research programmes.	• After the project has ended, there is no obligation for beneficiaries to upload results on CORDIS, as such an obligation is not mentioned in the grant agreements or Horizon programme rules, as is the case with the NSF repository of projects in the US. • CORDIS does not have advanced filtering options for scientific publications, as is the case in the NSF repository. Such filtering options are available on another pilot platform (OpenAIRE), but it is not promoted in CORDIS. • CORDIS does not include any information on patent applications and patents awarded, even though this is a key output of research. Patent content is planned to be integrated in 2024. • There are limitations to the data that users can download from CORDIS (i.e. search results are only downloadable in parts). By comparison, all search results are fully downloadable from the NSF repository. • CORDIS project pages do not include references to some of the Commission platforms on EU research programmes where the	• CORDIS automatically classifies projects in the categories of 'field of science' (including AI), based on an algorithm. Beneficiaries can review such tagging, but there is no Commission guidance on how beneficiaries should review the AI tagging, meaning that such tagging may be inconsistent. In our sample of 10 AI projects, only five had an AI tag in CORDIS. • The Commission took no action to ensure consistency between AI tagging by CORDIS and the recently implemented AI tagging in Horizon Europe or in Innovation Radar. • AI tagging offers no possibility to search for more specific AI topics (e.g. edge AI, frugal AI, or generative AI), or for AI methods employed to produce research results. The Commission is evaluating new terms for inclusion in the CORDIS taxonomy.

System and purpose	General shortcomings	AI specific shortcomings
	projects are promoted (e.g. Innovation Radar, Horizon Results Platform).	
Innovation Radar Commission initiative that was launched in 2019 to identify and promote high-potential innovations and innovators from EU-funded research projects, and facilitate their uptake and access to private financing.	• Certain results such as IPRs related to listed innovations are not shown in the tool, even though this could be useful for potential investors. • There is no interconnection between the Innovation Radar tool and the main dissemination tool (Cordis), a link which could potentially increase its visibility and outreach. • Limited search options (e.g. no possibility to search by project number or acronym)	The website has no filters for selecting projects or innovations in the field of AI. The filtering options are generally vague (e.g. 'deep tech' under the category 'Innovation Topic'), and do not allow searches for more specific technologies.

Abbreviations

AI: Artificial intelligence

AIOD: AI-on-demand platform

DEP: Digital Europe Programme

DG CNECT: Commission Directorate-General for Communications Network, Content and Technology

DG RTD: Commission Directorate-General for Research and Innovation

EDIH: European Digital Innovation Hub

EIC: European Innovation Council

EIF: European Investment Fund

EISMEA: European Innovation Council and SMEs Executive Agency

EIT: European Institute of Innovation and Technology

ESIFs: European Structural and Investment Funds

JRC: Commission Joint Research Centre

OECD: Organisation for Economic Co-operation and Development

PPP: Public-private partnership

R&I: Research and innovation

RRF: Recovery and Resilience Facility

SME: Small or medium-sized enterprise

TEF: Testing and experimentation facility

Glossary

AI-on-Demand: Online platform facilitating knowledge sharing, research and development, and the uptake of solutions and technologies in the area of artificial intelligence.

Artificial intelligence: Using computers to simulate human intelligence through capabilities such as learning and problem-solving.

Big Data: Sets of data from diverse sources that are too large to be processed by conventional data-processing methods.

Cloud computing: Remote processing and storage of data through the internet.

Digital Europe Programme: EU programme focused on bringing digital technology to businesses, citizens and public administrations.

European Digital Innovation Hubs: EU network of advisory bodies in the member states which serve as one-stop shops to help companies make effective use of digital technologies.

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

European Partnerships: Initiative under Horizon Europe through which the Commission works with private and public partners from member states and associated countries to provide support for research and innovation activities.

European Structural and Investment Funds: The five main EU funds which together supported economic development across the EU in the 2014-2020 period: the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development, and the European Maritime and Fisheries Fund.

Horizon 2020: The EU's research and innovation programme for the 2014-2020 period.

Horizon Europe: The EU's research and innovation programme for the 2021-2027 period.

InvestEU: Mechanism to mobilise private investment in projects of strategic importance for the EU. Succeeded the European Fund for Strategic Investments.

Machine learning: Process in which an IT application uses artificial intelligence to improve its performance on a specific task.

Public-private partnership: Cooperation between a government or other public body and one or more private-sector companies for a specific purpose, such as an EU-funded research and innovation activity.

Recovery and Resilience Facility: The EU's financial support mechanism to mitigate the economic and social impact of the COVID-19 pandemic and stimulate recovery, and meet the challenges of a greener and more digital future.

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

Unicorn: Privately held start-up with a value of over $1 billion, so called due to the rarity of such ventures.

Venture capital fund: Investment fund that focuses on SMEs with strong growth potential.

Replies of the Commission

https://www.eca.europa.eu/en/publications/sr-2024-08

Timeline

https://www.eca.europa.eu/en/publications/sr-2024-08

Audit team

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

This performance audit was carried out by Audit Chamber IV Regulation of markets and competitive economy, headed by ECA Member Mihails Kozlovs. The audit was led by ECA Member Mihails Kozlovs, supported by Edite Dzalbe, Head of Private Office and Laura Graudina, Private Office Attaché; Kamila Lepkowska, Principal Manager; Adrian Savin, Head of Task; Dimitrios Maniopoulos, Jörg Genner, Ezio Guglielmi and Stefan-Razvan Hagianu, Auditors. Mark Smith provided linguistic support. Alexandra-Elena Mazilu provided graphical support. Mattia Belli and Emanuele Fossati provided data analysis support.

From left to right: Jörg Genner, Laura Graudina, Edite Dzalbe, Mihails Kozlovs, Stefan-Razvan Hagianu, Kamila Lepkowska, Ezio Guglielmi, Adrian Savin

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Embracing AI technology will likely determine the path of the EU's future economic development. In 2018, the Commission adopted a coordinated plan with the member states to scale up investment in artificial intelligence and adapt the regulatory environment, which was updated in 2021.

We assessed whether the Commission's implementation of the framework was being effective. We found that the Commission's actions covered key dimensions that are important for the development of an EU ecosystem for artificial intelligence. However, the multiple actions (many of which are still ongoing) had a limited effect in developing the EU AI ecosystem by the time of the audit and did not accelerate AI investment in line with global leaders. The Commission and national measures were not effectively coordinated, as the Commission lacked the necessary governance tools and information.

We recommend that the Commission re-assess the EU investment target for AI and how member states might contribute to it, evaluate the need for a more AI-focused capital support instrument, reinforce coordination and monitoring, and steps up support for the exploitation of results in the EU.

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

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