
Reports from Member States on the Implementation of the 2021 UNESCO Recommendation on the Ethics of Artificial Intelligence

I - Introduction (1054)

These Guidelines are intended to assist Member States in the preparation of the reports on the implementation of the 2021 Recommendation on the Ethics of Artificial Intelligence (henceforth referred to as the “2021 Recommendation”) that was adopted by the 41st session of the General Conference of UNESCO on 23 November 2021.

The 2021 Recommendation is composed of three main pillars – values, principles and policy areas – that together build an all-encompassing framework for the protection and promotion of human rights while developing, using and implementing artificial intelligence (AI) systems.

Pursuant to Articles 15 and 16.1 of the *Rules of Procedure concerning recommendations to Member States and international conventions covered by the terms of Article IV, paragraph 4, of the UNESCO Constitution*, the Director-General of UNESCO has invited Member States by the Circular Letter (CL/4377) to submit the 2021 Recommendation to their competent authorities within a period of one year from the close of the session of the General Conference at which it was adopted, i.e. before 24 November 2022.

Furthermore, under Article VIII of UNESCO’s Constitution, Member States are required to submit a report on the legislative and administrative provisions and any other measures they have taken to implement the conventions and recommendations adopted by the Organization.

(17076)

Type: (X/boilerplate)

II - What Are the Aims of this Consultation? (1064)

This global consultation aims to assist Member States in:

- 1. Mapping policies, mechanisms and actions related to AI against the objectives of the 2021 Recommendation,**
- 2. collecting and disseminating progress and good practices on ethics of AI,**
- 3. identifying challenges and opportunities faced by Member States in the implementation of the 2021 Recommendation, to identify specific capacity-building needs.**

(17077)

Type: (X/boilerplate)

III - How to Fill In the Questionnaire? (1055)

In the two years following the adoption of the 2021 Recommendation, the Secretariat of the Social and Human Sciences Sector of UNESCO elaborated a comprehensive plan for the implementation of the 2021 Recommendation, following its provisions. This plan includes monitoring tools (the [Readiness Assessment Methodology](#) (RAM) and the [Ethical Impact Assessment](#)), the establishment of expert networks like the Women for Ethics of AI platform and AI Ethics Experts without Borders, a flagship annual Global Forum on the Ethics of AI, the establishment of the Global AI Ethics and Governance Observatory; and more. The full plan can be [reviewed here](#) . Thus, many of the questions in this questionnaire aim to examine Member States' adherence, familiarity and progress in relation to this implementation plan.

In particular, the monitoring tools mentioned above are at the core of the implementation plan, and UNESCO is currently working with a growing number of countries around the world to implement them. The RAM aims to assist Member States in examining where they currently stand in terms of regulatory preparedness to implement AI ethically and responsibly. UNESCO also consulted with Member States in the process of developing those tools using a pre-survey. Thus, countries who already conducted Readiness Assessment, or filled in the pre-survey, are welcome to use some of their answers to fill in the questionnaire below and update them as needed given that the domain of AI is changing rapidly, so changes to laws and policies are to be expected. Member States are encouraged to work closely with the secretariat to align with the implementation plan and undergoing Readiness Assessment, as this in-depth exercise serves as a gold standard for reporting and will assist Member States in moving from principles to practice in the implementation of the 2021 Recommendation and the ethical deployment of AI.

The following questionnaire aims to guide and assist Member States with their reporting on the progress made in the implementation of the 2021 Recommendation on the Ethics of AI. It aims to collect information on the extent to which Member States have integrated the core values, principles and policy areas anchored in the 2021 Recommendation, in their national science,

technology and innovation systems.

Responses to this questionnaire will be considered as the official national report of each Member State.

Prior to completing the questionnaire, Member States are encouraged to organize the necessary consultations within and outside the concerned ministries and institutions, including with authorities and bodies responsible for science, technology, innovation, and ethics, as well as other relevant actors concerned with AI ethics, including the scientific community, professional associations, civil society, indigenous and traditional knowledge holders, private sector partners and National Commissions for UNESCO.

Member States are invited to submit their AI Ethics questionnaire in either English or French, preferably via our [dedicated online platform](#) , or alternatively by sending the [questionnaire](#) to ai-ethics@unesco.org . We encourage the use of the online platform to ensure a streamlined submission process.

To ease the reporting process, Member States are requested to designate a contact person responsible for information sharing and cooperation with UNESCO in relation to reporting on the 2021 Recommendation. Member States should inform the Secretariat of this designation by 30 September 2024 at: ai-ethics@unesco.org . The access code to the online questionnaire will then be shared with the designated person promptly .

Upon your permission, the results of this questionnaire will be made available on UNESCO's website to facilitate the exchange of information relating to the promotion and implementation of this Recommendation.

(17078)

Type: (X/boilerplate)

IV - General Information About the Respondent (1053)

Country: (17159)

Type: (list-dropdown)

EE - Estonia

Organization(s) or entity(ies) responsible for the preparation of the report: (17079)

Type: (Q/multiple-short-txt)

Ministry of Justice and Digital Affairs

Name: (17080)

<https://www.justdigi.ee/>

Website: (17081)

info@justdigi.ee

Email address: (17082)

(+372) 620 8100

Phone number: (17083)

The main duty of the Ministry of Justice and Digital Affairs is to plan and to carry out the digital, legal and criminal policy of the state, which will help ensure an open and secure society, where people may be assured of the use and protection of their rights.

Please describe the role/mandate of your organization: (17084)

Officially designated contact person(s) who completed this survey:

(17085)

Type: (Q/multiple-short-txt)

Henrik Trasberg

Full Name: (17086)

Legal Adviser on New Technologies

Position: (17087)

henrik.trasberg@justdigi.ee

Email address: (17088)

Full Name(s) of designated official(s) certifying the report:

(17091)

Type: (S/text-short)

Henrik Trasberg

Brief description of the consultation process established for the preparation of the report:

(17092)

Type: (T/text-long)

Initial input was gathered from governmental and academic organizations. Once the draft report was finalized it was sent for feedback to public sector, private sector and academic institutions.

1 - Promoting the Ethics of AI in your Country Through the 2021 Recommendation (1056)

1.1 - Has the 2021 Recommendation on the Ethics of Artificial Intelligence been promoted and/or shared with appropriate ministries and institutions as well as affiliated organizations in your country? (17160)

Type: (L/list-radio)

Yes

Y

1.1.a - Please indicate which ministries and or national authorities/entities have been involved in the promotion of the 2021 Recommendation. (17093)

Type: (T/text-long)

Ministry of Culture, Ministry of Justice, Ministry of Economic Affairs and Communications.

1.2 - Is the 2021 Recommendation available in the national language(s) of your country? (17094)

Type: (L/list-radio)

Yes

Y

1.2.a - Which language(s)? (17162)

Type: (S/text-short)

Estonian

1.3 - Have there been awareness raising activities such as seminars, workshops, conferences or other campaigns/ events related to the 2021 Recommendation, organized or foreseen to be organized by the end of 2025 in your country by national authorities or entities? (17095)

Type: (L/list-radio)

Yes

Y

1.3.a - Please provide details on the activities organized or foreseen and links as relevant.

(17163)

Type: (T/text-long)

Awareness raising on the ethics of AI and specifically on the 2021 Recommendation has been done among educators – a workshop on this topic was organised for UNESCO ASPnet members in Estonia. Furthermore, there are general awareness raising activities on AI ethics that cover the topics of the 2021 Recommendation.

1.4 - Does your government currently have plans to implement the 2021 Recommendation, through establishing a national AI Ethics Commission or through other measures? (17096)

Type: (L/list-radio)

Yes

Y

1.4.a - Please elaborate. (17164)

Type: (T/text-long)

The 2021 Recommendations will largely be implemented through the governance structure established by the EU AI Act as well as through the activities foreseen in the “Data and AI White Paper 2024-2030” and “AI Action Plan 2024-2026” (both are available in Estonian here: <https://www.kratid.ee/kratt-visioon>).

1.5 - Has your country participated in any UNESCO organized events on the Ethics of AI, such as the annual Global Forum on the Ethics of AI? (17097)

Type: (L/list-radio)

Yes

Y

1.5.a - Please elaborate. (17596)

Type: (T/text-long)

Estonia has participated in the previous Global Forum on the Ethics of AI events.

1.6 - Has your country worked with UNESCO on implementing the monitoring and evaluation tools of the 2021 Recommendation: the Readiness Assessment Methodology (RAM) or the Ethical Impact Assessment (EIA)? (17098)

Type: (L/list-radio)

Neither

N

1.9 - Is your country interested in undergoing Readiness Assessment together with the secretariat? (17101)

Type: (L/list-radio)

Yes

AO01

1.10 - What external factors have impacted or could potentially impact the effective implementation of the 2021 Recommendation on the Ethics of Artificial Intelligence in your country? (17102)

Type: (T/text-long)

The EU legal framework on AI and the international AI governance efforts strongly impact the focus and the choices made in balancing the rights and interests of different stakeholders.

2 - Developing an Enabling Policy Environment for Artificial Intelligence (1057)

2.1 - In your country, which ministry(ies) is/are responsible for AI governance? (17103)

Type: (T/text-long)

Ministry of Justice and Digital Affairs is responsible for AI governance. The relevant teams include data science and machine learning expertise, data governance expertise, legislative policy expertise, data protection and fundamental rights expertise. Furthermore, Ministry of Foreign Affairs is responsible for international AI governance matters, such as for Global Digital Compact implementation process.

2.2 - Does your country have a national AI strategy? (17104)

Type: (L/list-radio)

Yes

Y

2.2.a - Please elaborate and provide the name and link to any relevant document(s). (17173)

Type: (T/text-long)

The underlying strategy is the Estonian Digital Agenda 2030 (<https://mkm.ee/en/e-state-and-connectivity/digital-agenda-2030>). More specific goals, metrics and activities on AI and data are outlined in the “Data and AI White Paper 2024-2030” and “AI Action Plan 2024-2026” – both are available here (in Estonian): <https://www.kratid.ee/kratt-visioon>.

2.3 - Does your country have binding laws or regulations mentioning AI, algorithms or machine learning? (17105)

Type: (L/list-radio)

Yes

Y

2.3.a - Please elaborate and provide the name and link to any relevant document(s). Please refer to both sectoral regulation as well as horizontal laws. (17175)

Type: (T/text-long)

Yes. The key regulation governing AI is the EU AI Act. Data and algorithms are also regulated via various other EU data economy regulations, including the GDPR, Data Governance Act, Data Act, Digital Services Act, Digital Markets Act, among others. In Estonia, automatic processing of data (including via algorithms) is mentioned in the Personal Data Protection Act (<https://www.riigiteataja.ee/en/eli/515012025002/consolide>). Public information systems and public databases are regulated via Public Information Act (<https://www.riigiteataja.ee/en/eli/529122024008/consolide>). Various rules on liability and obligations for information service providers are established in Information Society Services Act (<https://www.riigiteataja.ee/en/eli/503092024004/consolide>).

2.4 - Does your country have a data protection law? (17106)

Type: (L/list-radio)

Yes

Y

2.4.a - Please elaborate and provide the name and link to any relevant document(s). (17177)

Type: (T/text-long)

The EU General Data Protection Regulation as well as Convention 108 of the Council of Europe apply. They are implemented nationally largely through the Personal Data Protection Act (<https://www.riigiteataja.ee/en/eli/507112023002/consolide>).

2.5 - Do you have a national data sharing framework? (17107)

Type: (L/list-radio)

Yes

Y

2.5.a - Please elaborate and provide the name and link to any relevant document(s). (17179)

Type: (T/text-long)

The primary legislation guiding the management and disclosure of public information is the Public Information Act (<https://www.riigiteataja.ee/en/eli/529122024008/consolide>), which stipulates that data produced by government institutions should be accessible to the public, except in cases where legal limitations or privacy concerns apply. This principle aligns with the EU Open Data Directive, ensuring that Estonia's approach to data sharing is consistent with broader EU efforts to encourage the reuse of public sector information.

A key element of the Estonian framework is the "open by default" policy, which directs government bodies to release their datasets proactively in machine-readable formats that promote interoperability and foster innovation. This is further enhanced by Estonia's "once only" principle, which reduces administrative burdens on citizens and businesses by allowing them to submit data to public authorities just once.

Subsequently, government agencies rely on a secure data exchange layer – called the X-Road – to share information instantly and consistently among themselves. X-Road is the backbone of Estonia's national data sharing framework (read more here: <https://www.ria.ee/en/introduction-x-tee>). This infrastructure eliminates redundant data collection, speeds up service delivery, and improves both efficiency and accuracy across multiple public services.

The Ministry of Justice and Digital Affairs, together with the Information System Authority (RIA), drives Estonia's broader digital strategy and ensures that data sharing mechanisms operate smoothly. To improve accessibility and transparency, a government open data portal provides a single platform for accessing open data. State Information System Registry provides overview of all government registries and databases (www.riha.ee).

To safeguarding privacy and security, all operations comply with the EU's General Data Protection Regulation (GDPR) and are built on reliable cybersecurity protocols to maintain citizens' trust in digital services.

2.6 - Does your country have open government data policies? (17108)

Type: (L/list-radio)

Yes

Y

2.6.a - Please elaborate and provide the name and link to any relevant document(s). (17181)

Type: (T/text-long)

Public Information Act (<https://www.riigiteataja.ee/en/eli/ee/514112013001/consolide/current>) provides the main legal basis for how public sector information is managed and disclosed. It states that public information should be accessible, unless restricted by law (e.g., for national security or personal data protection reasons), all open data needs to be findable via government open data portal (<https://avaandmed.eesti.ee>), although certain restrictions apply (specific requirements outlined in Principles for Managing Services and Governing Information Act, <https://www.riigiteataja.ee/en/eli/ee/507072017004/consolide/current>). Furthermore, Digital State Agenda 2030 (linked above) sets out as an objective: “All machine-readable open data are available and reused as actively as possible” and adherence to “open by default” and “digital by default” principle, meaning government services and information are designed to be accessible online. Additional activities are undertaken to ensure everyone regardless of their technological skills and accessibility requirements can access services and information. For example, real-time subtitling and automatic transcription solutions were created and implemented in national broadcast, the Parliament, courts and other places to ensure people with hearing impairments have access to information. Government open data portal is developed and maintained by State Information System Authority. The Ministry of Justice and Digital Affairs together with Statistics Estonia manages government metadata standard and provides trainings, hands-on support, guidelines etc. for data management (including data quality). The supervision of the Public Information Act and the Personal Data Protection Act is carried out by the Data Protection Inspectorate (AKI).

2.7 - Does your country have laws or policies regarding procurement of AI systems or products/services that include AI components? (17109)

Type: (L/list-radio)

Yes

Y

2.7.a - Please elaborate and provide the name and link to any relevant document(s). (17183)

Type: (T/text-long)

The general procurement rules apply for procurement of AI systems and AI-based products. There are currently no legal amendments planned for AI-specific procurement. However, there are existing guidelines to provide technical support for AI procurement, see here:

https://www.kratid.ee/_files/ugd/980182_8d0fcb0be030467aa55a4f2839560cbe.pdf.

2.8 - Is there any legal obligation on the government to inform the public when they are subjected to the use of AI systems that profile or make decisions about them in the provision of public services? (17110)

Type: (L/list-radio)

Yes

Y

2.8.a - Please elaborate and provide the name and link to any relevant document(s). (17185)

Type: (T/text-long)

The GDPR Article 22 provides that the data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her, unless specific exceptions apply - including a transparency requirement. Furthermore, the Estonian Administrative Procedure Act establishes general transparency and explanation provisions for administrative acts which indirectly presumes providing information when a decision was rendered with the help of AI system. In the future, the EU AI Act Article 26(11) and Article 86(1) will create further obligation to inform of AI-driven decisions.

2.9 - Is there a law or policy highlighting monitoring, redress, and remedy mechanisms against harms caused by AI systems? (17111)

Type: (L/list-radio)

Yes

Y

2.9.a - Please elaborate and provide the name and link to any relevant document(s). (17187)

Type: (T/text-long)

The general monitoring, redress, and remedy mechanisms that apply to conventional harms also extend to those caused by AI systems. Typically, the disputes for establishing liability for harm caused would be adjudicated in courts. In addition, several oversight bodies have an important role, among else the Data Protection Inspectorate, the Chancellor of Justice, the Gender Equality and Equal Treatment Commissioner, and the Consumer Protection and Technical Regulatory Authority. The oversight bodies are tasked with investigating, monitoring, and enforcing compliance in cases which may also involve AI-induced harms. The EU AI Act will introduce harmonized, AI-specific provisions that will further clarify accountability and redress mechanisms across the EU member states.

2.10 - Does a liability regime for AI harms currently exist in your country? (17112)

Type: (L/list-radio)

Yes

Y

2.10.a - Please elaborate and provide the name and link to any relevant document(s). (17189)

Type: (T/text-long)

The general liability regime applies to AI harms. Currently, there is no intention of establishing a separate country-specific regime for AI harms.

2.11 - Is there a government strategy/program to improve digital skills in the public sector?

(17113)

Type: (L/list-radio)

Yes

Y

2.11.a - Please elaborate and provide the name and link to any relevant document(s). (17191)

Type: (T/text-long)

Improving digital skills and competences, including in the public sector, is one specific goals as foreseen in the “Data and AI White Paper 2024-2030” and “AI Action Plan 2024-2026” (both linked above). The documents establish a goal of improving digital skills in the public sector and set out various measures to achieve that, such as providing further e-learning courses on the Digital State Academy platform (<https://digiriigiakadeemia.ee/?lang=en>).

3 - Social and Cultural Aspects of AI (1058)

3.1 - Has your country enacted any law or policy to reduce the digital gender gap? (17114)

Type: (L/list-radio)

Yes

Y

3.1.a - Please elaborate and provide the name and link to any relevant document(s). (17193)

Type: (T/text-long)

There are general policies on reducing gender gaps, that are also relevant in digital context. A key policy document is the Welfare Development Plan 2023-2030 (<https://sm.ee/sites/default/files/documents/2023-05/Welfare%20Development%20Plan%202023-2030.pdf>), which establishes various policy goals and actions for enhancing gender equality, reduction of gender segregation and promotion of gender balance in ICT.

There are specific projects undertaken for reducing digital gender gap, including information and communication campaigns, research projects, nudging projects, training programs, and hobby education initiatives. One notable project is "Choose IT!", which partners with Estonian IT companies to enable postgraduates to retrain as software developers. As an example of a specific project, The HK Unicorn Squad (<https://unicornsquad.ee/?lang=en>) is a movement that provides hobby technology education exclusively for girls, aiming to foster genuine interest in engineering, robotics, and natural sciences among girls aged 8-14 through practical assignments. Another example is the training programs provided by Smartwork Academy (<https://www.smartworkacademy.com/>), which offers free training opportunities for women to start IT careers.

3.2 - Has your country enacted any law or policy related to enhancing diversity in the AI workforce? (17115)

Type: (L/list-radio)

Yes

Y

3.2.a - Please elaborate and provide the name and link to any relevant document(s). (17194)

Type: (T/text-long)

General legal obligations established in the Gender Equality Act (<https://www.riigiteataja.ee/en/eli/505012024003/consolide>) and the Equal Treatment Act (<https://www.riigiteataja.ee/en/eli/507032022003/consolide>), including those concerning promoting gender equality and equal treatment by employers, also apply in the context of AI workforce. In addition, there are policies for enhancing diversity in workforce that also apply in context of AI. Notably, in the Estonian Welfare Development Plan 2023-2030 (linked above), one sub-goal for gender equality is the increasing of economic equality between women and men. This includes “implementing measures to reduce gender segregation in education and the labour market” and “to improve gender balance in the fields of natural sciences, technology (including ICT), engineering and mathematics (so-called STEM disciplines) and education, health and welfare.” The plan also foresees activities aimed at changing societal attitudes to value and support gender equality, including reducing the prevalence of negative gender stereotypes and their restrictive effects, and raising awareness among key stakeholders (among them employers) of the manifestations of gender inequalities, their causes and related problems, gender stereotypes and their impact, and the need and opportunities to promote gender equality. In addition to promoting gender equality, the "Welfare Development Plan 2023-2030" aims also to ensure equal treatment and to promote equal opportunities for self-realization and participation for minorities and people with special needs. Therefore, activities are also foreseen aimed at raising employers' awareness on promoting diversity in enterprises and organizations. For this purpose, the government has supported the work of the network of employers committed to the Estonian Diversity Charter (<https://humanrights.ee/en/topics-main/diversity-and-inclusion/charter/>), and administering of the Diverse Workplace Label (<https://humanrights.ee/en/topics-main/diversity-and-inclusion/mitmekesise-tookoha-margis/>). Additionally, activities are implemented to improve accessibility in the society which also supports participation of people with special needs at labour market.

3.3 - Is there online content and data available to train AI systems in all your country's official languages? (17116)

Type: (L/list-radio)

Yes

AO01

3.4 - Are there any measures put in place or surveys conducted in the country with regard to assessing the level of trust of the public in AI technologies? (17117)

Type: (L/list-radio)

Yes

Y

3.4.a - Please elaborate. (17168)

Type: (T/text-long)

There are occasional surveys conducted to assess level of trust among the public in AI and digital services. The study and raw data from an 2023 survey can be found here: <https://avaandmed.eesti.ee/data-sets/%22eesti-elanike-teadlikkus-ja-arvamused-tehisintellektist%22-uuringu-alusandmed>.

One of the key metrics of the "Data and AI White Paper 2024-2030" (linked above) is the percentage of people who decide against using AI or data-driven services due to trust concerns.

3.5 - Do you have in place any policy for addressing the impact of AI on the environment and on sustainability? (17118)

Type: (L/list-radio)

Yes

Y

3.5.a - Please elaborate and provide the name and link to any relevant document(s). (17195)

Type: (T/text-long)

As part of the Estonian “Digital State Agenda 2030” the government has outlined “Green digital government” as one of the four priority areas, with the following objective: “Estonia has the greenest digital government in the world and sets an example to others.” There is an analysis on the environmental impact of the Estonian digital government, including AI, and ways to reduce it (<https://www.mkm.ee/sites/default/files/documents/2022-07/Digiriigi%20keskkonnas%C3%B5bralikkuse%20hetkeolukorra%20ja%20v%C3%B5imaluste%20anal%C3%BC%C3%BCs.pdf>). Based on the policy, Estonia has initiated the climate and environmental friendliness and green IT action plan, which for example, covers AI compute and its optimization, how AI could be used to address challenges related to climate change and sustainability, impact of data lifecycle management on the environmental goals and more.

4 - Scientific and Educational Aspects of AI (1059)

4.1 - Please provide data about Research and Development expenditure on AI, including gross expenditure on research and development on natural sciences and engineering, and/ or estimate of government funding for Research and Development in AI. (17119)

Type: (T/text-long)

The Estonian AI Action Plan (linked above) establishes that Estonia will contribute at least €85 million between the years 2024-2026 toward research, development, implementation and governance of AI.

4.2 - Please provide data about AI-related research in your country, this may include, for example, the number of AI ethics or generally AI-related publications or patents per capita, conferences that took place in the country, or the number of interdisciplinary research centres on AI per capita. (17120)

Type: (T/text-long)

According to the Estonian Research Information System (ETIS, <https://www.etis.ee/>) there are 300 results for the year 2024 for AI related publications with the keyword „artificial intelligence“ and related terms like “machine learning”, “natural language processing”, “neural networks”, “deep learning”. That amounts to 0.22 published articles per year per 1,000 people. In 2024 Estonia opened a center of excellence in AI (EXAI). EXAI brings together 13 research groups and almost all AI competences, including privacy and security in AI, AI for E-governance, AI for healthcare, AI for cybersecurity, AI for education, etc. EXAI is one of three AI-related centers of Excellence that are planned to be opened (which would amount to 2.3 dedicated AI research centers per million people).

4.3 - Please provide data on AI talent in your country, this may include for example number of AI researchers (computer scientists, data scientists, roboticists, AI ethics researchers) per capita. (17121)

Type: (T/text-long)

According to ETIS (Estonian Research Information System), Estonia has 426 AI researchers with a PhD and 525 AI professionals in total. With a population of 1.3 million, this equates to approximately 0.33 AI researchers per 1,000 people (PhD only) or 0.40 per 1,000 people (all AI professionals).

4.4 - Does your country have any laws or policies to integrate AI or other digital tools into the education system? (17122)

Type: (L/list-radio)

Yes

Y

4.4.a - Please elaborate and provide the name and link to any relevant document(s). (17196)

Type: (T/text-long)

Estonia does not have a specific law governing the use of generative AI in education. However, official policies and guidelines do exist, including the Ministry of Education and Research's "AI Guidelines" (<https://www.hm.ee/tehisaru-koolis>), which provides recommendations for the ethical and effective use of AI in schools. This guideline helps teachers and educational institutions navigate AI tools, including generative AI applications, to support learning while ensuring responsible and transparent usage.

The Estonian Basic Schools and Upper Secondary Schools Act (<https://www.riigiteataja.ee/en/eli/504092024001/consolide>) states that published learning materials (textbooks, workbooks) have to be published digitally as well (one part of digitalising education), national curriculums of basic schools, simplified basic schools and upper secondary schools provide guidance on a national level regarding the digital competence and using digital tools in education.

As a result of recent initiative, starting from 2025/2026 schoolyear, all high-school students and their teachers will be given access to certain AI tools and will be integrated into the learning process (<https://tihupe.ee/en>, <https://openai.com/index/estonia-schools-and-chatgpt/>).

4.5 - Does your country have any law/ policy about the use and integration of generative AI in the education system? (17123)

Type: (L/list-radio)

Yes

Y

4.5.a - Please elaborate and provide the name and link to any relevant document(s). (17597)

Type: (T/text-long)

Similarly to the previous question, there is no law in place, but the key policy documents include the above-linked "AI Guideline" by the Ministry of Education and Research and the initiative to integrate certain AI tools into the learning process (<https://tihupe.ee/en>).

4.6 - Please provide data about curriculum content related to AI and AI ethics throughout the education system, for example, the number of tertiary education programs dedicated to AI, machine learning or data science per capita, or educational programs that include both technical and ethical aspects of AI. (17124)

Type: (T/text-long)

There are numerous tertiary education programmes related to AI, machine learning or data science. Estonia has approximately 3.65 AI-related tertiary education programmes per million people. In the context of AI ethics, there are two master's programmes that partially focus on this aspect – IT Law programme at the University of Tartu and Technology Law programme at Taltech.

4.7 - Are there, in your country, courses about AI ethics or the technical aspects of AI aimed at the general public? (17125)

Type: (L/list-radio)

Yes

Y

4.7.a - Please elaborate and specify whether they are free and available in multiple languages. (17171)

Type: (T/text-long)

There is a free online introduction to artificial intelligence for non-experts (<https://www.elementsofai.com/>) and various courses on AI at government digital academy (digiriigiakadeemia.ee). There are also other specialised courses. Government has funded a data science coursebook, available to everyone for free (<https://cs.ut.ee/et/uudis/uus-eestikeelne-andmeteaduse-opik-koigile-tasuta-kattesaadav>).

5 - Economical Aspects of AI (1060)

5.1 - In your country, what is the estimated contribution of AI to the economy (as a share of GDP and/or in USD)? (17126)

Type: (S/text-short)

Based on a previous assessment, over 39,900 companies in Estonia are utilizing AI and data-driven solutions – with a total sales revenue of approximately 19.5 billion euros in 2022. Added value to the economy is around 5-7 billion euros. The estimated annual growth rate of the data economy in 2023 was 14.7%, and in 2021–2023, the data economy grew by 35.3%. A more detailed overview of Estonian data economy can be found here: <https://medium.com/digiriik/mis-on-andmemajandus-67b282b13472>.

5.2 - In your country, what is the number of AI companies per capita, or the percentage of AI companies relative to the total number of companies? (17127)

Type: (S/text-short)

There are around 39,900 companies that have at least one-third of employees in data related roles – these companies are considered data and AI intensive. Around 15 % of all Estonian companies have implemented AI in their operations.

5.3 - In which sectors do AI companies mainly operate? (17128)

Type: (T/text-long)

Starting with the highest and excluding government/public sector, the top six are 1) ICT, 2) communications, 3) finance and insurance, 4) manufacturing, 5) commerce, 6) education.

5.4 - What is the level of usage of AI in the private sector and public sector? (17129)

Type: (S/text-short)

In private sector, the most recent data indicates that around 15% of companies have implemented AI solutions. As per the DESI 2024 index, 25% of companies utilize data analytics. In public sector, over 70 central government organizations have adopted standalone AI solutions. Information about specific public sector use-cases can be found here: <https://www.kratid.ee/en/ai-use-cases>.

5.5 - How much does your government spend on incentivizing AI (including grants, loans and tax incentives)? (17130)

Type: (S/text-short)

The Estonian AI Action Plan (linked above) establishes that Estonia will contribute at least €85 million between the years 2024-2026 toward research, development, implementation and governance of AI.

5.6 - What is the amount of private investment in AI in your country? (17131)

Type: (S/text-short)

According to Crowdsourced database (https://docs.google.com/spreadsheets/d/1csgtaNSI949AumfOBhw hD_S-o7wc1UIhKZdWUS4Vy-Q/edit?gid=5#gid=5) the Estonian tech companies raised around 350 Million Euros through VC funding in 2024. According to Atomico's "State of European Tech 2024", Estonia takes the world's top spot by the relative scale of investment in tech, with VC funding accounting for 1.17% of GDP over the past decade.

6 - Technical and Infrastructural Aspects of AI (1061)

6.1 - Please provide data about the degree of connectivity in your country. (17132)

Type: (T/text-long)

As per DESI 2024 index (data from 2023), overall Internet take-up is 93,22% of households. Mobile broadband take-up is 90%. 87% of the Estonian territory is covered with 5G Network. 77% of Estonian households have availability of very high-speed access network (FTTP). 35.5% of households have a fixed broadband connection contract with a speed of at least 100 Mbit/s. In 2023, 67% could connect to a very high-capacity access network that provides a speed of 1 Gbit/s (as per the Estonian Digital State Agenda, this should increase to 100% by 2030).

6.2 - Is your country involved in standardization (both technical and ethical) of AI and digital technologies? (17133)

Type: (L/list-radio)

Yes

AO01

6.3 - What is the number of data centres in your country per capita? If data centres do not exist within the country, where is the closest one? (17134)

Type: (S/text-short)

There are 4 major data centers in Estonia (1 data center per 342 000 persons)

6.4 - Does your country have a policy for AI-driven cloud computing? (17135)

Type: (L/list-radio)

Yes

Y

6.5 - Are there any laws or policies providing a comprehensive framework for consistent data management and publication? (17136)

Type: (L/list-radio)

Yes

Y

6.5.a - Please elaborate and provide the name and link to any relevant document(s). (17599)

Type: (T/text-long)

The primary legislation guiding the management and disclosure of public information is the Public Information Act (<https://www.riigiteataja.ee/en/eli/529122024008/consolide>), which stipulates that data produced by government institutions should be accessible to the public, except in cases where legal limitations or privacy concerns apply. A key element of the framework is the “open by default” policy, which directs government bodies to release their datasets proactively in machine-readable formats that promote interoperability and foster innovation. In terms of policy, the “Data and AI White Paper 2024-2030” and the “Data Action Plan 2024-2025” (Andmete tegevuskava 2024-2025.pdf) foresee specific activities for data management and publication. There are various guidelines and activities on developing data governance which can be accessed here: <https://www.kratid.ee/en/andmed>.

