Digital Public Administration factsheet 2023

Estonia

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1 Interoperability State-of-Play

# 1 Interoperability State-of-Play

In 2017, the European Commission published the European Interoperability Framework (EIF) to give specific guidance on how to set up interoperable digital public services through a set of 47 recommendations divided in three pillars. The EIF Monitoring Mechanism (MM) was built on these pillars to evaluate the level of implementation of the framework within the Member States. Whereas during the previous, the MM relied upon three scoreboards, the 2022 edition includes an additional scoreboard on cross-border interoperability, assessing the level of implementation of 35 Recommendations. The mechanism is based on a set of 91 Key Performance Indicators (KPIs) clustered within the four scoreboards (Principles, Layers, Conceptual model and Cross-border interoperability), outlined below.

Scoreboard 1 Interoperability Principles	Recommendation(s) n°
Principle 1 - Subsidiarity and Proportionality	1
Principle 2 - Openness	2-4
Principle 3 - Transparency	5
Principle 4 - Reusability	6-7
Principle 5 - Technological neutrality and data portability	8-9
Principle 6 - User-centricity	10-13
Principle 7 - Inclusion and accessibility	14
Principle 8 - Security and privacy	15
Principle 9 - Multilingualism	16
Principle 10 - Administrative simplification	17
Principle 11 - Preservation of information	18
Principle 12 - Assessment of Effectiveness and Efficiency	19

Scoreboard 2 Interoperability Layers	Recommendation(s) n°
Interoperability Governance	20-24
Integrated Public Service Governance	25-26
Legal Interoperability	27
Organisational Interoperability	28-29
Semantic Interoperability	30-32
Technical Interoperability	33

Scoreboard 3 Conceptual Model	Recommendation(s) n°
Conceptual Model	34-35
Internal information sources and services	36
Basic Registries	37-40
Open Data	41-43
Catalogues	44
External information sources and services	45
Security and Privacy	46-47

**Scoreboard 4 Cross-border Interoperability**

Source: European Interoperability Framework Monitoring Mechanism 2022

Each scoreboard breaks down the results into thematic areas (i.e. principles). The thematic areas are evaluated on a scale from one to four, where one means a lower level of implementation and four means a higher level of implementation. The graphs below show the result of the EIF MM data collection exercise for Estonia in 2022, comparing it with the EU average as well as the performance of the country in 2021.

SCOREBOARD 1 - TWELVE PRINCIPLES
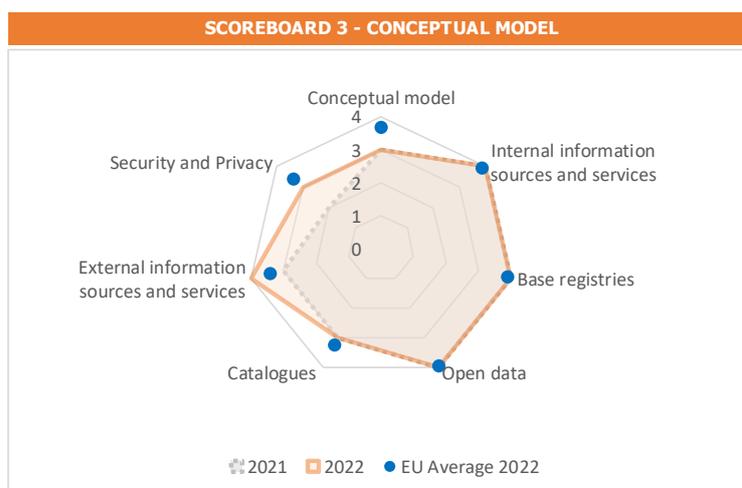
2021   2022   EU Average 2022
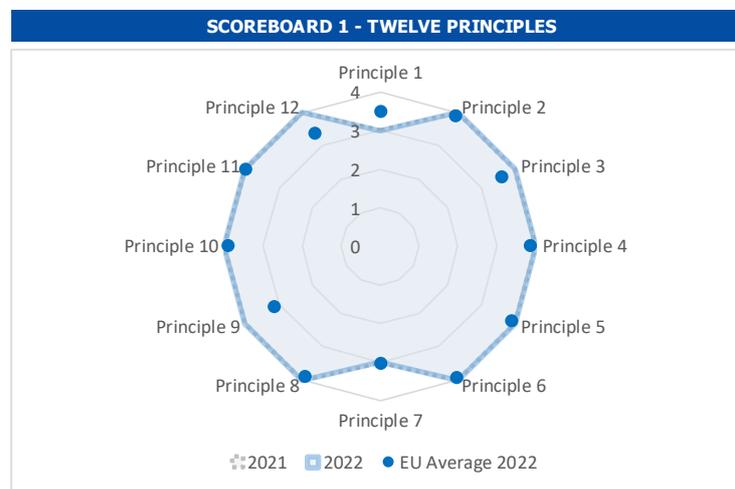
Source: European Interoperability Framework Monitoring Mechanism 2022

Estonia's results in Scoreboard 1 show an overall good implementation of the EIF Principles, scoring above the European average for Principle 9 (Multilingualism) and 12 (Assessment of Effectiveness and Efficiency). Possible areas of improvements are concentrated in the Principles 1 (Subsidiarity and Proportionality) and 7 (Inclusion and Accessibility) for which the score of 3 shows an upper-medium performance in the implementation of corresponding recommendations. Indeed, the alignment of national interoperability frameworks and interoperability strategies with the EIF and the use of e-accessibility specifications to ensure all public services are accessible to all citizens, including persons with disabilities, the elderly and other disadvantaged groups (Principle 7 – Recommendation 14) are partial and could be bettered to reach the maximum score of 4.
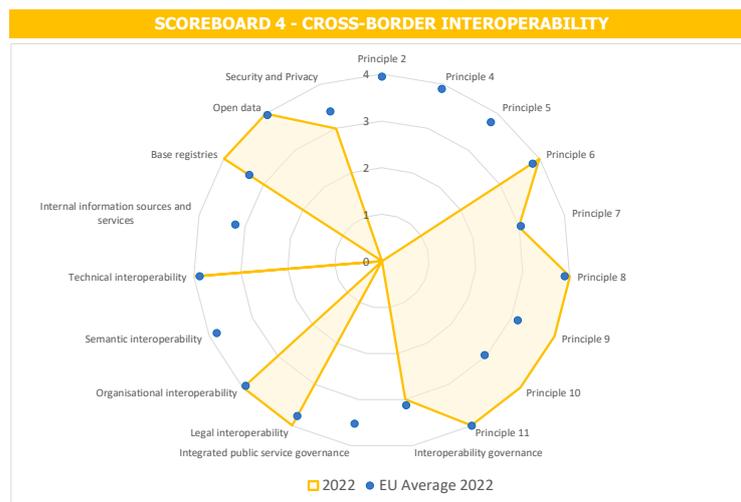
SCOREBOARD 2 - INTEROPERABILITY LAYERS
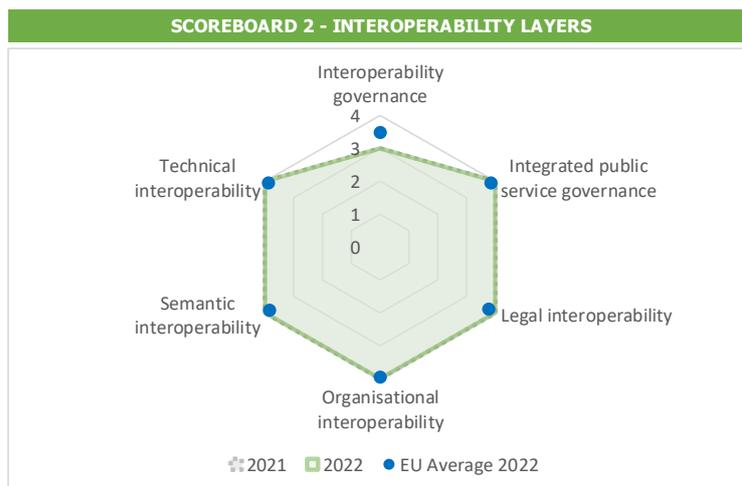
Source: European Interoperability Framework Monitoring Mechanism 2022

The Estonian results for the implementation of interoperability layers assessed for Scoreboard 2 show an overall very strong performance with scores of 4 in each layer with the exception of the interoperability governance area. More specifically, the score of 3 for Estonia derives from Recommendation 21, stating that countries should put in place defined processes for the selection and adoption of standards and specifications and from Recommendation 23, stating that relevant catalogues of standards, specifications and guidelines at national and EU level should be consulted when procuring and developing IT solutions.

SCOREBOARD 3 - CONCEPTUAL MODEL

Source: European Interoperability Framework Monitoring Mechanism 2022

Estonia's scores assessing the Conceptual Model in Scoreboard 3 show a good performance in the implementation of recommendations associated with internal and external information sources and services, base registries, open data and catalogues. The implementation of recommendations in the areas of security and privacy have enabled to move from a score of 2 to 3 in 2022. However, there is still room for improvement with security and privacy as well as the conceptual model, where Estonia's score of 3, are below the one of the EU average. More specifically, the use of trust services to ensure secure data exchange in public services (Security and Privacy - Recommendation 47) and the existence of a common scheme for interconnecting loosely coupled service components (Conceptual Model – Recommendation 35) hinder the overall Estonian score with regard to security and privacy and the conceptual model.

SCOREBOARD 4 - CROSS-BORDER INTEROPERABILITY

Source: European Interoperability Framework Monitoring Mechanism 2022

The results of Estonia concerning Cross-border Interoperability in Scoreboard 4 show an at least upper-middle performance of the country in 16 indicators despite the lack of data of several indicators. However, Estonia has still margin for improvement. For instance, efforts could focus on putting in place processes to select relevant standards and specifications, evaluate them, monitor their implementation, check compliance and test their interoperability (i.e. Interoperability governance -Recommendation 21) and on the use of trust services according to the Regulation on eID and Trust Services as mechanisms that ensure secure and protected data exchange in public services (i.e. Security and Privacy - Recommendation 47).

Additional information on Estonia's results on the EIF Monitoring Mechanism is available online through interactive dashboards.

Curious about the state-of-play on digital public administrations in this country?

Please find here some relevant indicators and resources on this topic:
- Eurostat Information Society Indicators
- Digital Economy and Society Index (DESI)
- eGovernment Benchmark

2 Digital Public Administration Political Communications

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2.1 Specific Political Communications on Digital Public Administration

Joint Declaration on Cooperation for Powering Digital Transformation

In October 2020, Estonia signed a Joint Declaration of Intent titled 'Cooperation for Powering Digital Transformation', so as to cooperate in accelerating the digital transformation and digitalisation of public administration for the achievement of the sustainable development goals. The declaration was also signed by Germany, the International Telecommunication Union and the Digital Impact Alliance. The collaboration aims to expedite the digital transformation and help governments deploy digital public services in a cost-efficient manner by providing them with building blocks to do so, such as expertise, guidelines, best practices and case studies.

Global Declaration on the Digital Response to COVID-19

On 1 July 2020, Estonia and Singapore announced their co-sponsorship of a Global Declaration on the Digital Response to COVID-19 titled 'Close the Digital Divides: the Digital Response to COVID-19'. The declaration was launched at a ministerial conference, aimed at providing a forum to examine how countries can emerge from the COVID-19 public health crisis stronger and better equipped by using innovative digital solutions and working together with global partners. Thus far, 69 countries have expressed their support for the declaration.

Berlin Declaration on Digital Society and Value-Based Digital Government

In December 2020, the Estonian government signed the Berlin Declaration on Digital Society and Value-Based Digital Government, thus re-affirming its commitment – together with other European Union (EU) Member States – to foster digital transformation in order to allow citizens and businesses to harness the benefits and opportunities offered by modern digital technologies. The Declaration aims to contribute to a value-based digital transformation by addressing and strengthening digital participation and digital inclusion in European societies.

Digital Agenda 2020 for Estonia

The Digital Agenda 2020 for Estonia, adopted in 2014 and reviewed at the end of 2018, provides guidance for the creation of a well-operated national information and communication technology (ICT) environment. The main goals include an ICT structure fostering economic growth, national development, welfare of the population, an increased number of jobs with higher added value, improved international competitiveness, better quality of life, smarter governance and increased awareness of eGovernance all over the world. This policy will be replaced by the new Digital Agenda 2030, which is undergoing public consultation and is yet to be approved. The draft of the plan is publicly available in Estonian.

Digital Society Development Plan 2030

Under the leadership of the Ministry of Economic Affairs and Communications, Estonia adopted in October 2021 a new Development Plan for the Estonian Digital Society 2030, which is a continuation of the previous Estonian Information Society 2020 development plan. The new plan is divided into three areas: (i) digital State; (ii) connectivity; and (iii) cybersecurity. It aims to define a long-term strategy to ensure the success of the Estonian digital society.

2.2 Interoperability

new Estonian Interoperability Framework

In Estonia, the eGovernment is fully aligned with the Estonian Interoperability Framework (EIF) in terms of terminology and general principles. An example in this regard, related to base registries in general and the Once-Only principle in particular, is the Underlying Principle No. 9 of

the EIF which concerns administrative simplification. In this field, when the documentation of the databases is coordinated in the Management System of the State Information System (RIHA), the purposefulness of data collection and the compliance with the principle of a single request for data are verified to ensure that the Estonian system complies with the EIF.

A new interoperability framework is being launched in 2023, replacing a framework that is over ten years old. The new framework will be more of a living document rather than a legislative text, so that it can be edited more frequently.

The new framework will not be mandatory across the government, and it will rather be a guidance document containing suggested principles. Therefore, the document will provide value to domains where some of the principles would not apply. More information on the service can be found here.

Digital Agenda 2030 for Estonia

The Digital Agenda 2030 for Estonia states that it is necessary to join forces and share experiences and solutions with each other, in order to keep the already established digital State sustainable and introduce new solutions in the best possible way. Therefore, common directions and requirements must also be in place to ensure interoperability, avoid duplication and guarantee that the completed solutions rely on an optimal technological base. All national initiatives in the digital sector stem from the agenda and must be in line with the document. The Digital Agenda 2030 is publicly available in English.

2.3 Key Enablers

2.3.1 Open Data, Reusability and Access to Public Information

new Open Government Partnership

In 2018, the government approved the Open Government Partnership Action Plan 2018–2020, aiming to foster open and inclusive policy-making at national and local level. At national level, requirements were defined for a new information system that would support a more inclusive law-making process.
In October 2020, the Open Government Partnership Action Plan 2020–2022 was adopted.
The Government Office has published the new Open Government Partnership Action Plan 2022–2024. The final document was adopted in September 2022.

2.3.2 eID and Trust Services

White Paper on eID

The White Paper on eID was published in December 2018, describing the ten-year vision for the national ID card and eIdentity.

Cybersecurity Strategy 2019–2022

Based on the experience from the two previous periods (2008–2013 and 2014–2017), the Cybersecurity Strategy 2019–2022 is the third strategy document on cybersecurity and general security which defines the long-term vision in the field, and the objectives, priority activity areas, roles and functions necessary to adopt it. The goal of the document is to enter into agreements and lay the conditions for implementing a comprehensive, systematic and inclusive sectoral policy. In this context, the strategy forms the basis to plan activities and resources in the field. As a horizontal strategy, it involves parties who contribute to ensuring Estonian cybersecurity, namely the public sector (both civilian and military defence), vital service providers, businesses operating in the field, universities and research institutes.

2.3.3 Interconnection of Base Registries

No political communication has been adopted in this field to date.

2.3.4 eProcurement

No political communication has been adopted in this field to date.

2.4 Domain-specific Political Communications

Agreement on the International Certificate of Vaccination

On 5 October 2020, Estonia signed an agreement with the World Health Organisation (WHO) agreeing to collaborate on the development of a digital International Certificate of Vaccination. The agreement involves working together across a variety of eHealth projects, not just the vaccination card. Other projects include a global framework for health data interoperability, and guidelines for national ePrescription and eDispensing systems, as well as the European Roadmap for the Digitalisation of National Health Systems.

Digital Testbed Framework

The Digital Testbed Framework was finalised in 2019 and was launched globally with a new website in autumn 2021. The essence of the framework is to come up with solutions, developed through public-private cooperation, that can be added to the Estonian code repository, and be reused and further developed freely by all public and private stakeholders. This framework allows the government to facilitate innovative cooperation, whereby a private sector party (e.g. a company, university or individual developer) can create additional components to the government stack or further develop previously created solutions. The State and the public have access to the developed solution for free and the author of the solution can promote it as a success story with Estonian State references all over the world. This opens a whole new perspective for public-private partnerships, and allows stakeholders from the private and non-governmental sector to join the Estonian platform-based approach and help accelerate the development of new technologies.

National Coordination of Updated ICT Strategies in Different Domains

Estonia is currently carrying out a national coordination of updated ICT strategies in different domains. More specifically, the coordination involves the ICT strategies of: (i) the Ministry of Education and Research; (ii) the Ministry of Finance and its Information Technology Centre; (iii) the Ministry of the Environment; (iv) the Ministry of the Interior; (v) the Ministry of Social Affairs and its Health and Welfare Information Systems Centre; (vi) the Ministry of the Interior and its Information Technology and Development Centre; (vii) the Ministry of Culture; (viii) the Ministry of Rural Affairs; (ix) the Ministry of Justice and its Centre of Registers and Information Systems; (x) the Chancellery of the *Riigikogu* (the Parliament of Estonia); (xi) the Government Office; (xii) the Supreme Court of Estonia; and (xiii) the Office of the President.

eResidency

On 8 August 2019, the Estonian government approved the eResidency 2.0 Action Plan with the aim of updating the previous programme to make it more secure and convenient for the eResidency community, and more beneficial for entrepreneurs. Specifically, the new action plan provides that a control is carried out before issuing a digital ID and after the completion of the procedure. Moreover, the action plan lays down the creation of a user-friendly online platform that facilitates the use of services provided by the State and offers a marketplace to help Estonian and international companies to provide services to eResidents. The platform is conceived as a services export platform and possibly a store where eResidents have access to private and public sector services, all available into one platform.

Next Generation Digital Government Architecture

In March 2020, Estonia's Chief Technology Officer, Mr. Kristo Vaher, published a paper on the Next Generation Digital Government Architecture, tackling the challenges of the future of digital governance and addressing the technical aspects of reaching the new objectives and goals. In particular, the paper focuses primarily on the software and solution architecture layers of government technology, while also addressing data and business architecture dependencies.

2.5 Innovative Technologies

2.5.1 Artificial intelligence (AI)

`new` National Strategy on Artificial Intelligence

In June 2019, following the Digital Agenda 2020 for Estonia, the country published its National Strategy on Artificial Intelligence 2019–2021. In addition, the concept paper '#KrattAI: the next stage of digital public services in #eEstonia' further develops the vision for a national strategy on artificial intelligence (AI). In particular, the paper, stemming from the AI Strategy, provides a vision on how AI-based personal assistants and government services should operate from the user's point of view.

The national strategy's goal is to automate certain tasks performed by government employees, as well as make decision-making procedures more effective. More specifically, it encompasses the following topics:

- A legal framework to enable the use of fully autonomous software systems in all different areas, and regulate the relevant liability and safety issues, as well as other aspects;
- A national AI plan or strategy on how Estonia could advance the uptake of AI solutions in the public sector as well as in the wider economy; and
- Raising public awareness on AI in all sectors – from labour market challenges to education, through the potential use cases of AI in the public sector.

As of June 2021, more than 100 AI-based tools had been deployed or were under development in the Estonian public sector, along with use cases. By way of example, the projects allow for the use of predictive analytics to decide where to send the police for traffic regulation, the use of AI to match job seekers with vacancies through the Estonian Unemployment Insurance Fund and the use of an AI-assisted application helping to track activities in the farming sector and facilitate information sharing among the authorities monitoring the use of government subsidies to farmers.

In 2022, the country published its second National Strategy on Artificial Intelligence 2022–2023. The current strategy focuses on five key pillars: (i) public sector; (ii) private sector; (iii) education and R&D; (iv) legislation; and (v) data as an enabler. In the current Digital Agenda 2030, one of the developments is AI-powered government, with the goal of realizing certain tasks in the public sector with the help of a chatbot. With the help of AI, a new leap in efficiency has been made in the public sector.

In 2023, the country will develop a new AI strategy for 2024–2025. To support the implementation of Privacy Enhancing Technologies (PETs), the country is working on an action plan to guide their implementation and thereby help preserve privacy and avoid bias in data analysis.

2.5.2 Distributed Ledger Technologies

Central Bank Digital Currency

The Estonian Central Bank, Eesti Pank, has launched a project to determine the suitability of Keyless Signatures Infrastructure (KSI) blockchain in supporting the digital money infrastructure of a central bank. KSI blockchain is a core eGovernment technology component in Estonia. The research will consist of several phases and is planned to last two years in order to determine how to design a platform that is practical, scalable and cryptographically secure, while meeting high privacy and security requirements.

2.5.3 Big Data

No political communication has been adopted in this field to date.

2.5.4 Cloud Computing

`new` Government Cloud

The Estonian Government, represented by the State Infocommunication Foundation (RIKS), and a consortium of private sector companies including Cybernetica, Dell EMC, Ericsson, OpenNode and Telia, have developed the Estonian Government Cloud.

Estonia has been a pioneer in converting public services into flexible electronic solutions for its citizens and e-residents. The implementation of the Government Cloud solution provides an excellent basis for online public services and solutions, making Estonia the most digital country in the world. With this solution, Estonia is taking the next step in its digital evolution to develop its ICT society.

The Estonian Government Cloud will modernise and renew existing information systems, exploit the possibilities offered by cloud technology and provide greater flexibility in the delivery of electronic services by Estonian government agencies and providers of essential services to residents and e-residents.

The solution will integrate the Estonian public sector's siloed IT infrastructures into a pool of shared resources. Estonian public institutions will gradually migrate from legacy systems to a new government cloud solution, which has been developed in accordance with the National IT Security Standard (ISKE) to ensure compliance with security and quality requirements. For example, sensitive personal data is stored and processed with confidentiality and integrity.

To accommodate physical security requirements, the Estonian Government Cloud will be deployed in two locations, one being outside the capital, thus allowing to manage data and information systems in a distributed manner. A long-term plan has been introduced to establish eEmbassies outside of Estonia in friendly foreign countries, to support the Estonian digital independence and uninterrupted operation of public IT services in state of emergency.

The Estonian Government Cloud is managed by Estonian IT Centre (RIT).

2.5.5 Internet of Things (IoT)

No political communication has been adopted in this field to date.

2.5.6 High-performance Computing

EU Declaration on a Cooperation Framework on Quantum Communication Infrastructure

In September 2020, Estonia signed the EU Declaration on a Cooperation Framework on Quantum Communication Infrastructure, i.e. an agreement to explore how to develop and deploy a secure data infrastructure, and boost European capabilities in quantum technologies and cybersecurity. The infrastructure aims to secure Europe's critical infrastructure and encryption systems against cyberthreats, and protect smart energy grids, air traffic control, banks and healthcare facilities, among others, from malicious hacking. The infrastructure will also allow data centres to safely share information and guarantee the privacy of government data in the long term.

2.5.7 High-speed Broadband Connectivity

No political communication has been adopted in this field to date.

2.5.8 GovTech

No political communication has been adopted in this field to date.

3 Digital Public Administration Legislation

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3.1 Specific Legislation on Digital Public Administration

No legislation has been adopted in this field to date.

3.2 Interoperability

Public Information Act

The Public Information Act regulates various elements related to interoperability, namely:
- The prohibition to collect duplicate data;
- The concept of base data (defining the authoritative source for every piece of data collected in the public sector), going further than the concept of base registries; and
- The mandatory consultation process with IT coordination, data protection and statistics bodies when preparing legal acts establishing new public sector databases or introducing changes to existing ones.

The Public Information Act also serves as legal basis for secondary legislation establishing:
- The classification system;
- The geodetic system;
- The system of address details;
- The system of security measures for information systems;
- The data exchange layer of information systems; and
- The management system of the State Information System.

3.3 Key enablers

3.3.1 Open Data, Reusability and Access to Public Information

Public Information Act

The first version of the Public Information Act took effect in January 2001. The Public Information Act also transposed the provisions of Directive 2003/98/EC on the re-use of public sector information (PSI), with Estonia notifying the full transposition of the Directive in July 2009. Since 1 January 2008, the act has also been regulating the field covered by the former Databases Act (in force from 1997 to 2007). A newly revised and updated Public Information Act entered into force on 1 January 2015, starting the transposition of the provisions of the revised Directive (2013/37/EU) into national law. The full transposition of this Directive is currently under way. The act is enforced by the Data Protection Inspectorate.

The Public Information Act covers State and local agencies, public law legal entities, and private entities that are performing public duties, including education, healthcare and social or other public services. Any person can make a request for information, which is then registered; the holder of the information has to respond within five working days. Fees are waived if the information is requested for research purposes. Departments and other holders of public information are required to offer websites and post an extensive list of information on the web. These entities are also required to ensure that information is not outdated, inaccurate or misleading. Email requests are treated as official requests for information.

Further amendments to the Public Information Act came into force in December 2018, introducing requirements regarding the accessibility of websites and mobile applications of public sector bodies. The aim is to improve accessibility so that the public as a whole, but especially people with special needs, can communicate with the government and use digital government services more conveniently and effectively.

The Public Information Act ensures that citizens, businesses and other branches of the public administration have access to information meant for public use. The aim is to create public control mechanisms with regard to the fulfilment of public duties.

Archives Act

The Archives Act entered into force on 1 May 1998, setting the principles that apply to collecting, evaluating, archiving, preserving and accessing archival documents, as well as to archiving activities. In particular, the Archives Act provides guidelines for private records entered in the archives' register and the transfer of ownership of private records entered in the archives' register.

3.3.2 eID and Trust Services

Electronic Identification and Trust Services for Electronic Transactions Act

The Electronic Identification and Trust Services for Electronic Transactions Act was adopted on 12 October 2016, effectively transposing Regulation (EU) No.°910/2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS Regulation). The act also replaced the Digital Signatures Act (DSA), which had entered into force on 15 December 2000 and had been revised in 2014. The DSA gave digital and handwritten signatures equal legal value and set an obligation for all public institutions to accept digitally signed documents.

In January 2019, the amendments to the Electronic Identification and Trust Services for Electronic Transactions Act entered into force. The State Information Authority is now the single competent authority regarding rights and obligations arising from the eIDAS Regulation.

3.3.3 Security Aspects

Cybersecurity Act

The Cybersecurity Act entered into force in May 2018, aiming to strengthen the security of the digital systems used in providing vital and other socially important services to the public. The act establishes the requirements applying to the maintenance of the network and information systems which are essential for the functioning of the society and the State, as well as of local authorities' network and information systems. The act also provides for liability and supervision provisions, and serves as a basis for the prevention and resolution of cyber incidents.

Personal Data Protection Act

The first Personal Data Protection Act (PDPA) entered into force on 19 July 1996. The act was amended in 2003 to be made fully compliant with the EU Data Protection Directive (95/46/EC), then amended again in January 2008 and renewed in 2019. The current version of the act can be found here.

The PDPA protects the fundamental rights and freedoms of persons with respect to the processing of their personal data, in accordance with the right of individuals to obtain freely any information that is disseminated for public use.

The 2008 version of the act introduced several changes. First, the previous classification of personal data into three groups (non-sensitive personal data, private personal data and sensitive personal data) was replaced by two data categories, namely 'personal data' and 'sensitive personal data', with the latter being a sub-class under special protection. Second, all processed personal data are protected and registered by chief processors (i.e. controllers) with the Data Protection Inspectorate, the data protection supervision authority. Finally, the new PDPA extended all general principles applying to the processing of personal data to the processing of the personal identification code (the unique number assigned to every Estonian citizen and resident).

From 1 January 2015, the Data Protection Inspectorate may submit reports to the Constitutional Committee of the *Riigikogu* and to the Legal Chancellor concerning significant matters which have an extensive effect or need prompt settlement emerging in the course of supervision over compliance with the act.

System of Security Measures for Information Systems

On 1 January 2008, the regulation establishing the system of security measures for information systems used for processing the data contained in State and local government databases and related information assets entered into force. The system consists of the procedure to specify security measures, and the description of organisational, physical and IT security measures to

protect data. Importantly, however, the regulation does not apply to the security of information systems processing State secrets.

3.3.4 Interconnection of Base Registries

Estonian Base Registries

In Estonia, the concept of base registries has been phased out and replaced by the basic data principle. Databases are regulated by law (some of them being established by government regulation in secondary laws) as primary sources of basic data, that is unique data. Hence, in Estonia all registries are base registries involving unique data collected in the respective registries. Furthermore, the Business Registries of Estonia and Finland were interconnected with the use of the X-Road infrastructure. In February 2019, the Estonian Ministry of Justice and the Finnish Patent and Registration Office signed an agreement in Helsinki, providing that data can be exchanged automatically between the Business Registries of the two countries. No amendment to the national legislation was needed to that purpose.

Business Registry

The Business Registry is regulated by the Commercial Code and its amendment, establishing the basic principles of Estonian entrepreneurship and regulating the setting up of companies in the country. In Estonia companies can be registered electronically.

Population Registry

The Population Registry is regulated by the Population Registry Act, providing information regarding its data composition, the procedure for the introduction and maintenance of the Registry, the processing of and access to data, the entry of data on residence, and the supervision over the maintenance of the registry. The purpose of this act is to ensure the collection of the main personal data of the subjects of the Population Registry in a single database to be used by the State and local governments to perform their functions.

Land Registry

The Land Registry is regulated by the Land Registry Act, stipulating provisions with regard to the maintenance procedure, the data content, the entries, the reservation, the documents necessary for registration, the correction of entries, access and extracts, etc.

Vehicle Registry

The Vehicle Registry is established by the General Traffic Act, specifying the content of the Registry, the Ministry governing it, what data it contains and who may access it.

3.3.5 eProcurement

Public Procurement Act

The Public Procurement Act came into force in May 2007, with the current version transposing the EU Directives on public procurement. The act includes legal provisions enabling the further development of eProcurement (eAuctions, Dynamic Purchasing System, eCatalogues, etc.) to offer better opportunities to reach a fully electronic procurement tendering process.
Importantly, the previous version of the Public Procurement Act (October 2000) had already established rules for the eNotification of public tenders through the country's Public Procurement State Register.

Act on Amendments to the Accounting Act

On 20 February 2019, the Estonian Parliament approved a bill providing that the accounting of the State was to fully switch to electronic invoicing. Starting from July 2019, the public sector could only accept eInvoices. In other words, the Act on Amendments to the Accounting Act (795 SE), initiated by the government, made machine-processable invoices mandatory in invoicing with the public sector, aiming to reduce the workload and the time required in invoicing within the public sector. The act also transposed the EU Directive on eInvoicing. An electronic invoice is a

machine-readable document drawn up on the basis of a common standard, sent from one software system to another to avoid entering data by hand.

3.4 Domain-specific Legislation

Information Society Services Act

The Information Society Services Act was passed on 14 April 2004 and entered into force on 1 May 2004, implementing Directive 2000/31/EC on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market. More in detail, the act established the requirements pertaining to information society service providers, as well as the organisation of supervision and liability in case of violation of these requirements.

Simplified Business Income Taxation Act

On 1 January 2018, the Simplified Business Income Taxation Act entered into force, establishing the concept of business account. The business account is aimed at small companies (one-man private limited companies and self-employed persons) in order for them to operate without bureaucracy. In particular, the act enables a natural person to open a business account with 20% of the balance automatically transferred to the Tax and Customs Board. Therefore, the account holders disclose themselves to the Tax and Customs Board and, in return, need not submit annual reports and tax returns.

Principles for Managing Services and Governing Information

The Principles for Managing Services and Governing Information (a government regulation) entered into force in March 2021, obliging all authorities to ensure:
- Management and quality of direct public services;
- Management and quality of processes;
- Information governance and quality thereof; and
- Every sub-activity of information governance and quality thereof.

The regulation aims to establish a common view on how to develop, maintain and provide high-quality public services. With this regulation, Estonia adopted a new approach to developing public services: from that moment on, public services must be life event-based and, where possible, proactive. Estonia is currently developing a methodology on how to develop and offer such public services.

The problem that authorities often face is that they do not have a clear view of their services (as defined in the second article of the regulation). For this reason, the regulation obliges authorities providing public services to maintain an up-to-date list of their own direct public services and of support services provided to other authorities, containing at least significant services. Furthermore, the management of the processes behind the services must have a clear owner.

The regulation also established a network of coordinators:
- The Ministry of Economic Affairs and Communications is responsible for the management of direct public services, including determining, sharing and exchanging the information necessary for providing such services;
- The Data Protection Inspectorate is responsible for organising access to and protection of information; and
- The Estonian Information System Authority is responsible for the implementation of the requirements applying to the architecture of the State Information System and the key components of the State Information System.

While executing their tasks, the coordinators have the following functions:
- Planning the main directions for development and the activities supporting such development;
- Issuing guidelines and recommendations;
- Monitoring the implementation of planned activities and the application of guidelines;
- Managing communication;
- Cooperating with other coordinators; and
- Engaging other parties, as necessary.

Regulation on the Cross-Border Exchange of Information Regarding Health Services

The Regulation on the Cross-border Exchange of Information regarding Health Services came into force in November 2018, aiming to enable people abroad to have better access to medical care and medicines thanks to the electronic exchange of prescription data between countries. Estonia and Finland became the first two countries in Europe to exchange medicine prescription data. Since January 2019, the first EU patients have been able to use digital prescriptions issued by their home doctor when visiting a pharmacy in another EU country: Finnish patients are now able to go to a pharmacy in Estonia and retrieve medicines prescribed electronically by their doctor in Finland. The initiative applies to all ePrescriptions in Finland and to the Estonian pharmacies that have signed the agreement. The novelty of this initiative is that the ePrescriptions are visible electronically to participating pharmacists in the receiving country via the new eHealth Digital Service Infrastructure, without the patient having to provide a written prescription.

3.5 Innovative Technologies

3.5.1 Artificial Intelligence (AI)
No legislation has been adopted in this field to date.

3.5.2 Distributed Ledger Technologies
No legislation has been adopted in this field to date.

3.5.3 Big Data
No legislation has been adopted in this field to date.

3.5.4 Cloud Computing
No legislation has been adopted in this field to date.

3.5.5 Internet of Things (IoT)
No legislation has been adopted in this field to date.
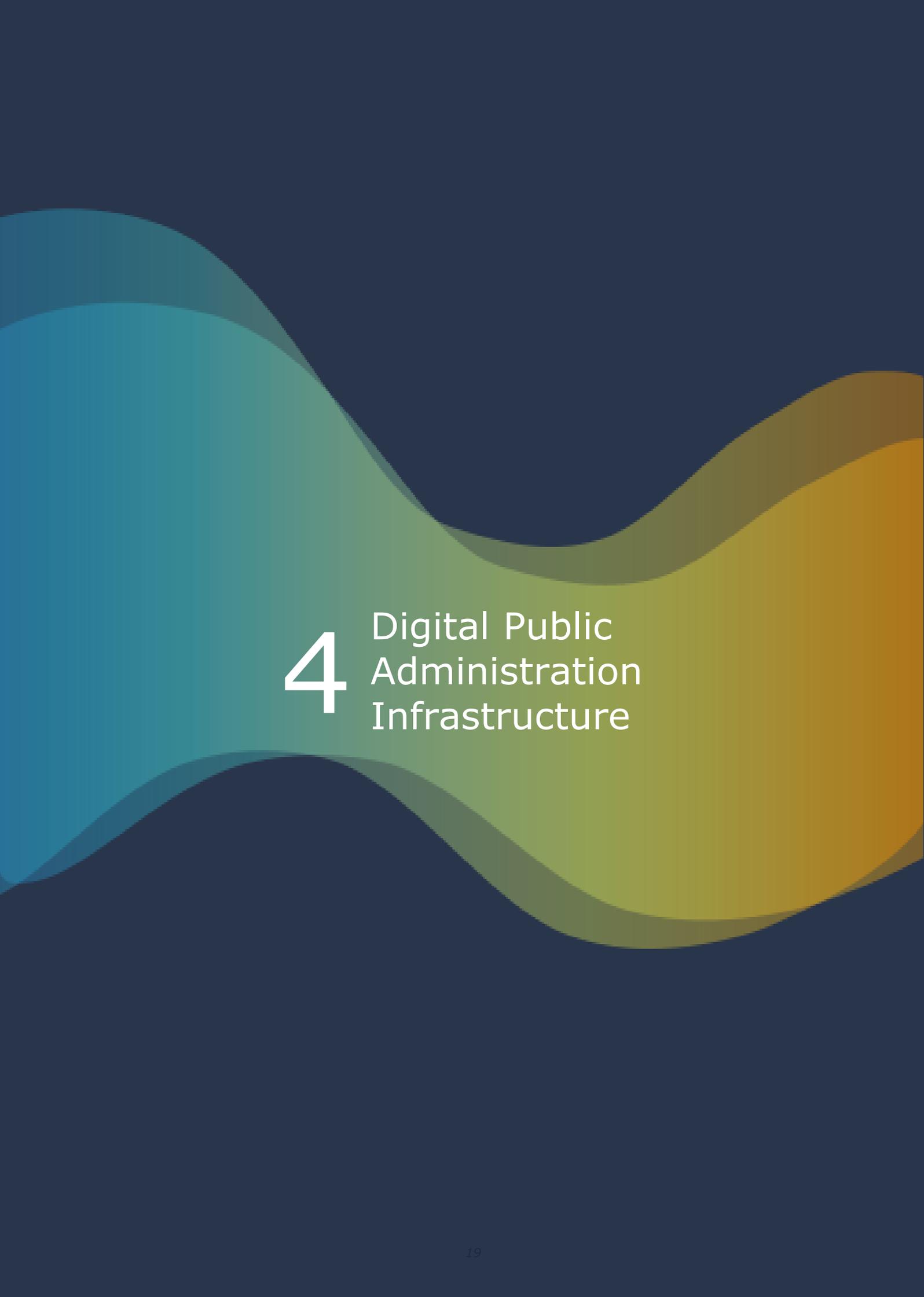
3.5.6 High-performance Computing
No legislation has been adopted in this field to date.

3.5.7 High-speed Broadband Connectivity
No legislation has been adopted in this field to date.

3.5.8 GovTech
No legislation has been adopted in this field to date.

4 Digital Public Administration Infrastructure

4 Digital Public Administration Infrastructure

4.1 Platforms and Applications

4.1.1 National Platforms and Applications

eesti.ee: eGovernment Portal

Estonia's eGovernment Portal was first launched in March 2003 on the basis of the eCitizen project initiated in 2002 and has been constantly renewed since then. The portal coordinates the information provided and the services offered by the various State institutions, ensuring a safe internet environment for communicating with the State, and offering reliable information and eSolutions for citizens, entrepreneurs and officials. Access to the relevant information and eServices on the portal depends on whether the user is a citizen, entrepreneur or State official.
The State portal's environment allows users to: (i) authenticate with their national eID card to access and check their personal details; (ii) perform transactions with municipal and government bodies; (iii) complete and send online forms and applications; (iv) sign documents digitally; (v) create email addresses with the suffix @eesti.ee; and (vi) receive email or SMS notifications. In addition, the portal gives access to other registry services (e.g. the Forest Registry) on more than 20 national databases.

Estonian Tax and Customs Board

On September 2019, the eServices of the Estonian Tax and Customs Board (ETCB) were made available in the newly redesigned eMTA environment, offering users logically structured content and easy navigation. The goal was to make compliance in tax and customs matters equally easy to achieve for both occasional and regular users (e.g. accountancy employees).

Open Data Portal

The Open Data Portal provides the general public and businesses with a single point of access to unrestricted public sector data, with the permission to reuse and redistribute such data for both commercial and non-commercial purposes. In other words, the Open Data Portal is intended to serve as a platform for the dissemination of data by public bodies, and for the search and retrieval of such datasets by open data users.
The Open Data Portal allows to:
- Search and download open data;
- Publish new open data (to that end, prior registration with the Portal's administrator is required);
- Store datasets by government agencies and local authorities;
- Search and use applications created on the basis of open data; and
- Post news, questions and instructions pertaining to open data and have discussions on relevant topics.

Government Portal

Since June 2014, all Ministries have developed similarly designed and structured webpages to allow visitors to access information faster and more easily than before, and to have a clear overview of the goals and activities of the government and governmental authorities. The similarly structured and designed webpages of the government, Government Office and eleven Ministries now form a common online environment: the Government Portal. Additionally, all Government Portal webpages allow access to the webpages of the other Ministries.

eGovernment Code Repository

The Ministry of Economic Affairs and Communications, and RIA have finished the first version of an eGovernment code repository, called *koodivaramu*, making public software solutions built for the government. The eGovernment code repository is based on open source technologies and the code is public for everyone. In the future, all source codes for eGovernment solutions will be open and available for use by everyone, unless required otherwise for security reasons.

The first base component for AI-based solutions added to the source code repository is a text analysis tool created by Texta OÜ, which to date has been used by many institutions for increasing the effectiveness of their work processes and the automation of routine activities.

Accelerate Estonia

Accelerate Estonia is a government-led national testbed platform powered by the Tehnopol Science and Business Park for citizens and businesses to experiment, validate and solve global problems. Citizens and businesses are called upon to provide solutions to problems in Estonia that can be scaled globally, develop significant economic opportunities for Estonia, and create or catalyse systematic change in Estonia. In exchange for citizens' and businesses' efforts, Accelerate Estonia fosters collaboration with policy owners and public sector influencers to identify systemic enablers and resolve any constraints on the solution. Furthermore, it provides a team of public sector specialists to help work on the solution, and covers the costs of the experiment for selected projects through grants of up to EUR 90 000.
Accelerate Estonia's focus themes for 2022 are mental health, green turn and Wild Card, but other topics are also welcomed. The discussions for 2023 themes will start in the second quarter of the year and finish in the third.

`new` e-Health Record

The Electronic Health Record (e-Health Record) is a nationwide system that integrates data from Estonia's different healthcare providers to create a common record that every patient can access online.

`new` National Data Portal

By the end of 2023, the National Data Portal will be ready. The portal pursues the following objectives: (i) to publish dataset descriptions; (ii) to publish and encourage the reuse of semantic assets (i.e. vocabularies, ontologies); (iii) to publish information on reuse (including the availability of services, PETs, data services and open data sets); (iv) to grant the possibility to request restricted data; and (v) knowledge sharing and guidance.

4.1.2 Subnational Platforms and Applications

Rural Municipality Portal

The Rural Municipality Portal was launched in February 2011 by the Estonian government, with a view to increasing the transparency of local governments and promoting citizen participation. Based on an open source content management tool allowing for an easy and uniform site administration, the portal builds on an innovative concept. The developed solution includes a standard website structure for local governments, tools for site administration and built-in interfacing with public registers.

4.2 Networks

ASOnet's 'EEBone'

EEBone (PeaTee) is the broadband network for data communication among government institutions. More in detail, EEBone is a government-wide backbone network connecting more than 20 000 computers from all government offices across the country, and providing secure access to the internet and the government's intranet.
The network was launched in October 1998, and was developed based on ASONet, the backbone network elaborated by the Border Guard Administration, the Customs Board and the Police Board in 1993. The network currently provides approximately 50% of all administrative services to the various associations. The use of the backbone network is financed centrally from the State budget and is free of charge for subscribed clients. Clients only need to pay to access the backbone network and to determine the access connection service themselves.
RIA is highly involved in running the network, either as a mediator of customised value-added data services, or as a provider of customer services.

Management System of the State Information System

The creation and maintenance of government databases is governed by the Public Information Act of 2007, establishing a Management System for the State Information System (RIHA) where all databases and information systems must be registered. The objective of RIHA is to ensure the interoperability of public sector information systems, and the reuse of technical, organisational and semantic resources, so as to give a clear view of the State registers and the related services. The system of integrated registers also allows for the application of new principles to administrative arrangements, such as citizen-orientation, flexibility, swiftness, and cost and time effectiveness for both citizens and the State.

RIHA includes metadata about existing public sector databases, ranging from information on the administrators of the databases to the eServices offered and the technical data concerning the environment/platform. In the same web-based environment, requests to other information systems can be made to launch a new X-tee-based service.

Trans European Services for Telematics between Administrations

Estonia uses the Trans European Services for Telematics between Administrations (TESTA) network as the main cross-border infrastructure to communicate digitally among the EU agencies, institutions and Member States.

4.3 Data Exchange

HOIA

HOIA is a decentralised, free contact-tracing mobile application that was developed by the Estonian government and private sector companies. The purpose of the app is to inform the close contacts of those infected with the coronavirus and provide them with initial instructions on how to proceed thereafter. In this way, users can quickly find out about possible close contacts with a COVID-19 infected person, allowing them to take steps to protect their own health and the health of others. The application was developed as open source software and the source code is available for further reuse.

X-Road Middleware

Launched in December 2001, the X-Road (referred to as X-tee in English since 2018) is a middle-tier data exchange layer enabling government databases to communicate with each other and serving as main interoperability solution inside Estonia. In particular, the use of X-tee is the mandatory solution for data exchange between public sector information systems.

Initially developed as an environment facilitating the formulation of queries to different databases in a standardised way, the system allows officials, as well as legal and natural entities, to search data from national databases over the internet, within the limits of their authority, using a unified user interface.

In addition, the system has been further developed to enable the creation of eServices capable of simultaneously using data stored in different databases. As a result, several extensions have been developed for the X-tee system, such as writing operations in databases, transmitting huge datasets between information systems, performing successive data search operations in different data sheets and providing services via web portals.

new Anonymiser

At the end of 2022, an application for the anonymisation of personal data was released, aiming at increasing security in the training of bureaucratic contacts. The Data Anonymiser will identify personal identifiers such as names, IDs and locations of individuals from text, which it will be able to replace with another value of the same entity class (e.g. Tallinn will be replaced with Tartu).

The application is intended to be used both in Bürokratt and in applications and information systems of other institutions tasked with the processing or storing of personal data.

The Anonymiser contributes to mitigating the risk associated with the processing of personal data and is compliant with ICSMS regulations. The application has the potential to be used with both anonymisation and pseudonymisation methods, depending on the user's needs. Interfaced customers can use the application on the basis of the NER corpora developed by the University of Tartu, as well as to further train the corpora with institution-specific datasets.

4.4 eID and Trust Services

Electronic ID Card

Estonia started issuing national eID cards in January 2002. The card, fulfilling the requirements of Estonia's Digital Signatures Act, now replaced by the Electronic Identification and Trust Services for Electronic Transactions Act, is mandatory for all Estonian citizens and residing foreigners over 15 years of age. The eID card is meant to be the primary document for identifying citizens and residents, and is used for all activities – governmental or private. In particular, the eID card can be used to vote electronically (since 2005), create a business, verify banking transactions and access medical history (since 2010), and can work as a virtual ticket. Furthermore, the eID card is a valid travel document within the EU. Since 1 January 2007, the card issued by the Citizenship and Migration Board (CMB) has become valid for five years (instead of ten years previously). In January 2020, more than 1.3 million people in Estonia (almost 98% of inhabitants) had eID cards. In addition to being a physical identification document, the card features advanced electronic functions facilitating secure authentication and providing a legally binding digital signature for public and private online services. An electronic processor chip contains a personal data file, a certificate for authentication, a certificate for digital signature and the associated private keys, protected with PIN codes. The certificates contain only the holder's name and personal code (national ID code).

Mobile-ID

The mobile-ID is the ID card-based identity verification and digital signature solution for users of mobile phones in Estonia. The mobile phone, based on a standardised SIM application, acts as a secure signing device. Thus, similarly to the eID card, the mobile-ID enables authentication and digital signing of documents, bearing the same legal value. The user's certificates are maintained on the telecom operator's SIM card and require the user to enter a PIN code to be used.

Smart-ID

As an alternative to the mobile-ID, Estonia has a new private sector-offered solution for secure authentication, called smart-ID. The smart-ID can be used to log in to eServices, to use the online banking and to sign documents. Signatures given with the smart-ID are legally binding and recognised in all EU States, and have the same legal effect as handwritten signatures.

ePassport

To comply with Regulation 2252/2004/EC on standards for security features and biometrics in passports and travel documents issued by Member States, the systems developed by the CMB have undergone considerable changes that have been implemented step-by-step. Changes in the organisation of the work and the supporting systems of the CMB are planned at both customer service and document issuance system level. The first biometric passports containing the holder's biometric data were delivered on 22 May 2007.

Dokobit Portal

The Dokobit portal is available for numerous countries, including Estonian eID-card, and Estonian, Icelandic and Lithuanian mobile-ID users. In addition, users can log in to the portal using the smart-ID from Estonia, Latvia and Lithuania. The portal allows for digital signatures, verification of the validity of digital signatures, and documents to be forwarded to and received from other users of the portal.
The Dokobit portal provides a quick and easy way to raise the security of any web service to meet the highest demands, making it possible to carry out authentication based on strong authentication devices from different vendors and providing service providers with the opportunity to enter legal signatures on any created data within their service. That way, the portal provides long-term validity and proof of action in courts across the EU. Finally, the portal enables to gather digital signatures for documents that need to be signed by multiple parties, including entrepreneurs, government officials and individuals.

4.5 eProcurement

Public Procurement Registry

The Public Procurement Registry offers an innovative, free, self-service working environment for buyers (i.e. contracting authorities) to organise and tenderers (i.e. economic operators) to participate in public procurements. Anyone can freely browse published procurements, notices and contract information, and review the decisions of the Committee that decides the outcome of the procurement. The Public Procurement Registry is administered by the Ministry of Finance.

eInvoicing in Estonia

The implementation of eInvoices in Estonia began in 2014. According to the amendments to the Accounting Act introduced in 2019, government authorities can only accept eInvoices, which is in line with the Once-Only principle, and significantly reduces the time and labour invested into processing invoices. Private sector operators can utilise various providers to send eInvoices to the government or to other operators.

4.6 ePayment

TARGET Instant Payment Settlement

Since November 2018, commercial banks operating in Estonia have been able to join the TARGET Instant Payment Settlement (TIPS) through Eesti Pank (Bank of Estonia). TIPS is an instant payment system developed by the central banks of the euro area at the initiative of the European Central Bank. Like other pan-European instant payment systems, TIPS allows clients to settle payments in real time, night and day and throughout the year.
For years now, Estonians have been able to pay in one click and already in 2012 99.3% of the payments were electronic.

4.7 Knowledge Management

Document Exchange Layer

The Document Exchange Layer (DHX) is a document exchange protocol that enables the safe exchange of documents and information between the document management system of the public sector and other information systems. The DHX relies on X-Road version 6 as transport-level infrastructure.
The automatic document exchange in the Estonian public sector began in 2006. Due to an irregular internet connection, sending documents from one document management system to another was challenging. For this reason, the State created a central solution, i.e. the Document Exchange Centre, where documents would be temporarily stored in such situations. The Document Exchange Centre was used by all Ministries and agencies in their area of government, county governments, agencies and inspectorates, but also by most of the local governments and educational establishments, and other institutions of the public sector. In 2009, the European Consortium for Electronic State Awards recognised the Document Exchange Centre as a good service and strategic initiative.
The transition to the new means of document exchange began in 2017, with the Document Exchange Centre closed at the end of 2018 and the new distributed solution for the exchange of documents, the DHX, implemented at the beginning of 2019. The new protocol enables documents to be transported between agencies directly from sender to receiver.

eKool Web Application

eKool is a simple web application that connects all education stakeholders in an easy way over the internet, helping them to collaborate and organise their teaching/learning related information. eKool is available either as a direct web service for end users or as a hosted white-label service for distributing/promoting partners.

Personal Data Usage Monitor

The Personal Data Usage Monitor is a set of four micro service-style applications that, when combined with each other and attached to X-tee, provide citizens with a comprehensive view of how their personal data have been used by the government.

Select IT

Select IT is a pilot adult retraining programme that was launched in 2017. In the framework of this pilot project, 500 people without prior IT education were trained for the position of junior software developer in the subsequent four years. The programme lasts 3.5 months (14 weeks) and is carried out on the basis of a dedicated study programme. In accordance with the needs of the involved IT company, teaching is provided either on Java or the .NET platform.

Digi ABC

Digi ABC is an initiative of the Ministry of Economic Affairs and Communication bringing digital skills to the industry.

4.8 Cross-border Infrastructures

Nordic Institute for Interoperability Solutions

The Nordic Institute for Interoperability Solutions (NIIS) is an association founded jointly by Estonia and Finland with the aim of ensuring the development and strategic management of X-Road and other cross-border components for eGovernment infrastructure. The Population Register Centre of Finland and Estonian Information System Authority (RIA) had already concluded a cooperation agreement to formalise cooperation relating to X-Road and work as a contractual platform for deepening cooperation. NIIS then took over the X-Road core development from Finland's Population Register Centre and RIA, starting by running the Working Group. In September 2018, Iceland also became a partner of the NIIS and then a member country on 1 June 2021.

NIIS works both as network and cooperation platform, and as executioner of IT developments in the common interest of its members. The Institute focuses on practical collaboration, experience sharing and promotion of innovation. The operating model of the Institute is something quite unique world-wide.

Data Embassy in Luxembourg

The world's first Data Embassy has been established by Estonia in Luxembourg. Estonia's pilot project is based in a high-security data centre in Luxembourg, storing copies of the most critical datasets identified by the Estonian government that are the minimum set to keep the country running. In the next phases, Estonia intends to go beyond a mere back-up site and operate live from the Data Embassy when necessary.

The Data Embassy backs up the databases from eFile (court system), the Treasury Information System, the eLand Registry, the Taxable Person's Registry, the Business Registry, the Population Registry, the State Gazette, the Identity Documents Registry, the Land Cadastral Registry and the National Pension Insurance Registry.

4.9 Base Registries

No particular infrastructure in this field has been reported to date.

4.10 Innovative Technologies

4.10.1 Artificial Intelligence (AI)

#KrattAI

#KrattAI is the Estonian government's vision of how digital public services should work in the age of AI. It will be an interoperable network of AI applications, enabling citizens to use public services with virtual assistants through voice-based interaction. The network will use Kratt, an AI system

that is based on a software algorithm that is autonomous and learnable, and performs traditional human actions. As outlined in #KrattAI's roadmap, many citizens do not know which public agency to contact and do not have an overview of either their obligations or opportunities offered by government, and communication is time-consuming. #KrattAI aims to foster progress in AI and virtual assistants, and use these improvements to refine the design and delivery of digital public services. Several Proof of Concepts (PoC) have been developed in the context of this project, including a chatbot and messaging room, a classification of citizen messages, and an analysis and PoC of the eesti.ee mobile application.

HANS – AI system

On 14 September 2020, the Estonian Parliament (*Riigikogu*) introduced a tool called HANS – AI system, which supports the work of lawmakers and employees of the *Riigikogu* by preparing verbatim reports of parliamentary sittings. By deploying a speech-recognition technology developed by the Tallinn University of Technology, the system offers the transcription of sessions with increased efficiency and accuracy.

4.10.2   Distributed Ledger Technologies

No particular infrastructure in this field has been reported to date.

4.10.3   Big Data

No particular infrastructure in this field has been reported to date.

4.10.4   Cloud Computing

No particular infrastructure in this field has been reported to date.

4.10.5   Internet of Things (IoT)

No particular infrastructure in this field has been reported to date.

4.10.6   High-performance Computing

No particular infrastructure in this field has been reported to date.

4.10.7   High-speed Broadband Connectivity

No particular infrastructure in this field has been reported to date.

4.10.8   GovTech

No particular infrastructure in this field has been reported to date.

5 Digital Public Administration Governance

5 Digital Public Administration Governance

For more details on Estonia's responsible bodies for digital policy and interoperability, its main actors, as well as relevant digital initiatives, please visit the NIFO collection on Joinup.

5.1 National

Ministry of Economic Affairs and Communications

The Ministry of Economic Affairs and Communications holds political responsibility for the development of the State information policy. In particular, the Ministry elaborates the State economic policy and economic development plans, while also drafting the respective legislation bills in a variety of fields, including informatics, development of State information systems, research and development, and innovation.
With regard to political coordination, management and financing, interoperability initiatives are also coordinated by the Ministry of Economic Affairs and Communications. In particular, the Ministry, being responsible for developing the State Information System, designs the interoperability framework and prepares the related documents.

Government Chief Information Officer Office

The Government Chief Information Officer (CIO) Office (formerly known as the State Information System Department) of the Ministry of Economic Affairs and Communications plays a major role in the elaboration of the Estonian information society policy. The Government CIO Office develops information society-related activities in the field of IT and prepares draft legislation in the relevant areas. More in detail, the Government CIO Office's strategic tasks include the coordination of State IT-policy actions and development plans in the field of State administrative information systems, such as State IT budgets, IT legislation, IT projects, IT audits, standardisation, IT procurement procedures and international cooperation in the field of State information systems.

Estonian Association of Information Technology and Telecommunications

The Estonian Association of Information Technology and Telecommunications (ITL) is a non-profit organisation aiming to group Estonian IT and telecommunications companies, to promote their cooperation in the development of Estonia towards an information society, to represent and protect the interests of its member companies and to express their common positions. The main activities of the association include the popularisation of ICT, the promotion of vocational education and amendment of legislation.

eEstonia Council

The eEstonia Council (formerly known as the Estonian Informatics Council) was created in 2014 and is a government committee directing the development of the digital society and eGovernance in Estonia. In addition to playing a coordination and policy formulation role, the eEstonia Council, as an expert committee, also advises the government on ICT matters in a horizontal manner.
The Council is composed of five ICT sector representatives and experts as well as three ministers, and is chaired by the Prime Minister. Other government institutions and experts are involved upon need.

Estonian Information System Authority

On 1 June 2011, the Estonian Informatics Centre was restructured into the Estonian Information System Authority (RIA). Its mission is to coordinate the development and management information system so that Estonian citizens are served in the best possible way. In particular, RIA coordinates all public key infrastructures related to the operation of ICT and IT, like the State portal, the middleware system X-tee, the government backbone network EEBone, RIHA and the Electronic Document Exchange Centre (DVK). Moreover, the Authority is also responsible for the coordination of the State information system development projects, and the preparation of and participation in international projects. RIA also monitors the legislation process concerning the management information system requirements. Finally, RIA is also the main body responsible for interoperability activities in Estonia.

Computer Emergency Response Team of Estonia

The Computer Emergency Response Team of Estonia (CERT Estonia), established in 2006, is an organisation responsible for the management of security incidents in '.ee' computer networks. More in detail, CERT Estonia deals with security incidents that occur in Estonian networks or incidents that have been notified by citizens or institutions either in Estonia or abroad. In this context, CERT Estonia assists Estonian internet users in the implementation of preventive measures to reduce possible damage from security incidents and to respond to potential security threats.

Information Technology Foundation for Education

The Information Technology Foundation for Education (HITSA) (formerly Estonian Information Technology Foundation or EITF) is a non-profit association established by the Republic of Estonia, the University of Tartu, the Tallinn University of Technology, Eesti Telekom and the ITL.
The role of HITSA is to ensure that graduates at all levels of education have obtained the digital skills necessary for economic and societal development, and that the possibilities offered by ICT are skilfully used in teaching and learning, helping to improve the quality of learning and teaching at all levels of education.

eGovernance Academy

The eGovernance Academy is a non-governmental, non-profit organisation aiming to promote the use of ICT in the work of government bodies and in democratic practices. More in detail, the Academy's mission is to train and advise leaders and stakeholders in using ICT, to increase government efficiency and to improve democratic processes with the aim of building open information societies.

Management System of the State Information System

The Management System of the State Information System (*Riigi Infosüsteemi Halduse Infosüsteem*, RIHA) is the Estonian catalogue of public sector information systems, serving as national registry of systems, components, services, data models, semantic assets, etc. RIHA facilitates planning and operation activities related to information systems, with the main goal of guaranteeing a transparent and optimal balance, and an efficient management of public sector information systems. In addition, the RIHA supports the interoperability of databases, the life-cycle management of information systems and the reuse of data by providing complete and up-to-date metadata relating to the Estonian public sector information systems. The registration of public databases and information systems on RIHA is mandatory and enforced by law.

5.2 Subnational (Federal, Regional and Local)

Association of Estonian Cities and Rural Municipalities

The Association of Estonian Cities and Rural Municipalities (AECM) is a voluntary union established to represent the common interests of cities and rural municipalities, and organize cooperation among them. The main goal of the AECM is to ensure the development of local governments through joint activities. At present, 74 municipalities out of 79 are members of the Association. Local governments belonging to the Association cover 99% of the population of Estonia, with all Estonian regions being represented. The AECM is funded through membership fees, the amount of which depends on the revenues of each member.

6 Cross-border Digital Public Administration Services

6 Cross-border Digital Public Administration Services for Citizens and Businesses

Further to the information on national digital public services provided in the previous chapters, this final chapter presents an overview of the basic cross-border public services provided to citizens and businesses in other European countries. Your Europe is taken as reference, as it is the EU one-stop shop which aims to simplify the life of both citizens and businesses by avoiding unnecessary inconvenience and red tape in regard to 'life and travel', as well as 'doing business' abroad. In order to do so, Your Europe offers information on basic rights under EU law, but also on how these rights are implemented in each individual country (where information has been provided by the national authorities). Free email or telephone contact with EU assistance services, to get more personalised or detailed help and advice is also available.

Please note that, in most cases, the EU rights described in Your Europe apply to all EU member countries plus Iceland, Liechtenstein and Norway, and sometimes to Switzerland. Information on Your Europe is provided by the relevant departments of the European Commission and complemented by content provided by the authorities of every country it covers. As the website consists of two sections - one for citizens and one for businesses, both managed by DG Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) - below the main groups of services for each section are listed.

6.1 Life and Travel

For citizens, the following groups of services can be found on the website:
- Travel (e.g. Documents needed for travelling in Europe);
- Work and retirement (e.g. Unemployment and Benefits);
- Vehicles (e.g. Registration);
- Residence formalities (e.g. Elections abroad);
- Education and youth (e.g. Researchers);
- Health (e.g. Medical Treatment abroad);
- Family (e.g. Couples);
- Consumers (e.g. Shopping).

6.2 Doing Business

Regarding businesses, the groups of services on the website concern:
- Running a business (e.g. Developing a business);
- Taxation (e.g. Business tax);
- Selling in the EU (e.g. Public contracts);
- Human Resources (e.g. Employment contracts);
- Product requirements (e.g. Standards);
- Financing and Funding (e.g. Accounting);
- Dealing with Customers (e.g. Data protection).

The Digital Public Administration Factsheets

The factsheets present an overview of the state and progress of Digital Public Administration and Interoperability within European countries.

The factsheets are published on the Joinup platform, which is a joint initiative by the Directorate General for Informatics (DG DIGIT) and the Directorate General for Communications Networks, Content & Technology (DG CONNECT). This factsheet received valuable contribution from the Ministry of Economic Affairs and Communications of the Republic of Estonia.

The Digital Government Factsheets are prepared for the European Commission by Wavestone

An action supported by Interoperable Europe

The ISA² Programme has evolved into Interoperable Europe - the initiative of the European Commission for a reinforced interoperability policy.

The work of the European Commission and its partners in public administrations across Europe to enhance interoperability continues at full speed despite the end of the ISA² programme. Indeed, enhanced interoperability will be necessary to unlock the potential of data use and reuse for improved public services, to enable cross-border collaboration, and to support the sector-specific policy goals set by the Commission for the future.

Interoperable Europe will lead the process of achieving these goals and creating a reinforced interoperability policy that will work for everyone. The initiative is supported by the Digital Europe Programme.

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