



European
Commission



State-of-play report on digital public administration and interoperability 2022

Directorate General for Informatics



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Luxembourg: Publications Office of the European Union, 2022

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PDF NO-02-22-302-EN-N ISBN: 978-92-76-53766-3 DOI: 10.2799/429353

This study was carried out for the European Commission by 

State-of-play report on digital public administration and interoperability 2022

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Executive Summary

The 2022 edition of the State-of-Play report on Digital Public Administration and Interoperability provides the reader with a run-through of the latest digital initiatives put in place between 2020 and 2022 in 35 European countries, as well as undertaken at European and global level, with the goal to further digitalise public administrations and services and ensure their interoperability. In addition, an overview of the current state-of-play of interoperability across Europe is provided by the reader, based on an overview of the level of implementation of the European Interoperability Framework (EIF) in 36 European countries¹ in 2021. This dedicated chapter on interoperability will also provide the readers with comparisons between the countries' performances in 2020 and 2021, so as to find correlations and commonalities but also potential areas of improvement to help European countries in further implementing the EIF.

The report demonstrates that European countries continue their path towards an increasingly digitalised public administration, a trend already perceived in the last few years and further accelerated by the COVID-19 pandemic.

However, a clear shift of mindset is observed regarding the use of digital tools by public administrations and the conception of digital public services, where user-centricity, usability and interoperability have emerged as key priorities when (re-)designing new or existing services. In this context, the European Commission has demonstrated a strong dedication to promote the uptake of digital solutions by its Member States, supporting the development of cross-border digital services in the EU and acting as an innovative driving force for digital transformation. To illustrate it, the report provides an overview of the state-of-play of the main initiatives around digital public administration and interoperability at the EU level, including EU funding programmes and digital-related political and legislative initiatives put forward by the European Commission in the period 2020-2022 to fuel the digital transformation of the public sector across Europe. Lastly, this year's edition of the report provides insights on the most recent global initiatives developed since 2020 by various international organisations, such as the United Nations and the World Bank, to support public administrations around the globe on their path towards interoperability and digitalisation.

¹ The 36 European countries include the 27 EU Member States, as well as the countries of the European Free Trade Association, Ukraine, Montenegro, Türkiye, the Republic of North Macedonia and the United Kingdom.

Introduction

Following the mandate from the European Commission's Directorate-General for Informatics (DG DIGIT), and in the context of the monitoring and reporting activities of the National Interoperability Framework Observatory (NIFO) project, Wavestone was requested to produce the third edition of the study on the state-of-play on digital public administration and interoperability across Europe. The report describes the landscape of activities aimed at promoting digital public administration and interoperability at the national, European and international level.

The study covers the recent developments on digital public administration and interoperability in the 27 EU Member States as well as in the countries of the European Free Trade Association (Iceland, Liechtenstein, Norway, Switzerland), Ukraine, Montenegro, Turkey, and the Republic of North Macedonia, hereafter the "European countries". Further to providing an overview of the main initiatives introduced by the European Commission to foster digital transformation across the EU, the report also covers some of the initiatives in the fields of digital public administration and interoperability sponsored by the major international organisations namely the United Nations (UN), the Organisation for Economic Cooperation and Development (OECD), and the World Bank.

The report reveals that the main areas on which the analysed countries have focused their digital efforts between 2020 and 2022 revolve around the digital transformation of their public administrations, the provision of digital government services and the advancement of digital inclusion. Moreover, the study shows that an overall net progress has been made since 2019 by European countries in implementing the recommendations stemming from the European Interoperability Framework.

The state-of-play report on digital public administration and interoperability is structured around the following chapters:

- **CHAPTER 1 – Latest developments in digital public administration in Europe.**

Through the lens of the principles outlined in the [Berlin Declaration](#) on Digital Society and Value-Based Digital Government, this chapter presents the results of the analysis of over 450 political and legislative initiatives as well as digital infrastructures (such as portals and networks) around digital public administration put forward and implemented by European countries between 2021 and 2022.

- **CHAPTER 2 – Latest developments in interoperability in Europe.**

This chapter focuses on the progress made over the past three years by 36 European countries in the implementation of the [European Interoperability Framework's \(EIF\)](#) recommendations. Further to that, it identified commonalities between the results of the EIF monitoring mechanism of 2020 and the one of 2021 and drew conclusions on the key areas for improvement. Finally, it presents a selection of good practices from two European countries, France and Italy, as well as those of the World Bank, in the field of interoperability governance.

- **CHAPTER 3 – The role of the European Union.**

This chapter details the European Commission's commitment in terms of political, legislative, and funding initiatives aimed at fostering digital transformation and interoperability across the EU.

- **CHAPTER 4 – Latest developments in digital public administration and interoperability in the world.**

This chapter summarises the most recent initiatives developed by international organisations to provide guidance and support to governments and public administrations in their digital transition.

Through the breadth of this year's edition, the reader is presented with a multilevel narration of an irreversible trend towards a more digital and interoperable society, both in Europe and in the world.



CHAPTER 1

Latest developments
in digital public
administration
in Europe

1

Latest developments in digital public administration in Europe

By digitalising their public administrations, European governments' main objective is to improve the efficiency and effectiveness of their public sector by harnessing the potential of information and communication technologies (ICT) to promote innovation, sustainability, and transparency, thereby bringing benefits to their citizens and businesses. The trend towards the digitalisation of public administrations and public services had already been in governments' spotlight for years but was further reinforced by the COVID-19 pandemic and subsequent crisis, which highlighted the need for public administrations to be able to rely on effective digital tools and services to meet the increasing needs of their citizens, especially in times of crisis. Building on the advancement of innovative technologies, the development of new digital public infrastructures and services are also increasingly thought of in a cross-border and interoperable² dimension. Beyond this willingness to increasingly rely on digital tools to deliver their services, public administrations are also engaging in a deeper reflection on their adoption, putting the usability and accessibility of digital tools for citizens at the centre of their priorities.

Each year, a variety of initiatives are implemented by countries in Europe to digitalise, and thus improve, their processes and services, whether in the form of strategies, action plans, soft policies, roadmaps, frameworks, binding legislative proposals or amendments, which can sometimes result in new digital infrastructures. This first chapter of the State-of-play report draws a clear picture of the main trends identified from the political communications, legislations and infrastructures designed and implemented by European countries between 2021 and 2022. The results rely on data gathered through the most recent editions of the Digital Public Administration factsheets, i.e., 2021 and 2022. Our findings are the result of an in-depth analysis and clustering of more than 450 initiatives from 35 European countries³.

[The Berlin Declaration on Digital Society and Value-based Digital Government](#), signed in 2020 by representatives of all Member States in Europe, acknowledges the importance of the digitalisation of the public sector, as well as digital public services, while considering the public sector as a driving force for the development of new and innovative solutions, including the use of emerging technologies. For our analysis, the initiatives retrieved from the Digital Public Administration factsheets 2021 and 2022 are clustered in five categories, aligned with some of the key principles of the Berlin Declaration:

- Digital transformation of public administrations refers to all the digital strategies, action plans, legislations and initiatives more broadly, that aim to modernise and digitalise public administrations;
- Trust and security in the digital government sphere refers to all the initiatives put in place by the Member States to ensure that citizens and businesses are able to rely on trustworthy and verifiable digital government applications and services, conforming to European standards (e.g., eID);
- Digital inclusion and digital government services refers to the initiatives put in place by governments and public authorities, at all levels, that provide digital services which respond and meet citizens' digital preferences and needs;
- Digital sovereignty and interoperability refer to the initiatives that aim to create the right conditions in Europe to develop and deploy secure and interoperable digital capacities; and
- Innovative technologies in the public sector refers to the Emerging Disruptive Technologies (EDT) initiatives and opportunities that Member States are promoting and investing on, including the Internet of Things, Artificial Intelligence systems, distributed ledger technologies and quantum computing, among others.

² In the context of this report, interoperability is defined as the ability of organisations to interact to achieve mutually beneficial goals, which implies the sharing of information and knowledge between these organisations, through the business processes they support, by exchanging data between their ICT systems.

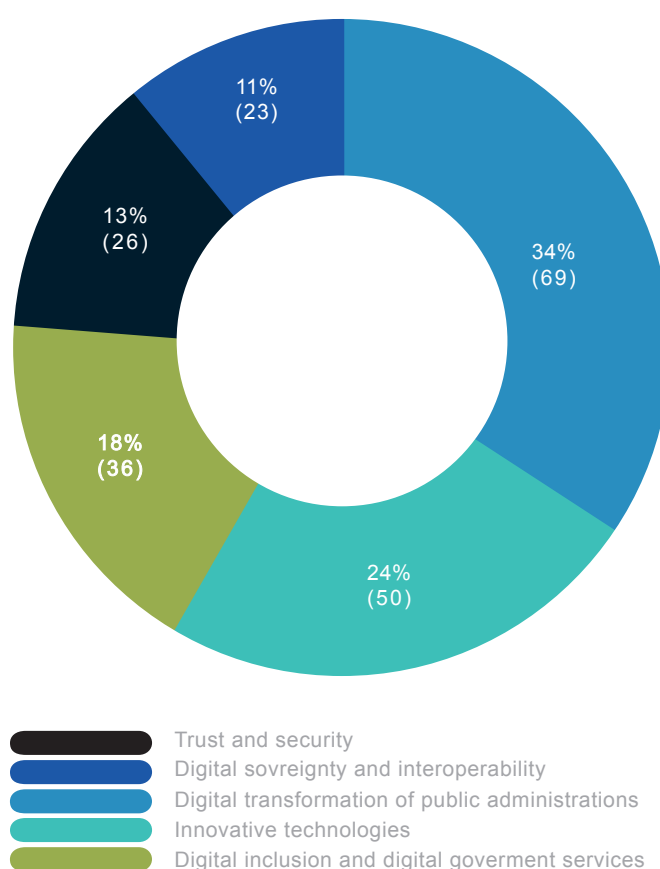
³ The countries studied are the 27 EU Member States, the members of the European Free Trade Association (Iceland, Liechtenstein, Norway and Switzerland) as well as Ukraine, Montenegro, Turkey and the Republic of North Macedonia.

1.1 Most recent political communications supporting digital public administration throughout Europe

The first sub-section is meant to provide an overview of the latest political communications in the field of digital public administration adopted (or currently under discussion/revision) by the 35 European countries under the scope of this study, in the course of 2021 and 2022. Our analysis, which encompasses the five abovementioned policy areas, has revealed that 204 political communications related to digital public administration and introducing new commitments, or announcing the revision of existing ones, have been released over the considered timeframe⁴.

Figure 1 hereafter displays the main digital policy areas on which the analysed countries have focused their political communications between 2021 and 2022.

Figure 1 Political Communications' digital themes



Source: analysis of the main political communications gathered from the 2021 and 2022 Digital Public Administration factsheets, performed by Wavestone.

⁴ A table showing the number of political communications adopted per cluster and per country is available in Annex 1.

Harnessing digital transformation across European public administrations

Between 2021 and 2022, 69 new political communications concerning the overarching topic of digital transformation of public administrations have been put forward by 30 European countries⁵. Most initiatives highlight national **digital** or **eGovernment plans and/or strategies**, some of these being an intrinsic part of EU Member States' **National Recovery and Resilience plans** submitted in 2021 under the European Commission's NextGenerationEU. For instance, Portugal's [National Recovery and Resilience Plan](#) adopted in July 2021 underlines the country's ambition to accelerate the transition to a more **digital public administration and society** as a whole. In this regard, significant reforms and investments are planned in the following areas: empowerment and digital inclusion of people through education; training in digital skills and promotion of digital literacy; digital transformation of the business sector; and digitalisation of the State. Some countries have even taken a step further by introducing **digital rights**. As a matter of fact, in July 2021, Spain adopted the [Digital Rights Charter](#) which enshrines a set of principles and rights to guide future regulatory projects and the development of public policies in order to guarantee the protection of individual and collective rights in new digital scenarios.

Promoting and investing in innovative technologies

Several countries are increasingly adopting political communications aimed at fostering the knowledge and use of innovative technologies in the public sector, thus highlighting the key role that these technologies are playing in all aspects of citizens' and businesses' lives. Overall, our analysis has uncovered 50 new

political communications on this matter in 24 different European countries⁶ over the past two years. Among these, initiatives related to **artificial intelligence** and **high-speed broadband connectivity** appear to be key for countries' digital development. For instance, Ireland published in July 2021 the [AI – Here for Good: National Artificial Intelligence Strategy](#) aimed at providing a high-level direction to the development, adoption, and implementation of AI in the country. Similarly, Lithuania released its National Broadband Plan in October 2021 which determines the measures that the public administration should implement between 2021 and 2027 in order to achieve the targets of at least 100 Mbps speed broadband development and ensure possibility for all Lithuanian households to have access to the Internet at a speed of at least 100 Mbps.

Bolstering digital inclusion at all levels

36 initiatives have been published by 20 different countries⁷ in Europe in the past two years with the objective of boosting **digital inclusion** and further developing **digital government services**. In this regard, Austria recently introduced its [Digital Competence Framework](#) which serves to classify and compare digital skills under six areas and eight competence levels as well as foresees the implementation of a certification system for digital skills. Other countries like Finland have opted for strategies that tackle inclusion by considering the impact that digital can have on **sustainable growth** and the environment, among others. In fact, the Finnish [Sustainable Growth Programme](#) and the [Climate and Environment Strategy for the ICT Sector](#), both adopted in 2021, introduced instruments aimed at reducing the carbon and environmental footprint of the digital sector while also helping to reach the benefits of digitalisation.

⁵ Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and Ukraine.

⁶ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, France, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey, and Ukraine.

⁷ Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, Ireland, Italy, Latvia, Luxembourg, Malta, Norway, Portugal, Slovakia, Slovenia, Spain, Switzerland, and Ukraine.

Ensuring trustworthy and verifiable digital government applications and services

Trust and security in the digital government sphere continue being important priorities for European countries in their digitalisation process. Overall, 26 initiatives have been introduced by 18 countries⁸ over the timeframe under consideration. In December 2021, Denmark launched a new national strategy for **cyber and information security** for the period 2022-2024 which will strengthen the national cyber and information security of Danish society through 34 specific initiatives which include robust protection of key functions of society (16 initiatives); increased level of competencies and management responsibilities (6 initiatives); strengthened public-private cooperation (7 initiatives); and active international engagement in the fight against the cyber threats (5 initiatives). Similarly, Montenegro's [Cyber Security Strategy 2022-2026](#) highlights the country's objective to create an environment in which citizens, critical infrastructure operators, and the public administration are protected as much as possible from the negative impacts of cyber threats and crime through continuous education on safe use of information and communication technologies in everyday life and business.

Deploying secure and interoperable digital capacities while preserving the integrity of data

As mentioned above, governments are increasingly focusing on the seamless and interoperable dimension of their digital capacities and infrastructures. In fact, in 2021 and 2022, 23 initiatives have been introduced by 19 countries⁹ across Europe, focused primarily on improving **interoperability** and **open data** standards. In 2021, the Netherlands published the [Inter-Administrative Data Strategy](#) which outlines how the government should tackle social challenges using data in an effective and responsible way. The data strategy also contains initial suggestions for data system functions that should be available to all government bodies and elaborates on the need for orchestration of responsible data sharing. Moreover, Malta and Bulgaria are currently updating their [National Interoperability Framework](#) in line with the standards of the European Interoperability Framework in order to modernise the public sector using the latest technology available. Malta's National Interoperability Framework, adopted in 2021, uses the EIF interoperability principles and recommendations as a basis to direct national efforts towards a connected Government and public administrations through legal, organisational, semantic, and technical interoperability. Bulgaria started drafting a new National Interoperability Framework in 2022, aiming to facilitate public sector activities and increase public sector efficiency in the country by improving the quality of services provided to Bulgarian and EU citizens.

⁸ Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, Iceland, Ireland, Luxembourg, Malta, Montenegro, Norway, Slovakia, Slovenia, Sweden, Ukraine and Turkey.

⁹ Bulgaria, Czech Republic, Denmark, France, Germany, Hungary, Iceland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, and Ukraine.

Taking a closer look at the Berlin Declaration on Digital Society and Value-based Digital Government

In December 2020, the 27 EU Member States also signed the [Berlin Declaration on Digital Society and Value-based Digital Government](#), a political communication meant to reaffirm their commitment to fundamental rights and European values, as already stipulated in the 2017 Tallin Declaration on eGovernment. It is composed of 22 Policy Actions, grouped into 7 key principles, to be implemented in Member States' national frameworks by 2024. The Berlin Declaration emphasises the importance of digital public services in our everyday lives and upholds the role of public administrations in driving a value-based digital transformation of European societies. The European Commission was called upon to implement and monitor progress towards the above-mentioned Policy Actions stipulated in the Declaration. More information on the Berlin Declaration monitoring mechanism can be found below.

What is the Berlin Declaration monitoring mechanism?

By signing the Declaration in December 2020, each EU Member States agreed to implement the 22 Policy Actions mentioned above in their national frameworks by 2024. Thus, the European Commission and other EU institutions were tasked to monitor the progress made by the Member States in implementing said Policy Actions. This gave rise to the idea of developing and deploying a framework to monitor their implementation, whose key objective is to support the Member States in identifying the progress made over time in implementing the Berlin Declaration. In addition, by highlighting the measures taken by each Member State to reach the Policy Actions set out in the Berlin Declaration, this work also allows to identify good practices and lessons learned along the way.

Want to learn more about the results of the Berlin Declaration monitoring mechanism?

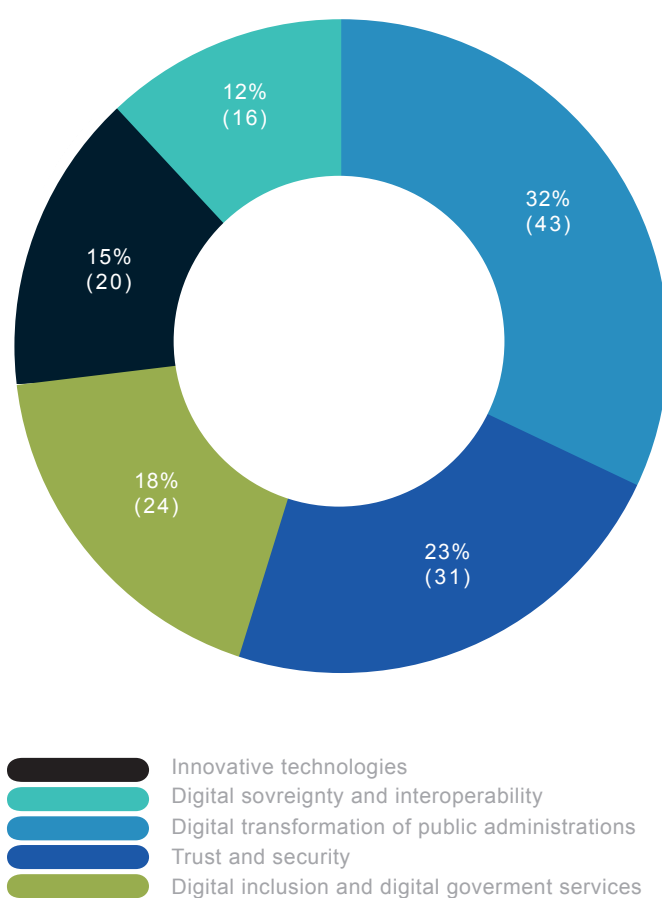
If you are interested to learn more about the methodology behind the deployment of this monitoring mechanism, as well as by a Member State's level of implementation of the Berlin Declaration in 2021, then do not think twice and visit the [Joinup page](#) to learn all about the Berlin Declaration monitoring mechanism and its related results, and read the recently published [progress report](#).

1.2 Most recent legislative initiatives supporting digital public administration throughout Europe

The second section of the first chapter is focused on the analysis of the newest (spanning from 2021 to 2022) legislative initiatives put in place by the 35 analysed countries in Europe to regulate various aspects related to the digitalisation of public administration. According to our analysis, 134 legislative initiatives have been or will be adopted between 2021 and the end of 2022. As for the political communications above, the legislations have been grouped into five clusters to highlight predominant digital themes¹⁰.

Figure 2 hereafter shows the main digital policy areas in which legislations were adopted or amended by the analysed countries between 2021 and 2022.

Figure 2 Legislations' digital themes



Source: analysis of the main legislations gathered from the 2021 and 2022 Digital Public Administration factsheets, performed by Wavestone.

¹⁰ A table showing the number of political communications adopted per cluster and per country is available in Annex 2.

Regulating the digitalisation of internal processes and resources of public administrations

In 2021 and 2022, 43 new legislations and amendments of existing laws or regulatory frameworks targeting the digitalisation of public administrations have been adopted by 23 European countries¹¹. Among them, most legislative initiatives support the adoption of new regulations on eGovernance and eProcurement. A vast majority of legal initiatives linked to **eGovernance** are aimed at establishing or reinforcing a legal framework for the development, testing and application of new electronic administrative processes, including the monitoring of automated decision-making processes. In Austria, the legal framework Digital Office was finalised in 2021, regulating new and selected inter-ministerial electronic administrative processes and services, while ensuring a broad stakeholder involvement. On **eProcurement**, new legislations and revisions are planned in the following areas: strengthening competition, increasing the flexibility of procurement processes, expanding the legal protection for contracting authorities and contracting entities, as well as defining the methods and processes of digitalisation regarding processes flows or data management. In Luxembourg, the [Law of 13 December 2021](#), amending the Law of 16 May 2019 on Electronic Invoicing in Public Procurement and Concession Contracts aimed at making electronic invoicing mandatory in B2G transactions, is under review to contribute to the reduction of the administrative burden on back offices, while digitalising the invoicing process. Another recurrent theme is the regulation of citizens' **access to public information**, as well as of **internal processes' digitalisation** aimed at

fostering administrative simplification. In Norway, the [Public Administration Act](#) and the [Archival Act](#) are being revised in 2022 to consider the further digitalisation of public administration, and more specifically the digitalisation of internal processes and the use of eArchiving.

Establishing trust and security within the digital public sphere

A total of 15 countries in Europe¹² have introduced new regulations on trust and security, which are mostly related to eID and cybersecurity. Indeed, among the legislations analysed for this report, 31 out of a 134 were focused on these themes. Regarding **eID**, countries in Europe are adopting initiatives meant to define their governments' provision on electronic means of identification to their citizens, so as to integrate the [Regulation \(EU\) N° 910/2014 on Electronic Identification and Trust Services for Electronic Transactions in the Internal Market](#) (eIDAS Regulation)¹³ within their national regulations and introduce their national eID scheme, as well as to prepare the future implementation of the [Digital Identity Wallet](#)¹⁴ concept as proposed by the European Commission in June 2021. In Switzerland, the [eID Act](#) voted on 7 March 2021 regulates how citizens can be uniquely identified on the internet by their eID, so that they can order goods or services online more easily and securely. The other major theme identified in our analysis is **cybersecurity**. Several EU countries, such as Lithuania, Italy, and Slovenia, are introducing laws on the role and functions of their new national cybersecurity authorities while others are amending their Cybersecurity Acts or adopting provisions on the institutional security of their governments' systems of information.

¹¹ Austria, Bulgaria, Czech Republic, Finland, France, Germany, Greece, Iceland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Switzerland, Turkey and Ukraine.

¹² Austria, Belgium, Cyprus, Denmark, Italy, Latvia, Lithuania, Poland, Portugal, Slovakia, Slovenia, Spain, Switzerland, Turkey and Ukraine.

¹³ The eIDAS Regulation ensures that people and businesses can use their own national electronic identification schemes (eIDs) to access public services available online in other EU countries. It also creates a European internal market for trust services by ensuring that they will work across borders and have the same legal status as their traditional paper based equivalents.

¹⁴ The EU Digital ID Wallet will allow EU citizens to opt into a unified digital identification system, enabling them to securely share personal information in a range of scenarios, from accessing healthcare to hiring a car or renting a property.

Defining standards for digital public services and encouraging digital inclusion

According to our analysis, 24 legislations related to digital inclusion and the provision of digital public services have been adopted by 13 European countries¹⁵ between 2021 and 2022. Indeed, the COVID-19 crisis has underlined the importance for citizens to be able to rely on effective **digital public services**, which can explain the large number of new legislations aimed at defining new standards for the creation and adoption of these services. In April 2021, Croatia adopted the [Conclusion on the Standard for the Development of Public eServices in the Republic of Croatia](#). The legal standard sets out activities and measures to ensure uniformity of eServices and a minimum level of quality and accessibility. **Digital inclusion**, as well as the notion of **accessibility**, are central elements of various legislative measures adopted by countries in Europe in 2021 and 2022. While digital public services need to be accessible for all citizens, including for more vulnerable groups, such as the elderly and people with disabilities, digital inclusion is also supported through the adoption of rules promoting **digital skills** for all. In Slovenia for example, the [Promoting Digital Inclusion Act](#), which was voted in February 2022, aims to raise awareness on the benefits of using digital tools, as well as to promote interest in the field of digital technologies to increase the level of basic digital competences in the population, as well as entrepreneurship in digital.

Overseeing the use of innovative technologies

Between 2021 and 2022, 20 legislative initiatives regulating the **use of innovative technologies** within the public sector and beyond have been drafted or adopted by 14 countries¹⁶ in Europe. Three technologies are particularly targeted: artificial intelligence (AI), distributed ledger technology (DLT, including blockchain) and Internet of Things (IoT). In addition, Turkey,

Cyprus, and Ukraine have also adopted specific regulations on virtual/crypto assets. In September 2021, Ukraine passed the [Law on Virtual Assets](#), a bill providing for a comprehensive settlement of legal relations arising from the circulation of virtual assets in the country, defining the rights and obligations of participants in the virtual assets market and the principles of the state vision on the matter.

Enhancing open data, digital sovereignty, and interoperability

Finally, many countries in Europe have drafted or adopted regulations covering various aspects of the **use of open data** and the **reuse of data** by public administrations, as well as enforced the **Once-Only principle** and **interoperability** guidelines for information systems and registries. Throughout 2021 and 2022, 16 legislative initiatives in this field have been implemented by 13 European countries¹⁷. In 2021, Italy adopted two acts enforcing a set of guidelines promoting interoperability: the [Technology Guidelines and Standards for the Security of Interoperability through API](#) and the [Guidelines on the Technological Infrastructure for the National Digital Data Platform for the Interoperability of Information Systems and Registries](#). This last Act will provide a technical and organisational framework, compatible with the national one, that will support a streamlined mechanism for consuming information between Italian Agencies with the goal of providing interoperable digital public services. 10 European countries transposed or amended existing laws to harmonise their domestic legislation with the Open Data Directive (2019/1024) on open data and the re-use of public sector information. While transposing this directive into its national legislation in July 2021, Finland also adopted two new acts on the reuse of information: one on the [Reuse of Research Data \(713/2021\)](#) and one on the [Reuse of Data Held by Publicly Owned Companies \(712/2021\)](#).

¹⁵ Austria, Croatia, Czech Republic, Estonia, Greece, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and Ukraine.

¹⁶ Cyprus, Czech Republic, Finland, Hungary, Germany, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Spain, Switzerland, Turkey and Ukraine.

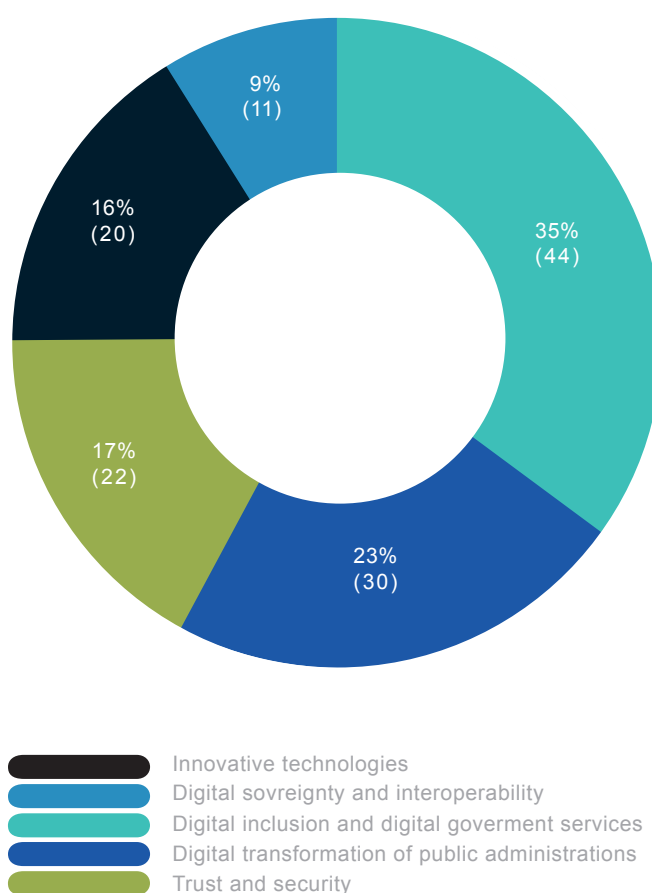
¹⁷ Austria, Croatia, Cyprus, Denmark, Finland, Germany, Italy, Latvia, Luxembourg, Malta, Poland, Romania and Sweden.

1.3 Most recent digital infrastructures put in place to support digital public administration throughout Europe

The last subsection of this chapter provides an overview of the public digital infrastructures identified across Europe between 2021 and 2022 and how these are clustered according to the above-mentioned taxonomy. Our analysis revealed that a total of 127 initiatives related to the development or deployment of digital infrastructures have been or will be adopted in 2021 and 2022¹⁸.

Figure 3 represents the main policy areas on which the analysed countries have focused on to either modify, expand or create their digital infrastructures between 2021 and 2022.

Figure 3 Infrastructures' digital themes



Source: analysis of the main infrastructures gathered from the 2021 and 2022 Digital Public Administration factsheets, performed by Wavestone.

¹⁸ A table showing the number of infrastructures adopted per cluster and per country is available in Annex 3.

Broadening the catalogue of eServices and improving their accessibility and usability

Between 2021 and 2022, 44 initiatives were introduced in 20 European countries¹⁹ to create or develop infrastructures supporting digital inclusion or bettering the delivery of eServices. Over these two years, countries in Europe have developed **portals** for the delivery of eServices as **One-Stop-Shops** and added new **functionalities** to existing infrastructures such as eidentification or electronic payments. When it comes to digital public services, improving the user experience and accessibility appears as a priority, as well as improving the clarity, simplicity and usability of interfaces. Driven by the COVID-19 crisis, many **health-related** applications and websites have been created to manage vaccinations and digital certificates. In France and Croatia, new medical data spaces for citizens are also being set up. Since January 2022, every French citizen has a personal digital health space called [Mon Espace Santé](#), which provides a direct access to their personal secured health data storage space, a secured messaging system with health professionals, a medical calendar to manage medical appointments, as well as a health app store providing a selection of useful health apps. In addition to health, new infrastructures related to **education** and **eDemocracy** are enhancing digital inclusion and facilitating citizens' interactions with public authorities. Cyprus developed in 2022 an eConsultation Portal as a single space where all public consultations will be published. The platform will enable citizens to submit comments or suggestions to all open public consultations, follow certain consultations in real time, receive notifications and access all comments submitted by citizens/organisations as well as the public bodies' responses to them.

Digitalising public administrations through better IT systems

The digitalisation of administrations requires efficient **IT systems**, which allow the automation of administrative tasks, speed up bureaucratic procedures and reduce the average response rate to citizens' requests. In fact, 30 initiatives introducing new unified information systems, software and hardware have been put in place by 14 countries²⁰ in Europe in 2021 and 2022. The objectives of these improvements to state IT systems are diverse: integration of electronic payments modules into central and local administrations, new management systems for official documents, improvements on official websites and portals (regarding citizens' access to information or user-friendliness) and the implementation of server equipment, among others. In 2022, 79 Turkish municipalities were integrated into the ePayment infrastructure of the national eGovernment Gateway, providing an infrastructure for electronic payment transactions for all public administrations in Turkey. All payment transactions should get collected through this infrastructure by 2023. In Greece, the [Central Electronic Document Routing System \(CEDRS\)](#), which was implemented by the Ministry of Digital Governance in 2022, provides a secure central infrastructure for the exchange of electronic documents between public organisations. 4 countries in Europe have introduced new **eProcurement** solutions, introducing new computerised processes and electronic transactions in public procurement. Montenegro set up a [new electronic system](#) in 2021 allowing an efficient public procurement in the country, complemented by a legal solution introducing the concept of eProcurement.

¹⁹ Belgium, Croatia, Cyprus, Czech Republic, Denmark, France, Greece, Ireland, Italy, Liechtenstein, Luxembourg, Montenegro, Norway, Poland, Romania, Slovenia, Spain, Sweden, Switzerland and Ukraine.

²⁰ Bulgaria, Croatia, Cyprus, Denmark, Finland, Greece, Ireland, Latvia, Luxembourg, Montenegro, Portugal, Sweden, Turkey and Ukraine.

Modernising public administrations' capacities through innovative technologies

Through 2021 and 2022, 14 countries²¹ in Europe have invested in projects around the adoption of innovative technologies in public administrations, as well as advanced research and development within the public sector. Following the analysis of the 22 identified initiatives in this regard, three types of technologies appear to be standing out: **artificial intelligence (AI)**, Distributed Ledger Technology (DLT)/**blockchain** and **quantum/supercomputers**. On AI specifically, a wide variety of infrastructures are being created to support the delivery of digital public services: such as AI-assisted voice generator services (text-to-speech), AI-assisted voice description services (speech-to-text) and AI-assisted communication assistants, among others. In Slovenia, the [Semantic Text Analyser](#), relying on AI, will be used for preparing and updating vocabularies and to improve fast reading of government (and other) documents by the end of 2022.

Providing secure electronic means of identification to citizens

Our analysis showed that 16 countries²² in Europe have adopted a total of 20 initiatives related to the establishment of new trust and security infrastructures. Most of these infrastructures are linked to **electronic identification** or **eID**, ranging from a new eIDAS compatible version of the national Identity Card or passport and the construction of an eIDAS node, to the development of a mobile app for eSignature creating secure points of access for electronic eGovernment services. Bulgaria has started the development of a new mobile app for eID, named BGID, that should be available by summer 2022 for both Android and IOS. The objective of BGID is to solve the existing problem stemming from the lack of widely spread, accessible, secure, reliable, easy-to-use and free-of-charge means of electronic identification in the country, making it conveniently available for all through a mobile device.

Interconnecting infrastructures and countries to develop interoperability and cross-border digital services

Finally, interoperability and digital sovereignty, and by definition data sovereignty, appear as important priorities for many countries in Europe. A total of 11 initiatives, put in place between 2021 and 2022, are meant to increase the use of interoperability and open data within 8 European countries²³ public administrations, so as to improve the exchange of information and the delivery of cross-border digital services. During these two years, several European countries have also put in place **interoperability portals** aimed at increasing the overall level and maturity of interoperability at national level and promote it through the publication of standards and guidelines on interoperability. In February 2021, the Chancellery of the Prime Minister of Poland launched a new Interoperability and State Information Architecture Portal, whose purpose is to increase the degree of regional, national and transnational interoperability and widespread use of the [State Information Architecture](#), which contains principles, standards, models and management processes, as well as elements necessary to implement the digital vision of the State, covering legal, organisational, semantic and technical layers. Romania also launched its [National System of Interoperability \(SNI\)](#) in November 2021, which is meant to interconnect local and central government IT systems, as well as the data associated with those systems, so that data can be shared between parties, regardless of the technology used to build the systems and regardless of the type of data. Another example of this type of initiatives is the creation or revision of national **metadata** or **open data portals** with the objective to make information that is generated and collected by public sector entities available and reusable, in addition to becoming fully compatible with the European Data Portal. This will increase citizens access to information and eDemocracy, as well as interoperability, both at the national and European level. In 2022, Denmark will launch a new central data portal that will harvest metadata from decentralised data catalogues of Danish administrations.

²¹ Austria, Croatia, Finland, France, Germany, Hungary, Italy, Lithuania, Romania, Slovakia, Slovenia, Sweden, Switzerland and Ukraine.

²² Austria, Bulgaria, Croatia, Cyprus, Denmark, Finland, Greece, Latvia, Luxembourg, Norway, Romania, Slovakia, Slovenia, Sweden, Switzerland and Turkey.

²³ Croatia, Cyprus, Denmark, Hungary, Poland, Romania, Slovenia and Sweden.

Harmonising intentions and actions

A comparative analysis with the findings of the ‘Digital path to recovery and resilience in the European Union’ report

[Interoperable Europe](#), through [the National Interoperability Framework Observatory \(NIFO\)](#), published the ‘[Digital path to recovery and resilience in the European Union](#)’ report in March 2022, analysing Member States’ Recovery and Resilience Plans, published in the context of the Recovery and Resilience Facility (RRF), by identifying and assessing the importance of digital initiatives within the Plans. To do so, a screening of the national Plans was performed, in order to identify and provide an overview of the main investments, and when available, of the overarching reforms, that the Member States will undertake with regard to digital transformation until 2026. While analysing the specificities of each Member State’s Plan, the goal of the report was also to identify and highlight the main upcoming trends in the digital sphere.

The data analysis showcased that many Member States are planning to heavily invest in the development and deployment of high-speed networks with the goal of bridging the digital divide, as well as in the delivery of digital public services and the digitalisation of their public administrations through the simplification of internal administrative processes and procedures, the promotion of interoperability and the Once-Only principle, among others. Boosted by the COVID-19 pandemic, the digitalisation of businesses also appears as an evident investment priority when analysing the National Recovery and Resilience Plans. Finally, to increase the Union’s resilience and its competitiveness at global level, Member States are also heavily investing in the deployment of advanced digital technologies, particularly in the fields of artificial intelligence, cybersecurity and blockchain.

The main findings of this report resonate with the analysis of the Digital Public Administration factsheets of 2021 and 2022 presented above. In fact, these strong similitudes demonstrate that, although they have until 2026, the European countries have already started to effectively invest and work towards the goals they set in their respective National Recovery and Resilience Plans.



Interview with Nadina Iacob

Research Fellow in the Global Governance, Regulation, Innovation, and Digital Economy (GRID) unit at the Centre for European Policy Studies (CEPS)

- How would you **define** the concept of ‘**digital government**’?

In the last years, the focus has shifted from eGovernment to the concept of ‘digital government’. This shift also changes the main perspective of how public administrations use ICT tools to deliver public services: the focus is no longer on inputs but on **outputs**. In this transition, the adoption of ICT tools is no longer the goal in itself for public administrations. With a greater focus on outputs, the emphasis is now on using the available tools (especially ICT-enabled) to achieve better results (and thus outcomes). The aim of this shift is to deliver the best possible results to all citizens through better, more effective, and more efficient public services. The purpose of using ICT is not just to tick a box, but to think about how we can **improve service delivery** and the **experience of citizens** using public services.

- In your view, how is **the role and definition** of digital government going to change in the coming years, also in light of the COVID-19 pandemic recovery and the subsequent further **boost to digital transformation**?

Public administrations have the tools they need and a vision of where they want to go to improve the delivery of digital public services. The definition of “digital government” is unlikely to change per se. However, there is a **growing awareness among all stakeholders**, as evidenced by the adoption of the [Berlin Declaration on the Digital Society and Values-based Digital Government](#), or the growing interest in interoperability. In the past, the follow-up to such political commitments was not always visible and concrete measures were lacking. However, since the beginning of the COVID-19 pandemic, citizens have become more demanding as they have also become increasingly aware of the **importance of digital services in their daily lives**. At the EU policy level, the outbreak of the COVID-19 pandemic has inadvertently provided an additional reason to accelerate the implementation of the policies laid out in the [Data Strategy](#), published by the Commission just before the spread of COVID-19. The crisis underlined the importance of Member States working together within the EU on healthcare, sharing health data on an ongoing basis and creating national and cross-border digital solutions.

- In your opinion, how can **emerging technologies** improve and further **support European public administrations** in their adoption of eHealth initiatives?

One important element that could support European public administrations regarding eHealth is the clear recognition of the **role of intermediaries**²⁴ in the management of health data. Different health-related data might be collected, for example, by using wearable devices²⁵ or applications on smartphones. At one point in the future, the increasing quantity of data might become hard to manage for a citizen. Therefore, the support of intermediaries would be essential to manage this data collected at the individual level, to analyse it and to link it to data contained in the 'classical' public electronic health records²⁶. While the role of intermediaries is mentioned in the Data Act established by the European Commission, a clearer framework on the topic – specific to the sector – might be needed. At the same time, the purpose would be to allow the holder of the digital wallet²⁷ to decide what to do with their data or with whom to share it.

Involving intermediaries in the process of gathering health data could also facilitate interactions with citizens and allow them to link data with research. For instance, in the case of clinical trials, data could be exchanged or shared between different trials and then made available on the basis of the consent of the data subject to different research projects. In this context, the private sector will lead the initiative under a determined set of rules (e.g., data privacy and strict use of data) in close collaboration with the public sector.

- What are, in your opinion, the main **interoperability barriers** that could hinder the deployment of data sharing in areas including healthcare and the public sector in general, in the Member States? Would you have any **recommendations** on how to overcome these barriers and ensure further and better interoperability?

Three main interoperability barriers can be identified in healthcare: the **fragmentation of approaches** to interoperability in the EU, the **lack of digitalisation** in Member States, and the **limitation of financial resources**.

For a country, the limitation of resources can have a big impact on its level of digitalisation, as well as its capacity to invest heavily on digital tools or the digitalisation of existing processes in the public sector. Often, the priority of Member States with less resources is more focused on getting better medicines and medical equipment, than to invest in the digitalisation of their health. It is therefore essential to restate why digitalisation is necessary in this field and what benefits it can bring in the long term. This issue could also be reduced through a better allocation of financial and material resources. The recommendation to overcome interoperability barriers is to improve the **cooperation** at the EU level in the field and to increase **awareness** on the importance of health digitalisation. In addition, the development of common and/or interoperable European/cross-border infrastructures is essential. The common approach to follow should become clearer with the introduction of the European Data space²⁸.

²⁴ In this context, an intermediary is an organisation collecting data, that can make the link between those who are or wish to make their data available (consumers), and those who seek to leverage that data (public administrations).

²⁵ Such as connected watches and glasses.

²⁶ Data gathered in the medical environment, e.g. by general practitioners and at the hospital.

²⁷ The EU Digital ID Wallet will allow EU citizens to opt into a unified digital identification system, enabling them to securely share personal information in a range of scenarios, from accessing healthcare to hiring a car or renting a property.

²⁸ This refers to the creation of an EU data infrastructure with tailored governance mechanisms that will enable secure and cross-border access to key datasets in targeted thematic areas that will be accessible to businesses and the public sector across the EU. More information on: https://ec.europa.eu/newsroom/repository/document/2021-46/C_2021_7914_1_EN_annexe_acte_autonome_cp_part1_v3_x3qnsqH6g4B4JabSGBBy9UatCRc8_81099.pdf.

A vertical photograph on the left side of the page shows a person's hands holding a smartphone. The person is wearing a dark suit jacket and a watch. The background is a blurred office environment with a window and a desk. The image has rounded corners.

CHAPTER 2

Latest developments
in interoperability
in Europe

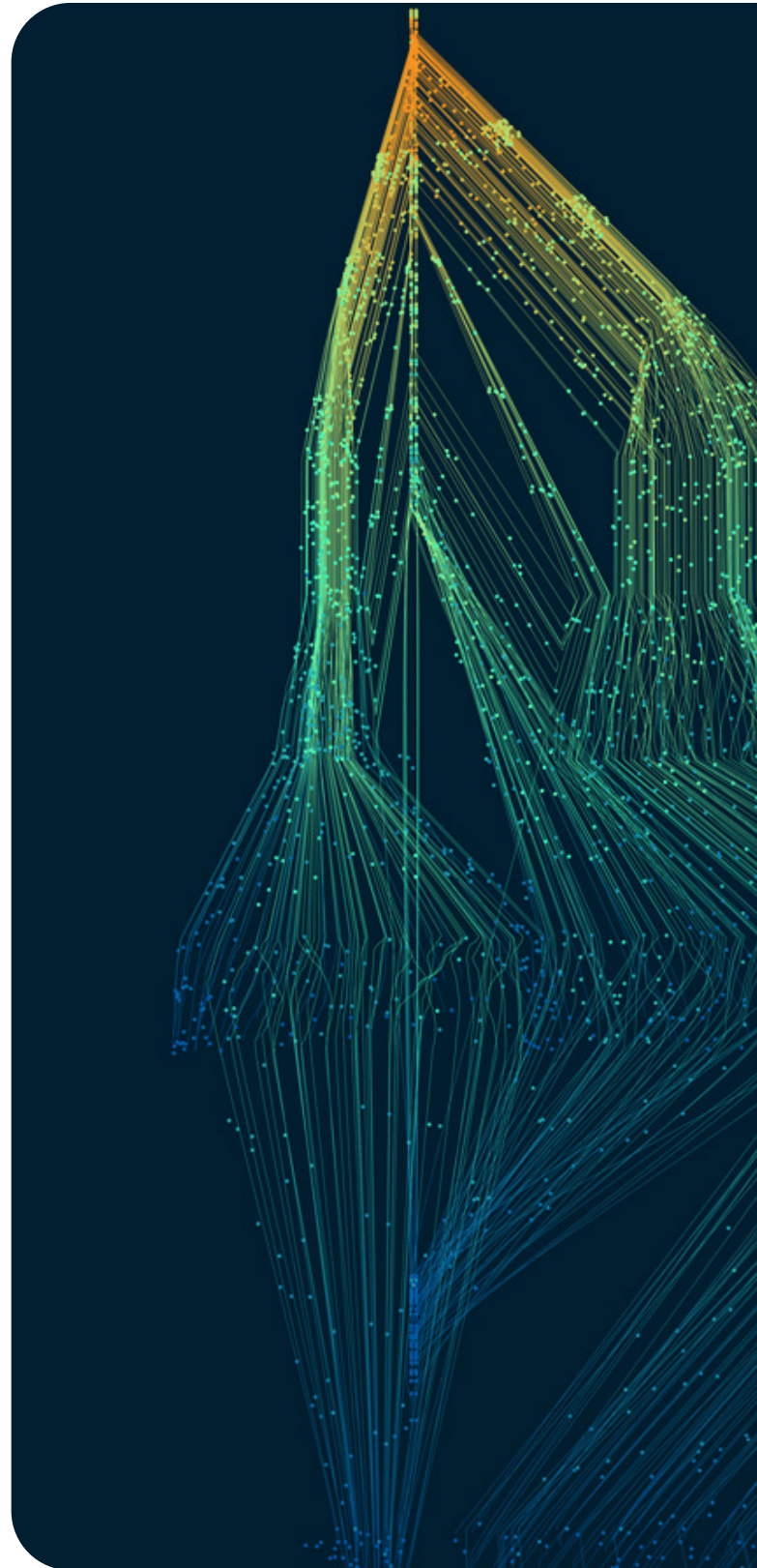
2

Latest developments in interoperability in Europe

The objective of this chapter is to present the progress made in the past three years by the 35 European countries included in the sample of this study (henceforth referred to as “European countries”) in implementing the [European Interoperability Framework \(EIF\)](#). In particular, this chapter briefly introduces the EIF monitoring mechanism for the Member States and provides an overview of the evolution of the interoperability landscape over the last year. Additionally, it offers an overview of the tools made available by the EC to support European countries in assessing their level of interoperability, before investigating their performance in 2021 compared with the ones in 2020 and 2019 to identify potential trends across Europe and draw conclusions. Finally, this chapter highlights the good practices of two European countries, France and Italy, as well as of the World Bank, in the field of interoperability governance.

2.1 Context and background of the EIF and its monitoring mechanism for Member States

This section provides a description of the activities of the EIF and its monitoring mechanism. It also shows a high-level overview of the evolution of the implementation of the EIF recommendations over the last year, in particular how the EU is supporting European countries in assessing their level of interoperability.



2.1.1 Introduction to the EIF and its monitoring mechanism

In March 2017, a revised EIF was adopted and part of the European Commission's [Communication on Interoperability](#). This revised version of the EIF was accompanied by the [Interoperability Action Plan \(IAP\)](#) supporting its implementation. The EIF is designed as a generic and non-binding framework applicable to all public administrations in the EU. Its objective is to spur and guide European public administrations in their efforts to design and deliver seamless European public services through 47 recommendations, organised in three pillars:

- **The 12 interoperability principles**, which are fundamental behavioural aspects aimed at guiding European policymakers in their pursuit of interoperability.
- **The 4+2 layers of interoperability**, which present the different aspects of interoperability that should be addressed in the design of European public services and are considered an integral element of the interoperability-by-design paradigm.
- **The conceptual model**, which is aligned with the interoperability principles and is meant to set a common standard and approach to the design and delivery of integrated public services. This model is modular and comprises loosely coupled service components interconnected through shared infrastructure.

The monitoring, evaluation and reporting of the implementation of the 47 recommendations of the EIF are ensured by an integrated framework

created by the European Commission: the [EIF Monitoring Mechanism](#). This mechanism was developed and is maintained within the remit of the [National Interoperability Framework Observatory \(NIFO\)](#) action, which is part of [Interoperable Europe](#), the successor of the [ISA² programme](#).

This mechanism provides each European country with its level of implementation of the EIF based on a recommendation-by-recommendation basis. The resulting level of implementation is derived from the aggregation of the data of one or more key performance indicators (KPIs). This data helps European countries identify the areas in which their performance could be improved, as well as the areas in which they are performing well, with the results at the EU level as a benchmark. The results obtained for each of the 47 recommendations are then clustered under three scoreboards, based on the three above-mentioned pillars, namely the interoperability principles, the interoperability layers and the EIF conceptual model for integrated public services provision. The scoring mechanism is based on a scale from 1 to 4, the latter being the highest score²⁹.

This assessment relies on a data collection exercise which depends, on the one hand, on primary indicators, collected through an online survey disseminated to national contact points and, on the other hand, on secondary indicators, collected from external data sources, such as the [Open Data Portal](#), [Digital Economy and Society Index \(DESI\)](#) and other EU initiatives.



²⁹ More information on the EIF monitoring mechanism is available [here](#).

2.1.2 The evolution of the interoperability landscape over the past year

A major development that took place over the past year and which impacts the interoperability landscape is the evolution of the ISA² Programme into Interoperable Europe, as briefly mentioned in the previous section. The ISA² programme ran until 31 December 2020 and was officially closed with a conference in April 2021. Its mission is thus expanded by Interoperable Europe, the European Commission's new initiative for a reinforced interoperability policy in the public sector. It is aimed to support European public administrations in their digital transformation and will lead the progress towards the following goals: unlock the potential of data use and reuse for improved public services, enable cross-border collaboration, and bolster the sector-specific policy goals set by the European Commission for the future.

In November 2021 was also published [the Study supporting the evaluation of the implementation of the EIF](#), whose objective was to assess the achievements and shortcomings of the current EIF framework and to present the lessons learnt, considering five evaluation criteria: effectiveness, efficiency, coherence, EU added value and relevance.

Its findings show that the actual results of the EIF only partially achieved its expected outcomes and impacts. In particular, while the high-level

guidance provided by the EIF has supported the development of interoperable digital public services, national policies and national strategies for interoperability in the European countries, there is a gap between these guiding principles and the practical implementation within the Member States, especially at the regional and local level. The study notably concludes that improvements, such as clearer and more practical set of guidelines, are necessary to achieve broader impacts and to support European countries in developing public services that are interoperable, user-centric and widely available in the EU.

Additionally, the Commission adopted in February 2022 a new [EU Strategy on Standardisation](#) aiming to strengthen the EU's global competitiveness, to enable a resilient, green and digital economy and to preserve democratic values around new technologies. This strategy underlines the importance of standards to further support European competitiveness by ensuring the interoperability of products, services and data, reduce costs, improve safety and foster innovation.



2.1.3 The EU's support to European countries in assessing their level of interoperability

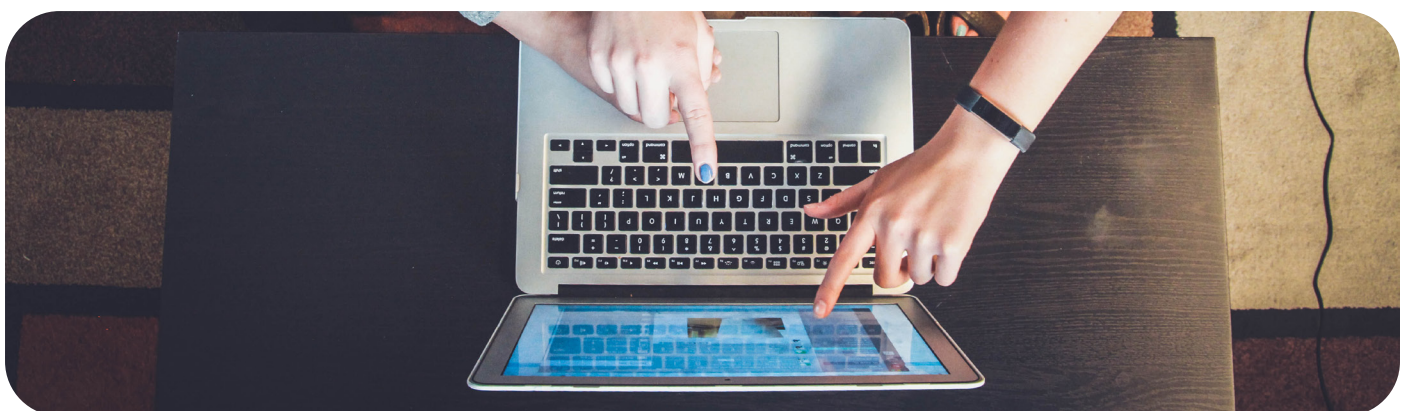
The above-mentioned launch of the European Commission's [Interoperable Europe](#) initiative will be the main driver of the digital transformation of European public administrations and aims at creating a reinforced interoperability policy that will suit every European country. It is supported by the [Digital Europe Programme](#), the European Commission's funding programme (with an overall budget of €7.5 billion) designed to provide strategic funding to support projects in the following five key capacity areas: supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and ensuring a wide use of digital technologies across the economy and society, through Digital Innovation Hubs.

The third edition of the EIF monitoring mechanism falls within the Interoperable Europe's ambition of continuously fostering interoperability and supporting the European countries in identifying potential challenges and areas for improvement on the topic. Particularly, the re-designed [EIF monitoring mechanism dashboards](#) represent a key tool to provide an overview of the status and level of implementation of the EIF within all the European countries under its scope. The interactive dashboards showcase the performance of the countries at different levels of granularity: EIF Pillars, EIF Recommendations and KPIs.

Closely linked to the EIF monitoring mechanism dashboards stands the [EIF Toolbox](#), an interactive portal meant to provide guidance and support to the national public administrations in the

implementation of the EIF recommendations. To do so, the Toolbox contains information on the theoretical background of the EIF framework (the so-called EIF Pillars) and provides access to information on reusable solutions or components to tackle specific aspects of interoperability when designing new public services or updating existing ones. The Toolbox is progressively being reshaped according to European countries' needs. One of the [latest added features](#) is the possibility for European public administrations to submit their good practices and concrete examples of the implementation of the EIF recommendations that can serve as inspiration to other countries. The Toolbox also provides, at Pillars level and for each recommendation, an overview of the legal initiatives, countries good practices and reusable solutions to better implement the concerned recommendation.

Beside the EIF monitoring mechanism and related State of Play Reports³⁰ and [Digital Public Administration Factsheets](#), there are other useful supporting tools aimed at helping European countries to gain intelligence on their and other Member States' interoperability efforts and advances over the years, such as [DESI](#), [EU Open Data Portal](#), and the [eGovernment Benchmark](#). Similarly, to the EIF monitoring mechanism, these other assessment frameworks also provide dashboards to visualise their results and analytical reports.



³⁰ The State of Play Reports from previous years are available [here](#) for the 2019 edition, and here for the [2020](#) edition.

2.2 Overview of the performance of European countries in the field of interoperability

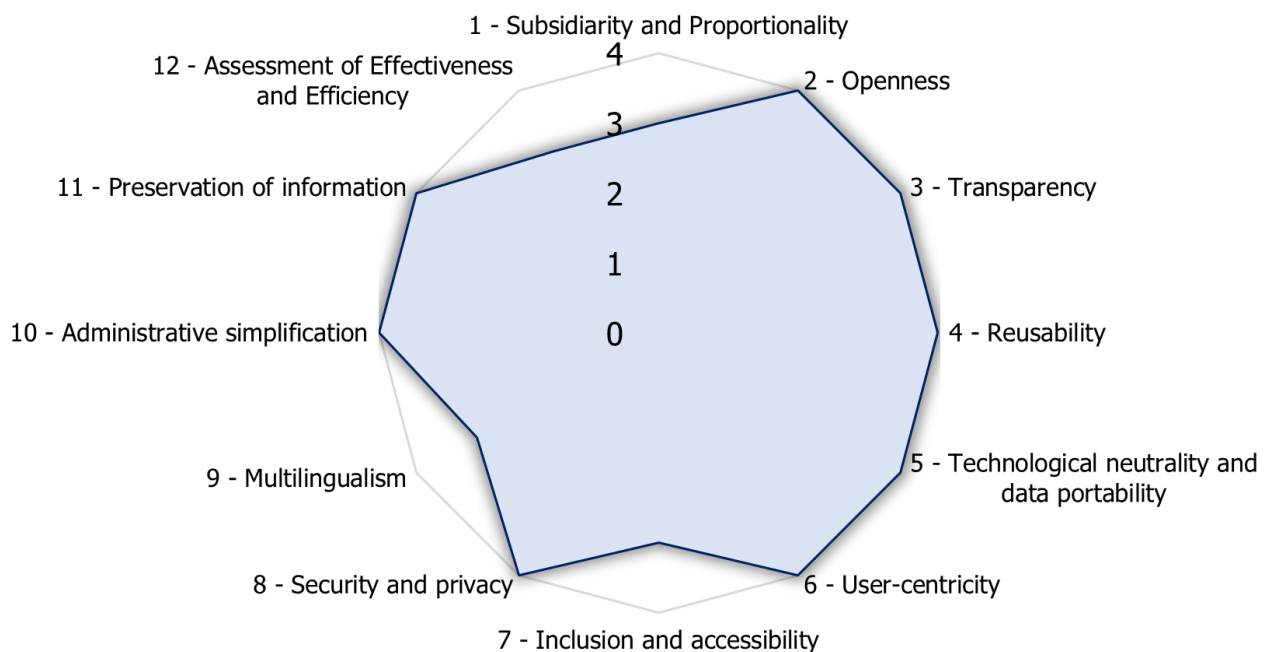
This section provides a global overview of the European countries' performance in 2021 for each pillar of the EIF. Additionally, this section analyses the results of the EIF monitoring mechanism of 2021 and compares them with the results of 2020 and 2019 to identify trends, commonalities,

disparities and draw conclusions. In particular, the assessment of the European countries' progress throughout the years is focusing on the evolution of the number of countries obtaining the maximum score, per scoreboard, between 2019 and 2021.

2.2.1 The implementation of the interoperability principles in Europe

Figure 4 presents the 2021 results of the implementation of the **interoperability principles at the EU level**.

Figure 4 European 2021 results of the implementation of the interoperability principles

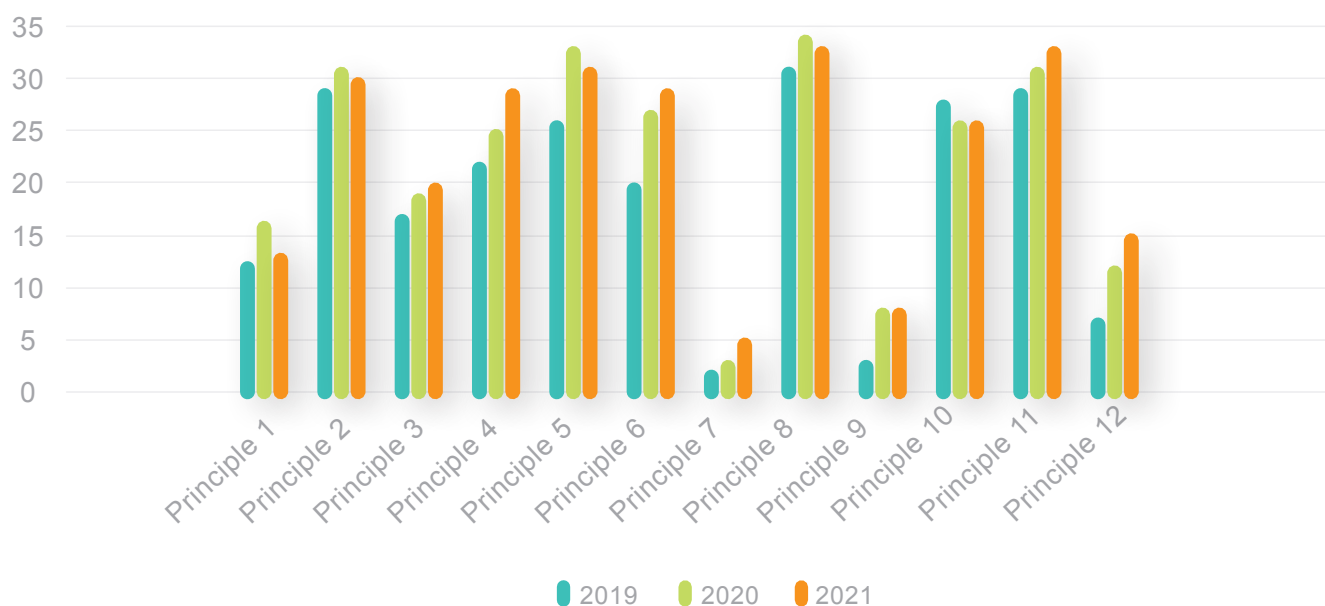


Source: analysis performed by Wavestone, 2022

For the first pillar of the EIF, the overall results for 2021, both at EU and at country level, show that there are potential areas for improvement regarding the interoperability principles of subsidiarity and proportionality (Principle

1), inclusion and accessibility (Principle 7), multilingualism (Principle 9) and assessment of effectiveness and efficiency (Principle 12). These results are the same as for the two previous editions of the EIF monitoring mechanism.

Figure 5 Number of European countries obtaining the maximum score, for the first scoreboard (interoperability principles), between 2019 and 2021



Source: analysis performed by Wavestone, 2022

When focusing on the evolution of the number of European countries obtaining the maximum score, for the first scoreboard, between 2019 and 2021, as shown in Figure 5, the results are positive, and some net progress has been made since 2019. These positive progress concern more particularly the Interoperability Principles on the Assessment of Effectiveness and Efficiency

(Principle 12) and on Increasing reusability of data and solutions (Principle 4). Some areas for improvement can still be made for some European countries notably in the Interoperability Principles on Subsidiarity and Proportionality (Principle 1) and Openness (Principle 2), where European countries are improving at a slower pace. These results are detailed hereafter.

Continuing to better assess effectiveness and efficiency (Principle 12)

Principle 12 assesses the extent to which nine key elements, i.e., return on investments, total cost of ownership, reusability, adaptability, risks, administrative burden, simplification of administrative processes, user satisfaction and user-centricity, are taken into account in the evaluation of the effectiveness and efficiency of a European public service.

The principle is evaluated through Recommendation 19 which states that European public administrations should “evaluate the effectiveness and efficiency of different interoperability solutions and technological options considering user needs, proportionality and balance between costs and benefits”.

When looking at the evolution of the number of countries that obtained the maximum score throughout the three years of monitoring, this principle is the one that has progressed the most, with 7 countries obtaining the maximum score in 2019 against 15 countries in 2021. The overall performance in this area can be explained by the fact that European countries are strongly striving to reduce the administrative burden, which has been triggered by [the ‘Once-Only’ principle](#). Indeed, it promotes the reuse of data to facilitate the delivery of digital public services and lower the cost of administrative procedures. Additionally, European countries have made efforts to assess their existing and new solutions and services more comprehensively. A shift towards a user-centric approach has been identified, as well as a change in the countries’ approach to balancing costs and benefits. Thus, European countries are now more focused on the cost-benefit ratio of the digital solutions and service they propose, while taking into account users’ needs, rather than basing the evaluation of their services and solutions only on their organisation’s needs. Using open-source solutions is also increasing, as they help to reduce total ownership costs. Finally, the creation of catalogues of solutions supported the re-use of solutions and thus boosted their effectiveness.



The application of the ‘Once-Only’ Principle in Spain

Spanish Laws [39/2015](#) and [40/2015](#) promote the use of digital procedures to provide documents to public administrations. They also stipulate that interested parties should not be required by public administrations to provide documents prepared by them. Administrations must also collect documents electronically through their corporate networks or by consulting the [Data Intermediation Platform \(PID\)](#), which is a horizontal service that enables the ‘Once-Only’ principle. It simplifies administrative procedures so that citizens or businesses do not have to deliver data more than once.

Increasing reusability of data and solutions (Principle 4)

Principle 4 focuses on the reusability and sharing of IT solutions, information and data between EU public administrations and governments, and it is assessed by Recommendations 6 and 7 about the reuse and sharing of solutions and data when implementing public services. Such reusability is considered as an interoperability enabler, a driver of quality and cost saver in terms of resources and time.

Significant activities towards the reuse of data and IT solutions have been undertaken by Member States over the past three years, with 7 additional countries reaching the highest score in 2021 compared to 2019. Multiple factors have contributed to this increase, among which the growing number of national collaborative platforms³¹ that are put in place to facilitate the reuse, sharing and development of IT solutions. European countries are also launching actions to foster this reuse by establishing national catalogues of generic and reusable building blocks and by encouraging public administrations to use Application Programming Interfaces (APIs) in order to be able to properly and effectively reuse IT solutions. Finally, this trend has also been boosted by the use of common reference architecture³² to manage generic and reusable building blocks as portfolios. It has been observed that more and more governments provide guidance, for instance online, on how to use reference architecture to develop a public sector organisation's technology and how it shares data across government.



Collaborative platforms in Czechia

Collaborative platforms have been created at central government level, such as the [Archi.gov.cz](https://archi.gov.cz) platform which is a central collaborative platform introduced and maintained by the Chief Architect of eGovernment. Collaborative platforms also exist at the sectoral and regional levels, providing support to local administrations within the framework of the National Architecture Plan and national digital strategies.

³¹ A collaborative platform is a virtual workspace where resources and tools are centralized with the aim of facilitating communication and personal interaction in corporate project work.

³² Reference architectures are standardized architectures that provide a frame of reference for a vertical domain or sector. For instance, the European Commission's Common Reference Architecture (CORA) aims to support the development and maintenance of statistical IT tools for use by NSIs and other national authorities, within the general framework of a common reference architecture for the data life cycle at national level, and using appropriate common open standards and guidelines such as SDMX. More information is available here: https://ec.europa.eu/eurostat/cros/content/common-reference-architecture-cora_en

Focusing efforts on ensuring subsidiarity and proportionality (Principle 1)

Principle 1 is assessed through Recommendation 1 of the EIF which states that European countries should ‘ensure that national interoperability frameworks and interoperability strategies are aligned with the EIF and, if needed, tailor and extend them to address the national context and needs. Therefore, it focuses on the extent to which national strategies or frameworks take the EIF into account.

It is one of the principles where no significant improvements have been made by Member States since 2019. Indeed, still in 2021, while many National Interoperability Frameworks (NIFs) have been established in European countries, these frameworks are not all fully aligned with the EIF components, thus explaining the low number of countries reaching the maximum score of 4. Therefore, countries still have to concentrate some efforts towards the full alignment of their NIF with the EIF. This alignment is a work in progress that will take some time in many countries, considering the significant number of EIF recommendations (47) that needs to be taken into account and the fact that the extent to which recommendations are implemented might be affected by the national legal framework and political context.

Furthermore, these recommendations touch upon many different elements, thus covering a large spectrum of action. Different approaches could be used by countries so as to assess the degree of alignment of their NIF with the EIF and thus spot the missing aspects where actions would be required. For instance, Spain implemented a gap analysis based on a traffic light system. This approach helps to define the overall state-of-play of the country and provides policy makers with detailed information when defining the way forward for the country.



The Maltese NIF

The current National Interoperability Framework (NIF) document is dated pre-2012 and takes into account the 12 principles and 25 recommendations detailed in the first version of EIF. This NIF, as well as the strategies and frameworks related to or extending it, are currently being revised and further aligned with the current version of the EIF so as to take all the EIF recommendations and principles into account.

Further need to deepen on openness (Principle 2)

The implementation of Principle 2 ‘Openness’ encompasses to have all public data freely available for use and reuse by others, unless restrictions apply e.g., for protection of personal data, confidentiality, or intellectual property rights (Recommendation 2). It also refers to the need for public administrations to both contribute to the creation and reuse open-source software technologies and products (Recommendation 3) and to favour open specification and standards (Recommendation 4).

This principle has also witnessed a slow progression over the past three years. However, this is mainly due to the fact that most European countries were already reaching the maximum score of 4 in 2019, thus giving little space for potential improvements in the following years. Indeed, when developing new IT solutions, most countries actively consider the use of open-source software and promote the use of open specifications, for instance to ensure that data is available and published in an open format. These processes have been standardised in public administrations at national and European level.

Additionally, it appears that the use of open standards and specifications is very often included as an architectural principle and implementing rules in the European countries’ NIFs. They also increasingly promote the use of these open specifications by and in digital public administrations on an ongoing basis. Finally, a new culture has emerged regarding the use of data, referred to as ‘Developing in the open’, which relates to the growing trend, not only within European countries, to further develop open-source software and make their source code publicly accessible and licensed, thus available to be seen and used by all.

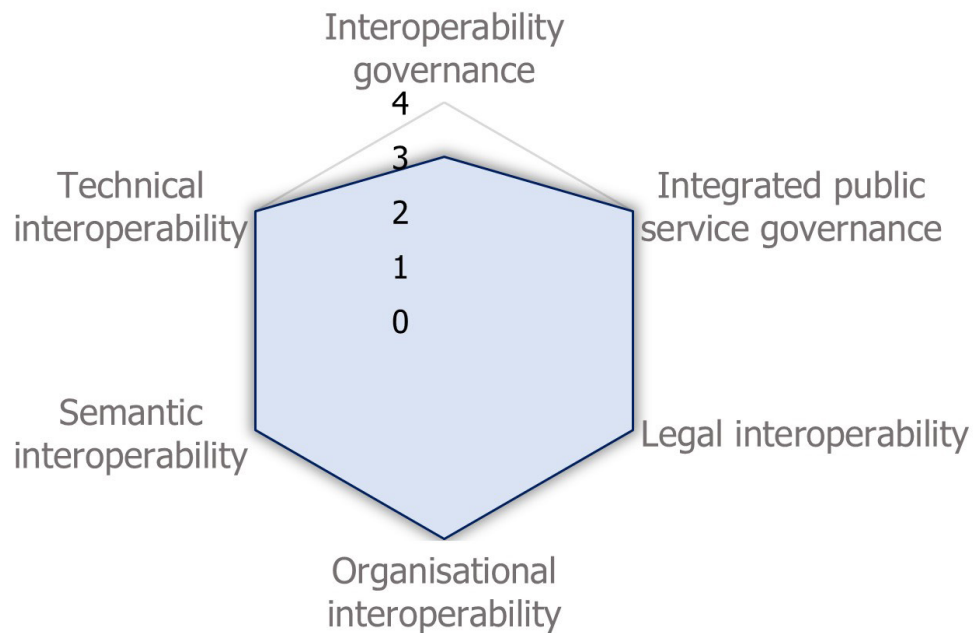
Open-source software in Austria

Open-source software and its respective Total Cost of Ownership (TCO) are considered as default when planning new public services. Besides the costs, additional perspectives are taken into consideration in software contracts, such as the confidentiality of secret algorithms, operational security, and legal aspects (e.g., compensation for damages). A number of e-Government applications make use of MOA (Modules for Online Applications) components, like MOA ID for identification, or MOA SP for signature verification.

2.2.2 The implementation of the interoperability layers in Europe

Figure 6 shows the 2021 results of the monitoring of the implementation for the **interoperability layers** of the EIF.

Figure 6 Interoperability layers European results for 2021



Source: analysis performed by Wavestone, 2022

For this pillar, the 2021 results show that, on average, European countries are scoring maximum points in all interoperability layers. These average results are similar to the two

previous years, excepted for the 'Interoperability governance' layer which obtained an average score of three in 2019 and effectively improved to a score of 4 in 2020.

Figure 7 Number of European countries obtaining the maximum score, for the second scoreboard (Interoperability layers), between 2019 and 2021



Source: analysis performed by Wavestone, 2022

Figure 7 shows European countries' progress throughout the years by focusing on the evolution of the number of countries obtaining the maximum score, for the second scoreboard, between 2019 and 2021. The 'Organisational interoperability' and 'Semantic interoperability' layers are those

where Member States progressed the faster between 2019 and 2021, whereas the 'Legal interoperability' layers is where they are slower in obtaining the maximum score of 4. These results are detailed hereafter.

Strengthening organisational interoperability

Organisational interoperability refers to the alignment of public administrations' business processes, responsibilities and expectations to achieve commonly agreed and mutually beneficial goals. It also relates to the definition of the relationship between service providers and service consumers. The implementation of this interoperability layer is assessed, on the one hand, through the documentation of public administrations' business processes using commonly accepted modelling techniques and their alignment to deliver a European public service (Recommendation 28). It is also assessed by looking at whether organisational relationships for establishing and operating European public services are clear and formalised (Recommendation 29).

In 2021, all European countries, except one, are scoring the maximum for Recommendation 28. A third of them obtained a score of four for the implementation of Recommendation 29, while the others reached a score of 3, which shows that there are evolving positively. When looking at the results for 2020 and 2019, the trends are very similar, although some countries have demonstrated a significant evolution through the years, such as Greece, Ireland and Portugal.

Since 2019, administrative entities have invested efforts in aligning their existing business processes and in defining new and more consistent processes where necessary. As shown by the example of Portugal hereafter, more and more modelling techniques, such as business process modelling notation (BPMN) and Unified Modelling Language (UML) diagrams, are being used by public administrations to document business processes. Additionally, some countries have even developed their own national modelling framework, such as the Luxemburgish PROMETA framework and platform, which aims to clarify and enact business processes management. It is implemented by the Business Process Management Office (BPMO) of the Luxemburg State IT Center that accompanies administrations and public bodies in their business process management and optimisation of their organisation.



Business processes using commonly accepted modelling techniques in Portugal

In Portugal, the (re)design of services promoted by the Public Administration Digital Competencies Centre (TicAPP, an organic unit integrated into the Administrative Modernization Agency (AMA) with other public entities considers modelling techniques such as BPMN (Business process model and notation), UML (Unified Modeling Language) sequence diagrams and Entity Relations diagrams (modeling data). Furthermore, BPMN and UML are used in several areas of governance.

Deepening semantic interoperability

According to the EIF, the semantic interoperability layer 'ensures that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties', this covering the semantic (meaning) and syntactic (format) aspects. The implementation of this layer by European countries is assessed by Recommendation 30 which provides that data and information should be perceived as a valuable public asset. It is also assessed by the existence of an information management strategy (Recommendation 31) and the establishment of sector-specific and cross-sectoral communities, notably to create open information specification (Recommendation 32).

Within the three-year period of monitoring, there has been positive developments in the implementation of semantic interoperability, with 8 additional countries reaching the score of 4 in 2021 compared to 2019. European countries are increasingly working on interoperability agreements, taxonomies, controlled vocabularies and reusable data structure and models to achieve semantic interoperability. These developments have been triggered by the 'Once-Only' principle, which aims to avoid duplication and fragmentation, as well as by the adoption of standard and specifications, encouraged by the European Data Strategy, which led to the adoption of the Data Governance Act in December 2021 aiming to make public sector data available for reuse, and the proposal for the Data Act put forward by the Commission in February 2022, which includes harmonised rules on fair access to and use of data.



Vocabularies and standards in Belgium

The Belgian Federal government is using the EU Publication Office's controlled vocabularies and thesauri and started building its own national reference data. Besides, the Flemish Region has published, in a central catalogue of standards, commonly agreed descriptions of data (vocabularies, application profiles and implementation models), which are published in both human- and machine-readable formats. Data standards have been developed in over 40 domains and are managed as a knowledge graph using a fully automated open-source toolchain. Some of these standards have even been formalised in legislation.

Further enhancing legal interoperability

Recommendation 37 is used to assess the implementation of the legal interoperability layer and calls on Member States to “ensure that legislation is screened by means of ‘interoperability checks’, to identify any barriers to interoperability”. It also specifies that, when drafting legislation to establish a European public service, Member States should “seek to make it consistent with relevant legislation, perform a ‘digital check’ and consider data protection requirements”. In doing so, it should be ensured that European organisations operating under different legal frameworks, policies and strategies are able to work together.

With regards to the legal interoperability layer of the EIF, the 2021 results showed that only three European countries are not yet top performers when it comes to promoting the use of open specifications by public administrations. When analysing previous years’ results, they were five in 2020, and ten in 2021 in this situation, thus showing a positive, although slow, evolution through the years. Additional efforts need to be made to take ICT into account when preparing new legislation. Hence, when drafting legislation to establish an EU public service, European countries should carry out a ‘digital check’³³ of the future legislation and take into account data protection requirements. This slow progress could be explained by implementation of the EU data protection legislation, the GDPR, as it takes time to fully align and implement all its requirements.



Legal interoperability and base registries in Italy

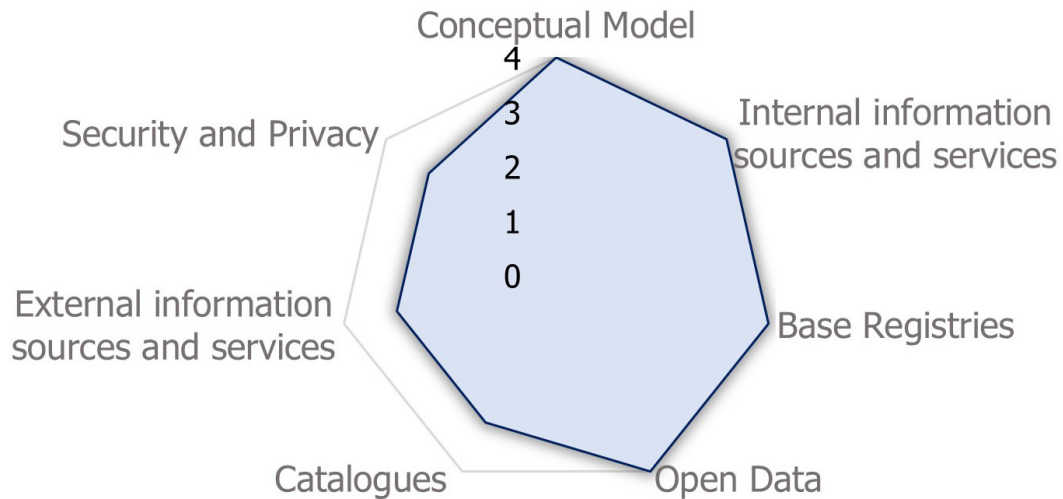
According to the *Piano Triennale* (3-year plan) 2021-2023, 16 base registries will be interconnected through fully interoperable APIs, semantically compliant with national and European ontologies and controlled vocabularies. To allow citizens to access their own personal information, a new “Anagrafi” platform is under construction: it will provide the first integration of at least 10 base registries.

³³ A digital check of proposed legislation should be performed to ensure that it suits not only the physical but also the digital world (e.g., the internet), identify any barriers to digital exchange and identify and assess its ICT impact on stakeholders. This will facilitate interoperability between public services at lower levels (semantic and technical) as well, and increase the potential for reusing existing ICT solutions, so reducing cost and implementation time.

2.2.3 The implementation of the EIF conceptual model in Europe

Figure 8 depicts the 2021 results of the monitoring of the implementation for the conceptual model pillar of the EIF.

Figure 8 Conceptual model European results for 2021

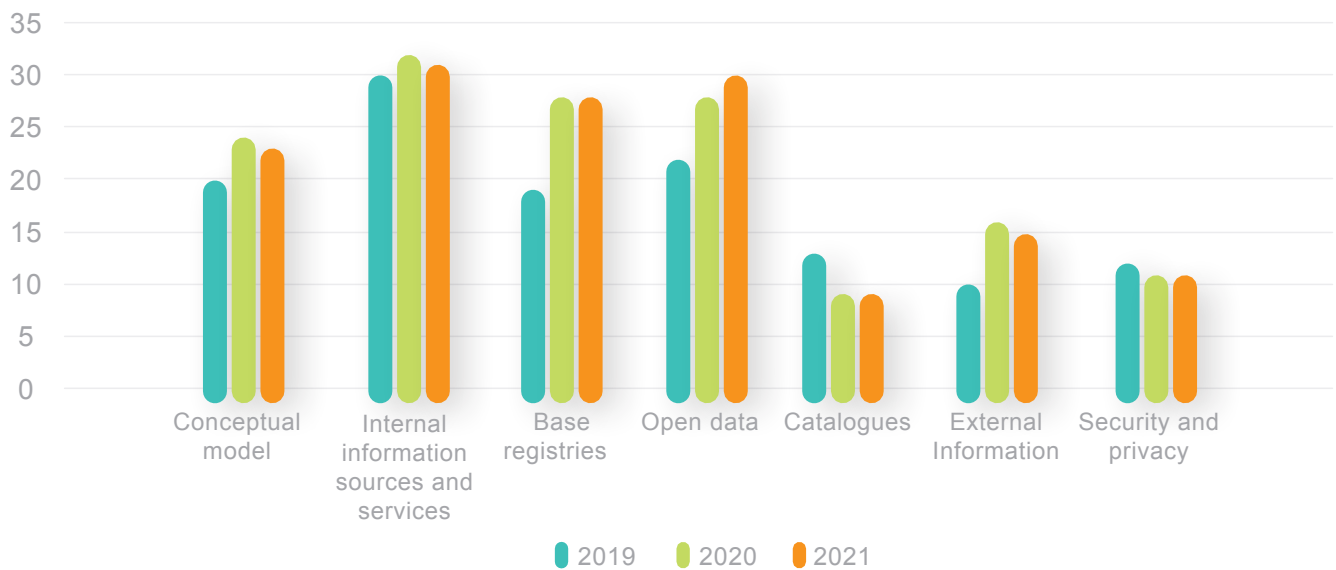


Source: analysis performed by Wavestone, 2022

For this third pillar, similarly to 2020 and 2019, the 2021 results show that, on average, European countries are scoring maximum points in four of the EIF conceptual model's components.

These results demonstrate the countries' dedication to further enhance data reuse, access, and openness, which are fundamental drivers for interoperability.

Figure 9 Number of European countries obtaining the maximum score, for the second scoreboard (Conceptual model), between 2019 and 2021



Source: analysis performed by Wavestone, 2022

When looking more particularly at the evolution of the number of European countries obtaining the maximum score throughout the years, for the third scoreboard, see Figure 9, it appears that countries' efforts have focused on the opening of data and the development of base registries. Indeed, there has been a rapid increase in the number of countries obtaining the maximum

score. However, another trend, similar to previous years, is that the same three components of the EIF conceptual would therefore require additional improvements, namely 'security and privacy' (for which fewer countries reached the maximum score), 'external information sources and services' and 'catalogues'. These results are detailed hereafter.

Developing base registries

Base registries are trusted and authoritative sources of basic information (i.e., data related to people, vehicles, etc.) which should be digitally reused by others. These central databases must provide an efficient, secure, and transparent exchange of the data they store. Therefore, they are the cornerstone of European public service delivery. The development of the different requirements linked to base registries within European countries is assessed by EIF Recommendations 37 to 40 included.

The number of European countries which obtained the maximum score of 4 for this component was already high in 2019 and has significantly increased since then (9 more countries in three years). This trend can be explained by the fact that more and more countries have created base registries (related to the population, vehicle, tax, land and business) that include agreements on reference data e.g., taxonomies, controlled vocabularies, thesauri, code lists and reusable data structure/models. European countries are also increasingly providing a list of the available base registries through a central website or platform. They have also been promoting, to a growing extent, the standardisation of processes around base registries, with particular efforts dedicated to improving the quality and security of master data and metadata management. For instance, countries, such as Czechia, have made a national authority responsible for the management of base registries data so as to ensure a secure and flowless sharing of data.



Base registries in France

Several base registries are now available in different domains, going from population to tax and business data. For instance, the French Interministerial Digital Directorate (DINUM) and the National Institute of Geographic and Forest Information (IGN) developed and launched on 1st January 2020 the National Address Base Registry, an open-source database gathering information on all geographical addresses on the French national territory.

Ensuring data opening

To ensure the reuse of public sector data, they should be released in machine-readable format and should be interoperable so that they can be found, discovered and processed. Such data openness is evaluated by Recommendations 41, 42 and 43, which respectively look at the establishment of procedures to integrate the opening of data in business processes, the publication of open data in machine-readable format, and the clear communication around the access and reuse of data.

The number of European countries reaching the maximum score of 4 has increased since 2019, together with the proportion of data available in machine readable format. This has fostered the use of data by others and stimulates a transparency, fair competition, innovation and data-driven economy. Also, many countries have established procedures to integrate the opening of data in their business processes, working routines and development of new information systems. Additionally, national and subnational legal and policy initiatives have been adopted, to promote data openness or even create an “open data by default” principle for public administrations’ data. National data portals are also being developed by more and more European countries to foster the reuse of public data.



Data openness in Ukraine

Since 2015, Decree No. 835 regulates open data in Ukraine. It provides a defined list of datasets (currently 39963) that have to be published in open data format by state authorities. It also regulates the national open data portal. Different dashboards monitor which state authorities have published their datasets in compliance with this Decree. In 2018, the Government also adopted its Action Plan for the implementation of the International Open Data Charter Principles. It ensures the efficient development of open data in Ukraine, citizens’ access to information rights, transparency and openness of state entities, and innovation fostering.

Further enforcing security and privacy

Security and privacy are primary concerns in the provision of public services. EU public administrations should therefore consider the specific security and privacy requirements and identify measures for the provision of each public service according to risk management plans (Recommendation 46). They should also use trust services as mechanisms that ensure secure and protected data exchange in public services, as provided by the Regulation on eIDAS Regulation (Recommendation 47).

This EIF component is one of the slowest paced in terms of the number of European countries that are reaching the maximum score of 4 through the years. Indeed, 11 countries were reaching the maximum score in 2019, and this number has not increased since. Such finding is quite unexpected considering the adoption of the EU Security Strategy in December 2020 and the current context, with the rise of cyber-attacks and cyber threats, even more exacerbated by the COVID-19 crisis.

This trend can however be explained by the fact that the security and privacy aspects are very narrow in the EIF, which focuses solely on the application of security and privacy principles for public services, through for instance Business Continuity Plan, Data Access Plans, are Data Access Authorisation Plans. In fact, European countries have been quite active in this area, notably through their National Security Framework and national regulations in which they cover the EIF requirements regarding the diverse plans previously mentioned. For instance, Finland established that all public authorities have to comply with the ISO 27001 standard for information security management when it comes to these plans (see in more detail hereafter).



Information security management in Finland

The national security framework for public services is ISO 27001 standard for information security management. All Finnish public authorities are therefore required to conduct risk analyses and preparation of risk management plans. They also have to determine the requirements for the continuity of information security management in adverse situations (Business Continuity Plan) and to make backups of information (Backup and/or Recovery Plans), as well as to prepare Data Access and/or Authorisation Plans, entities, and innovation fostering.

2.3 Good practices for the implementation of the EIF

After analysing the progress made by European countries in terms of interoperability, this subsection presents various best practices in fostering interoperability, in particular interoperability governance, based on the experiences of two countries and one international organisation. Italy and France were selected due to their very positive results in implementing the interoperability governance

layer, and the World Bank was approached so as to provide a broader point of view on the topic through non-European countries' experience. The representatives of these countries and organisation were invited to demonstrate their knowhow in a webinar on the EIF Monitoring Mechanism held on 26 April 2022³⁴. A summary of their presentations is provided below.

2.3.1 Italy: The interoperability governance model of Italy, and the Italian API interoperability framework

The Italian standardisation governance model is based on interoperability goals and results, and it aims at identifying relevant standards and communities to engage during the standardisation process. In order to standardise Italian digital services, the sub-national dimension (i.e., regions, municipalities, etc.) needs to be taken into account. Indeed, differently from other building blocks, interoperability requires actions not only from the central government, but from all agencies. In Italy, this is quite challenging due to the thousands of entities involved and for the transition from legacy systems. Therefore, the interoperability framework foundations are in the legal framework defined by the “Digital administration code”, which mandates a core set of central platforms which are supported by technical guidelines, together with user-centric services based on APIs .

One of the main initiatives implemented in Italy to enhance interoperability governance consists of supporting the integration of public sector use cases into Internet Standards (e.g., the HTTP and OAuth2 protocols) set by global standard defining organisations, such as the Internet Engineering Task Force (IETF), and implemented through open source solutions. Public sector use cases are identified by engaging local and national agencies and then generalised as technological requirements, so that they are suitable for private sector and gain some traction in global standardisation communities. These requirements are shared with relevant communities in order to be addressed in global, non-proprietary specifications.

Such practice lowers the cost and maintenance of the creation of new services and improves overall security. Moreover, this allows to respond to users' needs by developing interoperability solutions in large communities, thus implementing the openness and transparency principles of the EIF. Additionally, this process can provide a standardisation basis for new CEF/ISA solutions.

However, this practice is facing two main challenges. The first one is that the creation of a new specification is time-consuming as detailed security, privacy and interoperability considerations have to be provided and require a strong technological background. The second challenge is that the final outcome might differ from the expectations, hence complicating the obtention of a consensus among the general engineering community. In such cases, the new solution can be implemented publicly as a custom specification, this allowing to receive relevant feedback from world-class engineers.

The main success factor when integrating public sector use cases in global specifications, either by proposing changes to existing works or by creating new specifications is the knowledge acquired through the feedback received from standard communities and engineers, especially regarding security. This knowledge has been key for the development of other interoperability-related works and platforms. Finally, the interoperability level of solutions based on the new Italian framework has proven to facilitate the implementation of solutions by implementers and agencies and to lower their maintenance costs.

³⁴ More information about the EIF Monitoring Mechanism Webinar is available at: <https://joinup.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/news/eif-webinar-key-takeaways-26-april>

2.3.2 France: The French interoperability governance model and the application of the French General Interoperability Repository (RGI)

The French interoperability governance model has evolved and improved throughout the years, starting in 1986 and 1987 with the Decrees 86-1301 and 87-389 according to which the Secretary-General of each ministry is in charge of developing a strategy on information systems, called 'Master Plan'. Then, in 1995, an Interministerial Committee for State Reform has been created to coordinate the actions in the area of information systems, based on the Master Plans. Interoperability considerations have been tackled since 1998 through many organisational changes aiming to take into account the different components of interoperability, among which the General Interoperability Repository (RGI, *Référentiel Général d'Interopérabilité*) which was created in 2014, and revised in 2016. In the frame of its revision, the RGI considers the Open Document Format (ODF)³⁵ as a recommended standard for managing information exchanges between administrations and citizens. This choice for ODF is a major support for the open document format, ultimately fostering interoperability.

The RGI is the French National Interoperability Framework (NIF) that is immediately applicable to all administrative authorities. Beside the RGI, the French government also adopted the following standard frameworks:

- the RGS (*Référentiel Général de sécurité*), which aims to provide a trusted exchange of information between administrations;
- the RGAA (*Référentiel Général d'Accessibilité pour les Administrations*), which aims to improve access to information for citizens; and
- the R2GA (*Référentiel général de gestion des archives*), which establishes a comprehensive and unified policy for archives management.

Additionally, since 2011, different initiatives have been defined to convince the ministries and organisations to follow a common approach with regard to their digital transformation. A Strategic Framework for State's information systems (*Cadre stratégique commun du SI de l'Etat*), laying the foundations for a common and inter-ministerial transformation of the State's information systems, and a Common Enterprise Architecture for Systems (*Cadre commun d'urbanisation du SI de l'Etat*), listing the general principles applied when establishing public service information systems and organising the exchange of knowledge on existing systems, have been created. Additionally, each ministry has been made responsible for the definition and implementation of policies in defined areas related to digitalisation.

Furthermore, a global vision, called 'State as a platform' (*Etat plateforme*), has been created so as to define building blocks, components, and examples to follow, as well as to implement the 'Once-Only' Principle and generalise the use of APIs. While requiring the administration to gather user data in one place to offer almost ready-to-use services, this strategy aims to centre services on needs, rather than on the organisation of administrative structures.

Finally, to monitor the implementation of interoperability and the use of APIs, a public dashboard called 'the Observatory of Quality' (*L'Observatoire de la qualité des démarches en ligne*) has been created to monitor the 250 most used online procedures. Specific indicators have been established to track the progress of dematerialisation and the user experience. The results of this Observatory are presented by the Minister for Transformation to the French Council of Ministers every 4 months, so as to reinforce the implementation of the indicators by administration's bodies.

³⁵ The Open Document Format (ODF) is an XML-based open-source file format for saving and exchanging text, spreadsheets, charts, and presentations. Files saved under ODF, termed "OpenDocuments," have easily recognizable extensions, similar to Microsoft's proprietary.

2.3.3 The World Bank: Interoperability towards a data-driven public sector and good practices from non-EU countries

In the past years, governments have been increasingly mobilising their efforts to enhance their digital transformation. Hence, in 2019, the World Bank launched a GovTech³⁶ Global Partnership (GTGP)³⁷ to support regions and countries working on different areas of GovTech and to ensure the effective exchange and transfer of knowledge and good practices on the topic. The need for such efforts to enhance countries' digital transformation has been even exacerbated by the COVID-19 pandemic.

However, one issue experienced by both developed and developing countries in their digital transformation is the shift from siloed approaches to a system thinking imperative³⁸. To obtain such holistic, or 'Whole-of-Government', approach in practice, it is critical to have the right building blocks in place, such as enterprise architectures, digital identity, and interoperability. Therefore, the World Bank is supporting countries in implementing these building blocks.

More concretely, the World Bank assists countries to ensure that they have the right leadership for an integrated approach to digital transformation, as well as an action plan or a strategy in place to promote simple, efficient and transparent government. They also help them implementing a dedicated entity leading GovTech reforms, as well as shared key enablers, a conducive legal and regulatory framework, and adoption mechanisms, such as procurement.

Another tool developed by the World Bank to support countries in achieving their digital transformation is the GovTech Maturity Index (GTMI) which measures the state of four GovTech focus areas, namely, enhancing service delivery, supporting core government systems,

mainstreaming citizen engagement, and GovTech enablers. It uses 48 key indicators to collect data from 198 economies. More particularly, its results show that interconnectivity and interoperability are key areas where there is substantial room for improvement.

Examples of good practices in implementing interoperability governance, as specified by the EIF, can be found in several non-EU countries. For instance, Korea created the eGovFrame, the e-Government Standard Framework, which is a platform-specific standardized development framework for public sector IT projects in Korea. It provides increased interoperability as government agencies build applications based on its standards and improves interagency collaboration/connectivity. Another example lies in Brazil, with the creation of the architecture of the Interoperability Standards (EPING) that defines a minimum set of premises, policies and technical specifications that regulate the use of Information and Communication Technology in the Federal Government. Bodies and entities that are part of the Information Technology Resource Management System (SISP, Sistema de Administração dos Recursos de Tecnologia da Informação) must observe EPING's standards in the planning of contracting, acquiring and updating technology systems and equipment. Finally, Canada created its API Store, a one-stop shop for Application Programming Interfaces (APIs) through which the Government encourages the use of APIs to build new applications and services for Canadians. API standards govern how APIs are to be developed across Canada to better support integrated digital processes across departments and agencies.

³⁶ According to the World Bank, GovTech emphasizes three aspects of public sector modernization: citizen-centric public services that are universally accessible, a whole-of-government approach to digital government transformation, and simple, efficient and transparent government systems. See more information here.

³⁷ More information on the GovTech global partnership (GTGP) is available here.

³⁸ System thinking is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how systems work over time and within the context of larger systems.

CHAPTER 3

The role of the European Union



3

The role of the European Union

Among the European Commission’s key political priorities for the period 2019-2024, there is [Europe fit for the Digital Age](#), the EU’s digital strategy aiming to ensure that the digital transformation works for both people and businesses, while helping the Commission to achieve its climate-neutral target by 2050. While the EU and its Member States had already embarked on the path to digitalisation in many sectors, the COVID-19 crisis has accelerated this process and further emphasised the importance of digital technologies in today’s society and economy. In this context and in its role as supporting entity for these matters, the European Commission has shown substantial commitment in fostering the

uptake by its Member States of digital solutions that are sustainable in the long-term.

This chapter will provide the readers with an overview of the key digital initiatives put forward at the European Union (EU) level, by the European Commission or other EU institutions, to foster digital transformation and interoperability. It sheds a light on the state-of-play of digital public administration and interoperability in the EU by examining the vast array of political and legislative initiatives in this field in the period 2021-2022. Finally, it also provides an account of the supporting funding programmes aimed at fuelling this digital transformation.

3.1 Key digital initiatives of the European Commission to foster digital transformation

The following chapter will examine political communications (e.g., strategies, frameworks, action plans) as well as legislative initiatives that have been or will be implemented by the European Commission since 2021 to address various aspects of digital government and interoperability. These will include the Digital Europe Work

Programme 2021-2022, Interoperable Europe and the Digital Services Act among others. In addition, this chapter will include an overview of the main funding programmes aimed at fostering digital public administration and interoperability in Europe.

3.1.1 Transversal digital policies

This section will focus on the more encompassing and transversal initiatives put in place or supported by the European Commission to foster digital public administration and interoperability.

Shaping Europe’s Digital Future

The strategy [Shaping Europe’s Digital Future](#), covering the period of 2019-2024, is the EU’s approach to digital transformation, which addresses how the Union should continue to meet

new risks and challenges that arise from digital technology. In its [Communication](#) announcing the new strategy, the European Commission has laid down three key objectives: to develop, deploy and take up technology that works for the people, to ensure a fair and competitive digital economy and, finally, to foster a European digital transformation that supports the goals of a more open, democratic and sustainable society. These three pillars are meant to help the EU

establish itself as a global role model for the digital economy by coordinating efforts between Member States, regions, civil society and the private sector. By setting the global standards for technological development, the EU will ensure that the inclusion and respect of every human being is being considered. Furthermore, the Union will support worldwide developing economies transitioning to digital technologies and help them to further develop digital standards that can be promoted and referred to internationally.

In response to the COVID-19 crisis and the new challenges brought upon the European Union, the European Commission has been working on coordinating, complementing, and initiating measures based on the following digital technologies: Data, artificial intelligence and supercomputers; Telecommunications, networks and connectivity; Online platforms and disinformation; Skills, collaborative working and creativity; and Cybersecurity, trust and safety online.

Digital Europe Work Programme 2021-2022

The [Digital Europe Programme](#) is one of the initiatives put in place by the European Commission to contribute to the achievement of the digital targets, as outlined in the communication [2030 Digital Compass: the European way for the Digital Decade](#).

The [Digital Europe Work Programme 2021-2022](#) presented by the Commission in February 2020 has the goal to boost Europe's digital transformation and to further develop the digital single market and promote the uptake of digital technologies in both the public and private sectors. More specifically, the Programme aims to reinforce the most pressing EU digital capacities by encouraging Member States to invest in key areas such as artificial intelligence (AI), cybersecurity, advanced computing, data infrastructure, governance and processing, the deployment of these technologies and their best use for critical sectors like energy, climate change and environment, manufacturing, agriculture and health.

To achieve its mission, the Digital Europe has deployed a network of [European Digital Innovation Hubs](#) for the first three years of the Programme

(2021-2023) offering access to technology testing and supporting the digital transformation of private and public organisations, covering all regions of the EU and Associated Countries.

Europe's Digital Decade

As part of the [European Digital Strategy](#), the Commission proposed the policy programme [Path to the Digital Decade](#) to set up a governance framework aimed at ensuring that Europe reaches its [2030 Digital Decade objectives](#). This implied an annual cooperation mechanism between the Commission and Member States with the former developing projected EU trajectories for each target and the latter proposing national strategic roadmaps to achieve them.

Moreover, the Digital Decade also hopes to encourage international partnerships to ensure the security and resilience of supply chains and deliver global solutions. This will be achieved by setting a toolbox (regulatory cooperation, capacity building and skills, international cooperation and research partnerships), designing digital economy packages, combining EU investments and external cooperation instruments and investing in improved connectivity with the EU's partner countries. Potential areas of partnership could be 6G, Quantum and the Use of technology to fight climate change and environmental challenges.

On 9 March 2021, the Commission published the communication [2030 Digital Compass: the European way for the Digital Decade](#) which proposed a Digital Compass for the EU's Digital Decade. More specifically, this entails reaching an agreement on a set of digital principles, launching multi-country projects and planning a legislation setting out a solid governance framework to monitor progress.

Commission Work Programme 2022

Every year, the European Commission publishes and adopts a work programme presenting the list of the most important initiatives to be put forward in the year ahead. The [2022 Commission Work Programme](#) has been designed to rebuild a post COVID-19 Europe and aims to accelerate the twin green and digital transitions and build a fairer and more resilient society. Specific to the [Europe fit for the digital age](#) objective, the Commission

states that a competition policy related to digital matters will be launched as well as two major initiatives. The first one is the creation of a single market emergency instrument with the purpose of better preventing future disruptions. The second one is the proposal for building an EU space-based global secure communications system with the purpose of offering broadband connectivity to all, especially where it is currently missing.

Update of 2020 EU Industrial Strategy

In March 2020, the Commission presented its [Industrial Strategy](#), forming the foundations of an industrial policy meant to make the European industry greener, more circular, and more digital while remaining competitive at global level. While setting out the key drivers of Europe's industrial transformation at large and proposing a comprehensive set of specific future actions tackling a variety of issues, from EU competition rules to Intellectual Property rights, when it comes to the field of digital, the new strategy calls for the acceleration of investments in the research and deployment of technologies such as AI, 5G and 6G, data and metadata analytics. This strategy was designed so as to react to the technological and climate-related changes that industries throughout the European Union are facing.

On 5 May 2021, the Commission adopted the [updated 2020 Industrial Strategy](#), which took into account the experiences of the COVID-19 pandemic and its impact on the Single Market, considering aspects such as dependencies in key strategic areas and looking to drive the digital transformation in a more sustainable, digital, resilient and globally competitive economy.

Berlin Declaration Monitoring

In December 2020, all EU Member States signed the [Berlin Declaration on Digital Society and Value-Based Digital Government](#), henceforth referred to as Berlin Declaration, a political declaration reiterating the common commitment of the Commission and the EU Member States to continue investing in high quality, user-centric and seamless cross-border digital public services. The European Commission has welcomed the objectives put forward by the Member States and has agreed to support their policy initiatives at the European level. In particular, the Commission has helped to implement and monitor the progress made by the Member States towards the Declaration's seven principles mentioned in Chapter 1, also referred to as policy actions. To this end, it has designed and deployed a [monitoring mechanism of the Berlin Declaration \(BDM\)](#) aimed at identifying and assessing the measures and initiatives put in place by each country to implement the policy actions.

In terms of BDM results at EU level, all Member States have been working towards the implementation of the policy areas and related policy actions set out in the Declaration and all areas have been found to have an average European value of over 50%. Looking at the areas in which the Member States are performing best, policy area 4 "Strengthen trust through security in the digital sphere" and policy area 5 "Strengthen Europe's digital sovereignty and interoperability" are scoring the highest. In contrast, three policy areas, namely policy area 2 "Enhance social participation and digital inclusion, to shape the digital world", policy area 6 "Create value-based, human-centred Artificial Intelligence (AI) systems for use in the public sector" and policy area 7 "Fostering Resilience and Sustainability", are areas where the Member States are lagging more behind and should therefore focus their efforts on³⁹.

³⁹ More information on the results of the Berlin Declaration monitoring mechanism can be found in the [Report on the monitoring of the Berlin Declaration 2022](#)

3.1.2 Initiatives by specific themes

This section will focus on more specific initiatives, both political communications and legislations, put forward by the European Commission, categorised into the same four main themes used in Chapter 1, aligned with the key principles of the Berlin Declaration: Digital public services and digital inclusion, Trust and security, Digital sovereignty and interoperability, Innovative technologies.

3.1.2.1 Digital public services and digital inclusion

POLICIES

Action plan on integration and inclusion 2021-2027

Fostering social cohesion and building inclusive societies is at the heart of the European way of life. Integration and inclusion are therefore key for this purpose. It is against this background that on 24 November 2020, the Commission published its [Action Plan on Integration and Inclusion 2021-2027](#), which builds on the achievements of the 2016 action plan, focusing on the promotion of inclusion for all and the important contribution of migrants to the EU and focusing on the barriers that can hinder participation and inclusion of people with a migrant background. The action plan includes five actions to support the effective integration and inclusion of European citizens in all sectorial areas:

1. Building strong partnerships for a more effective integration process;
2. Increased opportunities for EU funding under the 2021-2027 Multi-annual Financial Framework;
3. Fostering participation and encounters with the host society;
4. Enhance the use of new technologies and digital tools for integration and inclusion; and
5. Monitoring progress: towards an evidence-based integration and inclusion policy.

The implementation of the action plan will entail the creation of partnerships between migrants, host communities, social and economic partners, civil society, local and regional authorities as well as the private sector.

Digital Education Action Plan actions for the period 2021-2027

In the last two years, the COVID-19 crisis has demonstrated that having an education system which is fit for the digital age is essential. In this regard, on 30 September 2020, the European Commission proposed the [Digital Education Action Plan 2021-2027](#), a policy initiative to support the sustainable and effective adaptation of the EU Member States' education and training systems to the digital age. The objectives set by the initiative are, among others, to address the challenges and opportunities of the COVID-19 pandemic and to promote stronger cooperation at the EU level on digital education. Moreover, to achieve these objectives, the Plan sets out two key priority areas: first, fostering the development of a high-performing digital education ecosystem and second, enhancing digital skills and competences for the digital transformation.

Declaration on European Digital Rights and Principles

Promoting a free, fair and inclusive society is a key priority for the European Commission. On 26 January 2022, building on previous initiatives including the [Tallinn Declaration on eGovernment](#), the [Berlin Declaration on Digital Society and Value-based Digital Government](#), and the [Lisbon Declaration](#), the Commission proposed a [Declaration on European Digital Rights](#) with the aim to inform people and provide a reference for policymakers and digital operators with regard to their actions in the digital environment. More specifically, the Declaration has at its core key rights and principles for the digital transformation, such as placing people and their rights at its centre, supporting solidarity and inclusion, ensuring the freedom of choice online, fostering participation in the digital public space, increasing safety, security and empowerment of individuals, and promoting the sustainability of the digital future.

European Health Data Space

The safe exchange of data is at the core of a well-functioning and prospering European society and economy. In January 2022, the Commission published a summary report of public consultation with stakeholders on the proposed initiative for a [European Health Data Space](#). The aim of this initiative will be to promote better exchange and access to different types of health data (electronic health records, genomics data, data from patient registries etc.), not only to support healthcare delivery (so-called primary use of data) but also for health research and health policy making purposes (so-called secondary use of data). The European Health Data Space will be built on 3 main pillars: a strong system of data governance and rules for data exchange, data quality and strong infrastructure and interoperability. The legislative proposal is expected to be adopted in spring 2022.

LEGISLATIONS

Recommendation on improving the provision of digital skills in education and training

As part of the above-mentioned [Digital Education Action Plan actions for the period 2021-2027](#), a proposal is planned by the end of 2022, for a Council Recommendation on improving the provision of digital skills. The primary goal of this initiative is to empower European citizens to develop basic and advanced digital skills through education and training. More specifically, the expected results of this initiative are to: create guidance on IT as a subject, including its principles, concepts and practices in teaching and learning; reach an agreement on a coherent vision and shared terminology related to providing high-quality computing/IT education to all students in Europe; share best practices for assessment in education institutions and highlight the potential and limitations of computing for solving societal challenges; and contribute to the objectives of the Strategy for Shaping Europe's Digital Future to ensure 65% of Europeans have at least basic digital skills by 2025.

Recommendation on the enabling factors for digital education

Similarly as the recommendation above, a [Recommendation on the enabling factors for digital education](#), aimed at setting out the investments and policy reforms that need to be put in place to ensure that everyone has access to digital education, is currently in preparation and planned for the fourth quarter of 2022.

Data Governance Act

After the publication of the [European Strategy for Data](#) in February 2020, a consultation revealed that 90% of respondents considered that the EU lacks a solid data governance mechanism that would facilitate data sharing across the EU and between sectors. For this reason, in November 2020, the European Commission published its draft [Data Governance Act](#) which aims to boost data sharing across EU Member States and across sectors through a comprehensive set of rules. To do so, the Regulation lays down the conditions for the re-use of certain categories of data held by public sector bodies within the EU. Further, it sets up a notification and supervisory framework for the provision of data sharing services as well as the requirements applicable to such services, and a framework which allows for the voluntary registration of entities collecting and processing data made available for altruistic purposes. This initiative therefore leverages the innovative potential of data sharing in sectors such as health, mobility, environment, agriculture, and public administration for the benefit of EU citizens and businesses.

A year later, in November 2021, the Commission reached a [provisional agreement](#) with the European Parliament to promote the availability of data across the EU. The informal agreement will now have to be formally endorsed by Parliament and Council.

Data Act

The 2020 [Communication on a European strategy for data](#) also stressed that further actions should be taken towards a European Data Act. This initiative aims at facilitating access to and use of data, particularly by fostering business-to-

government data sharing and further supporting business-to-business data sharing. In May 2021, the Commission published its [Inception Impact Assessment on the forthcoming Data Act](#) and conducted a public consultation on the Act until 03 September 2021. On 23 February 2022, the [Regulation on harmonised rules on fair access to and use of data](#) (Data Act) was proposed by the Commission. The aim of this initiative is to create a single market to allow data to flow freely within the EU and across sectors for the benefit of businesses, researchers, public administrations and society at large. The Data Act will clarify who can create value from data and under which conditions.

Digital Services Act (Package)

The COVID-19 crisis demonstrated the increased importance of digital platforms in our everyday lives. However, EU legislation in this field has remained untouched since the adoption of the [eCommerce Directive in 2000](#), while at the same time we have seen a few large digital platforms with a strong economic power controlling the entire digital ecosystem. In this regard, further commitment towards a safer digital transformation of the EU comes from the [Digital Services Act package](#), published in December 2020, consisting of two proposals for legislative initiatives – the [Digital Services Act \(DSA\)](#) and the [Digital Markets Act \(DMA\)](#). These have upgraded the rules governing digital services in the EU to keep the pace with their rapid and widespread development and regulate unfair practices in the digital market. The DSA and DMA have the goals of both creating a safer digital space in which users' fundamental rights are protected and establishing a space to foster innovation, growth, and competitiveness in the European Single Market and abroad.

More specifically, the DSA aims at creating a safer and trusted online environment for European citizens and businesses, by laying down a set of harmonised EU-wide rules to ensure transparency,

accountability and regulatory oversight of the EU online space. While the DMA aims at regulating the behaviour of digital platforms acting as gatekeepers between business owners and their customers in the EU.

The Portuguese Presidency has issued a [progress report](#) in May 2021 and on 23 April 2022, a provisional agreement has been reached between the Council and European Parliament to make the internet a safer space for European citizens. More specifically, the aim is twofold, on the one hand to protect the digital sphere against the spread of illegal content and on the other hand, to ensure that users' fundamental rights are protected.

EU Digital COVID Certificate Regulation

In July 2021, the [EU Digital COVID Certificate Regulation](#) entered into application, allowing EU citizens and residents to have their Digital COVID Certificates issued and verified across the EU. The aim of this initiative was to facilitate safe and free movement in the EU during the COVID-19 pandemic. To this end, the Certificate covers COVID-19 vaccination, test and recovery, is free of charge and available in all EU languages in both digital and paper-based formats.

Proposal for a directive of the European Parliament and the Council on improving working conditions in platform work

In December 2021, [the Commission published a Proposal for a Directive of the European Parliament and the Council on the improvement of working conditions in platform work](#)⁴⁰. Specifically, the Directive touched upon the employment status to ensure that people working through digital labour platforms are granted the legal employment status that corresponds to their actual work arrangements. It also increased transparency with regard to the use of algorithms by digital labour platforms, ensuring human monitoring with respect of working conditions and allowing to contest automated decisions.

⁴⁰ Platform work defined as “an employment form in which organisations or individuals use an online platform to access other organisations or individuals to solve specific problems or to provide specific services in exchange for payment” (Eurofound, 2018).

3.1.2.2 Trust and security

POLICIES

Roadmap on security and defence technologies

To ensure Europe's prosperity, security and way of life, it is essential that Europe's security and defence sectors remain technologically fit for purpose. For this reason, in February 2022, the Commission set out a [roadmap on security and defence technologies](#) for boosting research, technology development and innovation and reducing the EU's strategic dependencies in critical technologies and value chains for security and defence. This goal will be reached firstly, by identifying technologies crucial for EU security and defence, boosting them through European (RTD&I) programmes. Secondly, by ensuring that defence considerations are better taken into account in civilian European RTD&I programmes and industrial and trade policies, as appropriate, while possible civilian uses of technologies are also better considered in defence RTD&I programmes. Thirdly, by promoting from the outset an EU-wide strategic and coordinated approach to critical technologies for security and defence, to make the best use of EU and Member States' RTD&I programmes, to achieve synergies between civilian and defence RTD&I communities and mitigate strategic dependencies from external sources. Lastly, the EU will also coordinate and learn as much as possible from other like-minded partners, such as the United States and the North Atlantic Treaty Organisation (NATO), under mutually beneficial conditions.

Digital Europe - Cybersecurity for 2021 – 2022

Cybersecurity being at the centre of the EU digital transformation, a [Cybersecurity Work Programme 2021-2022](#) has been adopted by the Commission under the Digital Europe Programme, setting out the actions for Cybersecurity and Trust to be adopted in 2021 and 2022. The main objectives put forward are to support the

deployment of cybersecurity infrastructure, to strengthen cybersecurity uptake, to support the implementation of relevant EU legislation and political initiatives (e.g. cybersecurity strategy) and finally, to raise awareness and foster cybersecurity skills and training.

LEGISLATIONS

European Digital Identity Regulation

The [Regulation \(EU\) No 910/2014](#) on electronic identification and trust services for electronic transactions in the internal market, the eIDAS Regulation, is a major step towards building a Digital Single Market and in boosting trust, security and convenience online, for governments, businesses and consumers. Thanks to eIDAS, the EU now has a predictable legal framework providing legal certainty beyond national borders for electronic identification (eID) and for electronic trust services (such as electronic signatures, seals, among others).

At the end of 2020, the European Council asked the Commission to introduce an EU-wide digital ID system so as to secure users' identification in both the private and public spheres. On 3 June 2021 the Commission proposed the framework for a [European Digital Identity](#). Under the new regulation, Member States will issue European Digital Identity Wallets that will enable users to access services online without using private identification methods or share unnecessary data.

On 3 June 2021, the Commission proposed a trusted and secure digital identity for all Europeans, including digital identity wallets. Personal digital wallets will enable citizens to digitally identify themselves, store and manage identity data as well as official documents in electronic format (e.g. driving license, medical prescriptions, diplomas, etc.). This tool will therefore enable citizens to prove their identity when necessary to access online services, share digital documents. In February 2022, the Commission has launched an [online platform](#) to gather feedback from interested parties to shape future European Digital Identity Wallets.

Regulation on a Framework for the Free Flow of Non-Personal Data

In line with the objectives of the [Communication on Building a European Data Economy](#) and with the aim to achieve a more competitive and integrated EU market for data storage and/or processing services and activities, the European Commission set up the [Regulation on free flow of non-personal data](#), applicable as of 28 May 2019. More specifically, it entails the reduction of the number and range of data localisation restrictions; to enhance legal certainty; to ease cross-border availability of data for regulatory control purposes; to improve the conditions under which users can switch data storage and/or processing service providers or port their data back to their own IT systems; and to increase trust in and the security of cross-border data storage and/or processing. By November 2022, the Commission will have to report to the European Parliament, the Council and the EESC on how the regulation is being applied.

European Chips Act

As part of the Europe fit for the digital age objective, the Commission stated in its [2022 Work Programme](#), that a [European Chips Act](#) will be adopted with the purpose of promoting a state-of-the-art European chip ecosystem to boost EU innovative capacity, security of supply and develop new markets for ground-breaking European tech. A proposal on this Act will be published in Q2 2022.

In this regard, on 8 February 2022, the Commission adopted a 'European chips act package' focused on the strategic objective of increasing the resilience of the EU's semiconductor ecosystem and increasing its global market share.

European cyber resilience act

In parallel to the aforementioned Chips Act, the Commission also stated in its [2022 Work Programme](#), that a European cyber resilience act will be proposed to establish common cybersecurity standards for products. The proposal is foreseen to be published in Q3 2022.

3.1.2.3 Digital sovereignty and interoperability

POLICIES

Interoperable Europe

In April 2021, the ISA² programme, a funding programme of the European Commission that supported the development of digital solutions by enabling public administrations, businesses and citizens in Europe to benefit from interoperable public services, was officially closed and replaced by [Interoperable Europe](#), an initiative for a reinforced public sector interoperability strategy committed to transform the public administrations in Europe and help them in their digital transformation. More specifically, it will continue leading the process of achieving enhanced interoperability, necessary to reveal 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 is supported by the Digital Europe Programme.

Revised European Interoperability Framework (EIF) and Interoperability Action Plan

In October 2021, a [Study supporting the evaluation of the implementation of the EIF](#) was published by the Commission with the purpose of assessing whether relevant recommendations of the EIF should become part of a mandatory instrument. The [revised EIF](#) was adopted on 23 March 2017 and provided specific guidance on how to set up interoperable digital public services. It offers public administrations a set of 47 concrete recommendations on how to improve governance of their interoperability activities, establish cross-organisational relationships, streamline processes supporting end-to-end digital services, and ensure that both existing and new legislation do not compromise interoperability efforts. The Commission is currently working on the 2022 evaluation of the EIF, which has been conducted

LEGISLATIONS

Proposal for a Regulation of the European Parliament and of the Council on modernising judicial cooperation between EU countries

The Commission proposed a Regulation of the European Parliament and of the Council on [modernising judicial cooperation between EU countries](#) aiming at digitalising cross-border judicial cooperation in civil, commercial and criminal matters by making mandatory the use of digital technology to increase the efficiency and resilience of the communication between competent authorities. By using digital channels by default, all electronic communication in cross-border procedures involving individuals and businesses should be accepted by the Member States. Following the public consultation period from February to May 2021, the initiative has been adopted in December 2021. After which a feedback period was open until March 2022.

Proposal for a Regulation of the European Parliament and of the Council on fighting cross-border crime – IT collaboration platform for joint investigation teams

Complementary to the digitalisation of the justice strategy brought forward by the Commission, a proposal on [Joint Investigation Teams \(JIT\) IT collaboration platform](#) has been published. The objective of the initiative is to increase the efficiency and effectiveness of investigations and prosecutions done by JITs in cross-border cases, facilitated by digital communication, document/evidence storage and exchange tools. The regulation has been adopted in December 2021 and it is open for feedback until March 2022.

after consultations with relevant stakeholders and will be published soon. The Commission is also currently working on the Interoperable Europe Act, setting up a new governance framework to further foster digital policymaking and ensuring that the current EIF is aligned with the Member States' needs and expectations.

The revised EIF is accompanied by the [Interoperability Action Plan](#), outlining priorities to support the implementation of the EIF. The Action Plan consists of 22 actions, grouped into five focus areas. First, ensuring governance, coordination and sharing of interoperability initiatives. Second, developing interoperability solutions to foster collaboration between organisations. Third, engaging stakeholders and raising awareness of interoperability. Fourth, developing, maintaining and promoting key interoperability enablers and lastly, developing, improving and promoting supporting instruments for interoperability.

An [expert group on Interoperability of European Public Services](#) has also been formed whose goal is to identify and exchange good practices when implementing the EIF, to provide the Commission with opinions, analysis and reports on interoperability of public services, to identify and assess the legal, organisation, semantical and technical obstacles preventing the set-up of interoperable European public services, among others.

EIF for Smart Cities and Communities

For regional and local interoperability, the proposal on the [European Interoperability Framework for Smart Cities and Communities](#) (EIF4SCC) aims to support local administrations and policy makers in offering interoperability services to citizens and businesses by providing definitions, principles, recommendations, practical use cases and a common model that will enable public service delivery across domains, cities, regions and borders. The EIF4SCC is managed by DG CONNECT under the framework of the [Living-in.eu](#) movement. This initiative aims to roll out interoperable urban digital platforms and a set of standards and technical specifications, such as the Minimum Interoperability Mechanisms (MIMs).

3.1.2.4 Innovative technologies

POLICIES

Next Generation Internet innovation catalogue

In December 2021, the Next Generation Internet Initiative published an [online innovation catalogue](#) illustrating technology solutions such as hardware, software and apps, to shape an Internet fit for the digital age, fostering diversity, decentralisation and inclusivity. The new catalogue includes a vast range of technology building blocks that can be applied to any sector, from supply chains to research.

European 6G Research and Innovation Programme

Also in December 2021, the European Union launched the first large-scale [6G Research and Innovation Programme](#) funded by the Work Programme 2021-2022. The aim of this initiative is to allow Europeans to build the necessary abilities in terms of R&I for 6G systems and develop lead markets for 5G infrastructure. This will ultimately serve as a basis for the digital and green transformation.

Drone Strategy 2.0

As announced in the [Sustainable and Smart Mobility Strategy](#), the Commission plans to adopt a [Drone Strategy 2.0](#) in the fourth quarter of 2022.

The strategy aims to provide a comprehensive policy package and address obstacles to the development of new drone applications and transport services and to the competitiveness of this industry. It will also foster the uptake of this innovative technology in Europe while establishing the right balance between safety, security and other societal concerns, contributing to a new offer of sustainable services and transport.

The take-up of drones is affecting a growing number of sectors, such as agriculture, construction, surveillance, filming, healthcare, energy, environment, public safety and security, with future visions including the use of drones as

platforms for communication hubs or weather or pollution monitoring. To encourage investment and development of new innovative services for different sectors, the establishment of a harmonised EU approach should be ensured for increased cooperation between stakeholders, identification of regulatory gaps and support of technical harmonisation and research.

Joint Declaration on cloud

It is essential to propose a European cloud for two main reasons. On the one hand, in order to increase the competitiveness of European businesses. On the other hand, to provide European public administrations as well as citizens and enterprises, with greater choice regarding the trustworthy data processing infrastructure and services needed to develop future data-driven innovation and emerging technologies (e.g. 5G/6G and Artificial Intelligence). It is against this background that Member States have signed a [Joint Declaration on cloud](#) in October 2020, expressing their will to collaborate towards the creation of a European cloud. Specifically, the concerned countries have agreed in the Declaration that their joint actions will focus on three main points. First, combining private, national and EU investment in deploying competitive, green and secure cloud infrastructures and services. Second, defining a common European approach on federating cloud capacities, by working towards one set of joint technical solutions and policy norms in order to foster pan-European interoperable EU cloud services. Third, driving the take-up of more secure, interoperable and energy-efficient data centres and cloud services especially for SMEs, start-ups and the public sector.

European Alliance for Industrial Data, Edge and Cloud

Building on the European data strategy, in October 2020, the [European Alliance for Industrial Data, Edge and Cloud](#) was created to contribute to the shaping of the next generation of secure, low-carbon and interoperable cloud and edge services and infrastructure for Europe by fostering the development and deployment of next generation edge and cloud technologies.

Recommendation on a common European data space for cultural heritage

In November 2021, the Commission put forward a recommendation for a common [European data space for cultural heritage](#) with the aim to speed up the digitalisation of cultural heritage assets, such as monuments and sites, objects, among others. The Commission set an ambitious objective for Member States who should aim at digitalising all assets that are at risk of degradation and half of those highly frequented by tourists by 2030.

Directive 2014/61/EU on high-speed broadband connectivity in the EU

The Directive 2014/61/EU establishing the EU rules on high-speed broadband had the goal to enable fast internet connection across the EU by reducing the related costs. In light of technological, market and regulatory developments, the Commission has planned a [Revision of the EU rules on high-speed broadband](#) (Directive 2014/61/EU) for the second quarter of 2022 that will aim to enable a quicker and more efficient rollout of very high-capacity networks (including fibre and 5G), ensure the rules are aligned with the European Electronic Communications Code and explore potential environmental safeguards.

Harmonising spectrum for enhanced connectivity: 5G and innovation

On 9 February 2022, the Commission adopted four [implementing decisions](#) to ensure that the [EU's radio spectrum policy](#) met the growing demand for broadband and for innovative digital applications. The first one is a [Commission Implementing Decision](#) on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing electronic communications services in the Union. Second, a [Commission Implementing Decision](#) on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands. Third, a [Commission Implementing Decision](#) as regards to the update of harmonised technical conditions in the area of radio spectrum use for short-range devices. Finally, a [Commission Implementing Decision](#) on the harmonised use of radio spectrum in the

5 GHz frequency band for the implementation of wireless access systems including radio local area networks.

Regulation on establishing the new European High Performance Computing Joint Undertaking (EuroHPC JU)

The [European High-Performance Computing Joint Undertaking](#) (EuroHPC JU) was established in October 2018 as a legal and financial framework to pool EU and participating countries' resources to build a European world-class supercomputing and data infrastructure with exascale capabilities in the next two years, and post-exascale facilities by 2027. In the near future, Europe's leading role in the data economy will increasingly depend on its capability to develop key HPC technologies. For this reason, the European Commission has drafted a [Proposal for a Council Regulation on establishing a EuroHPC](#) which is a continuation of the existing initiative established under [Council Regulation \(EU\) 2018/1488](#). The proposed Regulation introduces modifications to adapt the Regulation to the new Multiannual Financial Framework (MFF) programmes and to the priorities of the von der Leyen Commission, in particular those outlined in the European Strategy for Data and in the Communication Shaping Europe's Digital Future.

Fostering a European approach to Artificial Intelligence

There has been a recent realisation of the strong potential benefits that Artificial Intelligence (AI) systems can have on European economic growth as well as on its innovation and global competitiveness. Nonetheless, concerns remain regarding certain AI systems, particularly linked to their safety, security, and fundamental rights protection. Hence, it is in the European Commission's best interest to try to address those concerns and establish a European regulatory framework for AI systems.

It is against this background that the European Commission unveiled in April 2021 a new [EU regulatory framework on AI](#), which aims at providing a European technology-neutral definition of AI systems within EU law. The proposal is now to be discussed by the co-legislators, the European Parliament and the Council.

Proposal for a Regulation establishing the Union Secure Connectivity Programme for the period 2023-2027

As part of the Europe fit for the digital age, the Commission stated in its [Work Programme 2022](#), that a proposal will be made to build an EU space-based global secure communications system with the purpose of offering broadband connectivity where it is currently missing. The legislative initiative on building this system is expected in Q2 2022. In this regard, on 15 February 2022, the Commission adopted the proposal for a [Regulation establishing the Union Secure Connectivity Programme](#) for the period 2023-2027 following three policy objectives: ensuring the provision of secure satellite communication for evolving public needs, increasing Member States and the Union resilience by guaranteed access to secure communication and avoiding critical dependencies on non-EU infrastructures as for governmental communication needs.



3.2 Key funding programmes of the European Commission to foster digital transformation

This section will present an overview of the main funding programmes aimed at fostering digital public administration and interoperability in Europe. These will include the Digital Europe Programme, the Recovery and Resilience Facility and Connecting Europe Facility – Digital, among others.

Digital Europe Programme

As part of the new [Multiannual Financial Framework for the period 2021-2027](#), the European Commission adopted in April 2021 the [Digital Europe Programme \(DEP\)](#), a new EU funding programme dedicated to the digital transformation of public services and businesses. The goal of this programme is to set up the strategic digital capacities of the EU and to promote a far-reaching deployment of new technologies, to be used by the EU's citizens and businesses. With an overall budget of EUR 7.5 billion for the period 2021-2027, the Digital Europe Programme aims to define and bolster the digital transformation

of Europe's society and economy in five specific objectives (SO). The money will be implemented by procurement and in the form of grants of different nature. The largest part of expenditures covers the building and strengthening of the EuroHPC (SO1) with EUR 2.2 billion, as well as the spread of Artificial Intelligence for public authorities and businesses (SO2) with EUR 2.1 billion. Cybersecurity represents another large heading of the DEP, with funds channelled to boost the overall EU cyber defence and finance cybersecurity equipment and infrastructure (SO3) with EUR 1.7 billion. Further, the DEP dedicates EUR 580 million to support advanced digital skills through, among others, the creation of European Digital Innovation Hubs (EDIHs) which provide access to technical expertise and experimentation for companies involved in digital transformation projects (SO4). Finally, the DEP supports the digital transformation of EU public administrations and their interoperability (SO5) with a budget of EUR 1.1 billion. In particular, the

interoperability budget is used to partially finance the European Digital Government Eco System (EDGES - 120 million for 2021-2022) and, more specifically, the Common Services Platform (CSP) and Interoperability Knowledge and Support Centre (IKSC). The aim of EDGES is to foster the digital transformation and interoperability of public administrations in order to increase the efficiency and accessibility of services delivery. More specifically, the interoperability budget is allocated to three focus areas: the creation of the Common Services Platform, Interoperability, the TESTA network and the GovTech Incubator being the only grant so far (with a co-financing of 50%).

In this context, the mature solutions in the past financed under ISA² will be moved to the CSP, which will serve as one-stop-shop for public administrations across the EU. On the other hand, all the pilots and solutions under development will stay under the umbrella of the Interoperability Knowledge and Support centre, which will serve as an incubator. When pilot solutions will reach a sufficient level of maturity, they will be transferred to the CSP, thus enabling public administrations to use these on a wider scale.

Recovery and Resilience Facility

The [Recovery and Resilience Facility](#) (the Facility) is the key instrument at the heart of [NextGenerationEU](#), the temporary recovery instrument of EUR 806.9 billion that allows the Commission to raise funds to help repair the immediate economic and social damage brought about by the coronavirus pandemic. The Facility provides EU Member States EUR 723.8 billion through grants and loans to support investments and reforms. The overall aim is to help the countries mitigate the economic and social impact of the crisis and make European economies and societies more sustainable, resilient and better prepared for future challenges.

In order to benefit from the support of the RRF, Member States were required to submit their recovery and resilience plans. These plans set out a package of reforms and public investment projects that the Member States will need to implement by 2026 in order to benefit from the support (and funding) of the Facility.

They should address the challenges identified in the [European Semester](#), as well as the ones related to the twin digital and green transitions. In particular, Member States had to demonstrate to what extent their plans contribute to the digital transition and how to address challenges resulting from it. Further, Member States had to demonstrate that a minimum of 20% of expenditure is earmarked for digital. Investments in digital technologies should respect the principles of interoperability, energy efficiency and personal data protection, allow for the participation of SMEs and start-ups and promote the use of open-source solutions. Member States' intervention fields in digital are indicated in the [Commission Staff Working Document](#) as follows: connectivity; digital-related investment in research and development of AI, cybersecurity, blockchain and quantum technology; development of digital capacity and enhancement of digital skills; eGovernment, digital public services and local digital ecosystems (including e.g. eID and eHealth); digitalisation of businesses (in particular, via Digital Innovation Hubs); investments in and deployment of advanced technologies (e.g. data spaces, edge computing, cybersecurity, AI, HPC and quantum computing infrastructures, IoT); greening the digital sector.

InvestEU

The [InvestEU programme](#) is the EU's investment programme that will play a major role in kick-starting the EU economy after the pandemic by providing long-term funding to companies and helping mobilise private investments for projects that are aligned with key political priorities of the Commission, including the digital transition. The Programme builds on the successes of the Investment Plan for Europe, in order to give an additional boost to sustainable investment, innovation and job creation in Europe, always in line with EU policies and contributing to the EU's economic recovery. Its overall investment is estimated at more than EUR 372 billion over the period 2021-2027 and is structured around four policy areas: sustainable infrastructure; research, innovation and digitalisation; SMEs; and social investment and skill.

Horizon Europe

As a continuation of [Horizon 2020](#), [Horizon Europe](#) is one of the EU's flagship programmes supporting the development of the [European Research Area](#), a single market for research, innovation, and technology across the EU. Horizon Europe represents the biggest budget component of the Single Market, Innovation and Digital heading of the MFF, with a total of EUR 95.5 billion. Horizon Europe facilitates collaborations among researchers and strengthens the impact of research and innovation in developing, supporting, and implementing EU policies, including the green and digital transformations. In line with the European Commission's objective of implementing Open science practices, the Horizon Europe budget is supporting the setup of the [European Open Science Cloud \(EOSC\)](#), a digital and physical environment for hosting and processing research data to support EU science.

Connecting Europe Facility - Digital

The goal of an integrated European Union is achieved, among others, through the building of a network of interconnected transnational infrastructures. This goal has been enshrined in the Regulation establishing the [Connecting Europe Facility \(CEF\)](#), a funding programme of the EU dedicated to supporting investments in cross-border infrastructures in the three sectors of transport, energy and digital. Whilst the first programme ran from 2014 through 2020, the European Commission has established to renew the programme as part of the new MFF for the period 2021 – 2027. The current digital envelope – with a foreseen budget of EUR 2 billion in current prices – aims at catalysing investments in digital connectivity as a basis for better digital services, particularly supporting actions falling into the market failure category. Budget efforts foreseen under the CEF 2 Digital Programme include the deployment and access to high-capacity overland and submarine network infrastructures within the EU, and between the EU and third countries, as well as the provision of broadband connectivity for European households in peripheral areas of the EU. These investments are fundamental in bridging the digital divide.

It is important to remind, as also described above, that the eGovernment components supporting digitalisation (e.g. eID, eSignature, eDelivery, eTranslation) and previously falling under the CEF Programme, are currently encompassed by the fifth pillar of the Digital Europe Programme, 'Digital transformation of public administration and interoperability'.

EU Funding for Broadband 2021-2027

In order to meet the ambitious goal set by the Commission's Digital Compass proposal that by 2030 all European households will be covered by a gigabit network and that all populated areas will be covered by 5G, strong funding instruments are needed.

The European Union has made available the following [financial tools](#) to support Member States and private investors: [Recovery and Resilience Facility](#), [European Regional Development Fund](#), [European Agricultural Fund for Rural Development](#), [Just Transition Fund](#), [Connecting Europe Facility - Digital](#), [Connecting Europe Broadband Fund](#), [InvestEU Fund](#).





Interview with Leontina Sandu

Head of the Interoperability Unit - DG DIGIT
at the European Commission

- How would you define **interoperability** and how important is it, in your opinion, for the implementation of a **modern and innovative digital government**?

Interoperability is the general capacity of organisations to interact to work together more efficiently. According to the [European Interoperability Framework](#) (EIF), interoperability is “the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of data exchanges”. As emerges from this definition, interoperability should be intrinsic to digital transformation and to a modern and innovative digital government, as a precondition to create the ecosystem of integrated digital public services where data can flow freely and be exchanged in a seamless way. Without it, government processes remain siloed, resulting in more administrative burden for citizens, businesses and governments.

The EIF, adopted in 2017, is a key instrument within the EU to develop interoperable public services, especially across borders. It contains a set of principles, models and recommendations aimed at guiding EU public administrations at all levels in the design and provision of digital public services. Several Member States have created their own “versions” of the EIF, namely their **National Interoperability Frameworks (NIFs)**, further advancing their government digitalisation.

Following the end of the ISA2 programme in 2020 and to continue and expand the mission for a reinforced interoperability policy in the public sector, the European Commission has recently launched the [Interoperable Europe](#) initiative. As part of the [Digital Europe Programme](#), which aims to bring technology closer and at the service of businesses, citizens and public administrations, Interoperable Europe aims to offer the necessary digital tools to invest more in public services and digital innovation. One example is the launch of the [GovTech incubator](#) in February 2022, which will take the form of a long-term cooperation framework between the European Commission and the Member States, aiming to ensure cross-border collaboration between countries’ digitalisation agencies, including actors from the private sector and academia.

Finally, with the upcoming **Interoperable Europe Act**, the Commission plans to set up a new governance framework to further foster digital policymaking, scale-up semantic interoperability, and ensure that the current EIF is aligned with the Member States’ needs and expectations.

- What have been, in your opinion, the **main challenges** faced by **European public administrations** in the past two years, especially when it comes to the delivery of public services?

Although the COVID-19 crisis demonstrated that European public administrations have the ability to adapt and react to major crises to ensure the continuity of their public services, for instance providing them remotely, it also unveiled the tendency of countries to work in isolation in times of crisis, targeting local problems. **The challenge is now to bring national solutions together and make them scale up.** In this regard, interoperability plays a key role to ensure not only that digital services can work across borders and across all domains, but also that they are as cost-efficient and user-friendly as possible.

Taking stock of the challenges faced by European public administrations, the European Commission aims to support them by:

- > Ensuring that interoperability is part of the policy design and is then implemented through digital public solutions;
- > Fostering collaboration, through a “sharing and reuse” approach;
- > Promoting the use of common standards and open source; Investing more in research on secure and trustworthy technology design;
- > Boosting innovation to test and experiment with data and digital technologies.

- Besides the challenges brought by the COVID-19 crisis, what are, in your opinion, the **main recommendations** to face the **interoperability barriers and challenges** on digital transformation in the coming years?

EU public administrations should ensure that public services are **interoperable by default** and that their policies take into account the **digital checks** so that they are ready for the digital age. They **should aim to build sound coordination functions and agree on a set of interoperable specifications, protocols, common processes and infrastructures which would enable the integration of digital services in an efficient manner** both at national and EU level. To achieve this, for instance, work needs to be done on semantics, to bridge the gap between the different datasets and domains to make sure that data portability can happen. The **COVID vaccination pass** can be seen as a good example to show the benefits of a common interoperability data model, allowing EU citizens to have one common reading and interpretation of the data. Further to that, public administrations should also try to **innovate more**, and invest, for example, in GovTech incubators and regulatory sandboxes.

The upcoming Interoperable Europe Act, mentioned above, will address some of these key challenges as it will aim at making interoperability an overarching and actionable instrument for governance.



CHAPTER 4

Latest developments
in digital public
administration and
interoperability
in the world

4

Latest developments in digital public administration and interoperability in the world

The previous chapters provided a thorough overview of the most recent initiatives developed and implemented between 2020 and 2022 by European countries and the European Commission to foster digital transformation, and most particularly digital public administration and interoperability. However, digital transformation keeps being a priority also outside Europe, with several international organisations fostering and supporting such a change. Although digitalisation

has been a prominent topic on international organisations' agendas for many years now, the COVID-19 crisis brought new attention to it and further accelerated this transition. This is reflected in the various initiatives and publications put forward by them between 2020 and 2022, which are meant to provide guidance and support to governments and public administrations in their digitalisation efforts.

4.1 Key digital initiatives of the international organisations to foster digital transformation in the world

The following paragraph will examine the main initiatives (e.g., strategies, guidelines) developed since 2020 by the international organisations to address various aspects related to digital

transformation, with a focus on digital public administration and interoperability. For the purpose of this study, the OECD, the World Bank and the UN will be considered.



4.1.1 Transversal digital programmes and policies

As mentioned above, digital transformation has been a key priority for many years for international organisations, with a particular focus on the transformation of public administrations, and the public sector in general. However, the COVID-19 crisis played a catalyst role for government transformation and made it necessary to further invest in digitalisation policies and programmes. Since 2020, the World Bank, the UN and the OECD have in fact put forward various transversal initiatives to foster the digitalisation of the public administrations of the countries under their scope. By transversal initiatives we refer to policy papers, projects and roadmaps, among others, not solely focused on a particular digital topic but rather encompassing and addressing various aspects of digital public administration.

Within the OECD, both the [Directorate for Public Governance](#) and the [Observatory for Public Sector Innovation \(OPSI\)](#) work on several initiatives related to the digitalisation of public administrations, and the public sector in general. Notably within the Directorate for Public Governance, the Digital Government department explores how governments can best use information and communication technologies to embrace good government principles and achieve policy goals. In December 2021 they published the [e-Leaders Handbook on the Governance of Digital Government](#), which explores the requirements needed to become a “digitally-mature government”. One of the main prerequisites is having a **good governance**, on the basis of which digital strategies and frameworks, and in turn interoperable and seamless public services, can be developed, with the final goal of being able to meet the evolving

needs and demands of citizens. In the same vein, the World Bank published in April 2020, the [Digital Government Readiness Assessment \(DGRA\)](#), a toolkit aimed at assessing governments’ readiness towards digital transformation. It delves into nine core foundations which are meant to help governments build open and agile digital government infrastructures. For the World Bank as well, the first of these pillars should be a **sound leadership and governance**, as having a clear vision, leadership and governance are key for building an innovative, open, accessible and agile digital government. The second pillar of the DGRA is the need for the government to be user-centric and therefore build public services around the users’ needs, so as to encourage citizens’ engagement and participation, and thus “dissolve the barrier between the government and the public”⁴¹. The World Bank has been working for decades on the delivery of the most suitable digital government solutions for citizens all over the globe. Indeed, citizen-centric service delivery has become a central aspect of the World Bank’s approach to digital government. The notion of **citizen-centric approach** refers to the design of solutions that consider device- and internet-access limitations, as well as digital literacy, different cultural norms, and other factors that might inhibit access to the services and solutions offered to citizens around the globe⁴². In this regard, the World Bank developed in May 2021 the first edition of its [GovTech Maturity Index](#), which is a measuring tool meant to assess the level of digital transformation in the public sector in the 198 economies under its scope. Among similar indices developed by other international organisations with the goal to measure different aspects of digital government, it is worth mentioning also the UN’s [eGovernment Development Index](#), and the OECD’s [Digital Government Index](#).

⁴¹ World Bank, 2020, Digital Government Readiness Assessment

⁴² World Bank, 2020, GovTech: the new frontier in digital government transformation.

Taking a closer look at the World Bank's [GovTech Maturity Index](#)

GovTech is usually defined as a more advanced stage of digital government. However, the World Bank goes further in its definition by underlining the importance of having a **whole-of-government approach** to public sector modernisation, which can promote simple, efficient, and transparent government systems with citizens at the centre of the reforms. According to it, this **citizen-centric approach** is essential and still missing from the more 'standard' definition of GovTech.

Based on this definition, the World Bank has developed its **GovTech Maturity Index** (GTMI), which was first launched in 2021 and is based on 48 indicators and constructed for 198 economies. The index aims to measure the four fundamental categories of GovTech according to the World Bank (i.e., Supporting core government systems, Enhancing public services delivery, Mainstreaming citizen engagement, and Fostering GovTech enablers) and assist key stakeholders in the design of new digital transformation projects.

The findings of the GTMI 2021 showcase that the **interest in GovTech is growing** around the world, and that digital government and good practices are well-established in 43 out of the 198 economies under the scope of the World Bank. Some other findings and potential areas of improvement include the following:

- The **maturity of GovTech foundations** is lower than expected in most countries, and the same happens with issues like online services delivery.
- There is a struggle to find a coherent approach to **digital citizen engagement** (or civic tech), even in very advanced countries. There is no structured way of embracing this topic.
- There is also a lot of room for improvement in the areas of **data exchange** and **interoperability**.

4.1.2 Initiatives by specific themes

This section will focus on more specific initiatives put forward by the OECD, the World Bank and the UN. These have been categorised into four main themes, following the same rationale used for Chapters 1 and 3.

Digital public services and digital inclusion

Digital inclusion has become a major focus for international organisations in the last two years. The COVID-19 pandemic has undoubtedly contributed to that, as it has exacerbated pre-existing inequalities and discrepancies in many countries around the globe, which in turn have further aggravated the digital divide between developed and developing countries. In fact, while the crisis caused a surge of internet users worldwide up to 5 billion, 3 billion people still remain offline, and 96% of these live in developing countries⁴³. More work should therefore be done to ensure that everyone has a proper and affordable access to the internet, as a prerequisite for further digitalisation. Through its [Roadmap for Digital Cooperation](#), the UN will ensure that, by 2030, every person has a “safe and affordable access to the Internet, including meaningful use of digitally enabled services in line with the Sustainable Development Goals”⁴⁴. Once global connectivity is established, it is necessary to ensure that all citizens have the correct set of skills and expertise to take the most advantage of it. In fact, another pillar of the UN’s Roadmap for Digital Cooperation is the strengthening of digital capacities and skills, so as to meet the growing demands of the digital world. Among the many initiatives put forward, the UN is committed to provide tailored support in digital capacity-building and work with local graduates and young professionals in building and developing their digital capacities. In 2020, the UN also published its [Digital Inclusion Work Plan](#) is meant to “ensure that the voices of those who are not fully benefiting from digital opportunities are heard”. In fact, one of the key actions aims to put in place by 2030 the development of an overarching framework meant to define key indicators and metrics for measuring digital inclusion, as well as the establishment of

a multi-stakeholder digital inclusion coalition, for policymakers working on the topic and willing to work together towards common goals. For its part, the World Bank published in March 2021 a [methodological guidebook](#) meant to help countries prepare their own Digital Skills Action Plans for higher education and technical vocational education; in order to take full advantage of the rapid development of digital skills amongst the younger generation. In addition, the OECD also published in 2021 its [Framework for Digital Talent and Skills in the Public Sector](#), which offers a guided approach for the public sector to hire digital talent and equip public servants with the adequate digital skills. The study demonstrates that the starting point for this is the creation of a workforce that is “digitally savvy”, and which is eager to support the digital transformation. Indeed, the public sector needs to embrace this change in culture and foster holistic digital strategies which will encourage flexibility and adaptability. Once this working environment is established, it must be equipped with the basic foundational skills that uphold digital government maturity. These include digital government user skills, socio-emotional skills, professional skills as well as leadership skills. By fostering a working environment which encourages digital transformation and by investing in people’s digital skills, the end goal of the public sector worldwide is to unravel the potential benefits of digital technologies and data, so as to better meet citizens’ evolving needs and offer trustworthy digital public services to all.

Trust and security (cybersecurity, eID)

The use of digital technologies has been spreading worldwide, including in the provision of essential services such as access to and management of water, food, energy, or healthcare. To safeguard the continuity of these essential services at all times, their digital security must be guaranteed and reinforced. The UN Secretary-General included a specific [section promoting digital trust and security](#) in its Roadmap for Digital Cooperation to pursue this objective. Consultation with the UN Member States are ongoing to engage all countries in the creation of a single document, which would provide universal guidelines and principles

⁴³ <https://blogs.worldbank.org/voices/digital-inclusion-unlocks-more-resilient-recovery-all>

⁴⁴ United Nations, 2020, The United Nations Secretary General’s Roadmap for Digital Cooperation: Achieving universal connectivity.

on how to better safeguard trust and security, particularly in the provision of digital services. For instance, one of these universal principles calls for the strengthening of the digital infrastructures of hospitals and other critical healthcare facilities to make them inviolable, even in times of war. After adoption, this document could also be open to multi-stakeholder endorsement.

Following the same objective of ensuring better digital security, the [Internet Governance Forum \(IGF\)](#), created by the UN as a global multi-stakeholder platform facilitating the discussion of public policy issues applicable to the internet, operates a [Best Practice Forum \(BPF\) on Cybersecurity](#) since 2014. The BPF working groups form part of the IGF's intersessional work between annual forums, and are designed to facilitate collaborative, community-led research around a certain topic affecting the internet and internet governance and, more recently, cybersecurity. Their work is focused on three main areas:

- Identifying cybersecurity initiatives, their relative scope, and explore areas of disagreement between mapped cyber norms⁴⁵;
- Highlighting testimonials from stakeholders affected by cybersecurity events to learn where norms development could or would have benefited from their input;
- Exploring the complex interplay between norms and cybercrime legislation and identifying where these efforts support each other, collide, or impact the overall work of mitigating the impact of major cybersecurity events.

In addition to cybersecurity, the lack of secure forms of identification or the unsuitability of existing systems, inadequate for the digital era or unable to safeguard people's rights and data, are other key issues tackled at global level. Improving the security, accessibility, quality, and governance of ID systems, as well as people's trust in such electronic means of identification, is essential to achieve the [Sustainable Development Goals](#)⁴⁶ and promote an inclusive economic development, including in the digital sphere. In 2017, a group of organisations, counting the World Bank, [United Nations Development Programme \(UNDP\)](#) and the [United Nations Children's Fund](#)

[\(UNICEF\)](#) among others, published a set of ten [Principles on Identification for Sustainable Development: Towards the Digital Age](#). These build on existing international norms and aim at fostering cooperation around the implementation of identification systems according to a shared set of values and standards. Since 2017, an increased number of countries have used these Principles to design new identification systems or reform existing ones. A [second edition of these Principles](#) has been published in 2021, based on broader public consultations and taking in account new perspectives and the lessons learned since its first publication. In this new version, several principles, such as Principle 2 on removing barriers to access to and use of identification systems, have been detailed with more sub-principles.

As mentioned above, trust is essential to embrace the benefits of the digital transformation and governments, as citizens need to be convinced that engaging in the digital environment will bring more benefits than downsides. To ensure trust, public administrations must mitigate at the maximum risks and uncertainties arising from the use of digital technologies and data exchanges, especially the ones related to privacy and consumer protection. The OECD regularly published different [material on digital trust](#) (e.g., reports, policy recommendations and measurement roadmap) as part of its [Going Digital Toolkit](#). In the [Going Digital Integrated Policy Framework](#) published by the OECD in 2020, trust is presented as one of the seven key policy dimensions to make digital transformation work for growth and well-being. This report not only presents the seven policy dimensions of the framework, but also provides guidance on putting the framework into practice and suggests key steps for developing a strategy that reflects a whole-of-government approach to policymaking in the digital age, including building digital trust.

Digital sovereignty and interoperability

Government interoperability is one of the key GovTech indicators presented in the World Bank's [GovTech Maturity Index \(GTMI\)](#), already mentioned above. The World Bank's report finds that there is a growing interest in the

⁴⁵ The cyber norms are defined by the IGF as 'collective expectation for the proper behaviour of actors with a given identity within the cybersecurity sphere'. More information is available in IGF2018 Best Practice Forum on Cybersecurity: Cybersecurity Culture, Norms and Values

⁴⁶ And more specifically, the target 16.9 'By 2030, provide legal identity for all, including birth registration'.

establishment of what the World Bank calls a Government Interoperability Framework (GIF)⁴⁷ as a pre-condition for the establishment of common standards for secure data exchanges between different government systems. The GTMI is calculated based on 48 key performance indicators (KPIs) defined in four categories: core government system indicators, public service delivery indicators, citizen engagement indicators and GovTech enablers. One of these KPIs is the development and implementation of a GIF in the countries' institutions⁴⁸. Of the 198 economies under the scope of the survey, 104 stated that they did not yet have a GIF in place. The report also finds that most of the countries with GIFs in place are high-income countries (53%) and that most of the poorest and most fragile countries do not yet have such frameworks in place. With regard to regional distribution, Europe and Central Asia, Latin America and the Caribbean and the Middle East and North Africa are the regions with the most operational GIFs in place. In its [e-Government Interoperability Guide](#), the United Nations' Development Programme (UNDP) also emphasises on the fact that eGovernment interoperability is becoming an increasingly crucial issue. The UN's Guide finds that most governments under the scope of its analysis have already set up their GIFs and designed sound eGovernment strategies, but that further attention should be paid to fostering interoperability, and to the need of better connecting, exchanging, sharing and reusing data among public administrations. The report stresses on the fact that governments should strive for further

interoperability for many reasons. One of them is that eGovernment interoperability leads to better and smoother decision-making as it allows all the data coming from various governmental bodies to be used together to make decisions which will be beneficial to many. In addition, interoperability allows for better coordination among public entities which supposedly leads to better services delivery for citizens and businesses. Along these lines, the OECD has published in October 2021 its [Recommendations on Enhancing Access to and Sharing of Data](#) (EASD), meant to guide policymakers in encouraging a comprehensive and systematic approach to data access and data sharing, to enable further interoperability. It is the first internationally agreed upon set of principles on how governments could maximise the benefits of accessing and sharing all types of data. The Recommendations are meant to guide governments in developing holistic data governance policies and/or frameworks to unravel the potential benefits of data across and within sectors. Already back in 2019, an OECD publication⁴⁹ had stressed on the role that data played in the digitalisation of public administrations and on the importance of having a whole-of-government approach in place, so as to develop a data governance model and a data-driven public sector. Today's governments must contend with the rising expectations of their citizens by fostering their citizen-centred and digital-by-design aspects, and by encompassing a whole-of-government approach, so as to be able to better deliver seamless digital services and deliver on the promise of the digital age.



⁴⁷ A Government Interoperability Framework (GIF) is a document that specifies a set of common elements such as vocabularies, concepts, principles, policies, guidelines, recommendations, standards, and practices for agencies that wish to work together, towards the joint delivery of human-centric joined-up public services.

⁴⁸ The survey question related to this KPI is: Is there a Government Interoperability Framework (GIF)/Service Bus (GSB)?

⁴⁹ OECD, 2019, The path to becoming a data-driven public sector.



Interview with João Ricardo Vasconcelos

Senior Governance Specialist, GovTech, Governance Global Practice at the World Bank

- How would you define **digital government** and how has its role and definition changed after the COVID-19 pandemic and the **subsequent boost to digital transformation**?

The concept of digital government can be defined as the **shift from eGovernment**, which was focused on the online transfer of data and processes, while digital government is understood as the possibility of leveraging such data and of digital technologies to transform government operations and services. During the COVID-19 pandemic, citizens became more reliant on digital public services, thus encouraging public administrations to work towards a better delivery of such services, . Hence, some important dimensions need to be considered for digital government to be successful:

- It should be **citizen-centred**, which entails that the needs of citizens should be the central issue of governments.
- It should be **digital-by-design**, entailing the need to have a digital mindset in place, rather than just putting digital on top of what was previously in place.
- It should entail a **whole-of-government** approach, thus fostering collaboration between various stakeholders and bring the citizens at the centre of the discussions.

- The World Bank has worked extensively on GovTech and how it can innovate and improve existing public services. In light of this, how would you define **GovTech**? Why do you consider it **essential** for the future modernisation and digitalisation of public administrations?

GovTech is usually defined as a **more advanced stage of digital government**. The World Bank follows this definition, underling the importance of having a whole-of-government approach to public sector modernisation which promotes **simple, efficient and transparent government systems with citizens at the centre of the reforms**. This **citizen-centric approach** is essential and is missing from the more 'standard' definition of GovTech. At the same time, it is important to have a **multi-stakeholder thinking approach**. In this respect, the World Bank created a [GovTech Global Partnership](#), which regroups government stakeholders, but also the academia and representatives of civil society, to share their knowledge and expertise on GovTech.

In 2021, the World Bank also launched its first [GovTech Maturity Index](#), aimed at measuring four fundamental categories of GovTech according to the Bank (i.e., Supporting core government systems; Enhancing public services delivery; Mainstreaming citizen engagement; and Fostering GovTech enablers), which are then applied to the 198 economies of the world under the scope of the Bank.

Some of the findings of the first edition of the GovTech Maturity Index were:

- The **maturity of GovTech foundations is lower** than expected in most countries, and the same happens with issues like online services delivery.
- There is a struggle to find a **coherent approach to digital citizen engagement** (or civic tech), even in very advanced countries. There is no structured way of embracing this topic.
- There is also a lot of room for improvement in the area of **data exchange and interoperability**.

The World Bank is working on the **second edition** of this index, which is expected for October 2022, with the goal of expanding it to be more specific and gather more evidence from the different countries on this area. Coordination with other international organisations is also ensured to **reuse more data** from the United Nations, the European Commission and the OECD, among others.

- As mentioned above, there have been rising expectations for governments to better perform and deliver digital public services in a fast and efficient way, mostly following the uptake of the COVID-19 crisis. In this regard, various initiatives have been put forward by the European Commission to **foster interoperability** and encourage the **development of interoperable public services**. Has there been a similar desire within the World Bank to promote interoperability across different sectors?

The World Bank has also been working for many years in the area of interoperability, and it is currently working on a **note on interoperability** (which is expected to be published in October 2022), aimed at guiding any country around the world in understanding what interoperability is and how to better foster it in their respective public administrations to take full advantage of its benefits. This note is intended to be simple and practical and would provide implementation guidelines on how to establish a good interoperability policy.

The World Bank is also considering launching a **GovTech working group on interoperability**. The goals of this initiative, considering the 198 economies that the World Bank works with, would be twofold: i) create **knowledge exchange** on the topic; ii) create a **community of practice** that could co-produce deliverables in the area of interoperability. The idea would be to have on board both digitally advanced and less digitally advanced countries to discuss and exchange ideas on the topic of interoperability.

Annexes

Annex 1. Overview of the **political communications** adopted by the 35 European countries (per cluster and per country) included in the 2021 and 2022 editions of the Digital Public Administration factsheets.

	Digital transformation of public administration	Digital inclusion and digital public services	Trust and security in the digital government sphere	Digital sovereignty and interoperability	Innovative technologies in the public sector	Tot.
Austria	0	3	1	0	2	6
Belgium	2	2	1	0	2	7
Bulgaria	3	1	0	1	1	6
Croatia	3	2	1	0	2	8
Cyprus	3	1	1	0	1	6
Czech Republic	2	3	3	3	4	15
Denmark	4	3	2	1	1	11
Estonia	3	0	0	0	0	3
Finland	2	2	1	0	1	6
France	5	0	0	1	1	7
Germany	1	0	0	4	0	5
Greece	3	0	0	0	3	6
Hungary	1	0	0	1	0	2
Iceland	4	0	2	1	1	8
Ireland	2	2	1	0	1	6
Italy	1	1	0	1	5	8
Latvia	1	1	0	1	3	6
Liechtenstein	0	0	0	0	0	0
Lithuania	1	0	0	1	2	4
Luxembourg	1	1	1	0	2	5
Malta	4	2	1	1	0	8
Montenegro	5	0	2	0	1	8
Netherlands	0	0	0	1	0	1
Norway	1	1	1	1	0	4
Poland	3	0	0	2	1	6
Portugal	2	1	0	1	3	7
North Macedonia						
Romania	0	0	0	0	1	1
Slovakia	1	1	1	1	0	4
Slovenia	1	2	2	0	2	7
Spain	1	3	0	0	1	5
Sweden	1	0	2	0	2	5
Switzerland	2	0	0	0	0	2
Turkey	2	0	1	0	3	6
Ukraine	4	4	2	0	4	14
Tot.	69	36	26	23	50	204

Annex 2. Overview of the **legislations** adopted by the 35 European countries (per cluster and per country) included in the 2021 and 2022 editions of the Digital Public Administration factsheets.

	Digital transformation of public administration	Digital inclusion and digital public services	Trust and security in the digital government sphere	Digital sovereignty and interoperability	Innovative technologies in the public sector	Tot.
Austria	2	1	2	2	0	7
Belgium	0	0	2	0	0	2
Bulgaria	2	0	0	0	0	2
Croatia	0	3	0	1	0	4
Cyprus	0	0	1	1	2	4
Czech Republic	1	2	0	0	1	4
Denmark	0	0	2	1	0	3
Estonia	0	1	0	0	0	1
Finland	4	0	0	1	1	6
France	1	0	0	0	0	1
Germany	1	0	0	1	1	3
Greece	2	2	0	0	0	4
Hungary	0	0	0	0	1	1
Iceland	2	0	0	0	0	2
Ireland	0	0	0	0	0	0
Italy	3	0	1	2	0	6
Latvia	2	0	3	1	0	6
Liechtenstein	0	0	0	0	0	0
Lithuania	2	0	2	0	2	6
Luxembourg	1	0	0	1	1	3
Malta	0	0	0	1	1	2
Montenegro	1	0	0	0	0	1
Netherlands	1	0	0	0	1	2
Norway	2	1	0	0	0	3
Poland	2	1	3	2	0	8
Portugal	1	2	2	0	2	7
North Macedonia						
Romania	0	0	0	1	0	1
Slovakia	1	0	1	0	0	2
Slovenia	2	4	3	0	0	9
Spain	3	3	4	0	1	11
Sweden	0	1	0	1	0	2
Switzerland	2	0	1	0	1	4
Turkey	2	0	3	0	3	8
Ukraine	3	3	1	0	2	9
Tot.	43	24	31	16	20	134

Annex 3. Overview of the **infrastructures** adopted by the 35 European countries (per cluster and per country) included in the 2021 and 2022 editions of the Digital Public Administration factsheets.

	Digital transformation of public administration	Digital inclusion and digital public services	Trust and security in the digital government sphere	Digital sovereignty and interoperability	Innovative technologies in the public sector	Tot.
Austria	0	0	1	0	2	3
Belgium	0	4	0	0	0	4
Bulgaria	2	0	1	0	0	3
Croatia	3	4	2	3	1	13
Cyprus	9	3	1	1	0	14
Czech Republic	0	1	0	0	0	1
Denmark	1	2	2	1	0	6
Estonia	0	0	0	0	0	0
Finland	1	0	1	0	1	3
France	0	4	0	0	4	8
Germany	0	0	0	0	2	2
Greece	2	1	1	0	0	4
Hungary	0	0	0	2	1	3
Iceland	0	0	0	0	0	0
Ireland	1	1	0	0	0	2
Italy	0	1	0	0	2	3
Latvia	1	0	2	0	0	3
Liechtenstein	0	2	0	0	0	2
Lithuania	0	0	0	0	1	1
Luxembourg	0	3	1	0	0	4
Malta	0	0	0	0	0	0
Montenegro	3	4	0	0	0	7
Netherlands	0	0	0	0	0	0
Norway	0	1	1	0	0	2
Poland	0	4	0	1	0	5
Portugal	3	0	0	0	0	3
North Macedonia						
Romania	0	1	2	1	1	5
Slovakia	0	0	1	0	1	2
Slovenia	0	2	1	1	1	5
Spain	0	1	0	0	0	1
Sweden	2	1	1	1	3	8
Switzerland	0	1	1	0	1	3
Turkey	1	0	1	0	0	2
Ukraine	1	3	0	0	1	5
Tot.	30	44	20	11	22	127

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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