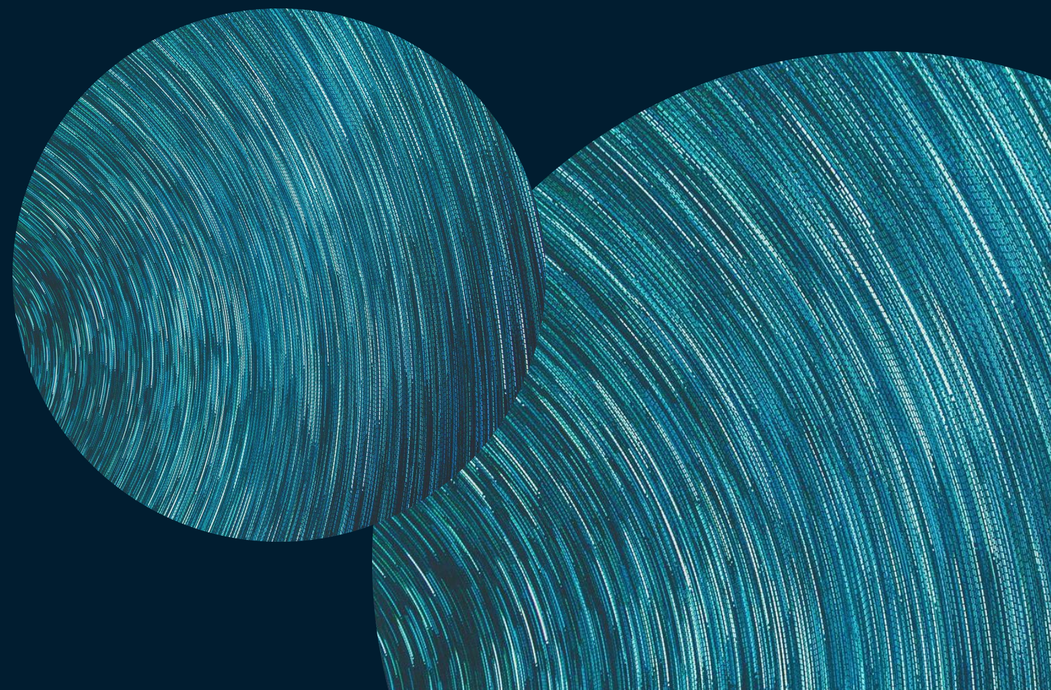
State-of-Play Report on Digital Public Administration and Interoperability 2024

National Interoperability Framework Observatory (NIFO)
DG DIGIT – B2

September 2024



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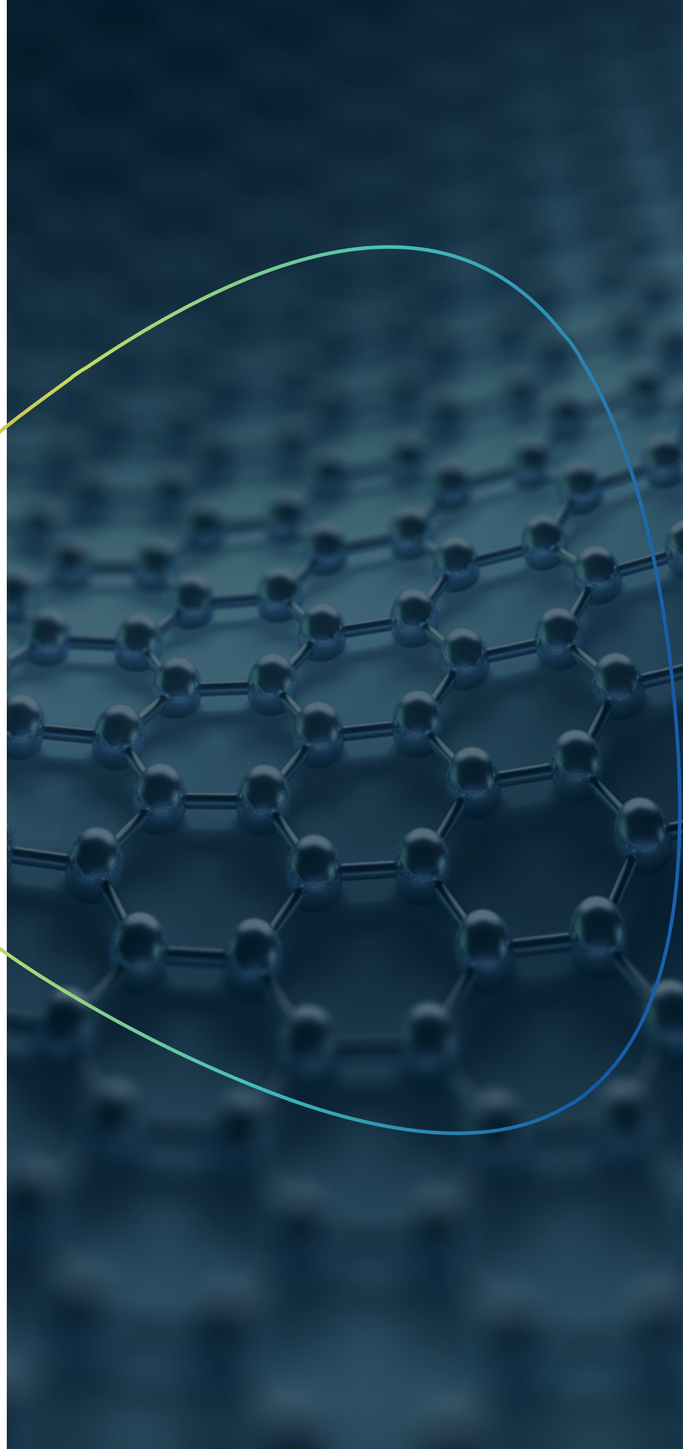

State-of-Play Report on Digital Public Administration and Interoperability 2024

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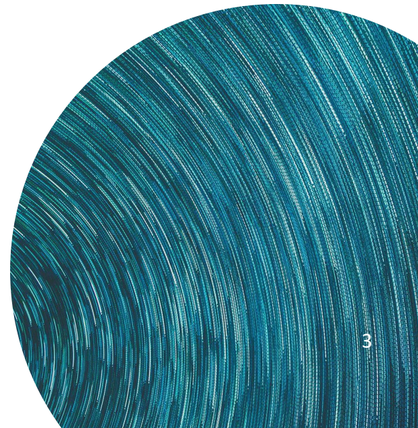

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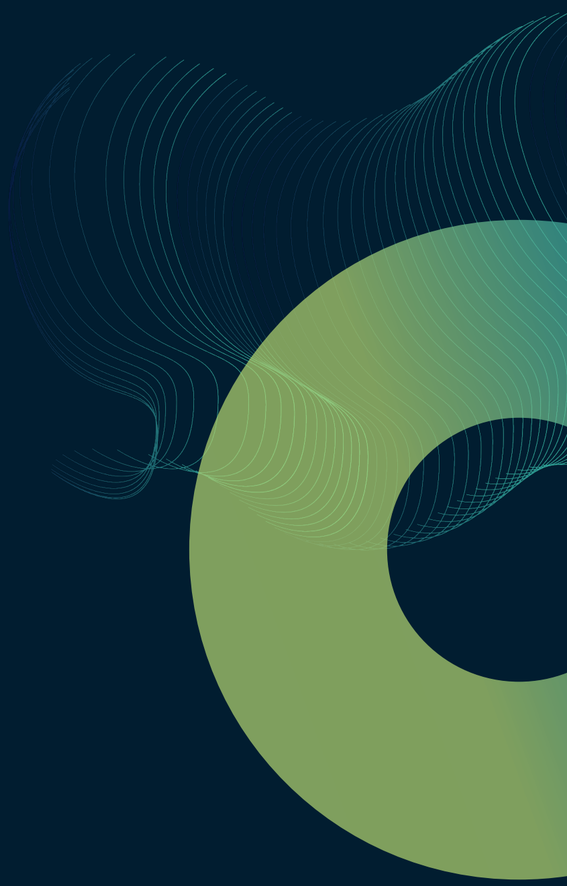


Foreword

Andrea Halmos

Deputy Head of Interoperability and Digital Government Unit

2024 marks a significant milestone for the European Commission and its Directorate-General for Digital Services (DG DIGIT) with the adoption of the Interoperable Europe Act. This landmark regulation is a pivotal step towards the provision of accessible and cross-border online public services, reinforcing our commitment to further enhance interoperability in Europe.

The National Interoperability Framework Observatory (NIFO) has been at the forefront of digital public administration in Europe since 2014, meticulously tracking and analysing the initiatives that shape our digital landscape. The 2024 State-of-Play report encapsulates this ongoing journey, providing a thematic exploration of key trends through the lenses of public administration transformation, interoperability, trust, cybersecurity, and innovative technology use.

This year's report is not just a reflection of where we stand; it serves as a valuable resource that helps us navigate towards the ambitious targets of the Digital Decade policy programme 2030. By offering valuable insights into the latest digital developments, it fosters knowledge sharing and supports the interoperability goals that are crucial for a digitally sovereign Europe.

As we look to the future, the report will adapt to the evolving landscape, particularly with the introduction of the Interoperable Europe Act. This will enhance our understanding of cross-border interoperability in digital public services, addressing both the challenges and opportunities that lie ahead. More information on the future design of the next years' reports will be shared soon, so make sure to follow the latest news on the Interoperable Europe Portal!

Finally, I would like to extend our heartfelt gratitude to the national contact points from the 39 participating European countries for their invaluable contributions. Their efforts have provided the crucial data that enabled us to develop this comprehensive report. Additionally, we would like to thank the three experts who were interviewed, offering additional insights that enriched the findings of this report. Their inputs reflect the collective dedication to achieving the broader policy objectives of the EU and advancing digital transformation and interoperability across Europe.

Together, we are not just observing change; we are actively shaping a more, efficient, and secure digital Europe.

Executive Summary

Key highlights

The 2024 edition of the State-of-Play report on digital public administration and interoperability focuses on four key topics: digital transformation of public administrations and public services; interoperability and data; trust and cybersecurity; and innovative use of technologies. These areas were selected in response to the adoption of key European initiatives linked to the digital remit, including the Interoperable Europe Act, and the ambitious objectives set by the Digital Decade policy programme 2030. The report highlights trends, good practices, and areas for improvement across 39 European countries, as well as actions undertaken at the European Union (EU) level.

To provide a comprehensive understanding of the current landscape, each chapter of this report includes a section on the analysis of the national and European state-of-play but also dedicates space to the international stage. Additionally, this year's edition features the latest results from the European Interoperability Framework (EIF) monitoring mechanism, supporting the analysis presented. Three chapters are further enriched with interviews on current topics related to the trends identified (i.e., EU Green Deal, Interoperable Europe Act, and GovTech).

The report underlines that European countries have adopted a wide array of initiatives aimed at supporting the **digitalisation of the public sector**. In this context, particular efforts have been noticed in the health sector, as well as sustainable digitalisation, and initiatives linked to **digital inclusion and skills development** in order to overcome the current digital divide. Likewise, the **interrelation between interoperability and data** has received wide attention thanks to the focus on data governance and reusability, and the development of data platforms and registries to streamline public service delivery. Moreover, the need for **trust and security** in the digital sphere has never been more critical. As a consequence, it appears that European countries have established **cybersecurity centres** and institutions to combat cyber threats, and boosted their efforts in **awareness-raising and training** to ensure that everyone understands risks that may incur both online and offline. Lastly, public administrations seem always more inclined to embed **innovative technologies** in their *modus operandi*, with AI, GovTech and cloud solutions being at the forefront of such a transition.

Overall, Europe emerges as a key player in the digitalisation of the public sector. The establishment of different initiatives at both the national and EU levels has equipped citizens and businesses with a plethora of tools aimed at ensuring a secure, interoperable, and user centric digital future.

Introduction

In the context of the monitoring and reporting activities carried out by the National Interoperability Framework Observatory (NIFO), the fifth edition of the study on the State-of-Play (SoP) provides an overview of the activities aimed at promoting digital public administration and interoperability at the national and European level.

This new edition of the study builds upon the Interoperable Europe Act, which entered into force in April 2024 to strengthen cross-border interoperability and cooperation in the public sector across the EU. The Act has introduced a new structure of cooperation between EU Member States and EU institutions to **secure cross-border exchange of data and agree on shared digital solutions**, such as open source software, guidelines, and frameworks. The new cooperation framework intends to address several new policy developments that affect one way or another digital services designed and provided by the public sector. Moreover, this report also supports the objectives of the Digital Decade policy programme 2030 by referencing national initiatives on the digital transformation of public administrations and public services, as well as interoperability, thus complementing existing data and indicators included in the Digital Decade reports and related resources.

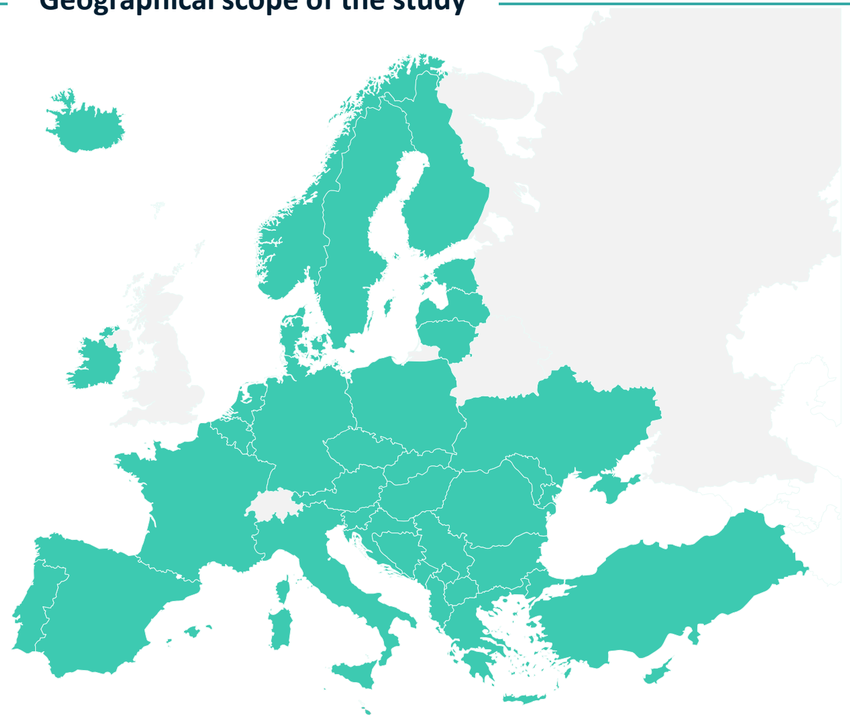
The report presents the main trends identified through the analysis of the 2024 edition of the Digital Public Administration factsheets (DPAFs), as well as the 2023 results of the European Interoperability Framework (EIF) monitoring mechanism[1].

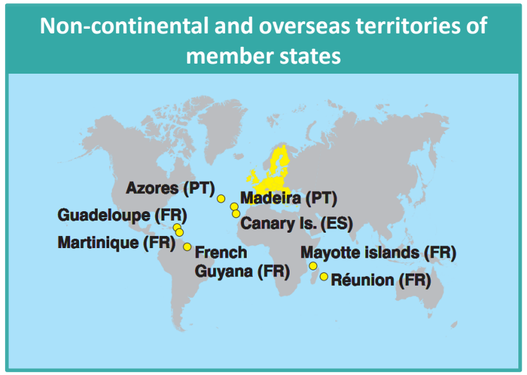
In addition to the data collected under NIFO, common trends are analysed at both the European and international levels to identify synergies across policy domains. What is more, the report has been further enriched with **three interviews with experts in their respective fields**, namely the EU Green Deal, the Interoperable Europe Act, and GovTech.

Compared to previous editions, the main novelty introduced this year is the extended scope of the geographical coverage of the report, and more specifically **the addition of eight new European countries to the scope of the DPAFs data collection**.

1 The report relies upon primary and secondary data collection activities. Particularly, the Study Team leveraged on content provided by National Contact Points in the context of the data collection activities for the annual update of the 2024 Digital Public Administration factsheets and the 2023 EIF monitoring mechanism.

Geographical scope of the study





Indeed, the report covers **recent developments linked to digital public administrations and interoperability** in the 27 EU Member States, the members of the European Free Trade Association (Iceland, Liechtenstein, and Norway) and Ukraine, as well as Albania, Bosnia and Herzegovina, Kosovo, Moldova, Montenegro, North Macedonia, Serbia, and Türkiye, hereafter called 'EU/European countries'. Furthermore, the report presents multiple national examples for each trend identified.

In this regard, the report considers new initiatives put forward by the selected European countries in 2023 and 2024.

To shed light on identified trends, the SoP report on digital public administration and interoperability contains the following chapters:

- Chapter 1 – **Digital transformation of public administrations and public services**;
- Chapter 2 – **Interoperability and data**;
- Chapter 3 – **Trust and cybersecurity**;
- Chapter 4 – **Innovative use of technologies**;
- Chapter 5 – **Conclusion**.

Additionally, an annex (Annex 1) offers a high-level overview of the performance of the 31 European countries included in the assessment of the implementation of the EIF [2].

2 The following countries take part in the EIF monitoring mechanism: the 27 EU Member States, the members of the European Free Trade Association (Iceland, Liechtenstein, and Norway), and Ukraine.

01

CHAPTER 1
Digital transformation of public administrations and public services

1. Digital transformation of public administrations and public services

In an increasingly digital society, EU countries continue to adapt their services to the needs of citizens and businesses, as well as facilitate external and internal administrative processes. Digitalisation has proven to be a **catalyst for change**, offering a wide range of benefits in various sectors. By harnessing technology, governments can **improve efficiency and effectiveness**, **streamline bureaucratic processes, and reduce administrative burden**. In addition, digitalisation – when managed appropriately – can contribute to reinforce **accessibility and social inclusion** by overcoming geographical boundaries and physical constraints, ensuring that services are available to all members of society and encouraging participation in democratic processes. In this sense, digital transformation not only benefits citizens and businesses but also enhances the **transparency** of government operations. However, digitalisation in the public sector can also bring a variety of challenges. For instance, European countries must address the need for enhanced **digital skills** to effectively navigate the development and use of digital technologies. Therefore, European public administrations and international organisations have adopted various strategies, action plans, and roadmaps to face such barriers. This chapter provides an overview of concrete actions currently taken at the national, European, and international levels to promote the digitalisation of public administrations and the delivery of public services, while facing these challenges.

1.1. Trends identified at national level

The 2024 edition of the Digital Public Administrations Factsheets (DPAFs) has yielded significant findings regarding **the digital transformation of public administration and public services**. Within the data collection encompassing 39 countries, 29 nations launched new measures in 2023 and 2024 to advance the digitalisation of public administrations, with 66 initiatives, and public services, with 83 initiatives. This represents the largest proportion of initiatives, positioning it as the most prominent topic among all others.

This section will delve into the main trends concerning the digital transformation of public administrations and their services, as identified by the analysis of the data collected for the 2024 edition of the DPAFs. The main trends encompass the alignment of digital strategies, action plans, and legislations with the objectives of the Digital Decade policy programme 2030, **significant advancements in eHealth**, alongside with the evolution of **sustainable digitalisation**. Lastly, this section will underscore the critical role of **digital inclusion and digital skills** as drivers for development, ensuring equitable access to opportunities in the digital age. National examples will be provided to demonstrate these trends.

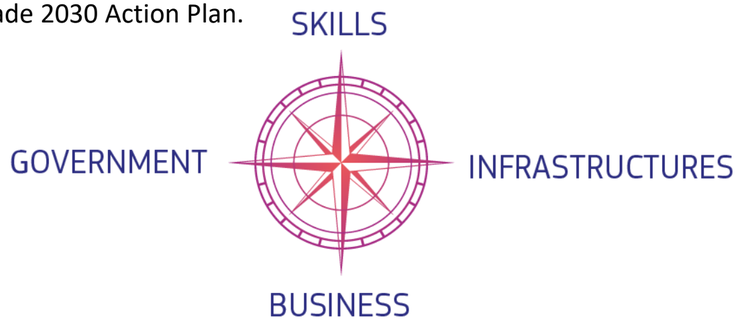
‘Europe aims to empower businesses and people in a human-centred, sustainable and more prosperous digital future.’

Europe’s Digital Decade: digital targets for 2030

1.1.1. Alignment between national initiatives and the Digital Decade policy programme 2030

The Digital Decade policy programme 2030 sets out digital ambitions for the next decade with clear, concrete targets. These main goals can be summarised in four points: fostering a digitally skilled population and highly skilled digital professionals; ensuring secure and sustainable digital infrastructures; driving the digital transformation of businesses; and advancing the digitalisation of public services. These goals include quantitative objectives, such as achieving 100% online public services and providing gigabit connectivity for all.

Through the establishment of digital rights and principles, the Digital Decade policy programme 2030 aims to create a **secure, safe, and sustainable digital transformation** that prioritises people, in line with EU values and fundamental rights. It provides guidance for EU countries and promotes the digital transformation in Europe with these objectives by 2030. Furthermore, a cooperation mechanism has been put in place with several components: a monitoring system based on the Digital Economy and Society Index (DESI) to measure progress; an annual report by the Commission evaluating progress and offering recommendations for actions; strategic roadmaps in which EU countries outline adopted or planned actions to reach the 2030 targets, multi-country projects and more. The second State of the Digital Decade Report on the EU's progress towards a successful implementation of the programme’s objectives was published on 2 July 2024, as foreseen in the Digital Decade 2030 Action Plan.



In this context, several EU countries have adopted significant initiatives to implement the objectives of the Digital Decade in 2023 and 2024. Among these initiatives, most represent national strategies that countries have put in place or are due to implement to align themselves with their national roadmaps to submit to the European Commission. These strategies aim to achieve several common objectives: strengthening digital skills, deploying secure infrastructures, promoting digitalisation in businesses, improving digital public services, encouraging research and innovation, and harnessing the potential of data. National strategies are either **cross-sectorial** or focus directly on specific sectors, such as digital skills or data strategies. Additionally, legislative efforts, particularly related to the provision of data for DESI indicators, play a crucial role in advancing these strategies.

National examples

Bulgaria

In March 2024, Bulgaria's Digital Decade Council approved the draft of the updated national strategy document **Digital Transformation of Bulgaria for the Period 2024–2030**, which includes the national Digital Decade strategic roadmap, the digital transformation analysis, and the national projected trajectories for the digital targets. The document identifies digital transformation as an important process to create the conditions to foster growth and innovation and improve the outlook of the job market, while providing citizens with high living standards.

Slovenia

In November 2023, the Slovenian Government adopted the **National Strategic Plan for the Digital Decade** which sets out the way forward and indicates how the Republic of Slovenia will contribute to the common European objectives of the Digital Agenda 2030 in the areas of digital competences, digital infrastructure, digital transformation of the economy, and digital public services. The plan includes various measures for which financial resources have already been secured from national or European sources, and action plans that indicate the way in which a certain policy goal of the Digital Decade Programme might be achieved.

Ukraine

The Cabinet of Ministers of Ukraine approved a legislation (**Resolution No. 774**) in September 2023, establishing a list of DESI indicators for Ukraine, along with the procedures for collection and exchanging index data based on the methodology defined at EU level. Key elements of DESI aligning with EU digital objectives, were prioritise, such as creating a secure and resilient digital infrastructure, enhancing digital skills, and digitalising businesses and public services.

1.1.2. Digital transformation of health

EU countries are making progress in eHealth, which is identified as one of the main trends in the provision of digital public services. The trend encompasses various initiatives, policies, and technological advancements aimed at leveraging digital technologies to improve healthcare delivery, enhance patient outcomes, and drive innovation in the healthcare industry. At national level, EU countries continue to prioritise investments in the digitisation of the healthcare sector, representing 30% of initiatives dedicated to eHealth among a wide variety of sectorial initiatives. Different type of initiatives was adopted to further support eHealth, both in terms of strategies and infrastructures, including **applications and end-user platforms**. More specifically, the digital transformation of the healthcare sector is characterised by several trends: enhanced administrative efficiency and interoperability, support for professional recognition and cross-border healthcare, and the adoption of AI and mobile health technologies. Efforts to simplify the recognition of foreign professional qualifications facilitate workforce mobility and ensure timely care, aligning with the **European Health Data Space** (EHDS) goals. Lastly, the integration of artificial intelligence and mobile health apps, aims to empower patients, support Small and Medium Enterprises (SMEs) in their digital transformation and drive innovation, ultimately improving healthcare delivery and patient engagement, while minimising risks and costs.

National examples

Germany

In March 2023, the Digitalisation Strategy for Health and Care was published, offering clear direction for the digital transformation of healthcare in Germany. The strategy adopts a holistic approach oriented towards individuals, aiming to overcome sector boundaries and prioritise the needs of both care recipients and providers. It identifies three areas necessitating concrete action: establishing person-centred and digitally supported cross-sector and cross-professional care processes; utilising high-quality data to enhance care and research; and implementing benefit-oriented technologies and applications. Targets are set for these areas of action, and strategic guidelines are outlined accordingly.

Italy

The plan known as ‘Connected Health’ aims to provide high-speed internet access to around 12,300 healthcare facilities in Italy, with ultra-broadband symmetric connectivity of at least 1 Gbit/s and up to 10 Gbit/s. The new network will include both active and passive components, such as dark fiber and active equipment. As of February 2024, 959 healthcare facilities were connected. Regular updates on the plan’s progress are accessible on a platform where citizens can find the targeted healthcare facilities and monitor their connection status

Norway

In 2023, Norway adopted its National eHealth Strategy, which is the health and care sector’s joint strategy for digitalisation. It shall contribute to a sustainable and innovative sector, which delivers coherent health and care services of excellent quality. In addition to pursuing joint overall priorities and political goals, the strategy aims to contribute to an increased implementation capacity in the eHealth area. It covers the time frame from 2023 to 2030 and foresees five strategic objectives, including active participation in one’s own health, simpler working day, and available information and strengthened collaboration.

1.1.3. The growth of sustainable digitalisation

As part of the global digitalisation of the public sector, the adoption of digital tools can offer innovative solutions that can significantly **reduce carbon emissions and resource consumption**. However, digitalisation can entail environmental risks including the high energy consumption and carbon footprint of data centres, as well as the resource depletion due to the reliance of digital infrastructure on raw material and water. In addition, while digitalisation offers benefits, unequal access to technology can exacerbate social and economic disparities. Therefore, it is crucial **to enhance the sustainability of the use by public administration**. According to the data collected through the DPAFs, 12% of the digital initiatives reported by EU countries were related to digitalisation supporting the **EU Green Deal** and the sustainable use of digital tools. Indeed, one of the objectives of the Digital Decade programme is to put in place sustainable digital infrastructures, which suggests that this type of initiatives will develop even more in the years to come.

National examples

Belgium

The Tomorrow's Tech Today conference organised on 7 and 8 February 2024 under the Belgian Presidency of the Council of the EU focused on sustainable telecommunications, data centres and digital solutions for a sustainable future. The event highlighted the rapid advancements in technology and emphasised the importance of sustainable and inclusive tech development for a better future for all. The event brought together a wide range of parties and demonstrated a willingness for government, industry and the public to work together to stimulate technological progress. The Tomorrow's Tech Today conference is part of the Belgian Presidency of the EU's program, which focuses on digital transformation and sustainability.

Portugal

In July 2023, Portugal initiated its Technical Assistance Project 'Strengthening Portugal's policy frameworks 2023-2025' to promote green SMEs and green entrepreneurship, and to support start-ups and scale-ups in industrial ecosystems through incubation and acceleration. Led by the Directorate-General for Economic Activities under the Ministry of Economy and Maritime Affairs, the project is funded by the European Commission and the OECD's Technical Assistance, and it is scheduled to run until March 2025. This initiative supports the public sector's transition to sustainable digital solutions by fostering innovation and sustainable practices in the private sector that can be adopted by public entities.

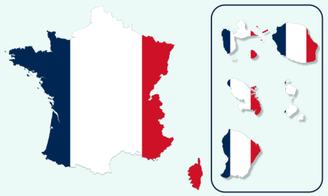
1.1.4. Digital inclusion and digital skills, a driver of development

The ability to navigate and use digital tools and platforms is increasingly crucial in a world where digital interactions have become or are becoming the norm. Without adequate digital skills, individuals may face barriers in accessing government services and in participating in the digital society. To tackle this risk, promoting **digital inclusion** can help ensuring that all members of society, regardless of their background or circumstances, have an **equal opportunity to benefit from digital initiatives** established by EU countries. Based on the DPAFs analysis, 22% of the initiatives adopted in 2023 and 2024 related to digital public services are focused on digital inclusion and digital skills. Numerous EU countries have opted to recognise and address this necessity by implementing solutions to confront the challenge of inclusion and digital skills. In terms of digital skills, the majority of the initiatives adopted in the last year focuses on the creation of specialised **training programmes** (e.g., workshops and online courses) for public servants and citizens, as well as on the identification of holistic packages of basic and advanced digital skills. With regard to digital inclusion, the adoption of accessibility standards and inclusion programmes are being carried out. Additionally, multiple European countries developed **awareness-raising campaigns and integration policies** reinforcing digital inclusion measures into various sectors.

National examples

Austria

The Digital Überall programme encompasses approximately 4,500 workshops for basic digital skills in 2024. These initiatives aim to impart fundamental digital skills by repurposing venues such as youth centres, music clubs and retirement homes as learning spaces. The emphasis is on providing easily accessible skill transfer. The measure aims to reach target groups who do not typically engage with traditional learning centres; instead, skills mediators bring training directly to the target group's locations. ‘Digital Überall Plus’ offers in-depth training and further education, with modular courses designed for individuals seeking to enhance their digital skills.



France

The French Interministerial Digital Department (DINUM) has launched a new service named Public Digital Campus in 2024, fostering public servants’ digital skills on five key components:

- Training all public servants interested in digital technology and promote digital excellence;
- Assessing and developing the digital skills of all public servants by deploying PIX across all ministries;
- Experimenting with pathways for career transition into in-demand digital sector roles;
- Professionalising initiatives to transform the management of digital projects; and
- Engaging public decision-makers in the digital transformation of public action through a year-long training plan.

1.2. Fostering the digital transformation of public administrations and public services at European and international levels

This section aims to assess the state of the trends identified at national level in a broader perspective, i.e. at European and international levels. EU and international initiatives play a pivotal role in advancing the digitalisation of public administrations and improving the delivery of public services. By fostering collaboration, sharing good practices, and aligning strategies, these initiatives can enhance efficiency, promote innovation, and create a more citizen-centric experience across borders.

As mentioned in the above section, the **Digital Decade programme** [3] aims to standardise basic digital skills across the European population by 2030, as well as to highlight the principle of sustainability, advocating that digital devices and infrastructures can support environmental sustainability and the green transition, among other objectives. The programme, which entails the creation of national roadmaps to align the countries' commitments with its objectives, inevitably influence the development of digital initiatives at national level. However, in a broader context, multiple initiatives established by the European institutions and other international organisations impacted the development of the national trends observed in Europe in 2023 and 2024.

3 Europe's Digital Decade: digital targets for 2030, European Commission. More information available here.

1.2.1. The growth of sustainable digitalisation

At the international level, sustainable digitalisation has become a key focus within several significant initiatives established in the last five years. Among them, the **United Nations Sustainable Goals (SDGs)**[4] provide a comprehensive framework for addressing sustainability challenges, including those related to digital technologies and infrastructures. Additionally, the **International Standards Organisation (ISO)** is actively promoting standards and guidelines for sustainable digital practices at national, regional and local levels, such as ISO 26000 (Social Responsibility), ISO 27001 (Information Security Management) and ISO 30173 (Digital Twin). These international frameworks and standards play a crucial role in advancing global efforts towards digital sustainability, promoting environmental responsibility, social equity, and economic resilience in the digital age.

Similarly, several EU initiatives have been introduced over the years to address sustainability and promote digital transformation. As a flagship initiative under the current European Commission, the **EU Green Deal**[5] aims to make Europe the world's first climate-neutral continent by 2050. Under this strategy, the **European Green Digital Coalition**[6] focuses on leveraging digital solutions to support environmental objectives, such as the reduction of emissions across sectors. The Coalition prioritises maximising sustainability benefits within the ICT sector, while assisting public and private stakeholders in achieving sustainability goals in other key sectors. Complementing these efforts, the **Circular Economy Action Plan**[7] is one of the main 'building blocks' of the Green Deal, which promotes the circular design, production, and use of digital products and services to reduce waste and improve resource efficiency. The Action Plan incorporates digitalisation by employing digital solutions, tools, and technologies to enhance the achievement of circular objectives. For instance, by tracking the resources and pathways of products, components, and materials, and ensuring secure access to the resulting data. Additionally, the **Digital Europe Programme (DIGITAL)**[8] seeks to boost the digitalisation of the EU economy and society by investing in sustainable digital infrastructure, skills, and technologies. Together, these initiatives reflect the European commitment to advancing sustainable digitalisation and fostering a greener, more inclusive economy.

1.2.2 Digital inclusion and digital skills, a driver of development

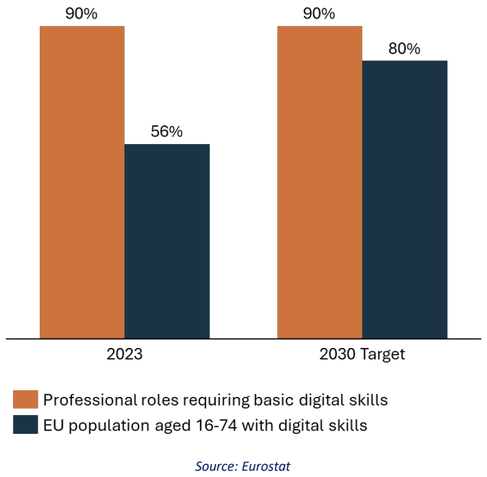
According to the World Bank's **State of the World's Digital Skills monthly insight (SKILLS4DEV)**[9], the digital economy now accounts for 25% of the global economy and is making a significant contribution to generating new avenues of growth and employment. This underlines the growing importance of digital skills in society, as demonstrated by the adoption of various international initiatives on this topic. Strategies are adopted including the World Bank's **National Action Plan for Digital Skills: The Who, What, and How**[10], published in 2021, which provides a comprehensive framework for the development of digital skills among young people. It facilitates the development of coordinated strategies involving relevant ministries and educational institutions. Assessments of the current digital skills landscape are

4 2015, The 17 Sustainable Goals, Department of Economic and Social Affairs, United Nations. More information available here.
5 2019, The European Green Deal, European Commission. More information available here.
6 Website of the European Green Digital coalition available here.
7 2020, Circular Economy Action Plan communication, European Commission, EUR-Lex. More information available here.
8 The Digital Europe Programme – Work Programmes, Shaping Europe's digital future, European Commission. More information available here.
9 2023, SKILLS4DEV, The Vital Role of Digital Skills in Building an Inclusive, Smart, Safe, and Sustainable Digital 9 Economy, World Bank Group. More information available here.
10 2021, Digital Skills the Why, the What and the How, World Bank Group. More information available here and here.

also being carried out. For example, the Organisation of Economic Cooperation and Development (OECD)'s 2022 report examines **trends in the demand for digital skills on the labour market** [11] in ten countries [12]. In addition, Brookings' Development Policy Research Unit and Africa Growth Initiative published in 2023 **an assessment of digitisation and the digital skills gap in Africa** [13]. Lastly, a working paper was published in 2022 on the **Demand for Digital and Complementary Skills in Southeast Asia** [14] to identify the digital, cognitive, and socio-emotional skills required for digital and non-digital occupations. Indeed, digital skills are not only a European concern; there is also significant concern on the international stage. Evaluating digital skills and addressing associated needs through investments on a global scale is essential to understand the current landscape and effectively bridge disparities, ensuring that all regions are equipped to meet the demands of an increasingly digital world.

Figure 1 illustrates the **digital skills gap** in the EU, where over 90% of jobs require basic digital literacy, yet only 56% of citizens aged 16-74 have such skills [15]. The EU's Digital Decade goal is to increase this to 80% by 2030, enhancing societal resilience [16].

Figure 1 Digital skills gap in the EU



Source: Eurostat

11 2022, Skills for the Digital Transition report, OECD. More information available here.

12 These include Belgium, Canada, France, Germany, Italy, the Netherlands, Singapore, Spain, the United Kingdom, and the United States.

The EU is dedicating resources to initiatives aimed at training Europeans and enlarging the talent pool in Europe to achieve this objective and anticipate an increasingly digitalised future. For instance, strategies and actions plan have been put in place, such as the **Digital Education Action Plan (2021-2027)** [17] and the **European Skills Agenda**[18], respectively adopted in September 2020 and April 2023. Both action plans include short- and medium-term objectives. In addition, the **Digital Skills and Jobs Coalition (DSJC)** and its platform were developed to allow different organisations (public sector, private sector, non-profit organisations, academia, etc) to exchange knowledge and good practices to address the lack of digital skills in Europe. They have the opportunity to exchange on the **Digital Skills and Jobs Platform**, which aims at helping Europeans to reinforce their digital skills and knowledge, further boost their careers and add value to their organisations. In concrete words, the platform offers insights on EU and national initiatives/actions supporting digital skills, training, good practices, data, and figures as well as news and funding opportunities. Lastly, **DigComp 2.2** [19], the European Digital Competence Framework, serves as a reference framework for digital skills development across the EU. Adopted in March 2022, it enhances the alignment of digital skills with current needs, facilitating the development of a digitally competent workforce to meet the challenges of the digital era in Europe. Since its initial introduction in 2012, several versions of DigComp have been adopted, continually updating and refining the framework to stay relevant.

13 2023, Digitalisation and Digital Skills Gaps in Africa report, Development Policy Research Unit. Africa Growth Initiative. Brookings. More information here.

14 2022, Cunningham, Wendy et al, The Demand for Digital and Complementary Skills in Southeast Asia, Working paper. More information available here.

15 2023, Digital skills article, Shaping Europe's digital future, European Commission. More information available here.

16 2023, 56% of EU people have basic digital skills article, Eurostat. More information available here.

17 2021, Digital Education Action Plan (2021-2027), European Education Area, European Commission. More information available here.

18 European Skills Agenda, Employment, Social Affairs & Inclusion, European Commission. More information available here.

19 2022, Vuorikari et al, DigComp 2.2: The Digital Competence Framework for Citizens – With new examples of Knowledge, skills and attitudes, JRC Publications Repository, European Commission. More information available here.

Interview with EU Green Deal Expert

Phoebe Koundouri

(SDSN European Green Deal Senior Working Group)

Environmental economics professor and global leader in sustainable development

‘The EU Green Deal aims to empower businesses and people in a human-centred, sustainable and more prosperous digital future.’

Q1: In your view, what challenges or obstacles need to be overcome to cultivate the benefits of digitalisation in the context of the green transition?

One of the main obstacles is the lack of digital skills to use the technologies that digitalisation is offering. The education system must be revised to introduce and integrate digitalisation in all its aspects. In addition, the support for research and innovation embracing and accelerating the sustainable transition via digitalisation, for both basic and applied research, is needed. Digitalisation should be viewed as a tool that facilitates faster and more efficient implementation. Indeed, the main priority should not only be to develop solutions and tools but also to empower stakeholders across society and build their capacity to use these technologies effectively. In 2023, the Twin skills for twin transition (AE4RIA) report was published on the status of the green and digital transition in Europe, and more precisely, on the skills and occupations needed to implement a greener digital transition in Europe based on current policies. The outcomes showed that, by 2030, only 15% of the skills currently needed for implementing the green and digital transition will be developed. This projection is reflected in the policies, laws, and regulations derived from the European Green Deal. This means that, even with the necessary policies and technologies in place, implementation is hindered by a lack of skilled labour in the market.

Q2: In your opinion, what are the main benefits that the EU Green Deal is currently bringing to EU Member States?

The European Green Deal focuses on four key areas: climate neutrality, pollution reduction and ecosystem protection, clean technology leadership by European companies, and ensuring that no one is left behind in this transition. The main benefits of the European Green Deal include providing a clear roadmap and regulatory framework that accelerates the transition to green energy, protects ecosystems, fosters technological leadership, and promotes social cohesion. At both production and consumption levels, the Green Deal represents a growth strategy compatible with sustaining ecosystems that support a safe and prosperous life in Europe. However, certain social groups may face regressive effects from climate, energy, and agricultural policies due to higher costs, especially those unable to invest in cheaper technologies. This challenge is addressed by the Green Deal's focus on social cohesion, which aims to generate revenues that can be returned to disadvantaged groups, subsidising their investments in the necessary technology, knowledge, and skills. This support ensures their participation in the green and digital transition without facing significant financial and capacity barriers.

Q3: In which way are emerging digital technologies shaping the future of environmental sustainability, and what trends do you foresee in the integration of digital innovations to address environmental challenges?

Emerging digital technologies are significantly shaping the future of environmental sustainability. One key trend is the increasing availability of open access data, which makes it harder to misreport or greenwash environmental information. The abundance of data allows for cross-validation, ensuring greater accuracy and transparency. Machine learning and data-driven techniques further enhance this by connecting and verifying information. As these technologies advance, it becomes more difficult to manipulate data, thereby increasing trust in environmental reporting. However, misinformation is still a challenge, as false data can still be easily incorporated into systems. Addressing this issue will require extensive research and robust validation mechanisms to ensure the integrity of the data used for policymaking.

> **‘With projections indicating that 70% of the population will reside in urban areas by 2050, it becomes imperative for local-level strategies to be meticulously crafted and tailored.’**

Q4: How do you envision the role of local public administrations and smart cities initiatives to foster environmental sustainability and the pursuit of a greener Europe?

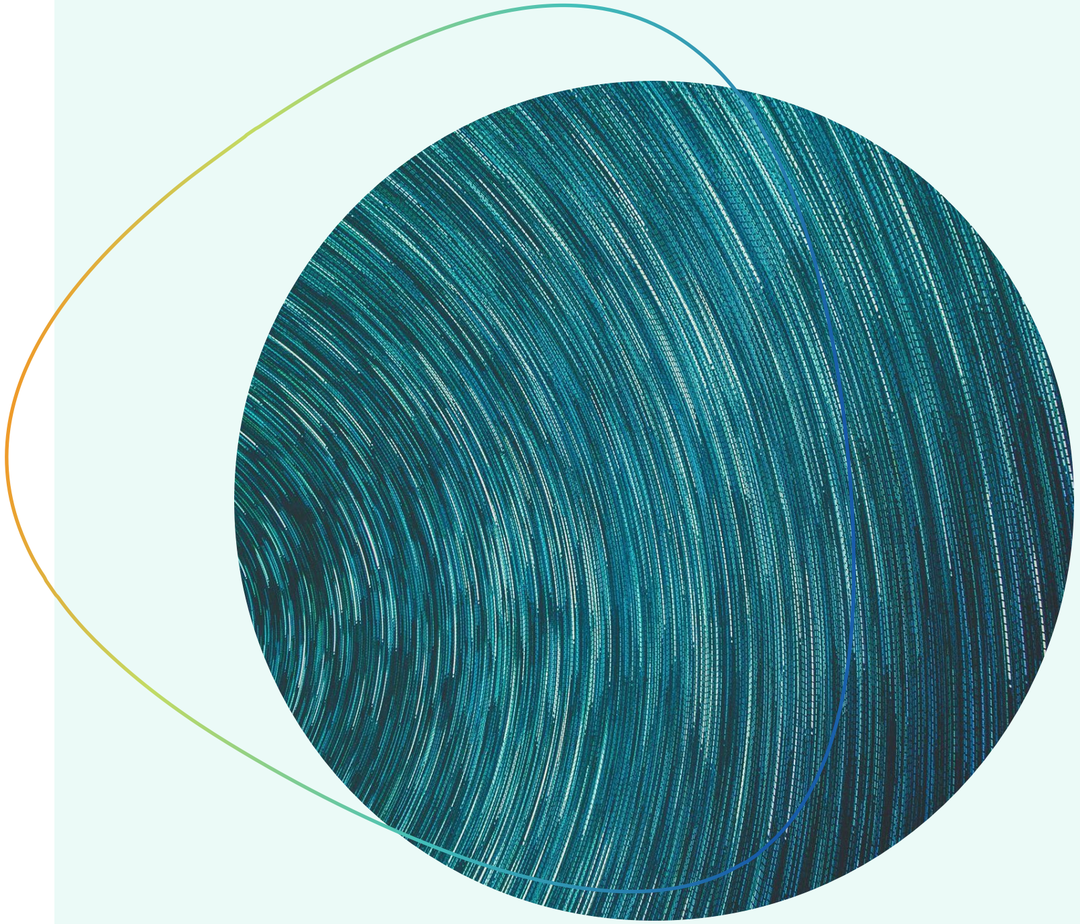
Adaptation occurs predominantly at the local level, underscoring the necessity for European initiatives to encompass climate adaptation, ensuring that pertinent major missions are grounded in the science of climate adaptation. This integration can be facilitated through digital and smart infrastructures, enabling the transition to clean energy, and embracing economy and nature-based solutions, as well as digital mobility. Such endeavours necessitate investment in digital skills, deployment of state-of-the-art digital technologies, and prioritisation of cybersecurity and digital literacy within communities. With projections indicating that 70% of the population will reside in urban areas by 2050, it becomes imperative for local-level strategies to be meticulously crafted and tailored. A combined green and digital approach holds the potential to achieve climate, biodiversity, and ecosystem objectives, while concurrently stimulating economic growth, fostering job creation, and promoting equity.

Furthermore, regarding these challenges, capacity building inherently occurs at the local level. It is therefore necessary for stakeholders, such as schools, universities and companies, to exchange views and communicate with each other to facilitate the introduction of vocational training. Additionally, substantial funding is required to cultivate the knowledge and skills essential for executing the green and digital transition. However, the issue of funding should not be centralised; rather, it should be deliberated at the regional level and tailored to the specific local objectives of each region (e.g., sustainable tourism, circular economy, clean energy, etc.).

My advice would be: upskilling and reskilling efforts should go beyond basic elements, 1) targeting promising areas, such as aquaculture area and other emerging sectors, and 2) adopting a mission-driven approach by defining a mission for the coming years, identifying focus areas, and 3) aligning technology, reskilling, policies, and finances with the priorities of the chosen mission. To do so, there is a need for science-based advisors to design the structure of digital transformation, while reflecting on the investments for upskilling and reskilling all stakeholders. In addition to skills, interoperability is crucial as we are working on systems that need to interact, and not only on a scientific or technical point of view, but also in terms of stakeholders engaged. With this objective in mind, interoperability is essential to connect data models, policies, stakeholders, infrastructures and implementation.

Q5: In light of these changes, what strategies do you believe public administrations could deploy to minimise the environmental impact of these digital tools?

Integration should focus on reducing redundancy by networking different centres rather than having multiple facilities perform the same tasks. Additionally, research on technologies aimed at minimising environmental impacts through redesign and advancement should be further promoted. Significant potential exists for researching new materials to prevent duplication and enhance connectivity, thereby reducing the need for extensive infrastructure. Interoperability and collaboration are essential for establishing efficient network structures that optimise analysis speed, while minimising environmental and economic footprints.



02

CHAPTER 2

Interoperability and data

2. Interoperability and data

Interoperability has been a significant focus for the EU over the past few decades, passing from being part of sectorial European and national initiatives to being at the centre of a more **horizontal and comprehensive EU interoperability policy**. Broadly speaking, interoperability is defined as the capability of people, organisations, and systems to work with each other while reducing the cost of doing so. More concretely, citizens of one EU Member State wishing to perform administrative procedures such as accessing social security benefits, registering a car, or starting a business while temporarily residing in another EU country can do so with ease thanks to interoperable solutions. As a matter of fact, the interoperability of public services across the EU, including, for instance, the cross-border recognition of eID and eSignatures, ensures that citizens can manage their information without difficulty, regardless of their location.

This seamless integration reflects the EU's commitment to a Digital Single Market, where people and businesses can thrive in a borderless digital environment [20].

When it comes to public administrations this can be translated into their capability to digitally cooperate across departments, cities, regions, as well as countries, to **organise secure data exchanges, and to offer better and more user-oriented, seamless public services**. The concept of interoperability has increasingly taken on importance as public services has gradually started transitioning to being more digital and as people have become increasingly mobile – for study, work, or leisure – within a city, region, or country, as well as across borders within the EU single market. In this sense, interoperability should not be seen as an aim, but rather an instrument which is now a central aspect of digitally enabled policy making and implementation.

20 COM(2017) 134 final, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, European Interoperability Framework - Implementation Strategy.

2.1. Trends identified at national level

The 2024 edition of the DPAFs has provided valuable insights into the current landscape of interoperability and data trends across European governments. A total of 34 initiatives linked to data and interoperability were identified across 18 European countries. This section aims to highlight the main trends identified through the analysis of collected data, focusing on interoperability frameworks, data policies, and platforms, among others. Moreover, examples of initiatives implemented by the studied countries will be provided to illustrate each trend.

2.1.1. Reinforcing the alignment of National Interoperability Frameworks with the EIF

Adopted in 2017 and revised in 2021, the EIF is a guidance document adopted by the European Commission that provides specific instructions on how to set up interoperable digital public services. This framework is part of the Commission's priority to create a Digital Single Market in Europe. The EIF offers public administrations 47 concrete recommendations on how to improve the 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 successful implementation of the EIF can improve the **quality of European public services** as it reinforces the idea of **interoperability-by-default** and participate to create an environment where public administrations can effectively collaborate digitally. The National Interoperability Frameworks (NIFs) are implemented by European countries to guide them in attaining a higher level of interoperability, building on the EIF, whilst taking into account the context and the specific national needs. They aim to ensure the interoperability of digital public services across Europe, thereby improving the quality of these services and facilitating digital collaboration among public administrations. While most countries show a high degree of alignment between their NIFs with the EIF, work is also ongoing outside the EU, with other countries taking inspiration from the EIF to develop their own interoperability strategies. Following the entering into force of the Interoperable Europe Act, the EIF should be updated in the coming years to reflect new priorities. It is therefore expected that the current versions of the NIFs will also be impacted.

National examples

Albania

The Albanian National Interoperability Framework was approved through Instruction No. 2, adopted in October 2023 and issued by the General Director of the National Agency of Information Society. It has been aligned with the 2017 European Interoperability Framework (EIF). The digital services standards aim to streamline the work during the digital public services design and implementation through the adoption of 14 specifications that should be taken into account when designing and improving electronic services, such as:

- understanding users and their needs by enabling their inclusion in various steps of services design,
- designing simple to use eServices and adapted to people with special needs,
- applying agile way of working,
- making sure digital services are secure and conform the privacy policies,
- applying constant improvements to eServices based on citizens' feedback and usage.

The document includes the assessment mechanism too, to ensure that eServices meet the requirements of the Services Standard during the creation or modernisation phases.

Estonia

A new National Interoperability Framework was published in 2023, replacing a framework that was over ten years old. It focuses primarily on the interoperability of services, information systems, and administrative processes, as well as the principles of the EIF. The new framework will be updated according to needs, but at least every two years, to reflect that it is more of a living document rather than a legislative text, so that it can be edited more frequently. The new framework is not mandatory across the government, but it represents a guidance document containing suggested principles. Therefore, the document provides value to domains where some of the principles would not apply.

2.1.2. Enhancing Data Governance, Reuse, and Security

Data policies play a pivotal role in shaping the governance, management, and utilisation of data within governments. The commonalities of data policies include a commitment to legal compliance, alignment with EU policies, emphasis on data governance and security, and a focus on fostering innovation and economic welfare.

According to the analysis of the 2024 DPAFs, data-related initiatives are primarily focused on **establishing and enforcing legal frameworks related to data management and access**. These efforts are crucial components of aligning with EU policies, which advocate for principles such as the **Once-Only Principle**, alongside regulations like 2018/1724 (Single Digital Gateway) and 2022/868 (Data Governance Act). These regulations specifically promote the reuse of public sector data and facilitate cross-border data governance within the EU. Initiatives aimed at data governance and security strive to develop a **coherent and effective approach to data policy** that is in line with EU legislation. These measures are essential for ensuring **data integrity, user privacy, and transparency** in data practices. In terms of innovation and economic welfare, these initiatives highlight the pivotal role of innovative technological solutions in driving societal and economic progress. Additionally, they recognise the significant value of public sector data in **fostering innovation and bolstering economic competitiveness**. By recognising and addressing these commonalities, governments aim to develop comprehensive data policies that promote transparency, accountability, and innovation in governance and management practices.

National examples

Cyprus

In Cyprus, the Deputy Ministry of Research, Innovation and Digital Policy aims to establish a coherent and effective approach to data policy that aligns with pertinent EU sectoral legislation and will be engaging experts to accomplish this goal. Its objectives include bolstering data security and privacy, guaranteeing transparency and user control, and fostering the advancement of innovative technological solutions that contribute to societal and economic welfare. The overarching aim is to formulate and enact an integrated policy framework for data management and protection that adheres to EU legislative mandates and policies, thereby facilitating digital transition and fostering innovation.

Ireland

Building on the success of the Open Data Strategy for the period 2017–2022, a new strategy for the period 2023–2027 was published in November 2023. The goal of this initiative is for Ireland to continue to drive excellence in the provision of open data to promote transparency and innovation in Ireland. The three pillars of the strategy are support Data Publishers; provide services via the Open Data Platform; and engage Open Data Users to ensure transparency and relevance of the data provided.

2.1.3. Developing data platforms and registries

A total of 16 initiatives related to platforms and registries have been identified in the DPAFs. This section first outlines the platform-related initiatives, followed by registries. The launch of platforms dedicated to interoperability and data access plays a crucial role in advancing digital governance and streamlining public service delivery. A total of 12 initiatives linked to the development of data platforms have been identified, each contributing to different facets of digital transformation. Through the development of new data platforms or the development of new features for existing ones, European countries aim to prioritise **enhancing data transparency and accessibility for citizens,** providing insights into how their personal data is accessed and utilised by government entities. Other platforms are developed to host and disseminate public sector data, making it easier for users to access relevant information. Additionally, various platforms concentrate on **promoting interoperability and data sharing** across government entities, fostering collaboration and integration of data resources. Finally, multiple initiatives emphasise compliance with open data standards and directives, ensuring that public sector information is readily available. By recognising and addressing these common themes, governments can drive digital governance forward, foster transparency and innovation, and ultimately enhance public service delivery for citizens and stakeholders.

National examples

Bosnia and Herzegovina

The Bosnian Agency for Identification Documents, Registers and Data Exchange (IDDEEA) has announced the launch of a new Open Data Portal. As a unique source of data available to everyone, without any restrictions or payment, it will provide users throughout Bosnia and Herzegovina and the world with access to a large number of relevant pieces of information.

Malta

A National Spatial Data Infrastructure (NSDI) is currently being set up in Malta. The aim of the NSDI is to allow for interoperability and sharing of spatial data across various government entities. The platform to be used for onboarding is ArcGIS Online. Initial onboarding activities are expected in the course of 2024.

Montenegro

The eGov Portal represents the one stop shop for eServices in Montenegro. All public institutions have the chance to create eServices through this Portal. Towards the end of 2024, the Ministry of Public Administration will implement the new eGov Portal with new functionalities, allowing citizens to actively participate in the drafting of laws and policy documents, by expressing their opinions and attitudes in the public debate.

The establishment of **base registries** plays a crucial role in facilitating interoperability and data access within governmental systems. By interconnecting data repositories and promoting standardised formats, these initiatives aim to **enhance data management, analysis, and decision-making processes**. All 4 identified initiatives linked to base registries focus on **establishing centralised data repositories to facilitate efficient data storage, management and analysis**. Another commonality among the initiatives is the emphasis on standardised data formats to ensure **compatibility and interoperability**. Authentication and data integrity are also key considerations in all initiatives to ensure the reliability and authenticity of data. Finally, **cross-agency collaboration** emerges as a common theme across the national initiatives, emphasising the importance of coordinated efforts in establishing and maintaining registry systems.

National examples

Croatia

In February 2024, the Croatian Government voted and decided on implementing the Resolution on determining base registers. The Resolution is made of data combined by the inputs gathered from the owners of the registers during 2023. The list contains 129 registers. Some of these registers are connected over the Government Service Bus (GSB) which enables data to travel from one body or institution to another via APIs. The other registers will be connected when possible, depending on the circumstances. The registries data format varies from registry to registry. Regarding the master data management approach, the policy is not to duplicate original (authentic) data unnecessarily which means that authentic data is usually found only within its original registry. GSB uses data only from these authentic sources, which are also catalogued on the Meta-register.

2.1.4. National Action Plans for Open Government Partnership

The Open Government Partnership (OGP) is a multilateral initiative that aims to **make governments more open, accountable, and responsive to citizens**. It was formally launched in 2011 by eight governments. As of today, the OGP has 75 national and 150 local members. In its first 10 years, OGP members created over 4,500 commitments in more than 300 action plans. The leadership of the OGP is substantially driven by EU members, many of which have received awards from the OGP's Independent Reporting Mechanism, recognising their commitment to enhancing transparency, accountability, and public participation in government. OGP participating countries are to create national action plans covering a two-year period, consisting of a set of commitments that **advance transparency, accountability, participation and/or technological innovation**. The action plans are co-created by governments and civil society.

The examples provided demonstrate the diverse approaches adopted by European countries to manage data and enhance interoperability. Continued efforts and innovative initiatives are crucial for fostering interoperability and maximising the benefits of data sharing in the digital age.

National examples

Denmark

As part of the Open Government Partnership, the Danish government adopted its fifth National Action Plan 2023-2025 with five initiatives promoting open governance and involvement of civil society. The action plan is focusing on civic participation, digital innovation, and open data.

Finland

The fifth Finnish Open Government Action Plan 2023-2027 focuses on openness and inclusion in three different dimensions: (i) openness as a shared value; (ii) a strong legal foundation for openness; and (iii) the continuous development of openness. These three themes were translated into the following commitments for the implementation phase: national dialogues and encounters with public services; reliable information and cooperation strengthen competence and participation; and support for open government actors in Finland and internationally.

North Macedonia

In February 2024, the Government of the Republic of North Macedonia adopted the sixth National Action Plan for Open Government Partnership 2024-2026. The new action plan was prepared in an inclusive and transparent process that began in June 2023 with the involvement of many non-governmental organisations and government institutions in the preparation of the commitment proposal. The new action plan in the Open Government section contains 15 commitments and 57 achievements distributed in five priority areas. Apart from the section on Open Government, this action plan also contains separate sections on Open Parliament and Open Judiciary, respecting the independence of the work of the legislative and judicial authorities as a separate authority in the Republic of North Macedonia.

2.2. The implementation of interoperability throughout Europe

In 2023, participating European countries showed strong performance across the EIF monitoring mechanism. They demonstrated **solid application of interoperability principles,** achieved top performance across all interoperability layers, and made significant progress in the EIF Conceptual Model and cross-border interoperability. However, despite the high overall performance, areas such as Inclusion and Accessibility, Multilingualism, Administrative Simplification, and Security and Privacy were identified as potential areas for further focus.

The European Interoperability Framework (EIF) and its monitoring mechanism

The European Interoperability Framework (EIF) serves as a guiding tool for EU public administrations in their quest to **design and deliver seamless**, integrated public services. It offers 47 recommendations, which are organised into 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.

To ensure the effective implementation of these recommendations, the EIF Monitoring Mechanism (EIF MM) was established. This mechanism provides a comprehensive assessment of each European country's level of EIF implementation, using key performance indicators (KPIs). The results are then organised under three scoreboards, each corresponding to one of the three pillars. Recognising the need for insights on **cross-border interoperability**, the European Commission expanded the scope of the EIF MM in 2022. An additional, transversal scoreboard was introduced, focusing specifically on cross-border interoperability. This scoreboard, like the others, is based on the thematic areas and recommendations of the EIF, with specific KPIs assigned to each area for assessment. The scoring system ranges from 1 to 4, with 4 being the highest possible score. The data for this comprehensive assessment is gathered through an online survey for primary indicators and external data sources for secondary indicators. in public service development also improved, leading to maximum scores

When compared to 2022, the EIF results in 2023 remained largely stable, with a few areas showing notable improvements (cf. Annex I). The implementation of Principle 12 on the Assessment of Effectiveness and Efficiency, and the Interoperability Governance layer both saw an increase, achieving the maximum score. The use of external information sources and services in five out of seven of the EIF Conceptual Model's components. These improvements underscore the ongoing efforts to enhance data reuse, access, and openness across Europe. This further confirms the trends observed from the DPAFs, which count 31 initiatives – the highest number within the Interoperability & Data Initiatives topic, specifically attributed to data access, management, and reuse.

In terms of good practices for the areas that have seen improvement in the last year, several countries have implemented interesting approaches.

2.2.1. Principle 12 - Assessment of Effectiveness and Efficiency

Different approaches have been taken to better implement the recommendations of the EIF linked to the assessment of effectiveness and efficiency. In **Czechia**, the evaluation of efficiency and effectiveness of interoperability solutions is carried out by a dedicated department. **Denmark** employs a risk-assessment approach for all major IT-projects, while in **Finland**, the Ministry of Finance evaluates IT solutions. **Spain** also stands out with its Catalogue of Standards, which undergoes two revision processes annually and on-request, based on the results of questionnaires filled local and national administrations.

2.2.2. Interoperability Governance

When it comes to interoperability governance, **Belgium** has developed a scalable process and method for raising semantic and technical interoperability within the public sector. This approach, inspired by the Flemish 'OSLO' initiative, includes specific events to achieve results and a method for completing these events. It has been ratified by the Steering Committee Flemish Information and ICT Policy, a regional governance body in Flanders, and supported by an inter-federal governance structure, including ICEG[23] thematic working groups and a federal governance board. **Finland**'s standardisation, coordinated by the Ministry of Employment and Economy, forms part of the administrative branch, with standards adopted as SFS[24] standards being mainly European or International Standards.

2.2.3. External information sources and services

For the use of external information sources and services in public service development, several practices have been identified. The Digital and Information Agency in **Czechia** uses Internet of Things (IoT) sources for smart cities services and public traffic regulation. **Hungary** provides many of the services needed for eGovernment services as centrally provided building blocks from the national catalogue of building blocks. In **Spain**, there are building blocks as cloud services to provide access to base registries, digital identification, digital signing, and digital payment.

For a more detailed view of the 2023 EIF results, including graphs for the four scoreboards, please refer to Annex I.

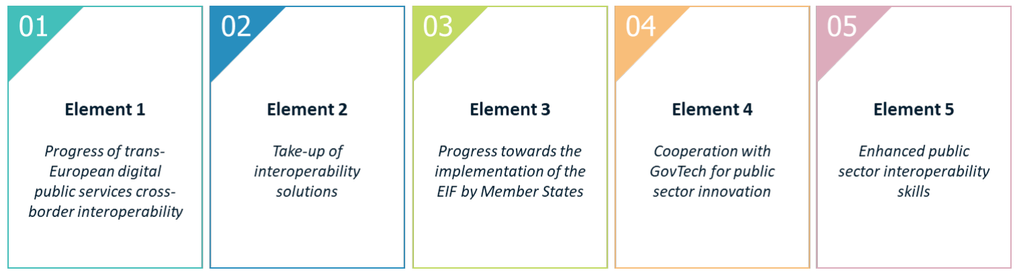
23 Inter-federal Committee for eGovernment.
24 Finland Standard Association (SFS).

Interoperable Europe Act: Towards a new monitoring framework

Looking ahead, the EIF is set to evolve following the adoption and enforcement of the Interoperable Europe Act (IEA). A **new interoperability monitoring mechanism** is currently under development, which is expected to further enhance the interoperability landscape in Europe.

Indeed, article 20 of the IEA outlines the framework for monitoring and evaluating the **progress of trans-European digital public services**, with the goal of supporting evidence-based policymaking and necessary actions at various government levels within the Union. In particular, Article 20 mandates the monitoring of five specific 'elements', and the Commission is currently working on operationalising these into a set of concrete indicators. The five elements identified are outlined in Figure 2.

Figure 2 Monitoring elements of Article 20



2.3. Fostering interoperability and data at international level

EU and international initiatives play a crucial role in complementing and driving national efforts on interoperability and data. By fostering cooperation between European countries and EU institutions, these initiatives promote cross-border exchange of data, enhance digital public services, and lead to **economic benefits** (e.g., costs saving, increased efficiency and digital market expansion).

2.3.1. Reinforcing cooperation around interoperability among public administrations in the EU

In its communication 2030 Digital Compass: the European way for the Digital Decade of March 2021, the Commission highlighted the need to establish a strengthened EU interoperability policy to **support the digitalisation of public services**, one of the four cardinal points of the Digital Compass, with a target of achieving 100% availability of key digital public services online by 2030. Following this objective, the Expert Group on Interoperability of European Public Services[25], provided recommendations[26] for the next interoperability policy in October 2021, which paved the way for the proposal for a new Regulation. While interoperability has been considered as a prerequisite for several EU policies, no binding overarching EU policy provision has addressed it directly.

Past initiatives, such as the EIF, helped establish a common understanding and test solutions, now integrated into various EU policies. To facilitate the interoperable implementation of those policies the European Commission presented the Interoperable Europe Act Regulation Proposal in November 2022.

25 The Expert Group on interoperability of European public services has replaced since 2020 the informal CIO network, which was running since 2015). More information available here.
26 Recommendations available here.

The Interoperable Europe Act

The Interoperable Europe Act, which entered into force on 11 April 2024, aims to assist EU institutions, agencies, and bodies as well as Member States' public sector organisations in ensuring that **public services can be seamlessly delivered across borders**, with interoperability as the default setting, benefiting citizens and businesses alike. This legislation is a crucial step towards the provision of key and accessible public services online, hand in hand with major EU legislations, such as the Single Digital Gateway Regulation. To accomplish this objective, the Act establishes a new framework for shared interoperability solutions within the EU's public sector, empowering administrations at all levels to offer cross-border digital public services. The Act introduces various novelties, which can be grouped around four main components:

- **Mandatory interoperability assessments**
- **Strengthened interoperability support**
  - GovTech and interoperability regulatory sandboxes
  - Policy implementation support projects
  - Trainings
  - Peer reviews
- **Structured and co-owned EU cooperation**
  - Governance (Board, Community, competent authorities, coordinators)
  - Interoperable Europe Agenda
  - Monitoring
- **Recognised reusable interoperability solutions**
  - European Interoperability Framework
  - Interoperable Europe solutions
  - Mandatory share and reuse
  - Interoperable Europe Portal

In addition to the Act, the European Commission implemented the Digital Europe Programme (DEP) , the EU funding programme focused on bringing digital technology to businesses, citizens, and public administrations (DEP's Specific Objective 5) to support Member States in the area of digital. According to DEP, the digital transformation of European public administrations should be driven by the promotion of interoperability, considered as a **fundamental enabler of Europe's digital self-sufficiency**, with the key objective to enhance the adoption of cross-border and cross-sectorial digital public services that are interoperable, user-centric, and compliant with regulatory standards.

2.3.2. Laying the foundations to facilitate cross-border data exchanges

At EU level, the European Strategy for Data sets the overall direction and goals on data in Europe, while the European Data Act provides the specific rules and regulations to achieve those goals. They work together to facilitate reliable and secure access to data, fostering its use in key economic sectors and areas of public interest. They also contribute to the **establishment of an EU single market for data**, ultimately benefiting both the European economy and society at large. In addition, the European Strategy for Data of February 2020 focuses on putting people first in developing technology and **defending and promoting European values and rights in the digital world**. It aims at creating a single market for data that will ensure **Europe's global competitiveness and data sovereignty**. The strategy intends to make more data available for use in the economy and society, while keeping the companies and individuals who generate the data in control. It also includes measures on data governance, access, and reuse. Common European Data Spaces are a key component of the European strategy for data as well as of the Interoperable Europe Act, which aims at enhancing the efficiency of data exchange, reducing the risks of misinterpretation, and **supporting semantic interoperability for data spaces portability and reusability** in the broader sense. Data spaces are, in fact, designed to make more data available for **access and reuse in a trustworthy and secure environment** for the benefit of European businesses and citizens. More recently, the Data Act, which entered into force on 11 January 2024, was introduced as a comprehensive initiative to address the challenges and unleash the opportunities presented by data in the EU, emphasising fair access and user rights, while ensuring the protection of personal data. The Act clarifies who can create value from data and under which conditions. It establishes clear and fair rules for accessing and using data within the European data economy. The Data Act provides the specific rules and regulations to achieve the goals of Common European Data Spaces.

2.3.3. Fostering the use of Open Government Data

As mentioned in the section 2.1.4, the Open Government Partnership (OGP) represents a multilateral initiative launched at global level in 2011 that secures commitments from national and subnational governments to **promote open government, fight corruption, and strengthen governance**. At the 2015 OGP Global Summit, the Open Data Charter (ODC) was adopted, which aims to foster the collection, sharing, and use of well-governed data by governments to effectively and accountably address pressing social, economic, and environmental challenges. It was established in 2015 and has been adopted so far by 96 national and subnational governments around the world. The ODC is based on 6 International Open Data Principles:

- For Improved Governance & Citizen Engagement
- Comparable and Interoperable
- Accessible and Usable
- For Inclusive Development and Innovation
- Timely and Comprehensive
- Open By Default

The OECD has conducted extensive research and analysis on data governance to propose policy approaches [27]. They have developed the Going Digital Guide to Data Governance Policy Making to help policymakers develop, revise, and implement policies for data governance. The OECD also focuses on **enhancing data access and sharing to foster data-driven innovations across the private and public sectors globally**. It has also developed the OECD Smart Data Strategy. The OECD promotes transparency, accountability, and value creation by making government data available to all. It has developed the **OECD Open Government Data project** to progress international efforts on Open Government Data (OGD) impact assessment [28].

The **United Nations (UN)'s Division for Public Institutions and Digital Government (DPIDG)** has been conducting research on OGD since 2010 [29]. OGD is an online government service (e-government) and an important initiative that strengthens **participatory governance**. It allows citizens to monitor data streams, thereby improving the accountability and transparency of government. DPIDG's work on open government is divided into four pillars: policies and regulatory framework; organisational framework; channels and modalities; and case studies. The UN has also identified good practices for enhancing data interoperability in the area of **sustainable development**. These aims are today embodied in the Collaborative on SDG Data Interoperability.

These initiatives aim to facilitate interoperability, data sharing, improve data governance and promote the use of data for innovation and growth at both the international and EU levels. They represent significant steps towards achieving a **more interconnected and data-driven world**.

27 Data governance - OECD
28 Open Government Data - OECD
29 Open Government Data and Services - OECD

Interview with Interoperable Europe Act Expert

Maria Leek

(Directorate-General for Digital Services (DIGIT))

Policy team leader (DG DIGIT B2 – Interoperability and Digital Governement)

‘The community plays a vital role in the successful implementation of the Interoperable Europe Act.’

Q1: Over the past decade, interoperability, and in particular cross-border interoperability, has become a key topic that has encompassed policy strategies and legislations both at the European and national levels. Based on your professional experience, what do you think are the main emerging trends linked to cross-border interoperability?

As we anticipate the future with the 2024 elections and a new political and legislative cycle, there are two main emerging trends linked to cross-border interoperability. The first trend is the increasing use of artificial intelligence and the growing availability of data. Governments need to become more data-driven and AI-driven. This transformation allows them to better serve their citizens and navigate the process of adapting to this new context. While these technologies offer many new opportunities, it is crucial for Europeans to ensure that their use fully respects EU values. This commitment to EU values is reflected in DG DIGIT’s leadership role in the Berlin Declaration and our collaboration on the European Declaration on Digital Rights and Principles. The second trend is the common need to rethink how we develop and implement policies in the digital age. Digital technology is becoming an integral part of policy initiatives, whether it is for reporting, monitoring, or digitising services.

This shift requires us to reconsider how we develop policies and to incorporate interoperability aspects early in the policymaking stage. These two trends were recently referenced in the new Council conclusions adopted by the Belgian Presidency on 21 May 2024. These conclusions include a strong call for interoperability and digital government, further emphasising the importance of these two trends. This could serve as a useful reference point for further discussions on the topic.

Q2: Joining the Interoperable Europe community allows stakeholders to actively participate in shaping the future of interoperability. How can the community contribute to the successful implementation of the Act?

The community plays a vital role in the successful implementation of the Interoperable Europe Act. Achieving the ambitious goals around cross-border interoperability requires the involvement of all stakeholders, including Member States, the private sector, civil society, and local and regional authorities. There are already vibrant communities, but the aim is to go beyond that and reach out even further. Local authorities, who are in direct interaction with citizens, are one of the stakeholders that should be more reached. DG DIGIT is collaborating closely with the Committee of the Regions and aim to do more.

The Act provides the community with better opportunities to shape a common vision on cross-border interoperability together with the future Board. The community will provide a feedback loop to bottom-up needs. Community members will also be invited to participate in support measures, fostering bottom-up innovation and experimentation. GovTech is an important area where the community's involvement is needed. In the future, there will also be regulatory sandboxes for regulatory learning activities. This will provide the community with ample new opportunities.

Q3: Today, the Interoperable Europe Act is the main legislative framework that the EU and the Member States have at their disposal to tackle interoperability. How do you think the Interoperable Europe Act complements the recently adopted digital policies and legislation (e.g., Digital Decade, European Data Strategy)?

The Interoperable Europe Act plays a significant role in complementing recently adopted digital policies and legislation, such as the Digital Decade and the European Data Strategy. The Act is unique in that, as it is a law specifically for public administrations, not just Member States, but it also impacts the EU level. This gives them a voice on the preferred solutions and building blocks they need to ensure cross-border interoperability and services. Thanks to the Act, there will be a repository of recommended interoperable solutions that can be found and utilised when implementing other laws. This is one way in which the Act complements other legislations. Specifically related to the European Data Strategy, the Act prompts to collaborate with the European Data Innovation Board. This collaboration is crucial as the Data Innovation Board works on interoperability standards for data spaces. In addition, DG DIGIT has a good collaboration with the Digital Decade Board. They are working together in the context of the Digital Decade report by providing data and co-drafting the chapter on key digital services. The Interoperable Europe Act not only complements other digital policies and legislation but also fosters collaboration and standardisation, which are key to achieving the goals of these policies.

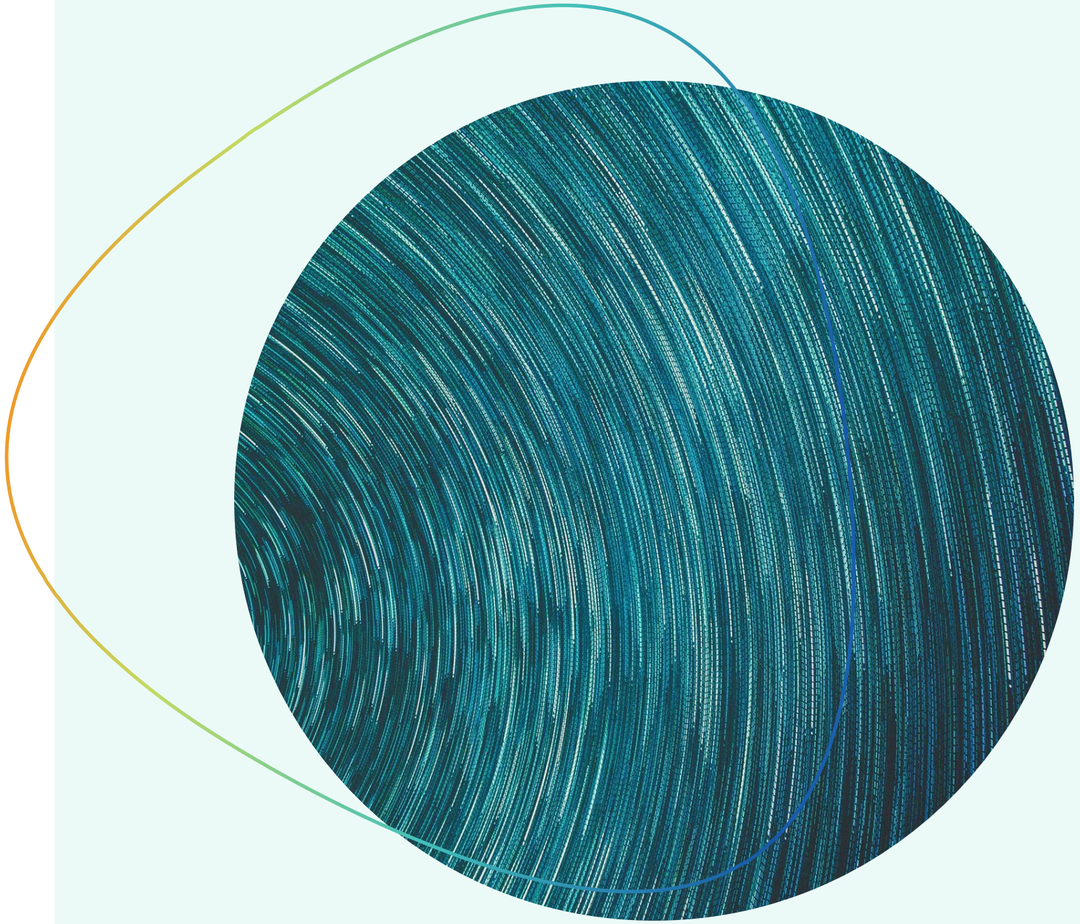
Q4: The Act proposes a structured and co-owned EU cooperation framework for public administrations. Could you please elaborate on this? What is the role of the Interoperable Europe Board under this framework?

The Interoperable Europe Board plays a central role in the framework of the Interoperable Europe Act. This body, comprising members from various stakeholders, is tasked with coming up with joint agreements on key aspects such as the roadmap, solutions, labels, and the future of the European Interoperability Framework. The Board is strategically important and is seen as transformative in implementing the Act. It acts as the gatekeeper for all major decisions to be taken. The law stipulates that by default, decisions are taken by consensus, emphasising the collaborative nature of the Board's work. The first crucial step to take is to establish the Interoperable Europe Board. This Board will be responsible for making a series of important decisions, including the adoption of guidelines for the assessments. A significant milestone is approaching in January 2025. By this date, countries are required to nominate their national competent authorities. Additionally, the interoperability assessments will become mandatory from this date onwards. Currently, DG DIGIT is accelerating its efforts to ensure they are fully prepared for this pivotal moment.

> **'The first crucial step to take is to establish the Interoperable Europe Board.'**

Q5: The Interoperable Europe Act introduces mandatory interoperability assessments for digital public services of European public administrations involving cross-border data exchange. This requirement will be applicable for the EU institutions, EU Member States, as well as for public administrations at regional and local levels. Can you explain what these assessments entail and how they will impact IT systems related to cross-border interoperability in the EU?

DG DIGIT is currently preparing guidelines with Member States, which provide step-by-step instructions on how to perform these assessments. They are also developing support tools to help carry out these assessments and identify requirements or barriers to interoperability using the EIF toolbox. These assessments will become mandatory as of January 2025 and will be published by then. DG DIGIT is also conducting a study to support the implementation, especially for national competent authorities and EU coordinators, to build a repository of knowledge on practices for carrying out these assessments. Furthermore, DG DIGIT will organise training sessions through the Interoperable Europe Academy, making them available in different languages where possible so that they can be used by administrations at all levels.



03

CHAPTER 3

Trust and cybersecurity

3. Trust and cybersecurity

In an era dominated by digital connectivity, the foundation of any successful online interaction rests ultimately upon trust. Trust services and cybersecurity stand as the vanguards in the digital realm, safeguarding the integrity, confidentiality and availability of data, while also ensuring the reliability of online public services. From digital signatures and encryption to identity authentication and access control, trust services play a pivotal role in **fostering confidence and security across diverse digital ecosystems**.

Cybersecurity, on the other hand, remains a top priority for European governments and businesses alike. With the EU's **General Data Protection Regulation** (GDPR) setting stringent standards for data protection and privacy, robust cybersecurity measures are indispensable for protecting personal data and sensitive information from cyber threats and attacks.

Together, trust services and cybersecurity form an indispensable duo, fortifying the digital infrastructure upon which the modern society, including public administrations, relies. As technology continues to evolve and threats become increasingly sophisticated, their importance only grows more pronounced.

Whether safeguarding sensitive financial transactions, protecting personal data, or defending critical infrastructure, the need for trust and security in the digital sphere has never been more pressing.

3.1. Trends identified at national level

Looking at the current landscape around cybersecurity and trust services, a total of 32 initiatives were identified across 19 European countries. This section aims to analyse the data collected and delve into the main trends amongst such initiatives, focusing on political communications, legislations, and infrastructures related to cybersecurity and trust services described in the 2024 edition of the DPAFs. Further to that, examples of initiatives implemented by European countries will be provided to better provide concrete evidence and possible good practices.

3.1.1. Creation of Cybersecurity Centers and institutions to further support the fight against cyber threats

Establishing a dedicated cybersecurity center is becoming more and more important for any nation in today's digital landscape. The European Cybersecurity Competence Centre (ECCC), along with its Network of National Coordination Centres (NCCs), offers an example of the efforts put into increasing Europe's cybersecurity capacities and competitiveness. By centralising expertise and resources, these centres can play a pivotal role in **safeguarding critical infrastructure, government systems, and private data against cyber threats**, thus enhancing a country's ability to respond swiftly and effectively to cyber incidents. Cybersecurity centres, however, go beyond this, being part of a proactive strategy aimed at national security, economic stability, and societal well-being in the digital age. For instance, they serve as a focal point for **raising awareness** among citizens and organisations about cyber risks and good practices, providing essential or more advanced **training**, as well as **fostering collaboration** among government agencies, private sectors, or international partners. Amongst the 32 initiatives identified, five countries took actions to ensure they have cybersecurity centers in place.

National examples

Greece

A Cybersecurity Operations Centre (SOC – Security Operation Centre) was created in Greece in September 2023, which operates in the Cyberspace Division of the National Intelligence Service (EYP) and is responsible for monitoring, detecting and reacting to cyber threats and security breaches, state digital infrastructures country. It comes to complement the actions of the EYP's Electronic Attack Response Team, which works to support all state agencies in matters related to the prevention, early warning, and response to cyberattacks. In October 2023, a Grant Agreement with the European Cyber Security Competence Centre was signed, which will finance the development and operation of the SOC.

Moldova

In February 2024, Moldova unveiled the creation of two new key institutions dedicated to cybersecurity: the National Cybersecurity Agency (ANC) and the National Institute of Innovations in Cybersecurity 'Cybercor'. Launched during the inaugural Moldova Cybersecurity Forum (MCF), these initiatives solidify the country's commitment to building a secure and resilient digital future.

Slovakia

The work carried out by the Slovak Cybersecurity Competence and Certification Centre is under continuous development. The Centre acts as the national sectoral and technological research centre in the field of cybersecurity and it provides services related to the organisation and technical provision of educational activities. Moreover, it offers consulting activities in the field of protection of classified information, cybersecurity and trust services, and it organises educational events, courses, training, and seminars.

3.1.2. Creation of Cybersecurity Centers and institutions to further support the fight against cyber threats

The adoption of national cybersecurity laws by European countries, in alignment with EU regulations, is also an aspect on which governments have been focusing over the past year. The main aim of doing so is to **provide a legal framework for addressing cyber risks**, such as protecting critical infrastructure, safeguarding personal data, and ensuring resilience against cyberattacks. Last but not least, these laws can also contribute **to enhance trust in digital technologies among citizens and businesses**. Particularly, some countries implemented the provision of Directive (EU) 2022/2555 (NIS 2), so as to guarantee alignment with common standards and practices, with an eye also to tackle **cross-border cyber threats**.

National examples

Kosovo

In February 2023, Kosovo's Assembly approved the Law on Cybersecurity transposing the NIS2 Directive. The Law on Cybersecurity creates a legal basis to establish the Cybersecurity Agency (CSA), the National Cybersecurity Council, and the State Cybersecurity Training Centre. In February 2024, the government of Kosovo approved the Regulation for the Organisation and Structuring of the CSA. Currently, the government is working on the recruitment of the core staff of the Agency.

Romania

In March 2023, Romania approved Law No. 58 which establishes the legal and institutional framework regarding the organisation and performance of activities in the fields of cybersecurity and defence, the cooperation mechanisms, and the responsibilities among the institutions. The law aims to ensure the security and defence of Romania in cyberspace by adopting and implementing policies and measures preventing and counteracting vulnerabilities, risks, and threats in cyberspace.

3.1.3. Reinforcing and modernising national eID schemes

The further development of initiatives related to electronic identification (eID) within European countries is a recurrent trend in the field of trust and cybersecurity. These initiatives enable **secure and simple digital authentication**, facilitating access to online services and transactions while ensuring user privacy and data protection. By implementing national **eID schemes**, countries align with EU regulations such as the **eIDAS Regulation**, which aims to create a **seamless and interoperable digital environment across Member States**. In doing so, they also contribute to the development of a trusted digital single market within the EU.

National examples

Latvia

Starting from 1 January 2023, the electronic identification cards (eID) is a mandatory identity document for Latvian citizens and non-citizens who have reached the age of 15 years, according to the amendments made to the Personal Identification Documents Law on 9 May 2019.

Lithuania

In May 2023, the Law on Electronic Identification and Trust Services for Electronic Transactions was modified. The most recent version came into force on 2 January 2024. The new law provides that the Ministry of Economy and Innovation of the Republic of Lithuania is responsible for the areas of eID and trust services for electronic transactions; the Communications Regulatory Authority of the Republic of Lithuania is the supervisory body for trust services and qualified eID services providers; and the Information Society Development Committee is responsible for the supervision of the eID node.

3.1.4. Awareness raising and training initiatives

Some countries are also further investing in **promoting awareness raising and training initiatives** around cybersecurity and trust. These initiatives align with EU policies, such as the NIS Directive and the Cybersecurity Act, which emphasise the importance of cybersecurity capacity-building and awareness-raising at national levels, as well as ultimately contribute to achieving the objectives of the Digital Single Market strategy by fostering trust and security in digital services and technologies. Their main goal is to equip citizens, businesses and public institutions with the **knowledge and skills** needed to navigate the complex landscape of cybersecurity threats and digital risks.

National examples

Hungary

In 2023, Hungary's Ministry of Justice, the Supervisory Authority for Regulatory Affairs, the Ministry for National Economy, and the Hungarian State Treasury joined the Cooperation Agreement called KiberPajzs (Cyber Shield Agreement). The education-oriented cooperation intends to draw attention to user awareness in the online space, as well as to the importance of basic knowledge on digital safety, informing both clients and users about the emerging threats in the online space.

Spain

The Territorial Networks of Technological Specialisation (RETECH) Cybersecurity programmes will develop initiatives focused on attracting and generating talent to the cybersecurity sector, through training in cybersecurity at both the supply and demand levels. Likewise, initiatives will be launched with the aim of training and raising the awareness of citizens in basic cybersecurity skills for an appropriate and safe use of new technologies.

3.2. Fostering trust and cybersecurity at European and international levels

As seen in the previous section, the 2024 edition of the DPAF has highlighted different trends in the field of trust and cybersecurity. Overall, there seem to be an ever-growing attention to these themes at national, as well as EU level, given the many opportunities, but also threats brought upon by digitalisation, which pervades every aspect of our life. It is also worth noting that fostering awareness within the society about cyber risks and how to tackle them features as a prominent topic. This section aims to frame these trends in the broader context of EU-level and international initiatives.

3.2.1. Strengthening cybersecurity

Cybersecurity is one of the Commission's top priorities and a cornerstone of the digital and connected Europe, as outlined in the EU's Cybersecurity Strategy, thus several actions have been taken in the past month to advance this goal. In January 2024, the Commission has adopted the first-ever European cybersecurity certification scheme, in line with the EU Cybersecurity Act. The scheme offers a **Union-wide set of rules and procedures on how to certify ICT products in their lifecycle** and thus make them more trustworthy for users. The scheme, based on drafts prepared by the European Union Agency for Cybersecurity (ENISA) in close cooperation with industry experts and Member States after technical and legal discussions, as well as public consultation, will also boost the implementation of the NIS2 Directive in Europe. It is also worth noting that the EU Cybersecurity Act mandates the European Commission to publish a Union Rolling Work Programme (URWP) for European cybersecurity certification, outlining a **strategic vision** and potential areas for future certification schemes, with ID Wallets and managed security services identified by the first URWP within the areas for future certification. The consistent implementation of the Cybersecurity Act and assistance in preparing candidate certification schemes will be provided by the European Cybersecurity Certification Group (ECCG), with the Stakeholder Cybersecurity Certification Group (SCCG) advising the Commission and ENISA on strategic cybersecurity certification issues. This group represents the first stakeholder expert group for cybersecurity certification initiated by the European Commission.

Looking at international initiatives, the OECD Digital Security Policy Framework aims to enhance global digital security by fostering **harmonised, effective digital security practices**, enhancing cross-border collaboration, and ensuring a resilient and secure digital environment globally. The framework emphasises the importance of protecting critical infrastructure, personal data, and digital services and aims at developing flexible, adaptable policies to address evolving cyber threats.

3.2.2. Ensuring trust, a fundamental objective for a digital society

The European Commission has set a number of targets and milestones for electronic identification in its Communication 2030 Digital Compass: the European way for the Digital Decade. For example, by 2030, all key public services should be available online, all citizens will have access to electronic medical records, and 100% of citizens will have access to **secure electronic identification** meaning that they are recognised throughout the Union, enabling them to have full control over identity transactions and shared personal data.

In February 2024, the European Parliament voted in favour of the new framework amending the 2014 Regulation on Electronic Identification and Trust Services for Electronic Transactions in the internal market (eIDAS Regulation), which laid the foundations for safely accessing public services and carrying out transactions online and across borders in the EU[30] . Amongst the changes introduced by this new framework, the **EU Digital Identity Wallet (EDIW)** emphasises the right of individuals to **maintain control over their digital identities**. The EDIW is a tool to empower citizens to manage their digital identities securely and privately as they traverse the EU, aligning with the **EU's digital rights declaration** and aiming to achieve the Digital Decade Policy Programme's objective of universal Digital ID access by 2030. Under the new law, Member States will offer citizens and businesses digital wallets that will be able to link their national digital identities with proof of other personal attributes (e.g., driving licence, qualifications, bank account).

In 2023, the EU initiated four major pilot programmes[31] to evaluate the EU Digital Identity Wallet implementation prior to its official introduction to the Member States[32] . Four large-scale pilot projects are collecting feedback on the requirements for the EU Digital Identity Wallet and supporting the development of the **Common Toolbox** to ensure its secure and smooth deployment. The aim is to **obtain a set of technical references, standards, components and solutions** including an application so the EU Digital Identity Wallet can be made available to Member States. These pilots involve approximately 360 entities, including private companies and public authorities from 26 Member States, Norway, Iceland, and Ukraine. Each pilot is structured as a consortium that merges expertise from both the public and private sectors within the EU, with co-funding provided by grants from the European Commission.

Outside the EU, multiples initiatives linked to digital identity have been put in place by international organisations to provide **guidance and support** on this topic. For instance, the OECD Council adopted in June 2023 a set of **recommendations on the Governance of Digital Identity**, encouraging its members to develop and govern digital identity systems as digital public infrastructure[33]. This involves creating and aligning sound and **future-proof policies and regulations for solution providers**, as well as **promoting cross-sector co-ordination**, international collaboration, and a healthy market for identity solutions. To do so, they suggest to public administrations to develop **user-centred and inclusive digital solutions**, to strengthen the governance of digital identity and to enable cross-border and interoperable use of digital identity.

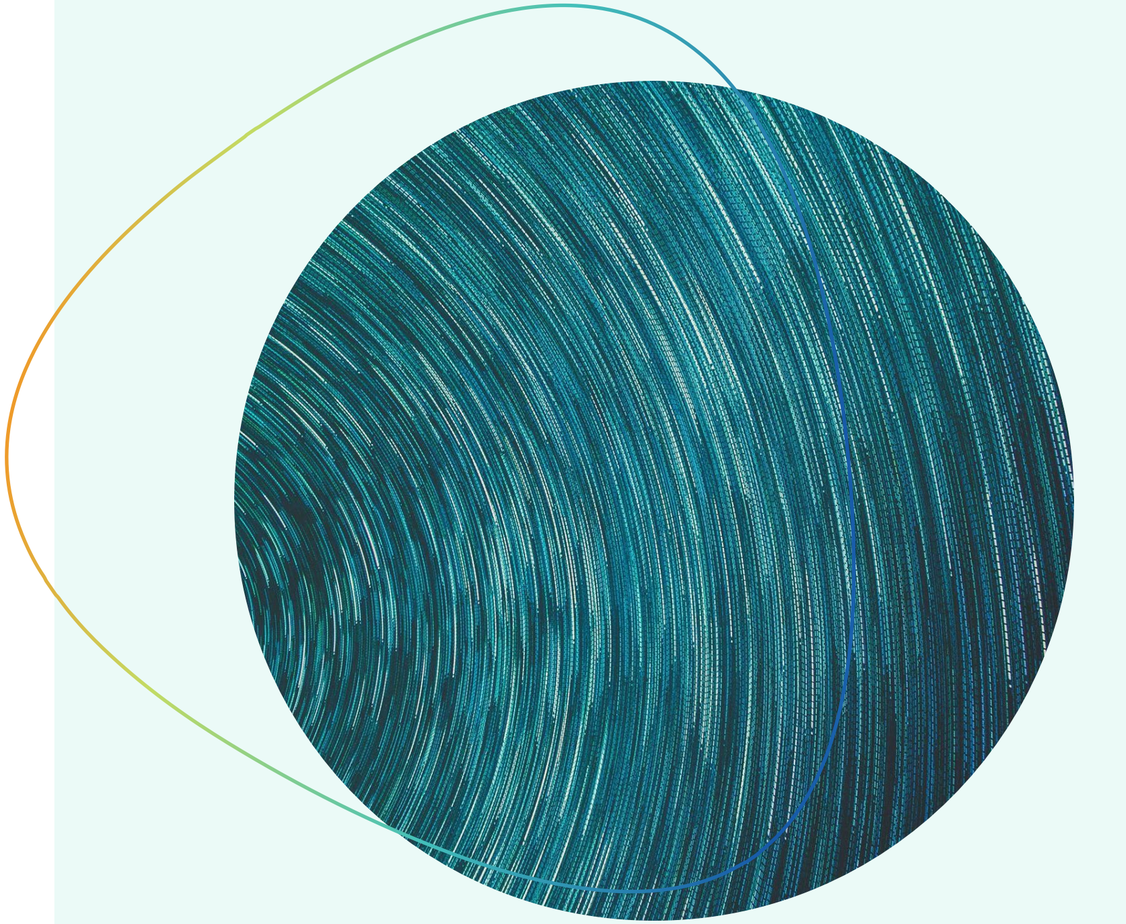
30 Electronic Identification
31 These are: EU Digital Identity Wallet Consortium (EWC), POTENTIAL, NOBID and DC4EU.
32 EUDI Wallet Implementation

3.2.3. Creating awareness and building a skilled workforce to effectively address cyber challenges

Creating awareness within the society, as well as providing training to the workforce of both the private and public sectors, are crucial actions to effectively address cyber challenges as these efforts equip individuals and organisations with the knowledge and skills needed to recognise and mitigate cyber threats. The European Commission is promoting several initiatives to raise awareness about the topic among the society. For instance, as part of the 2023 European Year of Skills, the Commission set up the Cyber Skills Academy which aims to **bring together and improve the coordination of existing cyber skills initiatives** in order to close the cyber security talent gap, strengthen the EU cyber workforce **and boost EU competitiveness, growth, and resilience**.

At the EU level, it must be acknowledged that ENISA plays a key role, offering educational programs, resources, and guidelines to enhance cybersecurity awareness and capacity across Member States. An example is the Awareness Raising in a Box (AR-in-a-BOX) package, launched in September 2023 and offered to public bodies, operators of essential services, large private companies as well as SMEs to help these organisations build their own awareness raising programmes. It is also worth mentioning the enhanced collaboration between ENISA and CISA, following the agreement signed in December 2023, covering points such as cyber awareness and capacity building to **enhance cyber resilience**; good practice exchange in the implementation of cyber legislation; and **knowledge and information sharing** to increase common situational awareness.

Finally, it is worth mentioning the work done by the OECD on the importance of building a Skilled Cyber Security Workforce, with several reports assessing the situation both within and outside Europe.



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CHAPTER 4

Innovative use of technologies

4. Innovative use of technologies

In the ever-changing landscape of innovative technologies, the integration thereof in the public sector stands as a testament to progress and foresight. Overall, such technologies encompass a diverse array of cutting-edge tools, systems, and approaches driving transformation across various domains.

When applied to the public sector, they play a pivotal role in **shaping governance, service delivery, and citizen engagement**, among others. Artificial Intelligence (AI), GovTech, cloud and edge computing, high-speed networks, and blockchain are just some of the innovative technologies that can be oriented **towards modernising public administrations**. At times, European countries have gone even one step forward by adopting 'general purpose'/'generative' AI solutions, which are capable of performing a wide array of tasks, including the generation of various forms of new content (e.g., text, code, data, images, voice) usually based on instructions provided by the user.

In recent years, many European countries have acknowledged the potential benefits of such technologies and have been striving for their adoption either in the form of **projects implementing them for public service delivery, funding programmes promoting their use, or legislation minimise their potential risks**.

At the same time, international organisations both in Europe and beyond have been supporting countries in their journey to their innovative use of technologies by providing guidance, allocating funding, and creating the conditions for the exchange of ideas, practices, and resources. All these efforts have been key for establishing an ecosystem that puts innovation and progress at the centre of technological advancement worldwide.

4.1. Trends identified at national level

Taking a look at initiatives adopted at the national level, the 2024 edition of the DPAFs shows an overall significant commitment by the participating countries to benefit from the use of innovative technologies in the public sector.

In total, 83 new initiatives in this field were put forward between 2023 and mid-2024. More concretely, the increasing attention that three innovative technologies – AI, GovTech, and cloud computing – have been receiving during the last years will be explored, together with the creation of multiple innovation centres specialised in research and development.

4.1.1. Boosting AI-related initiatives

During the past year, European countries have adopted several initiatives linked to AI, highlighting the integral part that this technology has acquired in our society. The use of AI has been extended to multiple applications including decision-making, healthcare, and is more and more addressing complex challenges, paving the way for even more significant advancements in the future. To better integrate AI solutions within the realm of public administration, European countries have established guidelines, strategies, and actions plans that are oriented towards ensuring that AI benefits are maximised, and risks are mitigated. Some of these benefits stem from the **automation of routine tasks, the improvement of decision-making, and the provision of personalised experiences for citizens**, all enhancing public services delivery.

National examples

Iceland

In February 2023, the Icelandic Government issued the Guidelines on the use of AI in the public sector. These guidelines serve as a comprehensive resource for public entities utilising or considering the use of AI, emphasising responsible, transparent, and reliable practices.

Liechtenstein

The Guidelines on the use of artificial intelligence for national administration were published in December 2023, as a guide for employees in the use of publicly available generative AI platforms. It enables employees to use these technical means in a responsible, compliant, and safe manner, while bringing them closer to the functioning and limits of the generative AI. It also shows them how to increase their work productivity and quality by correctly applying AI platforms.

Sweden

In 2024, a project partly funded by the Swedish Government was launched to develop a co-pilot meant to support public sector businesses. The project is managed by AI Sweden, a non-governmental organisation, and is also supported by four State agencies with a view to realising the ambition to implement AI co-pilots as public infrastructure. Several municipalities and regions will work with the first version from the start.

4.1.2. Harnessing GovTech solutions for public sector innovation

According to the Interoperable Europe Act, GovTech refers to ‘technology-based cooperations between public and private sector actors supporting public sector’s digital transformation’.

It emerges as a pivotal concept at the **intersection between governance and technology**, with the potential of bringing multiple benefits to the public administrations developing GovTech solutions, such as **streamlined administrative processes, fostered transparency, enhanced data-driven decision-making, and elevated quality of public services**. However, GovTech solutions are not free of challenges: implementing them often requires overcoming issues such as legacy systems, cybersecurity risks, and digital literacy gaps. Stemming from these multiple benefits and potential barriers, many European countries have been adopting and implementing measures and projects aiming at transforming their public services.

National examples

The Netherlands

SKIALabs is a Dutch initiative focused on GovTech that aims to contribute to a more human-centric, technology-savvy government. In collaboration with other organisations and experts, SKIALabs accelerates the development of new products, systems, and concepts for positive interactions in the public domain. By leveraging technology, social innovation, and collaboration efforts, it seeks to empower citizens, streamline administrative processes, and build a better government for all.

Serbia

The Serbian GovTech Programme focuses on applying new technologies across key public sectors, including health, education, transport, and smart cities. By leveraging solutions from start-ups, innovative entities, and scientific research organisations, this programme aims to enhance the delivery of public services.

4.1.3. Laying the grounds for cloud solutions

Governments are increasingly recognising the transformative potential of cloud technologies to **enhance efficiency, scalability, and accessibility in public services**. As a result, European countries are actively engaged in operational, technical, and procedural activities to facilitate the adoption and implementation of cloud services.

These efforts involve strategic planning, infrastructure development, and policy frameworks. One key motivation behind this trend is the need to host and manage data from various administrative bodies, while fostering collaboration and interoperability. By harnessing the power of cloud computing, countries aim to **streamline processes, improve citizen engagement, and create a more agile and responsive governance ecosystem**.

National examples

Czechia

In December 2023, the Czech Government assigned the State Treasury Shared Services Centre (SPCSS) the responsibility of providing cloud computing services at the highest security level to public administration authorities in compliance with Act No. 365/2000 Coll., on Public Administration Information Systems. The SPCSS works on capacity planning in collaboration with the Digital and Information Agency, contributes to the European Code of Conduct for Data Centres initiative, and implements the provisions of NIS 2.

Türkiye

Türkiye's Digital Transformation Office (DTO) is developing a Public Sector Cloud Computing Strategy that aims to transition IT infrastructure to a cloud model, leveraging private sector providers. Key principles include avoiding in-house IT investments (except for national security) and embracing commercial cloud services. Priorities encompass efficient cloud service provision, migration implementation, and workforce competency enhancement. This transformation, whose action plan is set to be finalised in mid-2024, is poised to unlock advanced technologies, consequently enhancing public service delivery.

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4.1.4. Establishing centres for innovative technologies to enhance knowledge sharing

Significant efforts have been made across Europe to create specialised centres focused on innovation in the public sector.

These centres serve as **hubs for collaboration, research, and deployment of innovative technologies**, bridging the gap between government agencies, start-ups, and entrepreneurs. By **fostering partnerships and knowledge exchange**, innovative technologies centres contribute to more efficient public services, digital transformation, and the adoption of cutting-edge solutions.

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National examples

Luxembourg

Set up in 2023, the Hive Academy aims to create an innovative training programme to enhance the skills of external consultants integrated into the *Centre des technologies de l'Information de l'État* (CTIE) specifically on IBM's Cloud Pack for Business Automation platform. Given the increasing adoption of the HIVE solution by various public administrations, the academy will train external collaborators, enabling them to join the CTIE's HIVE team and effectively handle projects for requesting administrations.

Poland

The Poznan Supercomputing and Networking Centre (PSNC) is planning on hosting one of the five European High-Performance Computer Joint Undertaking's (EuroHPC JU) new supercomputers. This mid-range supercomputer will be built in Poland and will become part of the national PLGrid infrastructure.

4.2. Fostering the innovative use of technologies by the public sector at European and international levels

Efforts conducted by national authorities of European countries to benefit from the adoption of innovative technologies and regulate their use to minimise potential risks have been accompanied by a **strong activity in the international arena** to achieve the same goals. Indeed, several frameworks and guidelines have been set forth by different international organisations in order to reinforce a global community linked to the use of innovative technologies based on ethical and safe approaches.

4.2.2. Harnessing GovTech solutions for public sector innovation

Given the multiple benefits that the application of innovative technologies brings to public administrations, GovTech initiatives have transcended national borders and have been receiving increasing attention by the EU and other international organisations, including the OECD and the World Bank. These institutions actively promote initiatives that **modernise government practices, enhance efficiency, and address societal challenges**, among many others. By fostering collaboration, sharing good practices, and assessing digital maturity, they contribute to a **global dialogue on the future of digital government**. Through these efforts, citizens worldwide stand to benefit from more efficient, user-friendly, and inclusive public services.

At the EU level, several actions have been established, including **#GovTech4all** and the **GovTech Connect Boot Camp**. Whereas the former is a groundbreaking initiative that places a strong emphasis on **inclusivity** and seeks to create scalable and user-friendly digital solutions that can be adopted across Europe, the latter is an intensive programme designed to **bridge the gap between tech start-ups and government agencies**. The GovTech Connect Boot Camp also encourages cross-sector partnerships, fostering innovation and knowledge exchange.

On the international stage, the **Digital Government Index (DGI)**, developed by the OECD, serves as a comprehensive framework for initiatives under the wider GovTech umbrella. It assesses the digital transformation of public administrations across member countries, according to some criteria that include user-centricity, data-driven policies, and the concept of digital government as a platform. By analysing these dimensions, the DGI helps countries **identify their strengths and areas for improvement**.

Similarly, the World Bank's **GovTech Maturity Index (GTMI)** assesses the maturity of digital government initiatives globally. It considers factors such as policy frameworks, infrastructure, human capital, and service delivery. By ranking countries based on their GovTech capabilities, the GTMI provides valuable insights into global trends.

Additionally, the World Bank has established the **GovTech Global Partnership (GTGP)**, a collaborative effort aimed at **supporting the digital transformation of the public sector in developing countries**. Through technical assistance, funding, and knowledge sharing, the GTGP empowers governments to adopt innovative GovTech solutions and promotes inclusive development, contributing to achieving the SDGs.

4.2.1. Boosting AI-related initiatives

Similarly to the national level, AI has garnered unprecedented attention in the EU and international scenarios too. International organisations and regional bodies, in fact, recognise the transformative potential of AI while grappling with its ethical, legal, and societal implications. Some organisations that have put forward important initiatives in the field of AI not only include the EU, but also the OECD, the Association of Southeast Asian Nations (ASEAN), and the African Union (AU), among others. These initiatives present different common objectives: **fostering responsible AI development, and ensuring that innovation aligns with human rights, transparency, and safety**.

The AI Act

Within the EU landscape, the AI Act was adopted in March 2024, aiming at creating a harmonised regulatory framework for AI across the EU. The Act covers aspects such **as transparency, accountability, and risk assessment for AI systems**. It also provides a useful classification tool allowing to distinguish between AI systems that create unacceptable risks, high risks, and low or minimal risks; and stemming from it, it issues general guidelines and prohibitions to regulate the use therefore.

Similarly, the EU's Digital Compass 2030, setting ambitious goals for digital transformation, frame AI as a top priority. Among other provisions, the Compass aims for the EU to have 20% of the world's AI production, and to ensure that all public services are available online. Additionally, it emphasises **an ethical AI development and the development of AI-related skills**, particularly relating the fields of STEM and ICT. Furthermore, the EU has created a European AI Office, which is poised to become the **hub of AI expertise** across the EU. Although not yet operational, its establishment marks a significant step towards a unified European AI governance system.

Beyond the European context, other international organisations have advanced multiple actions related to AI. For instance, by recognising the transformative potential of AI for Africa's socio-economic development, the AU's High-Level Panel on Emerging Technologies (APET) held an experts consultative meeting in Dakar, Senegal in May 2022. During this meeting, the APET prioritised AI as an emerging technology worth harnessing for the whole African continent. Moreover, the OECD's Principles on Artificial Intelligence, initially adopted in 2019, were updated in 2024. These principles address challenges associated with AI, including privacy, intellectual property rights, safety, and information integrity. They advocate for an **innovative and trustworthy AI that upholds human rights and democratic values**. Similarly, the ASEAN's Guide on AI Governance and Ethics, endorsed in February 2024, serves as a practical resource for organisations in the region aiming to design, develop, and deploy traditional AI technologies responsibly.

4.2.2. Harnessing GovTech solutions for public sector innovation

Given the multiple benefits that the application of innovative technologies brings to public administrations, GovTech initiatives have transcended national borders and have been receiving increasing attention by the EU and other international organisations, including the OECD and the World Bank. These institutions actively promote initiatives that **modernise government practices, enhance efficiency, and address societal challenges**, among many others. By fostering collaboration, sharing good practices, and assessing digital maturity, they contribute to a **global dialogue on the future of digital government**. Through these efforts, citizens worldwide stand to benefit from more efficient, user-friendly, and inclusive public services.

At the EU level, several actions have been established, including **#GovTech4all** and the **GovTech Connect Boot Camp**. Whereas the former is a groundbreaking initiative that places a strong emphasis on **inclusivity** and seeks to create scalable and user-friendly digital solutions that can be adopted across Europe, the latter is an intensive programme designed to **bridge the gap between tech start-ups and government agencies**. The GovTech Connect Boot Camp also encourages cross-sector partnerships, fostering innovation and knowledge exchange.

On the international stage, the **Digital Government Index (DGI)**, developed by the OECD, serves as a comprehensive framework for initiatives under the wider GovTech umbrella. It assesses the digital transformation of public administrations across member countries, according to some criteria that include user-centricity, data-driven policies, and the concept of digital government as a platform. By analysing these dimensions, the DGI helps countries **identify their strengths and areas for improvement**.

Similarly, the World Bank's **GovTech Maturity Index (GTMI)** assesses the maturity of digital government initiatives globally. It considers factors such as policy frameworks, infrastructure, human capital, and service delivery. By ranking countries based on their GovTech capabilities, the GTMI provides valuable insights into global trends.

Additionally, the World Bank has established the **GovTech Global Partnership (GTGP)**, a collaborative effort aimed at **supporting the digital transformation of the public sector in developing countries**. Through technical assistance, funding, and knowledge sharing, the GTGP empowers governments to adopt innovative GovTech solutions and promotes inclusive development, contributing to achieving the SDGs.

4.2.3. Establishing centres for innovative technologies to enhance knowledge sharing

In recent years, there has been a notable proliferation of innovative centres established by international bodies, aligning with trends identified at the national level in the field of innovative technologies.

Among the various existing initiatives, the European Digital Innovation Hubs (EDIHs) are strategic entities designed to **accelerate the digital transformation of businesses**, particularly SMEs, across Europe. These hubs serve as collaborative ecosystems, bringing together industry players, research institutions, and public authorities. Their primary objectives include **facilitating the adoption of cutting-edge technologies by SMEs**, enabling them to enhance their competitiveness and productivity, providing training and mentoring, and creating environments where SMEs can experiment with emerging technologies. EDIHs are distributed across various European regions, thus ensuring widespread accessibility.

At the international level, the ITS Technology and Innovation Lab, created in 2017, serves as an internal technology advisor and knowledge hub within the World Bank Group (WBG). Its mission revolves around **operationalising emerging technologies for development impact**, ensuring that the WBG remains **future-ready and competitive** in the digital age.

Similarly, the United Nations Innovation Technology Accelerator for Cities (UNITAC) is a prime example of an international centre dedicated to innovative technologies. Established in Hamburg, Germany, UNITAC operates under the auspices of the United Nations Human Settlements Programme (UN-Habitat) and the United Nations Office of Information and Communications Technology (UN-OICT).

Its mission is to harness innovation, prototyping, and applied research methodologies to develop solutions that accelerate the achievement of the SGDs related to **urbanisation and cities**. UNITAC's approach is multifaceted, focusing on public participation, spatial analysis, mapping, data simulation, and visualisation.

Interview with GovTech Expert

Stefanos Kotoglou

(Directorate-General for Digital Services (DIGIT))

Policy Officer – Public Sector Tech Watch – DG DIGIT

‘The use of innovative technologies should bring better and faster services available to all.’

Q1: According to the Joint Research Centre (JRC)’s Report on GovTech Practices in the EU, although there exist multiple definitions of GovTech, most of them share the following common approach when defining GovTech: public sector engagement with start-ups and small and medium-sized enterprises (SMEs) for the provision of tech-based solutions to innovate and improve public services. Do you share the same view/definition? Do you consider that the lack of agreement on the concept’s definition represents a challenge?

The definition provided by the JRC’s report emphasises the role of start-ups and SMEs, which have become key decision-makers due to their innovation and greater flexibility, allowing them to advance more quickly and reduce administrative burdens. When it comes to the lack of agreement on this concept’s definition, we cannot really say that this represents a challenge per se, but it rather offers different perspectives to approach GovTech, which may vary depending on the context and actors involved

Q2: Among recent developments in the use of innovative technologies in the public sector, which applications or good practices would you highlight? Additionally, which applications of innovative technologies in the public sector do you believe are currently underexplored but have the greatest potential for positive impact?

The use of innovative technologies should bring better and faster services available to all, whose goal should be to reduce the administrative burden and speed up processes. In this context, recent developments linked to generative AI and chatbots underline the commitment of the public sector, including within the European Commission, to make use of innovative technologies when designing and deploying digital public services. Other areas that have great potential exist, such as adopting virtual reality and using avatars to offer online trainings to citizens and public servants, as well as benefitting from the use of blockchain technologies to ensure security and anonymity in different contexts (e.g., when taking exams at university).

Q3: As recognised by the OECD's report Good Practice Principles for Data Ethics in the Public Sector, ensuring adherence to ethical guidelines and accountability for decisions is paramount. How can we ensure that these technologies used in the public sector adhere to ethical guidelines, and how can accountability be ensured?

Adherence to ethical guidelines and accountability are ensured by proper legislation. The AI Act and the Digital Services Act, among others, represent the foundation of such guidelines, whose main goal is to promote conformity with the EU's values and human rights. Implementation models and trainings can also serve as a useful way to ensure that ethical principles are upheld. In this context, the Public Sector Tech Watch has been carrying out consultations with relevant stakeholders to inform and formulate guidelines and actions aimed at respecting ethical guidelines when deploying competencies and governance practices for AI and other innovative technologies in the public sector.

Q4: As the demand for innovative technologies expertise grows, governments face the challenge of bridging the skills gap in this area. In the context of addressing this gap, experts grapple with the challenge of equipping individuals with the necessary knowledge and skills to thrive in a GovTech environment. In your opinion, how can governments address the skills gap in innovative technologies?

It is not always easy to understand which competencies are needed in such a fast-evolving environment, but different studies are helping policymakers bridging this gap. Other than expertise, creating synergies and boosting collaborative efforts with different stakeholders, including academia, are essential in order to address the skills gap. Nonetheless, to properly address the digital divide since the early stage of individuals' life, it is important that digital modules are incorporated in school curricula across Europe. This approach would also help meet the target set by the Digital Decade Programme of having at least 80% of the EU population with basic digital skills. Several initiatives at the EU level, such as the European Social Fund Plus and the EU Academy, can also support in achieving this goal.

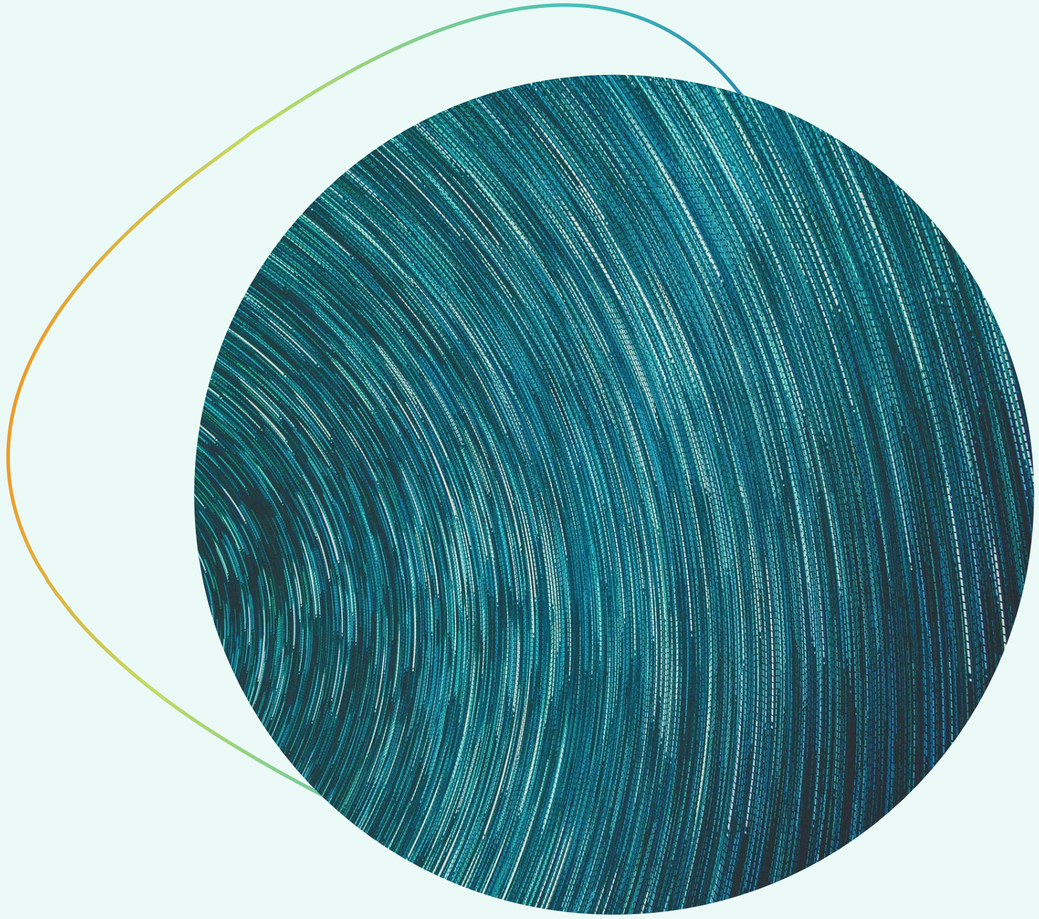
> **'It is important that digital modules are incorporated in school curricula across Europe.'**

Q5: The recently adopted Interoperable Europe Act offers an opportunity for innovative technologies, including GovTech, to play a key role in the EU digital context. In your opinion, which is the main role that GovTech plays within the IEA? And, how does it relate to other pieces of legislation at the EU level?

GovTech has a central role within the IEA. As a matter of fact, GovTech solutions represent one of the main entry points for establishing interoperability regulatory sandboxes, as well as developing open source interoperability solutions for public services, and fostering public sector collaboration and innovation. Furthermore, GovTech is connected to various EU legislative frameworks. For instance, it is integrated into the AI Act, aiding in addressing ethical concerns. It is also significant in the context of the Data Act and the Data Governance Act, particularly in the establishment of Common European Data Spaces. GovTech solutions play a crucial role in ensuring a trustworthy and secure environment, benefitting both European businesses and citizens.

Q6: In your opinion, what are the main strengths of the AI Act? Are there any areas for which the Act's provisions have fallen short? How do you foresee the implementation of the AI Act impacting the use of AI beyond Europe?

The main strengths of the AI Act are indeed the limitation of reuse for some companies and the requirement to conduct conformity assessments. On the other hand, there is no real area where the Act has fallen short, but its provisions may evolve in the future based on technological advancements. As the AI Act represents the first legislation on this topic worldwide, third countries may be inspired to adopt similar laws that will then have to be adapted to the national context. Now that the Act is part of the EU acquis, if third countries decide to enter the EU market, they would be obliged to comply with the provisions set forth.



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CHAPTER 5

Conclusion

Conclusion

By taking a look at the main achievements at both the national and European levels linked to digital public administration and interoperability-related initiatives, this report has presented a comprehensive overview of the significant progress made across different policy areas over the past year. As a matter of fact, the actions consulted and the data analysed for 39 European countries have revealed **notable strides in the digital transformation remit**, with an increasing number of public services becoming accessible online. At the same time, advancements have been registered in the field of interoperability and data access and re-use, as well as trust and cybersecurity. The innovative use of technologies has also been identified as an area of noteworthy progress. The overview offered by this report has been complemented by the results of the 2023 data collection on the implementation of the EIF. It is worth noting that the results from the 31 participating European countries showed steady growth between 2022 and 2023, standing as a testament to the commitment of countries in achieving the objectives set forth by the framework.

The main findings from the report point out that **digitalisation can be a catalyst for change**, offering many benefits for public administrations, including **improved efficiency and effectiveness, enhanced trust and security, and administrative burden reduction**. In this context, interoperability aims at facilitating the digital transition **by easing cross-border data exchange and accelerating the digital transformation of the public sector**. For this reason, the adoption this year of the Interoperable Europe Act becomes of paramount importance. This landmark legislation has, in fact, reinforced efforts done at the national and European levels and further affirmed the central role played by interoperability in accelerating the harmonisation of **seamless cross-border digital public services across Europe**.

Looking ahead, there is no doubt that interoperability will keep shaping the lives of European citizens and businesses. European countries and the European Commission will continue their efforts to adopt initiatives, including legislation, action plans, and infrastructures, aimed at supporting the digitalisation of the public sector and upscaling digital skills. Moreover, emerging technologies will drive the creation and adoption of innovative solutions, which are set to support and improve the delivery of public services and the work carried out by public administrations. All in all, 2024 has so far marked significant progress and achieved key milestones in the European digital journey; yet, this is just the beginning of what technological advancements may bring in the future.

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ANNEX I
Overview of the performance of European countries in the field of interoperability

6. Annex I - Overview of the performance of European countries in the field of interoperability

Annex I will provide more detailed information on the **2023 EIF results at EU level** (i.e., graphs and short descriptions of the four EIF scoreboards). This section provides a global overview of the 2023 European countries' performance for each pillar of the EIF and compares it to the 2022 results.

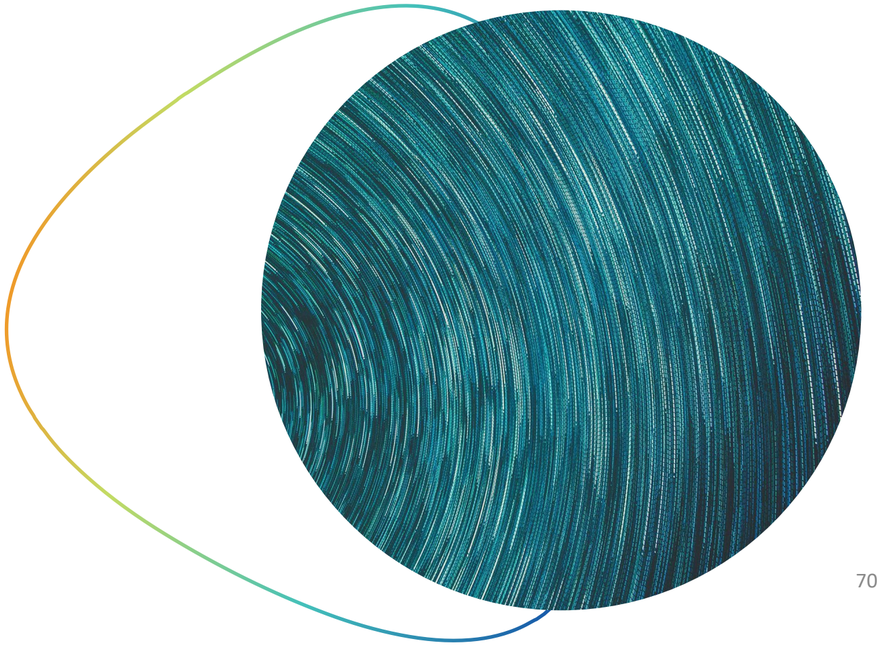

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Figure 3 European results of the implementation of the interoperability principles, 2023 vs 2022

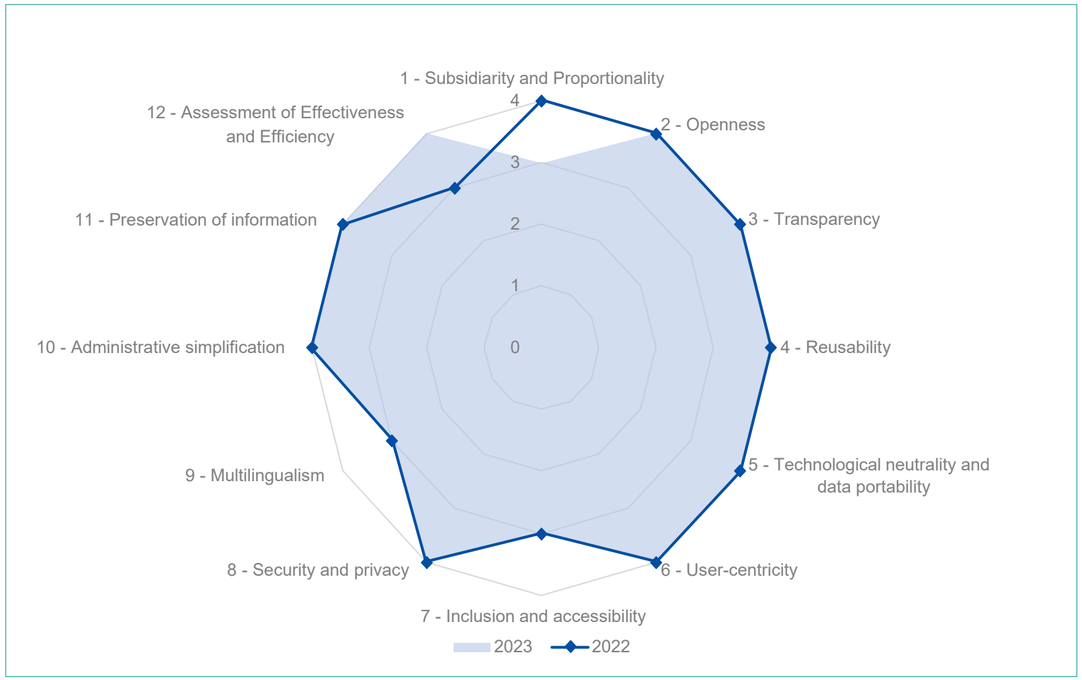

Figure 3 presents the 2023 and 2022 results of the implementation of the **interoperability principles at the EU level**.

In the first pillar of the EIF, the 2023 results indicate a decrease in the average implementation level of Interoperability Principle 1 – Subsidiarity and Proportionality. This decrease is due to one country changing their result from 'No Data' in 2022 to a score of 3 in 2023.

Conversely, there has been **an increase in the implementation of Assessment of Effectiveness and Efficiency** (Principle 12), with countries reaching the maximum score of 4.

The scores for Inclusion and Accessibility (Principle 7) and Multilingualism (Principle 9) have remained consistent with the previous edition of the EIF monitoring mechanism, indicating that these areas continue to be potential areas for improvement.

Figure 4 European results of the implementation of the interoperability layers, 2023 vs 2022

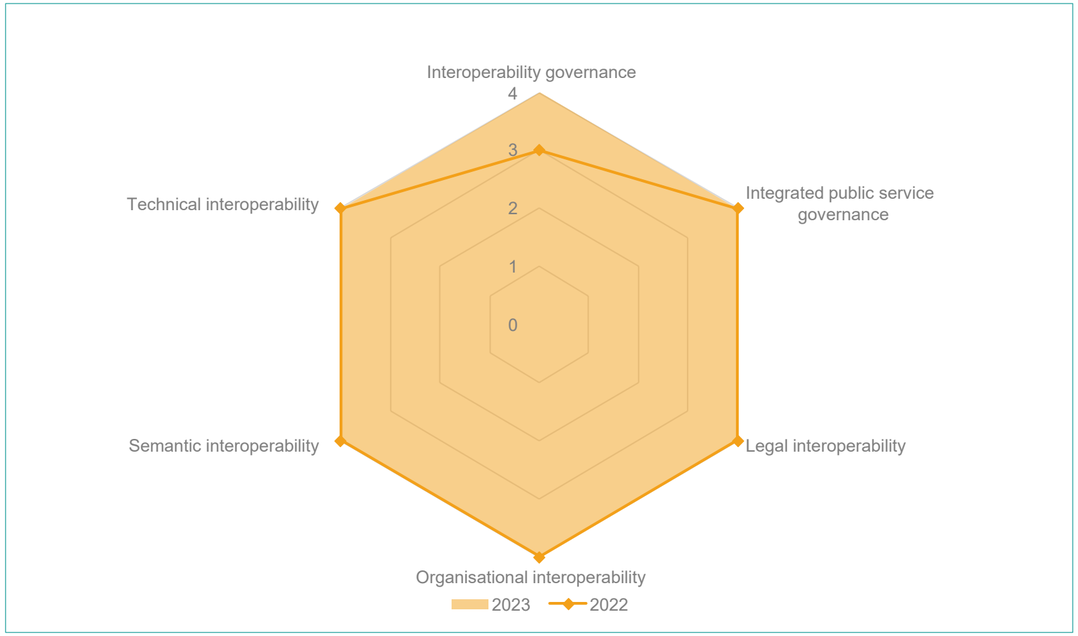

Figure 4 presents the 2023 and 2022 results of the monitoring of the implementation for the **interoperability layers** of the EIF.

For the second pillar, the 2023 results indicate that European countries have improved their scores since 2022.

Specifically, the **Interoperability Governance layer has seen an increase**, reaching the maximum score of 4.

As a result, **all interoperability layers are now scoring maximum points**.

Figure 5 European results of the conceptual model, 2023 vs 2022

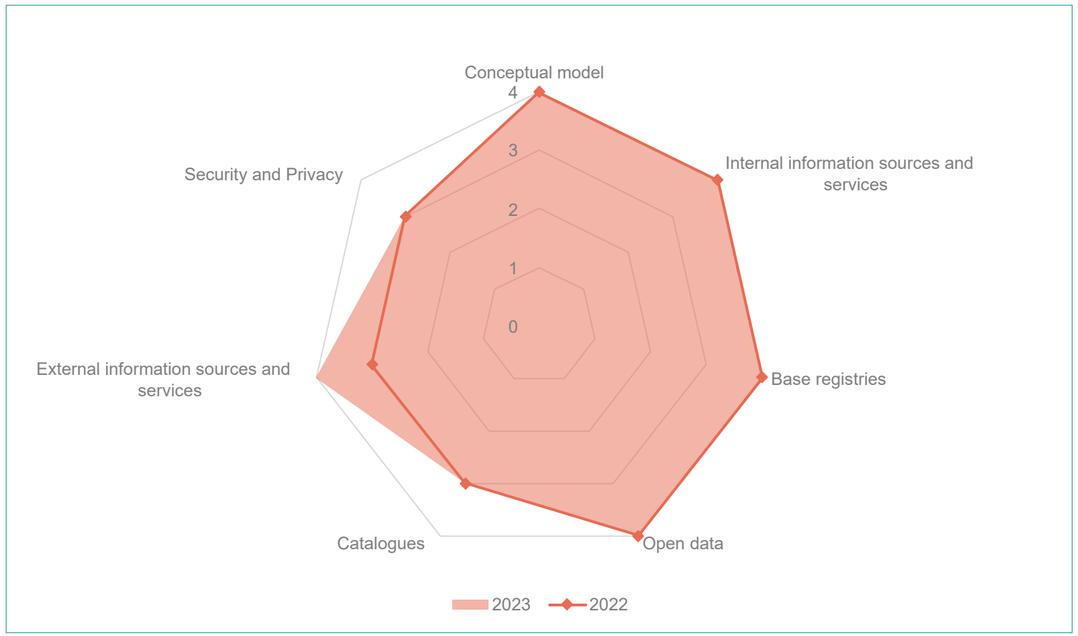

Figure 5 depicts the 2023 and 2022 results of the monitoring of the implementation for the **conceptual model** pillar of the EIF.

For the third pillar, the 2023 results show that, on average, European countries are now scoring **maximum points in five of the EIF conceptual model's components**, an improvement from 2022.

This is due to **an increase in the use of External information sources and services** while developing public services, which has now reached the maximum score of 4. These results reflect the countries' commitment to enhancing data reuse, access, and openness, key drivers for interoperability.

However, there is still potential for improvement in the setting up of catalogues for European public services and ensuring that security and privacy matters are adequately considered when providing public services.

Figure 6 European results of cross-border interoperability, 2023 vs 2022

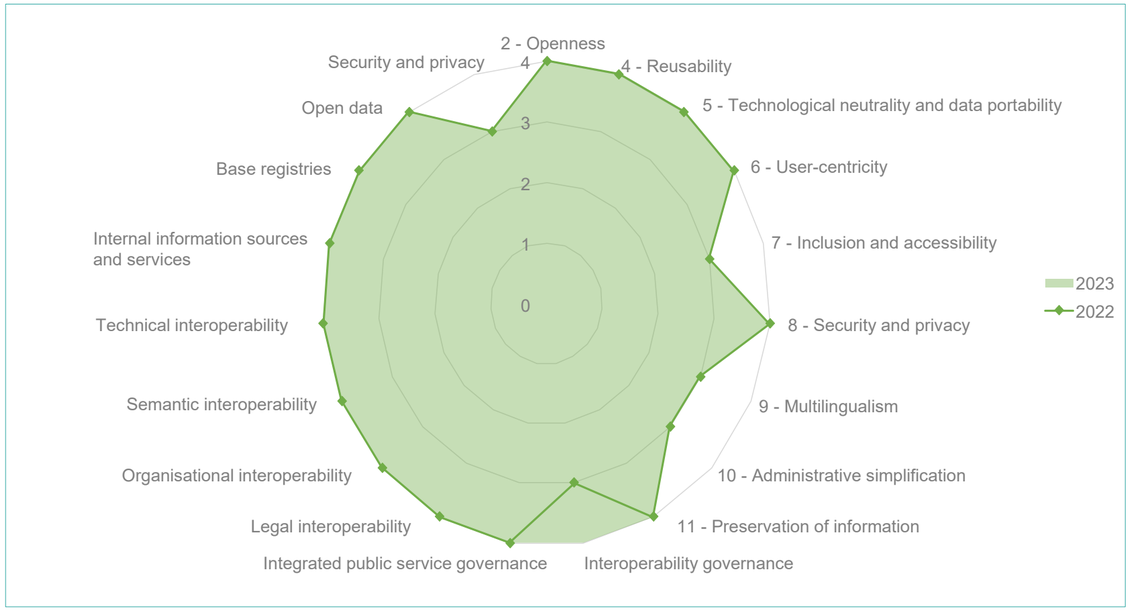

Figure 6 presents the 2023 and 2022 results of the fourth scoreboard of the EIF monitoring mechanism, on the European level of **cross-border interoperability**.

The overall 2023 results of the fourth scoreboard indicate that European countries have made **progress in their level of cross-border interoperability**. Notably, the score on Interoperability Governance has increased to 4.

The scores for the other areas, including Inclusion and Accessibility (Principle 7), Multilingualism (Principle 9), Administrative Simplification (Principle 10), and Security and Privacy, have remained unchanged.

These areas continue to represent opportunities for further improvement in cross-border interoperability.

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