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Identifying opportunities for streamlining European monitoring of digital policies

Landscaping the monitoring of interoperability and digital transformation

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Abstract

For over 20 years, European digital policies have tracked the progress of Member States through monitoring activities involving indicators and, increasingly, capacity-building, benchmarking and maturity assessments. This report presents a *Strengths, Weaknesses, Opportunities and Threats* (SWOT) analysis of the European Commission's (EC) monitoring 'landscape' of key digital policies related to interoperability and the digital transformation of government. It provides recommendations to streamline and modernise monitoring, drawing on evidence from key EC monitoring schemes and the EC staff responsible for them, alongside contributions from the Member States via their Chief Information Officers and members of the Interoperability of European Public Services Expert Group, amongst others.

Keywords

Regulatory monitoring, Better Regulation, RACER, indicator, public sector, interoperability, digital transformation of government, digital government, Digital Decade, European digital policies, EIF, NIFO, DESI, eGovernment Benchmark, Berlin Declaration, Digital-ready policymaking.

Foreword

The European Commission (EC) has put digital transformation at the heart of its policy agenda with its *Communication on Europe's Digital Compass* [1]. Digital technologies and innovation are critical in enabling access to various services. In this context, the EC is increasingly emphasising digital sovereignty. Europe is to develop its digital capacities and infrastructures rather than depending on others.

Additionally, the COVID-19 pandemic showed - more than ever - the importance of digital technologies to sustain governance processes and the need to innovate our institutional systems. As a response, digital transformation becomes a central pillar in the *Recovery and Resilience Facility (RRF)* [2] centrepiece of NextGenerationEU [3], designed to provide financial aid to Member States (MS) to make the European economy more digital and consequently, more resistant to future shocks.

The ongoing digital transition, and related challenges to achieve the targets set for *Europe's Digital Decade to 2030* [4], are well recognised in the European Union policies, especially by the *Europe Fit for the Digital Age* [5] priority of the European Commission, its revised *Digital Strategy* [6], and the ambitious agenda put forward by the *Recovery Plan for Europe* [7].

EC Joint Research Centre (JRC), the science and knowledge service of the EC with the mission to support EU policies with independent evidence throughout the whole policy cycle, plays a significant role in achieving all those priorities. Not alone, but by supporting and partnering with many policy Directorates-General (DGs).

One of those partnerships was established with Directorate-General for Informatics (DG DIGIT). The partnership has been developed over the last years through different programmes - mainly *ISA* [8] and *ISA²* [9] and several successful actions like *ARE3NA* [10], European Union Location Framework (*EULF*) [11] and European Location Interoperability Solutions for e-Government (*ELISE*) [12]. Their main goal was to support the development of digital solutions that enable public administrations, businesses and citizens in Europe to benefit from interoperable cross-border and cross-sector public services.

With the new generation programmes, DIGIT and JRC continue to make essential contributions in supporting the abovementioned policies, particularly the priorities set out in the *Digital Europe Programme* [13] (DIGITAL). The recent strategic partnership between them focuses on interoperability and digital government policies. It aims to help drive the digital transition of public administrations and public governance processes across the EU. More specifically, it helps to advance the digitalisation of European public administrations focusing on four complementary objectives:

1. Strengthen the interoperability of public administrations in Europe
2. Support the monitoring of digital transformations in digital governance
3. Understanding and promoting the use of Artificial Intelligence (AI) and emerging technologies in the public sector
4. Assist in community building for digital governance in Europe.

The activities supporting those objectives are named Innovative and Interoperable Public Administration and Services (I²PAS) and financed under the *European Digital Government Ecosystem* (EDGES) Chapter of DIGITAL.

The current report is one of the research results under I²PAS. It is a follow-up of the report "*Landscaping the monitoring of interoperability and digital transformation: streamlining the monitoring of Digital policies in the European Commission*" [14], therefore, contributing to objective 2, pointing to recommendations to optimise monitoring activities in the EU and, in particular, serving as a preparation for the proposal of a monitoring scheme of the upcoming *Interoperable Europe Act* [15].

More related materials and the latest news about our work are available from the innovative public governance section of the JRC's Science Hub [16]. Results from the collaboration with DIGIT are also provided in a dedicated section on the Joinup platform [17].

Acknowledgements

The authors would like to thank all those who contributed to the study. In particular, we would like to thank colleagues from the *Directorate General for Informatics* (DG DIGIT) and *Directorate General for Communication Networks, Content and Technology* (DG CONNECT) for their time and dedication to the activity in outlining the background and plans for their monitoring activities, as well as their interest in potential common ways forward towards improved monitoring of interoperability and the digital transformation of government in Europe.

In addition, we would like to thank the comments and reflections from colleagues in the JRC's T1 Unit *Digital Transformation and Data*, whose valuable inputs helped improve the report and provide insights into a range of ongoing activities, helping to make our content as up-to-date as possible and for the suggestions from our reviewers. In particular, we thank Lily Paniagua for her analysis and support.

Lastly, we would like to thank the Member State representatives working on digital monitoring for their input to the study, including those supporting the *Interoperability of the European Public Services* Expert Group. Their openness and sincerity have ensured the study team is well-placed to engage with the priorities that stakeholders have identified and can take ownership of collectively in the future.

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Executive summary

In recent years, the European Commission (EC) has established several monitoring and reporting activities to measure progress in interoperability-related policies and the digital transformation of government in the Member States. However, digital technologies and the policy demands they create evolve quickly, requiring monitoring to adapt to changes.

In this line, the EC priority *A Europe fit the digital age* [5], the *Digital Decade* [4] policy programme and the proposed Interoperable Europe Act [15] will either establish new or further develop existing monitoring systems. The proposed Act arrives at a critical moment requiring an analysis of the complexity of the European monitoring 'landscape' around digital to assess how current monitoring fits into the emerging overarching strategy.

For their part, Member State (MS) representatives have indicated that the monitoring obligations and their current governance represent an increasing challenge. Therefore, it is crucial to identify improvement areas that reduce the administrative burden of monitoring activities for both the EC and MS while multiplying the benefits of the insights gathered from monitoring.

This report is part of the study launched by the *Directorate-General for Informatics* (DG DIGIT) and undertaken by the *Joint Research Centre of the European Commission* (JRC) in close collaboration with *Directorate-General Communication Networks, Content and Technology* (DG CONNECT), entitled "*Landscaping the monitoring of interoperability and digital transformation: streamlining the monitoring of Digital policies in the European Commission*" [14], hereafter referred to as the JRC study.

In particular, this document includes the analysis of the EC monitoring landscape's *Strengths, Weaknesses, Opportunities and Threats* (SWOT). It also provides recommendations to streamline monitoring. It draws on evidence from the analysis of key *EC monitoring schemes* (i.e. indices, observatories, benchmarking activities etc.), as well as several discussions with EC staff responsible for them, alongside contributions from the MS via their Chief Information Officers and members of the *Interoperability of European Public Services Expert Group*, amongst others. Importantly, the diagnosis and recommendations provided are only a starting point to be validated, complemented and prioritised by the interested parties through a 'co-creation' approach.

Policy context

Interoperability is defined by the *European Interoperability Framework* (EIF) as a "key factor in making a digital transformation possible. [It] allows administrative entities to electronically exchange meaningful information in ways that are understood by all parties" [18]. It has been part of EC policy since the *Interchange of Data between Administrations* Programme (IDA) [19] in 1995, followed by a series of 5-year strategies and programmes to help enable e-government across borders and sectors in Europe. The EC's proposal of the *Interoperable Europe Act* in November 2022 can be seen to consolidate, therefore, over 25 years of collaboration between the EC and MS experts around this topic.

At the same time, EC policies on the information society have evolved, with *digital* being one of the high-level priorities of the current Commission, including digital considerations contributing to the economic policies of the *European Semester* [20] and the framing of digital policy under the *Digital Decade 2030* [4].

These two new policies provide the opportunity to evaluate and optimise monitoring activities. A recent evaluation [21] of the *2016 eGovernment Action Plan* concluded that *e-services'* availability varied notably across Europe, independent of the implementation of EC actions. Assessing progress in this area is, therefore, still needed.

Key conclusions

Given the policy context and technological changes, it is timely to assess if monitoring remains fit-for-purpose or if alternative approaches would create increased efficiency and new possibilities.

Monitoring efforts seem to rest at an early stage of digitalisation. There is a lack of integrated dashboards, and the underlying processes remain non-formalised and unaligned. Increased coordination and collaboration within the EC and between the EC and MS would improve the collective understanding of the digital landscape for the public sector across Europe. It could help assess where increased efficiencies would lie, moving from existing 'silos' to a more 'interoperable' approach.

Interoperability is recognised as a key enabler of digital transformation processes. It can facilitate the automation and sharing of processes within and across actors in the EC. Interoperability is also a concern of digital-ready policymaking, as defined under the current EC Digital Strategy. Most of interoperability's underlying

principles, as set out by the *European Interoperability Framework (EIF)*, are in play in this potential to modernise. Interoperability efforts across monitoring schemes can foster more agile and efficient monitoring asset exchanges, including their data, metadata and documentation.

Monitoring both the interoperability in public administrations and the digital transformation of government in the EU policy landscape covers numerous aspects, ranging from standards adoption to the protection of citizens' rights online. However, reporting burdens and inefficiencies persist. Some MS ask for priority-setting and to explore alternative approaches to reduce such monitoring and reporting burdens.

This report highlights a series of elements to pay attention to, ranging from improving the timing of requests for information to assessing if indicators are relevant or need data to be submitted annually or over longer periods. It points to the challenge of dealing with issues such as MS moving at different speeds in their digitalisation while, at the same time, applauding the 'personal bests' of those still learning. It is important to reconsider monitoring beyond *output* measurement, shifting attention towards digital policy *outcomes* and *impacts*. Piloting alternative approaches should help understand whether minor adjustments or more fundamental changes are needed.

Furthermore, the evolving policy context introduces uncertainties; for instance, the proposed *Interoperable Europe Act* (still under negotiation) will require regulatory monitoring covering the implementation of a yet-to-be-revised EIF, interoperability solutions uptake and open-source development. Among the new measures, *interoperability assessments* are foreseen that could perhaps be used as a source of information in the Act monitoring exercise. Similarly, any reconfiguration of monitoring efforts for interoperability could provide streamlined evidence useful for Digital Decade-related monitoring or other policies.

Any change should be highly collaborative between stakeholders to increase the benefits of monitoring and the ownership of results. Thus, a 'co-creation' process is proposed as the most appropriate way to assess the evidence base and take action towards the upcoming policy needs, setting a more sustainable set of activities in place.

Related and future JRC work

This report is a milestone in the study as it helps validate the evidence gathered over several months and sets the ground for work in 2023/2024. The next phase of the study will address issues in modernising the monitoring of digital transformation and interoperability in the public sector. More specifically, it will aim to support how the *Interoperable Europe Act* monitoring mechanism could be established.

The report is part of a series of JRC activities related to interoperability and data-sharing in the public sector. Activities include work on regulatory aspects and legal interoperability and support to the further development of semantic interoperability in public sector data-sharing. The JRC is also following the adoption and diffusion of specific technologies in the public sector, including Blockchain or Artificial Intelligence (AI) and the establishment of data spaces and the opportunities of sandboxing for both technical and regulatory purposes.

Although the study is very much positioned in terms of public sector processes, it also engages in those areas of digital where all actors meet, including those related to *GovTech* [22], where public and private sector actors innovate with ICT collaboratively, *digital innovation* and the broader sphere of *digital governance*. Relatedly, aspects of the study can contribute to the wider social and economic view of Europe in the *Digital Decade*, where interoperability can be an enabler towards the 2030 targets of the Digital Compass, particularly the digitalisation of public services.

Quick guide

This report summarises the work of analysing existing monitoring approaches and proposing a way ahead. It distils and further articulates the evidence base presented in the JRC report *Landscaping the monitoring of interoperability and digital transformation* [23], alongside recommendations for wider consultation.

Section 1 provides details of the key monitoring schemes addressed by the study, as well as its rationale, objectives, methodology, challenges and limitations. **Section 2** reports on the key takeaways from the broader landscaping study. **Section 3** presents the SWOT analysis, followed by recommendations for a way ahead in **Section 4** and conclusions presented in **Section 5**.



1

Introduction

1 Introduction

In 2022, the *Directorate-General for Informatics* (DG DIGIT)¹ launched a study with the European Commission's *Joint Research Centre* (EC-JRC) to examine the landscape of monitoring schemes related to Interoperability and Digital Government. Key initiatives include the *Digital Economy and Society Index* (DESI) [24] and the eGovernment benchmark (eGov) [25], both led by Directorate-General for Communications Networks, Content and Technology (DG CONNECT)², as well as the *National Interoperability Framework Observatory* (NIFO) [26], which includes the *European Interoperability Framework* (EIF) [27] monitoring and the *Digital Public Administration factsheets* [28] and the *Berlin Declaration monitoring* (BDM) [29], both led by DIGIT. These schemes were developed separately to examine the progress in adopting and implementing digital policies across the European Union (EU) across a broad set of topics (see **Annex: Overview of analysed established monitoring schemes** for details).

As the EU policies evolve to accommodate new realities, the need to measure progress is also subject to change. Of particular note in this context are initiatives such as the Digital Decade, where for the first time, the Member States (MS) have committed to contribute to the common achievement of their targets [4], the *Declaration of Digital Rights and Principles* [30], the *Local and Regional Digital Indicators for smart cities and regions* (LORDI) [31] as part of the *Living in EU* movement [32] and the proposal for the *Interoperable Europe Act* [15], including, among others, the revision of the EIF and its subsequent monitoring. These new activities address varying facets of digital transformation and interoperability.

In addition, MS representatives have indicated that monitoring obligations are becoming increasingly challenging. Therefore, seeking increased benefits from the information gathered while reducing monitoring-related administrative burdens is essential. More specifically, the MS have recognised the need for close work between the existing monitoring activities, as seen in the following key quote:

"We therefore invite the forthcoming EU Council Presidencies to pick up and improve this work, again with the support of all MS and the European Commission - and in close alliance with other EU initiatives (e.g., DESI, eGovernment Benchmark, NIFO)"

Berlin Declaration foreword – 2022

The *Digital Decade* policy program and the upcoming *Interoperable Europe Act* will establish new monitoring schemes or adapt existing ones, with a first round of reporting in the context of the Digital Decade expected in mid-2023.

This context offers a unique window of opportunity to assess and address the complexity of the current monitoring landscape by, for example, attempting to align efforts before the indicators are enshrined in implementing acts.

Flexibility in monitoring is needed to respond to the evolving EU policy needs, ensuring that any change is justified, transparent and endorsed by stakeholders. DESI will provide much of the assessment for progress on the Digital Decade's Compass but not the enabling role of cross-border interoperability. In addition, assessments of European Digital Rights and Principles under the Digital Decade will follow and extend some topics currently covered by the BDM.

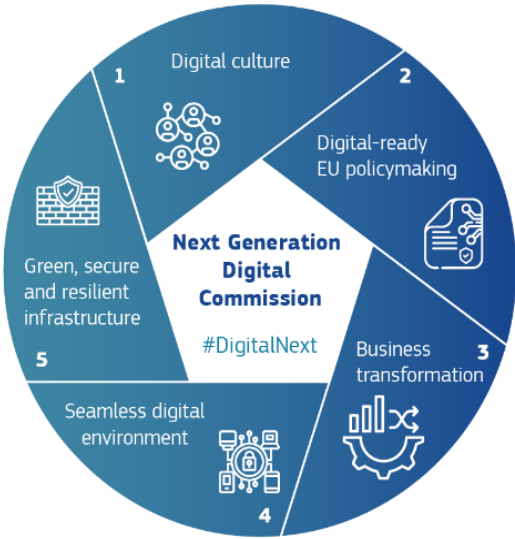
The described policy development also occurs alongside the EC Digital Strategy [6]. This internal strategy sets a new vision for addressing digital transformation opportunities of a post-pandemic scenario while supporting the delivery of the EU's strategic priorities by 2030. The strategy aims to optimise business operations and processes, streamline and automate workflows and use technologies to increase productivity. Balanced governance and stronger partnerships within the EC towards a single digital government mind-set are also key factors and fall, for that reason, within the scope of this study. More than an organisational 'IT strategy' to digitalise and automate, the Digital Strategy aims to improve the digital culture of the EC, including aspects of

¹ DG DIGIT is responsible for digital services that support other Commission departments in the EC in their daily work and that help public administrations in EU MS.

² DG CONNECT develops and implements policies to make Europe fit for the digital age.

digital inclusion, digital sovereignty, trust and the ethical use of innovative technologies. Key aspects of the EC's digital transformation are highlighted in **Figure 1**.

Figure 1: Commission’s strategic objectives for its digital transformation journey



Source: European Commission digital strategy - Next generation digital Commission.

Moreover, for several years, the EC has carried out policy simplification activities of regulatory fitness and performance through the *REFIT* [33] programme and improved evidence and stakeholder engagement through *Better Regulation* [34]. More specifically, the *Better Regulation Toolbox* [35] provides specific advice on *Monitoring Arrangements and Indicators* (Tool #43) that form part of the analysis and suggestions for further work. Similarly, the notion of *digital thinking* is introduced across all stages of the policy cycle, from policy design, impact assessments, stakeholder consultations, policy implementation and, of interest to this study, monitoring and evaluation, through the *Digital-ready policymaking* (Tool#28) and its associated policy assessments. EC guidance is, therefore, a reference frame that can aid the assessment of current monitoring practices.

The evidence base in this document is available in the JRC report *Landscaping the monitoring of interoperability and digital transformation* [23]. This detailed report analyses the policy context of interoperability, digital government and more recent developments in digital transformation in the public sector over the last 15 years, including more details of the above-mentioned Better Regulation approaches.

The landscape analysis focuses on the four key established initiatives mentioned above, placing them in the wider context of other established and planned EC-led activities, including the digitalisation of government at the local and regional levels. Analyses have included the composition of the monitoring schemes, their stakeholder groups, a detailed examination of the indicators and, importantly, their reuse between existing monitoring schemes. Research has also covered documentation, data-sharing approaches and the varying terminology used within and between schemes. Through stakeholder interviews, the study addresses the level of common understanding and plans for interoperability and digital transformation monitoring by EC staff and MS. Interviews have provided evidence on national approaches, perceived benefits and burdens in monitoring. Known and potential gaps are also presented, alongside future possibilities and a high-level review of national digital policy monitoring platforms, portals and other current practices.

Overall, the report provides evidence as to why improving monitoring in the EC digital policy context is an opportunity for improved interoperability and a course of action for digital transformation in the public sector for both the EC and the MS.

1.1 Rationale of the study

It is necessary to review established and planned monitoring schemes to propose areas for improvement in the monitoring landscape of the EC digital policy that can lighten the burdens perceived by the MS while adapting to new policies and technical realities.

Therefore, the study of monitoring schemes includes the analysis of their rationale, methodologies, nature and content of their indicators, data sources used, related outputs and timelines. However, further analyses are needed to understand the extent to which today's monitoring mechanisms are fit-for-purpose or whether alternative approaches should be added or replace current ones.

The potential to modernise monitoring exercises by improving interoperability and digital transformation across schemes is also in the scope of this study. Monitoring can be seen, to some extent, as a '*European Public Service*', with monitoring schemes, therefore, needing to be "interoperable by default". For example, the EIF principle of *Administrative Simplification* can also be applied to the streamlining of monitoring as a way to reduce the burden and create public value. Likewise, the EIF's interoperability governance supports the need to examine organisational issues, roles and responsibilities, amongst others, at national and EU levels.

1.2 Objectives of the study

The study aims to analyse the established monitoring approaches, practices and indicators related to interoperability and the digital transformation of government and identify areas for improvement under two main objectives:

- On the one hand, the study sketches a picture of the general situation in European digitalisation monitoring initiatives. It presents uncovered inefficiencies and opportunities to foster collaboration, helping reduce unnecessary burdens for the EC and the MS.
- On the other hand, the study aims to support the upcoming monitoring of the Interoperable Europe Act, building on the experiences of the inherited NIFO/EIF scheme. Ways to move ahead include reusing indicators from other EC schemes or third parties, gathering best practices, identifying opportunities for collaboration between different teams or ensuring the alignment of EIF and BDM with complementary European policies, to name a few.

More importantly, this study is more than the present report. A notable stakeholder engagement effort has been made to establish a stable communication channel with representatives from the EC and MS involved in monitoring digital transformation.

Specifically, the study addresses questions such as:

- Which monitoring schemes and specific indicators address interoperability and digital transformation of government?
- What is the level of coherence of the monitoring schemes? What is their rationale, and what role do they play? What are the verified usages or advantages of the different monitoring schemes? What are the challenges?
- What are the gaps, overlaps and emerging opportunities in the monitoring landscape? How to ensure synergies and alignment across the monitoring needs for digital policies in the EU in light of the new Interoperable Europe policy? How can the overall burden be reduced?
- How might the monitoring schemes be redesigned to fit future policy needs, reduce the burden and provide actionable and useful results for the EC and the MS?

The study examines these questions 'on the ground' in the first phase, with results reported in this document. A second phase will explore the steps that could be taken to modernise monitoring in collaboration with stakeholders to apply in the upcoming monitoring of the Interoperable Europe Act.

1.3 Study methodology

The study approach has treated the different monitoring schemes as case studies. Each monitoring scheme is a discrete activity with its artefacts, documentation and stakeholders, both within and outside the EC. The methodology has involved qualitative research techniques. These have included document and website review, semi-structured interviews (ten with EC staff and ten individuals participating in group interviews from four Member States) and attending three stakeholder workshops on DIGIT's monitoring schemes, occasionally as active participants. Although interviews and workshops did not follow an ethnographic approach, efforts have been made by the study team to act as a trusted and neutral advisor to build relationships with stakeholders for ongoing and future engagement.

Much of the work has involved examining documentation to create an overview of the landscape from measured discrete elements. For example, the indicator analysis followed an 'ecological' mapping of the relationships between the indicators, their related topics and the evolving scope of each initiative.

Details of the full approach and evidence captured in the study are further presented in the Technical Report "*Landscaping the monitoring of interoperability and digital transformation: streamlining the monitoring of Digital policies in the European Commission*" [14]. This more detailed report also examined the changing policy context, indicating the likely increase in monitoring efforts in new areas comprising new technological challenges and interest in local and regional developments. Regular internal meetings with key DG DIGIT and DG CONNECT staff have ensured the study team to adjust investigations with current policy developments.

Initial findings have been validated in two key stakeholder meetings, firstly with the *Commission Expert Group on Interoperability of European Public Services* (in October 2022) and secondly with leaders at the *Chief Information Officers* meeting (in November 2022). These meetings also showed the willingness of MS to engage in the study. Some in-depth interviews with representatives from France, Italy, Romania and Sweden also took place and provided inputs to the analysis presented in this report.

Specifically, this document presents a high-level overview of the monitoring landscape as a *Strengths, Weaknesses, Opportunities and Threats* (SWOT) analysis, followed by a series of recommendations for potential action. A co-creation process with relevant stakeholders is foreseen inside and outside the EC to address the uncovered issues. Therefore, this material sets out the landscape's 'problem space', offering a means to prioritise issues for discussion with stakeholders and to plan specific actions and tracks of work, including the potential to pilot new approaches to monitoring.

It should be noted that the work does not include a cost-benefit analysis of monitoring schemes. However, a first qualitative approximation is provided through interviews involving the compilation, submission and verification of national data. *Public value* also remains an underpinning consideration of the study. The approximate costs and benefits of any action taken may play a supporting role in the subsequent phase of the study.

1.4 Challenges and limitations of the study

The overall study can be framed as an attempt to increase the public value of the monitoring exercises through increased interoperability and deep digital transformation of EC monitoring schemes. The study team has identified a relatively large and varied stakeholder group involved in the EC digital monitoring landscape with somewhat fragmented competencies in different EU policy units. Moreover, stakeholders must fulfil their legal obligations while staying abreast of technological evolution, which requires regular revision of monitoring schemes.

An initial challenge has been the lack of semantic harmonisation when referring to monitoring and its components. The use of related but not equivalent terms has been observed, such as "index", "observatory", "dashboard", "scoreboard", "ranking", as well as "indicator" and "Key Performance Indicator (KPI)". For greater clarity and consistency in the scope of this study, it was necessary to fix early on the terms "monitoring scheme", "dimension", and "indicator" to refer generically to the concepts of components across the schemes examined.

Eurostat defines an indicator in its *Eurostat's Concepts and Definitions Database* [36] as a:

"Summary measure related to a key issue or phenomenon and derived from a series of observed facts. (They)... can be used to reveal relative positions and/or show positive or negative change. When evaluated at regular intervals, an indicator can point out the direction of change across different units and through time. In the context of policy analysis, indicators are useful in identifying trends and drawing attention to particular issues. They can also be helpful in setting policy priorities and in benchmarking or monitoring performance."

Indicators provide essential information on the status and progress of given activities and allow the comparison of different aspects over time and geographies. Monitoring produces the data indicators track, which is then reflected in reports that interpret data. Other opinion-based sources, such as testimonials or interviews, can enrich the knowledge and help interpret and validate the value and direction of an indicator.

This terminology reflection is not trivial; a shared *conceptual model* of these fundamental aspects and how they fit together is missing, as recognised by stakeholders. It impacts the potential to align and evolve monitoring, with specific recommendations to tackle this noted below.

The reader should also consider a series of additional challenges and limitations:

- Only 'fully operational' monitoring schemes running for more than one data-gathering cycle have been analysed. However, information emerging about policy proposals and new indicators in creation or under review were considered to the fullest extent possible.
- Parts of this work are, by their very nature, subjective. On the one hand, there is a high degree of subjectivity, for example, when mapping existing indicators to underlying interoperability principles. The presentation of the SWOT analysis in this report aims to be somewhat abstract from this subjectivity by moving away from the particularities of specific instances to help validate the broader issues uncovered with stakeholders. Similarly, the qualitative evidence from interviews depends on the policy and technical profile of the interviewee. The latter impacted what they see as areas of concern, both inside and outside the EC, where issues were seen as 'stronger' if multiple interviewees shared similar insights.
- Given the explorative nature of this work, the sequence of interviews and presentations of intermediate results kept providing insights for possible additional investigations with new questions emerging. This raised a scoping challenge, as possible additional work could be done to broaden the monitoring schemes to evaluate or deepen the analysis almost continuously. A balanced approach was adopted to concentrate the first phase on a selected set of monitoring schemes. Extensions of this work would be possible based on future needs and interests, including research by other groups.
- Similarly, balancing expectations, timing, and quantitative and qualitative analysis was challenging. It is hoped that the foreseen co-creation process with stakeholders will help set the priorities based on the SWOT analysis for carrying out the subsequent phase of the study.

The background is a vibrant orange color. It features a large, stylized number '2' in a darker shade of orange, positioned behind the text. The background is also decorated with various geometric shapes, including triangles and polygons, some of which are semi-transparent. In the lower-left and bottom-right areas, there is a network diagram consisting of small colored dots (blue, green, orange) connected by thin white lines, suggesting a data or social network structure.

Key takeaways from the landscaping analysis

2 Key takeaways from the landscaping analysis

The first phase of the study, documented in the JRC report "*Landscaping the monitoring of interoperability and digital transformation: streamlining the monitoring of Digital policies in the European Commission.*", examined the nature of key EC digital monitoring schemes. This section encapsulates its key findings, grouped by the research questions they answer. They act as a basis for setting a baseline for the proposed pathways in the remaining sections of this report.

Which monitoring schemes and specific indicators address interoperability and digital transformation of government? What is the level of coherence of the monitoring schemes? What is their rationale, and what role do they play? What are the verified usages or advantages of the different monitoring schemes?

The four analysed schemes cover aspects of digital transformation, such as *Digitalisation Progress* (DESI), *Usability of Digital Public Services* (eGov), the inclusion of democratic values in digital public services (BDM), or the adoption of measures fostering seamless Public Administrations (EIF). They all target public administrations, except for DESI, which covers the entire spectrum of the information society. Details on each are available in the **Annex Overview of analysed established monitoring schemes**.

Examining interoperability in these cases requires an analysis of the underlying principles involved to uncover relationships. Concerning coherence, the schemes seem to complement each other well. Thematically, they cover a useful range of topics under the umbrella of digital transformation with few overlapping areas. Their methodological heterogeneity, however, gives rise to indicators of different nature: quantitative/qualitative, of primary/secondary sources. Indicators are obtained through various data-gathering techniques, where automated techniques are still rare.

Data across the schemes have good spatiotemporal coverage and are generally available as raw and machine-readable data. Monitoring data is used to produce country and European reports or profiles, often through interactive visualisation tools. However, given the low uptake of such outputs by the MS, their value has been questioned compared to the cost of their creation. Further improvements can be made to foster openness and reusability, such as incorporating data into the European data catalogue and indicating the data use license.

The reuse of indicators is already happening through more or less informal collaborations. Such data reuse follows the 'Better Regulation' advice while providing a basis for further alignment or rationalisation of resources. However, reuse is often conditioned by specific monitoring timelines, especially the publication of the final reports, which establishes the order and sequence of the activities which follow. In addition, high dependencies between schemes have been observed when the reuse is done in both ways for the same year of collection, forcing joint publications. The former conditions can create bottleneck situations and even chained delays.

At the conceptual level, stakeholders seem to share a common understanding of the role of interoperability within digital government transformation. Many interviewees outline interoperability as a key component of the latter alongside areas such as improved digital skills. However, further alignment would require addressing challenges and a range of efforts outlined below.

What are the challenges? What are the gaps, overlaps and emerging opportunities in the monitoring landscape? How to ensure synergies and alignment across the monitoring needs for digital policies in the EU in light of the new Interoperable Europe policy?

The SWOT analysis (see Section 3) aims to address the above research questions in detail.

Many challenges arise from heterogeneous methodological and operational approaches.

There seems to be a need for resetting priorities to minimise the burden. Potential actions include re-evaluating existing indicators to know: if they reflect the policy's intended outcomes and remain relevant as implementation progresses or as the socio-technological context evolves. Similarly, the volatility of what is measured and its derived cost could be reviewed to adapt or optimise the observation frequency to the strictly necessary. Regular contact across monitoring teams and the performance of alignment exercises may help satisfy current and future digital-related policy needs.

Some MS have indicated that the volume and nature of information gathered need revision. A recurring request is to reduce opinion-based questions, particularly when input from multiple government departments is required. There are cases where MS question the accuracy or validity of analyses when contrasted with national data, and EC staff are also considering more objective approaches beyond self-reporting. These cases indicate a need for further collaboration to strengthen trust in the evidence produced, with co-creation potentially playing a role.

While each monitoring scheme has its *raison d'être*, common approaches should be explored to aid alignment, transparency and reuse of data and indicators, including through coordinated publication timing, common documentation approaches and potentially the presentation of results.

EC digital policies act similarly but do not have a discrete shared conceptual model, impacting alignment and where changes could occur towards common strategic goals. There is no comprehensive vision of data flows and monitoring systems at the operational level, which will probably affect the efficiency and costs of Information and Communications Technology (ICT) in both the EC and the MS.

A good collaborative environment for monitoring seems to form a good basis for future policies and monitoring developments. However, the existence of many groups of experts widely related to digital policy and government can raise challenges in coordination for the EC and MS.

How might the monitoring schemes be redesigned to fit future policy needs, reduce the burden, and provide actionable and useful results for the EC and the MS?

A range of alternative approaches to current monitoring practices has emerged through the study. One element would be to examine how an assessment of (mid to long-term) impacts and outcomes could be made to meet policy objectives and targets rather than focus on monitoring the status of a topic under investigation, thus being able to consider more the consequences of policy actions. Designing such an approach may involve developing a common view of the intervention logic of various monitoring schemes and the needs of, for example, the proposed Interoperable Europe Act and the monitoring of the Digital Decade.

From a techno-organisational point-of-view, the study shows that current EC digital policy monitoring faces interoperability and digitalisation challenges. Getting around them requires adopting a digital-ready policymaking mind-set and embarking on a fundamental digital transformation journey at the corporate level.

One way to address these would be to improve information exchange across monitoring schemes, as in a shared data infrastructure or a dataspace. This would include more aligned terminology across the evidence requested. It may also incorporate interoperability tools such as an indicator registry to reference and manage details while aiding transparency and reuse discretely, as well as appropriate templates, processing tools and governance approaches. In addition, several EC and MS actors have proposed a shared system or 'common database' that could support a wider set of users, including potentially the academic community interested in monitoring and digital policy.

From a research point-of-view, the work could be extended to monitor developments in relevant sectors engaged with ICT in government, thus broadening the view of the digital policy landscape. It may also be possible to deepen the analysis to address the ecosystem of actors and activities at national and subnational levels, including the efforts of LORDI and support through European Digital Innovation Hubs. This could aid a better understanding of data flows and the community engaged in achieving increased interoperability and the digital transformation of government. The 're-wiring' process noted above could trickle-down, where appropriate, as a transformative process across government.

Calls for "automation" could start with the mapping and modelling of data flows and business operations that intervene in and across schemes, involving, if appropriate, the ecosystem of subnational digital actors and policy. Automated data-gathering techniques, as noted in Article 20 of the proposed Act, may include data mining or the use of web analytics platforms. Running experiments that verify, for example, the interoperability level of cross-border digital public services through validation web services could also be considered. Alternative data sources could come, for example, from users, crowdsourcing and peer-reviewed evaluations. Artificial Intelligence (AI) or Blockchains that certify self-assessment authorship could also be used to reduce the burden or potentially improve objectivity and trust.

Given the above topics and possibilities, entering a meaningful 'co-creation process' is appropriate. Such a process should involve organising, testing, reforming, communicating, capacity building and, importantly, 'learning by doing', potentially through an 'agile approach'. Co-creation would, therefore, enable the best



SWOT of the monitoring schemes' landscape

3 SWOT of the monitoring schemes' landscape

A summary of the SWOT analysis in **Figure 2** concisely displays the key aspects of the monitoring landscape.

Awareness of their strengths sets the possibilities for action and 'launch-pads' for improvements. Identified weaknesses can guide which improvements can be made with minor effort and notable impact or where challenges require more investigation. Taking stock of the landscape allows opportunities and alternative approaches to be considered. However, some threats have also been set out at this study stage.

SWOT elements are closely related to each other, either because they have a cause-and-effect relationship or because they offer two sides of the same coin; for example, a weakness can lead to an opportunity.

Any options considered for action, ideally as part of a strategic action plan, will likely require further evaluation with their own set of risks and associated threats on a project or pilot basis.

Importantly, the material presented below is the result of the evidence base from the landscaping exercise of the first phase of the study, mainly derived from the opinions expressed by stakeholders in interviews, workshops and desk research of indicator sets. These are, therefore, not the opinions of the research team; rather, the only intervention made is an attempt to present a neutral and coherent view of these issues.

Figure 2: SWOT analysis of main groups (with the number of elements in brackets)

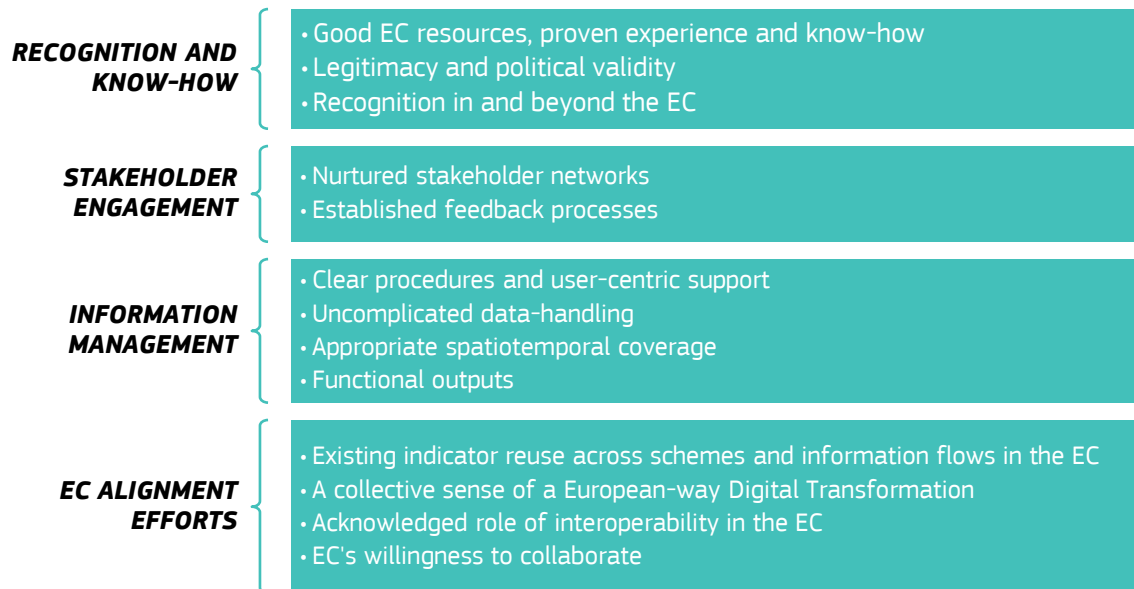


Source: JRC own elaboration

Strengths

We see the following strengths of the current monitoring schemes:

Figure 3: Summary of strengths found in monitoring schemes analysed



Source: JRC own elaboration

RECOGNITION AND KNOW-HOW

STRENGTH 1. Good EC resources, proven experience and know-how

The EC has extensive experience in monitoring different policies. Arguably, the amount of technical resources and the human capacity for monitoring is sufficient to undertake the framing and analysis tasks, often with the support of experienced consultants. However, some MS would appear to have limited capacity to respond to the EC requests for information related to the monitoring schemes examined.

STRENGTH 2. Legitimacy and political validity

Although not all monitoring exercises required by the EC have a legal basis, contributions to them might be seen as politically valid. Monitoring can show policy progress but might also be used as the basis for interventions such as granting aid or sanctioning.

Monitoring schemes' engagement and management can also be seen as a political commitment to digital policy, with the EC and MS receiving support from consultants.

STRENGTH 3. Recognition in and beyond the EC

EC results from some monitoring exercises seem to have a good recognition of their quality. Their reuse outside of their original context in both other monitoring schemes in the EC and by other international organisations and academic groups confirms this.

STAKEHOLDER ENGAGEMENT

STRENGTH 4. Nurtured stakeholder networks

Good stakeholder engagement is observed in all analysed cases. The composition varies significantly across schemes, with DESI being the scheme dealing with a greater number of formalised stakeholder groups. All initiatives involve MS representatives, generally through formal networks or expert groups.

Trusted fora exist between the MS and the EC and among the MS that favour fluid communication and a willingness to collaborate.

STRENGTH 5. Established feedback processes

Requests for MS interaction are also numerous across the different monitoring cycle phases. Generally, MS are involved in the review or design of indicators and in providing or validating data and subsequent reports. Different feedback periods and communication channels are available to foster consultation and stakeholder feedback. Feedback actions go beyond the data-gathering phase.

INFORMATION MANAGEMENT

STRENGTH 6. Clear procedures and user-centric support

Stakeholders seem to be familiar with the different phases of monitoring exercises, especially with the data collection techniques and how data will be analysed and presented. Consultancy support and documentation are generally available. Care is taken to ensure comparability over time, or changes to the monitoring model impact as little as possible on the required effort.

STRENGTH 7. Uncomplicated data-handling

Simple tools, including spreadsheets, editable documents and online surveys, are used to gather primary source evidence, generally following technological neutrality principles. Accordingly, a low technical (ICT) skill level is required to contribute. Despite not being technically very demanding, there is room for improvement in the usability of the tools chosen, for example, in the EIF/BDM joint questionnaire.

STRENGTH 8. Appropriate spatiotemporal coverage

All four analysed monitoring schemes have a European-wide geographical scope but often include contributions from EFTA and candidate countries. The spatial extension enriches the knowledge base on digital by understanding the situation and good practices of the closest neighbours that may influence EU citizens and businesses. Geographical and temporal comparability seems adequate to facilitate analysis across schemes. Geographical data gaps have not been observed. However, time-series availability is diverse among the schemes, with some schemes having long-standing data-gathering efforts and others only having captured a single cycle. There are also some breaks in the time series, as seen for EIF and eGov.

STRENGTH 9. Functional outputs

Monitoring results are disseminated in annual reports. Publications often distinguish between European state-of-play reports and dedicated country factsheets or profiles. There are attempts to synthesise and facilitate communication through, for example, the translation to the official languages of the MS, infographics and interactive public dashboards.

Structured raw data with monitoring results are generally available for download on official Commission channels. However, none of the datasets was indexed in the *European Data Portal*, and only a few were in the *JRC COIN explorer*³. Greater visibility on these corporate platforms could increase their discoverability and reusability potential.

EC ALIGNMENT EFFORTS

STRENGTH 10. Existing indicator reuse across schemes and information flows in the EC

As recommended in the *Better Regulation guidelines*, leading players of digital policies in the Commission are already working together, sharing and reusing indicators to the greatest extent possible. Notably, eGov is used by all three other schemes contributing with up to 15 indicators. In addition to indicators, publications and project information are generally shared and reused. The study's analysis of schemes data sources has uncovered up to 15 data sources, all from the EC.

³The Composite Indicators and Scoreboards Explorer is an interactive tool produced by the Joint Research Centre to explore and visualise data from over 100 indices and scoreboards.

STRENGTH 11. Collective sense of a European-way Digital Transformation

Although coming from different angles and radii of action, there is a shared understanding of the role of digital transformation and the European way of performing it in the EC. The preference for particular terminological forms and different emphasis on certain elements that enable the transforming process do not seem to detract from high-level understanding. All schemes include, more or less explicitly, links to European values and the right to good administration, such as the right to citizens' accessibility in the digital world. Such good awareness inside the Commission sets the ground for further collaboration.

STRENGTH 12. Acknowledged role of interoperability in EC

There is a good awareness of the concept of interoperability and its role in digital administration in the EC. EC stakeholders have recognised that interoperability is an enabler of digital government transformation. Recognition goes beyond DIGIT's immediate policy sphere. For example, LORDI and the European Digital Innovation Hubs' Digital Maturity Assessment survey for public administrations aim to collect explicit interoperability aspects at a sub-national level.

STRENGTH 13. EC's willingness to collaborate

Initial meetings between JRC, DIGIT and CONNECT lay the groundwork for good collaboration to address gaps in digital policy monitoring and potential pathways for change. Conversations have begun to take place to agree and schedule contributions between established schemes and for the Digital Decade.

Weaknesses

We see the following weaknesses of the current monitoring schemes in view of possible future alignments:

Figure 4: Summary of weaknesses found in monitoring schemes analysed



Source: JRC own elaboration

MONITORING CHALLENGES

WEAKNESS 1. Insufficient priority-setting

Some indicators appear not to follow the Better Regulation RACER criteria⁴, namely, to be closely linked to policy evaluation objectives. For example, indicators have been found in EIF that collect information about the adoption status of standards, such as DCAT-AP. Although these indicators have reached a significant level of maturity due to the implementation of MS, they do not ensure that the expected benefits of political intervention have been achieved.

It is important to ensure that indicators are relevant and fit their purpose without exceeding what needs to be addressed. Indicators should match policy objectives with as little burden as possible while reporting whether intervention is at the community level. Moreover, although policies set out a range of needs, there should be some natural form of priority and order-setting to the topics of investigation. No weight is given to the evidence-gathering indicators and where MS must allocate resources. A preference should be made for the areas that matter most to aim for a proportionate effort.

WEAKNESS 2. Exhaustive monitoring

Annual reporting requires each indicator to be monitored each cycle without considering the likelihood of any change in condition. However, examples exist of some schemes (eGov) spreading the burden over a two-year cycle avoiding intensive and universal monitoring. A similar approach could be potentially applied in other schemes.

Another aspect of the exhaustive follow-up of schemes based on primary data through surveys is the length of their questionnaires. The questionnaires arguably are too long and require too much detail, which could affect quality and response rates. They take days to complete, as a coordinated response from multiple officers is often required. Questionnaires should focus on collecting truly policy-relevant indicators that capture first-hand information about the initiative that could not otherwise be collected. The former does not prevent it from being supplemented with insights from other sources, preferably automated and quantitative or best practices that illustrate key areas of interest.

WEAKNESS 3. Limited multilingualism support

Several EC and MS stakeholders have suggested that evidence gathering and sharing only in English can be limiting. This can include the ability to communicate readily with evidence providers (especially for sub-national and cross-border activities) or the uptake or application of outputs.

Some schemes like DESI already produce monitoring-related publications in different EU official languages. For its part, the upcoming LORDI scheme is considering posing questions in the official languages as a requirement to reach local entities. Moreover, increasingly, corporate tools support multilingualism, such as EU Survey or the JoinUp platform, used in NIFO initiatives with an automatic web page translation service.

FRAGMENTATION

WEAKNESS 4. Incompatible heterogeneous methodological approaches

DESI follows the Handbook on Constructing Composite Indicators [37] (jointly produced by the Organisation for Economic Co-operation and Development (OECD) and the JRC), which imposes strong requirements when defining and including new indicators or data in its scheme.

Even though EIF and BDM are based on self-reported evaluations by the MS representatives, they are not considered objective and robust enough to be integrated into DESI. For its part, eGov uses a mix of mystery shopping and automatic checks. Some stakeholders have indicated that although the technique is valid and innovative, it does not capture real digital public services users' perceptions since well-trained consultants carry out the tests.

⁴ RACER is an approach to help select indicators that are *Relevant, Accepted, Credible, Easy to Monitor and Robust*. "RACER+" is a term used in the study to cover the extended set of criteria for indicators mentioned in the Better Regulation guidance such as good quality, timely data and the use of metadata to document indicators. More details at: https://commission.europa.eu/system/files/2022-06/br_toolbox_-_nov_2021_-_chapter_5.pdf.

WEAKNESS 5. Scattered and varied outputs

The monitoring results across schemes are not presented in comparable or harmonised ways, impacting their integration or ready reuse. Although all the products belong to the EC, they are difficult to retrieve. They are scattered and stored in various online resources. Instead of complementing each other, they seem to compete for visitors' attention, with the risk that the ecosystem continues to grow with additional platforms for new initiatives, such as the Digital Decade.

WEAKNESS 6. Mushrooming stakeholder groups

There are now several functioning stakeholder groups within the digital policy landscape, and more are foreseen. This may be partly an artefact of different DGs and policyholders aiming to define a consultative group to work with, including for technical matters. Still, such proliferation can lead to consultation fatigue and a simple burden of uncoordinated engagement. It will also be interesting to see how groups will evolve with policy changes.

EC STRATEGY

WEAKNESS 7. Uncoordinated digital policy management

"Europe fit for the digital age" is a far-reaching and pervasive European priority impacting many areas, including digital skills and the Twin Transition.

Different Directorate Generals have competencies in digital policies, which may risk misalignment. Although well-resourced, scattered teams are working on monitoring different aspects of digital policy with different budgets, potentially impacting efficiency. Notable communication and interdepartmental coordination efforts could be needed.

The study has mainly addressed the monitoring of DG DIGIT and DG CONNECT. Still, public sector modernisation and digitisation activities are also being carried out in Directorate-General for Structural Reform Support (DG REFORM) and Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW), among others.

Added to the above is the lack of a coordinated action plan for digital government, impacting opportunities for harmonisation and collaboration.

WEAKNESS 8. Absence of an integrated conceptual model

The lack of an overarching conceptual model or framework prevents having a shared and 'universal' view across all digital policies. Such absence impacts the outline of a comprehensive policy intervention logic(s) and what (common) outcomes should be achieved. Many indicators focus on short-term results and outputs rather than potentially longer-term policy objectives and impacts. Moreover, models and methodological approaches are born in isolation, potentially creating gaps in assessing the digital policy landscape.

MANAGEMENT

WEAKNESS 9. Informal cooperation patterns

Indicator reuse is exposed to risks as information-sharing and timing details are communicated informally between individuals. While close and informal communication between colleagues across all DGs is a good indicator of collaborative spirit, it can also pose a risk in, for example, job transfers or handovers. The interaction points across the organisation should be protected and formalised through institutional operational agreements to provide greater guarantees.

WEAKNESS 10. Lack of formalised workflows and procedures

Monitoring activities' processes do not seem to be formally documented, for example, using common modelling techniques (i.e. BPMN or UML). Workflow modelling can help identify processes likely to be automated. Describing monitoring schemes processes from start to finish can show all steps, tasks and activities that fit together while uncovering interdependencies. The analysis of the cross-scheme monitoring timelines uncovered data flow dependencies and tensions with publication needs.

WEAKNESS 11. No controlled list of digital policy indicators

Building a list from scratch based on scattered and heterogeneous information was necessary for this study. Information on the traceability of deprecated or modified indicators and their lineage is limited, if not absent.

A maintained and governed indicator list can minimise the burden and encourage greater and better reuse across departments. There are good examples of established indicator registries set by international organisations, including the work of the EC Publication Office and those in the JRC interested in reference data and metadata management.

LIMITED IMPACT

WEAKNESS 12. Low uptake of end-products

Some stakeholders, especially MS representatives, have questioned the usefulness of some final products of monitoring exercises beyond details aiding 'benchmarking'. Despite large investments of resources by all involved, monitoring activities may not create any clearly delineated additional public value. It would be advisable to reconsider the objectives and benefits the EC expects from the end-product materials and evaluate the reasons for their low adoption. This knowledge would allow prioritising to take action, including, for example, redesign.

WEAKNESS 13. Limited trust in methods and results

Although the activities are recognised as performing well, some actors, for technical and political reasons, do not fully trust and take ownership of the analyses of indicators. Comments include questioning the objectivity of reported data, how European assessments differ from national ones and the aptness of the frameworks and methodologies. Trust needs to be fostered through, for example, further collaboration between actors and with efforts to increase the transparency of approaches, including harmonising descriptions to ensure a common narrative and a sense of purpose.

WEAKNESS 14. Low adaptation to changes

Pressures from changing policy priorities and ever-more rapid technological development imply a need for agility and responsiveness. Still, the cycle of framing evidence, gathering, analysis and possible feedback to policy is fragmented, where full planning may be lacking or slow to respond.

Opportunities

We see the following opportunities for the evolution of the monitoring schemes, with some caution as to the required conditions to reach possible improvements:

Figure 5: Summary of opportunities found in monitoring schemes analysed

PRIORITISING NEEDS	<ul style="list-style-type: none"> • Focus monitoring effort • Align for future policy needs
EXTENDING ECOSYSTEM	<ul style="list-style-type: none"> • Explore digital policy monitoring in other sectors • Exploring the sub-national ecosystem towards a community of practice
SYSTEM REVIEW	<ul style="list-style-type: none"> • Harmonise monitoring outputs and documentation • Explore ways of managing indicators • Produce user-driven outputs
ALTERNATIVE MONITORING	<ul style="list-style-type: none"> • Devise and pilot alternative or novel data sources • Pilot a multifaceted analysis of key online services • Extend evidence beyond government • Look beyond the European Union
LIMITED IMPACT	<ul style="list-style-type: none"> • Digitally transform monitoring • Put co-creation into action

Source: JRC own elaboration

PRIORITISING NEEDS

OPPORTUNITY 1. Focus monitoring effort

An in-depth indicator assessment with stakeholders is needed to highlight where priorities lie. Relatedly, there should be a move beyond status to focus indicators on outcome, impact and values. Two key examples of extending or replacing assessments beyond certain indicators' current status could involve examining the impacts/outcomes related to them for elements such as policy, users or the wider society/economy/environment and/or assessments reflecting principles and rights (in practice).

In addition, MS have suggested that some of the 'monitoring burden' relates to the effort to interact with the monitoring at different times throughout the year, suggesting the potential for a more focused period for evidence sharing that requires further discussion.

OPPORTUNITY 2. Align for future policy needs

A frequent re-evaluation of monitoring schemes considering political and technological changes can ensure relevance and consistency in the bigger picture.

There is an opportunity to assess how existing indicators can help meet the needs of new and recent policies, for example, the monitoring of the Digital Decade and the proposed Interoperable Europe Act. Moreover, upcoming monitoring schemes can also contribute to feeding or upgrading existing ones.

EXTENDING THE ECOSYSTEM

OPPORTUNITY 3. Explore digital policy monitoring in other sectors

The landscaping activity of this study has been a first attempt to survey the 'terrain' and should be maintained. There is also an opportunity to map further the existing digital policy landscape and its relationship to related policy or sectoral contexts, programmes and initiatives.

OPPORTUNITY 4. Exploring the sub-national ecosystem towards a community of practice

The study so far addressed the actors within the EC and national representatives involved in monitoring. Still, there is also an opportunity to foster a community of practice that provides an evidence base towards the national level in a wider ecosystem of actors and data/indicators.

SYSTEM RETHINKING

OPPORTUNITY 5. Harmonise monitoring outputs and documentation

There are leading examples of documentation of monitoring schemes and indicators, including metadata and data management. However, a harmonised approach would make future comparisons more effective and data/indicator reuse more technically feasible. Moreover, some terminological differences exist between scheme content, including concepts related to the monitoring scheme structure.

Documentation should follow good practices and reuse open specifications and international standards as much as possible.

OPPORTUNITY 6. Explore ways of managing indicators

Sharing details about indicators and the governance mechanisms required to align them technically and jointly between monitoring schemes involves the support of technical systems. Governance should include long-term preservation policies.

OPPORTUNITY 7. Produce user-driven outputs

Common to many initiatives that create and share data/indicators, owners of the processes know much about the upstream context of their data but have a limited understanding of the downstream use and potential it creates. A better understanding of the (public) value of outputs and the potential reuse of the data would create an extended view of the ecosystem and potentially engage actors who may help shape the indicators and secondary consumers. The benefits of supporting multilingualism across the monitoring exercise could also be explored in this context.

ALTERNATIVE MONITORING

OPPORTUNITY 8. Devise and pilot alternative data sources

New data sources or innovative methodologies could help reduce burdens or distribute efforts.

New data sources include MS government administrative data, national indicators and monitoring from academic and international organisations. Other alternative approaches include using innovative technologies or exploring collaborative approaches such as crowdsourcing and peer review. Examples of collaborative monitoring exercises are UN Online Services Index (OSI) and Local Online Services Index (LOSI) 2022 edition [38], and the Global Open Data Index [39].

OPPORTUNITY 9. Pilot a multifaceted analysis of key online services

There is an opportunity to explore a small set of key public services (e.g. life events) in each MS and apply the monitoring schemes' indicators to see how interoperability and digital transformation assessments can work together to create a complete picture around a focussed topic, including in cross-border contexts.

OPPORTUNITY 10. Extend evidence beyond government

Although user-centricity is a key concern for public sector digital developments, the monitoring approaches mainly focus on government-based reporting or official statistics. The latter raises possibilities for citizens and businesses to be involved in assessing digital policy's efficacy as evidence providers and framing assessments.

OPPORTUNITY 11. Look beyond the European Union

More broadly, good practice in monitoring and public sector digital practices is likely to be found within the EU and on a broader base in other global regions, such as North America and the Far East.

NEXT STEPS

OPPORTUNITY 12. Digitally transform monitoring

Although current monitoring approaches seem to suffice, some stakeholders see automation as a means to ease the monitoring burden. While there are some attempts to apply technologies that automate some aspects of monitoring (for example eGov to measure mobile-friendliness), no steps have been taken to modernise monitoring fundamentally.

In line with the EC Digital Strategy, piloting the digital transformation of monitoring exercises would be useful. Deep knowledge of existing business processes is key to automation throughout the monitoring cycles. Data analytics and Artificial Intelligence techniques may play a role in moving towards data-driven monitoring, from data capture to the automated creation of reports.

OPPORTUNITY 13. Put co-creation into action

As already indicated to stakeholders, the most crucial consideration for the study is the opportunity to move to new approaches in monitoring digital policy, especially for interoperability and the digital transformation of government, using a co-creation approach. Scoping the nature of that approach will ensure that the process has joint ownership as a vehicle to achieve the study's objectives, set in the context of policy requirements. Understanding the incentives needed for MS to engage in co-creation could be an important initial step in framing this approach.

Threats

We see the following threats to the evolution of the monitoring schemes:

Figure 6: Summary of threats found in monitoring schemes analysed



Source: JRC own elaboration

CONTENT RISKS

THREAT 1. Scheme saturation

Some MS have achieved the maximum possible score for some indicators. This form of 'saturation' means that leading countries have to report on activities already achieved and, in some senses, are now less relevant. It also means that new possibilities or targets are not being assessed. A potential threat in this context is that 'leaders' have redundancy/burdens and may become disengaged in the monitoring activity.

THREAT 2. Immobility in complexity

The experience in the study team has shown that as analysis goes deeper, the material at hand becomes less clear and more complex. Although finite, the 'end-nodes' of where this complexity becomes stable are relatively unclear for topics such as policy ambition, (multisector) terminology and underlying processes likely to impact information provision, indicator reuse and/or alignment. Increasing expert (technical and/or policy) knowledge is needed to fully engage with specific indicators/questions, ranging from digital rights for individuals to technical infrastructure aspects, with more policies likely to emerge in the future. These issues may impede a cohesive and comprehensive understanding to readily and correctly respond to requested evidence.

STAKEHOLDER CHALLENGES

THREAT 3. Consultation fatigue

Several monitoring schemes are now in place and planned for assessing digital transformation and interoperability in the public sector, including beyond the Commission. Stakeholders may be facing

consultation fatigue or notable coordination efforts to respond to requests for evidence from teams in their countries. A risk exists that stakeholders cannot respond with appropriate capacity and may be losing interest or even only replying with minimal information. The threat is especially present when topics are repeatedly requested from different institutions and the possibility of not focusing on those requests from the EC.

THREAT 4. Differing speeds and priorities

Some stakeholders probably need to pass certain steps in advancing interoperability and digital transformation that cannot be 'leap-frogged' to keep up with technical and policy developments. Given varying stages of public sector digital transition, priorities vary between MS, including what can be monitored. This includes some countries limiting their monitoring effort while waiting for new policies and requirements to emerge. 'Learners' may become 'laggards', and the existing disparities in the ability to implement and monitor may increase and intensify as digital government evolves in scope and understanding. This situation risks that some MS, or perhaps specific organisations within them, may be left behind.

THREAT 5. Transition risks of a new regulatory environment

Digital policy and regulation involve monitoring technical matters and increasingly socio-economic/socio-technical concerns, including rights and values. There could be a potential mismatch between stakeholder understanding especially those belonging to more technical groups in ICT and the new regulatory environment.

MISSING MOMENTUM

THREAT 6. Shrinking opportunity windows

The window of opportunity to build capacity for alignment between monitoring schemes and more effective contributions from MS with reduced burden is starting to close. Stakeholders are likely to act in a reactive rather than fully engaged mode if monitoring is not considered a priority, impacting co-creation and co-ownership.



**Proposal of
a way forward**

4 Proposal of a way forward

The SWOT analysis captures succinctly the landscape of EC monitoring schemes dealing with digital transformation and interoperability in the public sector.

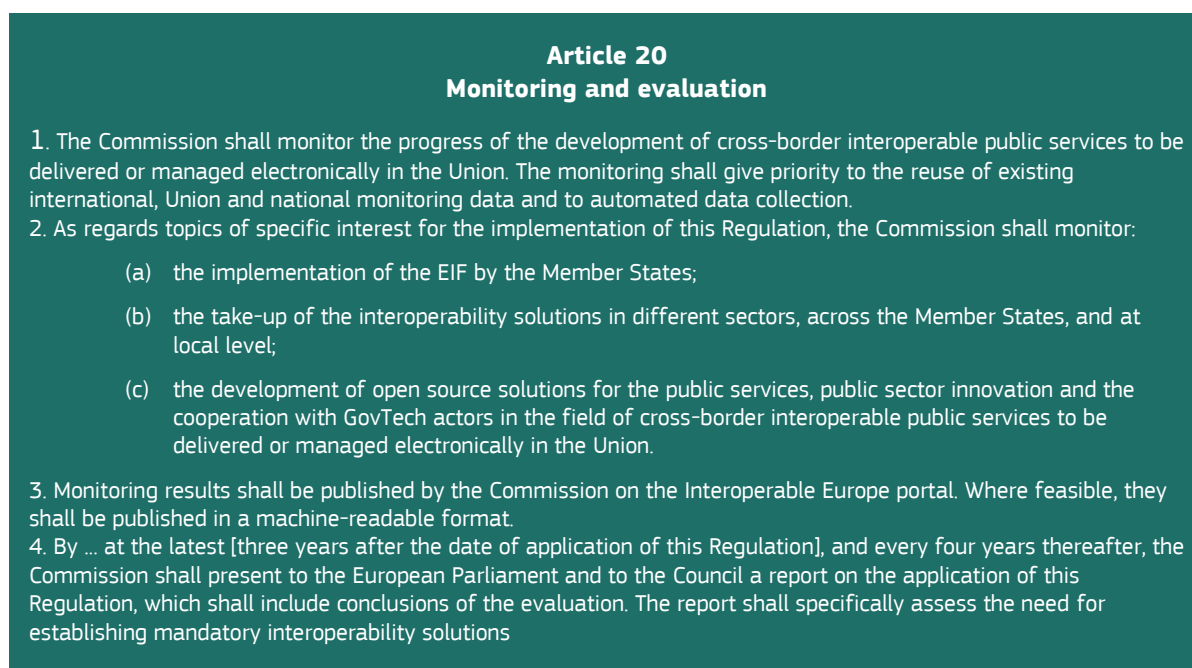
Understanding its flaws and confirming its assets has allowed the JRC to draw recommendations for greater interconnection and integration of EC monitoring teams, data and systems. In other words, towards a larger corporate interoperability effort as the basis for EC's monitoring digital transformation.

The recommendations are aligned with the *EC Digital Strategy, Better Regulation guidelines* and the *European Interoperability Framework interoperability principles* [40]. They reflect the feedback provided by MS and EC stakeholders and desk research findings. They will likely bring efficiency gains to all parties, including reducing unnecessary burdens in MS reporting efforts. However, implementing them requires joint commitment and the participation of different parties ranging from MS representatives, DIGIT as the EC IT service provider⁵, to all EC DGs concerned in digital monitoring.

The recommendations are clustered in different topics/activity tracks. A first group of recommendations is provided for **4.1 Streamlining EC Digital Policy Monitoring** applicable to any monitoring scheme. The second group includes specific recommendations for **4.2 Supporting the Establishment of the Interoperable Europe Act Monitoring**.

To facilitate the understanding of the scope of the Interoperable Europe Act's monitoring, **Figure 7** presents the key activities of Article 20. It is worth noting a change of focus in European Interoperability from the EIF monitoring of today to **cross-border interoperability of (digital) public services**.

Figure 7: Extract from the Interoperable Europe Act proposal



Source: *Interoperable Europe Act proposal*

Below is a **non-exhaustive** list of recommendations and underlying potential actions that could address the different issues the study has uncovered. This 'catalogue' can provide a starting point for selecting and prioritising actions, ideally structured in an action plan, to improve the monitoring of interoperability and digital transformation.

⁵ DG DIGIT can be considered as the "central IT department" of the EC and leader of its digital strategy.

4.1 Streamlining EC Digital Policy Monitoring

This first set of recommendations would help further align the digital transformation and interoperability monitoring by streamlining current efforts. They can be seen to apply to all monitoring schemes so that the specificities in certain cases can be examined separately.

IMPROVE INDICATOR DEFINITION, REVIEW AND ALIGNMENT

We recommend comparing and aligning all the currently-used indicators in one consistent frame, potentially involving the following actions:

- The EC should identify and prioritise the most important or pressing indicators to monitor the *specific, measurable, achievable, relevant, and time-bound* (SMART) policy objectives and agree on them with stakeholders.
- Assess existing indicators to understand the extent to which they reflect the intervention logic of the policy, including the expected change and impacts in the short, medium and long term. Explore the suitability of existing indicators before defining new ones.
- Explore approaches to incorporate emerging issues/policies for monitoring without compromising stability.
- Assess the frequency needs considering the 'volatility' of indicators to avoid unnecessary data capture burden.
- In defining new indicators, follow RACER criteria and document the indicator methodology and metadata.
- Apply Better Regulation RACER (+) assessment during review cycles of existing indicators to reduce redundancy about the needs of the monitoring scheme and (upcoming) policy needs.
- In the event of new policy proposals, apply "digital checks" to make monitoring as digitally ready and as 'automated' as possible.

MOVE TO A DATA-DRIVEN AND DIGITAL-BY-DEFAULT MONITORING SYSTEM

We recommend considering IT capabilities and automation across the entire monitoring process for gathering input data, data analysis, and reuse. The following concrete actions might be carried out:

- Consider the IT capabilities in Better Regulation's *Tool 43* [35] when setting up a monitoring system.
- Consider moving towards a data-driven monitoring approach, relying on data sources that provide machine-readable access to API or dynamic data streams, where possible.
- Analyse the existence of alternative data sources to be reused as secondary data sources, also from indices and scoreboards not necessarily owned by the EC.
- Identify "contextual" indicators from the EC and/or third-party sources to be reused as base data to allow comparable cross-analysis (e.g. Population, Gross Domestic Product etc.).

EXPLORE NOVEL MONITORING SOURCES AND TECHNIQUES

In addition to current methodologies, we recommend identifying new (additional) monitoring techniques and evaluating their fitness for use. In particular, the following actions might be taken:

- Brainstorm alternative monitoring approaches to self-assessment and questionnaires, including, amongst others: automatic checks, more data reuse, mystery shoppers, user journey mapping and crowdsourced data.

- Consider using innovative and emerging technologies such as AI, advanced data analytics⁶ or blockchain, for example, to certify the authorship of the contributions.
- Consider obtaining support from the *EC Innovation Lab* [41] as part of the Commission's ICT Innovation framework to, for example, test emerging technologies; create inclusive IT solutions; exploit data, information and knowledge; and solve everyday challenges.

PROMOTE OPENNESS AND REUSABILITY

We recommend further improving open access and reusability of existing monitoring data and approaches, including the following actions:

- Publish EC-owned monitoring datasets on the European data portal through an open licence in line with the *European strategy for data* [42] and the *internal data governance and data policies* [43].
- Index monitoring schemes with the *JRC Composite Indicators & Scoreboards Explorer* [44].
- Provide EC-owned monitoring results through an API with access to historical data (instead of file-based content).
- Consider creating a multilingual glossary of key terms used.

SUPPORT BETTER STAKEHOLDER ENGAGEMENT

We also recommend improving the engagement of stakeholders throughout the entire monitoring process, where the following actions might be considered:

- Stakeholder networking should be maintained.
- Ensure coordinated requests to the MS through a 'one face' Commission.
- Map all existing formal and informal stakeholder groups to understand their target audience and roles.
- A review of the function and composition of stakeholders across digital policy stakeholder groups is needed, down to the level of the individual representative.
- Ensure that MS representatives involved in monitoring have the appropriate skills and technical support to engage with new topics, including clear guidance and potentially a helpdesk or issue tracker to help develop shared understanding when clarifications are needed.
- Evaluate the current interaction and feedback methods and understand how they could be more proactive.
- Evaluate if feedback timing (input/validation) could be better distributed to balance the effort over the year.

PRODUCE MORE IMPACTFUL AND USER-DRIVEN OUTPUTS

We recommend focussing the monitoring schemes on user-driven and, thus, more impactful outputs. To do so, we identify the following possible actions:

- Explore harmonised approaches to documentation and publishing of data and outputs.
- Understand the real usage of the monitoring outputs. Analyse the reasons for low uptake as the basis for proposing improvement strategies.
- Understand if the results could become more accessible concerning accessibility standards and using visual or plain language.

⁶ According to the EC Digital Strategy, a Commission AI action plan will pave the way for corporate AI solutions, built on pilots and proofs of concept, and inspired by the principles of the proposed Artificial Intelligence Act.

FOSTER INTERNAL DOCUMENTATION AND COMMUNICATION

We recommend advancing the documentation of monitoring schemes and EC-internal communication in the following ways:

- Apply data management and curation/quality principles following the *EC data governance and data policies* [43]—for example, document monitoring scheme descriptions through machine-readable metadata following open specifications.
- Consider the setup of a registry of indicators with access to historical traceability. Put in place deprecation processes for removing or ‘retiring’ any less valuable indicators, including those of potentially limited reuse. Persistent identifiers and long-term preservation measures are key for its maintenance.
- Improve completeness and quality of indicator documentation, and ensure the availability of key metadata elements. Key elements include, among others, title, definition, purpose, rationale, measurement method, methodology, reporting frequency, disaggregation, weaknesses and sources. International and European standards and specifications can help address this area, such as Statistical Data and Metadata Exchange (SDMX) [45] and Euro SDMX Metadata Structure (ESMS) [46] developed by Eurostat. Euro SMDX can also be complemented with Euro SDMX Metadata Structure – Indicator Profile (ESMS-IP) [47].
- Document the conceptual monitoring models following standard representation techniques such as UML. Consider creating an ontology to model concepts and relationships.
- Model all business processes involved across the monitoring cycle from start to end. Include data workflows, activity diagrams, any dependencies between monitoring schemes (including timing, as noted above) and the different actors involved.
- Align terminologies between monitoring initiatives if divergent (related to the above-mentioned glossary).
- Share planning and calendars.
- Involve data-dependant schemes in review processes and notify changes in advance.

TOWARDS A SEAMLESS EC DIGITAL POLICY MONITORING HUB

We recommend exploring the establishment of one single monitoring hub for EC digital policies. This could be done by taking actions such as:

- Formalise partnerships across departments responsible for EC monitoring schemes related to digital.
- Identify cross-organisational needs.
- Involve the EC central IT department (DIGIT) to plan a future-proof digitally transformed EC monitoring considering existing IT corporate strategies⁷. The *EC Digital Solutions Modernisation Plan* can support cross-department modernisation. Moreover, they can support innovation pilots, foster collaboration and consolidate methodologies, processes and resources, as well as promote the reuse of IT solutions.
- Timely communication on policy developments will ensure that interoperability is considered in other digital policy areas.
- Consider the extent to which the existing activity should be formalised further as an Information Management Steering Board (IMSB) Action, helping to share outcomes with others in the Commission.
- Establish institutional arrangements, such as *Service Level Agreements*, to ensure data-sharing.
- Examine the opportunity to align data-sharing as a first experience of alignment activities in practice to be applied to other ‘low-hanging fruit’ to improve monitoring.

⁷ Corporate Information Security Strategy, European Commission Cloud Strategy, IT Security Strategy, Collaboration Solutions Strategy, Data@EC Strategy, Open source software strategy, European Interoperability Framework, Digital Workplace Strategy, User experience framework, and Towards a Mobile-enabled Commission.

- Explore the digital activity (primarily related to digital transformation and interoperability) and any related monitoring in other policy areas, including those foreseen in the broader landscape of this study but also sectoral developments in public service/sector areas, such as transport, environment and energy.
- Establish a process to coordinate requests for similar topics so that one activity comes from the EC. Alternatively, provide a timeline for when those requests will likely appear to aid national coordination.

4.2 Supporting the Establishment of the *Interoperable Europe Act* Monitoring

Considering that the EC has proposed the *Interoperable Europe Act*, it is also recommended to consider the outcomes of this work when setting up the monitoring of this proposed regulation. In this case, other generic recommendations collected under the section STREAMLINING EC DIGITAL POLICY MONITORING would also apply. This list, therefore, specifically addresses the proposed Act.

This report closes with one approach to monitoring the *Interoperable Europe Act* to stimulate debate and offer a potential starting point. It is important to recognise any future monitoring scheme must be formed in collaboration with stakeholders to be relevant, feasible, sustainable and valued.

The following recommendations are relevant to the monitoring related to EIF implementation by MS, Take-up of Interoperability Solutions and assessing Open Source development and public sector innovation, including GovTech.

ENSURE A MONITORING LINKED TO POLICY OBJECTIVES

We recommend a better link to policy that would:

- Reconcile the *Interoperable Europe Act* objectives with key complementary digital policies to keep them coherent and aligned (e.g., Digital Decade, eID etc.).
- Determine the general objectives of the *Interoperable Europe Act's* intervention.
- Define candidate outcome indicators the monitoring scheme should keep track of.
- Outline the policy impact pathways, differentiating outputs from outcomes/impacts and connecting them to the general policy objectives.
- Anticipate policy evaluation needs by proposing candidate indicators that will support evidence-based assessment. Specifically, the extent to which the intervention was effective, efficient, relevant, and coherent and provided EU-added value.

STOCKTAKING AND PREPARATORY WORK

We see the need for further work to:

- Define and prioritise monitoring requirements (e.g. MOSCOW method), including:
 - Prioritise “fact-based” indicators keeping the strictly necessary qualitative information.
 - Prioritise digital-ready approaches, different from self-assessment, to monitor new elements. Assess what could be automatically extracted, e.g. through web statistics.
- Document informational needs for the next *Interoperable Europe Act* monitoring.
- Understand what indicators of current EIF monitoring can be kept for the *Interoperable Europe Act* monitoring, deprecating all that is irrelevant.

DEFINE MONITORING INDICATORS

Following the above, we recommend that work takes place to:

- Draft a list of candidate indicators relevant to the *Interoperable Europe Act*, including *outcomes* and *output* indicators.
- Check candidate indicators against RACER criteria, linking them to general policy objectives.
- Determine which existing indicators could be reused from:
 - ↳ inherited EIF monitoring,
 - ↳ other established EC existing schemes,
 - ↳ international sources (e.g. United Nations, World Bank and OECD),
 - ↳ national contexts.
- Determine the suitability of reusing indicators from Digital Decade and other EC monitoring schemes as they become public (e.g., LORDI, SDG, eID etc.).
- Determine the suitability of content from the foreseen interoperability assessments and Digital Administration Factsheets.
- Define data/questions to create new indicators that cannot be obtained from existing sources.
- Peer-review newly defined indicators against RACER criteria (*Relevant, Accepted, Credible, Easy to Monitor, Robust*), linking them to general policy objectives.
- Pilot the collection of the candidate indicators.
- Reject any indicator that is difficult to gather or provides limited value or where it would simply be disproportional to efforts and needs.

LEVERAGE ON CO-CREATION OPPORTUNITIES

- Recognise that the existing MS stakeholder base offers the groundwork to begin co-creation activities.
- Consider if this circle of actors should be widened to include business and civic representatives.
- Consider stakeholders' degree of involvement in the monitoring scheme establishment (indicator definition, requirement gathering, design, testing), with a preference to open collaboration approaches.
- Consider stakeholders' degree of involvement throughout the different monitoring phases (data collection, processing, validation, publication).
- Ensure that the MS resources are proportional to the EC's ambitions to ensure good quality monitoring data in line with principles of subsidiarity and proportionality.
- Tap into the expertise of MS to collect cases of monitoring systems partially or fully automated and/or devise novel approaches to monitoring.
- Evaluate the efficiency and cost-effectiveness of experiments that gather evidence from end-users such as businesses and citizens, especially for cross-border online public services. Consider techniques such as user journeys, user satisfaction measures and usability testing for any services still in the design phase (including what does not work).

Conclusions

5 Conclusions

For over 20 years, European digital policies have tracked progress in the MS through monitoring activities involving indicators and, increasingly, capacity-building, benchmarking and maturity assessments. Digital policy is a priority for the EC, with increasing legal acts being created in recent years, addressing various topics from different perspectives. These can range from the adoption of technical standards to the protection of citizens' rights online. Moreover, the increased pace of technological change introduces the need to evaluate monitoring methodologies and the exchange of data, and other resources, in modern and transparent ways while assessing holistically if existing approaches remain fit-for-purpose.

This report has presented a SWOT analysis of the 'landscape' of key digital policies related to interoperability and the digital transformation of government, further analysing and distilling the broad evidence base from the report *Landscaping the monitoring of interoperability and digital transformation: streamlining the monitoring of Digital policies in the European Commission* [14]. In turn, this document has marked a milestone in our work by providing recommendations that can aid the streamlining and modernisation of digital policy monitoring, in general, and steps towards a monitoring scheme for the proposed Interoperable Europe Act while considering the strategic targets of the Digital Decade. Importantly, the material contained within this document has been validated with stakeholders as the base to take forward such ideas.

Interoperability itself, is widely recognised as a key enabler of digital transformation. It can facilitate the automation and sharing of processes within and between actors in the EC and has direct links to digital-ready policymaking and public sector innovation. More specifically, the EIF's principles can help identify those areas requiring modernisation for the MS while considering a more agile and efficient exchange of data, metadata and documentation.

Monitoring efforts mainly rest at an early stage of digitalisation. There is a lack of integrated dashboards, and the underlying processes remain non-formalised and unaligned. Increased coordination and collaboration within the EC and between the EC and MS would improve the collective understanding of the digital landscape for the public sector across Europe. The Interoperable Europe Act is an opportunity to enhance collaboration within a sound frame of stakeholder governance and techno-organisational resources.

Monitoring and reporting burdens and inefficiencies persist, where MS have called for priority-setting and the exploration of alternative approaches. In response, the report has highlighted topics ranging from improving the timing of requests for information to assessing if all topics require the same frequency of monitoring so that some data are not captured annually. It is also important that any approaches to improve activities also acknowledge that European governments are moving at different speeds in their digitalisation, with varied cultural and organisational contexts; where Europe has leaders, the 'personal bests' of those still learning should also be applauded.

Monitoring needs to look beyond output measurement, with attention now paid to digital policy outcomes and impacts. Piloting alternative approaches should help understand whether minor adjustments to monitoring schemes, methods and indicators should occur or if more fundamental changes are needed in scope and approach, importantly in collaboration with stakeholders.

The work will, therefore, continue stakeholder engagement in both the EC and the MS by taking steps to co-design and, ideally, co-create the essential elements of monitoring required by Article 20 of the Interoperable Europe Act. In particular, emphasis will be placed on the potential reuse of MS resources for monitoring cross-border public services and the implementation of the Act, how automated data collection may be applied to key topics of Article 20 and the development of a draft set of indicators related to the Act's intervention logic.

Abbreviations

AI	Artificial Intelligence
ARE3NA	A Reusable INSPIRE Reference Platform
BDM	Berlin Declaration Monitoring
BEREC	Body of European Regulators for Electronics Communications
BPMN	Business Process Model and Notation
CEF	Connecting Europe Facility
COIN	Composite Indicators and Markers Competence Centre
DG	Directorate General
DG CONNECT	Directorate General for Communication Networks, Content and Technology
DG DIGIT	Directorate General for Informatics
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DG REFORM	Directorate-General for Structural Reform Support
DCAT-AP	Application profile for data portals in Europe
DESI	Digital Economy and Society Index
DIGITAL	Digital Europe Programme
eID	electronic identification
ELISE	European Location Interoperability Solutions for e-Government
ESMS	Euro SDMX Metadata Structure
ESMS-IP	Euro SDMX Metadata Structure – Indicator Profile
EULF	European Union Location Framework
ICT	Information and Communications Technology
IMSB	Information Management Steering Board
ISA	Interoperability Solutions for European Public Administrations
ISA ²	Interoperability Solutions and common frameworks for European public Administrations, businesses and citizens
EC	European Commission
eGov	eGovernment Benchmark
EIF	European Interoperability Framework
EU	European Union
JRC	Joint Research Centre
KPI	Key Performance Indicator
LORDI	Local and Regional Digital Indicators for smart cities and regions
LOSI	UN Local Online Services Index
MOSCOW	(method) Must have, should have, could have and will not have
MS	Member State(s)
NIFO	National Interoperability Framework Observatory
NIFO/EIF	In the context of this study, EIF monitoring and Digital Public Administration factsheets are considered as a single monitoring scheme.

OECD	Organisation for Economic Co-operation and Development
OSI	UN Online Services Index
RACER	Relevant, Accepted, Credible, Easy to monitor, Robust
RRF	Recovery and Resilience Facility
SDG	Single Digital Gateway
SDMX	Statistical Data and Metadata Exchange
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound
SWOT	Strengths, Weaknesses, Opportunities and Threats
UML	Unified Modelling Language

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Annex: Overview of analysed established monitoring schemes

Details as of November 2022⁸.

Monitoring scheme	Digital Economy and Society Index	eGovernment Benchmark	European Interoperability Framework Monitoring	Berlin Declaration Monitoring
Acronym	DESI	eGov	NIFO/EIF	BDM
Purpose	'The EU's digital barometer'	'Comparing online service-user experience.'	'Making interoperability a shared reality.'	'Comparing progress on adopting values and approaches for the DTG.'
Brief description	Summarises Europe's digital performance indicators and tracks the progress of EU countries.	Brings insights into the state-of-play of e-government in Europe from a user perspective.	Snapshot of the developments of digital public administration and interoperability in Europe using the EIF framework	Assesses Europe's implementation of the Berlin Declaration Actions while gathering good practices on Policy Areas.
Responsible Unit	Directorate-General for Communications Networks, Content and Technology (CNECT) Digital Economy, Recovery Plan and Skills (CNECT.F.4)	Directorate-General for Communications Networks, Content and Technology (CNECT) eGovernment and Trust (CNECT.H.4) & Digital Economy, Recovery Plan and Skills (CNECT.F.4)	Directorate-General for Informatics (DIGIT) Interoperability (DIGIT.B.2)	Directorate-General for Informatics (DIGIT) Interoperability (DIGIT.B.2)
Policy mandate	The DECISION (EU) 2022/2481 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 14 DECEMBER 2022 ESTABLISHING THE DIGITAL DECADE POLICY PROGRAMME 2030 refers to some DESI indicators for monitoring progress towards the 2030 targets. An implementing Act is expected, including the definition of indicators and sources.	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU eGovernment Action Plan 2016-2020 Accelerating the digital transformation of government ⁹	DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 25 NOVEMBER 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA ² programme) as a means for modernising the public sector ¹⁰	The ministerial Berlin Declaration on <i>Digital Society and Value-based Digital Government</i> was signed by the ministers responsible for digital transformation in the public administration of the European Union Member States.
Status	Active - Stable	Active - Stable	Active - Stable	Active - Stable
Planned updates	Alignments towards Digital Decade have already been applied.		2022 data collection will also include a "cross border" perspective in the dashboard. EIF will be reviewed and continued under	Ensured until 2024 2022 data collection will add some updates to the methodology.

⁸ The methodological sources referred are those available at the time of the research, namely: DESI's 2022 Methodological note, eGov Benchmark 2020-2023 Method paper; EIF 2020 Analytical model and Berlin Declaration's 2022 [First] progress report [Appendix I].

⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016DC0179>

¹⁰ <http://data.europa.eu/eli/dec/2015/2240/oj>

Monitoring scheme	Digital Economy and Society Index	eGovernment Benchmark	European Interoperability Framework Monitoring	Berlin Declaration Monitoring
			Interoperable Europe Act [2023/2024]	Raw data and a dashboard will be made available.
Frequency	Yearly	Yearly ¹¹	Yearly	Yearly
Time series available	2014 - 2021	2016 2017 2018 2019 2020 2021 ¹²	2015 2016 ¹³ 2019 2020 2021	2021
Geographical Coverage	EU27 + ¹⁴	EU27 + Albania; Iceland; Montenegro; North Macedonia; Norway; Serbia; Switzerland; Turkey ; United Kingdom	EU-27 + Iceland; Liechtenstein; Montenegro; Switzerland; Turkey; Ukraine	EU 27
Number of indicators	Total: 33 Primary indicators: 0 Secondary indicators: 33	Total: 14 Primary indicators: 14 Secondary indicators: 0	Total: 71 Primary indicators: 43 Secondary indicators: 28	Total: 44 Primary indicators: 25 Secondary indicators: 18
Data sources and methodologies	Primary sources: <i>None</i> Secondary sources: <ul style="list-style-type: none">○ Eurostat○ Communications Committee (COCOM)○ Broadband coverage studies○ Retail broadband prices studies○ eGovernment Benchmark○ Survey of businesses on the use of digital technologies○ European Open Data Portal	Primary sources: <ul style="list-style-type: none">○ Mystery shoppers analysis○ Automated tool Secondary sources: <i>None</i>	Primary sources: <ul style="list-style-type: none">○ Survey combined with BDM Secondary sources: <ul style="list-style-type: none">○ Eurostat○ European Data portal○ Location Interoperability Framework Observatory (LIFO)○ DESI○ eGovernment Benchmark○ European Language Resource Coordination (ELRC)○ Trusted List Browser	Primary sources: <ul style="list-style-type: none">○ Survey combined with EIF Secondary sources: <ul style="list-style-type: none">○ eGovernment Benchmark○ EIF○ Connecting Europe Facility (CEF) dashboard○ European Data portal○ DESI
Outputs Produced	<ul style="list-style-type: none">○ European report○ Country profile reports¹⁵○ Raw data○ Dashboards and visualisation○ Methodological note○ Explanatory video	<ul style="list-style-type: none">○ European report○ Country reports○ Raw data○ Dashboards and visualisation○ Methodological note	<ul style="list-style-type: none">○ European report○ Digital Public Administration country factsheets○ Raw data○ Dashboard○ Infographics○ Methodological note○ Explanatory video	<ul style="list-style-type: none">○ European report○ Country reports

¹¹ Each year, Mystery Shoppers evaluate services that are related to one of four life events, which cycle every two years. One year, the life events Business Start-Up, Career, Family and Studying are evaluated, and the other year Regular Business Operations, Moving, Owning and Driving a Car, and Starting a Small Claims Procedure are the subject.

¹² There is a comparison break between e-Government Benchmark 2013-2019 and 2020 onwards.

¹³ Gap between 2017 and 2019. Non-comparable monitoring assessments.

¹⁴ For some dimensions, DESI has data for countries beyond EU 27.

¹⁵ DESI country reports are available in English and the official country language(s).

Monitoring scheme	Digital Economy and Society Index	eGovernment Benchmark	European Interoperability Framework Monitoring	Berlin Declaration Monitoring
Data management details	<p>Technical details</p> <ul style="list-style-type: none"> Data and data visualisation tool powered by open-source software¹⁶ Linked data approach [Shared with eGov benchmark] <p>Artefacts</p> <ul style="list-style-type: none"> Metadata at the monitoring scheme level Metadata at the indicator level Available SPARQL endpoint <p>Visibility</p> <ul style="list-style-type: none"> Shaping Europe's digital future Website Present in the COIN Explorer platform¹⁷ <p>Standards used</p> <ul style="list-style-type: none"> Data and metadata following W3C RDF Data Cube Vocabulary DESI was developed according to OECD/JRC's guidelines and recommendations in the Handbook on constructing composite indicators 	<p>Technical details</p> <ul style="list-style-type: none"> Data and data visualisation tool powered by open-source software Linked data approach [Shared with DESI] <p>Artefacts</p> <ul style="list-style-type: none"> Metadata at the monitoring scheme level Metadata at the indicator level Available SPARQL endpoint <p>Visibility</p> <ul style="list-style-type: none"> Shaping Europe's digital future Website Present in the COIN Explorer platform <p>Standards used</p> <ul style="list-style-type: none"> Data and metadata following W3C RDF Data Cube Vocabulary 	<p>Technical details</p> <ul style="list-style-type: none"> Questionnaire set up with proprietary tool <i>Alchemer</i> [Shared and launched with BDM] Dashboard based on Microsoft Power BI <p>Artefacts:</p> <ul style="list-style-type: none"> Available glossary <p>Visibility</p> <ul style="list-style-type: none"> JoinUp NIFO Collection Factsheets Indexed in the EU data platform 	<p>Technical details</p> <ul style="list-style-type: none"> Questionnaire set up with proprietary tool <i>Alchemer</i> [Shared and launched with EIF] <p>Artefacts:</p> <ul style="list-style-type: none"> Available glossary <p>Visibility</p> <ul style="list-style-type: none"> JoinUp NIFO Collection
Monitoring approximate timeline	<p>Preparation: throughout the year</p> <p>Data Collection: January, can last up to 2 years¹⁸</p>	<p>Preparation: September – mid -October</p> <p>Data Collection: 2 weeks in November</p>	<p>Preparation: September – mid-October</p> <p>Data Collection: mid-October till mid-January</p>	<p>Preparation: September – mid-October</p> <p>Data Collection: mid-October till mid-January</p>

¹⁶ Software available at <https://github.com/digital-agenda-data/>. More documentation at: <https://digital-agenda-data.eu/documentation>

¹⁷ The Composite Indicators and Scoreboards Explorer is an interactive tool produced by the Joint Research Centre to explore and visualise data from over 100 indices and scoreboards.

¹⁸ Typically collected in Q1 and Q2 every year, processed in Q3-Q4 and published in Q4 to be used in the DESI of the following year. e-Government data is collected in Q3-Q4, processed and published in Q1 of the following year and then used in DESI.

Monitoring scheme	Digital Economy and Society Index	eGovernment Benchmark	European Interoperability Framework Monitoring	Berlin Declaration Monitoring
	<p>Data Processing: July-March</p> <p>Publication: May - June</p>	<p>Data Processing: mid-November – mid-December</p> <p>Publication: May-June</p>	<p>Data Processing: January-June</p> <p>Publication: July-September¹⁹</p>	<p>Data Processing: January-April</p> <p>Publication: May</p>
Stakeholders involved	<p>Organisation(s)</p> <ul style="list-style-type: none"> Various government departments <p>Network(s)</p> <ul style="list-style-type: none"> e-Government Benchmark Expert Group DSM Strategic Group Body of European Regulators for Electronics Communications (BEREC) Information Society Statistics Working Group ESTAT and Taskforce 	<p>Organisation(s)</p> <ul style="list-style-type: none"> Mystery shoppers (consultants) Various government departments <p>Network(s)</p> <ul style="list-style-type: none"> e-Government Benchmark Expert Group 	<p>Organisation(s)</p> <ul style="list-style-type: none"> Various government departments <p>Network(s)</p> <ul style="list-style-type: none"> Interoperability of European Public Services Expert Group NIFO subgroup 	<p>Organisation(s)</p> <ul style="list-style-type: none"> Various government departments <p>Network(s)</p> <ul style="list-style-type: none"> Chief Information Officer network
MS involvement	<ul style="list-style-type: none"> Support the design, review and collection of indicators Data/Report validation 	<ul style="list-style-type: none"> Support design and review of indicators Select online services for evaluation Data/Report validation 	<ul style="list-style-type: none"> Support the design and review of indicators Input data Data/Report validation 	<ul style="list-style-type: none"> Support the design and review of indicators Input data Data/Report validation
Usage by MS	<p>Evidence from DESI and other monitoring activities has been used as evidence for ICT investments by ministers.</p> <p>Evidence aids the development of national strategies to see if performance in DESI meets nationally-set targets.</p>	<p>The eGovernment Benchmark has been used to advise local administrations about potential targets for online service improvement.</p>	<p>Evidence from the NIFO factsheets and details from BDM are used for ministerial briefings for foreign visits.</p>	

¹⁹ EIF publication happens after DESI and eGov indicators.

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