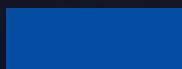




Public Sector Tech Watch

Mapping Innovation in the EU Public Services

A collective effort in exploring the applications of Artificial Intelligence and Blockchain in the Public Sector



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Abstract

This report presents the Public Sector Tech Watch (PSTW), the observatory dedicated to monitor, analyse, and disseminate the use of emerging technologies within the public sector in Europe. The observatory has been launched by the European Commission, and more specifically by the Directorate-General for Informatics (DG DIGIT) and the Joint Research Centre (JRC). In a context where the use of emerging technologies like Artificial Intelligence (AI) and Blockchain is growing, the launch of PSTW is an important milestone to accelerate the adoption of such technologies in the public sector in Europe. In this regard, PSTW aims at providing a knowledge hub and a virtual space to access and share knowledge and experiences, fostering a community that facilitates the implementation of innovative public services in Europe. To do that, it provides empirical evidence to help better understanding the various challenges and the appropriateness of emerging technologies in solving real problems and improving functions of public administration. Moreover, PSTW is a place where people can meet, share experiences and practices, raising awareness and fostering a mutual learning process at European level. PSTW is addressed to all the stakeholders with an interest in the topic, including public administrations, private sector, academia, and civil society. The current report presents the main functionalities of the observatory as well as an overview of the data collected on more than one thousand use cases of AI and Blockchain in the public sector.



Introduction

The use of emerging technologies like Artificial Intelligence (AI) and Blockchain in the public sector is growing, with solutions being developed and implemented across various levels of government and in different economic sectors. Indeed, emerging technologies, like AI and blockchain offer the potential to positively impact public administrations, streamlining administrative processes and improving the effectiveness of public services for citizens and businesses alike (Sun & Medaglia, 2019).

Researchers are extensively assessing the adoption of emerging technologies in public administrations, and in recent years the European Commission has contributed to the body of knowledge on the topic through a use case-based approach, i.e., by analysing systematically a large number of concrete examples of AI and Blockchain use by public bodies. Such an approach has allowed to monitor the development, uptake, and impact of AI in Europe, leading to various publications on the topic, including the “AI Watch. European landscape on the use of Artificial Intelligence by the Public Sector” (Tangi et al., 2022) and the “European Landscape on the Use of Blockchain Technology by the Public Sector” (Martin-Bosch et al., 2022), which provide an overview and analysis of the status of implementation of AI and Blockchain respectively.

Furthermore, in an effort to consolidate the assessment of the adoption of emerging technologies in the European public sector, the European Commission (EC), more specifically thanks to the effort of DG DIGIT, and the Joint Research Centre (JRC), has recently launched the Public Sector Tech Watch (PSTW) aiming to provide a knowledge hub and a virtual space where public administrations, civil society, private companies and academia can find and share knowledge and experience. The observatory’s objective is twofold: to **monitor, analyse, and disseminate** the use of emerging technologies within the public sector in Europe to **build a community** that contributes to facilitate the

implementation of innovative public services in Europe. Moreover, it seeks to expand the work conducted so far by the EC, further analysing and showcasing the adoption and implementation of AI, Blockchain and other emerging technologies by public administrations, becoming the “one-stop shop” for all stakeholders interested on the latest technological developments to improve public sector operations and service delivery.

The objective of this report is twofold: (i) to present the PSTW by describing its context and the main reasons why its creation is an important milestone to accelerate the adoption of emerging technologies in the European public sector and (ii) to offer a glimpse of the current data available in the observatory embedding the discussion in the existing debate on the implementation and use of AI and Blockchain in the public sector. Despite the observatory aims at investigating the role of emerging technologies in the public sector, the current report will mainly focus on AI and Blockchain, as they are the two main emerging technologies in use in the public sector nowadays.

To achieve this goal, the report is divided in five sections. First it gives an overview of the current literature and policy landscape. Second it describes the different tools, and information provided by the observatory, for example a tool to analyse the extensive case collection or a section named “Stories” where the users can find testimonials to showcase challenges faced by European administrations. The third and fourth sections deep dive into the Artificial Intelligence and Blockchain landscape and the cases collected by the observatory. This comprehensive analysis of use cases¹ allows to gain a hands-on understanding of how public administrations across Europe are piloting and implementing emerging technologies. The fifth section concludes with some recommendations to catalyse further change and innovation within Member States’ national, regional, and local administrations.

1 In the context of this report, use cases refer to solutions at any stage of implementation from pilots to under development or already implemented cases.

1 Background context



This section aims to describe the context in which the adoption of emerging technologies like AI and Blockchain is evolving in the European public sector. First, a brief literature review about what we know from the existing literature regarding AI and Blockchain is presented. Second, an analysis of the international and European policy context that regulates and enables the adoption of such innovative solutions is provided.



1.1 Scientific Background

1.1.1 Artificial Intelligence²

Existing literature is still debating on the definition of AI. Building on previous attempts, such as those of the High-Level Expert Group on Artificial Intelligence (HLEGAI)³, the OECD recently updated its definition to reflect scientific developments and provide a common foundation to future legislation on AI across the world. OECD identifies an AI system as a ‘machine-based system that for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual

environments’. Such approach has been adopted in the definition of AI systems that co-legislators agreed on for the **AI Act**⁵.

Beyond the definition of AI, since the very beginning scholars and practitioners started acknowledging the great potential of this technology (Sun & Medaglia, 2019; Tangi et al., 2022). More recently scholars started arguing the potential **disruptiveness** of AI in the public sector (Raisch & Krakowski, 2021; Pavaloaia & Necula, 2023).

² This section aims at synthetically discussing the more recent updates in the existing literature on AI in the public sector. It extends and updates the previous extensive literature review, published in the previous report “AI Watch European Landscape on the Use of Artificial Intelligence by the Public Sector” (Tangi et al., 2022).

³ The High-Level Expert Group on Artificial Intelligence is described in detail at <https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai>

⁴ The OECD definition of AI is retrievable here <https://oecd.ai/en/wonk/ai-system-definition-update>

⁵ The latest update on the AI Act negotiation process is available at <https://www.consilium.europa.eu/en/press/press-releases/2023/12/09/artificial-intelligence-act-council-and-parliament-strike-a-deal-on-the-first-worldwide-rules-for-ai/>



Scholars agree that AI could improve policy making processes, public service delivery and the internal management of public administrations. For instance, AI can reduce or eliminate tedious tasks. It can support the provision of healthcare (e.g., precision medicine or cancer detection), transport or security. Moreover, public administrations can leverage AI for communicating with citizens and businesses or supervising the implementation of regulations (Berryhill, J. et al., 2019).

In the last few years, we assisted to an interesting shift: the technology has become more mature, and public administrations start using it in daily operations. By looking at the data of our previous report, it is evident the relevant percentage of implemented cases, and fully developed solutions that are used in daily operations within the public administration (more than 30% of the total case collection (Tangi et al., 2022). In this context, research on AI in the public sector was still very limited until a few years ago, especially if compared with the adoption of AI in the private sector. Nowadays, the existing literature that forms the body of knowledge, as well as research interests, have expanded (Rjab et al., 2023; Wirtz et al., 2021; Zuiderwijk et al., 2021).

Moreover, the growth in the use of AI has changed the research approach. While since few years ago, research was mainly theoretical, speculating about possible challenges, benefits, and risks on the use of AI, nowadays it becomes more empirical trying to understand real-life problems in the concrete implementation of AI.

Research is now exploring how public administrations can prepare themselves to use these technologies. Literature suggests that to be successful in AI adoption, governments should not only invest in high-quality data, but also make sure that the public sector is ready to manage and harness such information (Misuraca & van Noordt, 2020). Moreover, recent research explores the capabilities that public administrations need for adopting such technologies. These capabilities vary from technical to managerial skills. Moreover,

1.1.2 Blockchain

studies were conducted for developing IT architecture for supporting public administrations' transition towards adopting emerging technologies (see for example van Noordt and Tangi, 2023, Mikalef et al., 2023). Finally, research is exploring which challenges public administrations are facing (Sienkiewicz-Małyjurek, 2023; Tangi et al., 2023). For example, Tangi et al. (2023) argues the need to stress the importance of cultural and organisational challenges. In this direction, Maragno et al., (2022), Maragno et al. (2023) and Giest & Klievink, (2022) highlight how AI is asking public administrations to define new roles and tasks for public servants. All these changes face the inherent tension between public organisations' identity, characterised by formal and rigid structures, and the demands of AI innovation that require experimentation and flexibility (Selten & Klievink, 2024).

Finally, another stream of research is looking more at ethics and trust. Hohensinn et al., (2023) explore the perceived ethicalness of police actions when police follow AI advice. Janssen et al., (2022) highlight the need of explainable AI, in order to support the decision-making process. Similarly other scholars looked at public servants' reaction to AI suggestions (Grimmelikhuijsen, 2022; Selten et al., 2023).

In general, research on AI in the public sector remains relatively limited, particularly given the technology's potential and the accelerated growth in its utilisation. Nevertheless, there is a discernible growth of attention to pertinent aspects and challenges associated with AI adoption. The utilisation of empirical data, case studies, surveys, and experiments warrant further expansion to bridge the existing gap between research and practical implementation. This expansion is crucial to facilitate a mutually beneficial exchange, fostering a positive influence between research and practice. Such collaboration is imperative to assist public administrations in ensuring a trustworthy use of AI technologies.

This section aims at synthetically discussing the more recent updates in the existing literature on blockchain in the public sector. It extends and updates the previous extensive literature review, published in the previous report "AI Watch European Landscape on the Use of Blockchain by the Public Sector" (Martin-Bosch et al., 2022).

The first step towards blockchain was made in 1991 by Stuart Haber and W. Scott Stornetta, who presented a computational solution to verify that a document existed at a specific time in a particular version. The time-stamp digital documents were achieved by computing hash values of documents, timestamping them, and interlinking the records in a data structure by incorporating the hashes of previous records' certificates. In 1992, Bayer Merkle trees were integrated into the digital time-stamping system (Bayer, Haber, and Stornetta, 1999). Such background work, in 2008, inspired the individual or group known as Satoshi Nakamoto. Nakamoto proposed an entirely decentralised data structure, eliminating the need for central intermediaries. This served as basis for Bitcoin, the first Blockchain use case (Nakamoto, 2008).

Blockchain is the most well-known distributed ledger technology. It is a public ledger consisting of all transactions taken place across a peer-to-peer network⁷. It is a data structure consisting of linked blocks of data, forming a chain. The decentralised computer network enables the peers to make transactions without the need for a trusted central authority, while ensuring the integrity of transactions through cryptography. The information stored on a blockchain is immutable and transparent. Once a block of data is added, it cannot be altered. Also, all participants in the network have access to the same information.

In recent times interest in Blockchain applications in the public sector has increased. Available studies on the use of Blockchain in the public sector provide an overview of potential benefits

⁷ The EU definition of blockchain is available at <https://www.enisa.europa.eu/topics/incident-response/glossary/blockchain>



and challenges related to such applications. Despite this growth, empirical data based on specific use cases are still lacking (Riyoldi et al., 2023).


Blockchain can support public sector service delivery by **ensuring gains in security, trustworthiness, accountability, transparency, and efficiency**. In this respect, **public records management** and **healthcare** are two of the main public services where applications of blockchain technology appear promising (Cagigas et al., 2021). In the case of public record management, Blockchain can eliminate inefficiencies and ensure document accessibility. For instance, Blockchain reduces registration and verification times, enhancing reliability of transactions, and eliminating hard copies (Allessie et al., 2019). Moreover, Blockchain applications in the healthcare sector guarantee greater control over data, allowing citizens to decide with whom data should be shared as well as ensuring traceability and integrity. In addition, Blockchain-based solutions may enhance reliability, environmental sustainability, and accountability of public sector services (Cagigas et al., 2021). Blockchain could support governments in tackling global challenges

(e.g., climate change, reduction of biodiversity, water security, disaster management) (WEF, 2018). Moreover, it could impact democratic processes through e-voting (European Parliament, 2017). In the EU, blockchain-based services have already been developed for general public services, economic affairs, education, health, social protection and environmental protection (Martin-Bosch et al., 2022).

Furthermore, research highlights how integration of blockchain with other enabling technologies (i.e., AI, Internet of Things, Big Data and Cloud) is key in developing sustainable smart cities (Riyoldi et al., 2023). An effective integration of digital solutions could optimise energy distribution, waste management and transport as well as ensure integrity and privacy of information shared by relevant stakeholders.

Challenges of Blockchain adoption are of technological, organisational and environmental nature (Batubara et al., 2018). From a technology perspective, security, scalability, and flexibility issues may limit the uptake of Blockchain applications by public organisations. Organisational issues relate to the acceptability of new governance models, as well as organisational readiness and possible trust limitations.

Finally, the lack of legal and regulatory frameworks generates uncertainty among public administrators, given that blockchain adoption requires governance decisions on a number of issues.



1.2 Policy context for the Public Sector

1.2.1 Artificial Intelligence

1.2.1.1 International initiatives

AI is at the centre of several policy initiatives promoted by international organisations and standardisation bodies. Overall, initiatives are principle-based, aimed at raising awareness about potential risks, particularly societal and ethical, stemming from the uptake of AI. Institutions promote measures to ensure that AI is deployed responsibly, respects human values, and adheres to high levels of security, trustworthiness, and transparency. AI's potential to contribute to global challenges, such as Sustainable Development Goals (SDG) or to opportunities in the public sector is often underscored. The lack of governance regimes for AI development, both at national and international level is identified as a potential gap.

OECD presented a set of comprehensive principles fostering the responsible adoption and deployment of AI. The **AI principles**⁸ focus on ensuring that AI is inclusive, prioritises human-centric values, and promotes transparency and

accountability. Moreover, they highlight that AI systems need to be robust, safe, fair and privacy friendly. AI principles acknowledge the global nature of AI and encourage international cooperation on this topic. To ensure engagement in AI principles, the OECD has built the **Global AI partnership**⁹, fostering cooperation among experts from science, industry, civil society, governments, international organisations, and academia. **Based on those principles, OECD recommendations on AI acknowledge both the international and national aspects of AI development.** They identify AI trustworthiness stewardship as an international issue, stressing how stakeholders should proactively promote specific features in AI development. Namely, respect of **human-centered values and fairness, transparency and explainability, robustness, security and safety and accountability.** Nation States are also encouraged to act autonomously and invest in R&D, foster a digital ecosystem for AI, create an enabling policy environment, build human capacity, prepare the labour market transformation, and commit to the development of global standards (OECD, 2023).

⁸ OECD AI principles can be consulted here <https://oecd.ai/en/ai-principles>

⁹ More information on the Global AI partnership is available at <https://gpai.ai/about/>

Building on OECD work, G7 Principles¹⁰, developed in 2023, focus on mitigating risks throughout the development of advanced AI systems. This entails taking measures commensurate to the level of risks associated with AI applications, implementing AI governance and risk management policies, particularly in relation to society, safety and security aspects. G7 reiterates the importance of **transparency**, including of informing the public about domains of appropriate/inappropriate use of AI, making AI content recognisable and sharing information about incidents. G7 encourages investing in security and the prioritising AI contributions to global challenges, such as climate change or other SDGs. Finally, it invites to advance international standards.

G20 AI Principles¹¹ were issued in 2019 and draw from the OECD work as well. Most recently, G20 leaders reaffirmed their commitment to implement such principles, pursuing pro-innovation regulation, governance mechanisms and promoting responsible AI for achieving SDG¹². The Bletchley Declaration¹³, signed by 28 countries, including some EU Member States, and by the EU, acknowledges safety risks arising from AI and promotes a human-centric, trustworthy and responsible AI. In view of this, signatories commit to focus policy agendas on addressing AI safety risks, building an evidence-based understanding of such risks and corresponding risk-based policies. The Bletchley Declaration stresses the importance of transparency, particularly by private actors, as well as of harnessing public sector capability and scientific research. In 2023, the UN issued the ‘Governing AI for Humanity’

Interim Report¹⁴, which is part of the roadmap towards a Global Digital Compact¹⁵. The report, while acknowledging abovementioned actions¹⁶, underlines the lack of a global AI governance. It therefore proposes functions that an international regime for AI should carry out, including develop and harmonise standards, safety, and risk management, ensure risk monitoring, incident reporting, and coordinated emergency response. The report proposes AI principles, affirming that AI should be governed inclusively and in the public interest. Its governance should be rooted in multi-stakeholder collaboration, respectful of international law and commitments, such as SDG.

Standardisation processes are advancing as well. Many standards development organisations have been active in AI and more impetus will be given to standardisation initiatives in Europe following the adoption of the AI Act. **ISO/IEC**¹⁷ have published several standards, including on AI system life cycle processes, risk management, governance, and ethical and societal concerns, and more are being developed. The **IEEE 7000 series** focuses on trustworthiness and transparency aspects, providing technical specifications for mitigating algorithmic bias considerations, ensuring transparency of autonomous systems, inspecting, and investigating incidents and addressing ethical concerns during system design (Soler Garrido et al., 2023). **CEN-CENELEC** have accepted a standardisation request from the European Commission. Their Joint Technical Committee 21 has, among others, provided guidance on how to implement ISO standards.

10 The G7 AI principles can be found at the following link <https://www.mofa.go.jp/files/100573471.pdf>

11 The G20 AI principles can be found at https://www.mofa.go.jp/policy/economy/g20_summit/osaka19/pdf/documents/en/annex_08.pdf

12 The G20 Declaration on AI principles is available at <https://www.consilium.europa.eu/media/66739/g20-new-delhi-leaders-declaration.pdf>

13 The Bletchley Declaration is retrievable at <https://www.gov.uk/government/publications/ai-safety-summit-2023-the-bletchley-declaration/the-bletchley-declaration-by-countries-attending-the-ai-safety-summit-1-2-november-2023>

14 The ‘Governing AI for Humanity’ Interim Report is available at https://www.un.org/sites/un2.un.org/files/ai_advisory_body_interim_report.pdf

15 Global Digital Compact: <https://www.un.org/techenvoy/global-digital-compact>

16 Including UNESCO’s Recommendation on the ethics of AI <https://unesdoc.unesco.org/ark:/48223/pf0000381137>

17 The ISO standardisation committee for AI is visible at the following link <https://www.iso.org/committee/6794475.html>

18 Further detail is available at https://standards.cenelec.eu/dyn/www/f?p=205:22:0:::FSP_ORG_ID,FSP_LANG_ID:2916257,25&cs=1827B89DA69577BF3631EE2B6070F207D

1.2.1.2 EU Declarations

The EU started to play an active role in AI policy in 2018, when Member States, Norway and the UK signed the Declaration of Cooperation on AI¹⁹. Signatories committed to work together on the most relevant issues related to AI, including Europe's competitiveness in the development of AI as well as the social, economic, ethical, and legal impacts of such emerging technology.

In 2020, Member States stated their commitment towards a value-based digital transformation, by signing the Berlin Declaration on Digital Society and Value-based Digital Government²⁰. The Declaration sets out key principles, including the respect of fundamental rights and democratic values in the digital sphere as well as the importance of developing human-centred systems and innovation technologies in the public sector, so to ensure security and trustworthiness by design. The implementation of the Berlin Declaration is progressing²¹ and the area of 'human-centred systems and innovative technologies in the public sector' is one of those where Member States have more room for improvement.

More recently, Member States signed two additional declarations. The first was the Lisbon Declaration on Digital Democracy with a Purpose²² in 2021. With the Declaration, governments committed to ensure access for everybody to human-centric, secure, and inclusive digital services offered by public administrations. It encourages the public sector to offer such services proactively. Moreover, it specifies that when AI systems are used in high-risk areas, they must, among others, be transparent, duly documented, without discriminatory effects. Finally, the European Declaration on Digital Rights and Principles for the Digital Decade 2023²³ stresses the importance of fostering citizens' participation in digital public spaces, to be conceived as trustworthy, diverse, and multilingual online environments. Moreover, it encourages transparency around the use of AI and algorithms, promoting users' freedom of choice.

19 The Declaration of Cooperation on AI can be consulted here <https://digital-strategy.ec.europa.eu/en/news/eu-member-states-sign-cooperate-artificial-intelligence#:~:text=On%2010%20April%2025%20European,European%20approach%20to%20deal%20therewith>

20 The Berlin Declaration on Digital Society and Value-based Digital Government is accessible here <https://digital-strategy.ec.europa.eu/en/news/berlin-declaration-digital-society-and-value-based-digital-government>

21 More information on this can be found here https://joinup.ec.europa.eu/sites/default/files/news/2023-07/SC26_D02.03_BDM_Report_2022_v4.00_FINAL.pdf

22 The Lisbon Declaration on Digital Democracy with a Purpose is accessible at <https://www.lisbondeclaration.eu/>

23 The European Declaration on Digital Rights and Principles for the Digital Decade 2023 is accessible at <https://digital-strategy.ec.europa.eu/en/policies/digital-principles>

1.2.1.3 EU Strategies

Building on commitments enshrined in Declarations, the European Commission has adopted a number of strategic documents outlining a mix of policy, funding and regulatory initiatives on AI. In 2018, the **Artificial Intelligence for Europe** and the **Coordinated Plan on Artificial Intelligence**^{25 26}.

Through the **Artificial Intelligence for Europe**, The European Commission has laid out a vision for Artificial Intelligence in Europe, encompassing technological, social, and regulatory perspectives. It emphasizes the need to enhance the EU's capacity in AI and anticipates the socioeconomic changes that AI will bring, as well as introduces the ethical and legal questions around the use of AI, proposing to set a framework for stakeholders and experts to develop a European approach, including the so-called-European AI Alliance.

The **Coordinated Plan** encourages Member States to put forward national strategies on AI, increase investments, extend public-private partnerships, strengthen research centres and hubs, tackling education issues and working towards the creation of common data spaces. The Plan deals with AI for the public sector, highlighting the importance of procuring AI solutions, if possible, jointly among Member States and stressing the added value that AI could provide to evidence-based policymaking.

As of 2019, the High-Level Expert Group (HLEG) on AI²⁷, gathering AI experts from academy, industry, government, NGOs and think tanks,

investigates the ethical and legal aspects of AI uptake. The Group delivered ethics guidelines for trustworthy AI, a tool for assessing the trustworthiness of AI applications (the so-called Assessment List for Trustworthiness of AI, ALTAI) and policy and investment recommendations.

The most recent strategic decision setting out EU goals for 2030 is the one on the Digital Decade Policy Programme 2030²⁸. The document identifies targets for the EU to reach by the beginning of the new decade. Among others, it encourages the Union to digitalise public services and make sure that, by 2030, there is 100% online accessible provision of key public services, 100% of Union citizens have access to their electronic health records and 100% of Union citizens have access to secure electronic identification (eID). According to the latest data, 77% of public services for citizens are digitised and 84% for businesses²⁹.

The European Commission is committed to enhancing the European Administrative Space (ComPact)³⁰. To do so, it leverages the Technical Support Instrument³¹ and other EU funding mechanisms to strengthen the capacity of public administrations for their digital transformation. The EU is assisting the public sector's digital upskilling and the implementation of digital and data-related legislation (e.g., the AI Act). This should increase public sector's readiness to integrate AI technologies into their operations in a safe and trustworthy way as well as to supervise AI applications across society.

24 The Artificial Intelligence for Europe strategy is accessible at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A237%3AFIN>

25 The Coordinated Plan on Artificial Intelligence is available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0795&rid=3#:~:text=The%20Communication%20E2%80%9CArtificial%20Intelligence%20for,by%20the%20end%20of%202018>

26 The 2021 revision of the Coordinated Plan on Artificial Intelligence is available at <https://digital-strategy.ec.europa.eu/en/library/coordinated-plan-artificial-intelligence-2021-review>

27 More information on the expert group can be found at <https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai>

28 The EU Digital Decade Policy Programme 2030 is available at <https://eur-lex.europa.eu/eli/dec/2022/2481/oj>

29 More findings can be found at <https://digital-strategy.ec.europa.eu/en/library/2023-report-state-digital-decade>

30 More information on the European Administrative Space (ComPact) can be found at https://reform-support.ec.europa.eu/public-administration-and-governance-coordination/enhancing-european-administrative-space-compact_en

31 More information on the Technical Support Instrument is available at <https://eur-lex.europa.eu/eli/reg/2021/240/oj>

1.2.1.4 EU Funding

The EU has significantly stepped-up investment in AI in the 2021-2027 Multiannual Financial Framework (MFF). The Digital Europe Programme³² (DEP) allocates EUR 2.1 billion to AI. Funds are being used to develop and open-up the use of Artificial Intelligence by businesses and public administrations. Moreover, it facilitates the set up European data spaces and enhances safe access to and storage of large datasets and trustworthy and energy efficient cloud infrastructure. DEP is also key for supporting Testing and Experimentation Facilities (TEFs) in areas such as health and mobility in Member States and encourage their cooperation.

DEP contributes decisively to build-up and strengthen the network of European Digital Innovation Hubs (EDIHs)³³, aiming to have a Hub in every region, to help companies benefit from digital opportunities. EDIHs support both public sector organisations and companies – especially SMEs – to test solutions and, overall, to increase their level of digital maturity, through support to find investment, training, and networking opportunities. Many of the 151 funded EDIHs provide services related to AI and robotics. A dedicated Working Group of EDIHs on AI in the public administration has been established for sharing knowledge and experience on the matter. The EU investment in AI is complemented by other sources of funding. For instance, the **Horizon Europe Programme** allocates a part of its EUR 100 billion budget to AI research activities, while through the **Recovery and Resilience Facility** Member States invested EUR 27.5 billion in digital public services³⁴ (20% of the total investment in digital transformation across the EU).

DEP significantly supported the discovery of new interoperable solutions, including AI, through the GovTech Incubator Framework Partnership Agreement³⁵. The long-term partnership targets solutions to be part of a Common Service Platform. The incubator supports the sharing of best practices, helps GovTech start-ups' and SMEs' growth and promotes simplified public procurement. The incubator, called Govtech4all, was launched in 2023³⁶. It includes 21 government agencies from 14 European countries. By 2025, the incubator will develop three cross-border pilots dedicated to secure information in cross-border data spaces, personal regulation assistants and start-up challenge. On a related note, the DT4Regions project³⁷ aims at creating a European Platform for Regions to enable AI and Big Data collective solutions.

The Technical Support Instrument has also been mobilised to enhance AI digitisation. More specifically, the European Commission has dedicated the 2024 flagship project to an **AI-ready public administration**. Funding is made available to support public administrations to integrate AI in a safe and trustworthy way. Measures supported include regulatory mapping and capacity building, modernisation of the computing infrastructure, IT and data governance management, development of ethical AI governance, re-skilling, and up-skilling of public employees.

32 The Digital Europe Programme is described in detail here <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/digital>

33 The European Digital Innovation Hubs (EDIHs) initiative is described at <https://digital-strategy.ec.europa.eu/en/activities/edihs>

34 More information can be found here https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/assets/thematic_analysis/2_Digital.pdf

35 More information on the GovTech Incubator Framework Partnership Agreement is available at <https://joinup.ec.europa.eu/interoperable-europe/news/call-digital-govtech-incubator-open>

36 More information on GovTech4All is available at https://lisboncouncil.net/wp-content/uploads/2023/05/LISBON_COUNCIL_PRESS_RELEASE-Govtech4all-.pdf

37 More information on DT4Regions is available at <https://dt4regions.eu/about-dt4regions>

1.2.1.5 Contextual Regulations

With the White Paper on Artificial Intelligence³⁸ of 2020, the European Commission inaugurated the discussion around the European Approach to AI, inviting all interested parties to provide input. Building on the results of the HLEG, this publication represented a first step towards a future EU regulatory framework, sketching out type of requirements features of such framework. Moreover, it reaffirmed the need for the public sector to adopt AI solutions, starting with the healthcare and public service operators.

The review of the Coordinated Plan on AI³⁹ puts forward seven sectoral action areas for EU strategic leadership, including public sector, restating the need for public procurement of AI systems to accelerate. Hence, it setting-up the Adopt AI Programme and the public procurement data space. The former will finance adoption/ procurement of Artificial Intelligence solutions/ technologies by the public sector. The latter will connect European databases and national procurement data sets through four integrated layers⁴⁰. This should increase transparency, facilitate SMEs' and companies' access to public procurement and improve the value for money for the public sector.

The most relevant development is the AI Act, a regulation proposed by the European Commission in 2021⁴¹. Co-legislators recently struck a political agreement on the final text of the Act⁴². Once adopted and in force, such Regulation will regulate AI applications based on a risk-based approach, according to which higher requirements will be imposed on more risky solutions. The Act

prohibits systems that pose unacceptable risks, such as AI-based social scoring or real-time remote biometric identification. The European Commission proposal identifies high-risk applications based on their area application, such as biometric identification of persons, management of critical infrastructures of access to social benefits. Going beyond regulatory requirements, the AI Act introduces measures in support of innovation, such as regulatory sandboxes. Finally, it establishes the European governance of AI, proposing the establishment of the European AI board as well as the EU Database for stand-alone high-risk AI systems.

Another relevant piece of EU law that co-legislators recently agreed on⁴³ is the Data Act⁴⁴. This Regulation lays down harmonised rules on the availability of data for business-to-consumer, business-to-business as well as public-private exchanges. More specifically, it allows public sector bodies to access and use data held by the private sector in specific circumstances, such as public emergencies or following a legal mandate in case data are not otherwise available. The Data Act removes obstacles for switching between data processing services and promotes data spaces interoperability through the development of ad-hoc standards. In terms of Open Software, the European Commission reviewed in 2021 its 'Decision on the open-source licensing and reuse of European Commission software'⁴⁵. In line with the Open-Source Software Strategy 2020-2023⁴⁶, the European Commission made it easier to disseminate software under an open sources licence, committed to identifying software with the

38 The 2020 White Paper on Artificial Intelligence can be found here https://commission.europa.eu/system/files/2020-02/commission-white-paper-artificial-intelligence-feb2020_en.pdf

39 The 2021 review of the Coordinated Plan on AI is available at <https://digital-strategy.ec.europa.eu/en/policies/build-leadership-ai>

40 More information is available at https://single-market-economy.ec.europa.eu/single-market/public-procurement/digital-procurement/public-procurement-data-space-ppds_en

41 The AI Act is available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206>

42 The final text of the AI Act was agreed in early December, more information can be found at <https://www.consilium.europa.eu/en/press/press-releases/2023/12/09/artificial-intelligence-act-council-and-parliament-strike-a-deal-on-the-first-worldwide-rules-for-ai/>

43 In June 2023, the legislators agreed on the Data Act. More information can be found here https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3491

44 The EU Data Act is available here <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A68%3AFIN>

45 Decision on the open-source licensing and reuse of Commission software is available at https://commission.europa.eu/news/commission-adopts-new-rules-open-source-software-distribution-2021-12-08_en

46 The Open-Source Software Strategy 2020-2023 can be consulted here https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/digital-services/open-source-software-strategy_en

potential to bring value outside the organisation and allowed its developers to contribute to open-source projects with improvements developed while working for the EU.

In 2022, the European Commission proposed the **Interoperable Europe Act**⁴⁷. The Regulation promotes cross-border interoperability of IT solutions used for public services. It does so by establishing the Interoperable European Board, tasked with developing a common strategic agenda for cross-border interoperability. Moreover, it introduces mandatory interoperability assessments for IT cross-border systems, as well as establishes a common Interoperable Europe Portal, enabling the community to share and reuse solutions. Finally, it supports innovation through regulatory sandboxes and GovTech cooperation. The Interoperable Europe Act is also close to being adopted⁴⁸.

Other contextual EU policies to be considered are:

- **Digital Market Act**⁴⁹: It aims to create fairness in the digital market by regulating large online platforms and promoting competition, innovation, and consumer choice.
- **Digital Service Act**⁵⁰: It aims to establish clear rules for digital service providers, ensuring a safer online environment for users and promoting transparency and accountability.
- **Cybersecurity Act**⁵¹: It focuses on strengthening the EU's cybersecurity capabilities, promoting cooperation among member states, and ensuring a high level of cybersecurity across the region.



1.2.1.6 National Strategies

National strategies are a key vehicle to ensure the implementation of international principles about AI. Among other elements, national AI strategies have a public sector focus, with policy initiatives aimed at stimulating awareness, improving data access and quality, improving capacity, launching pilots and experiments, developing ethical and legal AI guidelines, and defining funding and procurement objectives (Tangi et al., 2022). An updated picture is available by OECD live repository⁵².

47 More information on the Interoperable Europe Act is available at <https://joinup.ec.europa.eu/interoperable-europe/news/eu-commission-adopts-proposal-act>

48 More information on the Interoperable Europe Act is available at <https://joinup.ec.europa.eu/interoperable-europe/news/political-agreement-interoperable-europe-act>

49 The Digital Market Act: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/digital-markets-act-ensuring-fair-and-open-digital-markets_en

50 The Digital Service Act: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/digital-services-act_en

51 <https://digital-strategy.ec.europa.eu/en/policies/cybersecurity-act>

52 <https://oecd.ai/en/dashboards/overview>

1.2.2 Blockchain

1.2.2.1 International initiatives

The policy debate around Blockchain signals a significant interest in exploring its potential for the economy, including its applications for the public sector. Policymakers generally focus on identifying and analysing potential Blockchain-based applications and services, while deployment of solutions seems less widespread than for AI. The public sector is keen on understanding challenges and opportunities as well as draw up best practices and guidance for use cases development and deployment. Moreover, the main aspects investigated are **governance and legal implications, interoperability, security, and privacy issues**. In addition, as governments increasingly adopt **digital identity**, Blockchain-based solutions for digital credentials are being explored. Finally, sustainability aspects are increasingly investigated.

The OECD recommends⁵³ **fostering responsible innovation and technology adoption**. Key elements affecting national policies and international cooperation in this area are the development of agile and technology neutral rules and standards on governance and interoperability. Moreover, governments are invited to enhance support to innovation, through investments in education and skills and the creation of innovation-conducive ecosystems. This is being pursued through the establishment of hubs (e.g., European Digital Innovation Hubs), incubators and accelerators. Furthermore, governments contribute to community events and meetups, as well as of public-private partnerships, such as coalitions⁵⁴.

The use of Blockchain in international trade is increasingly supported, given the potential gains in **transparency, trust and digitisation**. In this respect, the World Economic Forum (WEF) developed a toolkit⁵⁵ inspired by best practices, including use cases from governments, to guide decision-makers throughout the lifecycle of a solution deployment. The toolkit promotes interoperability and integrity of supply chains by looking at several aspects, such as the use of digital identities, data protection, cybersecurity, data integrity, regulatory and legal compliance. Moreover, the toolkit provides guidance about the specificities of the public or private blockchain solutions, looking at specific factors influencing the public or private approach.

The G20 put the accent on the **benefits that Blockchain could bring to consumers and SMEs**, stressing how the use of Distributed Ledger Technologies (DLTs), such as Blockchain, in global value chains, have the possibility to offer greater transparency and accountability⁵⁶. The International Telecommunication Union looked at the issue of **standardisation of DLT and analysed use cases**⁵⁷, including for government and public sector. Possible public sector cases use envisaged are regulatory compliance, government data management and international relations.

Policies around the relation between blockchain and sustainability are also being considered. This entails on one side, identifying how distributed ledger technology can support climate action and, on the other one, understanding how to reduce the environmental and social impacts of blockchain. When looking at the environmental impact of

53 OECD recommendations on blockchain and other DLTs are available at <https://www.oecd.org/mcm/Recommendation-on-Blockchain-and-other-Distributed-Ledger-Technologies.pdf>

54 Blockchain for Social Impact Coalition (BSIC) is an example, more information can be found at <https://blockchainforsocialimpact.com/>

55 The toolkit is available at <https://widgets.weforum.org/blockchain-toolkit/modules/index.html#consortium-governance>

56 The Declaration of G20 Digital Ministries can be found at <http://www.g20.utoronto.ca/2021/210805-digital.html#:~:text=The%20Blockchain%20in%20Global%20Value.offer%20greater%20transparency%20and%20accountability>

57 The International Telecommunication Union DLT use cases can be found here <https://www.itu.int/en/ITU-T/focusgroups/dlt/Documents/d21.pdf>



blockchain technologies, WEF outlines a potential approach for a unified impact assessment that balances economic, environmental, and social perspectives and illustrates examples of how blockchain solutions applied to the energy sector could support the transition towards net-zero emissions⁵⁸.

Blockchain applications could **enhance sustainability and support actions against climate change**. For instance, by contributing to transparently measure, report, and verify information about emissions provided by actors bound by international agreements (e.g., Paris Agreement⁵⁹). Blockchain could democratise access to carbon finance markets selling carbon credits to a large public⁶⁰. More in general, increasing attention is being devoted to how Blockchain technology could contribute to achieving SDGs, supporting sustainable supply chains, improving energy efficiency, and promoting the creation of secure and reliable smart cities (Parmentola et al., 2022).

While national strategies for emerging technologies are being developed⁶¹, an international body of rules and standards is emerging, mostly on finance, eID and data (OECD 2022). Governments have developed regulatory sandboxes⁶² allowing businesses to test relevant products or services, helping to experiment potential innovative business models. In parallel, standardisation is advancing. Since 2015, ISO⁶³ has been developing and publishing technical standards for Blockchain. Adopted standards focus on use cases, vocabulary, systems design, privacy, overview of DLT, reference architectures, security management, governance, and identity

58 WEF Guidelines for Improving Blockchain can be consulted here https://www3.weforum.org/docs/WEF_Guidelines_for_Improving_Blockchain%E2%80%99s_Environmental_Social_and_Economic_Impact_2023.pdf

59 The Paris Agreement on climate action: <https://unfccc.int/process-and-meetings/the-paris-agreement>

60 WEF Blockchain for Scaling Climate Action report can be found here https://www3.weforum.org/docs/WEF_Blockchain_for_Scaling_Climate_Action_2023.pdf

61 The national strategies for blockchain of Austria, US and UK can be found here <https://asic.gov.au/for-business/innovation-hub/enhanced-regulatory-sandbox-ers/>, <https://www.whitehouse.gov/wp-content/uploads/2022/02/02-2022-Critical-and-Emerging-Technologies-List-Update.pdf>, <https://www.gov.uk/government/publications/digital-regulation-driving-growth-and-unlocking-innovation/digital-regulation-driving-growth-and-unlocking-innovation>

62 Some examples of government regulatory sandboxes are available at <https://asic.gov.au/for-business/innovation-hub/enhanced-regulatory-sandbox-ers/>, <https://www.dfsa.ae/innovation>, <https://www.securities-administrators.ca/resources/csa-finhub>

63 The ISO committee for blockchain is available in detail here <https://www.iso.org/committee/6266604.html>

1.2.2.2 EU Regulation

The EU strives towards leadership in Blockchain based on several actions, including infrastructure building, research and innovation financing, regulation, eco-system building and standardisation⁶⁴. As stated in the EU Strategy on Digital Finance⁶⁵, Blockchain technology applied to crypto-assets can bring significant advantages in finance, enabling cheaper and quicker machine-to-machine transactions. However, the EU proposed regulatory measures to mitigate potential risks stemming from the uptake of such technology.

From a regulatory perspective, the most relevant measures are the proposed Markets in Markets in Crypto-assets Regulation (MiCA)⁶⁶. Such instrument, which entered into force in June 2023, amends the previous Directive. It lays down requirements for the offer to the public of crypto assets, such as asset-referenced tokens and e-money. It defines transparency requirements for issuing, offering to the public and admitting crypto-assets, details their supervisory regime and protects clients of crypto-assets holders. In addition, it identifies measures to ensure the integrity of crypto-assets markets.

The uptake of Blockchain technology will be impacted also by other pieces of legislation, such as the Data Act, the Interoperable Europe Act (both described at section 2.3.1) and the European Digital Identity (eID) Regulation.

The proposed Data Act supports smart contracts as an effective tool to implement data access and use for co-generated IoT data. Hence, it supports the setting of standards for smart contracts, focusing on interoperability aspects. Essential requirements enabling smart contracts' interoperability include robustness, safe termination, continuity, and access control.

The proposed **eID Regulation**⁶⁷ lays down conditions for issuing European Digital Identity Wallets by Member States. Establishes the legal framework for, among others electronic signatures and ledgers, namely tamper-proof electronic records of data. Recently agreed on by co-legislators⁶⁸, the final text of the Regulation should be adopted before the end of the European Commission mandate.

⁶⁴ More information on the European Commission's blockchain strategy is available at <https://digital-strategy.ec.europa.eu/en/policies/blockchain-strategy#:~:text=The%20most%20significant%20parts%20its,interoperability%20with%20private%20sector%20platforms>

⁶⁵ The EU Strategy on Digital Finance is available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0591>

⁶⁶ The Markets in Markets in Crypto-assets Regulation (MiCA) is available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1114>

⁶⁷ The eID Regulation is available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0281>

⁶⁸ At the end of November 2023, the final text of the Regulation was reached. More information is available at https://ec.europa.eu/commission/presscorner/detail/en/ip_23_5651

1.2.2.3 EU Funding and Infrastructure

By 2019, the EU already invested EUR 180 million in support to R&D in Blockchain⁶⁹. The EU has stepped up efforts in the current MFF, including through the TSI support for cross border public services using decentralised technologies⁷⁰. DEP dedicates part of its budget to support European public administrations and industry to deploy and access state-of-the-art digital technologies, such as blockchain. More specifically, in its most recent work programme⁷¹, the DEP allocates EUR 10 million to developing and reinforcing the European Blockchain Services Infrastructure (EBSI). Moreover, part of the programme funds for skills, will foster the design and delivery of specialised training on Blockchain. Finally, EU-funded EDIHs contribute to provide Blockchain services to public organisations and SMEs.

The European Blockchain Services infrastructure (EBSI)⁷² provides an infrastructure consisting of distributed blockchain nodes across Europe. Partners are the 27 EU Member States, Norway, Liechtenstein, and the European Commission. EBSI is made of three layers: (i) the basic infrastructure, which contains the connectivity, Blockchains and necessary storage; (ii) the core service, which enables use cases and applications; (iii) the use cases and specific applications layer. Use cases explored through EBSI include the European Digital Identity⁷³, the sharing of diplomas and digital audit trails⁷⁴ and the municipality credentials.

Other EU instruments funding Blockchain solutions are Horizon Europe and Invest EU⁷⁵. The former is focused on research and innovation and can support innovative start-ups and SMEs. The latter serves as an investment platform for the development of key enablers, such as advisory services to enhance investment readiness of Blockchain SMEs and companies as well as build up the investor community.

1.2.2.4 Community

The last pillar of EU action on Blockchain can be identified in the community building and standardisation efforts. The European Blockchain Observatory and Forum⁷⁶ is a European Parliament-funded pilot project monitoring relevant initiatives in Europe, creating a forum for information sharing in Blockchain and formulating recommendations for the future. At international level, the EU supports International Association of Trusted Blockchain Applications (INATBA). Moreover, it supports standards' development at ISO, ETSI, CEN-CENELEC, IEEE and ITU.

69 More information is available at <https://digital-strategy.ec.europa.eu/en/news/eu-funded-projects-blockchain-technology>

70 The Communication "Enhancing the European Administrative Space (ComPAct)" can be consulted at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023DC0667&pk_campaign=preparatory&pk_source=EURLEX&pk_medium=TW&pk_keyword=Public%20administration%20&pk_content=Communication&pk_cid=EURLEX_news

71 More information is available at <https://ec.europa.eu/newsroom/dae/redirection/document/94609>

72 More information on the European Blockchain Services infrastructure (EBSI) is available at <https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Home#>

73 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-digital-identity_en

74 Use cases related to EBSI can be retrieved at <https://digital-strategy.ec.europa.eu/en/policies/european-blockchain-services-infrastructure>

75 More information on funding and investments on blockchain research is available at <https://digital-strategy.ec.europa.eu/en/policies/blockchain-funding>

76 The European Blockchain Observatory and Forum is available at the following link <https://www.eublockchainforum.eu/>

2 The Public Sector Tech Watch Observatory



2.1 Overview

Launched in September 2023, the **Public Sector Tech Watch (PSTW)** is the new European observatory dedicated to monitoring, analysing, and disseminating the information related to the implementation of public services using AI, blockchain and other emerging technologies. PSTW is managed by the European Commission, more specifically by Directorate-General for Informatics (DG DIGIT) and the Joint Research Centre (JRC) and it is based within the EU Joinup community platform.

The PSTW observatory is crafted to meet the informational needs of a diverse group of stakeholders, including public sector personnel, policy strategists, private sector entities, and academia and research institutions by providing comprehensive resources on cutting-edge technological advancements and their role in enhancing the efficiency and effectiveness of public service provision. PSTW serves not only as a repository where stakeholders can access valuable information and data but also as a community where they can convene, exchange ideas, share experiences, and learn from each other. Furthermore, the observatory plays a pivotal role in supporting the European Commission's initiatives to advance the digital transformation and cross-functional compatibility within the public sectors across Europe.



**PUBLIC
SECTOR
TECH
WATCH**

The European Commission has identified a knowledge gap regarding the potential benefits of emerging technologies within public administrations and government bodies at various levels. Moreover, the EC recognises that one of the challenges many administrations face is developing effective solutions with limited information and a lack of interaction and experience sharing with their counterparts.

The PSTW observatory has been established to bridge this divide, offering a constantly updated compendium of use cases, consolidating insights from an extensive array of contributors – that will be detailed below. The PSTW repository is not only a resource for public sector officials, but also a tool for policymakers across national, regional, and local governments. It aids them in understanding the impact of new technologies in the public sector, informs them on the related policies that encourage the adoption of these innovations and the allocation of resources towards specific research areas, such as the ones related with AI and blockchain technologies. Additionally, the gathered information serves the research and academic community by providing

a basis for studying the adoption patterns of AI and Blockchain across Europe, potentially enriching the discourse with new academic findings. Moreover, private sector entities can gain a clearer understanding of public sector technology utilisations and requirements. This knowledge may inspire the development of tailored solutions for government agencies, guided by the documented instances within our curated collection.

The PSTW observatory builds on two initiatives that the European Commission has pursued in recent years aiming at studying the adoption of innovative public services within the European public sector:

- **AI Watch** (De Prato et al., 2020). The project started in 2020 and aimed at doing research on adoption of AI in the Europe. Within the initiative, a task was dedicated on studying the adoption of AI in the Public Sector. In this specific context, two landscaping reports on the use of AI in the public sector have been published: one in 2021 (Van Noordt et al., 2021) and one in 2023 (Tangi et al., 2023). Overall, under AI Watch 686 cases of AI have been collected and analysed. Finally, another publication proposed a series of recommendations for the uptake of AI in the public sector (Manzoni et al., 2022). This effort also supported a wide community of experts and officers from EU public sector (Van Noordt et al., 2021) (Manzoni et al., 2021).

- **Innovative Public Sector observatory** (IPSO, Perego, A. et al., 2020). The initiative aimed at studying the feasibility of a European Commission observatory on emerging technologies in the public sector. The project

was conducted by DIGIT and JRC as part of the IPS Action under the EU ISA² Programme. The primary objective of IPSO is to oversee the adoption and utilisation of emerging technologies across Europe. This encompasses not only Artificial Intelligence (AI) but also Distributed Ledger Technologies, Internet of Things (IoT), and Application Programming Interfaces (APIs) specifically in the context of providing public services. The outcomes of this project include the publication of a feasibility study, serving as the foundation for the subsequent planning of the PSTW. Additionally, within this initiative, two reports focusing on GovTech have been released.

In the attempt to consolidate and streamline research and studies on these technologies, PSTW inherits the legacy of both work streams combining them in a single unified observatory. In addition, PSTW aims to expand upon both previous collections and research by consolidating all into a user-friendly repository thereby enhancing accessibility for researchers and public officials seeking to consult the database.

Moreover, PSTW aims at creating a community of interested actors that discuss and share experiences on this topic. In this direction the work is the continuation of the multidisciplinary Science for Policy Conference titled “Artificial Intelligence: What’s in it for the Public Sector?” jointly organised by JRC and DG DIGIT in 2022. The results of the conference have been later published and made available through a specific report that includes the conclusions of each one of the webinars, together with the material and main findings of the closing event (Farrell et al., 2023).



Public Sector Tech Watch

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Welcome

The Public Sector Tech Watch promotes knowledge on emerging technologies in the European Public Sector.

This observatory aims to become the "one stop shop" for public sector officials, policy makers, private companies and citizens, providing resources on latest trends and developments, promoting best practices, improving public sector operations and services, and contributing to public sector innovation and digital transformation.

Join the community!

Click on "Join the collection" to become a user of the collection and be able to:

- **Publish content:** Propose related news, events, and become an active member of the community.
- **Receive notifications:** Decide what type of and how often you would like to receive collection updates.
- **Be directly invited to events:** Receive direct invitation to all events organised in the context of Public Sector Tech Watch.



2.2 The Joinup platform

PSTW is hosted on the Joinup platform, a collaborative platform funded by the European Commission in 2016 via the “Interoperability Solutions for public administrations, businesses and citizens” (ISA2) Programme⁷⁷. It is a digital tool designed to facilitate collaboration, knowledge sharing and interoperability across the European Union. The aim of Joinup is to provide a common venue that enables public administrations, businesses and citizens to share and reuse IT solutions and good practices. In addition, it was created to facilitate communication and collaboration on IT projects across Europe by offering several services that aim at helping eGovernment professionals to share their experiences. Moreover, it serves as a central hub for public administrations, businesses, and citizens to exchange ideas, solutions, and expertise in areas such as eGovernment, eHealth, and public administration. The platform supports collaborative efforts through features such as document and project management,

community building, and sharing reusable software solutions and interoperability assets. By providing an inclusive and multilingual environment, Joinup encourages the participation of diverse stakeholders, promoting cross-border collaboration and the harmonisation of digital services and solutions across member states. Furthermore, it contributes to the development of interoperable and user-centric digital solutions, enhancing the efficiency, quality, and accessibility of public services throughout the EU.

Joinup is part of the European Commission efforts to enhance interoperability and promote the exchange of best practices among public administrations. Indeed, interoperability of public services is at the core of the European strategy for interoperability, facilitated by this platform where users can access open-source tools, solutions, and networking opportunities for best practice exchanges. Summarising, Joinup has a threefold objective, as it works as:

⁷⁷ https://ec.europa.eu/isa2/home_en/

- **A digital policy hub.** Joinup is a space to interact, stay informed, research and plan digital initiatives with fellow civil servants. The collections in the platform contain digital government references, monitoring of declarations, Member States' digital factsheets, guidelines, open-source policies and studies.
- **An interoperability solutions hub.** Joinup is also a space where administrators can find right solutions to make digital initiatives a reality. In fact, it also works as a direct access to open-source technical solutions from various sources such as the European Commission (i.e., Common Services Platform), Member States, academia, businesses, and external repositories.
- **A digital government in practice hub.** Joinup is a space to display digital initiatives and pilots that have been put into practice by the platform's members. Collections in the platform also work as communities of practice, where innovative tools are promoted to support digital government initiatives (e.g., European Interoperability Framework Toolbox⁷⁸, Joinup Licensing Assistant⁷⁹, Interoperable Europe Academy⁸⁰, GovTech Connect Community⁸¹, OSOR Community⁸², etc.).

78 <https://joinup.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory>

79 <https://joinup.ec.europa.eu/collection/joinup/news/joinup-licensing-assistant>

80 <https://joinup.ec.europa.eu/collection/digital-skills-public-sector/solution/interoperable-europe-academy>

81 <https://joinup.ec.europa.eu/collection/govtechconnect>

82 <https://joinup.ec.europa.eu/topic/ict/open-source-software>



2.3 The Public Sector Tech Watch features and activities

In order to fulfil the PSTW goals in being a knowledge hub and a reference point on the use of AI and emerging technologies in the public sector, several features have been proposed and several activities are ongoing.

The first core activity entails the identification and analysis of use cases based on AI, Blockchain and other emerging technologies in the public sector in Europe. This involves comprehensive desk research to gather as many real-world and up-to-date use cases as possible. The collection of such use cases raises awareness within public administrations about the potential of these emerging technologies. The goal of the PSTW is to catalyse further innovation within Member States' national, regional, and local administrations,

encouraging the adoption of the existing solutions collected here. At the same time, private sector is becoming aware of the technological evolution of the public sector, which is a viable market for edge-cutting innovative solutions, such as AI and Blockchain.

The second main activity regards the publication of scientific foresight reports, which provides insights into digital innovation trends in the public sector, based on the data collected.

In addition, community building among public administrators is fostered with a series of workshops, webinars and events designed to disseminate the results and discuss them with other researchers and policy makers.

SHOWCASE OF THE USE CASES COLLECTED

The PSTW provides a web-portal, where users can access and view in a user-friendly way the collection of AI, Blockchain and other technologies cases. The collection has started by the JRC in 2019 under the AI Watch, and at the time of writing includes 1123 cases.

These cases are updated and maintained and are categorised according to the taxonomy presented in paragraph 2.4.3. Figure 1 shows the case viewer on the website: each case can also be consulted singularly with a brief description, accompanied by an external link or source that describes in more detail the solution. The dashboard is maintained regularly to guarantee the best quality and up-to-datedness of the collection. Moreover, the list is published in open data and can be downloaded.

Figure 1. PSTW `s use case viewer.



Source: PSTW Observatory

RELEVANT USE CASES' STORIES

Stories with relevant and insightful use cases are published regularly, offering useful insights to the members of the observatory. The stories regard different sectors of government (e.g., healthcare, public order and safety services, general public services) and different applications (e.g., information analysis, public service personalisation, internal management processes). Stories also provide useful information on the challenges that administrations face when carrying out technological change, which can be taken as tips for replications from fellow civil servants.

KNOWLEDGE HUB

In the observatory users can consult the knowledge centre, which is a hub where theoretical content and studies related to the subject are published and linked. This includes PSTW reports, but also related JRC publications under other collections or observatories. Here, EU-funded initiatives and projects are also showcased to promote liaison.

NEWS AND EVENTS

Users can find news articles and events organised by DG DIGIT and the JRC related to emerging technologies in the public sector, GovTech and the EU digital ecosystem in general. The PSTW itself organises workshops aimed at disseminating the results of research activities and to promote collaboration among all stakeholders.

SUBMIT YOUR CASE

This constitutes a pivotal and fundamental aspect of the PSTW, wherein users play a central role in the initiative's success. The implementation of this online tool empowers various stakeholders, including public administrations, start-ups collaborating with public organisations, academic institutions, and others, to contribute by reporting their projects and solutions that are not currently featured in the repository. This participatory approach fosters a collaborative learning process within the community, enabling other administrations to discover viable solutions and benefit from shared experiences. Furthermore, the submission of a case qualifies the solution to be considered for the Best Cases Award - an initiative introduced by PSTW to appropriately acknowledge outstanding projects and solutions throughout Europe. The tool is already available online and we invite everyone to submit their cases.

GOVTECH AND RELATED INITIATIVES

Users can access all related to GovTech artefacts, including studies, workshops and news. The PSTW links all the GovTech initiatives developed by the European Commission. This includes the GovTech Connect and the GovTech4all Incubator. Figure 2 below provides an overview of the current GovTech ecosystem of European Commission's actions.

the GovTech ecosystem



Public Sector Tech Watch

a central observatory for citizens, policy makers etc. to gain visibility of the use cases on emerging technologies, and to share and promote their own cases.

GovTech Connect

a community that brings together GovTech actors for seizing opportunities, mitigate risks and share experiences. The community provides further support by creating guidelines and studies to further support the GovTech actors.

GovTech4all Incubator

a testing arena that provides the opportunity to public administrations to experiment, test and pilot GovTech solution in safe environments and sandboxes

interoperable Act

the IOP Act supports the investment in innovative measures (Article 10) with the creation of a GovTech community and a platform for presenting related activities and promoting use cases and best practices. At the same time encourages the experimentation and the participation in innovative sandboxes (Article 12) for piloting GovTech solutions.



BEST CASES AWARD

Public sector actors and technology providers (e.g., start-ups and SMEs) can submit their successful cases of implementation of emerging technologies on the PSTW. Awarded teams receive an official certificate issued by the European Commission. In addition, awarded cases are also promoted on the PSTW website, in newsletters, and on social media. The PSTW provides to awarded teams the potential opportunity for further development, scalability, networking, and collaboration opportunities. While the Awards are non-monetary, they aim to support the uptake of the best emerging technology use cases in the European Union.

JOIN THE COMMUNITY

Lastly, users can join and be part of the community. This subscription will give the possibility to be invited to PSTW events and be updated on the new publications.



2.4 Case collection methodology

This section delves into the methodology employed in the development of the Public Sector Tech Watch use case repository and provide details about the selection of metadata adopted to describe the cases. The list of metadata is described by the **PSTW Taxonomy** that is employed to carry out the standardised and structured categorisation of the collected and published use cases. During the data collection process, the research team has ensured that the newly gathered use cases maintained a balanced representation across various dimensions of the taxonomy, despite limitations. This includes, for example, technology

types with respect to AI (e.g., machine learning, natural language processing, computer vision etc.), administrative levels (national, regional or local) and geographical distribution (for instance, find at least one use case per EU Member State). This effort was undertaken considering inherent disparities in adoption rates of AI and Blockchain technologies, as well as the challenges associated with information retrieval that affect the statistical representativeness of this repository. Every effort was precisely undertaken to contain this limitation.

2.4.1 Main Sources

The PSTW use cases' collection follows the same approach and methodology use in predecessor reports⁸³. Across the years, the repository was constructed exploring four main typologies of sources:

- **News articles** collected through internet search. We scanned the web as much as possible in search of use cases of AI and blockchain in the public sector. We carried out this process also scanning for articles in national languages, to increase the chances of finding more unpublished use cases.
- **Scientific and grey literature.** We reported all the cases we detected from scientific publications or grey literature.
- **International and local initiatives or direct contacts** with Member States or other institutions. We included as much information as possible directly from Member States during the previous releases. For example, we included several cases collected by the NL AI Coalition.
- **Already existent collection of cases** published by other international organisations (e.g., OECD Observatory of Public Sector

Innovation case study library⁸⁴) or national, regional, and local administrations (e.g., City of Amsterdam Algorithm Register⁸⁵).

In some particular cases, data has been collected from primary sources (e.g., interviews, surveys, etc.).

Table 1 presents a compilation of key use case sources that the observatory routinely screens to support field research activities. This is done concurrently with active efforts to collect use cases directly through our established network of public administration authorities from EU Member States.

In addition, for the future releases of the database and for future publications, we will collect further use cases of AI, Blockchain and other emerging technologies through a public **self-reporting tool (i.e., Submit Your Case functionality)**. This online tool will allow public administrations, start-ups working with public organisations, academic institutions, among others, to report their projects and solutions that are not yet included in the repository. Please visit the PSTW observatory to get more information on this tool and to submit your case.

83 https://ai-watch.ec.europa.eu/publications/ai-watch-european-landscape-use-artificial-intelligence-public-sector_en
<https://publications.jrc.ec.europa.eu/repository/handle/JRC131202>

84 The use cases retrieved for the PSTW can be found here https://oecd-opsi.org/case_type/opsi/

85 The use cases retrieved for the PSTW can be found here <https://algoritmeregister.amsterdam.nl/en/ai-register/>

Table 1. Selection of use case sources.

Source	Technology	Target	Link
OECD - Observatory of Public Sector Innovation Casze study library	Artificial Intelligence, Blockchain	OECD countries	https://oecd-opsi.org/case_type/opsi/
EDIH (Digital Innovation Hub) Catalogue	Artificial Intelligence, Blockchain	EU	https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue
Atlas of urban AI	Artificial Intelligence	WW	https://gouai.cidob.org/atlas/
EU Blockchain Observatory and Forum	Blockchain	EU	https://www.eublockchainforum.eu/initiative-map
EU DG Justice and Consumers	Artificial Intelligence, Blockchain	EU	https://op.europa.eu/en/publication-detail/-/publication/4fb8e194-f634-11ea-991b-01aa75ed71a1
AI4EUROPE - AI on Demand EU project community	Artificial Intelligence	EU	https://www.ai4europe.eu/ai-community/projects
DT4REGIONS, EU project	Artificial Intelligence, Blockchain	EU	https://dt4regions.eu/dt-book/dt-solutions
Living in EU User-Centric Services Repository	Artificial Intelligence, Blockchain	EU	https://www.usercentricities.eu/services
CEF Service Translation Services Catalogue	Artificial Intelligence	EU	https://cef-at-service-catalogue.eu/
Algorithmic Transparency Standard Registry	Artificial Intelligence	EU	https://www.algorithmregister.org/
AAI AI Use Case Library	Artificial Intelligence	EU	https://www.archive.appliedai-institute.de/hub/library-of-use-case-families
EU EBSI Distributed Ledger Sandbox	Artificial Intelligence	EU	https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Sandbox+Project
Algorithm Watch	Artificial Intelligence	WW	https://algorithmwatch.org/en/stories/
EU INTERREG Policy Learning Platform	Artificial Intelligence, Blockchain	EU	https://www.interregeurope.eu/search?keywords=Artificial%20Intelligence
EU Funded Projects about AI - CORDIS	Artificial Intelligence	EU	https://cordis.europa.eu/article/id/446030-artificial-intelligence-expanding-scientific-boundaries-and-enhancing-innovation
Estonian Innovation in PS Projects catalogue	Artificial Intelligence	EE	https://www.kratid.ee/kasutuslood-kratid
EUIBA Emerging Technologies initiatives within various EUIBA (European Union Institutions, Bodies and Agencies)	Artificial Intelligence, Blockchain, RPA, extended reality, etc.	EU	https://joinup.ec.europa.eu/collection/euiba-emerging-tech
The Netherlands AI Coalition (NL AIC)	Artificial Intelligence	NL	https://nlaic.com/en/use-case/
Artificial Intelligence Projects in the public sector in Norway	Artificial Intelligence	NO	https://data.norge.no/kunstig-intelligens

Source: PSTW Observatory

2.4.2 Landscape of collected use cases

Regarding the landscape on AI, the collection process started at the very beginning of the AI Watch, in December 2019. The first landscaping report was published in 2020 with a total of **230 AI cases** in the report “AI Watch – Artificial Intelligence in public services” (Misuraca and van Noordt, 2020), which cases were later made available as open data together with some additional cases.

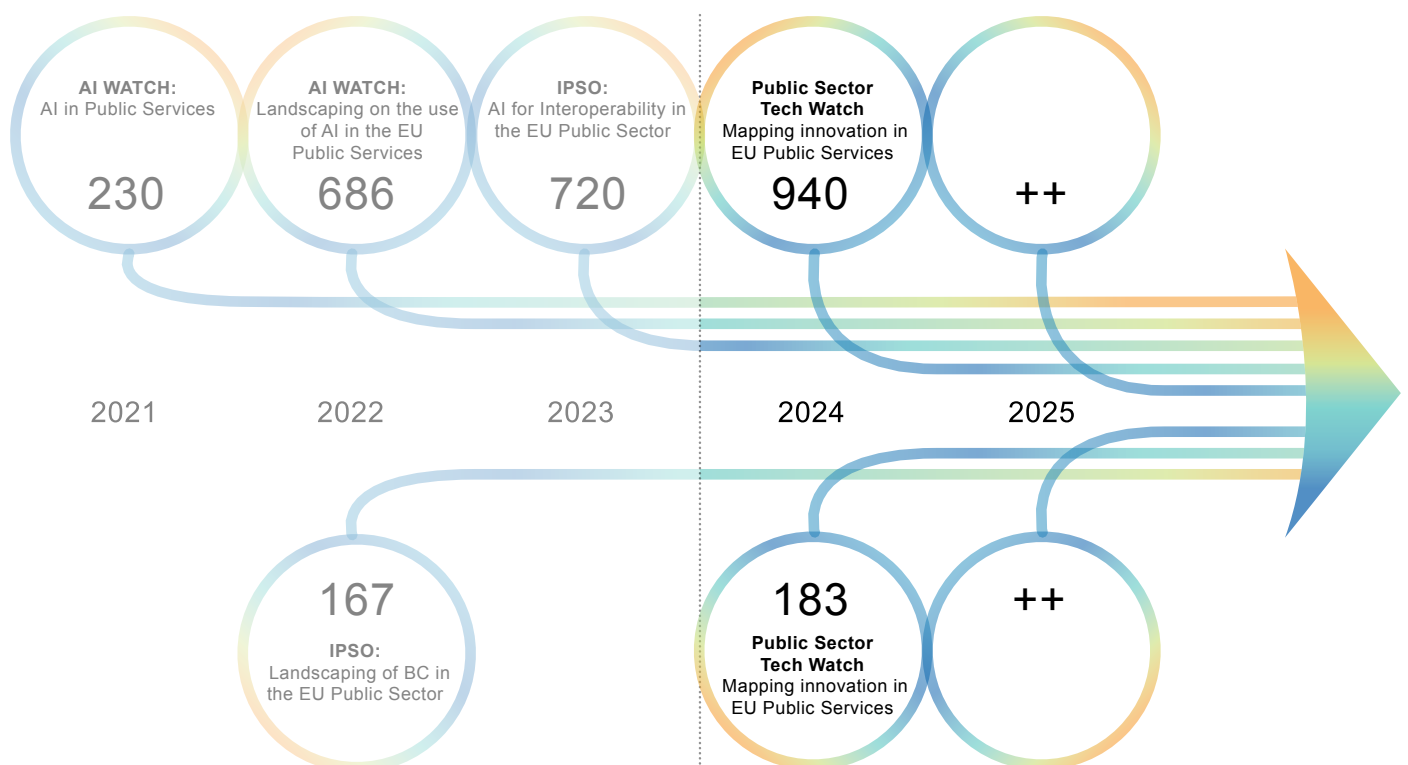
The case collection continued later and a new published for the first time a total of **686 AI use cases** (including the old ones) of AI across all 27 EU Member States and other neighbouring countries in the “AI Watch. European landscape on the use of Artificial Intelligence by the Public Sector” report (2022). In October 2023, the JRC has published the first report under the Public Sector Tech Watch observatory collection, i.e., “Artificial Intelligence for Interoperability in the European Public Sector” (2023). Here, the total number of use cases of AI reached **720**. For this publication, the total number of use cases of AI

has expanded to **940**, thanks to the research activities carried out under the Public Sector Tech Watch.

In a parallel and similar way, a first version of **blockchain use cases** database was published with the “European Landscape on the Use of Blockchain Technology by the Public Sector” report in 2022. In this report, the analysis was made over **167** cases of blockchain adoption across public administrations in all EU Member States and nearby nations. Inside this report the list of cases has grown to **183**, through the renewed research efforts under the Public Sector Tech Watch initiative.

The process of data gathering is continuously ongoing and will be reflected in the future releases of the PSTW database on the collection website and on the future reports. Moreover, cases on other emerging technologies will be added in the upcoming months.

Figure 3. History overview of today's' PSTW use case database.



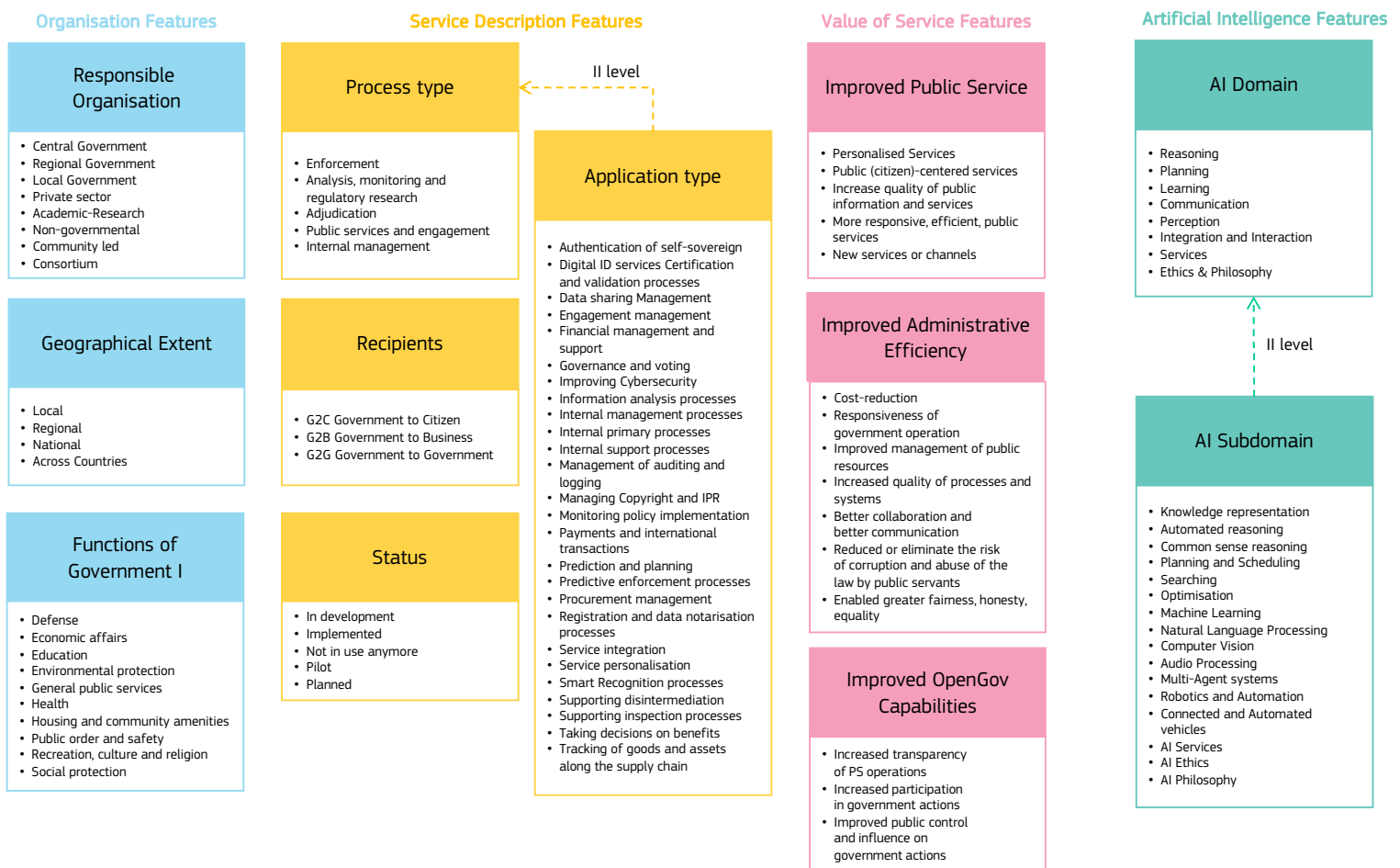
2.4.3 PSTW Taxonomy

One of the most important parts of our methodology is the application of an adequate taxonomy to categorise and analyse the collected AI and blockchain cases, which allowed to thoroughly describe their features and context of use. Moreover, it was built on the taxonomy of prior JRC reports (see Tangi et al., 2022, Martin-Bosch et al., 2022), and it ensures consistency and facilitates the comparison among cases, even if based on different types of emerging technologies. This framework allows us to methodically organise each use case by various characteristics, spanning from organisational structures to technical aspects, while striving to remain as neutral as possible regarding the specific nuances of the technology. By doing so, it is possible to conduct a thorough evaluation of how innovative technologies are being integrated

across Europe. This evaluation will pinpoint both the areas where we excel and those that require improvement, thereby shaping the foundation for crafting targeted and effective policy recommendations.

Additionally, this taxonomy aims to align with the OECD's AI Systems Classification Framework, introduced in February 2022, which advocates for systems to be characterised by the model, functions and outputs, economic environment, and contextual considerations pertaining to societal and environmental impacts. Although there is a congruence between the AI Watch taxonomy and the OECD Framework, notable distinctions exist in the breadth and granularity of the categories and criteria used to define the specific elements within.

Figure 4. PSTW Taxonomy main elements.



Source: Tangi et al., 2022

To categorise and analyse the use cases of AI and Blockchain, this taxonomy was designed to make a proper classification of each use case according to different features, ranging from organisational to technical ones. This categorisation allows for an in-depth analysis on the state of adoption of AI and Blockchain across the European continent, finding strengths and weaknesses and guide the design of proper policy recommendations.

- **Basic Information:** This category encompasses the use case's title and the nation of the implementing administration. These details are essential for assessing the broader uptake of transformative technologies within the European public sector. Additionally, information such as the name, website, and source link of each case is compiled for reference and accessible through the PSTW online platform for stakeholders to consult.

- **Organisational Characteristics:** This section captures data regarding the entity responsible for the technological solution, the level of government it operates within, its geographic coverage, and the particular government function or sector it pertains to.

- **Service Profile:** a concise overview of the use case, its current stage of development, and the implementation or pilot year. This also includes, when applicable, the final year of operation or pilot conclusion, as well as the

nature of the process and type of application involved in the solution (refer to Table 3 and Table 4 for additional specifics).

- **Service Impact:** This category evaluates the areas of public service or administrative performance that the solution aims to enhance or has already improved (refer to Table 5 for additional specifics).

- **AI Specifications:** AI is the technology with the bigger quantity of cases in the today database. Applicable solely to use cases utilising AI, there is a specific section to the taxonomy that delineates the specific AI technology used, identifying the domain, subdomain, and relevant keywords where possible.

The PSTW taxonomy will undergo regular evaluation and potential expansion in light of the on-going collection of new AI, Blockchain and other technologies use cases. This periodic review process may lead to enhancements, similar to past updates that incorporated additional AI-specific attributes. A more detailed description of each category of analysis that is addressed in this report is available in Table 2.

The dashboard, available in the PSTW Case viewer online, showcases the main features of the cases, such as the name, the website of reference, the sources, and the description of each use case.

Table 2. PSTW taxonomy.

Feature	Description	Source
Geographical extent	This variable indicates the geographical extent of the solution implemented, namely where the solution is implemented.	Authors' own elaboration
Country	This variable reports the country of origin of the Responsible organisation owning the solution.	Eurostat
Responsible organisation	The public authority implementing the solution or the public contracting authority procuring the solution.	Authors' own elaboration
Function of Government (Primary Functions) (COFOG) (level I, II)	The Classification of the functions of government, abbreviated as COFOG, was developed in its current version in 1999 by the Organisation for Economic Cooperation and Development and published by the United Nations Statistical Division as a standard classifying the purposes of government activities. Second level of COFOG classification, which specifies further per each sector of government the sub activity.	Eurostat
Status	This variable indicates the status of development of the solution at the time of discovery and collection.	Authors' own elaboration
Start year	This variable indicates when the solution was started or the project piloting it initiated.	Authors' own elaboration
Process type	This variable indicates the type of general public service or administrative process that the solution improves. This is a classification of 5 high-level types of government decision-making task commonly implemented with basic processes/tools and potentially governed with AI.	Engstrom, Ho, Sharkey, & Cuéllar, 2020
Application type	This variable is a further specification of the process type. It was elaborated by the JRC, and it is a mean between different case collection sources (not standardised).	Authors' own elaboration
Technology	This variable indicates whether the use case regards Artificial Intelligence or blockchain (or other innovation technologies).	Authors' own elaboration
E-government type of interaction	This variable refers to whether the solution affects the Government-to-Government (G2G), Government-to-Citizens (G2C) or Government-to-Business (G2B) interactions.	Authors' own elaboration
Expected public value assessment	These fields are a three-dimensional assessment of each case's e-government value.	Twizeyimana & Andersson, 2019; Maragno et al., 2021
Cross sector	This variable indicates whether the solution has a cross-sector implementation.	Authors' own elaboration
Cross border	This variable indicates whether the solution has a cross-border implementation.	Authors' own elaboration
AI-specific classification	List of representative core and transversal AI domains and subdomains. It encompasses the main theoretical AI scientific areas, and AI-related non-technological issues from industrial and R&D AI Activities, as well as ethical and philosophical issues.	Samoli et al., 2021

To enhance clarity on the procedures and categories of applications of innovative technology, PSTW is adopting the comprehensive descriptions of each element within these variables in Table 3 and Table 4. This classification represents an integrated framework, integrating various bespoke categorisations, and is crafted to reflect insights gathered from practical use cases, taking into account both overarching policy implications and specific operational feedback.

The detailed descriptions were initially introduced in the report “AI Watch. European landscape on the use of Artificial Intelligence by the Public Sector” (Tangi et al., 2022) and were subsequently

adapted for its inclusion in the report “European Landscape on the Use of blockchain Technology by the Public Sector” (Martin-Bosch et al., 2022). However, this is the inaugural presentation of the two sets of descriptions in a combined format. It is important to note that certain Application Types carry implications specific to particular technologies. For example, Blockchain technologies are predominantly utilised for certification and notarisation processes, in contrast to Artificial Intelligence. As we anticipate gathering more case studies on other emerging innovative technologies, we expect to further refine and enhance this classification.

Table 3. Descriptions of process types.

Process type	Description
Adjudication	Cases that are about governmental tasks that identify or prioritise targets of agency enforcement actions
Analysis, monitoring, and regulatory research	Tasks that collect or analyse information that shapes agency policymaking
Enforcement	Tasks that support formal or informal agency adjudication of benefits or rights
Internal management	Tasks that support the direct provision of services to the public or facilitate communication with the public for regulatory or other purposes
Public services and engagement	Tasks that support agency management of resources, including employee management, procurement, and maintenance of technology systems

Source: Engstrom, Ho, Sharkey, & Cuéllar, 2020

Table 4a. Descriptions of application types.

Process Type	Application type	Description
Adjudication	Taking decisions on benefits	Processes used for making decisions regarding approval, validation, or revocation benefits (e.g., social).
	Managing copyright and IPR	Processes within the public sector used for making decisions regarding concessions, demonstration, or revocation of rights.
Analysis, monitoring and regulatory research	Information analysis processes	Information and data analysis is the process of inspecting, transforming, and modelling information. It is made by converting information into actionable knowledge (e.g., dashboard to support decision-making).
	Monitoring policy implementation	Processes that follow and assess policies implementation to ensure they are developed, endorsed, and implemented.
	Innovating public policy	Processes that guide policy innovation and update to ensure they are improved.
	Prediction and planning	Processes for management of resources based on prediction models, to support planning.
Enforcement	Smart recognition processes	Processes that can identify objects, people, places, texts, situations and actions in images, video, audio, or other detectable physical phenomena.
	Management of auditing and logging	Collection of records, and/or destination and source of records that provide documentary evidence of the sequence of activities that have affected at any time a specific operation, procedure, event, or device.
	Predictive enforcement processes	Processes that analyse amounts of information available to predict and help prevent potential future crimes/mistakes/misunderstandings.
	Supporting inspection processes	Supporting processes used to identify wrongdoing or mistakes before an intervention by the responsible authorities (e.g., tax positions to be checked, businesses registered with anomalies).
	Improving cybersecurity	Cybersecurity is the application of technologies, processes, and controls to protect systems, networks, programs, devices and data from cyber-attacks.
	Registration and data notarisation processes	Systems to support legal registration of information or data.
	Certification and validation processes	Processes where public administration provides citizens or other organisations with an official document attesting or validating a status or a certain right.

Table 4b. Descriptions of application types.

Process Type	Application type	Description
Internal management	Internal primary processes	Process that directly create value for the external customer and the impact of their performance on the level of customer (citizens, firms) satisfaction.
	Internal support processes	Processes that produce services and information for the functioning of the organisation. They have only internal customers.
	Internal management processes	Processes that provide management, control, and decision support tools necessary to achieve the organisation's objectives and which have stakeholders and managers as clients.
	Procurement management	Activities that concern the procurement processes of administrations
	Financial management	Processes for providing social protection or financial support to citizens, other organisations or for internal purposes
Public services and engagement	Engagement management	Establish and enhance connections with citizens and businesses to build trust at every point in their PS journey throughout the user relationship established.
	Data Sharing Management	Data sharing processes are supporting accesses to PS data, considering interoperability and data licensing (e.g., open data).
	Service integration	Service Integration is the management of the integration of multiple service suppliers and information sources to provide a tailored new specific service to citizens or other organisations or even for internal purposes.
	Service personalisation	Delivering customised services considering the needs of the customer (citizen/businesses/civil servant). Recommendation systems are here included.
	Tracking of goods and assets along the supply chain	Tracking technology that allows knowing where goods are located at any time, so that transfers between supply chain actors are accurate and up to date

Source: Authors own elaboration

Advancing the description of the taxonomy, Table 5 presents the construction of the three macro categories forming the expected public service value assessment, with every sub-category that was considered. Each case was evaluated according to 3 categories, which seek to qualify the type of public value that the solution produces (fully implemented solutions) or is expected to produce (pilots, in development cases, etc.).

The first two categories, “Improved Public Service” and “Improved Administrative Efficiency” serve distinct functions and do not overlap. The former pertains to scenarios where public services for citizens have been improved, while the latter is specifically concerned with the internal administrative processes of public agencies. This distinction aligns with the modes of e-government interaction: solutions that facilitate Government-to-Citizen (G2C) or Government-to-Business (G2B) interactions are designed to, or anticipated to, enhance public service delivery. Conversely,

Government-to-Government (G2G) solutions are intended to, or expected to, bolster administrative efficiency.

The “Open Government Capabilities” examines the impact of solutions on the transparency and openness of public administration. This area of assessment is relevant to both public services and administrative operations, recognising initiatives that promote greater visibility and engagement in government processes.

It is important to underscore that the assessment made is keeping in consideration not only the concrete outcomes but also the prospective advantages, especially for pilot initiatives and projects that are currently in progress. Considering most of these cases are still in the preliminary stages, and have yet to undergo formal impact evaluations, the evaluation has primarily concentrated on the informed projections and expectations of the team responsible for the Public Sector Tech Watch.

Table 5. Descriptions of expected public service value assessment.

Service Value	Description
Improved Public	This aspect focuses on initiatives designed to elevate the offering of services provided to end-users, whether they are citizens or businesses. Examples include augmenting service accessibility, simplifying the user experience (such as through new communication channels), or improving the overall quality of services offered by public entities.
Improved Administrative Efficiency	This area encompasses objectives related to increasing efficiency, effectiveness, and quality while reducing costs within administrative processes, systems, and services. The aim is to maintain government operations that are systematic, sustainable, adaptable, strong, efficient, and agile. This also involves more effective management of public assets and financial resources.
Open government Capabilities	This refers to solutions that have an impact to implementing solutions that bolster the level of openness, transparency, engagement, and communication within public organisations. An example includes providing tools for citizens or businesses that enable them to have a say in and oversee government actions or policies.

Source: Twizeyimana & Andersson, 2019; Maragno et al., 2021



2.5 Limitations

According to prior assessments, the research framework encounters several constraints that need to be considered. The data acquisition process for the PSTW provides just a limited statistical representative sample reflecting the general trend of emerging technologies implementation (as AI and Blockchain) in the public sector. This is attributed to its substantial dependence on data sourced from publicly accessible channels. As a result, this limitation hinders our ability to conduct statistically robust comparisons of AI and blockchain uptake rates among EU Member States and adjacent nations.

There is a likelihood that the PSTW database does not adequately represent certain countries, due to language barriers or the restricted presence of information on open-source platforms.

Additionally, some applications may not be publicly disclosed for security reasons, particularly within the domains of public safety and defence. Despite ongoing efforts to broaden the data collection by including news articles in local languages, this intrinsic challenge associated with the data gathering process remains unresolved. Furthermore, the process of identifying and

gathering use cases depends on the accessibility of pertinent data. A use case can only be incorporated into the database if there is enough information available to classify it and compile comprehensive taxonomy. When the available information was insufficient, the use case was excluded from the database. Moreover, this dataset reflects a picture of technology adoption at a specific point in time.

To mitigate the risk of becoming outdated, the methodology involves **constant maintenance of the use cases already collected** (older than six months, i.e., all the use cases analysed in the previous reports before June 2023). This sometimes led to update the categorisation of some fields, when deemed necessary (e.g., development status, application types etc.). The date of the last update for each case is reported in the database. Still, given the velocity of digital innovation within public administrations, use cases might become obsolete despite research efforts. The status of these use cases may have changed or become unavailable after the initial collection or update.

Data collection, annotation and categorisation is also susceptible to **possible misinterpretations** and definitional inconsistencies. We mitigated this risk involving multiple coders, carrying our peer-reviews on each other categorisation, especially in technical fields, such as process and application type and AI domains and subdomains. The term Artificial Intelligence by itself encompasses a broad spectrum of technologies and applications, therefore there can be ambiguity in how use cases were categorised and described based on open-source information. The classification of AI domains and subdomains is also limited and does not consider the whole spectrum of AI technologies available on the market, but it offers a sufficiently specific classification for the purpose of this report and of the Public Sector Tech Watch.

The last point to underline is **the intricacies involved in delineating what constitutes the public sector**. This complexity stems from the diverse array of organisations, institutions, and entities that operate under different governance structures, serve various functions, and adhere to a range of policy objectives. The public sector is not a monolithic entity; rather, it encompasses national, regional, and local government bodies, as well as public agencies, public service providers, and state-owned enterprises, each with their distinct mandates and operational frameworks. Moreover, the scope of the public sector can vary significantly from one country to another, influenced by cultural, economic, and legal factors. This variability poses challenges when attempting to establish a standardised definition that is applicable for comparative analysis or benchmarking purposes. The multiple dimensions of the public sector, including its organisational forms, funding mechanisms, and legislative mandates, further contribute to the complexity of defining it in a clear and consistent manner.

The methodology is considering as **organisation or administration the entity that acts within the realm of public sector**, including state-owned industries, governmental agencies, universities, private research and development centres, and consortia piloting projects under European programmes, such as EU Horizon and the former Horizon 2020. At the same time, each organisation must act within one of the Functions of Government, presented in the COFOG areas of classification, presented in the taxonomy.

To date, the database made available only includes public sector use cases related to AI and Blockchain. The objective of the PSTW observatory goes beyond these two specific technologies and includes all emerging technologies. However, at the time of developing this report, Artificial Intelligence and Blockchain are the two emerging technologies of which the PSTW hosts cases.

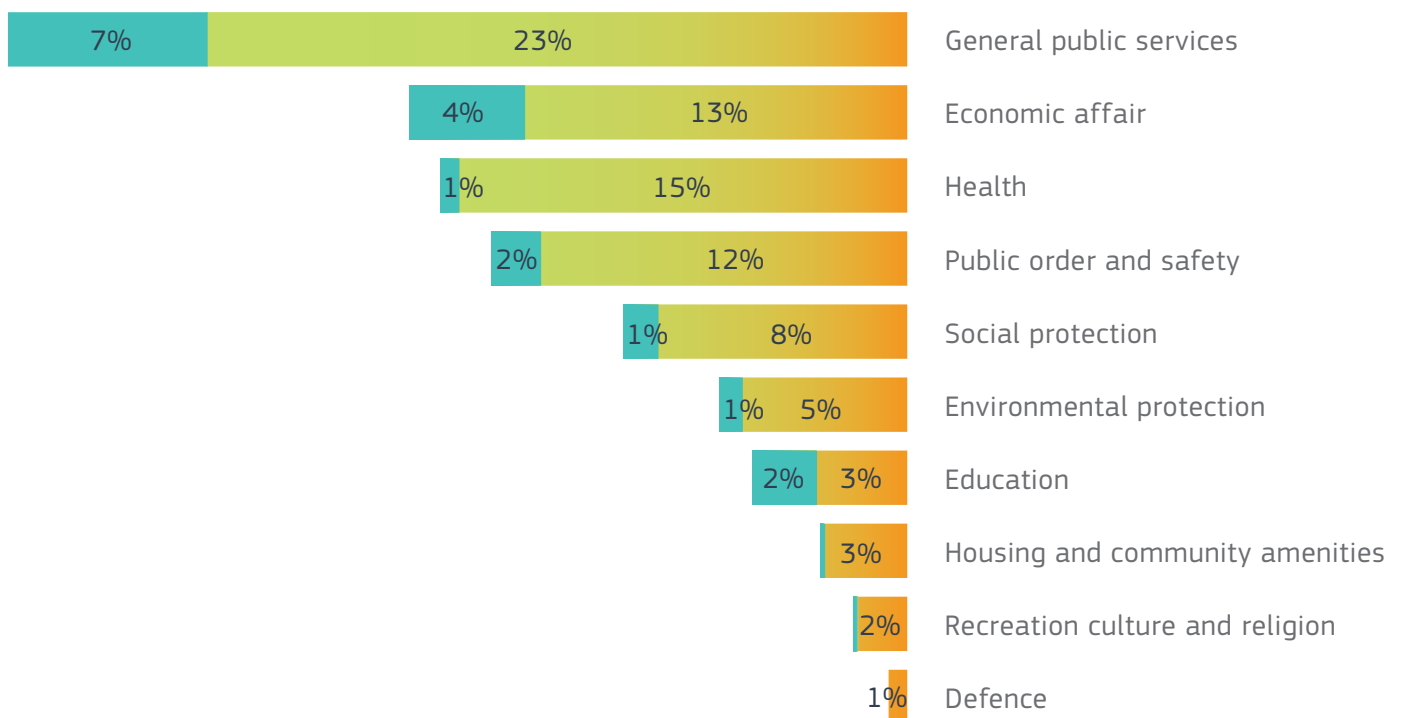
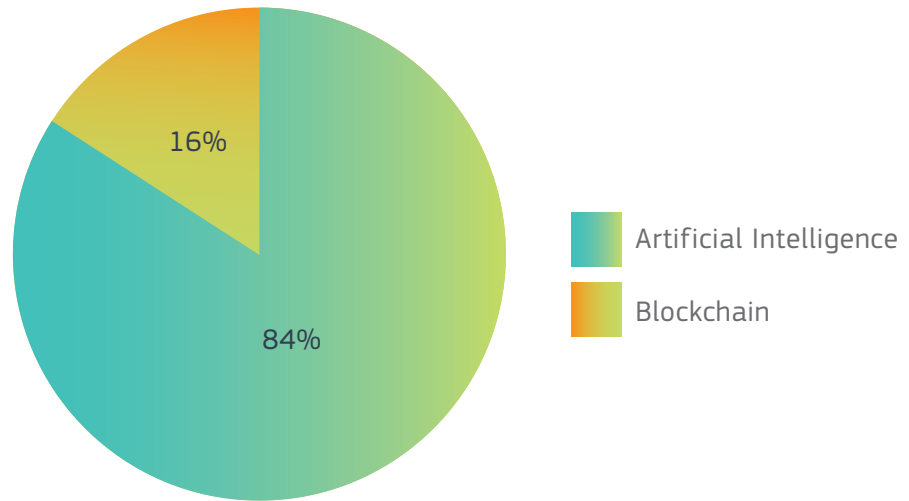


2.6 PSTW Up to date summary

The PSTW observatory contains more than 1,000 use cases within the European public sector and will be continuously enhanced and enlarged. This collection should be used to identify best practices, scale successful models nationwide, and support the European public sector to remain at the forefront of technological advancement for the benefit of all citizens.

This report is focusing on **940 use cases of AI** and **183 use cases of blockchain** in the European public sector. The use cases come from 33 European countries, including all the 27 EU Member States. Some use cases mapped here are also EU-level initiatives or solutions.


Figure 5. Published PSTW use cases overview.



Source: PSTW Observatory

3 AI's adoption in the Public Sector





3.1 Context and introduction

940 use cases of AI in the European public sector have been analysed for this report. The use cases come from 33 European countries, including all the 27 EU Member States. Within the cases mapped at the international level, i.e. across countries, eight use cases identified are also EU-level initiatives or solutions.

The collected data indicates that the different cases are distributed all around Europe. The most significant contributions of AI use cases come from the **Netherlands** (137), **Germany** (95), **Italy** (88), followed by **Portugal** (66), **Norway** and

Estonia (59). Moreover, 12 countries have at least 30 use cases of AI reported in the PSTW, namely **France** (54), **Spain** (51), **Belgium** (49), **United Kingdom** (45), **Finland** (45) and **Denmark** (33) are with **at least with 30 AI use cases** presented in the database, in comparison to previous AI landscaping reports mentioned before, highlighting the improved breadth of research conducted and AI's proliferation within Europe's public sector. These figures underscore a clear trend: AI implementation and pilot programs are on the rise throughout the continent.



3.2 Illustrative insights

The following insights are gathered using the PSTW Data Viewer business intelligence tool. It is important to recognise the limitations of these insights and consider them as a starting point for potential analysis. While they may not encompass all available metadata or potential cross-over analyses, they provide valuable examples that can be easily developed further. Accessing the freely available use cases database allows for

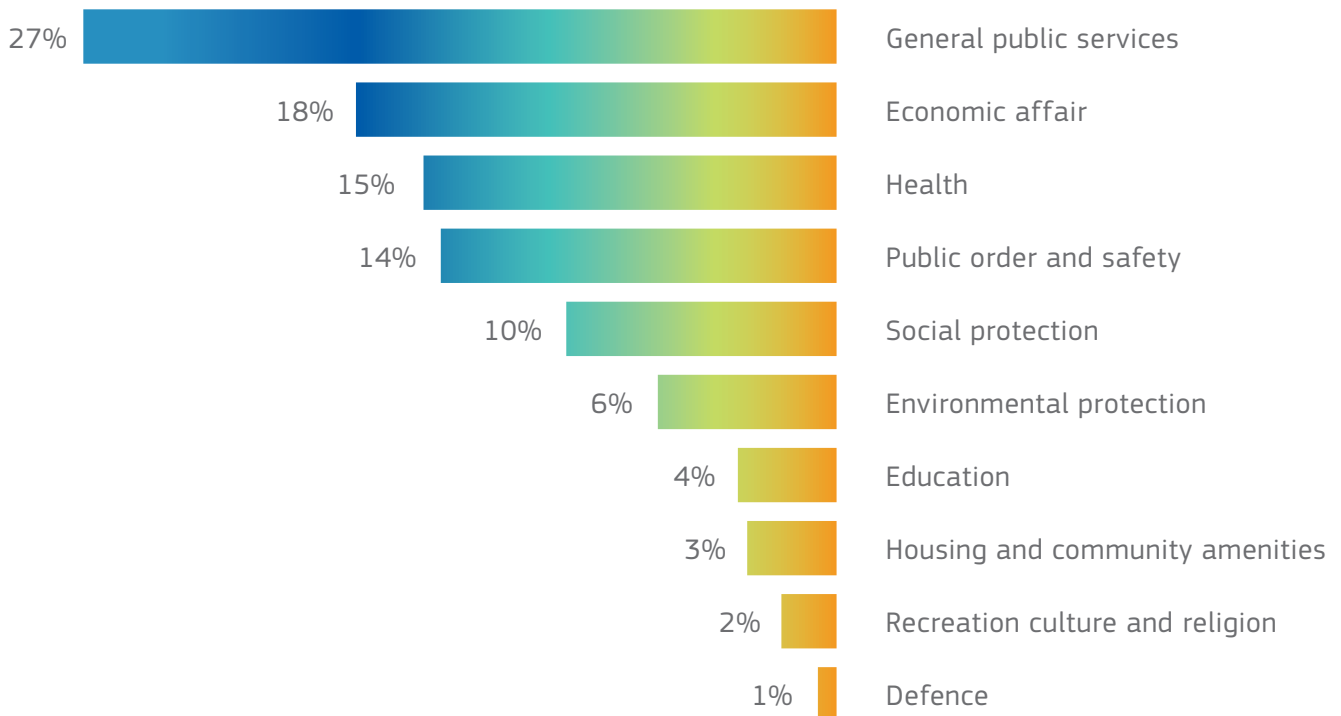
deeper exploration and comprehensive analysis, which is crucial for informed decision-making and the development of evidence-based policies. Embracing these opportunities for further development and leveraging open data resources is essential in shaping effective and impactful policies for the benefit of the community and stakeholders.

3.2.1 Primary Sectors (COFOG classification)

Figure 6 shows the primary functions of government where the use cases of AI have been initiated or implemented. **General public services** account for the highest number of use cases (27% of use cases), followed by **public order and safety** (18%), **economic affairs** (15%), and **health** (14%). Compared to previous publications, a notable increase in use cases within the public order domain has been observed, primarily in police services and traffic control management, which fall under this function. **Social protection** (10%) is another significant function as these services directly impact citizens.

A surge in **environmental protection** cases has emerged (6%), up from the 4% reported in the 2022 AI Watch landscaping in public sector report. Initiatives in this domain primarily involve AI technologies that automate benefit allocation and adjudication processes, directly affecting citizens. **Recreation, culture, and religion** (2%) and **Defence** (1%) are the areas that are less impacted by these technologies or less public documented. Possibly, the limited availability of public information due to security concerns could explain the low adoption in defence.

Figure 6. Distribution of AI use cases according to primary sectors (COFOG level 1).



Source: PSTW Observatory

Moreover, PSTW cases viewer allows to filter the data according to different criteria. Figure 7 shows the results filtering the AI-based cases under the General Public Services category.

It is possible to focus on this specific cases' dimension, filtering the cases viewer as shown in Figure 7, selecting the "General Public Services" category and highlighting the **256 cases**, allows the users to explore these cases in more detail. Most solutions in this category are chatbots on official websites – at both national and local levels of government – and solutions that streamline administrative processes (e.g., text classification of incoming emails).

Figure 7. PSTW case viewer filtering General Public Services AI-based use cases.



Source: PSTW cases viewer

3.2.2 Primary sector Vs Status of implementation

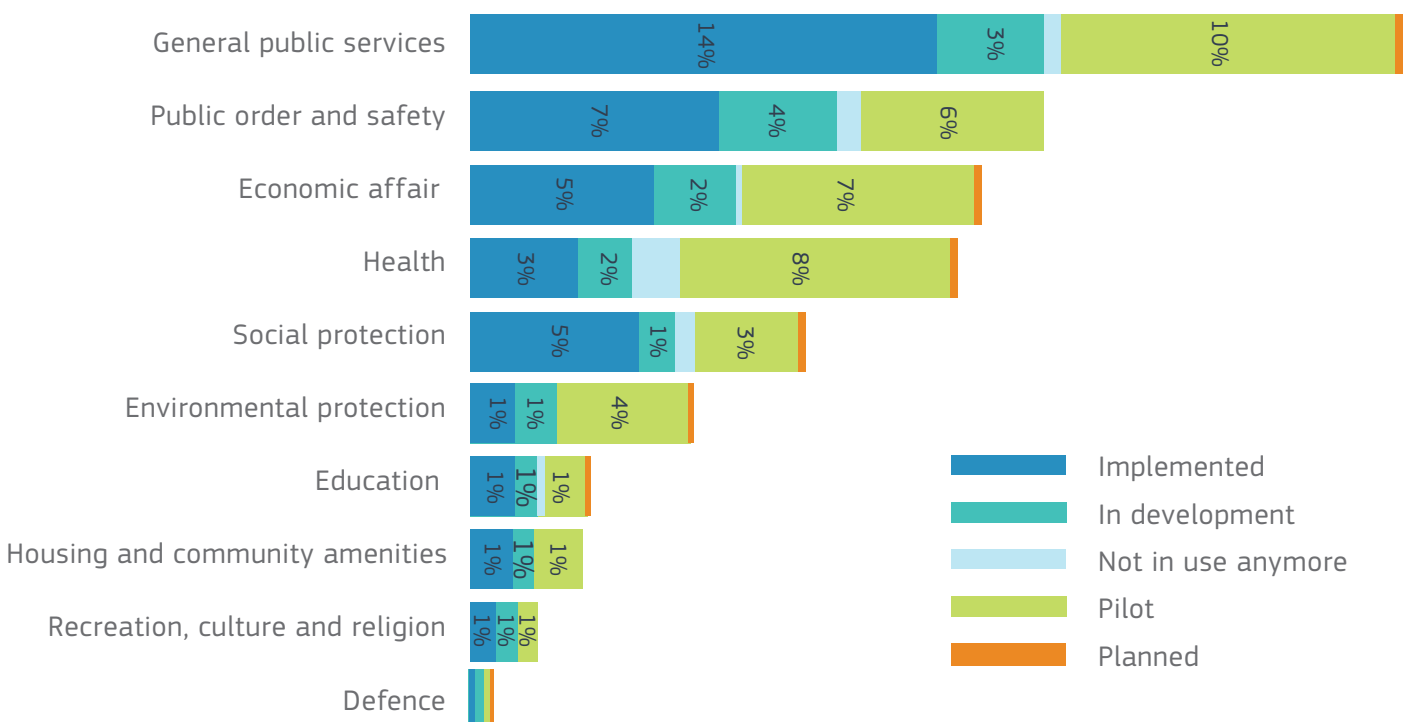
Most of the use cases of AI collected are **either pilots or implemented solutions (40% each)**. Upon examination of the available data depicted in Figure 8, the proportion of pilot projects has increased by 10 percentage points since the 2022 publication, indicating a growing trend among public administrations to fund projects and consortia exploring novel applications of AI technologies in the public sector.

The correlation between the classification of the primary functions of government and the development status of AI applications highlights some significant trends, more specifically, **most government functions have successfully implemented AI solutions**, while pilot programs represent the second most common category, followed by initiatives that are currently in development. This distribution suggests that **AI is beyond the nascent stage in terms of its technological evolution and integration into public administration**. Nevertheless, there remains a significant need to solidify the gains from extensive piloting and ongoing developmental efforts. It is particularly notable that the sectors

of Economic Affairs and Public Order and Safety exhibit a higher number of cases, signalling a more advanced level of AI maturity within these areas. Planned AI initiatives account for only a small fraction of our repository, a statistic that warrants further investigation to ascertain whether it reflects a deceleration in the AI adoption curve, or a phase of industry consolidation characterised by fewer announcements and more tangible, effective deployments within actual government operations.

The prevalence of pilot programs is a positive indication. Even in cases where pilots have concluded without transitioning to permanent application, they have provided valuable insights and data that can inform future research and development. However, due to a lack of specific information, we cannot conclusively determine the impact of these pilots. Moving forward, it is imperative to continue to monitor these trends to ensure that AI adoption is both effective and aligned with the evolving needs of public administration.

Figure 8. AI use cases: COFOG Primary sector vs Status.



Source: PSTW Observatory

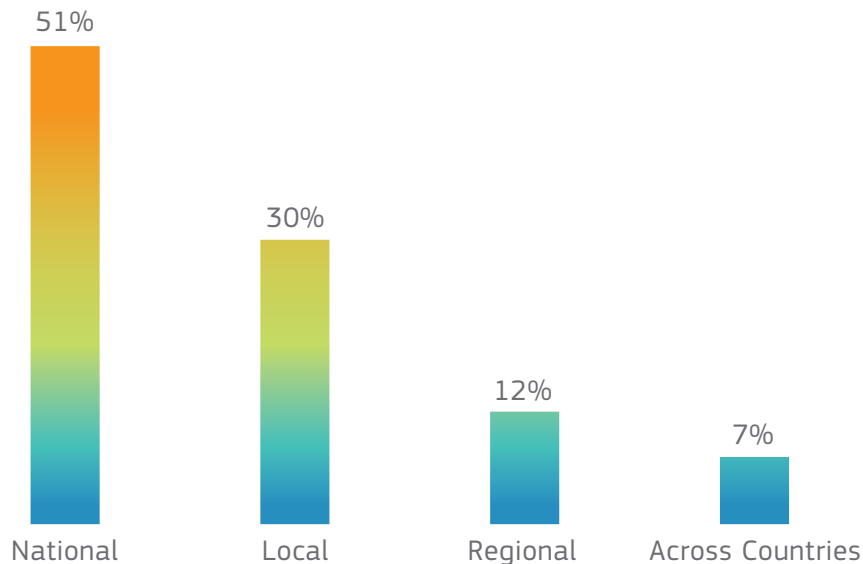
3.2.3 Administration levels

The categorisation of Artificial Intelligence cases by administrative level sheds light on their geographical distribution and serves as an indirect measure of resource allocation to AI initiatives within different levels of government. As depicted in Figure 9, the breakdown of AI use cases at various administrative strata reveals that **national governments** lead in AI deployment, accounting for **51%** of the documented instances. **Local authorities** are also significant contributors, with **30%** of AI applications, followed by **regional governments** at **12%**.

International partnerships and initiatives at the **across countries** scale constitute 7% of the collective efforts gathered, highlighting a relevant role of AI to contribute to the enhancing interoperable and cross-border functions.

This distribution suggests that national administrations are likely better equipped, in terms of resources, to finance and execute AI projects. The observed pattern underscores the need for continued support and investment in AI at all levels of government to ensure the equitable development and benefits of this transformative technology.

Figure 9. AI use cases according to their Administration Level.



Source: PSTW Observatory

Moreover, similarly to the primary sectors classification, the PSTW cases viewer allows to filter the data according to the selection of a administration level value. For example, Figure 10 shows the results filtering the data for the Local Administration category. In this category, the case viewer displays the different statistics for the Local Administration cases found. Economic

affairs, General Public Services and Safety are the most relevant functions of government (also referred as primary sector) involved. It is also visible that most of the cases are implemented, highlighting that the collected AI use cases at the local administration level are very oriented in effective implementation and slightly less on experimenting solutions with piloting.

Figure 10. AI use cases filtering the Local Administration level.



Source: PSTW Observatory

3.2.4 AI technology subdomains

This section analyses the use cases according to their AI technology subdomains, showing how the European public sector is exploring all the different AI-powered solutions. During the data collection and categorisation process, each use case was matched with multiple subdomains. Figure 11 depicts the distribution of use cases considering only the two main subdomains. Practically, one use case can be categorised both as Natural Language Processing (NLP) and Machine Learning at the same time, because both technologies are used in the solution.

Machine learning (ML) technologies account for the highest percentage of use cases (**55% of use cases**), followed by **NLP (24%)**, **Automated reasoning (23%)** and **Computer vision (23%)**.

ML is increasingly favoured as a solution across various industries due to its ability to analyse large volumes of data, identify patterns, and make predictions or decisions without explicit programming. This technology has the potential to automate repetitive tasks, improve efficiency, and free up human resources to focus on more complex and strategic activities. Additionally, machine learning algorithms can continuously learn and adapt from new data, making them a powerful tool for addressing dynamic and evolving challenges in the modern business landscape.

The use cases within the PSTW repository that employ ML techniques encompass anomaly detection, automatic classification of written texts (e.g., incoming emails, documents, etc.), data analytics platforms, sentiment analysis systems, and probabilistic models to aid decision-making, among others. In general, repetitive tasks can be streamlined using ML algorithms and deep

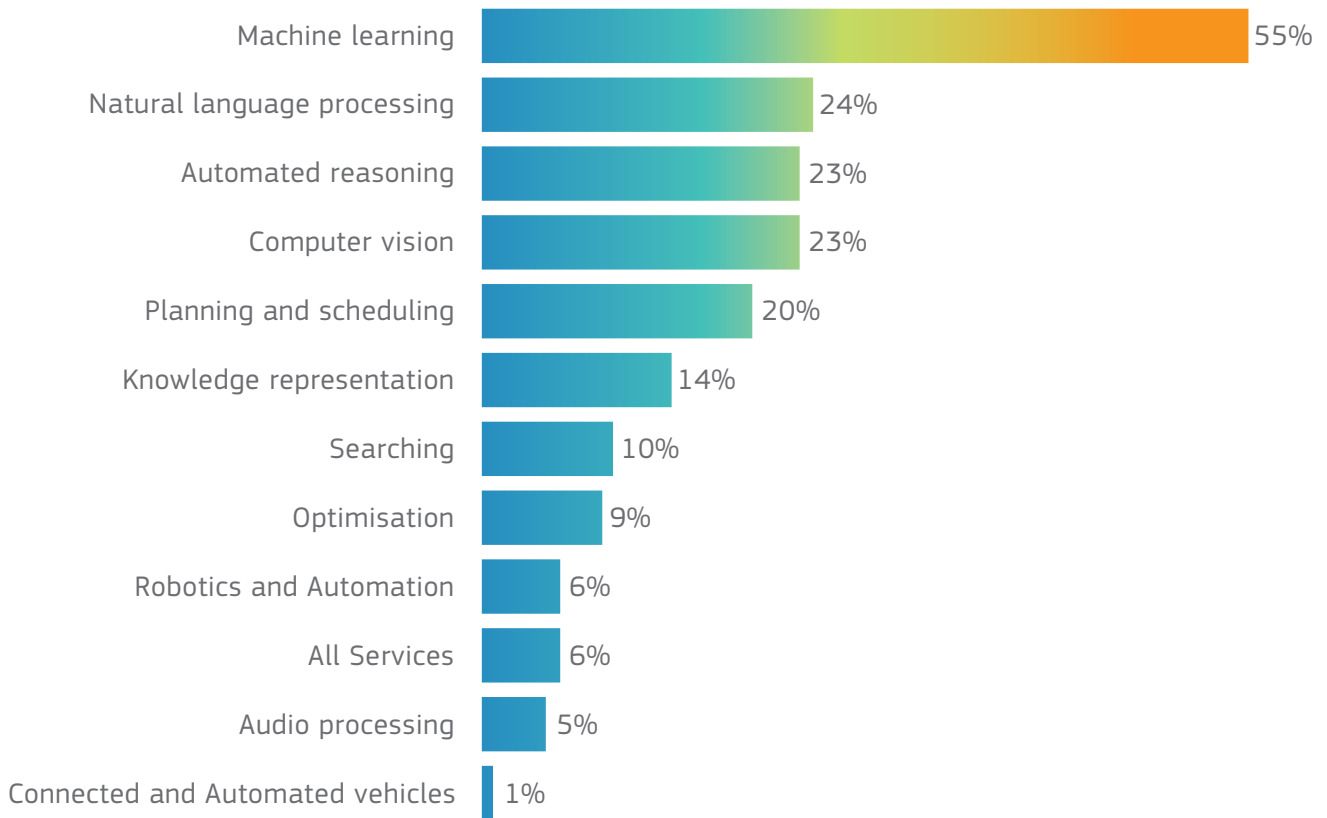
learning models are falling inside this category.

Automated reasoning techniques and ML share similarities in their approach to interpreting data for decision-making support systems. Both methodologies involve the use of algorithms to process and analyse data, enabling the systems to make informed decisions or recommendations based on the information available. However, while machine learning focuses on pattern recognition and predictive modelling, automated reasoning techniques emphasise logical inference and rule-based reasoning, providing complementary approaches to leveraging data for decision support.

Computer vision and **Natural Language Processing (NLP)** produce significant impacts on public sector services. Computer vision encompasses applications that utilise video and image scans to monitor social phenomena (e.g., predictive policing, car traffic etc.), with extensions into the healthcare sector (e.g., cancer recognition and monitoring through scanning and disease-detecting algorithms). NLP finds its niche in chatbots and virtual assistants for citizens, where understanding and interpreting human language and responding intelligibly are essential.

It is worth emphasising that ML is often intertwined with computer vision and NLP to support image, text, and audio processing, depending on the technological solution. In line with previous reports, algorithms remain the overwhelmingly preferred and most suitable solution in the European public sector today.

Figure 11. AI use cases distribution according to AI technology subdomains.



Source: PSTW Observatory

Note. Each case can be categorised with multiple AI subdomains; for this reason, the sum is above 100%.

Furthermore, after the four main categories, **Planning and scheduling (20%)** and **Knowledge representation (14%)** follow.

Planning and scheduling applications also incorporate intelligent automation, enabling the automatic execution of activities and decision-making processes. These management tools are specifically employed for tasks such as tax administration, budgetary planning, workforce management, and resource allocation. Overall, data-driven algorithmic solutions constitute the most prevalent applications of AI in the European public sector.

Knowledge representation finds application in conjunction with other technologies, primarily to structure data and make it available in a machine-readable format for executing selected algorithms, thus improving digital systems' efficiency and intelligence. This constructive interaction is crucial for advancing data-driven decision-making and automated solutions across sectors.

3.2.5 Process and application type

The Public Sector Technology Watch also provides valuable insights into the governance processes that AI solutions are designed to enhance within the public sector.

The most common process type (Figure 12) of AI solutions is in the realm of **Public services and engagement**, accounting for **31%** of all use cases. While this figure appears lower than the 36% recorded in 2022, this is primarily due to changes in the categorisation of cases during the update process and the growing increase of applications of analysis, monitoring, and research. Within the public services and engagement domain, service personalisation emerged as the most prevalent application, accounting for **18%**, a 5-percentage points increase from 2022. This also marks the highest application type across the entire repository. Engagement management (5%), service integration (6%), data sharing management (1%) represent less prevalent applications.

Enforcement, accounting for **26%**, constitutes the second largest application area. Smart recognition processes (9%), supporting inspection processes (8%), and predictive enforcement processes (7%) are the most relevant applications within this domain. These categories, despite their minor differences, encompass all those use cases in the

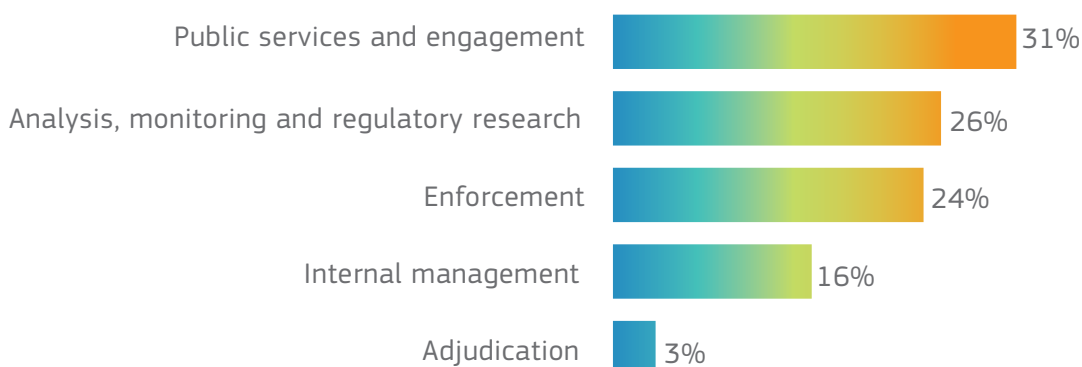
public order and safety function of governments where AI technologies are employed to inspect and monitor law abidance in various areas (e.g., customs, road safety, crime, etc.).

The third most prominent process area is **Analysis, monitoring, and regulatory research**, with a share of **26%**. Information analysis processes (12%) and prediction and planning (9%) are leading this category, followed by monitoring policy implementation (3%) and innovating public policy (1%).

Internal management, with a share of **16%**, holds the fourth position. This area is primarily focused on applications that enhance internal primary (9%) and support (6%) processes, among other applications. It encompasses initiatives aimed at improving the efficiency of administrations and their internal management, such as solutions that classify bureaucratic text for clerks.

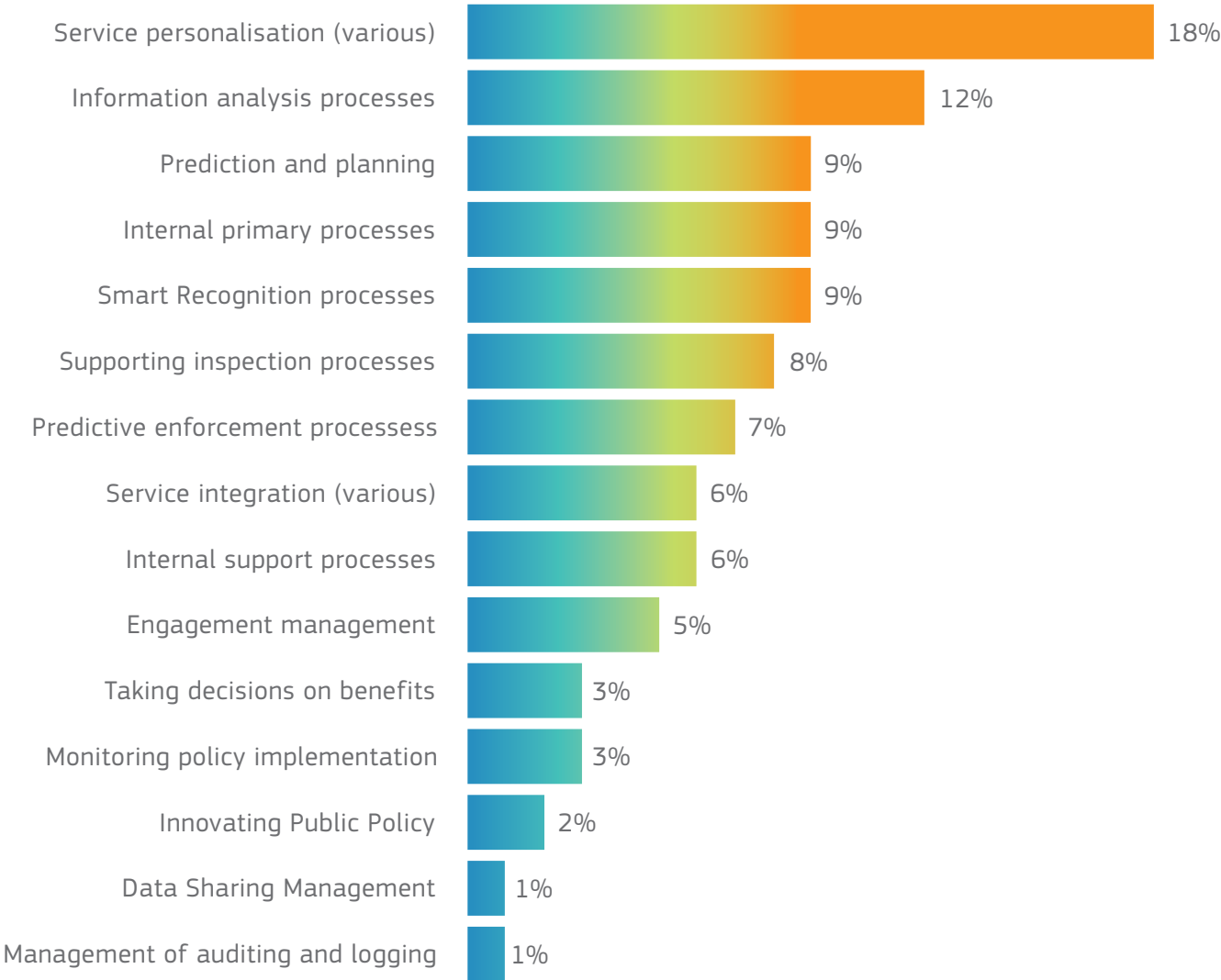
Adjudication with the **3%** remains the least significant application area in terms of AI use cases, but there is a slight uptick in solutions assisting benefit decisions. However, this kind of process is much more critical than others like the history about AI-based algorithms are employed to automate welfare benefits adjudication has taught.

Figure 12. AI use cases distribution according to Process and Application Type.



Source: PSTW Observatory

Figure 12. AI use cases distribution according to Process and Application Type.



Source: PSTW Observatory

4 Blockchain's adoption in the Public Sector





4.1 Context and introduction

As of the time of authoring this report, the PSTW's repository for blockchain includes 183 use cases. It is important to note that while the number of use cases is lower than AI, this is due to blockchain technology being in its initial stages, resulting in fewer potential applications in the public sector compared to AI.



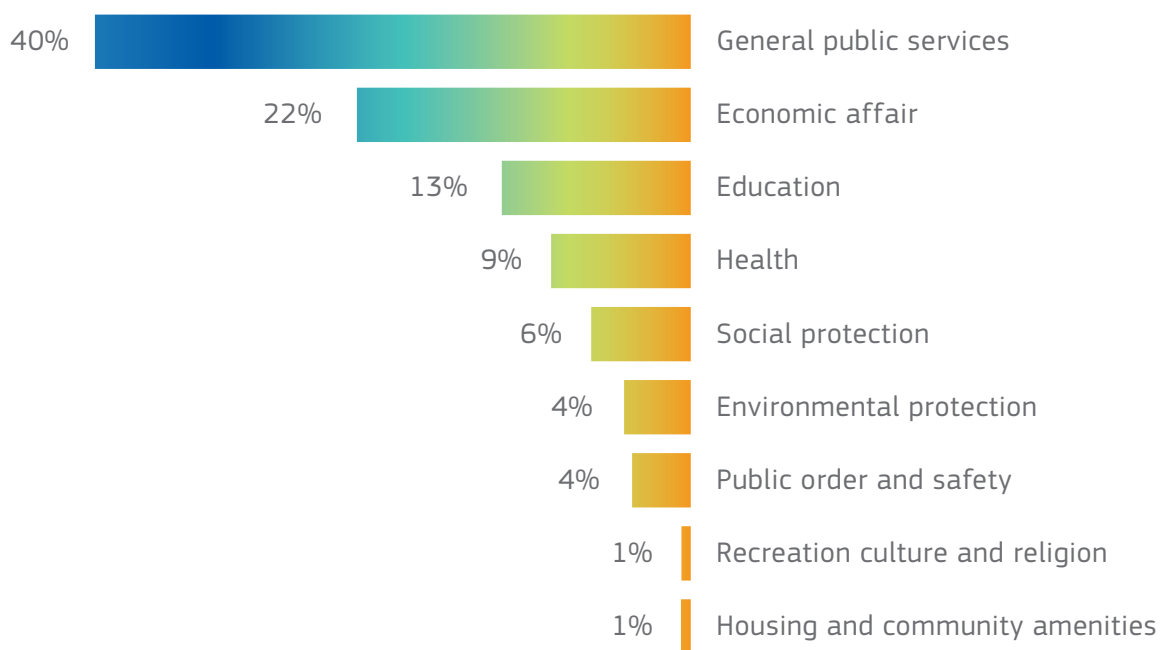
4.2 Illustrative insights

4.2.1 Primary sectors (COFOG classification)

One of the key aspects is identifying the main sectors of public administration where blockchain-based services are developed and tested. For this purpose, the PSTW observatory uses the COFOG classification. Figure 13 shows the distribution of cases. The majority of blockchain's documented use cases fall under the category of **General Public Services (40%)**, followed by **Economic Affairs (22%)**, **Education (13%)**, and **Health**

(9%). **Social Protection** and **Environmental Protection** use cases represent **6%** and **4%** of the repository, respectively. Public order and safety, recreation, culture, and religion, and Housing and community amenities account for a small portion of use cases (less than **6%** combined). Defence use cases were not yet recorded, likely due to the scarcity of publicly available information arising from security and safety concerns.

Figure 13. Blockchain use cases distribution according to Functions of Government.



Source: PSTW Observatory

Moreover, PSTW cases viewer allows to filter the data according to different criteria. Figure 14 shows the results filtering the blockchain-based cases for the category of General Public Services.

Figure 14. Blockchain use cases filtering General Public Services.



Source: PSTW Observatory

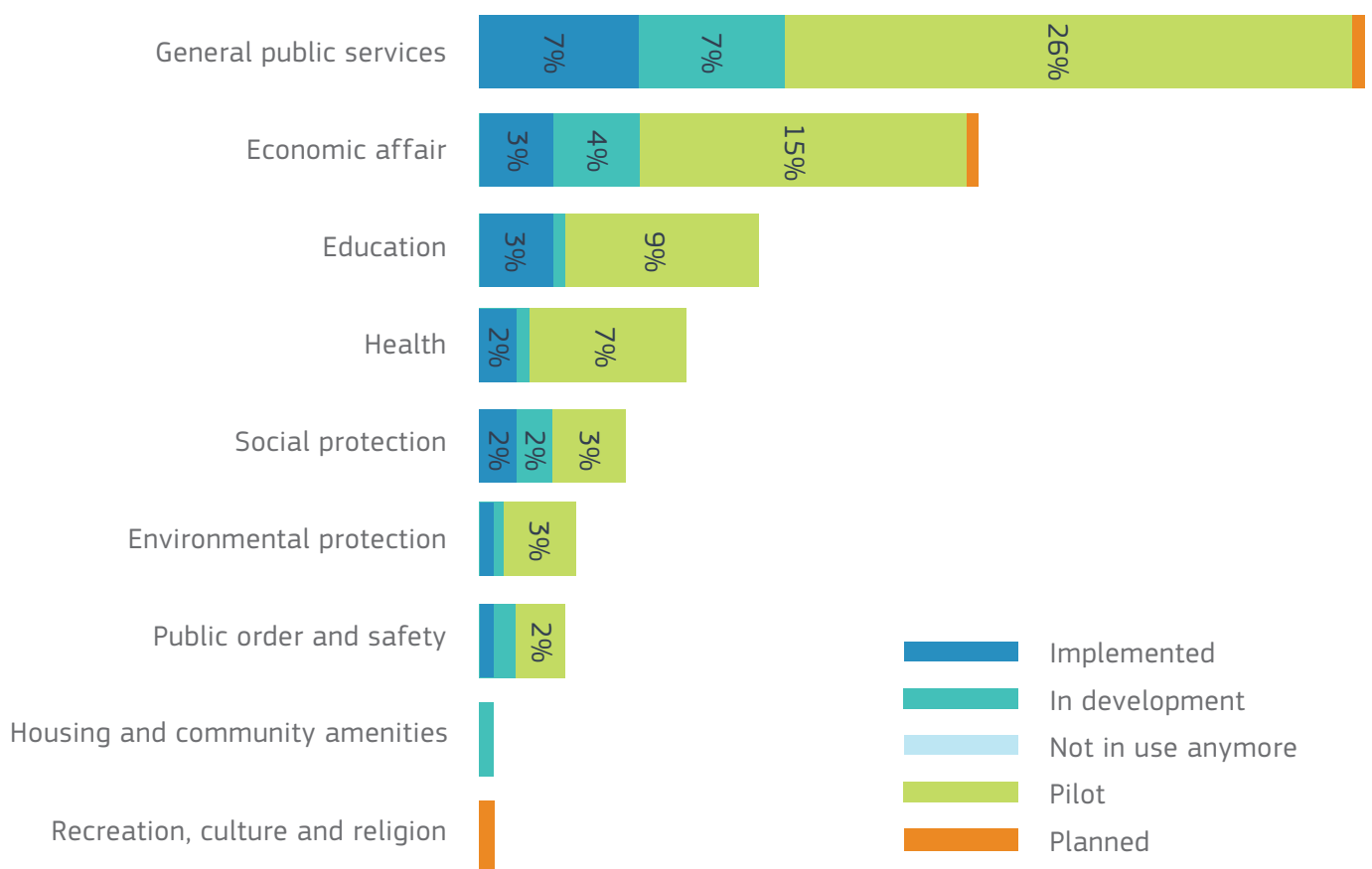
The cases viewer (Figure 14) allows users to check, more in detail, information about the filtered cases. In this case, General public services category includes use cases involving decentralised digital IDs for e-government service access, governance and voting systems, and certification and validation. The latter application is also prevalent in university networks to facilitate the cross-border certification and validation of degrees, and this also explains why education is the third biggest function of keyless signature in the PSTW blockchain cases.

4.2.2 Primary sector Vs Status of implementation

In this analysis, the public administration main sectors (COFOG) are crossed with the development status of the cases. Figure 15 presents the distribution of cases according to their primary sector (COFOG) crossed with their development status. Most of the cases, in all the sectors, are pilots, while only few of them are **already implemented** within administrations, this indicates that blockchain is still in its early stages in technology development and adoption. It is remarkable that the case of the Education sector has proportionally a higher quantity of implemented cases compared to other sectors.

This indicates a considerable level of maturity of the academic credentials use cases compared to other blockchain-based use cases in the public administration. Moreover, fewer cases are still in a **development** phase, meaning that they might not be at the testing or piloting phase yet. The cases that are **planned** or **not in use** anymore are a minority of the repository. The reasons for this are that pilots that ended are not necessarily in use anymore, but they offered findings and results to guide further research, but there is no available information to determine this.

Figure 15. Blockchain use cases: COFOG Primary sector vs Status.



Source: PSTW Observatory

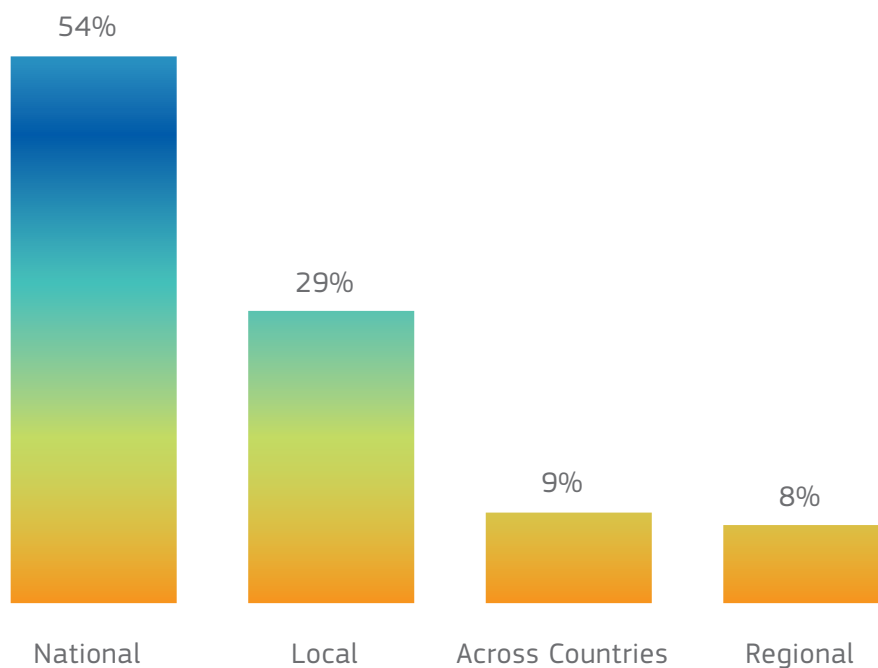
4.2.3 Administration levels

The administrative level classification of blockchain-based use cases indicates its geographical extent. This serves as a proxy variable to understand which administrations are dedicating more resources to blockchain adoption within the public sector.

Figure 16 shows the distribution of the collected cases across local, regional, national and across countries level. **National administrations** are the most prominent players, with **54%** of the use cases being implemented at the national

level. **Local administrations** follow closely behind (**29%**), while cases **across countries** account for **9%** of the total. The cases that are across countries exceeds the same result for the AI use cases, highlighting the greater inclination of blockchain solutions to be employed for interoperability and cross-border processes. **Regional administrations** remain relatively minor, with **8%** of the cases. Overall, national administrations appear to possess more substantial resources for funding or implementing blockchain solutions or projects.

Figure 16. Blockchain use cases according to its Administration Level.



Source: PSTW Observatory

Moreover, similarly to the primary sectors classification, the PSTW cases viewer allows to filter the data according to the selection of a concrete administration level. For example, Figure 17 shows the results filtering the data for the category of Local Administration. In this category, the case viewer displays the different statistics for these 53 cases found.

Figure 17. Blockchain use cases filtering the Local Administration Level.



Source: PSTW Observatory

5 Recommendations and conclusions



The urgent need to deliver better public services has been the driver for making digital transformation a priority for public organisations. At the same time, novel approaches delivering services in the private sector has raised citizens' expectations regarding the delivery of public services (OECD, 2017). Digital technologies evolve quickly, posing an in-depth transformation of the public sector. For the successful adoption of the emerging digital technologies in everyday operations, public administrations must address several challenges, e.g., technological or organisational, adding complexity to the adoption process.

In this context, the better understanding of where the public administration stands regarding the adoption of emerging technologies is becoming a crucial factor for a smooth and successful transition towards an enhanced public service delivery. In this respect, monitoring the digital transformation has many benefits. It **increases the awareness** regarding the potentials of emerging technologies along with the experimentation and implementation of innovative solutions. In addition, the **empirical evidence** created helps to better understand the different **challenges and the suitability** of emerging technologies to solve real problems of public administration. PSTW is the observatory that was developed as an answer to these needs, with **the objective of monitoring, analysing, and disseminating the use of emerging technologies** within the public sector in Europe and make an effort to build a community that contributes to facilitate the implementation of innovative public services in Europe.

RECOMMENDATION

It would be highly beneficial that Member States, public administrations, private companies, and users **promote awareness** regarding the potential positive impact of emerging technologies in the public sector. Simultaneously, it is necessary to acknowledge the complexity and associated risks linked to their implementation. This emphasis is crucial for fostering individual, organisational, and cultural changes necessary to ensure the effective implementation of these technologies.

Based on this, PSTW will contribute by continuously generating knowledge and disseminating it through open events and various channels to support Member States in their efforts. However, raising awareness requires collaboration with research and academia to create knowledge. It also requires the support by MSs, national governments, and institutions in spreading the knowledge within their respective countries.

The extensive and updated case collection of PSTW allows an in-depth analysis of the actual situation. For example, choosing the status of the application of a technology in a particular field, allows extracting different cases easily and offering the possibility to focus on a particular case for a more qualitative analysis. In this respect, it would be beneficial for public administrations **to be aware of the benefits of better understanding the actual landscape and closely monitor its evolution by promoting the collection and analysis of use cases.**

PSTW will continue its efforts to collect cases

RECOMMENDATION

It would be highly beneficial that Member States, public administrations, private companies, and users continue **sharing practices and experiences**, considering the European level as the optimal place for learning from each other's success stories and failures. This collaborative approach is essential to ensure a cross-border, trustworthy and effective use of emerging technologies for enhancing public services.

and practices and disseminate them through the cases viewer and database, the news and events and the stories published. We recognise the crucial importance of this assessment in understanding the ongoing developments and the utilisation of these technologies. Furthermore, we have noted the recommendable practice of certain Member States and neighbouring countries, such as the Netherlands^{87 88} or Norway⁸⁹, in conducting a systematic oversight of the AI implemented solutions in their respective countries. We strongly encourage other MSs to adopt this practice, as it can be highly beneficial for the entire European landscape. PSTW is also providing the opportunity to share individual projects or solutions through **the self-reporting tool, an essential instrument to uphold the good practice of learning and sharing experiences.**

Furthermore, one of the objectives of the PSTW is to expand the collection of use cases to include emerging technologies, such as virtual worlds. This expansion will allow for a more comprehensive understanding of the potential applications and implications of these technologies within every governmental sector. It is also essential for anticipating future trends, risks, and challenges, in order to be prepared for the potentialities and threats that technological advancement will bring to the public sector in the future.

For the delivery of better public services, the European Public Sector will need to act even more with unified intentions and approaches, so that citizens can access to public services in seamless experiences based on their wants and needs. This can begin by creating European communities, in which MSs, but also private companies and European citizens can regularly meet, discuss and share difficulties and experiences.

PSTW will continue building a community around AI and emerging technologies in the public sector

RECOMMENDATION

It would be highly beneficial that Member States, public administrations, private companies, and users engage in **community building at European level**, by discussing and co-creating possible solutions and developing synergies among the different national and European initiatives for delivering better public services.

87 <https://nlaic.com/en/use-cases/>

88 Dutch Data Protection Authority: <https://www.autoriteitpersoonsgegevens.nl/en/documents/ai-algorithmic-risks-report-netherlands-winter-2023-2024>

89 <https://data.norge.no/kunstig-intelligens>

90 To do it, the first basic step is to join the collection, in order to stay updated and involved in all the initiatives.

and organising webinars and workshops for discussions and for sharing good practices, ideas, and solutions. Additionally, intermediate results will be shared for discussion, feedback, and co-writing of recommendations. Therefore, the support by the Member States is crucial to ensure the growth of the PSTW community, encouraging more individuals to contribute and share their experiences and ideas⁹⁰.

PSTW has established synergies with other related projects and communities, such as GovTech Connect or the Public Buyer community. Collaboration with relevant initiatives strengthens the GovTech ecosystem, brings together all relevant stakeholders and enlarges the community, achieving better sharing of ideas and experience. In addition, these synergies include the Member States, being invited to express their needs, expanding the discussion beyond the national level to a European context.

The community's efforts aim at encouraging the adoption of existing solutions rather than starting from scratch and developing solutions that might have already been there. In this regard, PSTW promotes the sharing of concrete and non-anonymous practices to foster connections between public administrations in different countries. The self-reporting tool remains a crucial instrument to facilitate the knowledge and potential reuse of solutions. Additionally, the observatory is also addressed to the private sector, particularly the GovTech sector. It aims to demonstrate that the public sector is a viable market for innovative solutions by offering insights into prevailing technological trends in public sector innovation, thereby fostering further advancements. To achieve this, the observatory publishes all collected data as open

data, encouraging its use by a broad audience and promoting collaboration and knowledge creation by academia or any other stakeholder. Furthermore, all PSTW events are open to private companies, specifically GovTech, to allow them to understand public sector needs, express their needs, and create a European network.

The public sector in Europe is undergoing a significant digital transformation aimed at delivering improved public services. The current report provides information on the vision of the PSTW, the current activities and functionalities, and the data available, collected, and analysed on the observatory website.

First, PSTW addresses a simple yet crucial question: What is happening across Europe concerning the use of emerging technologies in the public sector? To answer this question, it gathers cases from across Europe, offering insights into prevailing trends in public sector innovation. This serves as a valuable resource for evidence-based policymaking and aims to raise awareness within public administrations about the potential of emerging technologies.

Moreover, PSTW goes beyond merely collecting and sharing data; it has been designed with a broader vision of becoming a knowledge hub and a virtual space where different actors can meet, discuss, and learn from each other. As a new initiative, the success of PSTW hinges significantly on the reaction and involvement of Member States, public administrations, civil society, academia, GovTech companies, and the private sector in general.

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